June 2023

BEACON WIND PROJECT:
Beacon Wind 1 and Beacon Wind 2

CONSTRUCTION AND OPERATIONS PLAN

VOLUME 2E: Social Resources

Prepared for

Beacon Wind LLC

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Bureau of Ocean Energy Management

Prepared by

AECOM

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8.0 Human Resources and the Built Environment

This section describes the socioeconomic resources, including population, employment, and other aspects of the economy, housing, land use and zoning, recreation and tourism, and environmental justice (EJ) relevant to the development of the Project. Potential impacts to socioeconomic resources resulting from construction, operations, and decommissioning of the Project are discussed. Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Beacon Wind expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards that Beacon Wind will comply with in using the facilities. Proposed Project-specific measures adopted by Beacon Wind are also described; these measures are intended to avoid, minimize, and/or mitigate potential impacts to socioeconomic resources.

Other socioeconomic-related uses discussed in separate sections include:

- Historic Properties (**Section 6.3**); and
- Visual Resources (**Section 7.0**).

Beacon Wind proposes to develop the entire Lease Area with up to two individual wind farms for BW1 and BW2, with a submarine export cable route for BW1 to Queens, New York and a submarine export cable route for BW2 to either Queens, New York or to Waterford, Connecticut. Two locations are under consideration in Queens, New York (NYPA and AGRE [which includes the AGRE East and AGRE West sites]) for the single proposed BW1 landfall and onshore facility. The Queens, New York onshore substation facility sites that are not used (NYPA, AGRE East, or AGRE West) for BW1 will remain under consideration, in addition to the Waterford, Connecticut site, for the single proposed BW2 onshore substation facility.

8.1 Population, Economy, Employment, and Housing and Property Values

This section describes the population, economy, employment conditions, and housing and property values observed in the Project Area. Potential impacts to population, economy, employment conditions, and housing and property values resulting from construction, operations, and decommissioning of the Project are discussed. Proposed Project-specific measures adopted by Beacon Wind are also described; these measures are intended to avoid, minimize, and/or mitigate potential impacts to these socioeconomic resources.

Other resources and assessments detailed within this COP that are related to population, economy, employment conditions, and housing and property values include:

- Visual Resources (**Section 7.0**);
- Land Use and Zoning (**Section 8.2**);
- Recreation and Tourism (**Section 8.3**);
- Commercial and Recreational Fishing (**Section 8.8**);
- Seascape, Landscape, and Visual Impact Assessment (**Appendix X**); and
- Socioeconomic Report (**Appendix GG**).

Data Relied Upon and Studies Completed

For the purposes of this section, the Study Area includes the municipalities that may be directly and/or indirectly impacted by the onshore components, including the onshore export and interconnection cable routes, the onshore substation facilities, and the staging and construction areas associated with the construction, operations, and decommissioning of the Project, as well as the municipalities from which Project structures may be visible (i.e., Martha's Vineyard, Nantucket, and portions of Barnstable County on Cape Cod) (see **Figure 8.1-1**).

This section relies upon data collected from the American Community Survey (ACS) and the Decennial Census through the U.S. Census Bureau. For neighborhood-level data in New York City, the analysis is based on ACS and Decennial Census data tabulated by the New York City Department of City Planning and included census data for the Sunset Park neighborhood of Brooklyn and the Steinway section of Astoria in Queens.

8.1.1 Affected Environment

The affected environment is defined as the municipalities that have the potential to be directly and/or indirectly affected by the construction, operations, and decommissioning of the Project. These include municipalities and/or neighborhoods in which the onshore Project components (e.g., the onshore export cables, interconnection cables, and the onshore substation facilities), ports, construction and staging areas, and operations and maintenance activities will be located, occur, or are potentially within the viewshed of Project structures (see **Figure 8.1-1**and **Table 8.1-1**). As detailed in **Section 8.1.2**, diverse literature supports the positive impacts that offshore wind energy projects have on the economy and employment conditions in affected communities.

The Study Area includes the neighborhoods surrounding the BW1 and BW2 landfall locations and onshore substation facilities in Queens, New York and Waterford, Connecticut, as well as the municipalities on Martha's Vineyard, Nantucket, and portions of Barnstable County on Cape Cod that are within the viewshed of the Project's wind turbines, and the neighborhoods surrounding the O&M Base at the SBMT, and the satellite O&M facility at the Port of New Bedford, Massachusetts. Although portions of the BW1 and BW2 submarine export cables cross through the Local Waterfront Revitalization Program (LWRP) boundaries for the Town of East Hampton and Town of Southold on the north shore of Long Island, Project activities associated with the submarine export cables construction, operation, and decommissioning are not expected to significantly impact population, economy, employment conditions, and housing and property values in these municipalities and they are not considered as part of the Study Area. See **Appendix A Coastal Zone Management Consistency Statements** for additional information regarding Project compliance with the State of New York's approved Coastal Management Program and with the applicable approved LWRPs.

As indicated in the Final Environmental Impact Statement (FEIS) for Vineyard Wind (BOEM 2021), the scenic quality of the coastal environment is important to the identity, visual attraction, and economic health of many shoreline communities; therefore, municipalities within the viewshed of the Project's wind turbines (i.e., Martha's Vineyard, Nantucket, and portions of Barnstable County) have been included in the Study Area. Coastal communities within the north shore of New York, Connecticut, and Rhode Island are discussed in **Section 8.3 Recreation and Tourism** relative to temporary impacts associated with the installation of the submarine export cables. These activities are not expected to significantly impact population, economy, employment conditions, and housing and property values and these municipalities are not considered as part of the Study Area evaluated in this section.

Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Beacon Wind expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards, which Beacon Wind will comply with in using the facilities.

TABLE 8.1-1. STATES, COUNTIES, AND TOWNS WITHIN THE STUDY AREA

State	County	Communities or Shoreline
Connecticut	New London	Town of Waterford
New York a/	Bronx	Southern shoreline including Hunts Point, Melrose, and Mott Haven
	Kings	Sunset Park b/
	New York	East Harlem, Roosevelt Island, Randall’s and Wards Islands
	Queens	Northern shoreline including the Steinway section of the Astoria neighborhood c/
Massachusetts	Barnstable	Shoreline
	Bristol	City of New Bedford d/
	Dukes	Martha’s Vineyard and Elizabeth Islands
	Nantucket	Nantucket Island

Notes:

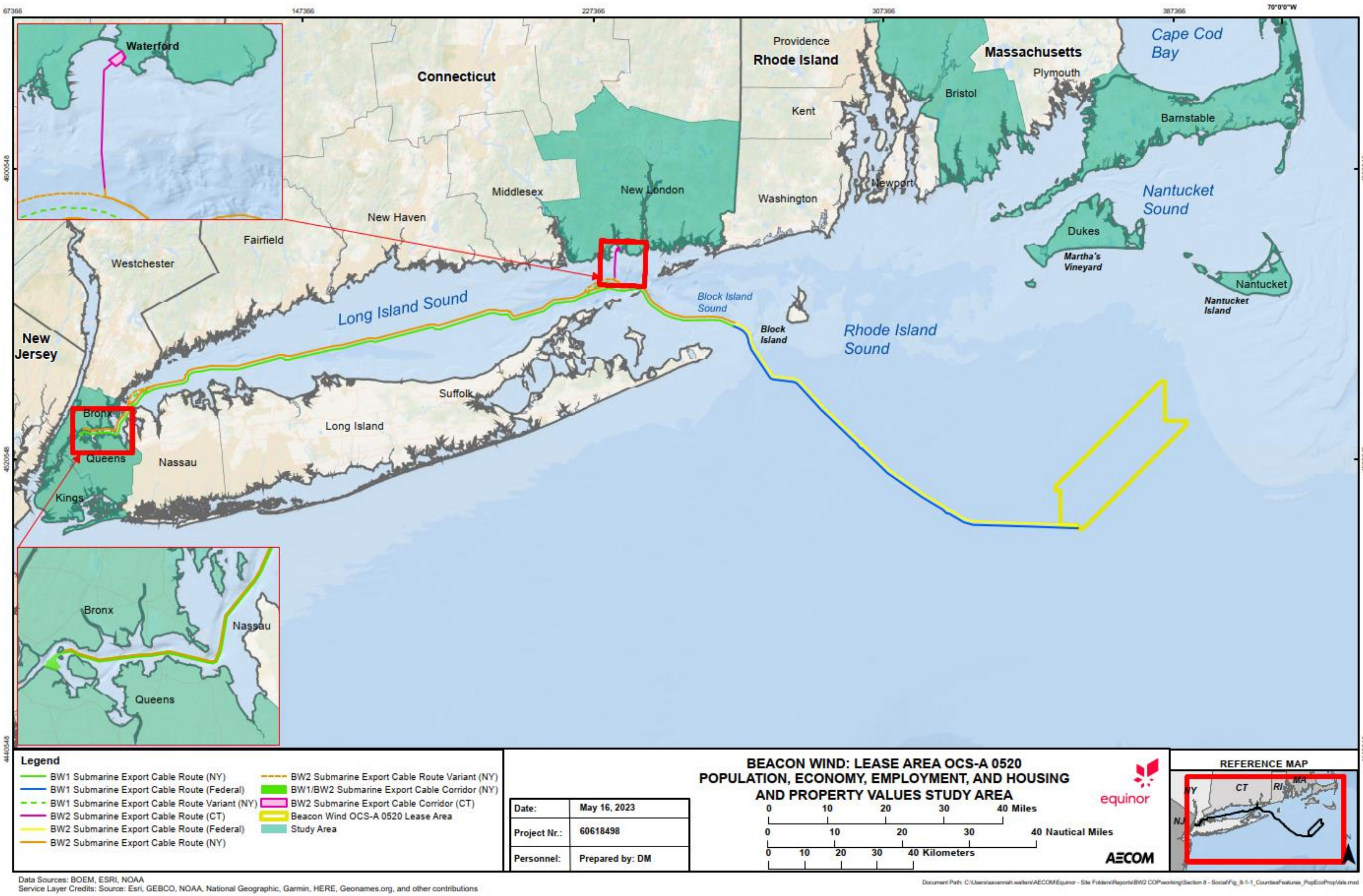
a/ Project activities comply with the Long Island Sound Coastal Management Program (LISCMP) and with the applicable approved LWRPs (see Appendix A Coastal Zone Management Consistency Statements for additional information). The LISCMP and the applicable LWRPs are part of the New York State Coastal Management Program and each has enforceable policies. Although portions of the BW1 and BW2 submarine export cables cross through the LWRP boundaries for the Town of East Hampton and Town of Southold, Project activities associated with the cable construction, operation, and decommissioning are not expected to significantly impact population, economy, employment conditions, and housing and property values in these municipalities. Therefore, these locations are not part of the Study Area and are not illustrated on Figure 8.1-1.

b/ The SBMT in Sunset Park is considered to be a Project staging area and an O&M Base. The O&M Base at the SBMT will be constructed to support both the Empire Wind project and the Beacon Wind project. As indicated in Section 3.5 Operations and Maintenance Activities, construction of the O&M Base is addressed within the Empire Wind permitting process; therefore, this location is not illustrated in Figure 8.1-1.

c/ The Astoria power complex in the Steinway section of Astoria in Queens, New York is considered to be the export cable landfall site for BW1 and is under consideration for BW2.

d/ The Port of New Bedford located in Bristol County may be used as a satellite O&M facility. O&M activities would be consistent with existing uses/facilities.

FIGURE 8.1-1. POPULATION, ECONOMY, EMPLOYMENT, AND HOUSING AND PROPERTY VALUES STUDY AREA



8.1.1.1 New York

Most onshore activity related to the Project will be in the State of New York. The Astoria power complex in the Steinway neighborhood of Astoria in Queens, New York is the location of a proposed landfall site for the export cables and onshore substation facilities. The South Brooklyn Marine Terminal (SBMT) in the Sunset Park neighborhood of Brooklyn (Kings County) is a Project staging area and will house the Project's O&M Base. Construction and permitting of the O&M Base at the SBMT will be completed as part of the Empire Wind project's timeline. Project activities associated with the submarine export cable construction, operation, and decommissioning are not expected to significantly impact population, economy, employment conditions, and housing and property values in counties along the coastal shore and they are not considered as part of the Study Area. See **Appendix A Coastal Zone Management Consistency Statements** for additional information regarding Project compliance with the State of New York's approved Coastal Management Program and with the applicable approved LWRPs. The areas in the state that may potentially be affected by infrastructure and/or activities related to Project are listed in **Table 8.1-2**.

TABLE 8.1-2. NEW YORK COUNTIES AND MUNICIPALITIES TO BE AFFECTED BY PROJECT INFRASTRUCTURE AND/OR ACTIVITIES

	Project Infrastructure					
County/ Municipality	Onshore Route	Onshore Substation Facilities	Staging/ Construction Facilities	O&M Base	Export Cables	Lease Area
Kings County			X	X a/		
Brooklyn			X	X a/		
Queens County	X	X	X		X	
Queens (Astoria)	X	X	X		X	

Note:
a/ The O&M Base at the SBMT will be constructed to support both the Empire Wind project and the Beacon Wind project. As indicated in Section 3.5 Operations and Maintenance Activities, construction of the O&M Base is addressed through the Empire Wind permitting process.

8.1.1.1.1 Population

The Steinway neighborhood of Astoria in Queens, New York was the only State of New York geography in the Study Area that experienced a population decline between 2000 and 2019, with a 10.0 percent loss of population (see **Table 8.1-3**). The median ages in the New York Study Area geographies ranged from 33.6 years (Sunset Park neighborhood) to 39.0 years (Queens County).

TABLE 8.1-3. NEW YORK POPULATION CHARACTERISTICS WITHIN THE STUDY AREA

County/ Municipality	Land Area (sq mi)	Decennial Census Population Count (2000)	Decennial Census Population Count (2010)	ACS Population Estimate (2019)	Population Density (persons per sq mi) (2019)	Population Change (2000-2019)	Median Age (2015-2019)
New York b/	47,126	18,976,457	19,378,102	19,453,561	413	0.4%	38.8
Kings County a/	71	2,465,326	2,504,700	2,559,903	36,055	2.2%	35.2
Sunset Park neighborhood of Brooklyn b/	1.8	52,312	54,041	54,667	30,371	4.5%	33.6
Queens County a/	109	2,229,379	2,230,722	2,253,858	20,678	1.0%	39.0
Steinway section of Astoria b/	2.1	53,604	47,534	48,235	22,969	-10.0%	36.3

Sources:
a/ U.S. Census Bureau 2000, U.S. Census Bureau 2019a, U.S. Census Bureau 2019b.
b/ NYC Planning 2021.

8.1.1.1.2 Economic and Employment Conditions

The most popular industry category of employment in each municipality in the Study Area within the State of New York was Educational Services, and Health Care, and Social Assistance (see **Table 8.1-4**). The counties and neighborhoods in New York City also had residents employed in a tourism-dependent sector, Arts, Entertainment, and Recreation, and Accommodation and Food Services. Median household incomes ranged from $53,360 in the Sunset Park neighborhood to $74,388 in the Steinway section of Astoria in Queens, New York.

TABLE 8.1-4. EXISTING NEW YORK ECONOMIC CONDITIONS IN THE STUDY AREA

County/ Municipality	Per Capita Income	Median Household Income	Civilian Labor Force	Unemployment Rate	Top 3 Industries a/
New York b/	**$39,326**	**$68,486**	**10,045,829**	**5.5%**	**E, P, R**
Kings County b/	$34,173	$60,231	1,292,871	6.2%	E, P, A
Sunset Park neighborhood of Brooklyn c/	$24,266	$53,360	27,929	4.7%	E, A, P
Queens County b/	$31,930	$68,666	1,184,562	5.6%	E, A, P
Steinway section of Astoria b/	$40,450	$74,388	29,483	4.5%	E, P, A

Note:

a/ E = Educational Services, and Health Care and Social Assistance; R = Retail Trade; P = Professional, Scientific, and Management, and Administrative and Waste Management Services; A = Arts, Entertainment, and Recreation, and Accommodation and Food Services

Sources:

b/ U.S. Census Bureau 2019a, U.S. Census Bureau 2019b.

c/ NYC Planning 2021.

8.1.1.1.3 Housing and Property Values

Combined, the counties in the Study Area that are located within New York City made up approximately 23 percent of the housing in the State of New York overall (see **Table 8.1-5**). Median home values in owner-occupied units in the counties and neighborhoods located in New York City had much higher values than the rest of the state. Rents were also higher in New York City than in the rest of the state.

TABLE 8.1-5. NEW YORK HOUSING STATISTICS IN THE STUDY AREA

County/ Municipality	Total Housing Units	2015-2019 Housing Vacancy Rate	Median Value of Owner-Occupied Units	Median Rent
New York b/	**8,404,381**	**11.8%**	**$313,700**	**$1,280**
Kings County b/	1,065,399	8.2%	$706,000	$1,426
Sunset Park neighborhood of Brooklyn a/	17,624	5.9%	$804,021	$1,467
Queens County b/	869,400	9.4%	$543,800	$1,583
Steinway section of Astoria a/	22,413	12.8%	$784,227	$1,722

Sources:

a/ NYC Planning 2021.

b/ U.S. Census Bureau 2019a.

8.1.1.2 Connecticut

The Project is considering a landfall location in Waterford, Connecticut in addition to the Queens, New York landfall location. Waterford is in New London County along the coastal shore in southeastern Connecticut. Project activities associated with the submarine export cable construction, operation, and decommissioning are not expected to significantly impact population, economy, employment conditions, and housing and property values in other counties along the coastal shore and they are not considered as part of the Study Area. The areas of Connecticut that may potentially be affected by infrastructure and/or activities related to the Project are defined in **Table 8.1-6**.

TABLE 8.1-6. CONNECTICUT COUNTIES AND MUNICIPALITIES TO BE AFFECTED BY PROJECT INFRASTRUCTURE AND/OR ACTIVITIES

	Project Infrastructure				
County/ Municipality	Onshore Route	Onshore Substation	Staging/ Construction Facilities	O&M Facilities	Export Cable
New London County	X	X	X		X
Town of Waterford	X	X	X		X

8.1.1.2.1 Population

The population of New London County declined between 2010 and 2019 and has a lower population density than the state as whole (see **Table 8.1-7**). The town of Waterford, Connecticut had an older median age (48.4) than the rest of New London County and the State as a whole.

TABLE 8.1-7. CONNECTICUT POPULATION CHARACTERISTICS WITHIN THE STUDY AREA

County/ Municipality	Land Area (sq mi)	Decennial Census Population Count (2000)	Decennial Census Population Count (2010)	ACS Population Estimate (2019)	Population Density (persons per sq mi) (2019)	Population Change (2000-2019)	Median Age (2015-2019)
Connecticut	**4,842**	**3,405,565**	**3,574,097**	**3,565,287**	**736**	**-0.2%**	**41.0**
New London County	665	259,088	274,055	265,206	399	-3.2%	41.4
Town of Waterford	33	19,152	19,517	18,746	568	-4%	48.4

Sources:
U.S. Census Bureau QuickFacts 2020; U.S. Census Bureau American Community Survey 2019; U.S. Census Bureau 2015-2019 American Community Survey 5-Year Estimates; U.S. Census Bureau 2000.

8.1.1.2.2 Economic and Employment Conditions

New London County has a lower median household income than the state as whole, however the town of Waterford, Connecticut has a significantly higher median income than the county as a whole. Additionally, unemployment rates in the town of Waterford and New London County are lower than the State at 5.2 percent and 5.9 percent respectively. See **Table 8.1-8** for a more detailed breakdown.

TABLE 8.1-8. EXISTING CONNECTICUT ECONOMIC AND EMPLOYMENT CONDITIONS IN THE STUDY AREA

County/ Municipality	Per Capita Income	Median Household Income	Civilian Labor Force	Unemployment Rate	Top 3 Industries a/
Connecticut	**$44,496**	**$78,444**	**1,932,092**	**6.0%**	**E, P, R**
New London County	$39,426	$73,490	141,204	5.9%	E, A, M
Town of Waterford	$44,280	$90,893	10,622	5.2%	E, M, A

Note:

a/ E = Educational Services, and health care and social assistance; R = Retail trade; M = Manufacturing; P = Professional, scientific, and management, and administrative and waste management services; A = Arts, entertainment, and recreation, and accommodation and food services

Sources:

U.S. Census Bureau QuickFacts 2020; U.S. Census American Community Survey 2019; U.S. Census 2015-2019 American Community Survey 5-Year Estimates.

8.1.1.2.3 Housing Conditions

Median home values in Waterford, Connecticut were greater than the median in New London County but less than the State median. See **Table 8.1-9** below for additional detail.

TABLE 8.1-9. CONNECTICUT HOUSING STATISTICS IN THE STUDY AREA

County/ Municipality	Total Housing Units	2015-2019 Housing Vacancy Rate	Median Value of Owner-Occupied Units	Median Rent
Connecticut	**1,516,629**	**9.6%**	**$275,400**	**$1,180**
New London County	123,426	12.6%	$241,700	$1,130
Town of Waterford	8,426	8.4%	$252,200	$1,312

Sources:

U.S. Census Bureau QuickFacts 2020; U.S. Census American Community Survey 2019; U.S. Census 2015-2019 American Community Survey 5-Year Estimates.

8.1.1.3 Massachusetts

Although there is no proposed onshore infrastructure for the Project on Martha's Vineyard, Nantucket, or Barnstable County, these areas are within the viewshed of the wind turbines located in the Lease Area. Additionally, the Port of New Bedford located in Bristol County may be used as a satellite O&M facility for crew transfer activities. The use of this existing port facility is likely to positively contribute to the local economy through the potential use of local workforces in addition to indirect and induced benefits. The closest wind turbine position is approximately 17 nm (32 km) from Nantucket (Nantucket County) and 21 nm (39 km) from Martha's Vineyard (Dukes County). The submarine export cables will exit the southeastern end of the Lease Area and will be located more than 35 nm (64.8 km) from the shoreline of Massachusetts. Project-related activities will occur in waters beyond 3 nm (5.6 km) from the shoreline. The counties and municipalities that will potentially be impacted by Project-related activities are defined in **Table 8.1-10**.

TABLE 8.1-10. MASSACHUSETTS COUNTIES AND MUNICIPALITIES WITH POTENTIAL TO BE AFFECTED BY PROJECT INFRASTRUCTURE AND/OR ACTIVITIES

	Project Infrastructure					
County/ Municipality	Onshore Route	Onshore Substation Facilities	Staging/ Construction Facilities	O&M Facility	Export Cables	Potential View of Lease Area
Barnstable County						X
Bristol County				X		
City of New Bedford				X		
Dukes County						X
Nantucket County						X

8.1.1.3.1 Population

Overall, Massachusetts saw a 5.3 percent increase in population between 2000 and 2019 (see **Table 8.1-11**). Both Massachusetts counties in the Study Area also saw population growth. Nantucket County saw the most population growth, with a 12.1 percent increase in that 19-year period. The Massachusetts median age was younger than that of Barnstable, Bristol, Nantucket, and Dukes Counties (53.3, 41.0, 40.3, and 47.1, respectively).

TABLE 8.1-11. MASSACHUSETTS POPULATION CHARACTERISTICS WITHIN THE STUDY AREA

County/ Municipality	Land Area (sq mi)	Decennial Census Population Count (2000)	Decennial Census Population Count (2010)	ACS Population Estimate (2019)	Population Density (persons per sq mi) (2019)	Population Change (2000-2019)	Median Age (2015-2019)
Massachusetts	**7,800**	**6,349,097**	**6,547,629**	**6,892,503**	**884**	**5.3%**	**39.5**
Barnstable County	1,306	222,230	215,888	213,496	163	-3.9%	53.3
Bristol County	553	534,650	548,285	565,217	1,022	5.7%	41.0
City of New Bedford	20	93,768	95,138	95,348	4,767	1.6%	35.8
Dukes County	103	14,987	16,535	17,332	168	4.8%	47.1
Nantucket County	45	9,520	10,172	11,399	253	12.1%	40.3

Sources:

U.S. Census Bureau 2000, U.S. Census Bureau 2019a, U.S. Census Bureau 2019b.

8.1.1.3.2 Economic and Employment Conditions

Nantucket County had a higher median income than the Commonwealth of Massachusetts and Barnstable, Bristol, and Dukes Counties had lower median household incomes than the Commonwealth of Massachusetts (see **Table 8.1-12**). The most popular industry category of employment for the counties in the Study Area and Massachusetts was Educational Services and Health Care and Social Assistance. Many Barnstable County, Martha's Vineyard (Dukes County), and Nantucket Island (Nantucket County) residents also worked in Construction.

TABLE 8.1-12. EXISTING MASSACHUSETTS ECONOMIC CONDITIONS IN THE STUDY AREA

County/ Municipality	Per Capita Income	Median Household Income	Civilian Labor Force	Unemployment Rate	Top 3 Industries a/
Massachusetts	**$43,761**	**$81,215**	**3,713,561**	**4.8%**	**E, P, R**
Barnstable County	$44,505	$74,336	110,264	4.1%	E, P, C
Bristol County	$36,343	$70,402	299,423	4.0%	E, R, M
City of New Bedford	$26,278	$47,305	45,096	3.0%	E, R, P
Dukes County	$45,990	$71,811	9,055	3.4%	E, C, P
Nantucket County	$55,398	$107,717	6,631	2.9%	E, P, C

Note:

a/ E = Educational Services, and Health Care and Social Assistance; R = Retail Trade; P = Professional, Scientific, and Management, and Administrative and Waste Management Services; C = Construction; M = Manufacturing

Sources:

U.S. Census Bureau 2019a, U.S. Census Bureau 2019b.

8.1.1.3.3 Housing and Property Values

Median home values within the Study Area in Massachusetts are higher than the median for the state, with the exception of Bristol County and the City of New Bedford (**Table 8.1-13**). Nantucket County had the highest median home value at $1,084,700 and the median home value in Dukes County was $699,500. Housing vacancy rates in Dukes County and Nantucket County are much higher than elsewhere in Massachusetts, likely due to the high number of seasonal homes that tend to be in coastal communities. Housing vacancy rates, median home values, and median rents in Bristol County and the City of New Bedford were lower than elsewhere in the Study Area and the values for Massachusetts.

TABLE 8.1-13. MASSACHUSETTS HOUSING STATISTICS IN THE STUDY AREA

County/ Municipality	Total Housing Units	2015-2019 Housing Vacancy Rate	Median Value of Owner-Occupied Units	Median Rent
Massachusetts	**2,928,732**	**9.7%**	**$381,600**	**$1,282**
Barnstable County	163,557	42.3%	$393,500	$1,311
Bristol County	236,903	7.0%	$329,200	$940
City of New Bedford	42,200	7.0%	$243,300	$744
Dukes County	18,146	62.2%	$699,500	$1,459
Nantucket County	12,675	69.9%	$1,084,700	$1,764

Sources:
U.S. Census Bureau 2019a.

8.1.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For population, economy, employment conditions, and housing and property values, the maximum design scenario is the full build-out of the Lease Area, including the submarine export cables, installation of onshore export cables and interconnection cables, and installation of the onshore substation facilities, as described in **Table 8.1-14**. The parameters provided in **Table 8.1-14** represent the maximum potential impact from the full build-out. This design concept incorporates a total of up to 157 structures within the Lease Area (made up of up to 155 wind turbines and two offshore substation facilities) with one submarine export cable route for BW1 to Queens, New York and one submarine export cable route for BW2 to Queens, New York or to Waterford, Connecticut and the associated onshore substation facilities.

TABLE 8.1-14. SUMMARY OF MAXIMUM DESIGN SCENARIO PARAMETERS FOR POPULATION, EMPLOYMENT AND OTHER ASPECTS OF THE ECONOMY, AND HOUSING AND PROPERTY VALUES

Parameter	Maximum Design Scenario	Rationale
Construction		
Offshore installation Project-related personnel	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities) and two submarine export cables.	Representative of the maximum number of new workers who would utilize the resources in the Project Area.
Onshore components	Based on full build-out of the Project (BW1 and BW2): • BW1 Queens, New York. • BW2: ○ Queens, New York or ○ Waterford, Connecticut. Construction and installation of export cable landfalls, onshore export and interconnection cables, and onshore substation facilities.	Representative of the maximum onshore construction work, which has the potential to temporarily impact the resources in the Project Area.
Onshore construction Project-related personnel	Based on full build-out of the Project (BW1 and BW2): • BW1 Queens, New York. • BW2: ○ Queens, New York or ○ Waterford, Connecticut. Construction and installation of export cable landfalls, onshore export and interconnection cable, and onshore substation facilities.	Representative of the maximum number of Project-related personnel who would utilize the resources in the Project Area
Duration onshore construction	Based on full build-out of the Project (BW1 and BW2): • BW1 Queens, New York. • BW2: ○ Queens, New York or ○ Waterford, Connecticut. Construction and installation of export cable landfalls, onshore export and interconnection cables, and onshore substation facilities.	Representative of the maximum period required to install the onshore components, which has the potential to temporarily impact resources in the Project Area.
Staging and construction areas, including port facilities, work compounds, and lay-down areas	Based on full build-out of the Project (BW1 and BW2). Maximum number of work compounds and lay-down areas required. Some ground disturbing activities may be anticipated at Queens, New York with grading and minor tree clearing at Waterford, Connecticut. Independent activities to upgrade or modify staging, construction areas, and ports prior to Project use will be the responsibility of the facility owner.	Representative of the maximum area required to facilitate the offshore and onshore construction activities.

Parameter	Maximum Design Scenario	Rationale
Operations and Maintenance		
Offshore structures	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities).	Representative of the presence of new fixed structures in an area that previously had none.
Onshore substation facilities	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (up to a 7 ac [2.8 ha] area). • BW2: ○ Queens, New York (up to a 7 ac [2.8 ha] area) or ○ Waterford, Connecticut (up to a 7 ac [2.8 ha] area).	Representative of the presence of a new structure in an area where there was previously none.
O&M Base	4.5 ac (1.8 ha) area	Representative of an existing structure in an area that will have been developed for this use.
Onshore operation and maintenance activities Project-related personnel	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York • BW2 to Queens New York or Waterford, Connecticut.	Representative of the maximum number of workers who would utilize resources in the Project Area.

8.1.2.1 Construction

During construction, the potential impact-producing factors for population, economy, employment, and housing and property values may include:

- Installation of the offshore components, including foundations, wind turbines, offshore substation facilities, and submarine export and interarray cables;
- Staging activities and assembly of Project components at applicable facilities or areas;
- Construction of the onshore electrical systems, including transmission towers and duct banks (installation techniques include trenchless (e.g., HDD, jack and bore, or micro-tunnel) and trenched (open cut trench) methods); and
- Construction of two new onshore substation facilities.

The following impacts may occur as a consequence of the factors identified above:

- Short-term creation of additional construction jobs;
- Short-term increase in workforce;
- Short-term increase in the demand for permanent and/or rental housing;
- Short-term increase in the demand for public services;
- Short-term increase in the demand for construction material and general purchasing;
- Short-term increase in tax revenue and economic benefits; and
- Short-term change in property values due to construction activities.

Creation of additional construction jobs. The Project is expected to lead to the creation of additional jobs during the construction period including construction laborers, crane operators, vessel crew, pile drivers, steel workers, and electricians. Overall, the construction activities associated with the Project will lead to the creation of hundreds of jobs. According to a 2017 NYSERDA report, approximately 3,500 manufacturing and installation jobs are anticipated to support New York wind farms (NYSERDA 2017). In 2020, NYSERDA issued a solicitation for offshore wind projects for two lease areas, OCS-A 0512 and OCS-A 0520. Equinor was selected as the developer in 2021 and the projects were named Empire Wind 2 and Beacon Wind, respectively. NYSERDA stated that the two offshore wind projects are expected to provide thousands of direct new jobs for New York workers and more than $3.2 billion in new economic activity in labor, supplies, development, and manufacturing in the State of New York. The two projects are expected to bring $8.9 billion in economic activity. The report also expects $47 million in workforce development and just access funding (NYSERDA 2020).

In addition, in 2018 Environmental Entrepreneurs (E2), a national, nonpartisan business group advocating for policies that are good for the economy and good for the environment, (2018) reported that a 352-MW wind farm would directly generate 2,345 jobs in the State of New York during the construction period; BW1 will generate at least 1,230 MW for the State of New York. A similar study completed by the Massachusetts Clean Energy Center used a model developed by the National Renewable Energy Laboratory (NREL) to determine that the construction of a 1,600-MW offshore wind facility would create 2,279 to 3,171 jobs for direct employees and 2,315 to 3,618 jobs for indirect employees (Bristol Community College et al. 2018).

Appendix GG Socioeconomic Report provides estimates of expected local economic and employment benefits of the Project. The report estimates that the construction and installation phase of BW1 to the Queens, New York landfall would be expected to support over 190 direct jobs in New York annually over the construction period resulting a total of over 1,700 cumulative job-years. Including indirect and induced impacts, this portion of the Project could result in almost 2,980 job-years in New York. The construction-related employment impacts associated with the use of the Queens, New York landfall for BW2 would be expected to duplicate the BW1 impacts. The employment impacts for the construction and installation phase associated with the Waterford, Connecticut landfall for BW2 would be split between Connecticut and New York with approximately 175 direct jobs annually in Connecticut and 147 direct jobs annually in New York for a total of approximately 2,000 cumulative job-years. Indirect and induced impacts could result in a total of 3,420 job-years in Connecticut and New York for the total construction phase.

As indicated in **Appendix GG Socioeconomic Report**, most of these jobs are anticipated to be located within the State of New York, especially along the onshore export and interconnection cable routes in Queens, Queens and the staging site in Sunset Park, Brooklyn. Construction-related jobs would be temporary, lasting during the construction period for each phase. However, the construction of Project components for Beacon Wind or other similar projects could lead to longer term increases in related employment through induced demand along the broader offshore wind supply chain. Additionally, the specific construction related skills and experience gained by staff would be applicable to other offshore wind projects as they enter the construction phase.

Increase in workforce. While a portion of the newly created jobs will likely be filled with the local workforce, it is anticipated that there will be a slight influx of workers relocating to the Study Area (see **Creation of additional construction jobs**, above, for estimates provided in various reports). This increase in workforce is likely to be the most pronounced along the onshore export and interconnection cable routes in Queens County, New York and New London County, Connecticut. New jobs are also likely to be located around the construction and staging areas.

Increase in demand for permanent and/or rental housing. The increase in workforce will likely result in an increased demand for temporary housing for workers and their families. As a result, the demand for temporary housing units is expected to increase, with a decrease in vacancy rate. This anticipated increase in relocated workers is unlikely to be greater than the available number of temporary housing units and is not expected to create a shortage. This demand for housing also has the potential to increase property values in the Study Area (see **Change in property values**, below).

Increase in demand for public services. Construction activities and the influx in the non-local workforce will likely result in an increased demand for public services, including police and fire services. The Study Area contains numerous hospitals, fire departments, law enforcement personnel, and public schools, and is well-developed with sufficient capacity such that the Project will not impact the availability of public services. Therefore, this anticipated increase in demand for public services is unlikely to create a shortage for the general public. Additional detail on potential impacts to health and public safety is discussed in **Section 8.12 Public Health and Safety**.

Increase in demand for construction material and general purchasing. Construction activities are expected to directly result in increased purchasing of construction and other materials in the Study Area, including general household purchasing for the temporary workforce.

Increase in tax revenue and economic benefits. The creation of jobs and increased purchasing of construction materials is expected to lead to an increase in tax revenue to local communities. According to NYSERDA (2017), offshore wind would result in as much as a $6.3 billion of expenditure in the State of New York. In addition, E2 (2018) showed that construction of a 352-MW project would generate over $737 million in economic benefits in the State of New York. The report also showed that for every $1 spent in building an offshore wind farm interconnecting to the State of New York, a total of $1.72 would be generated into the State's economy. As reported above (see **Creation of additional construction jobs**), NYSERDA (2020) indicated that Beacon Wind and Empire Wind 2 are expected to provide thousands of direct new jobs for New York workers and more than $8.9 billion in new economic activity in labor, supplies, development, and manufacturing in the State of New York. **Appendix GG Socioeconomic Report** estimates that the Project could result in almost $3.5 billion in cumulative gross state product and $750 million in local, state, and federal taxes over the life of the facilities if the Queens, New York landfall is selected for both BW1 and BW2. The report estimates approximately $3.2 billion in cumulative gross state product and $740 million in local, state, and federal taxes over the life of the facilities if the Queens, New York landfall is used for BW1 and the Waterford, Connecticut landfall is used for BW2.

Change in property values. The onshore components of the Project are proposed to be located in existing rights-of-way and within previously developed areas designated for such uses to the extent practicable. In addition, due to the temporary nature of the construction activities, property values are not anticipated to be negatively impacted during the construction phase. Vessels associated with the installation of the export cables through Long Island Sound to the landfalls at the Astoria power complex in Queens, New York or Waterford, Connecticut will only be present for a short period of time and vessels associated with the offshore components in the Lease Area will not be in close proximity to onshore property; therefore, property values are not anticipated to be negatively impacted due to offshore construction.

8.1.2.2 Operations and Maintenance

During operations, the potential impact-producing factors to population, economy, employment, and housing and property values may include:

- The presence of new fixed structures offshore (e.g., wind turbines and offshore substation facilities);
- Operations and maintenance activities associated with the onshore export and interconnection cables and onshore substation facilities; and
- Operations at the O&M Base.

The following impacts may occur as a consequence of the factors identified above:

- Long-term presence of new fixed structures in the Lease Area (e.g., wind turbines and offshore substation facilities);
- Long-term creation of additional operations and maintenance jobs;
- Long-term increase in workforce;
- Long-term increase in the demand for permanent and/or rental housing;
- Long-term increase in the demand for public services;
- Long-term increase in tax revenue and economic benefits; and
- Long-term potential for a change in property values due to operation and maintenance activities.

Presence of new fixed structures in the Lease Area. The MA/RI WEA is 10.4 nm (19.3 km) or more from the nearest coastline (BOEM 2013); however, the nearest wind turbine for the Beacon Wind project is more than 17 nm (32 km) from the closest land-point on Nantucket, Massachusetts. Visibility of the turbines within the Lease Area is expected to be limited to locations on the southern coast of Nantucket and Martha's Vineyard. There are components of the wind turbines that may be visible from these southern shorelines depending on meteorological conditions. Sullivan et al. (2012) performed a study suggesting that Project components might be visible from the shore during clear conditions, but will not be a focal point. Viewers from the southern shorelines of Nantucket (the closest land point) and Martha's Vineyard, over 21.7 nm (40 km) away will have a direct visual of the Vineyard Wind North project that has been approved with a FEIS and ROD by BOEM (2021). The view through the Vineyard Wind North project, which will be in front of Beacon Wind, partly obscures the visualization of the Project wind turbines. The visual density of turbines will increase substantially, resulting in fewer visual gaps within the frame of turbines. However, the horizontal extent of turbines will not be much larger with Beacon Wind added to Vineyard Wind 1.

Creation of additional operations and maintenance jobs. The Project is expected to lead to the creation of jobs during operations. E2 (2018) reported that for every $1.00 spent building an offshore wind farm, $1.72 will be generated in New York's economy, in addition to more than 140 direct, indirect, and induced jobs (premised on a model 352-MW wind farm).

Appendix GG Socioeconomic Report estimates that the operations and maintenance phase of BW1 is expected to support over 140 direct, long-term jobs for operating the facility, along with an additional almost 70 indirect and almost 90 induced jobs each year across New York and Massachusetts for a total of over 11,050 total job-years during the entire lifespan of the Project. Similarly, if the Queens, New York landfall is selected for BW2, the operations and maintenance phase of the Project is expected to support almost 150 direct, long-term permanent jobs for operating the facility, along with an additional 70 indirect and over 90 induced jobs each year across New York and Massachusetts for a total of over 11,590 total job-years during the Project's lifespan. If the Waterford, Connecticut landfall is selected for BW2, the operations and maintenance phase of the Project is expected to support over 130 direct, long-term permanent jobs for operating the facility, along with an over 60 indirect and over 80 induced jobs each year across New York, Massachusetts, and Connecticut, for a total of over 10,060 total job-years during its entire lifespan.

Furthermore, as with the construction phase, the specific skills and experience gained would be applicable to other offshore windfarm projects as they enter the operations phase. Most of these jobs are anticipated to be located within the Study Area, specifically in New Bedford, Massachusetts and the SBMT in Sunset Park, Brooklyn, the proposed sites for the satellite O&M facility and the O&M Base, respectively.

Increase in workforce. It is anticipated that there will be a slight influx in workers relocating to the Study Area (see above for estimates provided in various reports). This increase in workforce will be dispersed between the satellite O&M facility in New Bedford, Massachusetts and the O&M Base at the SBMT in Sunset Park, Brooklyn.

Increase in demand for permanent and/or rental housing. The increase in workforce will likely result in an increased demand for permanent and/or rental housing for workers and their families. The onshore substation facilities in Queens, New York and Waterford, Connecticut will be unmanned and increased housing demand will be more closely associated with the satellite O&M facility in New Bedford, Massachusetts and the O&M Base at the SBMT in Sunset Park, Brooklyn. As a result, the demand for housing units is expected to increase, with a decrease in vacancy rate. However, this anticipated increase in relocated workers is unlikely to be greater than the available number of housing units and is not expected to create a shortage.

Increase in demand for public services. Operation activities and the slight increase in the Study Area workforce will likely result in a slightly increased demand for public services. The Study Area contains numerous hospitals, fire departments, law enforcement personnel, and public schools, and is well-developed with sufficient capacity such that the Project will not impact the availability of public services. Therefore, this anticipated increase in demand for public services is very unlikely to create a shortage for the general public. Additional detail on potential impacts to public health and public is discussed in **Section 8.12 Public Health and Safety**.

Increase in tax revenue and economic benefits. The creation of jobs and operations activities are expected to lead to an increase in tax revenue to local communities. E2 (2018) indicated that operations of a 352-MW project would generate over $29 million in economic benefits in the State of New York (this includes direct, indirect, and induced values). Therefore, it is expected that the operation activities associated with a project the size of Beacon Wind will result in a significant increase in tax revenue to local communities surrounding the Project.

Appendix GG Socioeconomic Report estimates that the Project could result in over $750 million in local, state, and federal taxes over the life of the facilities if the Queens, New York landfall is selected for both BW1 and BW2 and over $740 million in local, state, and federal taxes over the life of the facilities if the Queens, New York landfall is used for BW1 and the Waterford, Connecticut landfall is used for BW2.

Change in property values. As the onshore components of the Project are proposed to be located in existing rights-of-way and/or within previously developed areas designated for such uses, changes in property values are not anticipated during the operations phase.

A 2017 study completed by the Sage Policy Group found that there is little evidence of a negative impact to property values when an offshore wind farm is located 4 mi (6.4 km) or more from the coast (US Wind 2018). Similar results were reported by Jensen et al. (2018), which showed that there was no impact on property values when the offshore wind farm was located 5.6 mi (9 km) offshore. Hoen et al. (2013) found that there was no significant relationship between wind turbines and property values. Additional information on the visibility of the offshore components of the Project can be found in **Appendix X Seascape, Landscape, and Visual Impact Assessment**.

8.1.2.3 Decommissioning

During decommissioning, the potential impact-producing factors to population, employment, and other aspects of the economy, housing, and public service resources are expected to be similar to those experienced during construction, as described in **Section 8.1.2.1**. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operation phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Beacon Wind anticipates will be needed for the Project, please see **Section 3 Project Description**.

8.1.3 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors associated with population, economy, employment, and housing and property values described in **Section 8.1.2**, Beacon Wind is proposing to implement the following avoidance, minimization, and mitigation measures.

8.1.3.1 Construction

During construction, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.1.2**:

- The Project will utilize an existing O&M Base and will not require construction of a new O&M Base in the State of New York; and
- Beacon Wind will install onshore components within existing rights-of-way and/or within previously developed areas designated for such uses, to the extent practicable.

8.1.3.2 Operations and Maintenance

Since onshore Project-related activities during the operations and maintenance phase are anticipated to be limited, avoidance, minimization, and mitigation measures are not expected to be necessary. Should additional onshore Project-related activities occur, measures proposed to be implemented are expected to be similar to those experienced during construction. Beacon Wind will consider following additional measure to mitigate impacts unique to O&M activities:

- Beacon Wind is considering the use of agency-approved-ADLS and is actively completing an evaluation to determine the impacts of the implementation of this system. This commitment as a mitigation is subject to final Project evaluation and agency approval.

8.1.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction, as described in **Sections 8.1.3.1**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures will be proposed at that time.

8.1.4 References

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8.2 Land Use and Zoning

This section describes land uses and zoning in the Project Area. Potential impacts to and conflicts with land use and zoning resulting from construction, operations, and decommissioning of the Project are discussed. Proposed Project-specific measures adopted by Beacon Wind are also described; these measures are intended to avoid, minimize, and/or mitigate potential impacts/conflicts to Project Area land use and zoning.

Other resources and assessments detailed within this COP that are related to land use and zoning include:

- Visual Resources (**Section 7.0)**;
- Population, Economy, Employment, and Housing and Property Values (**Section 8.1**);
- Recreation and Tourism (**Section 8.3**);
- Environmental Justice (**Section 8.4**); and
- Land Transportation and Traffic (Section 8.5).

Data Relied Upon and Studies Completed

For the purposes of this section, the Study Area includes the onshore components, including the onshore export and interconnection cable routes, the onshore substation facilities, and a 2,000- ft (610-m) buffer surrounding these assets (see **Figure 8.2-1** and **Figure 8.2-2**). This section relied upon the vegetation and land cover data from the USGS, and zoning data provided by the municipalities.

8.2.1 Affected Environment

The affected environment is defined as the onshore areas that have the potential to be directly affected by the construction, operations, and decommissioning of the Project. Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Beacon Wind expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards, which Beacon Wind will comply with in using the facilities.

8.2.1.1 Queens, New York

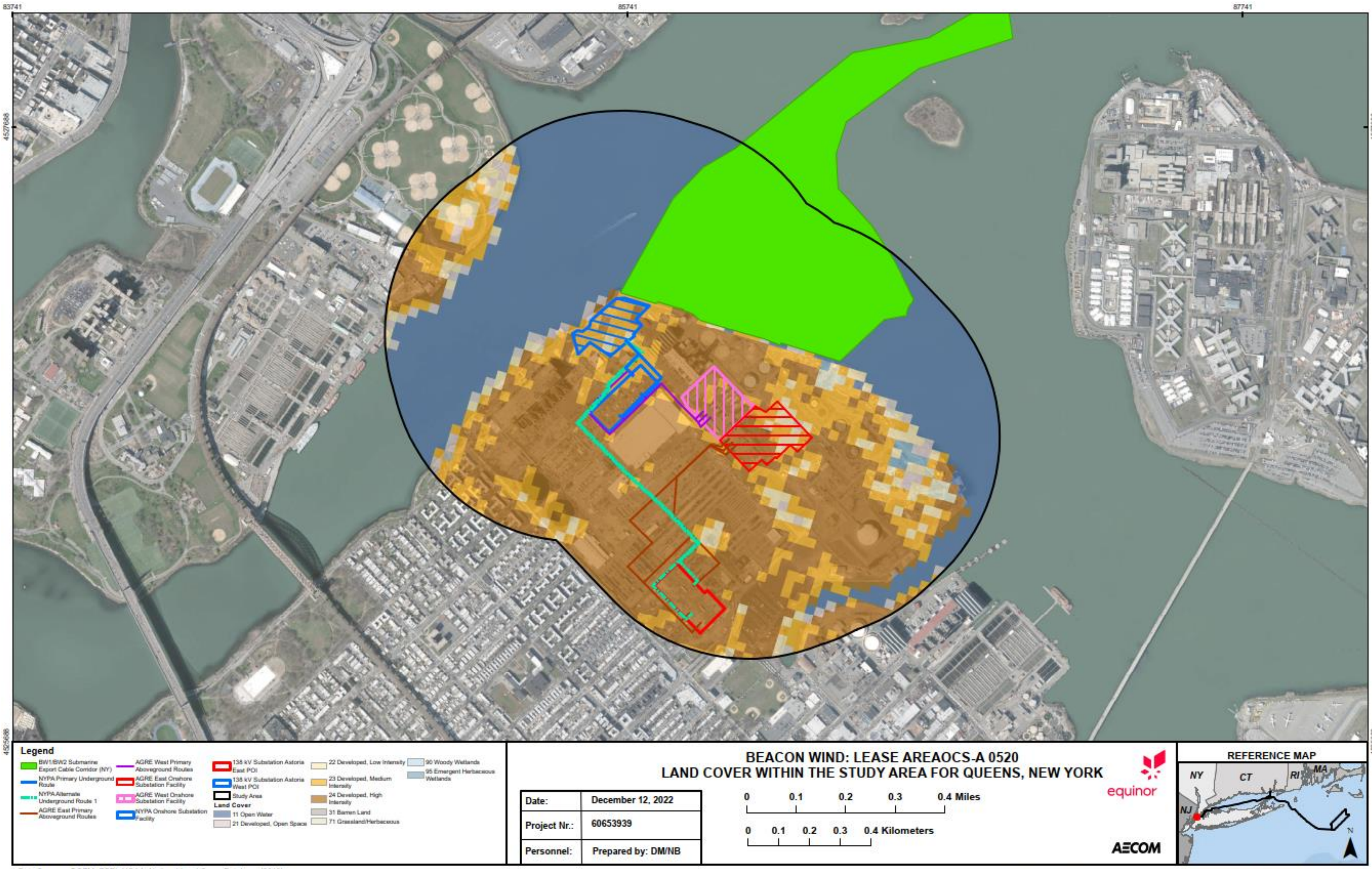
The Astoria power complex was selected as the POI for BW1 (and may also be used as the POI for BW2) to the New York Independent System Operator (NY ISO) transmission network. The Astoria East Substation (Astoria East POI) and/or the Astoria West Substation (Astoria West POI) exist for potential interconnection at this location. Two locations are under consideration in Queens (NYPA and AGRE [which includes the AGRE East and AGRE West sites]) for the single proposed BW1 landfall and onshore substation facility. The Queens, New York onshore substation facility sites that are not used (NYPA, AGRE East, or AGRE West) for BW1 will remain under consideration, in addition to the Waterford, Connecticut landing, for the single proposed BW2 landfall. The Astoria power complex is currently a dense industrial energy complex bordered by the East River, industrial/commercial development, and residential development. The area surrounding the onshore components of the Project, including the onshore substation facility locations under consideration, consists of low-density commercial or manufacturing development with no residential development and is currently a vacant lot with impervious surfaces (see **Figure 8.2-1**).

Zoning data were obtained from the New York City Department of City Planning. The current zoning of the onshore export and interconnection cable routes and onshore substation parcel at the Astoria power complex in Queens, New York, and the surrounding area is depicted in **Figure 8.2-2**. The affected parcel is located within a New York City Zoned Heavy Manufacturing District (M3-1), an area with heavy industries including power plants, solid waste transfer facilities and recycling plants, and fuel supply depots. The parcels abutting the M3-1 district in which the Astoria power complex is located are zoned for lighter manufacturing uses (M1-1) and three- or four-story residential buildings (R5) (New York City Department of City Planning 2021).

The following descriptions from the New York City Department of City Planning (2021) specify uses by district within close proximity of the onshore substation facility locations under consideration:

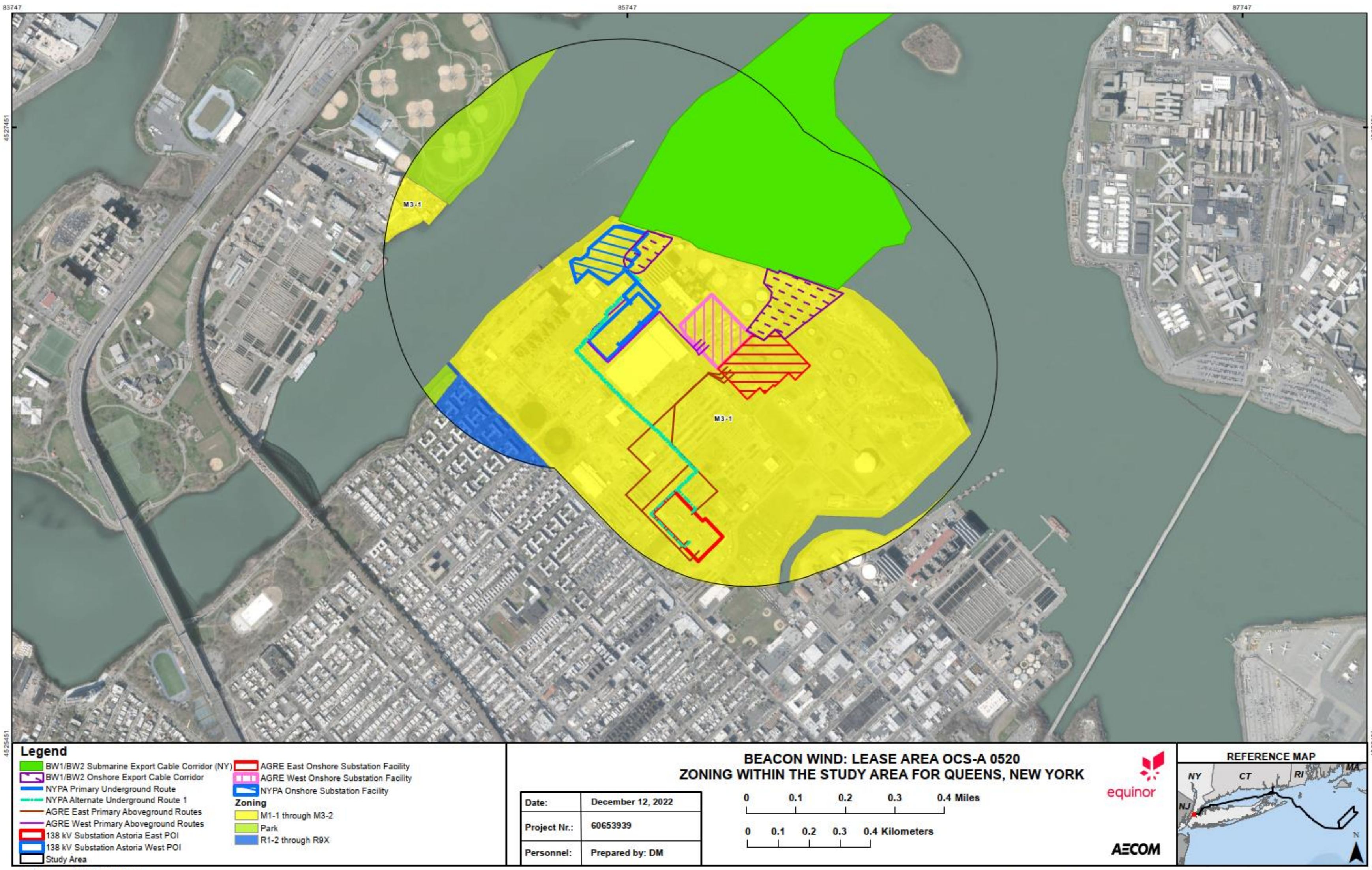
- **M3 districts** are designated for areas with heavy industries that generate noise, traffic, or pollutants. M3 districts are usually located near the waterfront and are buffered from residential areas. Typical uses include power plants, solid waste transfer facilities, and recycling plants, and fuel supply depots. In M3 districts, uses with potential nuisance effects are required to conform to minimum performance standards.
- **M1 districts** are designated for areas with light industries. Examples of M1 districts range from the Garment District in Manhattan and Port Morris in the Bronx with multistory lofts, to parts of Red Hook or College Point with one- or two-story warehouses characterized by loading bays. M1 districts are often buffers between M2 or M3 districts and adjacent residential or commercial districts. M1 districts typically include light industrial uses, such as woodworking shops, repair shops, and wholesale service and storage facilities. Most industrial uses are allowed in M1 districts if they meet the stringent M1 performance standards. Offices, hotels, and most retail uses are also permitted. Certain community facilities, such as hospitals, are allowed in M1 districts only by special permit, but houses of worship are allowed as-of-right (i.e., comply with the applicable zoning regulations and do not require discretionary action by the City Planning Commission or Board of Standards and Appeals).
- **R5 districts** are for residential uses that are higher density than single-family; the floor area ratio requirement in these districts typically results in the development of three- and four-story attached houses and small apartment buildings.

FIGURE 8.2-1. LAND COVER WITHIN THE STUDY AREA - QUEENS, NEW YORK



Data Sources: BOEM, ESRI, NOAA, National Land Cover Database (2019)
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

FIGURE 8.2-2. ZONING WITHIN THE STUDY AREA - QUEENS, NEW YORK



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

8.2.1.2 Waterford, Connecticut

Waterford, Connecticut was selected as a POI under consideration to the ISO-NE network for BW2, and an existing substation exists at this location adjacent to the Waterford power complex. The area immediately surrounding the Waterford, Connecticut onshore export and interconnection cable route and onshore substation facility site is nearly all developed at a high density. However, less than half a mile (0.8 km) from the site, the land cover changes dramatically, with deciduous forest and wetlands covering the majority of the area with the exception of scattered developments (see **Figure 8.2-3**).

The Town of Waterford, Connecticut provided zoning data for this analysis. The current zoning of the onshore export and interconnection cable route and onshore substation facility parcel in Waterford, Connecticut is General Industrial District (I-G). This district permits a variety of uses, including public utility buildings, substations, and storage yards, no amendments to the zoning would require for the onshore components of BW2. The parcel directly north of the affected parcel (across the Amtrak-owned train tracks) is zoned as a General Industrial Park Zone (IP-1), a district that allows many of the same uses as an I-G district, including public utility buildings. The other two parcels abutting the affect parcel are zoned for open space (OS) and a Waterfront Development District (WD), which allows uses specific to its waterfront location including boat yards, marinas, or yacht clubs. The majority of the remaining districts within a mile (1.6 km) of the site are zoned for medium- and low-density residential uses (see **Figure 8.2-4**; Town of Waterford 2021).

- **I-G districts** permit a variety of industrial uses in addition to public utility buildings including printing and publishing establishments; storage warehouses; and parks, playgrounds and public schools. Additional uses that are subject to the approval by special permit include places of worship and cemeteries; riding stables, nurseries, and commercial greenhouses; and convalescent nursing homes, places for assisted living, and hospitals.
- **IP-1 districts** allow many of the same uses as I-G districts. However, with a special permit, parcels in IP-1 zones can be used for more entertainment purposes than an I-G zone, including restaurants, motels and hotels, and sports arenas.
- **OS districts** do not permit any development and no vegetation or topography is permitted to be disturbed on these parcels. With the approval of a special permit, buildings and structures and substations operated by utility companies are allow in OS districts; however, service yards and outside storage areas are not allowed.
- **WD districts** follow guidance set forth in the *Connecticut Coastal Management Act* (effective 1979) and are meant to encourage a mixture of land uses, particularly those that are unique to waterfront access and other water-dependent uses. These uses include marinas, boat yards, and museums with nautical themes. With a special permit, WD districts can also accommodate restaurants, multi-family and mixed use development, retail stores and service establishments, hotels, and fishing and lobstering businesses. There is a single family residential property in the WD district adjacent to the affected parcel. The house was built in 1969 and likely predates the WD zoning.

FIGURE 8.2-3 LAND COVER WITHIN THE STUDY AREA - WATERFORD, CONNECTICUT

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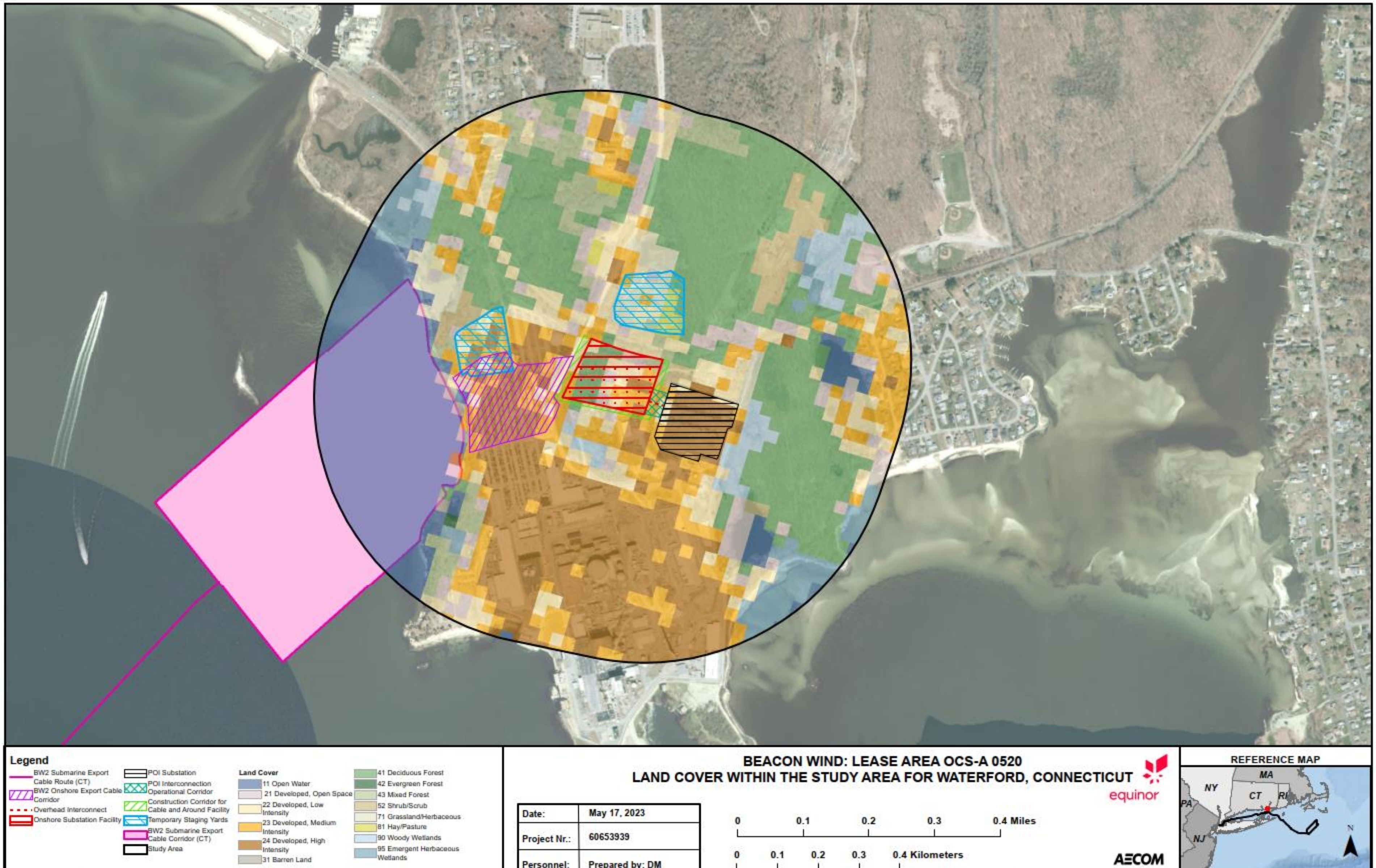

Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

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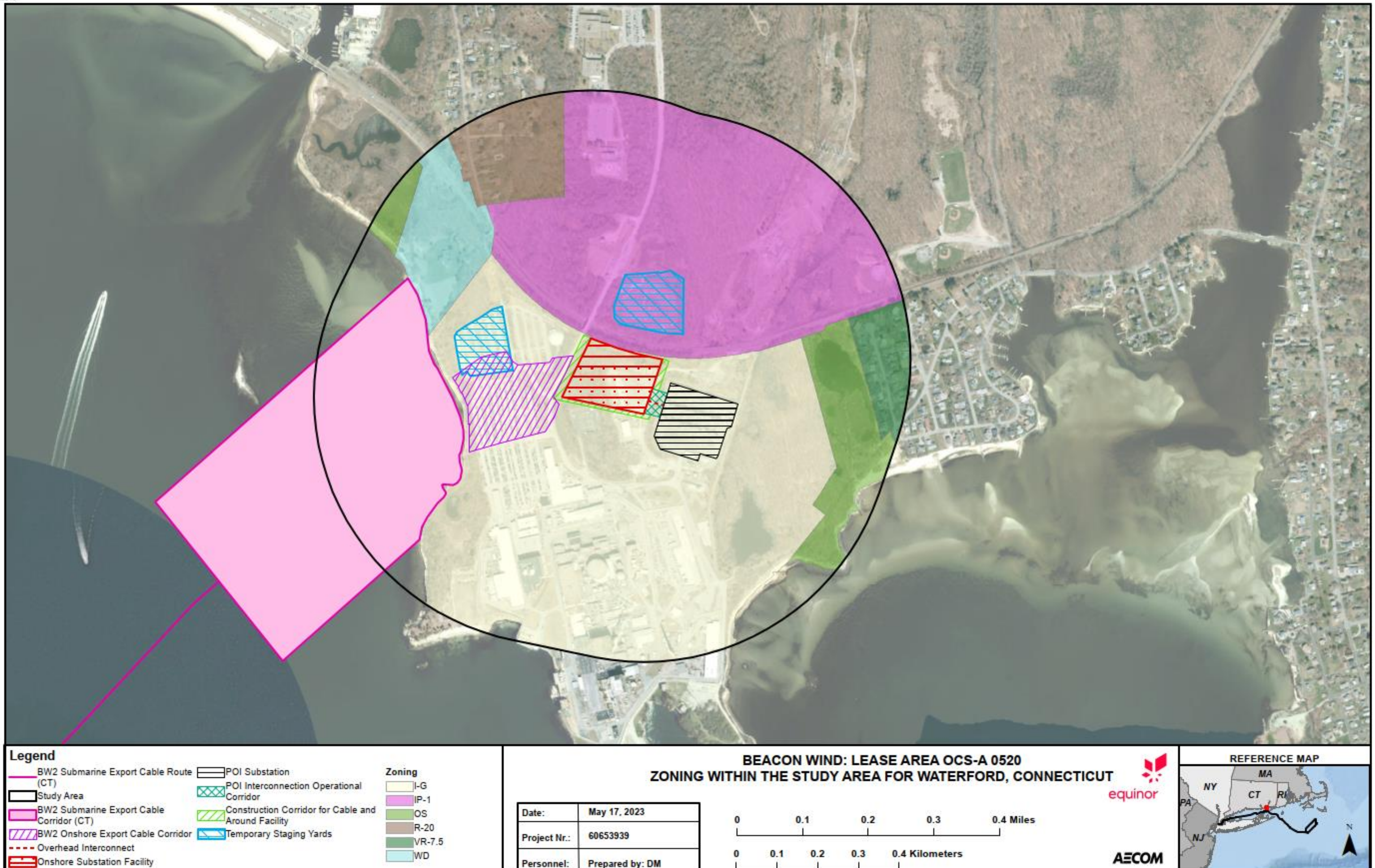
FIGURE 8.2-4 ZONING WITHIN THE STUDY AREA - WATERFORD, CONNECTICUT

233345



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

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8.2.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For land use and zoning, the maximum design scenario is the maximum number of construction corridors for the onshore export and interconnection cables and the onshore substation facilities, as described in **Table 8.2-1**. The parameters provided in **Table 8.2-1**. represent the maximum potential impact from the full build-out. This design concept incorporates one submarine export cable route for BW1 to Queens, New York and one submarine export cable route for BW2 to Queens, New York or to Waterford, Connecticut and the associated onshore substation facilities.

TABLE 8.2-1. SUMMARY OF MAXIMUM DESIGN SCENARIO PARAMETERS FOR LAND USE AND ZONING

Parameter	Maximum Design Scenario	Rationale
Construction		

Export cable landfalls	Based on full build-out of the Project (BW1 and BW2):
	• BW1 to Queens, New York (HDD work area in a 246 ft x 246 ft [75 m x 75 m] area onshore).
	• BW2:
	  ○ To Queens, New York (HDD work area in a 246 ft x 246 ft [75 m x 75 m] area onshore) or
	  ○ To Waterford, Connecticut (HDD work area in a 328 ft x 164 ft [100 m x 50 m] area onshore).
		Representative of the maximum area to be utilized to facilitate the export cable landfalls.

Onshore export and interconnection cables	Based on full build-out of the Project (BW1 and BW2):
	• BW1 to Queens, New York (0.93 mi [1.5 km]).
	• BW2:
	  ○ To Queens, New York (0.93 mi [1.5 km]) or
	  ○ To Waterford, Connecticut (0.55 mi [0.89 km]).
		Representative of the maximum length of onshore export and interconnection cables to be installed.

Onshore substation facilities	Based on full build-out of the Project (BW1 and BW2):
	• BW1 to Queens, New York (up to a 16 ac [6.5 ha] area).
	• BW2:
	  ○ Queens, New York (up to a 16 ac [6.5 ha] area) or
	  ○ Waterford, Connecticut (up to a 16 ac [6.5 ha] area).
		Representative of the maximum area to be utilized to facilitate the construction of the onshore substation facilities.

Staging and construction areas, including port facilities, work compounds, and lay-down areas	Based on full build-out of the Project (BW1 and BW2). Maximum number of work compounds and lay-down areas required. Some ground disturbing activities may be anticipated at Queens, New York with grading and minor tree clearing at Waterford, Connecticut. Independent activities to upgrade or modify staging, construction areas, and ports prior to Project use will be the responsibility of the facility owner.	Representative of the maximum area required to facilitate the offshore and onshore construction activities.

8.2.2.1 Construction

During construction, the potential impact-producing factors to existing land uses may include:

- Construction of onshore electrical systems, including transmission towers and duct banks (installation techniques include trenchless [e.g., HDD, jack and bore, or micro-tunnel] and trenched [open cut trench] methods);
- Staging activities and assembly of Project components at applicable facilities or areas; and
- Construction of two new onshore substation facilities.

The following impacts may occur as a consequence of the factors identified above:

- Short-term increase in onshore construction vehicle traffic and activities; and
- Short-term implementation of safety zones.

Increase in construction vehicle traffic and activity. An increase in Project-related construction, support, and workforce vehicle traffic along the onshore export and interconnection cable routes, the onshore substation facilities, ports, and construction and staging areas is anticipated during construction. However, the onshore cable routes, onshore substation facilities, and POIs in Queens, New York and Waterford, Connecticut occur within the controlled sites which will work to minimize the project footprint and potential conflicts. As the Project utilizes existing roads, rights-of-way, and infrastructure, new impacts resulting from construction activities will be minimized to the extent practicable and are anticipated to be similar in nature to other utilities installations or road improvement works carried out in these locations. The increase in vehicle traffic and activity is expected to be temporary and localized to the active construction sites; therefore, the increased traffic will be consistent with the existing uses. To further minimize potential construction effects, timely information regarding the planned construction activities and schedule will be provided to adjacent landowners; work will also be coordinated with New York and Connecticut Departments of Transportation and local counterparts. Areas temporarily disturbed during installation of the onshore export and interconnection cable routes will be restored in-kind, as applicable. Activities at staging and construction facilities will be consistent with the established and permitted uses of these facilities and Beacon Wind will comply with applicable permitting standards to limit impacts from Project-related activities. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- The addition of security measures to monitor active construction sites and the proper marking of such sites;
- The development of a Traffic Management Plan in coordination with, and as approved by, the affected local communities; and
- The provision of regular updates to the local community through social media, public notices, and/or other appropriate communications tools.

Implementation of safety zones. Safety zones will also be implemented around the construction activities. However, the construction activities will occur within private access-controlled site of the Astoria power complex in Queens, New York and the Waterford power complex in Waterford, Connecticut, which will greatly limit exposure of members of the public to construction activities. Since the Project utilizes existing roads, rights-of-way, and infrastructure, new impacts resulting from construction activities will be minimized to the extent practicable. Existing land uses may be restricted by the application of these safety zones; however, these restrictions will only be temporary. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- The development of a Traffic Management Plan in coordination with, and as approved by, the affected local communities;
- The addition of security measures to monitor active construction sites and the proper marking of such sites; and
- The provision of regular updates to the local community through social media, public notices, and/or other appropriate communications tools.

8.2.2.2 Operations and Maintenance

During operations, no impacts are anticipated to land use and zoning since the Project will utilize existing roads, rights-of-way, and infrastructure, to the extent practicable; these uses are consistent with the existing land use and zoning of the area. At Queens, New York, the interconnection from the NYPA onshore substation facility to the POI would be underground with some minor features of the export and interconnection cables (e.g., link boxes) aboveground. For the AGRE East and AGRE West sites, the proposed interconnection to the POIs would entail aboveground towers. Some portion of the interconnection in Waterford, Connecticut will entail aboveground towers from the onshore substation facility to the POI for a short distance. At both of these locations in New York and Connecticut, these aboveground appurtenances will be within the confines of existing private property with a predominantly utility-based land use. As such, the existing landscape will be preserved where components are underground, and aboveground changes will occur in an area already characterized by this use. Therefore, it is not anticipated that the Project will present excessive conflict with present or future planned uses within the Project Area, and will have, at most, a minimal impact on future planned uses. Should the Project require local zoning and land use variances and authorizations, Beacon Wind will obtain such variances and authorizations, as necessary, prior to construction.

8.2.2.3 Decommissioning

Impacts to land uses during decommissioning are expected to be similar to those experienced during construction, as described in **Section 8.2.2.1**. Zoning is expected to remain consistent with existing zoning during decommissioning. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Beacon Wind anticipates will be needed for the Project, please see **Section 3 Project Description**.

8.2.3 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors described in **Section 8.2.1.2**, the Project is proposing to implement the following avoidance, minimization, and mitigation measures.

8.2.3.1 Construction

During construction, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.2.2.1**:

- Installation of onshore components within existing ROWs and within previously developed areas designated for such uses, to the extent practicable;
- The development of a Traffic Management Plan in coordination with, and as approved by, the affected local communities, as applicable;
- The addition of security measures to monitor active construction sites and the proper marking of such sites, as deemed necessary; and
- The provision of regular updates to the local community through social media, public notices and/or other appropriate communications tools.

8.2.3.2 Operations and Maintenance

During operations, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.2.2.2**:

- Coordination with appropriate local and municipal agencies, officials, and stakeholders, in consideration of future land development plans;
- Proper marking of the onshore components; and
- Restoration of the onshore Project Area to conditions consistent with approvals from local authorities and/or property owners, as applicable.

8.2.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in **Sections 8.2.3.1** and **8.2.3.2**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

8.2.4 References

TABLE 8.2-2. SUMMARY OF DATA SOURCES

Source	Includes	Available at	Metadata Link
NYC.GOV	Zoning Districts	https://www1.nyc.gov/site/planning/data-maps/open-data/dwn-gis-zoning.page	https://www1.nyc.gov/assets/planning/download/pdf/data-maps/open-data/nyzd_metadata.pdf?r=1219
Multi-Resolution Land Characteristics Consortium	Land Use (USGS)	https://www.mrlc.gov/viewer/	N/A
Town of Waterford	Zoning Districts	https://hosting.tighebond.com/waterfordct_public/	N/A

New York City Department of City Planning. 2021. Zoning Districts and Tools Overview. Available online at: https://www1.nyc.gov/site/planning/zoning/districts-tools.page. Accessed November 17, 2021.

Town of Waterford Connecticut. 2021. Zoning Regulations. Available online at: https://www.waterfordct.org/planning-zoning-commission/files/zoning-regulations. Accessed March 10, 2022.

8.3 Recreation and Tourism

This section describes recreation and tourism in the Project Area. Potential impacts to recreation and tourism uses resulting from construction, operations, and decommissioning of the Project are discussed. Proposed Project-specific measures adopted by Beacon Wind are also described; these measures are intended to avoid, minimize, and/or mitigate potential impacts to recreation and tourism.

Other resources and assessments detailed within this COP that are related to recreation and tourism include:

- Visual Resources (**Section 7.0**);
- Land Use and Zoning (**Section 8.2**);
- Marine Transportation and Navigation (**Section 8.7**);
- Commercial and Recreational Fishing (**Section 8.8**);
- Other Coastal and Marine Uses (**Section 8.11**);
- Analysis of Visual Effects to Historic Properties (**Appendix W**); and
- Seascape, Landscape, and Visual Impact Assessment (**Appendix X**).

Data Relied Upon and Studies Completed

For the purposes of this section, the Study Area includes the coastal areas that may be directly and/or indirectly impacted by the offshore components, including the foundations, wind turbines, offshore substation facilities, submarine export cables, and interarray cables, and the onshore components, including the onshore export and interconnection cable routes and the onshore substation facilities, and the staging and construction areas associated with the construction, operations, and decommissioning of the Project (see **Figure 8.3-1** and **Figure 8.3-2**). This section relies upon recreation and tourism data and analyses compiled by state economic authorities in New York, Connecticut, Rhode Island, and Massachusetts, as well as research studies and reports.

8.3.1 Affected Environment

The affected environment is defined as the coastal areas that have the potential to be directly affected by the construction, operations, and decommissioning of the Project. Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Beacon Wind expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards, which Beacon Wind will comply with in using the facilities. For the purposes of this section, the recreation and tourism sector is defined by the following criteria:

1. Frequently sells to travelers;
2. Most of its sales come from travelers; and
3. Receives the largest proportion of travelers’ spending.

Based on these criteria, recreation and tourism typically consists of the following five principal industries, as identified by the U.S. Department of Commerce (NYS Department of Labor 2017):

1. Food services;
2. Lodging;
3. Transportation;
4. Retail and gasoline service stations; and
5. Recreation.

The Study Area (**Figure 8.3-1**) includes the coastal areas where recreation and tourism activities may be directly and/or indirectly impacted by the offshore components, including the foundations, wind turbines, offshore substation facilities, submarine export cables, and interarray cables. This includes Barnstable County, Martha's Vineyard, and Nantucket that are within the viewshed of the wind turbines and the counties in Connecticut, Rhode Island, and on Long Island where recreation and tourism activities could be temporarily impacted by construction activities associated with the installation of the submarine export cables. In addition, recreation and tourism activities could be impacted by Project activities associated with the onshore components, including the onshore export and interconnection cable routes and the onshore substation facilities. For the area that will potentially have onshore Project components associated with the landfall locations and onshore substation facilities, the Study Area includes the three counties located within a 3.1-mi (5-km) buffer around the Queens, New York landfall location and a 3.1-mi (5-km) buffer around the Waterford, Connecticut landfall location (**Figure 8.3-2** and **Figure 8.3-3**).

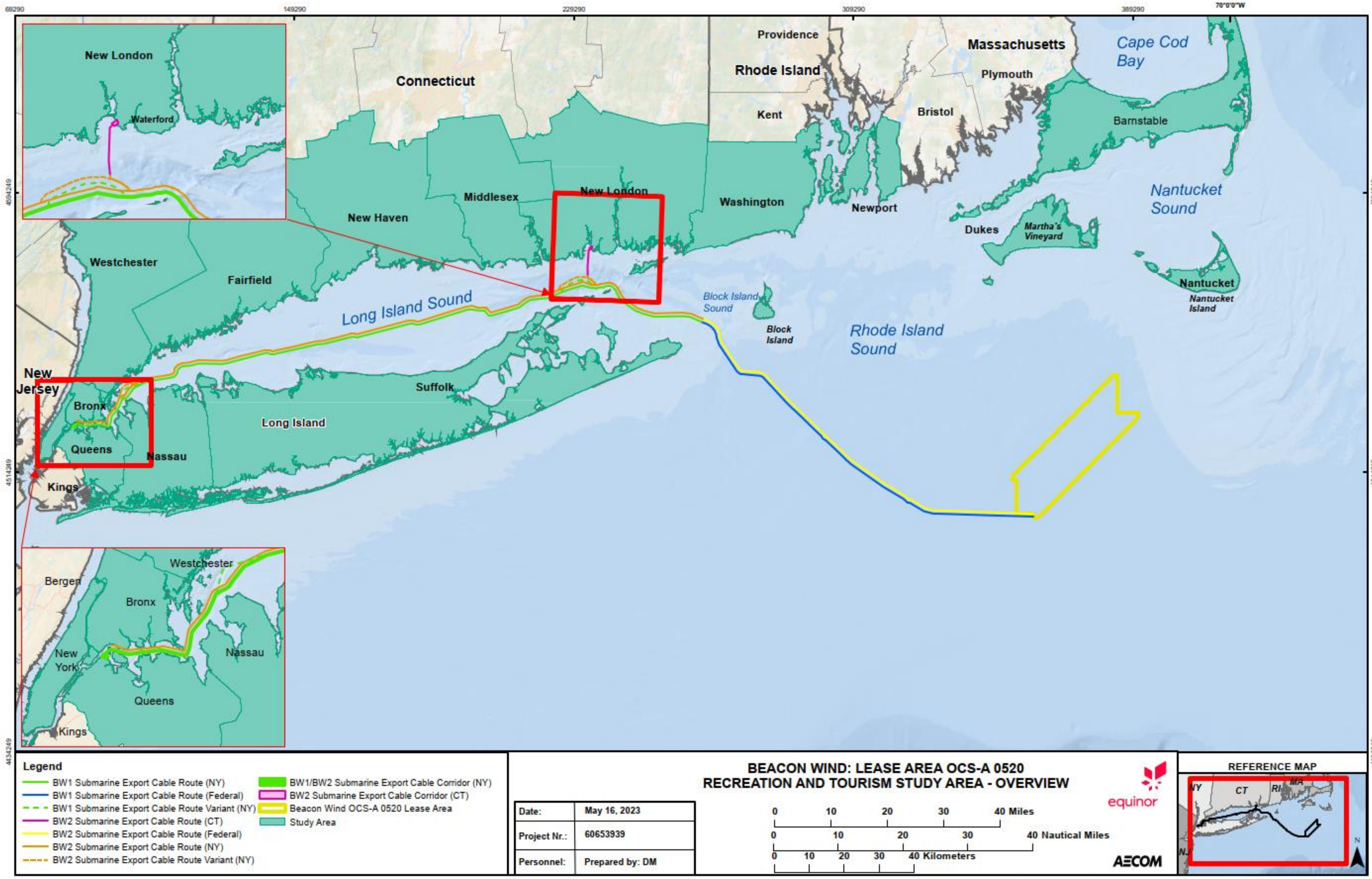
Ocean-based recreation and tourist activities within the Study Area include recreational boating and fishing, charter fishing, shellfishing, sailboat races, sightseeing, bird and wildlife viewing (including whale watching), swimming, visiting beaches, hiking, and other activities that contribute significantly to the economies. See **Section 8.11 Other Coastal and Marine Uses** for more information regarding underwater, surface-based marine recreational activities, and recreational boating and **Section 8.8 Commercial and Recreational Fishing** for more information regarding recreational fishing activities. BOEM (2021b) highlights that the scenic quality of the coastal environment is important to the identity, attraction, and economic health of the coastal communities assessed within this section. In addition, the visual qualities of historic coastal towns within the Study Area are important community characteristics.

Recreation and tourism play a major role in the environment and economy of the coastal communities in New York, Connecticut, Rhode Island, and Massachusetts. Visitors from all over the world travel to the area to partake in a variety of onshore and marine recreational activities. Marine recreational activities include wildlife viewing tours, scuba diving, and recreational fishing and boating. Popular onshore recreational activities include beach going, surfing, golfing, and scenic viewing. In 2019, New York State reported that tourists directly spent $73.6 billion in the state, a record high (Tourism Economics 2019a). In Connecticut, visitors directly spent over $9.3 billion in the state in 2017 (Tourism Economics 2019b). Rhode Island visitors spent $4.7 billion in the state in 2019 (Tourism Economics 2019c). In 2018, Massachusetts visitors directly spent $24.2 billion in the state (MOTT 2020).

As indicated by BOEM (2021b) and **Section 8.8 Commercial and Recreational Fishing**, the majority of recreational boaters are found within 3 nm (5.6 km) of the coastline with some recreational and commercial fishing, particularly for migratory species such as tuna, and commercial whale watching trips (see **Section 8.11 Other Coastal and Marine Uses** for more information regarding these activities) occurring further offshore potentially within the Study Area. The majority of the Project-related activities will occur in waters beyond 3 nm (5.6 km) of the shoreline and the nearest wind turbine will be approximately 18 nm (33 km) from the shoreline of Nantucket. Landfall locations in Queens, New York have been selected in industrialized areas not currently used for recreation or tourism to minimize potential effects.

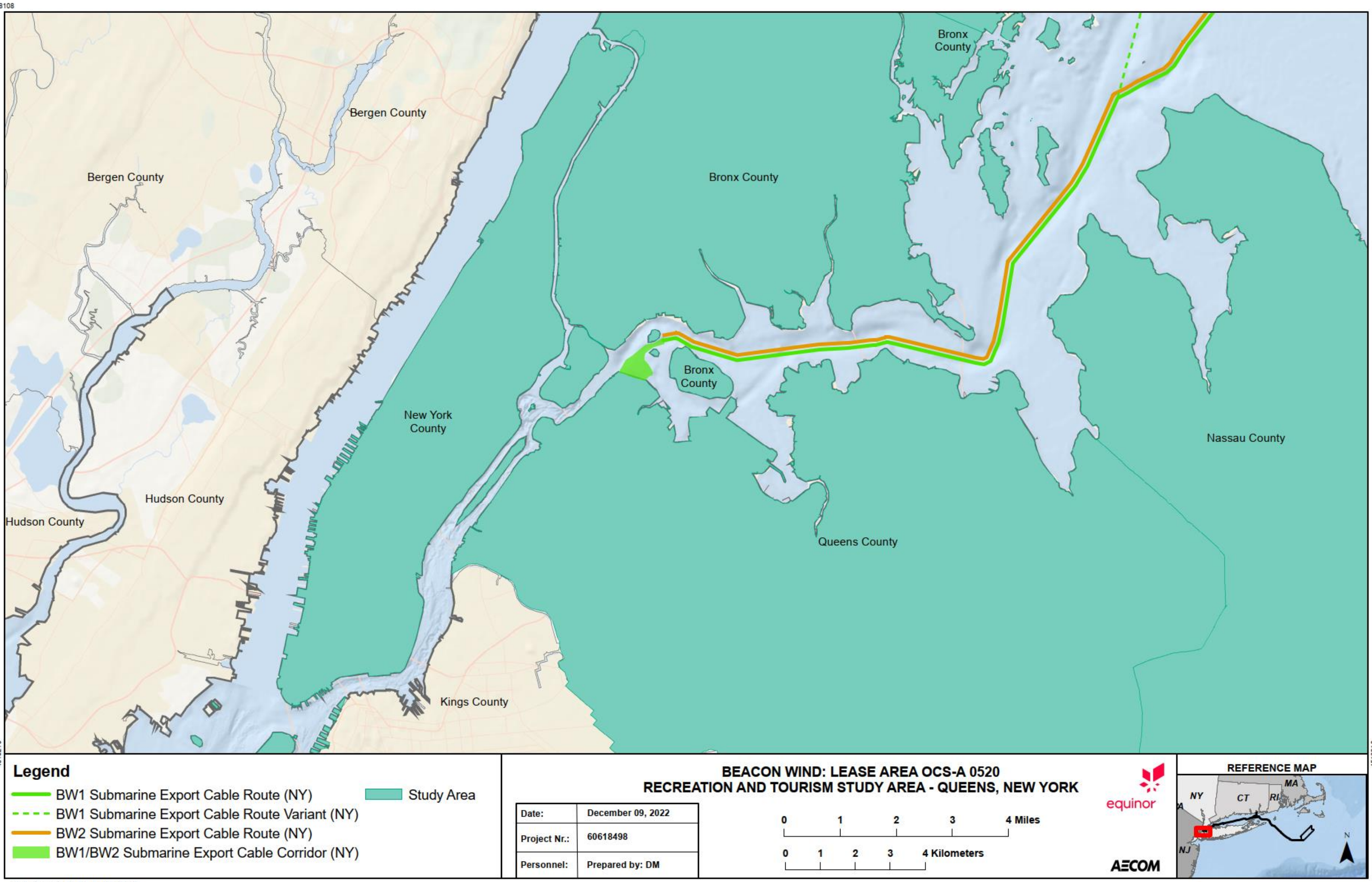
The global pandemic caused by Coronavirus SARS-CoV2-2019 (COVID-19) has disrupted the economy, especially the recreation and tourism sector, and the effects are still unfolding. The data presented in this section reflects pre-pandemic statistics.

FIGURE 8.3-1. RECREATION AND TOURISM STUDY AREA – OVERVIEW



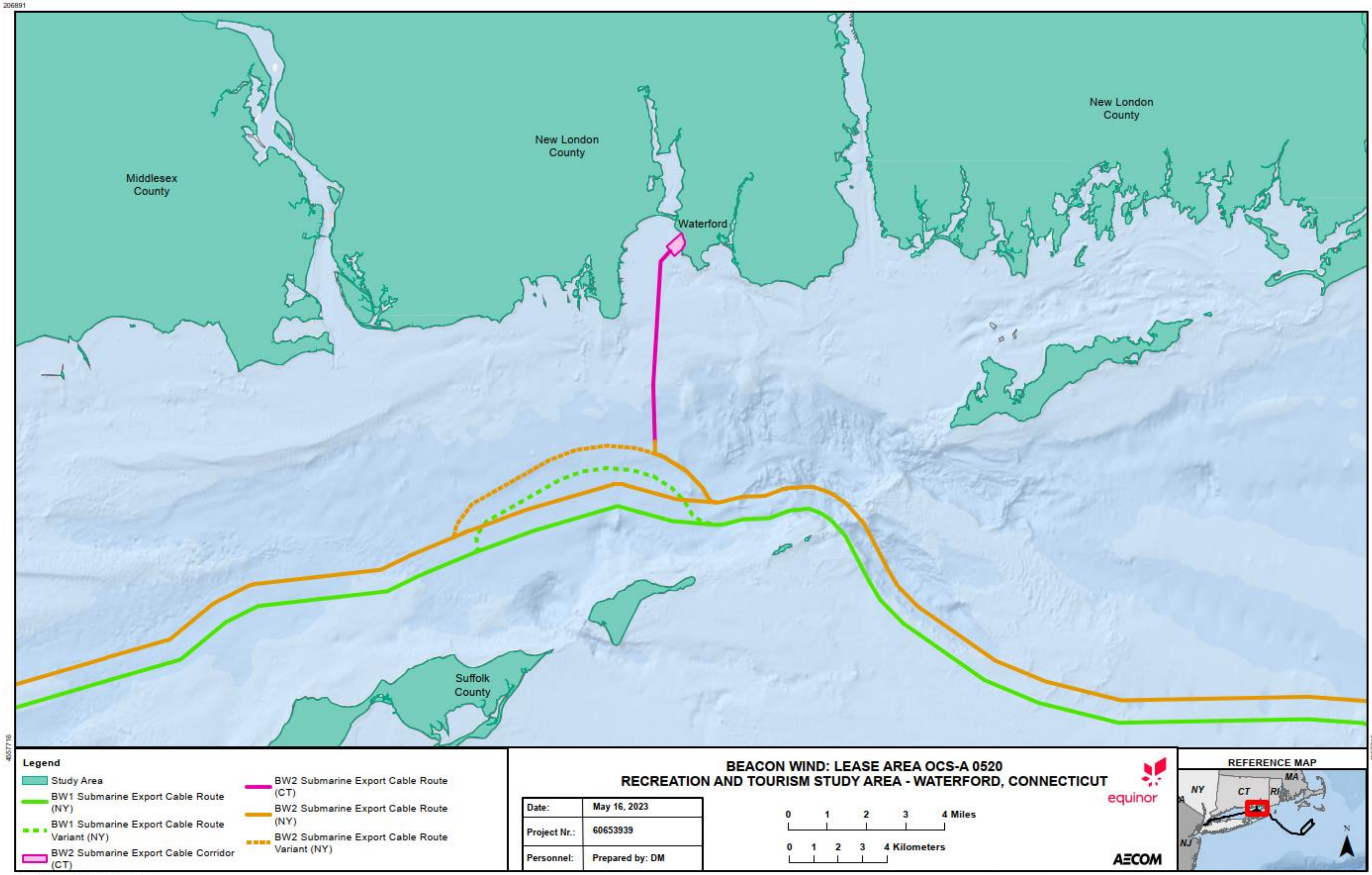
Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

FIGURE 8.3-2. RECREATION AND TOURISM STUDY AREA – QUEENS, NEW YORK



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

FIGURE 8.3-3. RECREATION AND TOURISM STUDY AREA — WATERFORD, CONNECTICUT



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

8.3.1.1 New York

In 2019, the State of New York experienced record high numbers within the recreation and tourism sector, with 265.5 million visitors generating over $117.6 billion dollars total for the local economy. As a result, recreation and tourism is now the third-largest employer in the state (Empire State Development n.d.). The State of New York has always been one of the top tourism destinations in the world, with recreation and tourism divided into 11 economic and geographically diverse regions in the state (Empire State Development n.d.). Five counties (Bronx, Nassau, Queens, Suffolk, and Westchester) that border Long Island Sound along the proposed cable route have been included in the Study Area. The New York communities located along the shoreline of Long Island Sound could be impacted by construction activities associated with the installation of the submarine export cables. The cable landfall is proposed within the Astoria power complex located in Queens County (**Figure 8.3-2**). The SBMT in Kings County is a Project staging area and will house the Project's O&M Base. Construction of the O&M Base will be completed as part of the Empire Wind project's timeline and O&M activities at the SBMT are not expected to impact recreation and tourism.

The tourism industry is mainly centered around the New York City region (including Queens), which accounted for 65 percent of traveler spending in 2019. The Long Island region, the second largest tourism region, accounted for nine percent of traveler spending in 2019. Long Island is a major tourist destination during summer months, particularly eastern Long Island near the mouth of the Long Island Sound, with a high volume of summer visitors that come to enjoy the region's beaches, wildlife, and recreational boating. On the south shore (or 'South Fork') of Suffolk County, at the mouth of Long Island Sound, Montauk Point State Park, Hither Hills, and Napeague State Park are popular seasonal destinations. Popular recreational destinations on the north shore (or 'North Fork') of the county include Greenport, Orient Point County Park, Fishers Island, Wildwood State Park, Sunken Meadow State Park, and Caumsett State Historic Park. Further west, Orchard Beach and Ferry Point Park in the Bronx and Randall's Island (located between Queens, and East Harlem, Manhattan) are very popular recreational destinations.

The New York City and Long Island regions have also experienced growth in traveler spending, with an increase of two to five percent in 2018 and 2019 (Tourism Economics 2019a). As a result, the tourism industry is a key component and driver of these local economies. Traveler spending was approximately evenly split across the five principal industries, with lodging consisting of 29 percent of total spending, followed by food services with 24 percent, transport with 19 percent, retail and gasoline service stations at 18 percent, and recreation at 10 percent (Tourism Economics 2019a).

There is no proposed onshore infrastructure in Bronx, Nassau, Suffolk, and Westchester counties; however, these counties may be within the viewshed of the installation of the submarine export cables. In addition, tourists and recreational boaters departing from ports within Queens County may encounter Project activities associated with submarine export cable construction. The Project elements will enter the geographic coastal boundaries of the LWRPs for New York City, Town of East Hampton and Town of Southold. These LWRPs include recreational boating/fishing, small watercraft and diving as offshore recreation activities in the area and include policies to promote and protect these activities. The Project is consistent with these policies to the extent applicable as the in-water activities proposed will be of limited scope and duration. See **Appendix A Coastal Zone Management Consistency Statements** for additional information regarding Project compliance with the State of New York's approved Coastal Management Program and with the applicable approved LWRPs.

The waterway between the Queens, New York landfall location and the entrance into Long Island Sound is narrow and, in some cases, less than the defined safety zone for construction activities. During installation of the submarine export cables, access to these waterways may be temporarily impacted, limiting recreation, and tourism activities in the immediate area. **Table 8.3-1** shows the number establishments, jobs, and total wages resulting from tourism and recreation in the New York coastal counties with the greatest potential to be affected by Project infrastructure and/or activities (National Ocean Economics Program 2021).

TABLE 8.3-1. ECONOMIC VALUE OF THE NEW YORK TOURISM AND RECREATION SECTOR IN THE STUDY AREA

County	Establishments	Employment	Total Wages (millions)
Bronx	605	4,587	$96.4
Nassau	1,447	17,679	$413.4
Queens	1,304	11,386	$256.2
Suffolk	2,691	35,083	$851.9
Westchester	429	4,755	$124.5

Source:
National Ocean Economics Program 2021.

In addition to the direct impacts from tourism and recreation created by visitors, indirect, and induced impacts from tourism and recreation are also significant. Indirect impacts are those that result from the recreation and tourism sector purchasing goods and services as inputs (e.g., food wholesalers, utilities). Induced impacts are those that result from the spending of an income generated from recreation and tourism that is put back into the local economy. In 2019, both indirect and induced impacts accounted for over $43 billion in expenditures (Tourism Economics 2019a).

8.3.1.2 Connecticut

In 2017,[1] the recreation and tourism sector in the State of Connecticut continued to experience steady growth for the eighth straight year, with over 110 million visitors generating over $9.3 billion dollars total into the local economy, $546 million and $431 million of which went directly to state and local taxes, respectively. As a result, the recreation and tourism sector is now the eighth-largest employer in the State of Connecticut (Tourism Economics 2019b).

Four counties in Connecticut (Fairfield, Middlesex, New Haven, and New London) border Long Island Sound along the proposed cable route and New London County pertains to the BW2 landfall in Waterford, Connecticut (**Figure 8.3-1**). Connecticut's coastline is a main contributor to the state's tourism revenue and recreational activities are directly dependent on use of the shoreline within the Study Area and access to the ocean. As a result, the tourism industry is a key component and driver of these local economies. Traveler spending was approximately evenly split across the five principal

[1] The *Economic Impact of Tourism in Connecticut, 2017* report was published in 2019 and represents the latest official tourism economic impact report published by the state. More important than any single data year is the trends identified within report which indicates a long trend of sector growth which can likely be extrapolated throughout the pre-pandemic period.

industries, with recreation at 29.3 percent of total spending followed by food services with 25.1 percent, lodging consisting of 18 percent, retail at 14.7 percent, and transport with 12 percent (Tourism Economics 2019b). The Connecticut coast is a popular destination in summer months and is home to many marinas and parks with coastal access that attract visitors from Connecticut and neighboring states. The most popular parks along the coastline include Bluff Point, Ocean Beach Park, Harkness State Park, Rocky Neck State Park, Hammonasset Beach State Park, Seaside Park, and Sherwood Island State Park.

The counties that border Long Island Sound in Connecticut are included in the Study Area as they may be within the viewshed of the installation of the export cables. The Waterford, Connecticut landfall and onshore substation facility are located in New London County. Tourists and recreational boaters departing from ports within these counties may encounter Project activities associated with Lease Area or export cable construction. **Table 8.3-2** shows the number of establishments, jobs, and total wages resulting from tourism and recreation in the Connecticut coastal counties with the greatest potential to be affected by Project infrastructure and/or activities (National Ocean Economics Program 2021). In 2017, indirect and induced impacts accounted for an additional $6.2 million in expenditures (Tourism Economics 2019b).

TABLE 8.3-2. TABLE ECONOMIC VALUE OF THE CONNECTICUT TOURISM AND RECREATION SECTOR IN THE STUDY AREA

County	Establishments	Employment	Total Wages (millions)
Fairfield	1,269	17,164	$468.4
Middlesex	180	2,707	$73.9
New Haven	835	11,582	$24.6
New London	487	7,483	$172.9

Source:
National Ocean Economics Program – 2017 Market Data.

8.3.1.3 Rhode Island

The State of Rhode Island recreation and tourism sector experienced over 26.2 million visitors spending $4.7 billion in 2019. Visitor expenditures generated $843 million in Rhode Island state and local tax revenue in 2019 (Tourism Economics 2019c). Traveler spending was approximately evenly split across the five principal industries, with food services at 24 percent of total spending followed by recreation with 22 percent, lodging consisting of 22 percent, retail at 16 percent, and transport with 14 percent (Tourism Economics 2019c). Newport County and Washington County, which includes Block Island, include coastal communities where some visitors travel to experience offshore activities around the Lease Area and submarine export cables (**Figure 8.3-1)**.

The tourism industry is the backbone of the Block Island economy. While home to about 1,000 permanent residents, Block Island can host up to 20,000 visitors per day during peak summer season (Harris and Lang 2019). With 17 miles of beaches, two full scale harbors (Old Harbor and New Harbor) and associated marinas, Block Island is known as one of New England's premier boating destinations. On the mainland, coastal Rhode Island has 24 marinas with some offering recreational offshore fishing and whale watching experiences.

There is no proposed onshore infrastructure in the State of Rhode Island; however, two coastal counties are included in the Study Area as tourists and recreational boaters departing from ports within these counties may encounter Project activities associated with Lease Area or submarine export cable construction. The submarine export cable routes for the Project crosses through Rhode Island's amended geographic location description (GLD) area. With the exception of the submarine export cable construction approximately 7 nm (12.9 km) from Block Island, Project activities are not expected to be visible from the State of Rhode Island. **Table 8.3-3** shows the number of establishments, jobs, and total wages resulting from tourism and recreation in the Rhode Island counties with the greatest potential to be affected by Project infrastructure and/or activities (National Ocean Economics Program 2021).

TABLE 8.3-3. ECONOMIC VALUE OF THE RHODE ISLAND TOURISM AND RECREATION SECTOR IN THE STUDY AREA

County	Establishments	Employment	Total Wages (millions)
Newport	408	6,857	$173.8
Washington	438	6,081	$138.9

Source:
National Ocean Economics Program – 2017 Market Data.

8.3.1.4 Massachusetts

The Commonwealth of Massachusetts recreation and tourism sector experienced over 31.75 million visitors generating $24.2 billion that went into the local economy in 2018. Visitor expenditures generated $1.6 billion in Massachusetts state and local tax revenue in 2018 (MOTT 2020). Recreation and tourism data in the Commonwealth of Massachusetts is broken into 14 counties, with three coastal counties (Barnstable, Dukes, and Nantucket) within the Study Area (**Figure 8.3-1**). The Lease Area is located approximately 17 nm (32 km) from Martha's Vineyard and approximately 21 nm (39 km) from Nantucket off the coast of Massachusetts; these islands are part of Dukes and Nantucket Counties, respectively. Barnstable County on Cape Cod is also included as part of the Study Area due to its proximity to the Lease Area and potential for visual impacts. These counties are the closest to the Project Area and are the focus of the discussion below. Other coastal counties in Massachusetts are at least 35 nm (64.8 km) from the Lease Area and the submarine export cables, so recreation and tourism in these other counties are not likely to be affected by Project activities.

Barnstable County is located along the northern edge of the viewshed for the Beacon Wind Lease Area. The county is host to substantial shoreline that includes Cape Cod. Because of its substantial shoreline, it is home to substantial natural and recreational resources. More than 16,000 people are employed in the recreation and tourism sector within the county and contribute to more than $500 million in earned wages.

Dukes County, off the south coast of Massachusetts has approximately 150 mi (241 km) of coastline consisting of sandy beaches on Martha's Vineyard and the Elizabeth Islands. Dukes County has approximately 15 public beaches, but on its largest and most populated island, Martha's Vineyard, much of the coast is private-access only. There are five harbors, two marinas, and three yacht clubs in Dukes County. The county also has six public boat launch facilities providing access to coastal waters. Dukes County's sole nationally protected land is on Noman's Land Island National Wildlife

Refuge. Gay Head Light is listed on the National Trust for Historic Preservation and the Gay Head Cliffs, where the lighthouse is located, is a National Natural Landmark owned by the Bureau of Indian Affairs in trust with the Wampanoag Tribe of Aquinnah. In 2015, the lighthouse was moved away from the edge of the Gay Head Cliffs to a 50-foot set-back because the cliffs erode at a rate of approximately 2 ft (0.6 m) per year. Nearly a quarter, or approximately 20,000 ac (8,094 ha), of Martha's Vineyard is conserved open space, which includes substantial recreational area. Dukes County's recreation and tourism sectors are supported by 164 establishments. In 2018, these facilities collectively generated over $66 million in annual wages.

Nantucket County has approximately 110 mi (177 km) of shoreline, of which approximately 80 mi (129 km) are comprised of sandy beach open to the public. The Nantucket National Wildlife Refuge accounts for 24 ac (9.7 ha) of nationally protected land and is the only national refuge on the island. Nantucket's two main harbors, Nantucket Harbor and Madaket Harbor, are both popular seasonal destinations for recreational vessels. Nantucket has two yacht clubs and seven marinas. Nantucket County's recreation and tourism sectors are supported by 134 establishments. In 2018, these facilities collectively generated over $52.4 million in annual wages.

There is no construction of onshore infrastructure associated with Beacon Wind currently proposed in Massachusetts. The Port of New Bedford located in Bristol County may be used as a satellite O&M facility; however, the use of this existing port facility is not expected to impact recreation and tourism. Three coastal counties in Massachusetts are located within the viewshed of the wind turbines. The top of the blades on the wind turbines would be visible from portions of Nantucket , Martha's Vineyard and the Elizabeth Islands, and Barnstable County but visibility would be obscured by atmospheric conditions and other wind energy projects that are scheduled to be constructed ahead of Beacon Wind (see **Section 7 Visual Resources** and **Appendix X Seascape, Landscape, and Visual Impact Assessment**). **Table 8.3-4** shows the number of establishments, jobs, and total wages resulting from tourism and recreation in the Massachusetts counties with the greatest potential to be affected by Project infrastructure and/or activities (National Ocean Economics Program 2021).

TABLE 8.3-4. ECONOMIC VALUE OF THE MASSACHUSETTS TOURISM AND RECREATION SECTOR IN THE STUDY AREA

County	Establishments	Employment	Total Wages (millions)
Barnstable	1,226	16,994	$513
Dukes	164	1,415	$52.4
Nantucket	134	1,599	$66.3

Source:
National Ocean Economics Program 2021.

8.3.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts to tourism and recreation resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For recreation and tourism, the maximum design scenario is the presence of new fixed structures offshore (i.e., wind turbines and offshore substation facilities) and onshore (i.e., onshore substation facilities), as described in **Table 8.3-5**. The parameters provided in

Table 8.3-5 represent the maximum potential impact from full build-out. This design concept incorporates a total of up to 157 structures within the Lease Area (made up of up to 155 wind turbines and two offshore substation facilities) with one submarine export cable route for BW1 to Queens, New York and one submarine export cable route for BW2 to Queens, New York or to Waterford, Connecticut and the associated onshore substation facilities.

TABLE 8.3-5. SUMMARY OF MAXIMUM DESIGN SCENARIO PARAMETERS FOR RECREATION AND TOURISM

Parameter	Maximum Design Scenario	Rationale
Construction		
Offshore structures	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities).	Representative of the maximum number of structures.
Nearshore export cable landfall installation	Trenched (open cut trench) methods (BW1 and BW2).	Representative of the maximum disturbance associated with export cable landfall installation, which would potentially impact the enjoyment of nearshore resources.
Safety zones for Project-related vessels and structures	Based on full build-out of the Project (BW1 and BW2), which corresponds to the maximum number of structures (155 wind turbines and two offshore substation facilities) and maximum number of associated vessels and safety zones. 1,640 ft (500 m) around relevant structures, activities, and vessels.	Representative of the maximum cumulative area and duration, which has the potential to impact recreation and tourism users who will be restricted from entering marine areas.
Duration offshore installation	Based on full build-out of the Project (BW1 and BW2) which corresponds to the maximum number of structures (155 wind turbines and two offshore substation facilities), two submarine export cables, interarray cables, and maximum period of cumulative duration for installation.	Representative of the maximum period required to install the offshore components, which has the potential to impact resources in, access to, or enjoyment of the Project Area.

Duration onshore construction	Based on full build-out of the Project (BW1 and BW2)
	• BW1 to Queens, New York.
	• BW2:
	  ○ To Queens, New York or
	  ○ To Waterford, Connecticut.
	Construction and installation of export cable landfalls, onshore export and interconnection cables, and onshore substation facilities.
		Representative of the maximum period required to install the onshore components, which has the potential to temporarily impact resources in the Project Area.

Onshore safety zones	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York. • BW2: ○ To Queens, New York or	Representative of the maximum area in which local traffic would be restricted from entering.

Parameter	Maximum Design Scenario	Rationale
	○ To Waterford, Connecticut The implementation of appropriate safety zones and traffic restrictions.	
Project-related vehicles	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York. • BW2: ○ To Queens, New York or ○ To Waterford, Connecticut. The maximum number of associated Project-related vehicles.	Representative of the maximum number of vehicles, which would result in an increase to local traffic.
Staging and construction areas, including port facilities, work compounds, and lay-down areas	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York • BW2: ○ To Queens, New York or ○ To Waterford, Connecticut. Maximum number of work compounds and lay-down areas required. Some ground disturbing activities may be anticipated. Independent activities to upgrade or modify staging, construction areas, and ports prior to Project use will be the responsibility of the facility owner.	Representative of the maximum area required to facilitate the offshore and onshore construction activities, which has the potential to temporarily impact resources in the Project Area.
Operations and Maintenance		
Offshore structures	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities).	Representative of the presence of new fixed structures in an area that previously had none.
Project-related vessels collision risk	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines, two offshore substation facilities), two submarine export cables, and associated interarray cables. Based on maximum number of vessels and movements for servicing and inspections.	Representative of the maximum number of predicted Project-related vessels for collision risk.
Onshore O&M activities	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York. • BW2: ○ To Queens, New York or ○ To Waterford, Connecticut. Longest operational duration, with the maximum amount of Project-related activities expected per year.	Representative of the maximum amount of activities from the Project during the O&M phase, which would have the potential to impact local traffic patterns and available parking in the Project Area.
Onshore substation facilities	Based on full build-out of the Project (BW1 and BW2):	Representative of the presence of a new structure in an area where

Parameter	Maximum Design Scenario	Rationale

	• BW1 to Queens, New York (up to a 7 ac [2.8 ha] area)
	• BW2:
	  o To Queens, New York (up to a 7 ac [2.8 ha] area) or
	  o To Waterford, Connecticut (up to a 7 ac [2.8 ha] area)
		there was previously none.

O&M Base	4.5-ac (1.8-ha) area.	Representative of an existing structure in an area that will have been developed for this use.

8.3.2.1 Construction

During construction, the potential impact-producing factors to recreation and tourism may include:

- Installation of the offshore components, including the foundations, wind turbines, offshore substation facilities, submarine export cables, and interarray cables;
- Staging activities and assembly of Project components at applicable facilities or areas;
- Construction of onshore electrical systems, including transmission towers and duct banks (installation techniques include trenchless [e.g., HDD, jack and bore, or micro-tunnel] and trenched [open cut trench] methods); and
- Construction of two new onshore substation facilities.

The following impacts may occur as a consequence of factors identified above:

- Short-term increase in construction vessel (offshore) traffic;
- Short-term increase in construction vehicle (onshore) traffic;
- Short-term increase in demand for rental housing; and
- Short-term displacement of recreation and tourism visitors.

Increase in construction vessel (offshore) traffic. An increase in Project-related construction and support vessel traffic transiting to, from, and within the Lease Area, ports, and the submarine export cable routes is anticipated during construction. Vessels associated with the Project will follow operational procedures such as entry/exit points to/from the array and designated routes to/from port. This may include travel within existing Traffic Separation Scheme (TSS) lanes and fairways, as practicable. The 2012 Northeast Recreational Boater Survey, conducted by SeaPlan and the Northeast Regional Ocean Council (NROC), surveyed the boating patterns and economic activity of 373,766 qualified registered boaters from New York, Connecticut, Rhode Island, Massachusetts, Maine, and New Hampshire and found that most recreational boating occurs within 3 nm (5.6 km) of shore and within state waters (Starbuck and Lipsky 2013). Over one-third of the recreational boating activity reported in the survey occurred within the Study Area (comprising approximately 2,224 of the 5,114 boating routes and 1,649 of the 4,635 recreational boater activity areas) (Starbuck and Lipsky 2013). Additional information and figures related to recreational activities assessed during the 2012 Northeast Recreational Boater Survey are provided in **Section 8.11 Other Coastal and Marine Uses**.

Potential impacts from an increase in Project-related vessel traffic to commercial and recreational vessel traffic are further discussed in the **Section 8.7 Marine Transportation and Navigation** and **Appendix BB Navigation Safety Risk Assessment**. As described further in **Section 8.7**, the change in vessel numbers transiting to/from the Lease Area against baseline levels is anticipated to be insignificant and is unlikely to be noticed or felt by other recreation and tourism users during construction. Beacon Wind will provide regular updates regarding construction activity and potentially closed areas to the local marine community and other applicable stakeholders through the Project website, social media, and/or other appropriate communications tools.

Increase in construction (onshore) traffic. An increase in Project-related construction, support, and workforce vehicle traffic along the onshore export and interconnection cable routes, onshore substation facilities, ports, and staging and construction areas is anticipated during construction. Due to the relatively small number of crew members expected and the use of existing energy infrastructure on land, the potential impact of construction vehicle traffic on recreation and tourism during construction activities is anticipated to be minimal due to the small number of crew anticipated. Proposed cable landfall sites are located within existing facilities and construction is not anticipated to disrupt access to beaches or other recreational points of interest.

Activities at staging and construction facilities will be consistent with the established and permitted uses of these facilities and Beacon Wind will comply with applicable permitting standards to limit impacts from Project-related activities. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- Regular updates to the local community through the issuances of Local Notices to Mariners (LNMs), social media, public notices, and/or other appropriate communications tools; and
- The development of a Traffic Management Plan, to be developed in coordination with, and approved by, the affected local municipalities, as applicable.

Temporary increase in demand for construction rental housing. The construction workforce that does not live locally will require rental or temporary accommodations. This increased demand could compete with the tourism rental market. However, the anticipated increase in relocated workers is unlikely to be greater than the available number of temporary housing units and is not expected to create a shortage in the Study Area. As the wind energy industry continues to mature, the construction workforce may live locally since the same ports may be used for various projects. This local workforce would not require temporary housing that could compete with the tourism housing market.

Displacement of recreation and tourism users. During construction activities, safety zones will be implemented around active sites, both offshore, and to a lesser extent, onshore. To ensure the safety of the public during onshore construction activities, construction staging areas will be set up and the public will not be allowed to enter such areas. Water trails (also called “blueways”) are recreational water routes in navigable waterways often used by canoers and other paddle sports. One water trail is located near the onshore cable landings and substation facilities in Queens, New York – the Bronx River Blueway in the Bronx, near the Queens, New York cable landfall site (Northeast Ocean Data 2021). The Niantic River Kayak Trail is in the Niantic River estuary northwest of the Waterford, Connecticut submarine export cable landfall site, and other fishing and boating activities occur in the vicinity of the Waterford, Connecticut landfall site (Northeast Ocean Data 2021). Access to these resources could be temporarily impacted by the use of safety zones during cable installation.

Offshore, to ensure the safety of local mariners, the work crew, and equipment, Beacon Wind proposes to work with the USCG to establish temporary safety zones in active construction areas within 12 nm (22.2 km) of the coast, depending on the nature and extent of construction activity. These zones would extend approximately 1,640 ft (500 m) around relevant structures, activities, and vessels. This approach for establishing safety zones is consistent with the FEIS for the Vineyard Wind project (BOEM 2021b). Should USCG Safety Zone authorities not extend beyond 12 nm (22.2 km) at the time of construction, Beacon Wind will utilize a combination of safety vessels, LNMs, and International Regulations for Preventing Collisions (COLREGS) to promote awareness of these activities as well as the safety of the construction equipment and personnel. Areas will be marked and lit in accordance with BOEM (2021a) and USCG requirements and will be monitored by a security boat that will be available to assist local mariners. The locations of the safety zones will be posted in LNMs, as well as on the Project website. Vessels will not be permitted to enter the safety zone without express consent from Beacon Wind. Recreational users will likely be restricted by the application of these safety zones; however, these restrictions will only be short-term and localized. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- The addition of safety vessels to monitor active construction sites and the proper marking of such sites; and
- The provision of regular Project updates to the local community through the issuance of LNMs, social media, public notices, and/or other appropriate communication tools.

8.3.2.2 Operations and Maintenance

During operations, the potential impact-producing factors to recreation and tourism uses may include:

- The presence of fixed structures (e.g., wind turbines and offshore substation facilities);
- Operations and maintenance activities associated with the onshore export and interconnection cables and onshore substation facilities;
- Operations and maintenance activities associated with the offshore components of the Project; and
- Operations at the O&M Base.

The following impacts may occur as a consequence of the factors identified above:

- Long-term modification of existing uses;
- Long-term change in demand for rental properties; and
- Long-term presence of new fixed structures (e.g., wind turbines and offshore substations) in the Lease Area.

Modified existing uses and the presence of new fixed structures. The onshore components of the Project will be located within existing roads, rights-of-way, and infrastructure sites that have been cleared, previously disturbed, zoned for the proposed use, and are not currently used for recreation or tourism. Therefore, no impacts to onshore recreation and tourism uses are expected as a result of the Project operations. Offshore, the operation of the wind farm will create a new permanent navigational pattern within the Lease Area (see **Section 8.7 Marine Transportation and Navigation** and **Appendix BB Navigation Safety Risk Assessment** for a discussion of navigation safety); however, users will not be excluded from using the area and existing uses will be able to continue. Additionally, the Project has adopted the universal 1x1 nm (1.9x1.9 km) layout (see **Section 3 Project Description**) along with neighboring projects to aid in ease of navigation within the OCS-A 0520 Lease Area.

The presence of new fixed structures within the Lease Area also has the potential to attract new marine users. It is possible that the wind farm could become a tourist attraction, creating a new use. This was observed with the Block Island Lease Area OCS-A 0487, which has seen an increase in tourism through the renting of vessels/charter services and the creation of new businesses to support the new visitor demand (Brookins 2017; Carr-Harris and Lang 2019). Lilley et al. (2010) also found that recreation and tourism users have an interest in paying for a boat tour to see the offshore wind farm. Hy-Line Cruises, based in Hyannis, had expressed interest in operating sightseeing vessels to other offshore projects with the expectation that such facilities will be popular tourist destinations (Cassidy 2011). This was also observed within the Block Island Wind Farm, with local vessel owners using their vessels full-time to take tourists to view the project (Brunetti 2018).

There are currently several offshore recreational fishing areas in the Study Area, including “The Star” which is located in the Lease Area at the northern edge along the 20 and 30 fathom line (**Figure 8.3-4**) and “The Dump,” an approximately 64,000-ac (25,900-ha) Dumping Area identified on National Oceanic and Atmospheric Administration charts near the southern end of Lease Areas OCS-A 500 and OCS-A 0501 (Epsilon Associates 2018). “The Star,” along with “The Dump” and others (“The Owl” and “Gordon’s Gully”) are popular locations for vessels targeting highly migratory and other recreational species. BOEM (2021b) indicated that in southern New England between 2002 and 2018, approximately 12 percent of the fishing trips for highly migratory species (HMS) such as federally-regulated sharks, blue and white marlin, sailfish, roundscale spearfish, swordfish, and federally-regulated tunas occurred within the MA/RI WEA. The Vineyard Wind Lease Area (OCS-A-501), located adjacent to the Beacon Wind Lease Area (OCS-A 0520), accounted for one to five percent of the total fishing trips in southern New England and six to 28 percent of trips in the MA/RI WEA, depending on the year. The waters to the south and east of Montauk Point and Block Island are also popular for HMS fishing (BOEM 2021b).

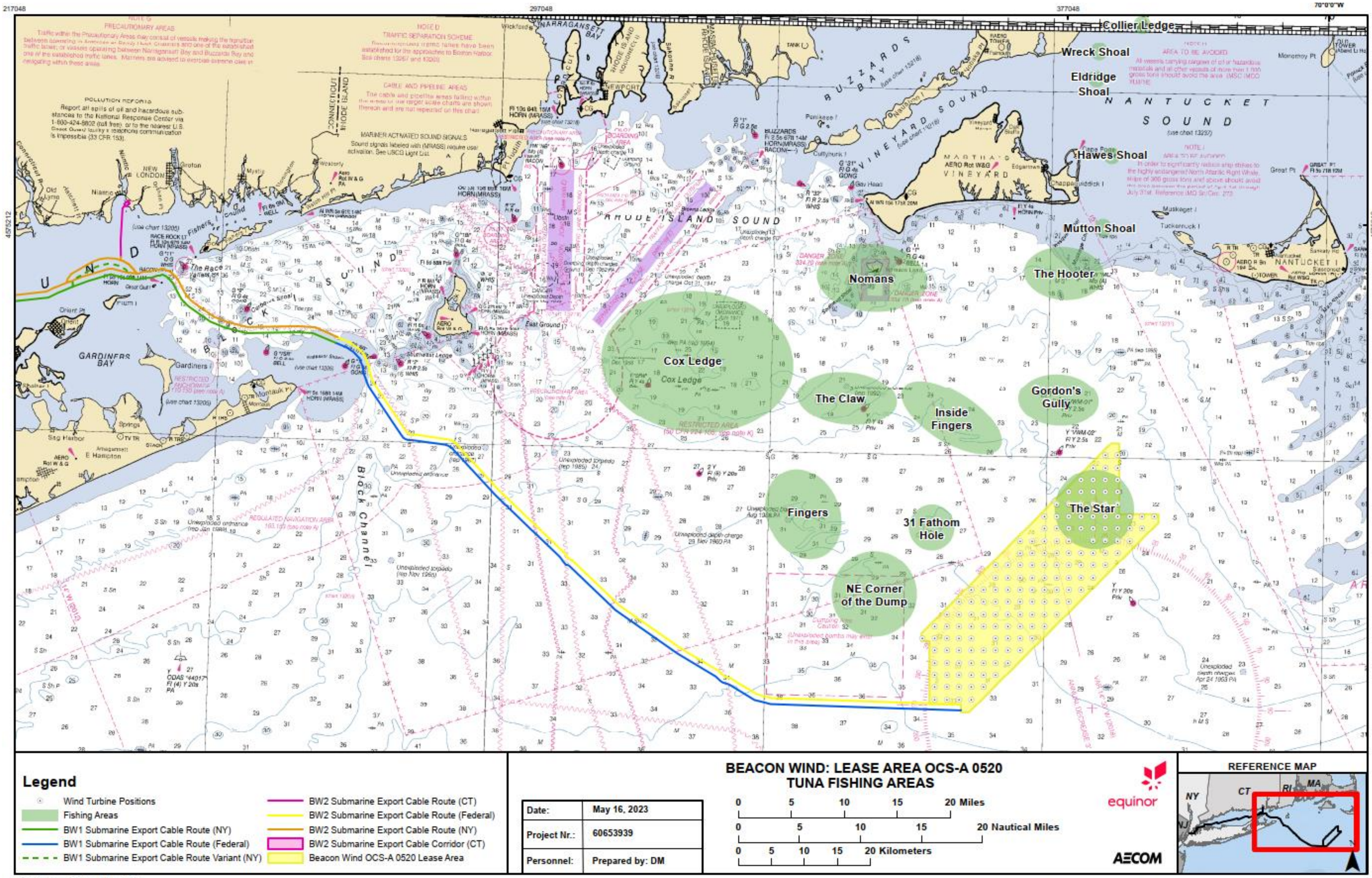
The intensity and locations of recreational fishing within the OCS-A 0520 Lease Area are not expected to be affected by the Project. The proposed Project may provide some positive effects to recreational fisheries by creating fish-friendly habitats for certain species (Kirkpatrick et al. 2017). It has been recognized that the scour protection around the wind turbines and offshore substation facilities may function as fish aggregating devices and provide additional habitat for certain species, which could provide new opportunities for recreational fishing (BOEM 2018) (see **Section 8.8 Commercial and Recreational Fishing** for additional details on fisheries). This may result in an increased interest in recreational fishing within the Lease Area. The magnitude of the benefit of additional fish habitat generated by the scour protection to recreational anglers may be reduced by the distance of the Lease Area from the shore (BOEM 2018). Anglers’ interest in visiting the Lease Area may also lead to an increased number of fishing trips out of nearby ports, which could support an increase in angler expenditures at local bait shops, gas stations, and other shore-side dependents (Kirkpatrick et al. 2017).

A 2020 study of recreational boaters found that it is unlikely that offshore wind project-related activities in the MA/RI WEA would have significant impacts on recreational boating because the boaters surveyed preferred to use waters closer to the coast (BOEM 2021b; Dalton et al. 2020). Recreational boaters who venture further away from the coast in the direction of the Lease Area would benefit from the increased abundance of targeted fish species that has been observed near offshore wind facilities (BOEM 2021b).

No changes to existing uses are expected along the submarine export cable routes. In addition, the presence of Project-related vessels in close proximity to the operational wind farm will provide a positive beneficial impact through the provision of immediate emergency assistance in the event of an emergency situation. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- The wind turbines and offshore substation facilities will be properly marked with a distinct identifier or number in accordance with BOEM (2021a) Lighting and Marking guidelines and USCG First District LNM entry 44-20 guidelines, including Private Aids to Navigation (PATON) requirements, to promote clarity of navigation for mariners (see **Section 3 Project Description** for additional details on the proposed marking and lighting measures); and
- Vessels will not be restricted from entering the operational wind farm areas; as a result, these structures may attract local charters for sightseeing and recreational fishing.
- The visibility of wind turbines and associated lighting may be of concern for coastal communities dependent on recreation and tourism however, wind turbines will be difficult to see from the shoreline of coastal communities in the Project region, particularly during the summer months, and are expected to not impact onshore and nearshore recreational resources (BOEM 2020). A visual impact assessment is provided in **Appendix X Seascape, Landscape, and Visual Impact Assessment.**

FIGURE 8.3-4. TUNA FISHING AREAS IN THE VICINITY OF THE BEACON WIND LEASE AREA



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

Change in demand for rental properties. Negative impacts to vacation rental property values due to decreased demand as a result of the Project are not anticipated during the operations phase (see also **Section 8.1 Population, Economy, Employment, and Housing and Property Values**). The onshore components of the Project are sited in existing rights-of-way and within previously developed areas designated for such uses, to the extent practicable. The visibility of wind turbines and associated lighting may be of concern for coastal communities dependent on recreation and tourism activities. **Section 7 Visual Resources** and **Appendix X Seascape, Landscape, and Visual Impact Assessment** describe the visibility of the offshore Project features. **Appendix X Seascape, Landscape, and Visual Impact Assessment** also includes visual simulations of the offshore wind turbines from 17 key observation points. This analysis indicates that turbines would primarily be visible from the south-facing coastlines on Nantucket and Martha's Vineyard. Approximately 22 percent of the land area in Martha's Vineyard and 35 percent of the land area in Nantucket would have some visibility of the Project.

Aviation lighting that will be required on the turbines at nighttime will be visible low on the horizon and will also be obscured by atmospheric conditions and other wind energy projects. Beacon Wind is considering the use of agency-approved-ADLS and is actively completing an evaluation to determine the impacts of the implementation of this system. This commitment as a mitigation is subject to final Project evaluation and agency approval.

A 2017 visual preference study found that there was minimal effect on vacation rental values associated with offshore wind farms when located more than 8 mi (12.9 km) from shore (Lutzeyer et al. 2017). A University of Delaware study found that wind turbines visible more than 15 mi (24.1 km) from a viewer would have negligible impacts on businesses dependent on recreation and tourism activity (Parsons and Firestone 2018; BOEM 2021b). The nearest wind turbine within the Lease Area will be approximately 18 nm (33 km) from the shoreline of Nantucket.

Further, a 2019 study on the effect of the Block Island Wind Farm found that the presence of the wind farm resulted in a significant increase in nightly reservations, occupancy rates, and monthly revenues for Airbnb properties on Block Island during the peak tourism months of July and August (although no effect was seen in other months) (Carr-Harris and Lang 2019). This study points out that demand could initially be higher and then decrease over the life of the project as the novelty wears off. Therefore, it is possible that there would be an increase in demand for rental properties, at least for a period of time, once the Project is constructed.

8.3.2.3 Decommissioning

Impacts during decommissioning are expected to be similar to or less than those experienced during construction, as described in **Section 8.3.2.1**. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Beacon Wind anticipates will be needed for the Project, please see **Section 3 Project Description**.

8.3.3 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors described in **Section 8.3.2**, the Project is proposing to implement the following avoidance, minimization, and mitigation measures.

8.3.3.1 Construction

During construction, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.3.2.1**:

- The addition of safety vessels to monitor active construction sites and the proper marking of such sites;
- The development of a Traffic Management Plan to be developed in coordination with, and approved by, the affected local communities; and
- The provision of regular Project updates to the local community through the issuance of LNMs, social media, public notice, and/or other appropriate communication tools.

8.3.3.2 Operations and Maintenance

During operations, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.3.2.2**:

- The wind turbines and offshore substation facilities will be properly marked in accordance with BOEM (2021a) Lighting and Marking guidelines and USCG First District LNM entry 44-20 guidelines, including PATON requirements, (see **Section 3 Project Description** for additional details on the proposed marking and lighting measures); and
- Vessels will not be restricted from entering the operational wind farm areas, and as a result these structures may attract local charters for sightseeing and recreational fishing.

8.3.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in **Sections 8.3.3.1** and **8.3.3.2**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

8.3.4 References

TABLE 8.3-6. SUMMARY OF DATA SOURCES

Source	Includes	Available at	Metadata Link
Northeast Ocean Data	Water Trails	https://www.northeastoceandata.org/	https://www.northeastoceandata.org/files/metadata/Themes/Recreation/WaterTrails.pdf
Northeast Ocean Data	Recreational Boater Activities	https://www.northeastoceandata.org/	https://www.northeastoceandata.org/files/metadata/Themes/Recreation/RecreationalBoaterActivities.pdf
Northeast Ocean Data	Recreational Boater Routes	https://www.northeastoceandata.org/	https://www.northeastoceandata.org/files/metadata/Themes/Recreation/RecreationalBoaterRoutes.pdf

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8.4 Environmental Justice

As defined by the EPA, Environmental Justice (EJ) is "the fair treatment and meaningful involvement of people, regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies" (EPA 2018a). EJ is based on the principles of fair treatment and meaningful involvement. Fair treatment means "no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies." Meaningful involvement means that "people have an opportunity to participate in decisions about activities that may affect their environment and/or health," that the public's concerns will be considered and have an opportunity to influence the regulatory agency's decision, and that those who may be affected will be sought out and encouraged to be involved (EPA 2018a).

The principles of EJ are enforced through *Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, which requires federal agencies to take appropriate steps to identify and address disproportionately high and adverse health or environmental effects of federal actions on minority and low-income populations (EPA 1997).

In response to Executive Order 12898, the Council on Environmental Quality (CEQ) developed guidelines to assist federal agencies in maintaining compliance with EJ during the NEPA process. The guidelines include the following six principles that should be utilized when conducting an EJ analysis (EPA 2018b):

- Consider the composition of the affected area to determine whether low-income, minority or tribal populations are present and whether there may be disproportionately high and adverse human health or environmental effects on these populations;
- Consider relevant public health and industry data concerning the potential for multiple exposures or cumulative exposure to human health or environmental hazards in the affected population, as well as historical patterns of exposure to environmental hazards;
- Recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed action;
- Develop effective public participation strategies;
- Assure meaningful community representation in the process, beginning at the earliest possible time; and
- Seek tribal representation in the process.

According to the CEQ guidance document, minorities are those groups including American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. Minority populations are defined where either (a) the minority population of the affected area exceeds 50 percent, or (b) the minority population of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. The CEQ guidance also directs low-income populations to be identified based on the annual statistical poverty thresholds from the Census Bureau. For the purpose of analysis in this section, low-income populations are defined as those individuals with reported income below the poverty threshold defined by the Census Bureau in the 12 months before the survey (U.S. Census Bureau 2019a).

This section describes environmental justice communities in the Project Area. Potential impacts to environmental justice communities resulting from construction, operations, and decommissioning of the Project are discussed. Proposed Project-specific measures adopted by Beacon Wind are also described; these measures are intended to avoid, minimize, and/or mitigate potential impacts to these communities.

Other resources and assessments detailed within this COP that are related to environmental justice communities include:

- Population, Economy, Employment, and Housing and Property Values (**Section 8.1**);
- Land Use and Zoning (**Section 8.2**); and
- Land Transportation and Traffic (**Section 8.5**).

Data Relied Upon and Studies Completed

For the purposes of this section, the Study Area includes the counties that may be directly and/or indirectly impacted by the onshore components, including the onshore export and interconnection cable routes and the onshore substation facilities, and the staging and construction areas associated with the construction, operations and decommissioning of the Project. In addition to the counties surrounding the BW1 (Queens, New York) and BW2 (Waterford, Connecticut or Queens, New York) landfall sites (see **Figure 8.4-1** to **Figure 8.4-5**), the Study Area includes four counties in Massachusetts. The Port of New Bedford located in Bristol County may be used as a satellite O&M facility and locations within Dukes County, Nantucket County, and Barnstable County are within the viewshed of the wind turbines (see **Figure 8.4-6** to **Figure 8.4-9**).

This section relies upon data collected from the ACS through the U.S. Census Bureau, the EPA EJSCREEN Tool (specifically their demographic index which combines low-income populations and people of color at the block group level), and data provided by the Connecticut Department of Energy and Environmental Protection (CTDEEP), New York State Department of Environmental Conservation (NYSDEC), and the Massachusetts' Executive Office of Energy and Environmental Affairs (MAEEA). EJ data from the EPA EJSCREEN tool and relevant state agencies are presented in **Figure 8.4-1** to **Figure 8.4-9**. Data for both the EPA EJSCREEN tool and state layers are presented at the block group level for the relevant counties of BW1 and BW2.[2] The EJSCREEN tool allows for comparison across state boundaries by providing a common data set. In addition to the figures providing state-level data, information from NYSDEC, MAEEA and CTDEEP are provided in **Table 8.4-2** for additional context on potential EJ communities within the Study Area.

The agency and stakeholder coordination and meetings conducted on behalf of the Project are summarized in **Appendix B Summary of External Engagement Activities**.

8.4.1 Affected Environment

For the purposes of this section, the communities that may be impacted by potential onshore Project activities were identified. In addition, communities located within the viewshed of the wind turbines were identified. **Table 8.4-1** includes the locations where Project construction, operations, or decommissioning activities will occur and the areas within the viewshed of the wind turbines. **Figure 8.4-1** to **Figure 8.4-9** identify the areas where potential EJ communities exist in counties affected by Project activities. Potential EJ communities are proximal to Project components including at the Astoria

[2] Note that Connecticut identifies EJ Block groups and Distressed Municipality. If a town or city is identified as a Distressed Municipality no state block group-level data will be displayed.

power complex in Queens, New York and Waterford, Connecticut as the onshore activities have the potential to impact EJ communities. Additional detail regarding which of the potential EJ communities in these counties may be affected by the Project is included following **Figure 8.4-9**.

EJ populations in the Study Area experience elevated levels of pollutants (increasing health risks from a variety of sources) as well experience increased rates of poverty, linguistic isolation and minority status which make them more sensitive to proposed actions. The fossil fuel-based generation that occurs at the Astoria power complex and other regional generation sites are contributors to regional pollutant levels and a transition towards renewables will help reduce reliance on such generation methods. Moreover, the use of the AGRE parcel for BW1 and/or BW2, which is currently a gas-powered generation site, would ultimately lead to the elimination of harmful pollutants and replace that capacity with renewable power generated by the offshore wind turbines. It should be noted that the AGRE facility currently exceeds NYSDEC regulations for nitrogen oxide emissions (Sierra Club 2022).

Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Beacon Wind expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards, which Beacon Wind will comply with in using the facilities.

As noted in the Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore Rhode Island and Massachusetts, Revised Environmental Assessment, the MA/RI WEA, which includes the Beacon Wind OCS-A 0520 Lease Area along with six other lease areas, is 10.4 nm (19.3 km) or more from the nearest coastline, a great enough distance from environmental justice communities exists to prevent disproportionally high or adverse environmental or health impacts on minority or low-income populations that may be located within Rhode Island and Massachusetts (BOEM 2013). Similarly, the emissions analysis conducted for the Vineyard Wind FEIS determined that despite the presumed overlapping construction periods of different wind projects in the MA/RI WEA, the total emissions generated would not significantly impact EJ communities as the activities would be along vessel routes and offshore work areas. The FEIS also cited the positive health outcomes associated with offshore wind and its potential to lower both GHG emissions and fine particulate matter, which has traditionally had a disproportionate impact on minority populations (BOEM 2021).

TABLE 8.4-1. COUNTIES WITHIN THE EJ STUDY AREA

State	County	EJ Communities Present (Yes/No) a/
New York	Bronx	Yes
	Kings	Yes b/
	New York	Yes
	Queens	Yes c/
Connecticut	New London	Yes
Massachusetts	Barnstable	Yes
	Bristol	Yes d/
	Dukes	Yes e/
	Nantucket	No f/

Notes:

a/ The following counties are within the Study Area used for investigating possible impacts to potential EJ communities. As noted previously, different metrics can be used for defining where EJ communities may and may not exist. The more detailed information included below provides mapping using the EPA's EJSCREEN Tool and relevant state level authorities, as well as tabular data at the county level for percent low income and percent minority. A 'yes' in this column indicates that portions of the listed county do contain a potential EJ community. For more detailed information on EJ communities, view Figure 8.4-1 to Figure 8.4-9 and Table 8.4-2.

b/ The SBMT in Sunset Park is considered to be a project staging area and an O&M Base. The O&M Base at the SBMT will be constructed to support both the Empire Wind project and the Beacon Wind project. As indicated in Section 3.5 Operations and Maintenance Activities, construction of the O&M Base is addressed through the Empire Wind permitting process; therefore, this location is not illustrated in the figures shown below.

c/ The Astoria power complex in the Steinway section of Astoria in Queens, New York is considered to be the export cable landfall site for BW1 and is under consideration for BW2 (see Figure 8.4-1 to Figure 8.4-4).

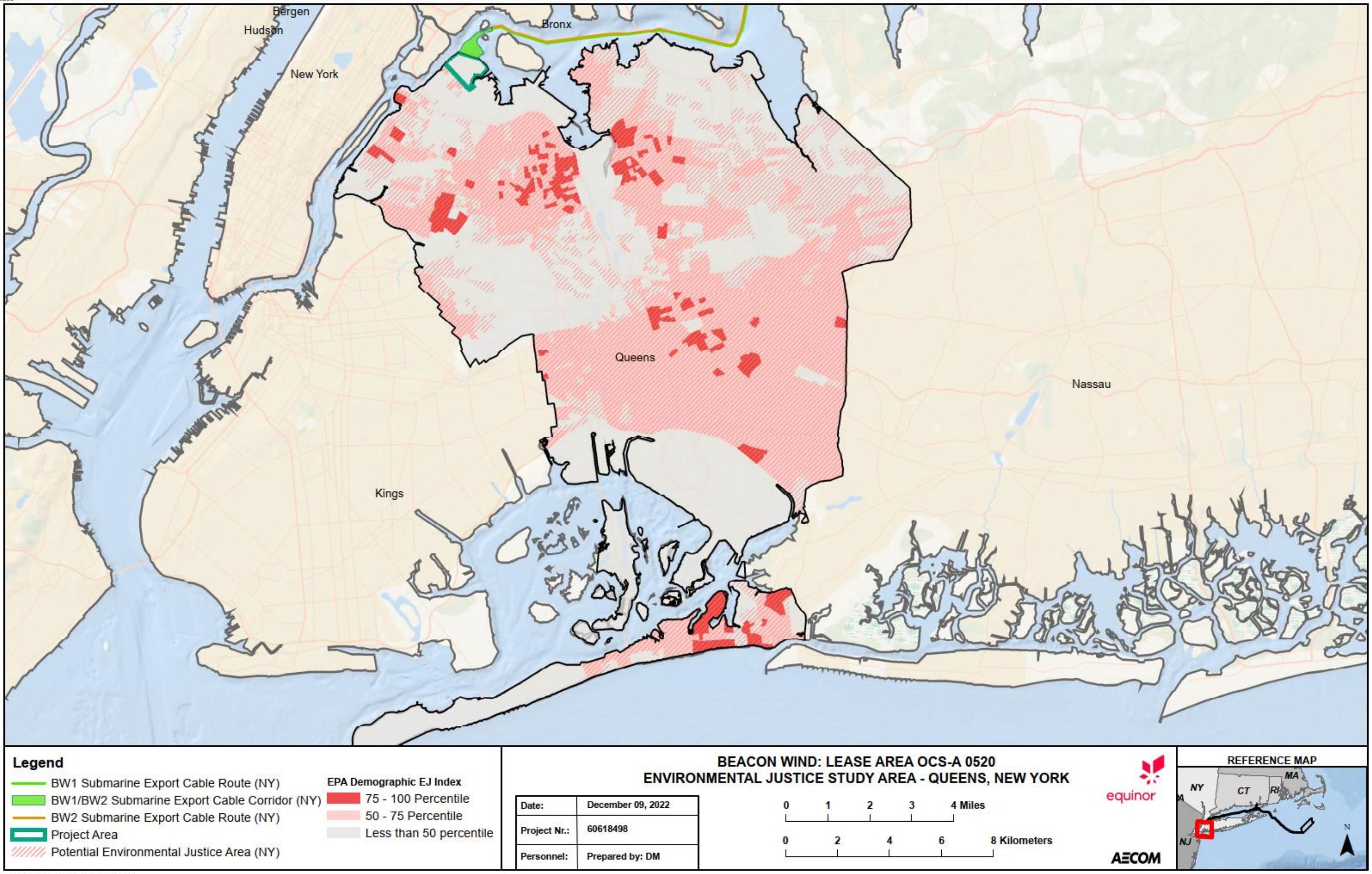
d/ Portions of Bristol County contain potential EJ populations including sections of New Bedford, which meet MAEEA thresholds for EJ populations for both income and minority population. The Port of New Bedford located in Bristol County may be used as a satellite O&M facility, but these O&M activities are not expected to significantly impact the surrounding community as the Project's uses would be consistent with existing use.

e/ The town of Aquinnah on the western point of Martha's Vineyard is considered an EJ community based on MAEEA thresholds. Additionally, four other block groups are identified as potential EJ communities by MAEEA thresholds for either minority population or income.

f/ The EPA Demographic EJ Index shown on Figure 8.4-9 indicates an index of less than the 50th percentile for the entire area, however MAEEA data indicates that one block group on the southern coast is identified as a potential EJ community based on state minority threshold.

FIGURE 8.4-1. POTENTIAL ENVIRONMENTAL JUSTICE COMMUNITIES – QUEENS COUNTY, NEW YORK

68255



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

Document Path: C:\Users\MarolaD\AECOM\Equinor - Site Folders\Reports\BW2 COP\working\Section 8.4 - Environmental Justice\Fig_8-4-1_CountiesFeatures_EnvJustice_Astoria_Queens.mxd

FIGURE 8.4-2 POTENTIAL ENVIRONMENTAL JUSTICE COMMUNITIES — NEW YORK COUNTY, NEW YORK

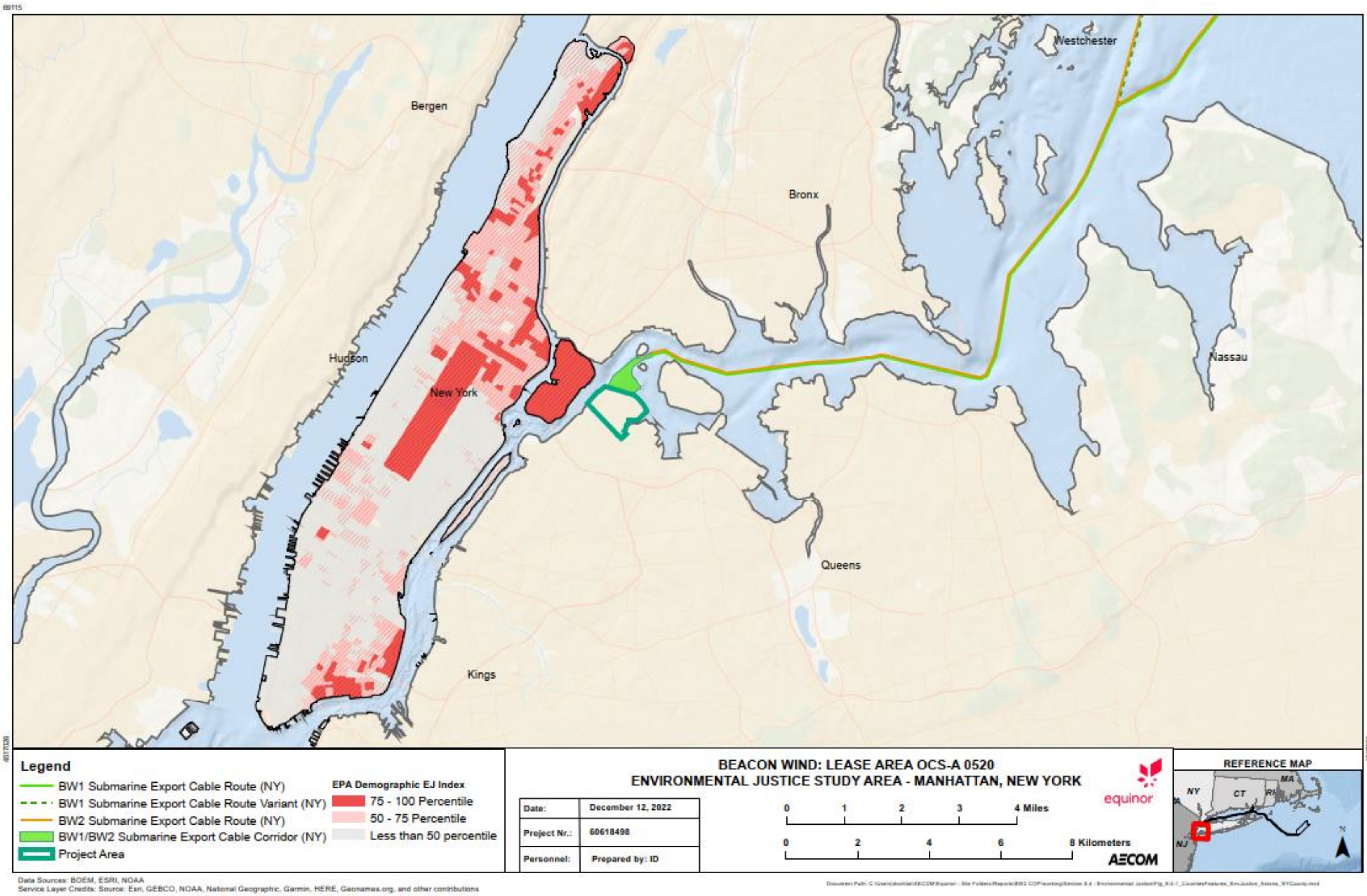
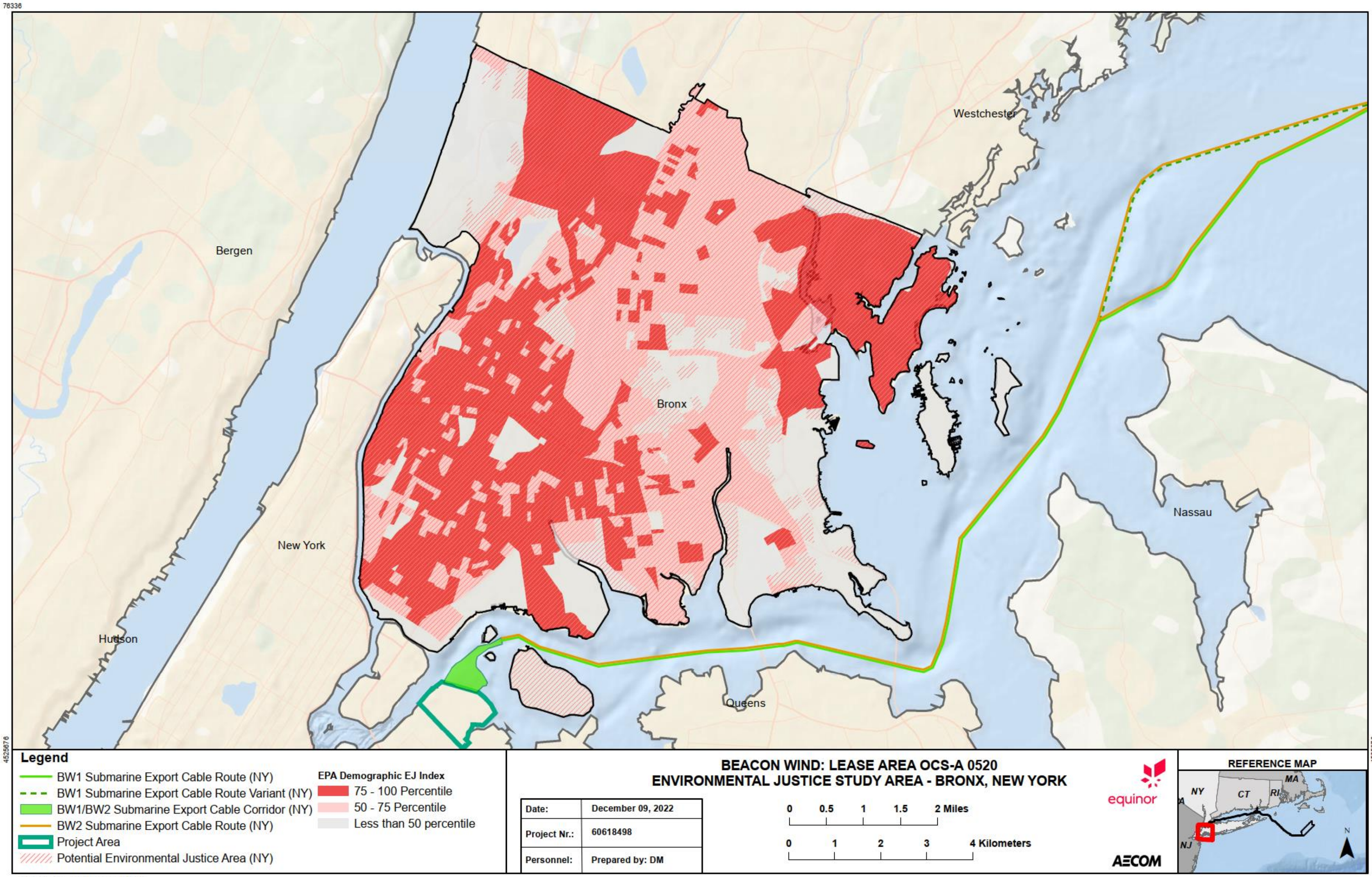
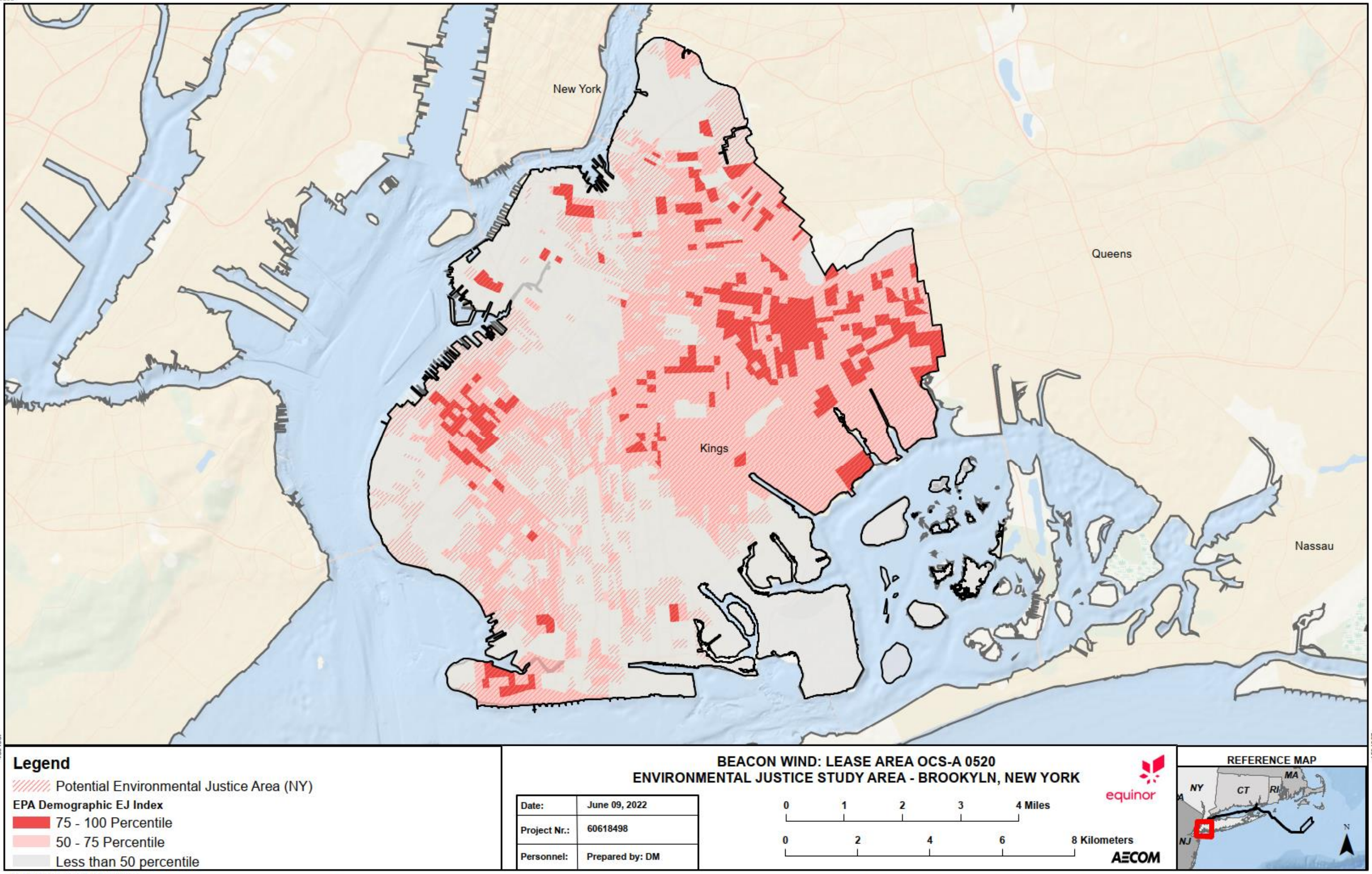


FIGURE 8.4-3 POTENTIAL ENVIRONMENTAL JUSTICE COMMUNITIES — BRONX COUNTY, NEW YORK



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

FIGURE 8.4-4 POTENTIAL ENVIRONMENTAL JUSTICE COMMUNITIES — KINGS COUNTY, NEW YORK



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

FIGURE 8.4-5 POTENTIAL ENVIRONMENTAL JUSTICE COMMUNITIES — NEW LONDON COUNTY, CONNECTICUT

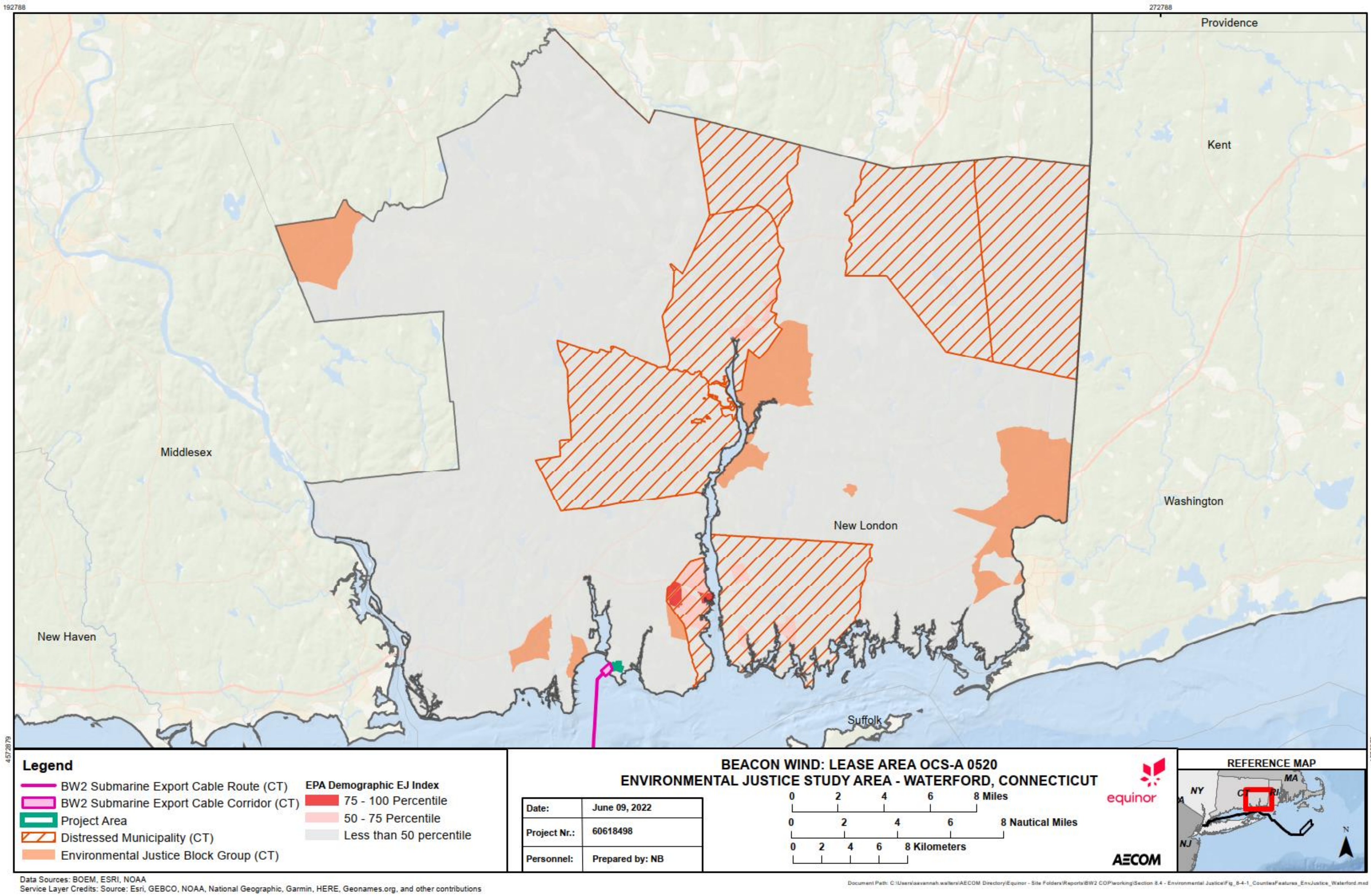
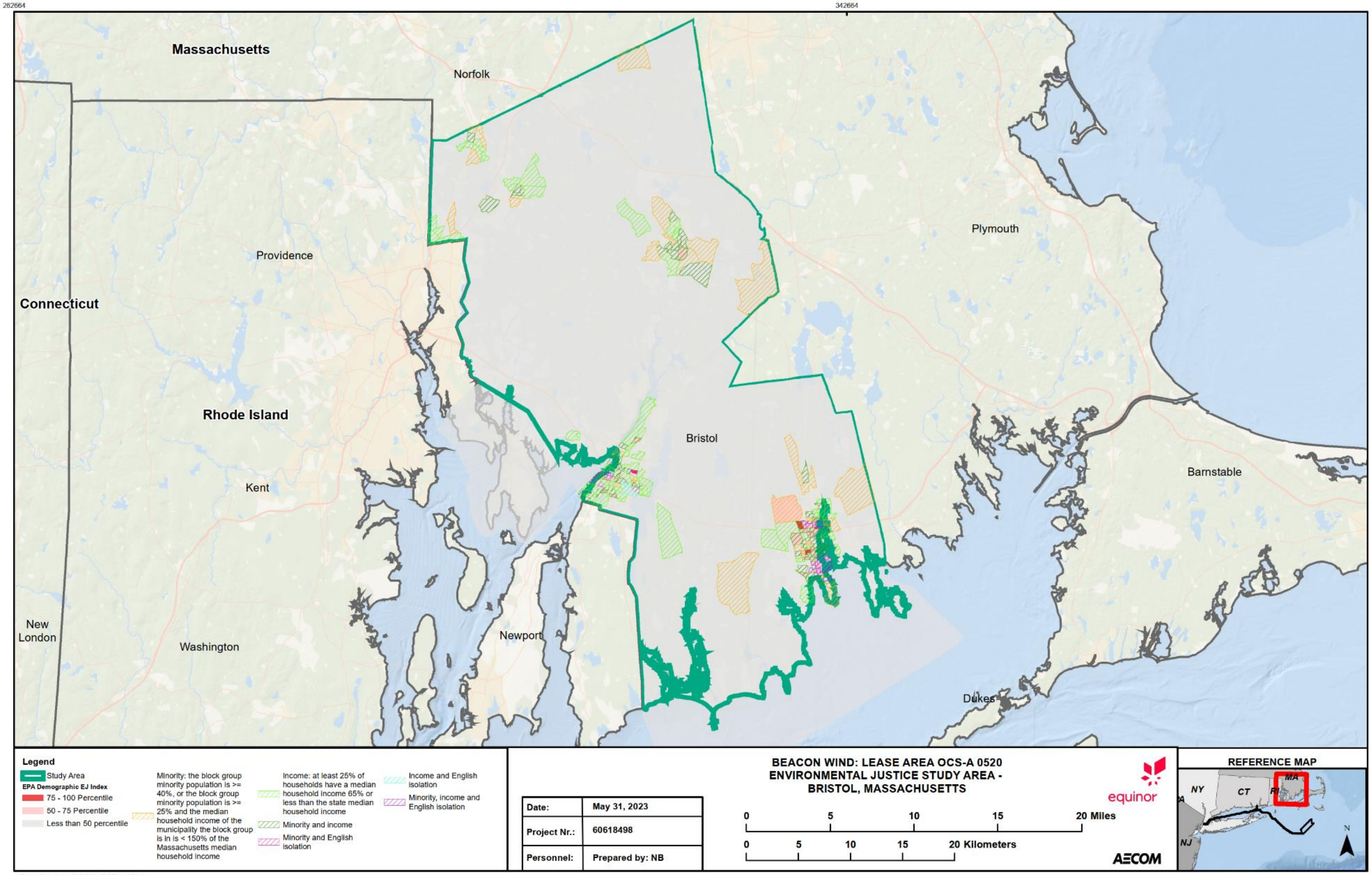


FIGURE 8.4-6 POTENTIAL ENVIRONMENTAL JUSTICE COMMUNITIES — BRISTOL COUNTY, MASSACHUSETTS



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

FIGURE 8.4-7 POTENTIAL ENVIRONMENTAL JUSTICE COMMUNITIES — BARNSTABLE COUNTY, MASSACHUSETTS

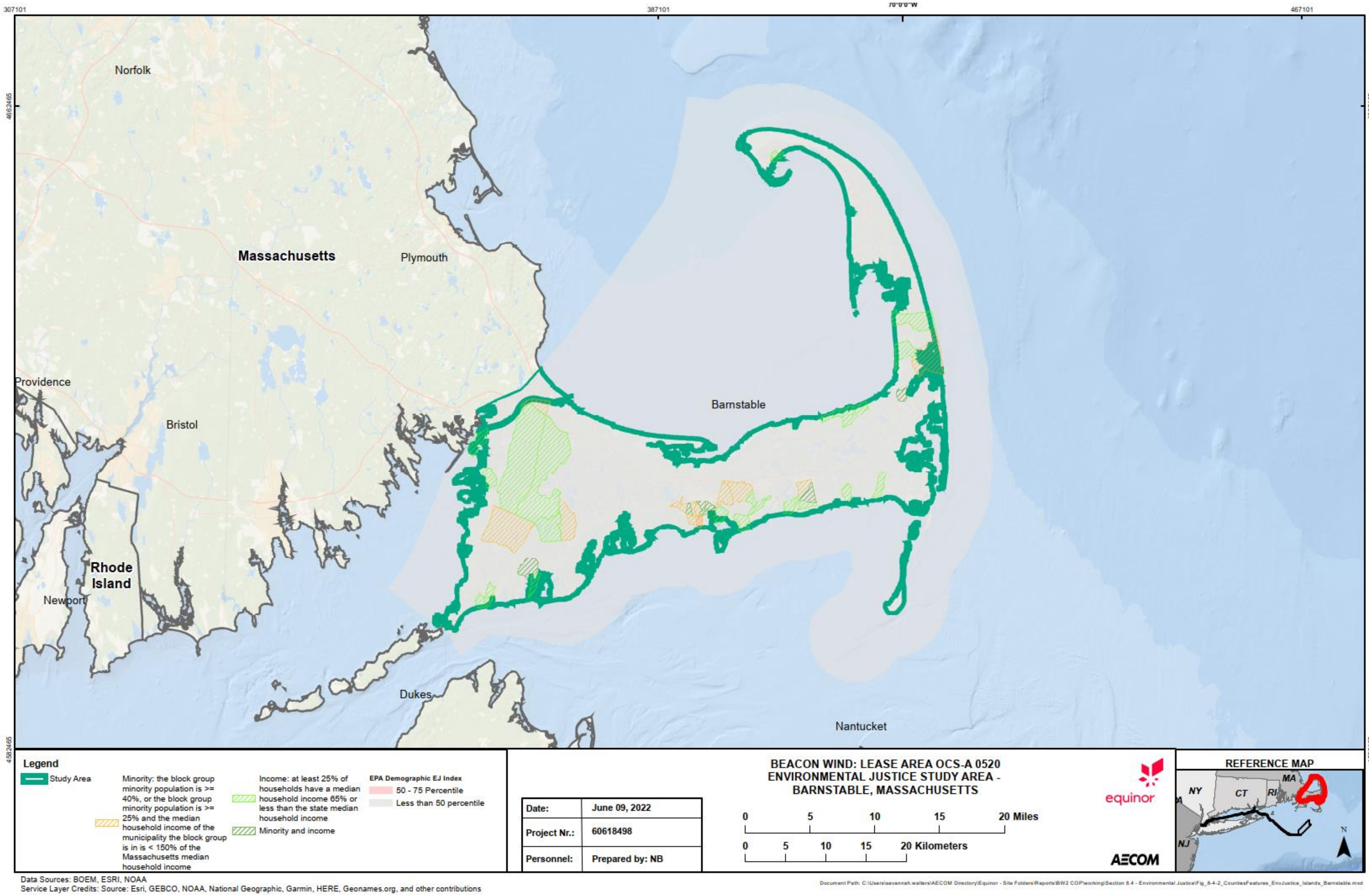
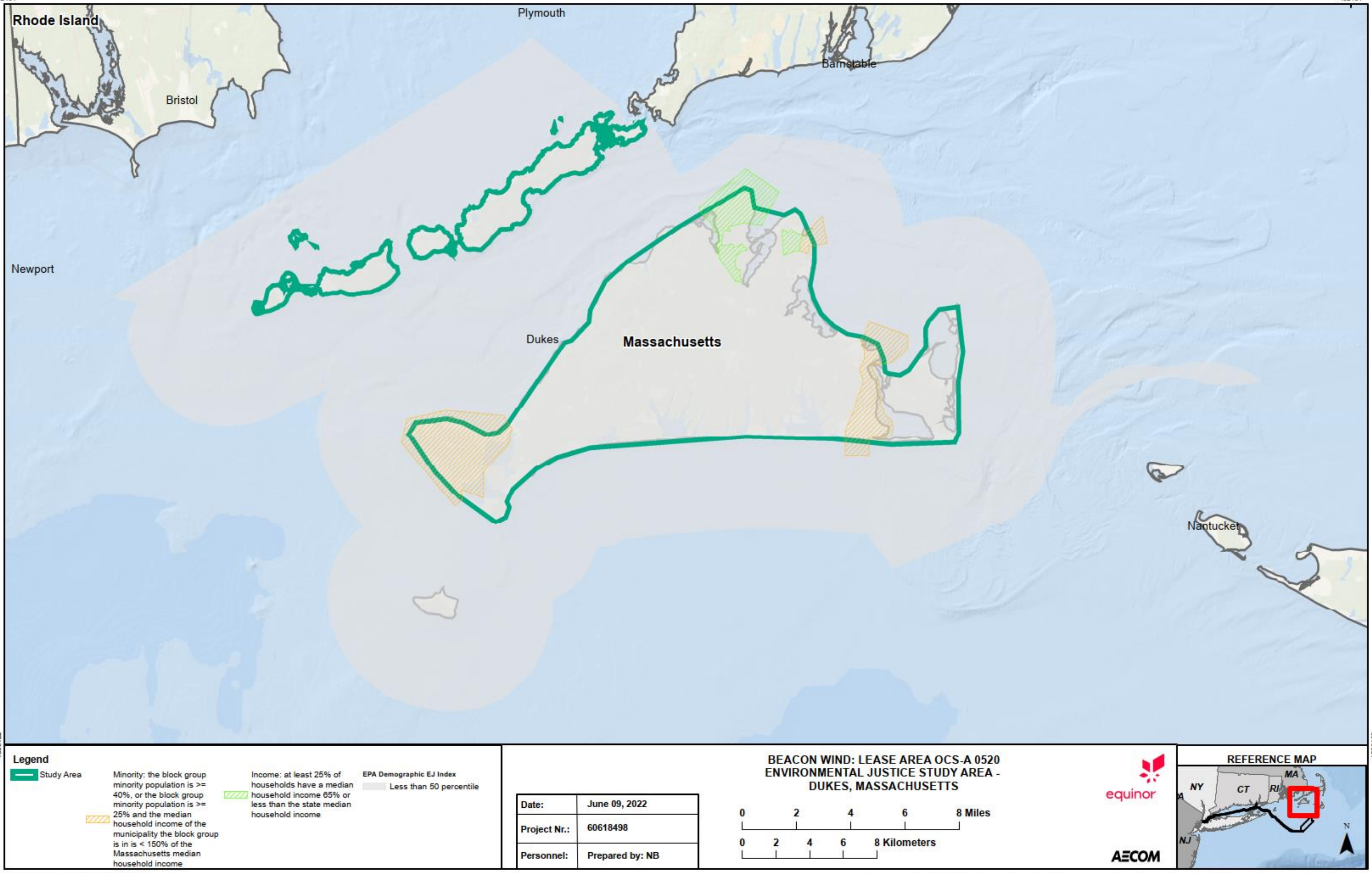
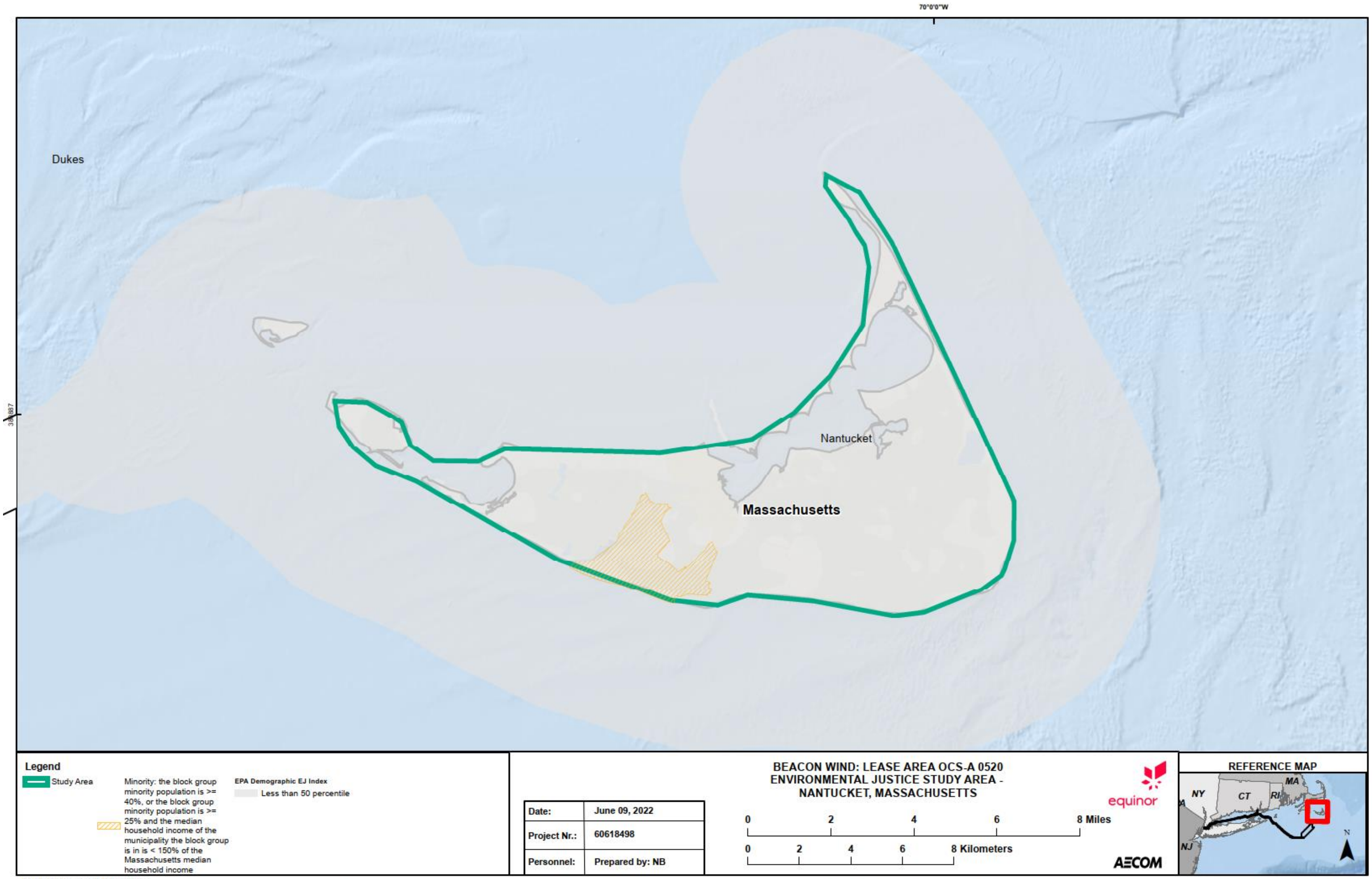


FIGURE 8.4-8 POTENTIAL ENVIRONMENTAL JUSTICE COMMUNITIES — DUKE'S COUNTY, MASSACHUSETTS



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

FIGURE 8.4-9 POTENTIAL ENVIRONMENTAL JUSTICE COMMUNITIES — NANTUCKET COUNTY, MASSACHUSETTS



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

It is expected that only onshore activities associated with the substation facilities and the O&M Base will have the potential to impact EJ communities (ESS Group 2016). However, the potential for impacts is generally low and is limited to the ports because of the location of the other onshore Project components and the short duration of the construction activities. Additionally, access to the Astoria power complex will follow, where practicable, New York City Truck Routes for access into and out of the site. The truck routes are defined citywide to mitigate impacts associated with truck freight to residents as well as reduce the likelihood of conflicts with low structures and oversized loads. For a potential BW2 landfall at the Waterford power complex access will be via State Routes (where practicable) to minimize impacts to the local road network.

Some of the coastlines and other resources in the Study Area are considered by Native American Tribes to be cultural resources (BOEM 2021). Beacon Wind has developed a Native American Tribes Communication Plan (NATCP) and continues to engage with Native American Tribes, including the Delaware Nation, Delaware Tribe of Indians, Narragansett Indian Tribe, Mashpee Wampanoag Tribe, Mohegan Tribe, Wampanoag Tribe of Gay Head-Aquinnah, Shinnecock Indian Nation, and the Mashantucket Pequot Tribal Nation to take into account potential impacts to tribal cultural resources. The purpose of the NATCP is to ensure Beacon Wind communicates and interacts effectively with Tribes about the Projects. The NATCP outlines a broad approach and key steps to be undertaken by Beacon Wind to manage Tribal engagement activities throughout all stages of project implementation, including planning, construction, operations, and decommissioning.

In addition to the guidance provided at the federal level, the states identified in **Table 8.4-1** address EJ concerns through policy and dedicated agency staff. The NYSDEC addresses environmental justice issues and concerns that affect low-income and minority communities through its Office of Environmental Justice. The Department’s *Commissioner Policy 29, Environmental Justice and Permitting* provides guidance for incorporating EJ concerns into NYSDEC’s environmental permit review process including identifying potential EJ areas and enhancing public participation requirements for proposed projects in those communities. In Massachusetts, MAEEA develops broad energy and environmental policy, including the *Environmental Justice Policy*, and is responsible for implementing these policies across state agencies and divisions like the Energy Facilities Siting Board and the Office of Coastal Zone Management, among many others. The MAEEA also develops criteria for identifying EJ populations in the state. The CTDEEP is responsible for energy, environmental quality, natural resources and outdoor recreation within the State of Connecticut. This includes administration of EJ policy and program to ensure vulnerable populations are not disproportionately impacted.

The affected environment, as described below, is defined as the counties identified in **Table 8.4-1** that have the potential to be directly and/or indirectly affected by the construction, operations, and decommissioning of the Project. Potential EJ communities within in these counties are identified through mapping at the block group level and identified for the entire affected county[ies]. Upgrades and improvements by port facilities that may be utilized by Beacon Wind as construction and staging areas for the Project are not assessed within this section as such upgrades are the responsibility of the port facility owners. Port and construction and staging areas will be appropriately permitted and governed by applicable environmental standards; the use of these facilities by Beacon Wind in support of the proposed Project will be consistent with the existing facilities’ activities for which these sites were permitted and developed.

The counties and municipalities identified in **Table 8.4-2** were included in the assessment of potential EJ populations. **Table 8.4-2** summarizes the percentage of state and county populations that would be considered minority or low-income for the purposes of analysis in this COP. Geographies with a 'yes' in **Table 8.4-2** have been identified as potential EJ areas or as areas containing potential EJ communities based on low income and minority population thresholds. While Barnstable, Dukes, Nantucket Counties were included as part of the EJ Study Area, the counties do not meet the thresholds for low income or percentage of minority residents to be considered a potential EJ community by EPA (e.g., greater than 50 percent minority population, income below the poverty threshold defined by the Census Bureau in the 12 months before the survey). However, portions of the Study Area in Massachusetts were identified as EJ communities based on MAEEA thresholds.

As shown in **Table 8.4-2**, the four counties in New York City (Bronx County, Kings County, New York County, and Queens County) meet the EPA criteria to be identified as containing potential EJ communities.

The Study Area associated with the onshore substation facilities in Queens, New York contains multiple EJ communities. As shown in **Figure 8.4-1** to **Figure 8.4-4**, the Study Area includes individual communities within Bronx County, Kings County, New York County, and Queens County with an EPA demographic EJ Index above the 50th percentile. Therefore, the community surrounding the Astoria power complex is considered an EJ community as defined by the EPA.

As shown in **Table 8.4-2** and **Figure 8.4-5**, New London County in Connecticut (containing the Waterford power complex) contains block groups which meet EPA criteria to be identified as containing potential EJ communities. Both New London and Groton are identified as Distressed Municipalities by CTDEEP along with one block group in Waterford and two in East Lyme.

As shown in **Table 8.4-2** and **Figure 8.4-6** to **Figure 8.4-9**, Barnstable, Bristol, Dukes and Nantucket counties (which are either in the project area viewshed or may be host to project activities) contain block groups which meet EPA and MAEEA thresholds to be considered potential EJ communities.

TABLE 8.4-2. INCOME AND MINORITY POPULATION LEVELS

County/Municipality a/	Total Population	Percent Population with Income Below Poverty Level	Percent Minority Population b/	EJ Community Present (Yes/No) c/
New York	**19,572,319**	**14.1%**	**44.4%**	
Bronx County	1,435,068	28.0%	90.9%	Yes
Kings County	2,589,974	20.0%	63.6%	Yes
New York County	1,631,993	15.8%	53.1%	Yes
Queens County	2,287,388	12.2%	74.9%	Yes
Connecticut	**3,575,074**	**9.9%**	**33.1%**	
New London County	267,390	9.4%	24.3%	Yes
Groton	38,825	9.9%	30.7%	Yes
New London	26,966	24.5%	55.1%	Yes
Stonington	18,445	7.2%	9.9%	Yes
Waterford	18,935	5.9%	14.9%	Yes
Massachusetts	**6,850,553**	**10.3%**	**28.4%**	
Barnstable County	213,505	6.4%	15%	Yes
Barnstable	44,406	7.9	8.6	Yes
Bristol County	565,217	11.4%	18.2%	No
City of New Bedford d/	95,348	20.2%	39.5%	Yes
Dukes County	17,312	7.6%	14.4%	Yes
Town of Aquinnah e/	531	6.6%	44.4%	Yes
Nantucket County	11,168	8.7%	14.8%	No

Notes:

a/ Counties located within New York City (Queens included) do not have town subdivisions and are the smallest Census boundary before the Census Tract level.

b/ Minority population includes anyone who does not identify as White alone and is not Hispanic or Latino.

c/ 'EJ Community Present' as determined by each state's respective authority (CTDEEP, NYSDEC, MAEEA). A 'Yes' designation means that within the given geographic boundary there is an EJ population as defined by the relevant state authority.

d/ The City of New Bedford meets MAEEA thresholds for EJ populations for both income and minority population.

e/ The town of Aquinnah on the western point of Martha's Vineyard is considered an EJ community based on the MAEEA threshold greater than 25 percent minority population.

Source: U.S Census Bureau 2019b.

8.4.1.1 New York State Environmental Justice Policy

The NYSDEC is responsible for implementing and incorporating the state's Environmental Justice policy, detailed in CP-29 Environmental Justice and Permitting (CP-29), as part of their environmental review process and the NYSDEC application of the State Environmental Quality Review Act (NYSDEC 2003).[3] CP-29 is also incorporated into portions of the NYSDEC's enforcement program, grants program, and public participation provisions. As detailed in CP-29, the NYSDEC is responsible for:

- Identifying potential EJ areas;
- Providing information on the policy to applicants with projects in these areas;
- Enhancing public participation requirements for projects in these areas;
- Establishing requirements for projects with significant environmental impacts in these areas; and
- Providing alternative dispute resolution opportunities to assist in resolving issues of concern within the community in these areas.

A potential EJ area in New York is defined as a minority or low-income community. A minority community is defined as an area having a minority population equal to or greater than 51.1 percent of the population in urban areas or 33.8 percent in rural areas. A low-income community is defined as an area having a low-income population equal to or greater than 23.59 percent of the total population. As indicated above and in **Table 8.4-2,** there are EJ areas surrounding the Queens, New York onshore export and interconnection cable routes.

In accordance with CP-29, when a project is located within a potential EJ area, the applicant must provide a Public Participation Plan, which requires active public participation throughout the application process, and a completed full environmental assessment form. A full EJ analysis is also required for those projects that require an Environmental Impact Statement (EIS); however, a NYSDEC environmental review is not required for projects that require a Certificate through the Article VII process, as CP-29 does not apply. Beacon Wind is developing a Public Involvement Plan as part of the Article VII application and plans to engage with and encourage participation by potential EJ areas in key communities in Queens, New York. The outreach will target communications with low-income, minority, and non-English-speaking populations to ensure that information and opportunities for engagement are available to all community members.

Outreach methods may include:

- Meetings and outreach events;
- Presentations to local groups, boards, and elected officials;
- Direct mailings;
- Public/legal notices and advertisements;

[3] Disadvantaged Communities identified by New York State's Climate Justice Working Group were not finalized prior to the completion of this EJ evaluation (finalized March 27, 2023) and are not included in the evaluation. Summary review of the work completed by the working group indicates limited change in designations from the assessments completed in this document. There are potential EJ and disadvantaged populations within proximity to Project components however impacts are expected to be limited. Disadvantaged Communities are those that bear the burdens of negative public health effects, environmental pollution, impacts of climate change, and possess certain socioeconomic criteria, or comprise high-concentrations of low- and moderate- income households. The indicators for identifying Disadvantaged Communities include geographic, public health, environmental hazard, and socioeconomic criteria. Additional information is available at: https://www.nyserda.ny.gov/ny/Disadvantaged-Communities

- Electronic communications and newsletters;
- Establishment of community outreach office;
- In-person tabling and local events;
- Social media outlets;
- Print or email newsletters;
- Press releases; and
- Maintenance of a document repository.

8.4.1.2 Connecticut State Environmental Justice Policy

The CTDEEP is responsible for administering the state's Environmental Justice Program. The Environmental Justice Program incorporates the following EJ principles into CTDEEP's program development, policy making, and regulatory activities:

- Assessing the effectiveness of CTDEEP efforts in the state's urban areas;
- Assessing and responding to environmental problems in the low-income and minority communities;
- Developing strategies to increase public participation in the agency's decision-making process;
- Identifying community health concerns in consultation with local and state departments of health;
- Enhancing public participation in administrative proceedings;
- Educating the public on CTDEEP regulations, policies and procedures; and
- Decreasing language barriers (CTDEEP n.d.).

In 2008, the state passed Section 22a-20a, an additional law addressing EJ with the intent of expanding public notice requirements to provide more meaningful public participation regarding permit applications for new facilities or the expansion of existing facilities located in EJ communities (CTDEEP 2012). Applicants seeking a permit from CTDEEP or the Connecticut Siting Council must:

- File a meaningful public participation plan and receive approval from the Department or Siting Council;
- Consult with chief elected officials in the town in which the facility will be located; and
- Notify, in writing local residents and environmental groups potentially affected by the facility activities and operations.

When evaluating whether projects will impact EJ communities, CTDEEP defines the study areas as both the Census Blocks directly containing the Project as well as the broader municipality where the project is located. CTDEEP defines EJ areas as Census Block Groups having a population where 30 percent or more of households have an income below 200 percent of the federal poverty level or a municipality that is designated a “Distressed Municipality” by CTDEEP.

8.4.1.3 Massachusetts State Environmental Justice Policy

The MAEEA is responsible for developing energy and environmental policy, including the *Environmental Justice Policy* (MAEEA 2017), and is responsible for implementing these policies across state agencies and divisions. As detailed in the *Environmental Justice Policy*, EJ is an integral consideration in the implementation of MAEEA programs including the provision of access to both active and passive open space, and the diversification of energy sources, including energy efficiency and renewable energy generation. The policy states that working with EJ populations, the MAEEA will:

- Enhance opportunities for residents to participate in environmental, energy, and climate change decision-making;
- Enhance environmental review of new and expanding significant sources of environmental burdens in EJ neighborhoods;
- Ensure that residents are prepared for and resilient to the effects of climate change and ensure that these effects are minimized during development;
- Ensure that existing facilities in these neighborhoods comply with state environmental programs, grants, and investments; and
- Encourage investment in responsible economic growth in these neighborhoods where there is existing infrastructure, in particular where an opportunity exists to restore a degraded or contaminated site and encourage its clean, productive, and sustainable use;
- Facilitate local residents' connection with governmental, labor union, community college, or other training opportunities in environmental fields; and
- Ensure that positive economic development that is consistent with environmental protections is a chief priority for EJ populations throughout the Commonwealth.

An EJ population in Massachusetts is defined as a neighborhood where 25 percent of the households have an annual median household income that is equal to or less than 65 percent of the statewide media or 25 percent of its population is Minority or identifies as a household that has English Isolation. As indicated in **Table 8.4-2,** Aquinnah in Dukes County (Martha's Vineyard) has been identified as an EJ community based on MAEEA minority population criteria, but not based on EPA criteria. This community located on the Island's western point includes members of the Wampanoag Tribe of Aquinnah. New Bedford also meets the MAEEA thresholds for EJ populations for both income and minority population. As stated previously, the use of the Port of New Bedford as a satellite O&M facility is not expected to significantly impact the surrounding community as the Project's uses would be consistent with existing use.

In accordance with Massachusetts' *Environmental Justice Policy*, the MAEEA works with state agencies to develop Language Access Plans that should be referenced during outreach to EJ communities and maintains an EJ organization and mailing list to guide public outreach. Public outreach is recommended for development activities that affect EJ communities and required under MEPA for projects that exceed Environmental Impact Report (EIR) thresholds for air or waste treatment and disposal and are located within one mile of an EJ population (or five miles if the project exceeds the mandatory EIR threshold for air).

8.4.2 Impacts Analysis for Construction, Operations, and Decommissioning

In regard to the EPA's *Environmental Justice Policy*, the potential impact-producing factor is that a federal action will have a disproportionately high and adverse health or environmental effect on a minority or low-income population. Therefore, potential EJ impacts resulting from the construction, operations, and decommissioning of the Project, as described below, are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For EJ communities, the maximum scenario is the full build-out of offshore and onshore components, as described in **Table 8.4-3**. The parameters provided in **Table 8.4-3** represent the maximum potential impact from full build-out. This design concept incorporates a total of up to 157 structures within the Lease Area (made up of up to 155 wind turbines and two offshore substation facilities) with one submarine export cable route for BW1 to Queens, New York and one submarine export cable route for BW2 to Queens, New York or to Waterford, Connecticut and the associated onshore substation facilities.

TABLE 8.4-3. MAXIMUM DESIGN SCENARIO PARAMETERS FOR ENVIRONMENTAL JUSTICE

Parameter	Maximum Design Scenario	Rationale
Construction		
Duration onshore construction	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York • BW2 to Queens, New York or Waterford, Connecticut. Construction and installation of export cable landfalls, onshore export and interconnection cables, and onshore substation facilities.	Representative of the maximum period required to install the onshore components, which has the potential to temporarily impact resources in the Project Area.
Project-related vehicles	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York • BW2 to Queens, New York or Waterford, Connecticut. The maximum associated Project-related vehicles.	Representative of the maximum number of vehicles, which would result in an increase to local traffic and reduced available parking.
Export cable landfalls	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (HDD work area in a 246 ft x 246 ft [75 m x 75 m] area onshore). • BW2: ○ To Queens, New York (HDD work area in a 246 ft x 246 ft [75 m x 75 m] area onshore) or ○ To Waterford, Connecticut (HDD work area in a 328 ft x 164 ft [100 m x 50 m] area onshore).	Representative of the maximum area to be utilized to facilitate the export cable landfalls.
Onshore export and interconnection cables	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (0.93 mi [1. 5 km]). • BW2: ○ To Queens, New York (0.93 mi [1.5 km]) or ○ To Waterford, Connecticut (0.55 mi [0.89 km]).	Representative of the maximum length of onshore export and interconnection cables to be installed.
Onshore substation facilities	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (up to a 16 ac [6.5-ha] area). • BW2: ○ Queens, New York (up to a 16 ac [6.5 ha] area) or ○ Waterford, Connecticut (up to a 16 ac [6.5 ha] area).	Representative of the maximum area to be utilized to facilitate the construction of the onshore substation facilities.

Parameter	Maximum Design Scenario	Rationale
Staging and construction areas, including port facilities, work compounds, and lay-down areas	Based on full build-out of the Project (BW1 and BW2). Maximum number of work compounds and laydown areas required. Some ground disturbing activities may be anticipated at Queens, New York with grading and minor tree clearing at Waterford, Connecticut. Independent activities to upgrade or modify staging, construction areas, and ports prior to Project use will be the responsibility of the facility owner.	Representative of the maximum area required to facilitate the offshore and onshore construction activities.
Operations and Maintenance		
Offshore structures	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities).	Representative of the maximum number of structures for BW1 and BW2.
Offshore O&M activities	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities, two submarine export cables, and associated interarray cables) and the maximum amount of Project-related activities expected per year.	Representative of the maximum amount of activities from the Project during the O&M phase.
Onshore substation facilities	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (up to a 7 ac [2.8 ha] area). • BW2: ○ Queens, New York (up to a 7 ac [2.8 ha] area) or ○ Waterford, Connecticut (up to a 7 ac [2.8 ha] area).	Representative of the presence of a new structure in an area where there was previously none.
O&M Base	4.5-ac (1.8-ha) area.	Representative of an existing structure in an area that will have been developed for this use.
Onshore O&M activities	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York • BW2 to Queens, New York or Waterford, Connecticut. Longest operational duration, with the maximum amount of Project-related activities expected per year.	Representative of the maximum amount of activities from the Project during the O&M phase which would have the potential to impact local traffic patterns and available parking in the Project Area.

8.4.2.1 Construction

Most of the construction activities associated with EJ will occur within ports or at the onshore substation facilities. Due to the existing industrial nature and uses of these areas, the relatively short duration of these activities, and Project-specific environmental protection measures, the potential is low for adverse environmental or health impacts for minority or low-income populations. Because construction activities for the submarine export cables will occur in unpopulated areas offshore, there will be no impacts to EJ communities from the export cable construction.

During construction, the potential impact-producing factors to EJ communities may include:

- Staging activities and assembly of Project components at applicable facilities or areas; and
- Construction of the onshore components, including the export cable landfalls, the onshore export and interconnection cables, and the onshore substation facilities.

The following impacts may occur as a consequence of the factors identified above:

- Short-term creation of additional construction jobs;
- Short-term increase in workforce;
- Short-term increase in the demand for public services;
- Short-term increase in tax revenue and economic benefits;
- Short-term increase in onshore construction vehicle traffic and activities;
- Short-term shortage of affordable housing due to increased demand;
- Short-term increase in onshore construction vehicle traffic and activities; and
- Short-term shortage of affordable housing due to increased demand.

Creation of additional construction jobs. The Project is expected to lead to the creation of additional jobs during the construction period, including construction laborers, crane operators, vessel crew, pile drivers, steel workers, and electricians. Overall, the construction activities associated with the Project will lead to the creation of hundreds of jobs. According to a 2017 NYSERDA report, approximately 3,500 manufacturing and installation jobs are anticipated to support New York wind farms (NYSERDA 2017).

In 2020, NYSERDA issued a solicitation for offshore wind projects for two lease areas, OCS-A 0512 and OCS-A 0520. Equinor was selected as the developer in 2021 and the projects were named Empire Wind 2 and Beacon Wind, respectively. NYSERDA stated that the two offshore wind projects are expected to provide thousands of direct new jobs for New York workers and more than $3.2 billion in new economic activity in labor, supplies, development, and manufacturing in the State of New York. The two projects are expected to bring $8.9 billion in economic activity. The report also expects $47 million in workforce development and just access funding (NYSERDA 2020).

In addition, E2 (2018) reported that a 352-MW wind farm would directly generate 2,345 jobs in the State of New York during the construction period; BW1 will generate 1,230 MW for the State of New York. A similar study completed by the Massachusetts Clean Energy Center used a model developed by the NREL to determine that the construction of a 1,600-MW offshore wind facility would create 2,279 to 3,171 jobs for direct employees and 2,315 to 3,618 jobs for indirect employees (Bristol Community College et al. 2018).

Most of these jobs are anticipated to be located within the State of New York, especially along the onshore export and interconnection cable routes in Queens, New York and the staging site in Sunset Park, Brooklyn, and in Waterford, Connecticut for the potential landfall of BW2. Construction-related jobs would be temporary, lasting during the construction period for each phase. However, the specific skills and experience gained would be applicable to other offshore wind projects as they enter the construction phase.

Increase in workforce. While a portion of the newly created jobs will likely be filled with the local workforce, it is anticipated that there will be a slight influx of workers relocating to the two Study Areas (see the previous discussion, **Creation of additional construction jobs**, for estimates provided in various reports). This increase in workforce is likely to be the most pronounced along the onshore export and interconnection cable routes in Queens County, New York and in Waterford, Connecticut along the potential onshore export and interconnection cable route for BW2. New jobs are also likely to be located around the construction and staging areas.

Increase in demand for public services. Construction activities and the influx in the non-local workforce will likely result in an increased demand for public services, including police and fire services. The Study Areas contain numerous hospitals, fire departments, law enforcement personnel, and public schools, and is well-developed with sufficient capacity such that the Project will not impact the availability of public services. Therefore, this anticipated increase in demand for public services is unlikely to create a shortage for the general public. Additional detail on potential impacts to health and public safety is discussed in **Section 8.12 Public Health and Safety**.

Increase in tax revenue and economic benefits. The creation of jobs and increased purchasing of construction materials is expected to lead to an increase in tax revenue to local communities. According to NYSERDA (2017), offshore wind would result in as much as a $6.3 billion of expenditure in the State of New York. In addition, E2 (2018) showed that construction of a 352-MW project would generate over $737 million in economic benefits in the State of New York. The report also showed that for every $1 spent in building an offshore wind farm interconnecting to the State of New York, a total of $1.72 would be generated into the State's economy. As described in **Creation of additional construction jobs**, NYSERDA (2020) indicated that Beacon Wind and Empire Wind 2 are expected to provide thousands of direct new jobs for New York workers and more than $8.9 billion in new economic activity in labor, supplies, development, and manufacturing in the State of New York.

Increase in construction vehicle traffic and activity. An increase in Project-related construction, support, and workforce vehicle traffic along the onshore export and interconnection cable routes, the onshore substation facilities, ports, and staging and construction areas is anticipated during construction. Activities at staging and construction facilities will be consistent with the established and permitted uses of these facilities, and Beacon Wind will comply with applicable permitting standards to limit environmental impacts from Project-related activities. During this time, nearby communities, including potential EJ communities, will experience an increase in construction-related activities, including a short-term increase in construction-related noise and equipment emissions. However, access to the Queens, New York site will follow, where practicable, New York City Truck Routes for access into and out of the site. The truck routes are defined citywide to mitigate impacts associated with truck freight to residents as well as reduce the likelihood of conflicts with low structures and oversized loads. For access to the Waterford, Connecticut (BW2) site, Project vehicles will follow State Routes where practicable to minimize impacts to residential neighborhoods.

As the Project utilizes existing roads, rights-of-way, and infrastructure, new impacts resulting from construction activities will be minimized to the extent practicable and are anticipated to be similar in nature to other utilities installations or road improvement works carried out in these locations. Furthermore, construction activities are not anticipated to disproportionately impact the EJ communities along the onshore export and interconnection cable routes. Potential public health impacts from the construction phase are discussed in **Section 8.12 Public Health and Safety**, including the accidental release of hazardous material. Air quality impacts from Project-related vehicle traffic is discussed in **Section 4.3 Air Quality**. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- The provision of regular Project updates to the local community through social media, public notices, and/or other appropriate communications tools; and
- The Project will utilize New York City approved truck routes, where applicable;
- The development of a Traffic Management Plan in coordination with, and as approved by, the affected local municipalities, as applicable.

Shortage of affordable housing due to increased demand. As discussed in **Section 8.1 Population, Economy, Employment and Housing and Property Values** and **Section 8.3 Recreation and Tourism,** the Project could result in increased demand for housing during the construction phase to accommodate additional workers. An increase in housing demand could disproportionately affect EJ communities. However, the project will work to communicate job openings to the local community which could lesson housing demand through the hiring of local personnel. Regardless, the anticipated increase in relocated workers is unlikely to be greater than the available number of temporary housing units and is not expected to create a shortage.

8.4.2.2 Operations and Maintenance

During operations, the potential impact-producing factors to EJ communities may include:

- The presence of fixed structures (e.g., wind turbines and offshore substations);
- Operations and maintenance activities associated with the onshore export and interconnection cables and the onshore substation facilities; and
- Operations at the O&M Base.

The following impacts may occur as a consequence of the factors identified above:

- Long-term creation of additional operations and maintenance jobs;
- Long-term increase in workforce;
- Long-term increase in the demand for public services;
- Long-term increase in tax revenue and economic benefits;
- Long-term presence of new fixed structures in the Lease Area (e.g., wind turbines and offshore substations);
- Long-term presence of new fixed structures onshore (e.g., onshore substation); and
- An increase in vehicle traffic associated with operations and maintenance activities.

Creation of additional operations and maintenance jobs. The Project is expected to lead to the creation of additional jobs during operations. According to a 2017 NYSERDA report, approximately 2,000 operations and maintenance jobs are anticipated to support New York wind farms (NYSERDA 2017). In addition, the 2018 E2 report noted that for every $1.00 spent building an offshore wind farm, $1.72 will be generated in New York's economy, in addition to more than 140 direct, indirect, and induced jobs (premised on a model 352-MW wind farm). As with the construction phase, the specific skills and experience gained by workers would be applicable to other offshore windfarm projects as Beacon Wind enters its operations phase. Most of these jobs are anticipated to be located within the Study Area, specifically in Brooklyn, Kings County, New York, at the expected location for the O&M

Base and potentially in New Bedford, Bristol County, Massachusetts at the potential location of a satellite O&M facility.

Increase in workforce. While a portion of the newly created jobs will likely be filled with the local workforce, it is anticipated that there will be a slight influx of workers relocating to the Study Area (see the previous discussion, **Creation of additional construction jobs,** for estimates provided in various reports). This increase in workforce is likely to be the most pronounced in Brooklyn, Kings County, New York at the O&M Base and potentially in New Bedford, Bristol County, Massachusetts at the potential location of a satellite O&M facility.

Increase in demand for public services. Operation activities and the slight increase in the workforce will likely result in a slight increase in demand for public services. The Study Area already contains numerous hospitals, fire departments, law enforcement personnel, and public schools, and is well-developed with sufficient capacity such that the Project will not impact the availability of public services. Therefore, this anticipated increase in demand for public services is very unlikely to create a shortage for the general public. Additional detail on potential impacts to health and public safety is discussed in **Section 8.12 Public Health and Safety.**

Increase in tax revenue and economic benefits. The creation of jobs and operations activities are expected to lead to an increase in tax revenue to local communities. In the 2018 E2 report, operations of a 352-MW project would generate over $29 million in economic benefits in New York (this includes direct, indirect, and induced values) (E2 2018). Therefore, it is expected that the operation activities associated with the Lease Area will result in a significant increase in tax revenue to local communities in New York, Connecticut, and Massachusetts. NYSERDA (2020) stated that the two offshore wind projects (Empire Wind 2 and Beacon Wind) are expected to provide more than $3.2 billion in new economic activity in labor, supplies, development, and manufacturing in the State of New York. The report also expects approximately $700 million of avoided health-impact benefits from the two projects.

Shortage of affordable housing due to increased tourism demand. As discussed in **Section 8.1 Population, Economy, Employment and Housing and Property Values** and **Section 8.3 Recreation and Tourism**, the Project could result in increased tourism and corresponding increased demand for vacation housing during the operations phase to accommodate additional visitors to the Study Area. An increase in housing demand could disproportionately affect EJ communities. However, this anticipated increase is unlikely to be greater than the available number of temporary housing units and is not expected to create a shortage.

Presence of new fixed structures in the Lease Area. The MA/RI WEA is 10.4 nm (19.3 km) or more from the nearest coastline; thus, offshore Project activities will not have disproportionally high or adverse environmental or health impacts on minority or low-income populations (BOEM, 2013). However, some of these coastlines, including Gay Head Cliffs in Martha's Vineyard, are considered by area Native American Tribes to be cultural resources (BOEM 2021). Beacon Wind has conducted outreach with Native American Tribes in the Study Area to ensure that impacts to cultural resources are mitigated.

It is possible that the offshore Project Area would also be used for recreational and/or commercial fishing by EJ communities that are not within the onshore Study Area, as defined in this section. Shoreline fishing is the most common access point for recreational fishing (NOAA Fisheries 2019a), which includes participants from EJ communities located near the potential submarine export cable landings. Boats from New York, Rhode Island, and Massachusetts were reported to work in the area seasonally, with catches brought into ports in those same states or other commercial ports within the region, such as Montauk, New York and Stonington, Connecticut (NOAA Fisheries 2019b). Beacon Wind is committed to coexisting with commercial and recreational fishing and is conducting extensive outreach and engagement with the fishing community as part of this Project, which will assist in identifying additional EJ communities that may rely on the offshore Project Area for fishing and that may require additional engagement (see **Section 8.8 Commercial and Recreational Fishing** for additional information).

Presence of new fixed structures onshore. The onshore substation facilities will each be constructed in an area with existing industrial uses. In addition, the onshore substation facilities will generate some operational noises (see **Section 4.4.1 In-Air Acoustic Environment** for additional information on anticipated noise levels). The presence of the new structures and the introduction of new sounds could disproportionately affect EJ communities. However, this impact will be minimized as the structures will be consistent with the land use and zoning in the surrounding area (see **Section 8.2 Land Use and Zoning** for additional information).

Increase in operations and maintenance vehicle traffic. An increase in Project-related vehicle traffic along the onshore export and interconnection cable routes and onshore substation facilities is anticipated during the operations and maintenance phase. The number of workers transiting to the O&M Base and onshore substation facilities is anticipated to be low and is not expected to add a noticeable increase to existing traffic congestion or air emissions (see **Section 4.3 Air Quality** for additional information on anticipated air emissions associated with the operations and maintenance of the Project).

8.4.2.3 Decommissioning

During decommissioning, the potential impact-producing factors to environmental justice communities are expected to be similar to those experienced during construction, as described in **Section 8.4.2.1**. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Beacon Wind anticipates will be needed for the Project, please see **Section 3 Project Description**.

Offshore impacts have not been assessed with respect to EJ communities, which would include commercial and recreational fishing uses that could be impacted by the Project. It is possible that EJ communities not identified in this section would rely on the Project Area for commercial or recreational fishing. Beacon Wind continues to seek input from fishermen; such input continues to play a substantial role in finalizing the Project design in order to minimize and prevent impacts to fishermen, including those who may be from EJ communities.

8.4.3 Summary of Avoidance, Minimization, and Mitigation Measures

Beacon Wind has maintained, and will continue to maintain, a strong community engagement policy throughout the life of the Project. Fundamental points of the community engagement policy include pre-application meetings with local agencies and stakeholders, open houses in key communities in the Project Area, and a Project website that provides Project updates to the local community. To date, the Project has met with and will continue to engage local civic leaders to discuss EJ concerns. In addition to the community engagement policy, the following avoidance, minimization, and mitigation measures are proposed in order to reduce the potential impact-producing factors described in **Section 8.4.2**, and to ensure that EJ communities are not disproportionately affected.

8.4.3.1 Construction

During construction, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.4.2.1**:

- Regular updates to the local community through social media, public notices, and/or other appropriate communications tools in a manner that aligns, to the extent practicable, with best practices outlined by the CTDEEP's EJ Policy, the Massachusetts Environmental Justice Policy (June 2021), and New York's Commissioner Policy 29 (CP29);
- Installation of onshore components within existing rights-of-way and within previously developed areas designated for such uses, to the extent practicable; and
- The development a Traffic Management Plan, to be developed in coordination with, and approved by, the affected local municipalities, as applicable.

8.4.3.2 Operations and Maintenance

During operations, while no specific avoidance, minimization, and mitigation measures will be implemented to mitigate impacts to EJ communities, Beacon Wind will continue to use measures similar to those implemented during construction and will consider the following additional measure to mitigate impacts unique to O&M activities:

Regular updates to the local community through social media, public notices, and/or other appropriate communications tools in a manner that aligns, to the extent practicable, with best practices outlined by the CTDEEP's EJ Policy, the Massachusetts Environmental Justice Policy (June 2021), and New York's Commissioner Policy 29 (CP29).

8.4.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in **Sections 8.4.3.1** and **8.4.3.2**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

Given the strong community engagement policy and the proposed avoidance, minimization, and mitigation measures, the Project is believed to be consistent with the EPA's Environmental Justice policies. While the New York Environmental Justice Policy does not apply, the Project will be undergoing a stringent review through the Article VII process, which will require public notification and community engagement.

8.4.4 References

TABLE 8.4-4. SUMMARY OF DATA SOURCES

Source	Includes	Available at	Metadata Link
EPA	EJSCREEN	https://gaftp.epa.gov/EJSCREEN/2020/	
NYSDEC	Potential Environmental Justice Areas	https://gis.ny.gov/gisdata/fileserver/?DSID=1273&file=PEJA.zip	https://gis.ny.gov/gisdata/metadata/nysdec.PEJA.xml

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EPA. 2018b. "Environmental Justice and National Environmental Policy Act." United States Environmental Protection Agency. Available online at: https://www.epa.gov/environmentaljustice/environmental-justice-and-national-environmental-policy-act. Accessed November 18, 2021.

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MAEEA (Massachusetts Executive Office of Energy & Environmental Affairs). 2017. “*Environmental Justice Policy of the Executive Office of Energy and Environmental Affairs*.” MAEEA. Available online at: https://www.mass.gov/files/documents/2017/11/29/2017-environmental-justice-policy_0.pdf Accessed May 6, 2021.

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U.S. Census Bureau. 2019a. American Community Survey and Puerto Rico Community Survey 2019 Subject Definitions. Available online at: https://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2019_ACSSubjectDefinitions.pdf. Accessed November 18, 2021.

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8.5 Land Transportation and Traffic

This section describes land transportation and traffic. Potential impacts to land transportation and traffic resulting from construction, operations, and decommissioning of the Project are discussed. Proposed Project-specific measures adopted by Beacon Wind are also described, which are intended to avoid, minimize, and/or mitigate potential impacts to land transportation and traffic.

Other resources and assessments detailed within this COP that are related to land transportation and traffic include:

- Land Use and Zoning (**Section 8.2**);
- Aviation (**Section 8.6**);
- Marine Transportation and Navigation (**Section 8.7**); and
- Navigation Safety Risk Assessment (**Appendix BB**).

Data Relied Upon and Studies Completed

For the purposes of this section, the Study Area includes a 0.25-mi (0.4-km) buffer around the onshore and interconnection cable routes, the onshore substation facilities, and the likely egress from the onshore facilities located at the Astoria power complex in Queens, New York and the Waterford power complex in Waterford, Connecticut. The Average Annual Daily Traffic (AADT) volumes referenced in this section provide a basis for projected future traffic volumes. The AADT is defined as an estimated average daily traffic volume on a certain route segment and is used by both federal and state agencies to determine the average traffic volume on a particular road. AADT volumes are taken from traffic count stations, which are short, pre-determined portions of a road over which traffic volumes are approximately equal (NYSDOT 2021). Considerably higher or lower values often result in areas of seasonal activities and when comparing weekend versus weekday traffic (NYSDOT 2021).

8.5.1 Affected Environment

The affected environment, as described below, is defined as the onshore areas that have the potential to be directly affected by the construction, operation, and decommissioning of the Project. For the purposes of this section, the affected environment includes the onshore components, including onshore export cables, onshore substation facilities, and interconnection cables. For BW1 it is assumed that the cable landfall and onshore substation facilities will be either at the NYPA parcel on the northern edge of the complex or the AGRE site (which includes AGRE East and AGRE West) (see **Figure 8.5-1**). For BW2 it is assumed that the cable landfall will occur at the Waterford power complex in Waterford, Connecticut or the Astoria power complex in Queens, New York. Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Beacon Wind expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards, which Beacon Wind will comply with in using the facilities.

The Astoria power complex directly abuts a residential neighborhood to the south and a commercial/industrial neighborhood to the east. Access to the site will follow, where practicable, New York City Truck Routes for access into and out of the site. The New York City Truck Routes are defined citywide to mitigate impacts associated with truck freight to residents as well as reduce the likelihood of conflicts with low structures and oversized loads. It has not yet been determined if the Project will use the existing site entrance from 20th Avenue or a possible dedicated access point off of 19th Avenue.

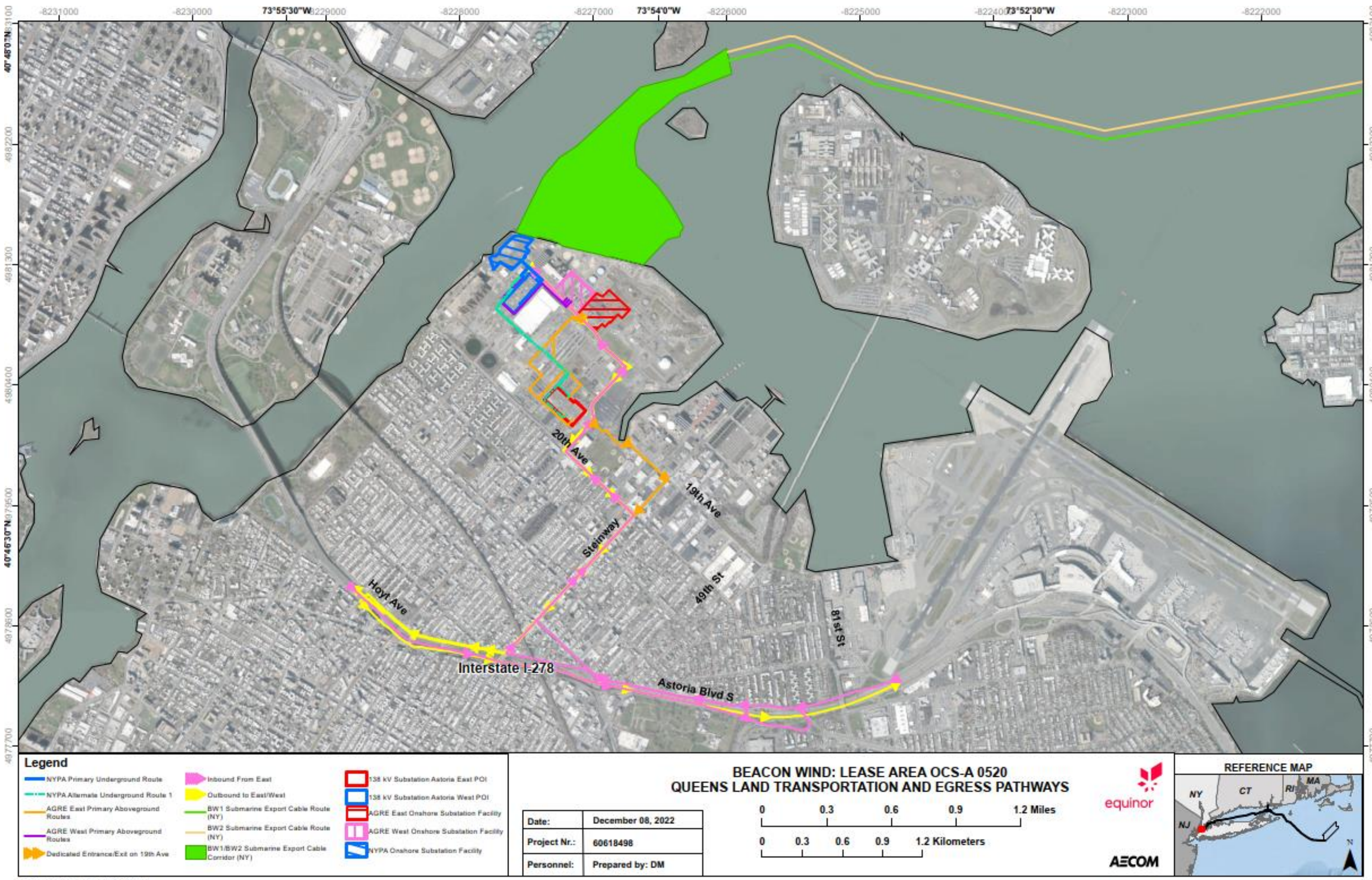
A 19th Avenue access point would serve as a reasonable entrance/exit for the Astoria East POI location, particularly if the parking area adjacent to Luyster Creek was used for staging of equipment or materials. Nineteenth Avenue is a two-lane road with on-street parking and sidewalks, lane widths are sufficient for commercial vehicles (45 ft [13.7 m] total road width). Intersections along 19th Avenue are unsignalized and are controlled by either 4-way stops or, more commonly, stop signs on the cross streets. The immediate neighborhood along the 19th Avenue corridor generally consists of commercial and industrial land uses. From 19th Avenue Project traffic would use Steinway Street to access I-278/Grand Central Parkway (the closest interstate). Access to/from the main gate of the Astoria power complex would egress onto 20th Avenue and subsequently use Steinway Street to access I-278/Grand Central Parkway (the closest interstate). While land transportation routes to and from the onshore Project Area are yet to be determined, the most likely pathways are captured in the AADT analysis below and subsequent mapping as a representative analysis.

Most of the direct construction impacts will be contained within the Astoria power complex, depending on the final landfall location, onshore cable route, and POI; therefore, some businesses within the complex may experience construction-related delays or access limitations. However, establishing an access point from 19th Avenue to the Luyster Creek area would mitigate much of the potential construction related impacts to the Astoria power complex. AADT data are not available for the roadways contained within the Astoria power complex. Impacts to the neighborhoods between the Astoria power complex and I-278/Grand Central Parkway will be limited to marginal increases to traffic associated with construction of onshore components inside the Astoria power complex.

The following are AADT volumes for the likely paths of egress from the Astoria power complex and count data from the New York State Department of Transportation (NYSDOT) Traffic Data Viewer that were collected in 2019. Count data is not available for the roadways within the Astoria power complex. See **Figure 8.5-1** below for a map depicting the egress pathways:

- 19th Avenue: 19th Avenue between Steinway Street and 81st Street had an estimated AADT volume of 9,376 and an estimated truck AADT volume of 721 (or seven percent of the total AADT volume).
- 20th Avenue: 20th Avenue in the vicinity of 31st Street has actual AADT volume of 9,408 and an estimated truck AADT 723 (or seven percent of the total AADT volume).
- Steinway Street: Steinway Street between 19th Ave and Astoria Blvd had an estimated AADT volume of 8,943 with an actual truck AADT volume of 1,125 (or 13 percent of the total AADT volume).
- Ditmars Boulevard: Ditmars Boulevard had an estimated AADT volumes of 9,096 and actual truck AADT volumes of 350 (or four percent of the total AADT volume).
- Astoria Boulevard: Astoria Boulevard had an estimated AADT volume of 13,888 and truck AADT volume of 2,206 (or 16 percent of the total AADT volume).
- Hoyt Avenue North: Hoyt Avenue North had an actual AADT volume of 19,455 and truck AADT volume of 727 (or four percent of the total AADT volume).
- Hoyt Avenue South: Hoyt Avenue South had an estimated AADT volume of 8,954 and truck AADT volume of 325 (or four percent of the total AADT volume).
- Interstate 278: I-278 in the vicinity of interchange 45 had an estimated AADT volume of 127,144 and truck AADT volume of 1,682 (or one percent of the total AADT volumes).
- Grand Central Parkway: Grand Central Parkway had an estimated AADT volume of 118,661 and an estimated truck AADT volume of 3,142 (or three percent of the total AADT volumes).

FIGURE 8.5-1. QUEENS, NEW YORK REPRESENTATIVE LAND TRANSPORTATION EGRESS PATHWAYS



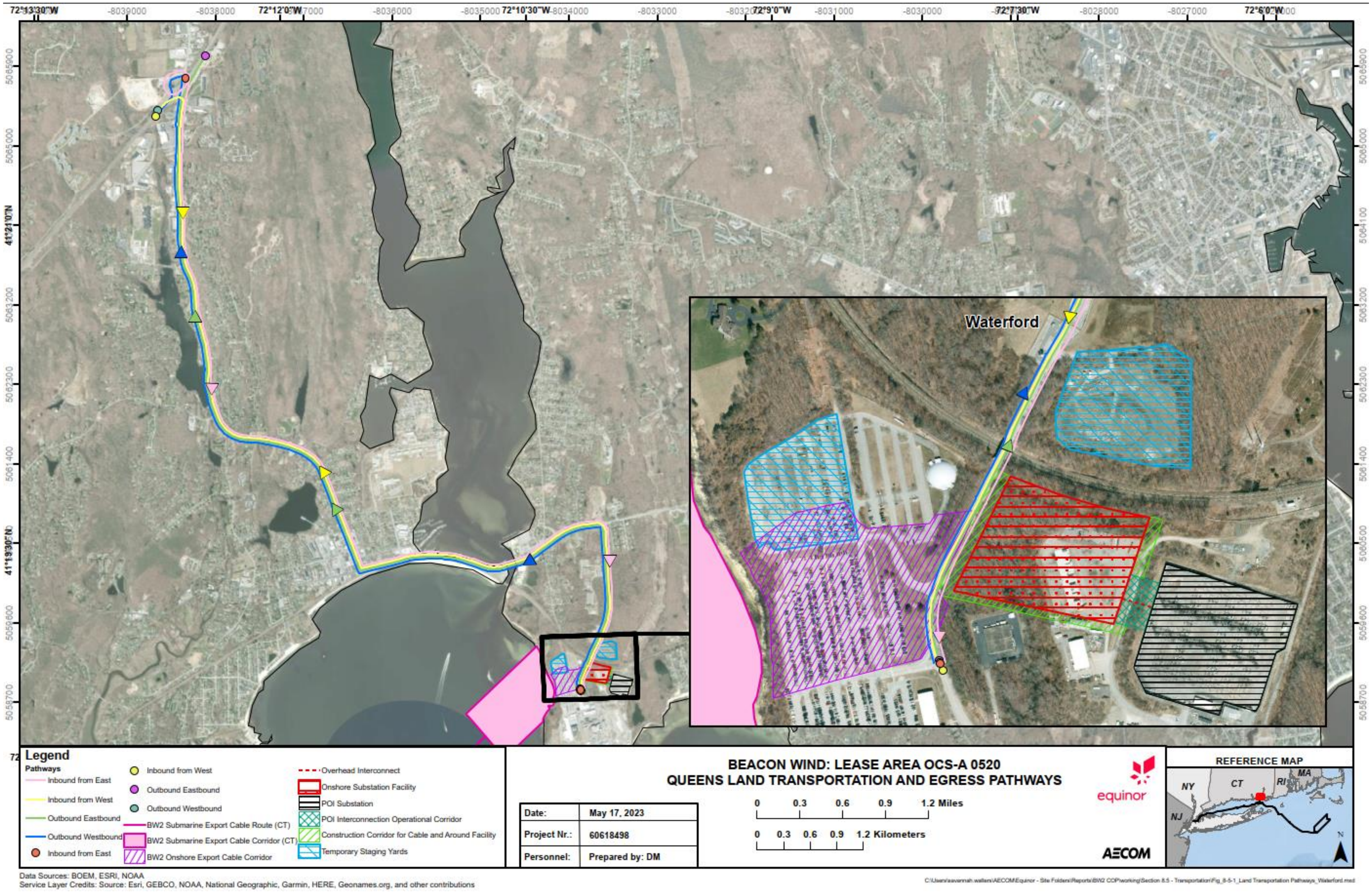
Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

The Waterford power complex is along Long Island Sound in Waterford, Connecticut on the west side of Niantic Bay. It is a controlled site with few proximal abutters and is accessed by a dedicated road (Millstone Road). While there are no defined truck routes as with Queens, New York, access to/from the site to the regional interstate network will follow to the extent practicable State Routes 156 and 161 to minimize impacts to residential neighborhoods. All of the direct construction impacts will be contained within the site, including the landfall location, onshore cable route, and POI.

The following are AADT volumes for the likely paths of egress from the Waterford power complex, count data is from the Connecticut Department of Transportation and were collected in 2018. See **Figure 8.5-2** below for a map depicting the egress pathways:

- Millstone Road: Data for Millstone Road is not available.
- Route 156: Route 156 between approx. Millstone Road and Route 161 has an AADT of 9,000, truck volumes are not known.
- Route 161: Route 161 between Route 156 and Aswegatchie Hill Road has an AADT of 8,000, truck volumes are not known.
- Route 161: Route 161 between Aswegatchie Hill Road and East Pattegansett Road has an AADT of 9,000, truck volumes are not known.
- Route 161: Route 161 between East Pattegansett Road and Society Road has an AADT of 14,700, truck volumes are not known.
- Route 161: Route 161 between Society Road and Chapman Woods Road has an AADT of 16,600, truck volumes are not known.
- Route 161: Route 161 between Chapman Woods Road and King Arthur Drive has an AADT of 22,000, truck volumes are not known.
- Route 161: Route 161 between King Arthur Drive and the I-95 southbound off-ramp has an AADT of 19,300, truck volumes are not known.
- Interstate 95 Southbound: I-95 southbound in the vicinity of interchange 74 has an AADT of 27,400 and 31,300, truck volumes are not known.
- Interstate 95 Northbound: I-95 northbound in the vicinity of interchange 74 has an AADT of 27,800 and 62,000, truck volumes are not known.

FIGURE 8.5-2. WATERFORD, CONNECTICUT REPRESENTATIVE LAND TRANSPORTATION EGRESS PATHWAYS



8.5.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For land transportation and traffic, the maximum design scenario from a regional perspective is the installation of onshore export cables, interconnection cables, and two onshore substation facilities, as described in **Table 8.5-1**, below. The parameters provided in **Table 8.5-1** represent the maximum potential impact on land transportation and traffic within the Study Area from full build-out of the onshore components for BW1 and BW2. The maximum design scenario for assessments associated with full build-out is represented by applying the longest onshore construction period.

TABLE 8.5-1. SUMMARY OF MAXIMUM DESIGN SCENARIO PARAMETERS FOR LAND TRANSPORTATION AND TRAFFIC

Parameter	Maximum Design Scenario	Rationale
Construction		

Onshore components	Based on full build-out of the Project (BW1 and BW2):
	• BW1 to Queens, New York.
	• BW2:
	  ○ To Queens, New York or
	  ○ To Waterford, Connecticut.
	Construction and installation of export cable landfalls, onshore export and interconnection cables, and onshore substation facilities.
		Representative of the maximum onshore construction work, which has the potential to temporarily impact local traffic and reduce available parking in the Study Area.

Onshore safety zones	Based on full build-out of the Project (BW1 and BW2):
	• BW1 to Queens, New York.
	• BW2:
	  ○ To Queens, New York or
	  ○ To Waterford, Connecticut.
	The implementation of appropriate safety zones and traffic management.
		Representative of the maximum area in which local traffic would be restricted from entering.

Onshore construction duration	Based on full build-out of the Project (BW1 and BW2):
	• BW1 to Queens, New York.
	• BW2:
	  ○ To Queens, New York or
	  ○ To Waterford, Connecticut.
	Construction and installation of submarine export cable landfalls, onshore export and interconnection cables, onshore substation facilities.
		Representative of the maximum period required to install the onshore components, which has the potential to temporarily impact resources in the Study Area.

Project-related vehicles	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York.	Representative of the maximum number of vehicles, which would

Parameter	Maximum Design Scenario	Rationale
	• BW2: ○ To Queens, New York or ○ To Waterford, Connecticut. The maximum associated Project-related vehicles.	result in an increase to local traffic and reduce available parking.
Staging and construction areas, including port facilities, work compounds, and lay-down areas	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York. • BW2: ○ To Queens, New York or ○ To Waterford, Connecticut. Maximum number of work compounds and laydown areas required. Some ground disturbing activities may be anticipated. Independent activities to upgrade or modify staging, construction areas, and ports prior to Project use will be the responsibility of the facility owner.	Representative of the maximum area required to facilitate the offshore and onshore construction activities.
Operations and Maintenance		
Onshore O&M activities	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York • BW2: ○ To Queens, New York ○ To Waterford, Connecticut Longest operational duration, with the maximum amount of Project-related activities expected per year.	Representative of the maximum amount of activities from the Project during the O&M phase, which would have the potential to impact traffic patterns and available parking in the Project Area.

8.5.2.1 Construction

During construction, the potential impact-producing factors to land transportation and traffic may include:

- Construction of onshore components, including transmission towers and duct banks (installation techniques include trenchless (e.g., HDD, jack and bore, or micro-tunnel) and trenched (open cut trench) methods);
- Staging activities and assembly of Project components at applicable facilities or areas; and
- Construction of two new onshore substation facilities.

The following impacts may occur as a consequence of the factors identified above.

- An increase in Project related construction vehicle traffic, including workforce; and
- The temporary modification of local traffic patterns.

Increased construction vehicle traffic. It is anticipated that that there will be an increase in Project-related construction, support, and workforce vehicle traffic along the onshore export cable routes, onshore substation facility parcels, ports, and staging and construction areas during construction (see **Section 8.1 Population, Economy, Employment and Housing and Property Values** for additional information on anticipated workforce). Activities at staging and construction facilities will be consistent with the established and permitted uses of these facilities, and Beacon Wind will comply with applicable permitting standards to limit environmental impacts from Project-related activities. Due to the relatively small number of onshore crew expected, the potential incremental impact of Project-related construction vehicle traffic on land transportation and local traffic during construction activities is anticipated to be small and similar in nature to other utilities installations or road improvement works carried out within the Astoria power complex and the Waterford power complex. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- The development of a Traffic Management Plan, to be developed in coordination with, and approved by, the other property owners within the Astoria power complex, Waterford power complex officials and affected local communities;
- Access to the Queens, New York site will follow, where practicable, New York City Truck Routes for access into and out of the site;
- The development of Project-related vehicle routes to and from construction sites which are consistent with allowable uses, to the extent practicable; and
- Regular updates to the local community through social media, public notices, and/or other appropriate communication tools.

Temporary modifications to local driving patterns. Installation of the onshore export and interconnection cables and the onshore substation facilities could result in the temporary closure of roads, sections of roads (e.g., a traffic lanes), and/or parking lots within the Astoria power complex and Waterford power complex, at various points during construction. Roadways will not be closed and/or blocked for long periods of time to allow for local vehicular traffic patterns to be maintained to the greatest extent practicable. Should parking lots need to be closed during construction and installation activities; Beacon Wind will work with the other property owners within the Astoria power complex and local communities to offset this impact. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- The development of a Traffic Management Plan, to be developed in coordination with, and approved by, the other property owners within the Astoria power complex, Waterford power complex officials, and affected local communities as applicable;
- The use of temporary, localized construction zones to minimize areas or sections of road closure;
- The use of highly visible marking and lighting of active construction sites; and
- Regular updates to the local community through social media, public notices, and/or other appropriate communications tools.

8.5.2.2 Operations and Maintenance

During operations, the potential impact-producing factor to land-based transportation and traffic uses may include:

- Operations and maintenance activities associated with the onshore export and interconnection cables, the onshore substation facilities, and the O&M Base and O&M facility.

The following impact may occur as a consequence of the factor identified above:

- An increase in operations and maintenance vehicle traffic, including workforce.

Increased operations and maintenance vehicle traffic. An increase in Project-related vehicle traffic along the onshore export and interconnection cable routes and at the onshore substation facilities is anticipated during the O&M phase. The number of workers transiting to the O&M Base[4] and the onshore substation facilities at the Astoria power complex and Waterford power complex is anticipated to be low and impacts to local traffic are not expected. Similarly, the number of workers transiting to/from the Port of New Bedford O&M facility is expected to be low and impacts to local traffic are not expected. The increase in staff transiting to the O&M Base at the SBMT and the onshore substation facilities at the Astoria power complex and Waterford power complex is not expected to add a noticeable increase to existing traffic congestion (see **Section 8.1 Population, Economy, Employment, and Housing and Property Values** for additional information on anticipated workforce). Additionally, both the Astoria power complex and Waterford power complex are controlled facilities, which limit traffic to site personnel and registered visitors. The onshore substation facilities will be unmanned during routine operations and will only be inspected periodically and, therefore, are not expected to add a noticeable increase to existing traffic. Personnel will be on site as necessary for any maintenance and repairs. Beacon Wind also proposes that the O&M Base and the onshore substation facilities will contain sufficient parking on-site to support onshore O&M workers, which will further avoid, minimize, and mitigate impacts.

8.5.2.3 Decommissioning

Impacts during decommissioning are expected to be similar to or less than those experienced during construction, as described in **Section 8.5.2.1**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Beacon Wind anticipates will be needed for the Project, please see **Section 3 Project Description**.

8.5.3 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors described in **Section 8.5.2**, Beacon Wind is proposing to implement the following avoidance, minimization, and mitigation measures.

8.5.3.1 Construction

During construction, Beacon Wind will consider the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.5.2.1**:

- The development of a Traffic Management Plan, to be developed in coordination with, and approved by, the other property owners within the Astoria power complex, Waterford power complex officials and affected local communities, as applicable;

[4] The O&M Base will be located at the SBMT and will be constructed to support both the Empire Wind project and the Beacon Wind project. As such, Beacon Wind will not need to construct an O&M Base for the Project. As indicated in **Section 3.5 Operations and Maintenance Activities**, impacts as a result of the construction of the O&M Base are addressed through the Empire Wind permitting process. Significant impacts to land transportation or traffic resulting from the O&M Base development or operation at the SBMT are not expected.

- The development of Project-related vehicle routes to and from construction sites, which align with New York City Truck Routes[5] and/or are consistent with allowable uses, to the extent practicable;
- The use of highly visible marking and lighting of active construction sites;
- The use of temporary, localized construction zones to minimize areas or sections of road closure (including pedestrian, bike, and transit infrastructure);
- Regular updates to the local community through social media, public notices, and/or other appropriate communications tools; and
- The Project will utilize an existing O&M Base and will not require construction of a new O&M Base in the State of New York; therefore, there will be no O&M Base construction-related impacts on traffic associated with the Beacon Wind project.

8.5.3.2 Operations and Maintenance

During operations, in the unlikely event that onshore export cable repair is required, Beacon Wind will commit to implementing avoidance, minimization, and mitigation measures, which are expected to be similar to those proposed for construction, as described in **Section 8.5.3.1**.

8.5.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in **Section 8.5.3.1** and **Section 8.5.3.2**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

8.5.4 References

CTDOT (Connecticut Department of Transportation). 2018-2020. AADT (data viewer). Available at: https://www.arcgis.com/home/item.html?id=8315fb52464d49ec9bedfd334f8efaa1. Accessed March 10, 2022.

NYSDOT (New York State Department of Transportation). 2021. Traffic Data Viewer. Available at: https://www.dot.ny.gov/tdv. Accessed June 29, 2021.

[5] See https://www1.nyc.gov/html/dot/html/motorist/trucks.shtml#routes for more information on New York City Truck Routes.

8.6 Aviation

This section describes airspace and aviation radar known within and surrounding the Project Area, which primarily includes the Lease Area. Potential impacts to airspace and aviation radar resulting from construction, operation, and decommissioning of the Project are discussed. Proposed Project-specific measures adopted by Beacon Wind are also described, which are intended to avoid, minimize, and/or mitigate potential impacts to airspace and aviation radar within the Lease Area and surrounding environment.

Other resources and assessments detailed within this COP that are related to airspace and aviation radar include:

- Department of Defense and OCS National Security Maritime Uses (**Section 8.8**);
- Aircraft Detection Lighting System (ADLS) Analysis (**Appendix Y**);
- Obstruction Evaluation and Airspace Analysis (**Appendix Z**);
- Radar and Navigational Aid Screening Study (**Appendix AA**); and
- Air Traffic Flow Analysis (**Appendix FF**).

Regulatory Context

In accordance with 49 U.S.C. § 44718 and 14 CFR § 77, the Federal Aviation Administration (FAA) has jurisdiction to assess all structures within the U.S. territorial waters that are greater than 200 ft (61 m) above ground level (AGL). Additionally, the FAA may have jurisdiction over lower structures depending on proximity to airports. The FAA's mission is to ensure that these structures, which fall within their jurisdictional zone, do not have adverse effects on the safety or efficient utilization of navigable airspace. Beyond the 12-nm (22-km) limit from the shoreline, BOEM accepts this role. In all cases, structures are assessed by the U.S. Department of Defense (DoD) and the Department of Homeland Security for potential impacts to military operations and/or radar systems. Structures with a height greater than 499 ft (152 m) AGL within FAA's jurisdictional boundary must be identified as a potential obstruction for assessment. No part of the Lease Area is within the 12 nm (22 km) FAA jurisdiction; therefore, the Beacon Wind project falls under BOEM review (see **Section 3 Project Description** for additional information on lighting and marking measures associated with the Project).

Data Relied Upon and Studies Completed

For the purposes of this section, the Study Area includes the Lease Area with a 25-nm (46.3-km) buffer that may be directly and/or indirectly impacted by the construction, operations, and decommissioning of the Project for aviation. The Study Area for aviation is shown in **Figure 8.1-1**.

In order to support the assessment of the Project, four reports were commissioned through Capitol Airspace Group (CAG) analyzing wind turbines up to 1,116 ft (340 m). After the commissioning of these reports, the Project PDE was further refined to a 1,083 ft (330 m) maximum turbine height – the more conservative results from the CAG reports are discussed in this section and considered applicable to the current PDE turbine height. An Obstruction Evaluation and Airspace Analysis was completed by CAG (**Appendix Z Obstruction Evaluation and Airspace Analysis**). The purpose of the analysis was to identify obstacle clearance surfaces established by the FAA that could limit the placement of turbines with maximum blade tip heights of 1,116 ft (340 m) AGL.[6] The analysis

[6] Obstruction Evaluation and Airspace Analysis was commissioned before the Beacon Wind COP PDE was adjusted to 1,083 ft (330 m) maximum turbine height. The evaluation also considered a minimum turbine height of 850 ft (259 m), which is not discussed within this COP.

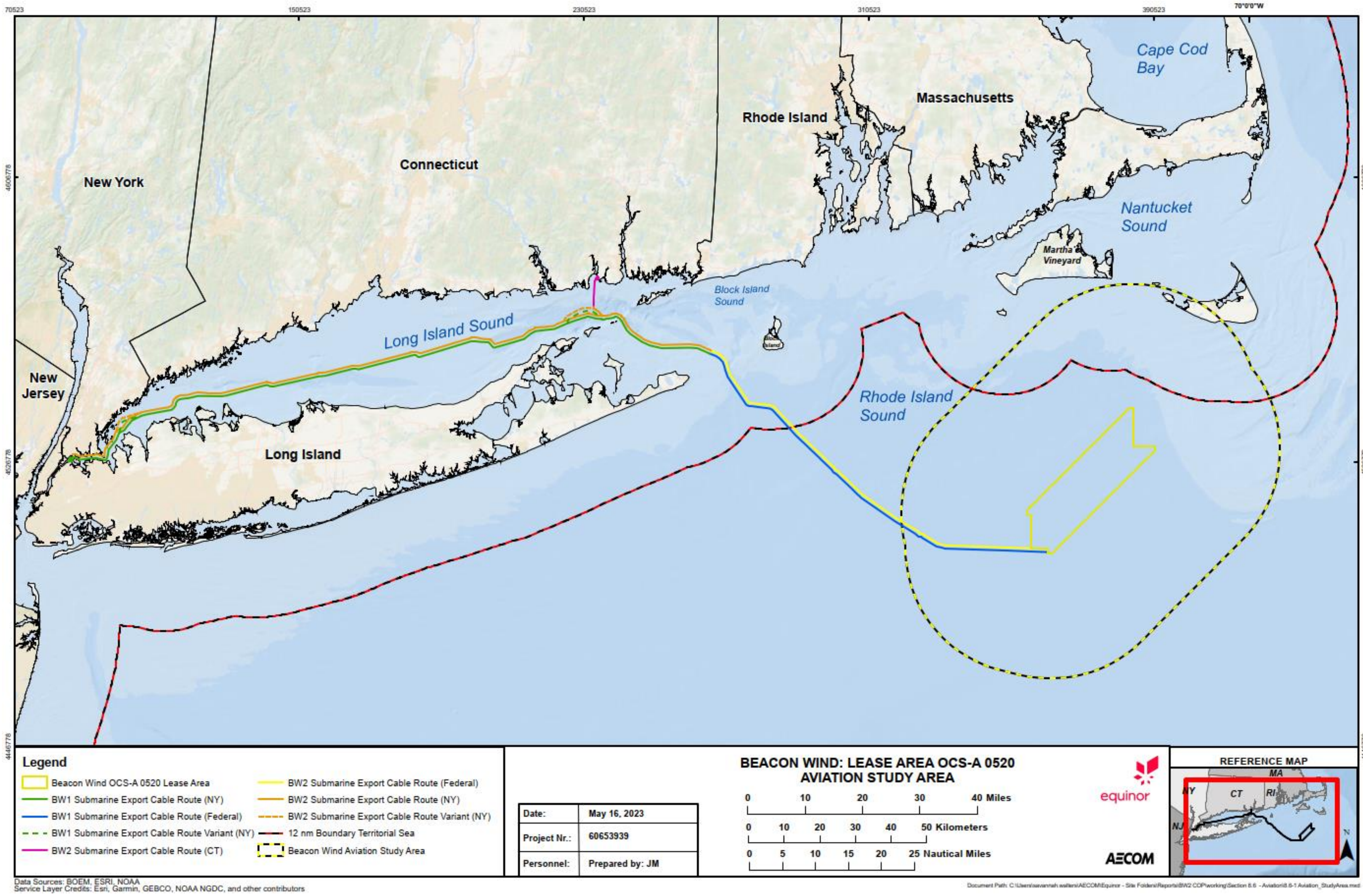
generated overlays to determine Lease Area proximity to airports, published instrument procedures, enroute airways, civilian minimum vectoring altitude (MVA) and minimum instrument flight rules (IFR) altitude sectors, and military airspace and training routes. In addition to this proximity determination, the analysis evaluated 14 CFR § 77 imaginary surfaces, published instrument approach and departure procedures, visual flight rules operations (VFR), FAA MVA, minimum IFR altitudes, and enroute operations. In complement with the Obstruction Evaluation and Airspace Analysis, the Project conducted a due diligence review of radar line of sight relevant to the Lease Area (**Appendix AA Radar and Navigational Aid Screening Study**) and an analysis of historical air traffic in the Study Area (**Appendix FF Air Traffic Flow Analysis**).

Beacon Wind is considering the use of agency-approved ADLS, or similar system, to turn the aviation obstruction lights on and off in response to detection of a nearby aircraft and is actively completing an evaluation to determine the impacts of the implementation of this system. This commitment as a mitigation is subject to final Project evaluation and agency approval. Therefore, the Project analyzed air traffic flow data in order to determine the requirements needed to implement an ADLS system to control the activation of obstruction lighting (**Appendix Y Aircraft Detection Lighting System [ADLS] Analysis**). For the purpose of this assessment, it is assumed the entire Lease Area will adopt ADLS. This analysis utilized historical air traffic data obtained from the FAA (dating from 2019-2020) to determine the total lights-on duration anticipated after implementing an ADLS system.[7] An ADLS utilizes radar surveillance systems to track aircraft transiting in proximity to a wind project and activates the wind turbine field's obstruction lights when an aircraft flies within the ADLS system coverage area. This coverage area is a pre-determined, project-specific vertical and horizontal distance from the edge of the wind farm (referred to as an ADLS three-dimensional volume). In accordance with FAA Advisory Circular 70/7460-1M, lights controlled by an ADLS must be activated and illuminated prior to an aircraft reaching 3 nm (5.55 km) from, and 1,000 ft (305 m) above, any wind turbine. For the purposes of the assessment completed for the Project, a conservative 3.55 nm (6.57 km) horizontal distance from the edge of the Project and a conservative vertical distance of 3,500 ft (1,066.8 m) above the maximum tip height of 1,116 ft (340 m) was used. Once the aircraft has departed this coverage area, the lights are deactivated by the ADLS. This effectively provides nighttime conspicuity on an "as-needed" basis and reduces the amount of time that the obstruction lights will be illuminated (for a complete overview of the Project's lighting and marking scheme see **Section 3 Project Description**).

The historical air traffic data indicate that flights during the one-year period from 2019-2020 would have resulted in a total obstruction light system activated duration of 2 hours 42 minutes and 9 seconds for 1,116-foot tall (340.2 meter) wind turbines. Considering the local sunrise and sunset times, obstruction lights controlled by an ADLS would be activated only 0.06 percent of the time that full-time obstruction lights would be active. It is important to note that the ADLS system utilized by Beacon Wind will be customized to be Project-specific by the selected ADLS manufacturer once the final wind turbines and layout are determined. The dimensions of the coverage area from the selected ADLS system will be designed to meet the FAA Advisory Circular but will likely exceed the minimum criteria per industry standard. As a result, the actual total light system activated duration may vary.

[7]Typically, one year of air traffic data is analyzed for the report. Beacon Wind requested a specific review of both 2019 and 2020 data. The results of the two years of analysis provides a range of potential light system activated duration.

FIGURE 8.6-1. AVIATION STUDY AREA



8.6.1 Affected Environment

The affected environment is defined as the Study Area that has the potential to be directly or indirectly affected by the construction, operation, and decommissioning of the Project. This includes the wind turbines that may result in impacts to airspace and aviation radar. Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Beacon Wind expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards, which Beacon Wind will comply with in using the facilities.

8.6.1.1 Airports

There are a number of public-use and private-use airports and heliports within 25 nm (46.3 km) of the Lease Area (**Figure 8.6-2**), including Martha's Vineyard Airport and Nantucket Memorial Airport. Between these two airports, 13 published instrument approach procedures were identified and assessed (**Appendix Z Obstruction Evaluation and Airspace Analysis**). The findings of this analysis indicate that instrument departure and approach procedures will not be materially affected. However, proposed wind turbines located in the northeastern portion of the Lease Area may affect "Minimum Safe Altitudes (MSA)." Since MSAs are for emergency use only, impact upon them cannot be used as the basis for determinations of hazard.

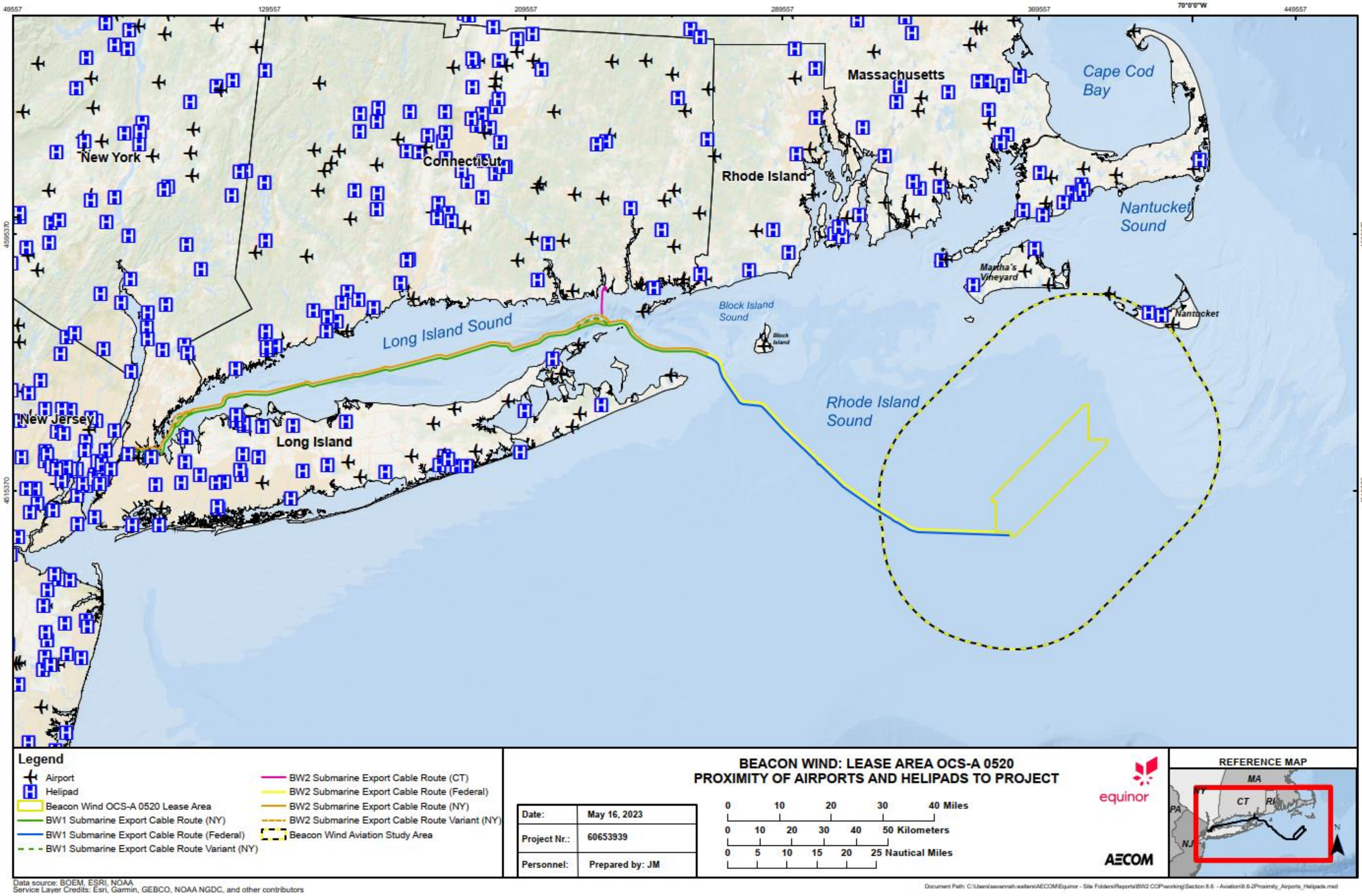
An evaluation of 14 CFR § 77.19 imaginary surfaces was also completed. These airport surfaces are used to determine if structures in proximity to airports are considered obstructions, even at heights less than 499 ft (152 m) AGL. It was determined that no public-use airport imaginary surfaces overlie the Lease Area and, therefore, these are not discussed further.

In addition to evaluating the potential for affecting published instrument departures and approaches, an analysis of known visual flight rules (VFR) traffic operations was completed. This included analyzing local VFR traffic pattern airspace used by pilots entering or leaving the airport environment and the potential for interfering with VFR routes. There are no VFR traffic patterns that overlap with the Lease Area. Further, since there are no linear features charted on the VFR sectional chart in proximity to the Lease Area, it is unlikely that the proposed wind turbines would affect regularly used VFR routes. Therefore, these features are not discussed further.

8.6.1.2 Enroute Airways and Minimum Vectoring Altitudes

Low altitude enroute airways provide pilots with a means of navigating when flying from airport to airport and are defined by radials between navigational aids. There are no enroute airways that overlie the Lease Area and, as a result, there is no impact on low altitude enroute airways. Minimum vectoring altitude (MVA) and minimum instrument flight rules (IFR) altitude (minimum instrument altitude [MIA]) sectors do overlie the Project. Minimum vectoring altitude (MVA) and MIA sectors describe the lowest altitudes at which air traffic controllers can issue radar vectors based on obstacle clearance. MVA sectors used by Boston Consolidated Terminal Radar Approach Control (TRACON) and MIA sectors used by Boston Air Route Traffic Control Center (ARTCC) do overlie the Lease Area. Modifications to these sectors, either by increasing their minimum altitudes or by modifying sector boundaries, may be required in order to accommodate up to 1,116 ft (340 m) turbines. See **Section 8.6.2.2** or **Appendix Z Obstruction Evaluation and Airspace Analysis** for additional details on these segments of airspace. If the FAA determines that modifying these sectors would affect as few as one radar vectoring operation per week, on average, it could be used as the basis for determinations of hazard. Additional research will be conducted to determine the number of operations anticipated to be affected.

FIGURE 8.6-2. PROXIMITY OF AIRPORTS AND HELIPADS TO BEACON WIND PROJECT



The FAA publishes MVA, IFR, and MIA charts that define sectors with the lowest altitudes at which air traffic controllers can issue radar vectors to aircraft based on obstacle clearance. The FAA requires that sectors have a minimum obstacle clearance of 1,000 ft (305 m) in non-mountainous areas and normally 2,000 ft (609 m) in mountainous areas. Proposed structures that exceed MVA/MIA sector obstacle clearance surfaces would require an increase to the altitudes usable by air traffic control for vectoring aircraft. If the FAA determines that this impact would affect as few as one radar vectoring operation per week, it could result in determinations of hazard. The Lease Area includes multiple IFR controlled airspaces with minimum vectoring/IFR altitudes; based on defined MVA's and minimum clearances, turbine structures of up to 1,116 ft (340 m) would exceed existing obstacle clearance surfaces within a portion of the Lease Area. MVAs would likely need to be increased over portions of the Lease Area to accommodate the turbines. See **Section 8.6.2.2 Operations and Maintenance** or **Appendix Z Obstruction Evaluation and Airspace Analysis** for additional details on these zones.

8.6.1.3 Military Airspace and Training Routes

Special Use Airspace, described as Warning Area W-105A, overlies the Lease Area. A warning area is a bounded zone that contains activity that may be hazardous to nonparticipating aircraft and is designed to notify nonparticipating pilots of the potential hazard. The Project will continue to engage with the applicable military contacts to assess, and feasibly mitigate, potential impacts (**Section 8.9 Department of Defense and OCS National Security Maritime Uses**). **Figure 8.6-3** details the boundaries of the Military Airspace in relation to the Project Area.

8.6.1.4 Radar

The following radar sites are located in proximity to the Project Area **(Figure 8.6-4**). Radar sites for air defense and air traffic control include the Falmouth Airport Surveillance Radar model-8 (ASR-8), Nantucket Airport Surveillance Radar model-9 (ASR-9), North Truro Air Route Surveillance Radar model-4 (ARSR-4), the Providence ASR-9, Boston ASR-9, and Riverhead ARSR-4. Weather radar sites include the Boston Weather Surveillance Radar model-88 Doppler (WSR-88D), the Brookhaven WSR-88D and the Boston Terminal Doppler Weather Radar (TDWR). Early Warning Radar (EWR) used for ballistic missile defense and space surveillance includes the Cape Cod Air Force Station (AFS) EWR. High Frequency (HF) radar sites used to collect ocean surface current and wave data include Amagansett HF radar, Block Island Long Range HF radar, Horseneck Beach State Reservation HF radar, Long Point Wildlife Refuge HF radar, Martha's Vineyard HF radar, Moriches HF radar, Martha's Vineyard Coastal Observatory (MVCO) Meteorological Mast HF radar, Nantucket HF radar, Nantucket Island HF radar, and Nauset HF radar. See **Appendix AA Radar and Navigational Aid Screening Study** for additional details on the results of the radar line of sight analysis**.**

Terminal and Enroute Navigational Aids (NAVAIDs) protection areas do not overlie the Lease Area making it unlikely that the proposed turbines would have either physical or electromagnetic effects on terminal or enroute NAVAIDs. Regardless, Beacon Wind will continue discussions with both the FAA and the DoD regarding the potential for interference, where appropriate, and to determine if there are operational impacts to these systems that need to be mitigated.

FIGURE 8.6-3. MILITARY AIRSPACE IN PROXIMITY TO PROJECT AREA

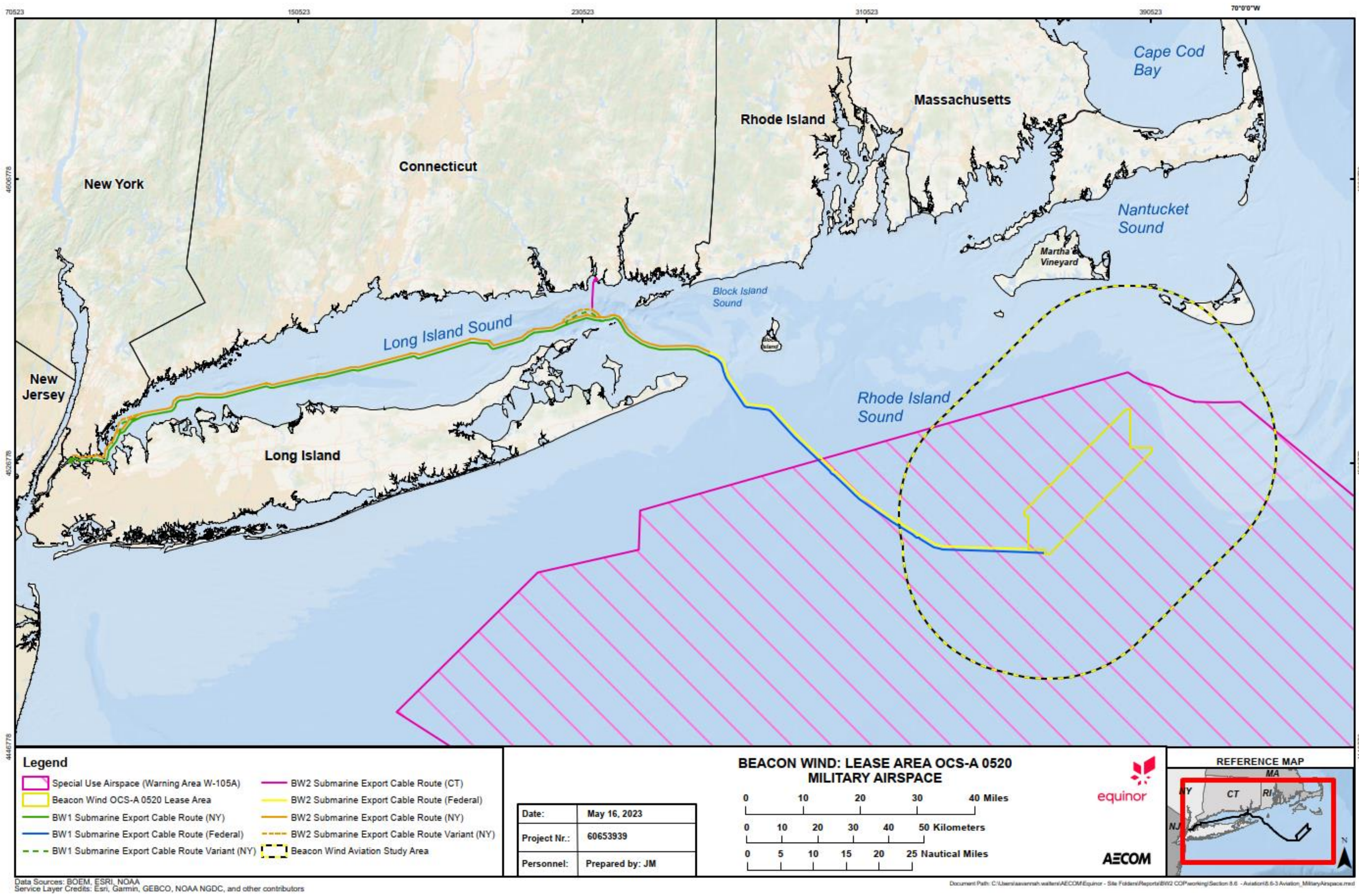
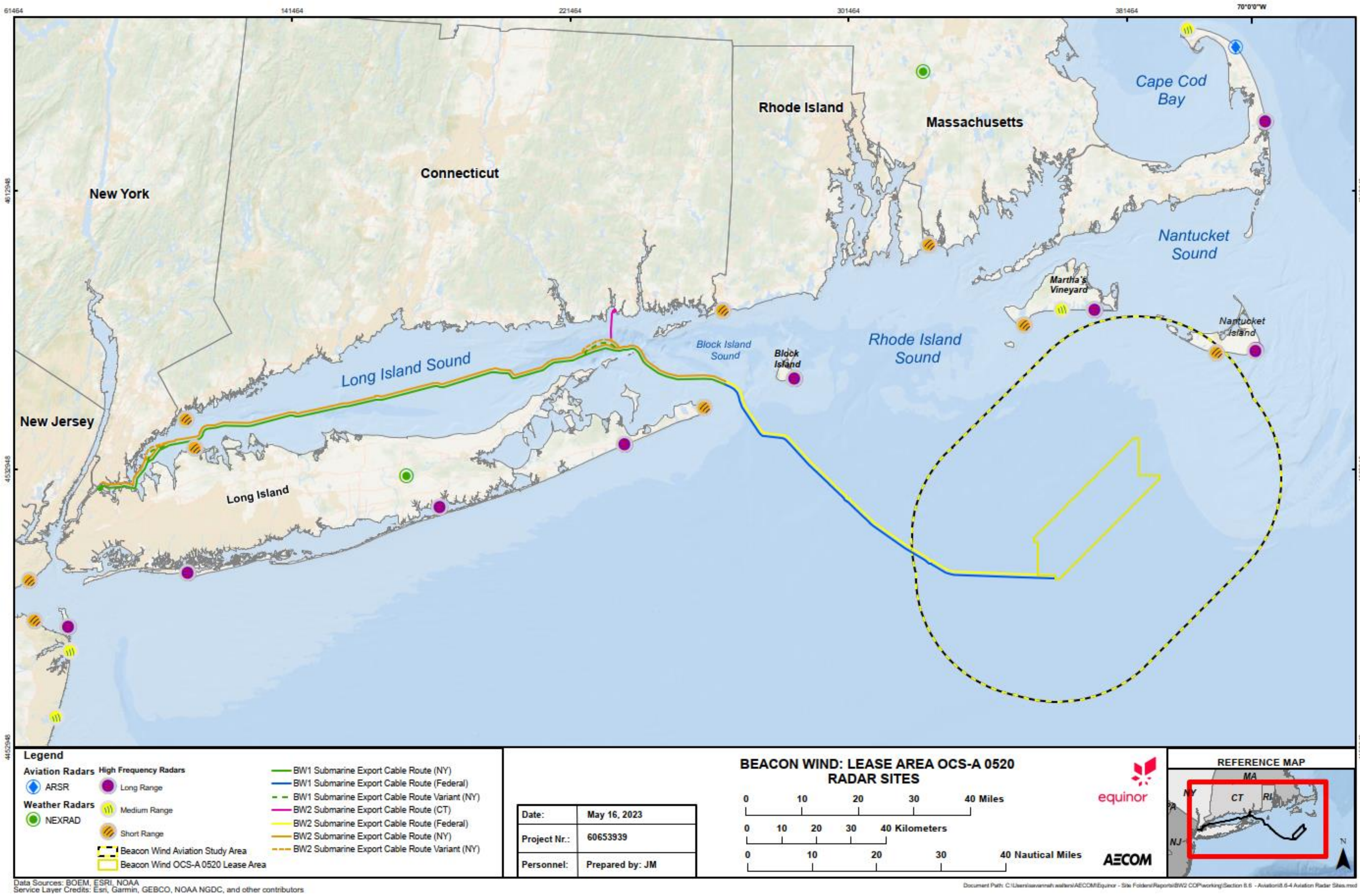


FIGURE 8.6-4. RADAR SITES IN PROXIMITY TO PROJECT AREA



8.6.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For airspace and aviation radar, the maximum design scenario is the maximum number of the tallest structures as described in **Table 8.6-1**. The parameters provided in **Table 8.6-1** represent the maximum potential impact from full Lease Area build-out for BW1 and BW2 and incorporates a total of 155 wind turbine structures within the Lease Area, at a maximum height of 1,083 ft (330 m) AGL.

TABLE 8.6-1. SUMMARY OF MAXIMUM DESIGN SCENARIO PARAMETERS FOR AVIATION AND RADAR

Parameter	Maximum Design Scenario	Rationale
Construction		
Foundation	Suction bucket jacket	Represents the tallest structure being transported upright within Project areas during construction.
Foundation height	413 ft (126 m)	Represents a suction bucket jacket transported upright on a barge.
Operations and Maintenance		
Wind turbines	Based on a full build-out of the Project (BW1 and BW2) of 155 1,083-ft (330-m) wind turbines.	Representative of the maximum number of structures and therefore the greatest exposure to aviation (155 wind turbines).
Upper blade tip height	1,083 ft (330 m) HAT	Based on the maximum wind turbine rotor height and, therefore, the greatest exposure to aviation.

8.6.2.1 Construction

During construction, the potential impact-producing factors to aviation uses may include:

- Transportation of materials (e.g., foundations) and equipment (e.g., cranes) during construction from onshore staging areas to the Lease Area and between marshalling yards; and
- Use of cranes to install nacelles and wind turbine blades in the Lease Area.

The following impacts may occur as a consequence of the factors identified above:

- Short-term interference with airspace due to the temporary presence of construction equipment and the transport of Project components; and
- Short-term interference with aviation radar due to the temporary presence of construction equipment and the transport of Project components.

Interference with airspace and aviation radar: For port activities, the Project will utilize cranes for assembly and loading/unloading of materials. Activities at staging and construction facilities will be consistent with the established and permitted uses of these facilities and Beacon Wind will comply with applicable permitting standards to limit environmental impacts from Project-related activities. If introduction of a new crane(s) is required, heights are not anticipated to exceed existing or historical crane heights; however, additional assessment will be completed to investigate potential interference that could take place during the transit of Project components. The Project will review the FAA Part 77.9 Notice Criteria for any structure to determine if FAA filing is required.

Equipment utilized for offshore construction within the Lease Area will not surpass the assessed height of 1,083 ft (330 m) for the wind turbines.

8.6.2.2 Operations and Maintenance

During operations, the potential impact-producing factors to aviation uses may include:

- The presence of fixed structures, for example wind turbines.

The following impacts may occur as a consequence of the factors identified above:

- Long-term interference with regulated airspace; and
- Long-term interference with aviation radar systems.

Interference with regulated airspace. The Obstruction Evaluation and Airspace Analysis (**Appendix Z Obstruction Evaluation and Airspace Analysis)**, which analyzed the placement of turbines with maximum blade tip heights of 1,116 ft (340 m) AGL,[8] indicated the lowest obstacle clearance surfaces overlying the Beacon Wind project range from 549 ft (167 m) to 4,549 ft (1,386 m) above MSL and are associated with MVA and MIA sectors. These surfaces could limit 1,116-ft (340-m) tall wind turbines in the central and northern sections of the Study Area (orange areas, **Figure 8.6-5**). If wind turbines are located in the northern corner of the Study Area (red area **Figure 8.6-6**) then they would require an increase to the Boston Consolidated (A90) TRACON Sector FF MVA. The 105 proposed wind turbines in the central and northern sections of the Lease Area (red and orange areas, **Figure 8.6-5** and **Figure 8.6-6**) would also require an increase to the Boston Consolidated (A90) TRACON Sector U MVA with their height of 1,116 ft (340 m). If the FAA determines that any of these impacts would affect as few as one operation per week, it could result in determinations of hazard.

[8] Obstruction Evaluation and Airspace Analysis was commissioned before the Beacon Wind COP PDE was adjusted to 1,083 ft (330 m) maximum turbine height. The evaluation also considered a minimum turbine height of 850 ft (259 m), which is not discussed within this COP.

FIGURE 8.6-5. BOSTON CONSOLIDATED (A90) TRACON FUSION 3 MVA SECTORS

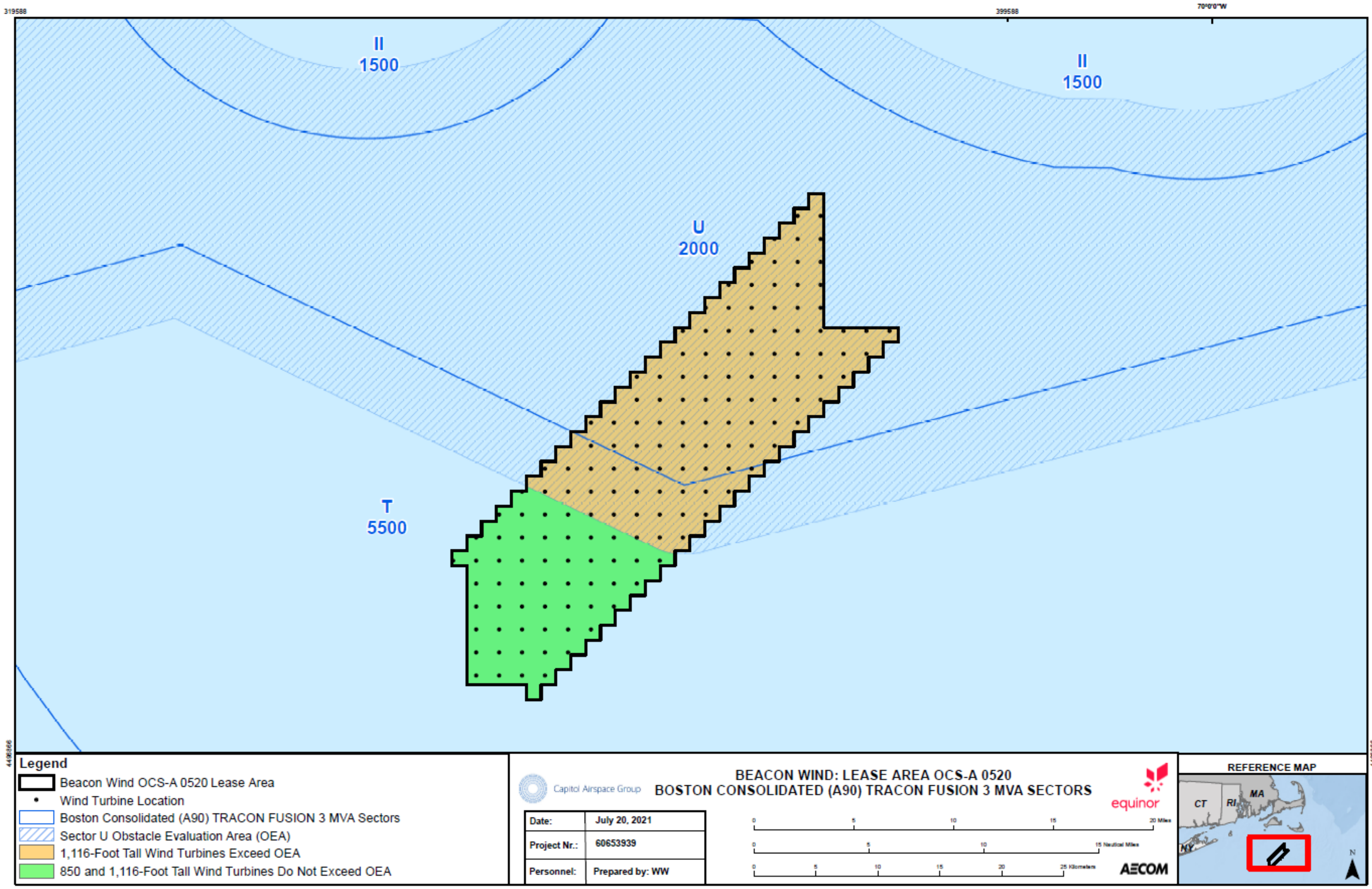
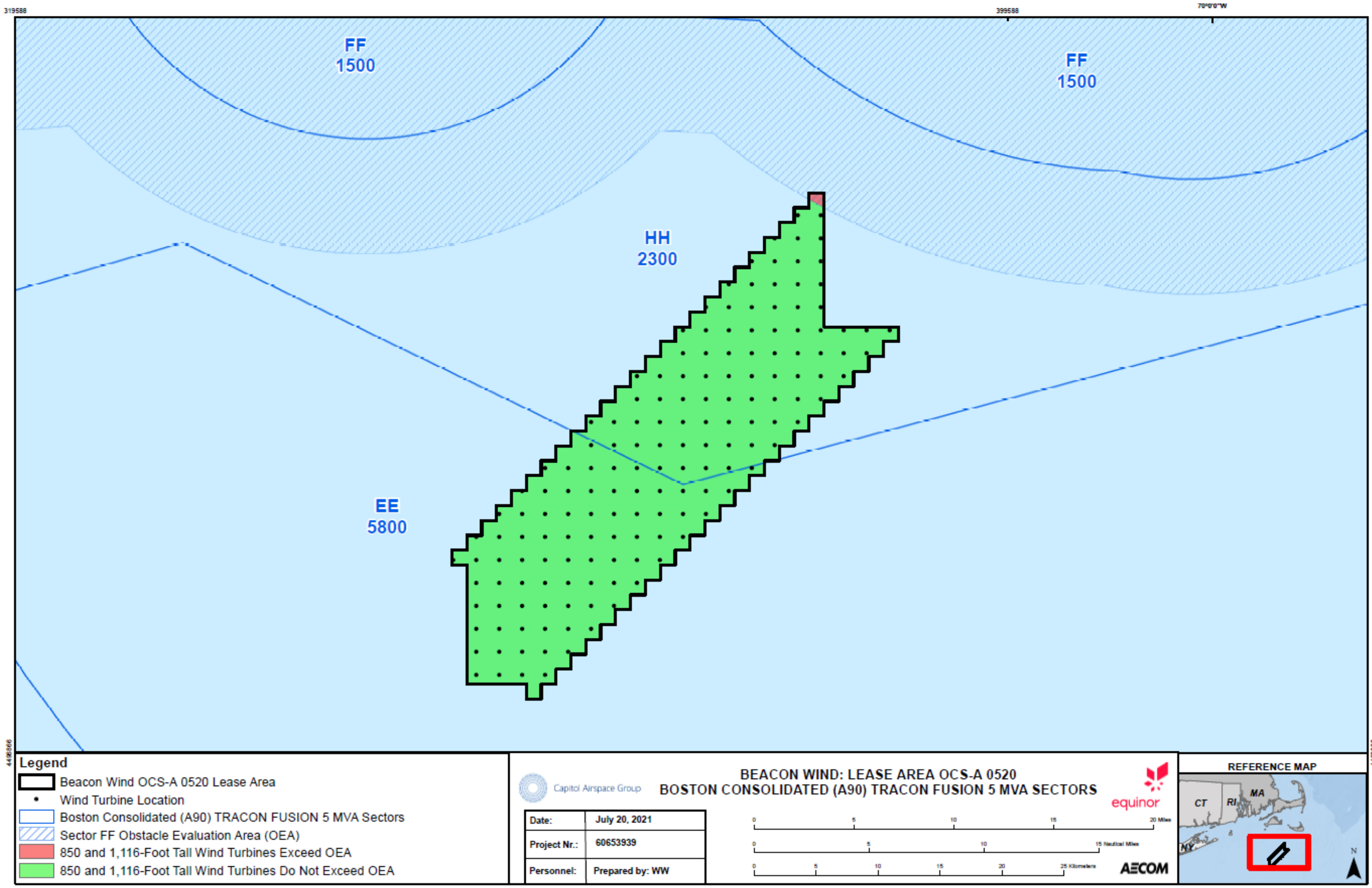


FIGURE 8.6-6. BOSTON CONSOLIDATED (A90) TRACON FUSION 5 MVA SECTORS



Interference with radar systems. NAVAID protection areas do not overlie the Lease Area, making it unlikely that the proposed turbines would have either physical or electromagnetic effects on terminal or enroute NAVAIDs, though they do overlie the Study Area. NAVAID buffers and imaginary surfaces associated with Martha's Vineyard (MVY) and Nantucket (ACK) airports are shown in **Figure 8.6-7** and **Figure 8.6-8**. Regardless, Beacon Wind will continue to investigate the potential for interference and to determine if there are any operational impacts to these systems. See **Appendix AA Radar and Navigational Aid Screening Study** for additional details on the results of the radar line of sight analysis**.**

FIGURE 8.6-7. BEACON WIND PROJECT AND NAVAID BUFFERS FOR NEAREST AIRPORTS

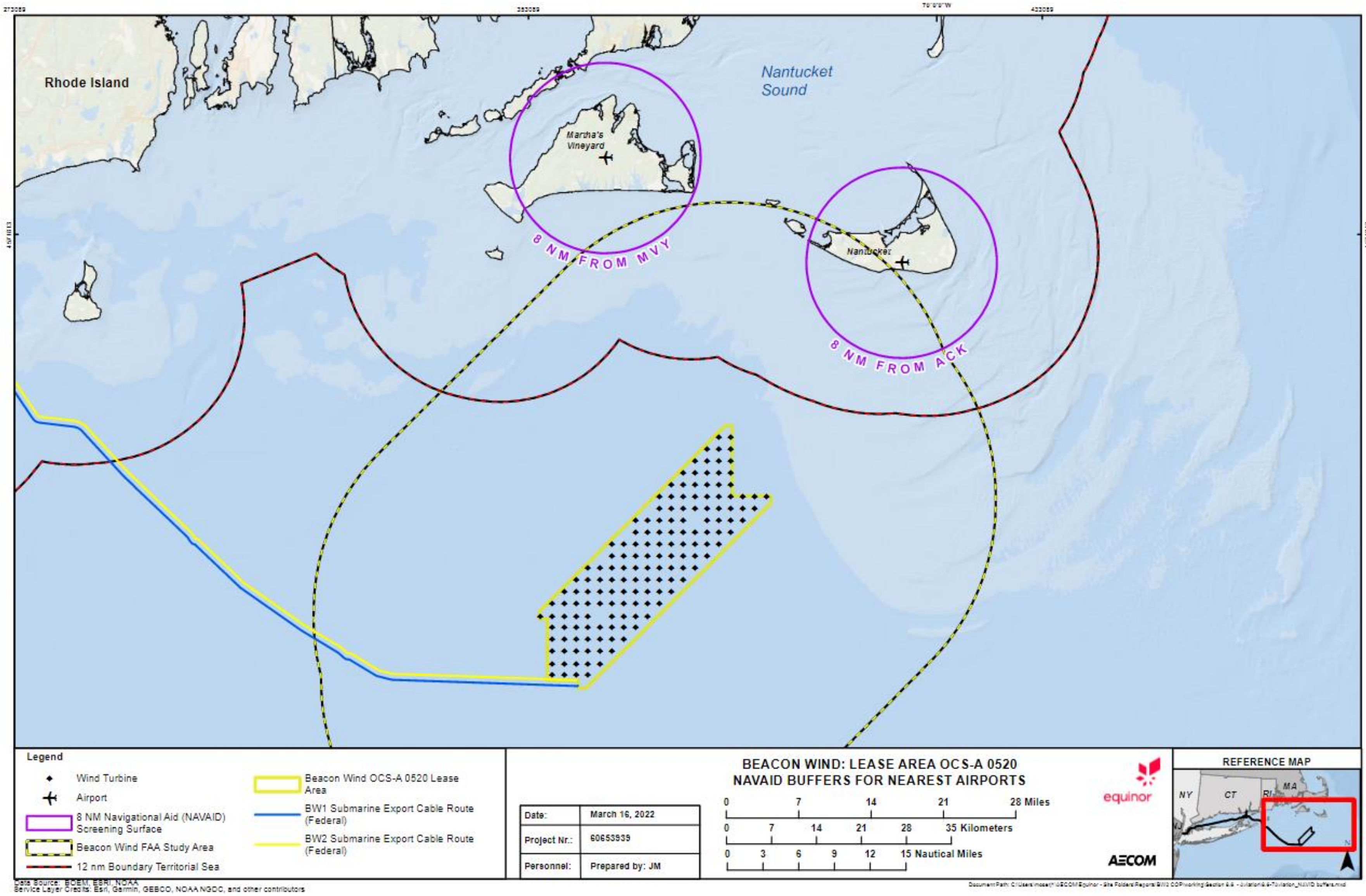
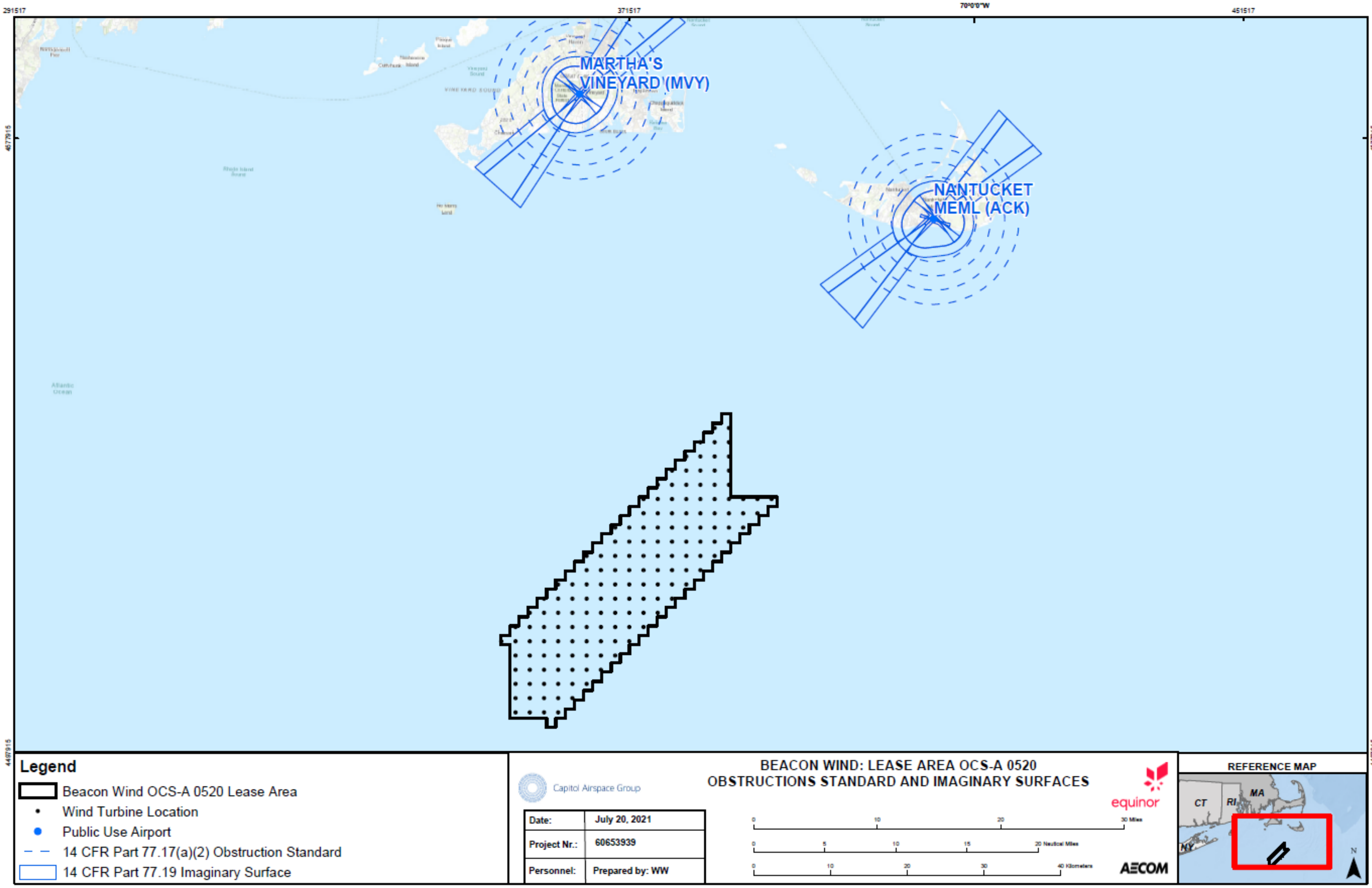


FIGURE 8.6-8. OBSTRUCTIONS STANDARD AND IMAGINARY SURFACES



8.6.2.3 Decommissioning

Impacts during decommissioning are expected to be similar or less than those experienced during construction, as described in **Section 8.6.2.1**. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Beacon Wind anticipates will be needed for the Project, please see **Section 3 Project Description**.

8.6.3 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors described in **Section 8.6.2**, Beacon Wind is proposing to implement the following avoidance, minimization, and mitigation measures.

8.6.3.1 Construction

During construction, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.6.2.1:**

- Continue consultation with the DoD Siting Clearinghouse, including the engagement of a formal Mitigation Agreement process to offset identified impacts to radar systems. Beacon Wind met with the DoD on June 29, 2021 to kick-off the mitigation agreement process with the mitigation response team and it was determined that the DoD would begin drafting a mitigation agreement for the Project to be formalized following COP submittal;
- Coordination with NOAA to minimize, and/or mitigate potential impacts to high frequency weather and current radar systems;
- Should Beacon Wind utilize helicopters during the construction phase, the Project will utilize a suitably certified charter firm for the transportation of crews to the Lease Area;
- Direct communication with applicable agencies and personnel to alert the appropriate parties to planned construction movements and actions; and
- Wind turbines and construction equipment will be properly lit and marked in accordance with FAA’s Advisory Circular 70/7460-1M within FAA jurisdiction and beyond, or other methods as deemed required during consultation and as applicable (see **Section 3 Project Description** for additional information on proposed marking and lighting measures).

8.6.3.2 Operations and Maintenance

During operations, Beacon Wind will commit to the following avoidance, minimization and mitigation measures to mitigate the impacts described in **Section 8.6.2.2**:

- Regular communications and updates with key aviation stakeholders, including the DoD Siting Clearinghouse, on wind turbine locations. Beacon Wind met with the DoD on June 29, 2021, to kick-off the mitigation agreement process, and it was determined that the DoD would begin drafting a mitigation agreement for the Project to be formalized following COP submittal; and
- Wind turbines will be properly lit and marked in accordance with FAA’s Advisory Circular number 70/7460-1M within FAA jurisdiction and beyond, or other methods as deemed required during consultation and as applicable (see **Section 3 Project Description** for additional information on proposed marking and lighting measures).

8.6.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in **Section 8.6.3.1** and **Section 8.6.3.2**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

8.6.4 References

TABLE 8.6-2. SUMMARY OF DATA SOURCES

Source	Includes	Available at	Metadata Link
BOEM	Lease Area	https://www.boem.gov/BOEM-Renewable-Energy- Geodatabase.zip	N/A
BOEM	State Territorial Waters Boundary	https://www.boem.gov/Oil-and-Gas-Energy-Program/Mapping-Data/ATL_SLA(3).aspx	http://metadata.boem.gov/geoand-spatial/OCS_SubmergedLandsActBoundary_Atlantic_NAD83.xml
NOAA	Territorial Sea (12-nm Limit)	http://maritimeboundaries.noaa.gov/downloads/USMaritimeLimitsAndBoundariesSHP.zip	https://www.fisheries.noaa.gov/inport/item/39963
NOAA NCEI	Bathymetry	https://www.ngdc.noaa.gov/mgg/coastal/crm.html	N/A
Northeast Ocean Data	Naval Warning Area	http://www.northeastoceandata.org/files/metadata/Themes/NationalSecurity.zip	http://northeastoceandata.org/files/metadata/Themes/Security/NEWarningAreas.pdf

FAA (Federal Aviation Administration). n.d. "Aeronautical Information Manual Chapter 3 §4-4." Available online at: https://www.faa.gov/air_traffic/publications/atpubs/aim_html/chap3_section_4.html. Accessed July 19, 2021.

8.7 Marine Transportation and Navigation

This section describes marine transportation and navigation within and surrounding the Project Area. Potential impacts resulting from construction, operation, and decommissioning of the Project are discussed. Proposed Project-specific mitigation measures adopted by Beacon Wind are also described; which are intended to avoid, minimize, and/or mitigate potential impacts to marine transportation and navigation users.

Other resources and assessments detailed within this COP that are related to marine transportation and navigation include:

- Recreation and Tourism (**Section 8.3**);
- Commercial and Recreational Fishing (**Section 8.8**);
- Department of Defense and OCS National Security Maritime Uses (**Section 8.8**);
- Marine Energy and Infrastructure (**Section 8.10**);
- Other Marine Uses (**Section 8.11**); and
- Navigation Safety Risk Assessment (**Appendix BB**).

The Ports and Waterways Safety Act acknowledges that navigation and vessel safety and protection of the marine environment are matters of national importance. The Ports and Waterways Safety Act requires the USCG to conduct studies to provide safe access routes for vessel traffic in the waters under the jurisdiction of the U. S. In addition, the USCG must take into account the possible uses of the waterways to reconcile the need for safe access routes with the needs of the other uses of the waterways.

The USCG serves as a cooperating agency with BOEM by providing recommendations as the subject matter expert for safety, maritime security, maritime mobility (management of maritime traffic, commerce, and navigation), national defense, and protection of the marine environment. Guidance is provided by the USCG for offshore wind farms in the form of a *Navigation and Vessel Inspection Circular (NVIC) 01-19* (USCG 2019a). This guidance includes the requirement to develop a Navigation Safety Risk Assessment (NSRA), a key study used by the USCG to make their recommendation to BOEM. The NSRA complies with the requirements set out in the NVIC 01-19 and a checklist is contained in Attachment A of the NSRA (provided in **Appendix BB Navigation Safety Risk Assessment**) to show how each element of the NVIC has been covered. The NVIC provides guidance on information and factors that the USCG will consider when reviewing an application for a permit to build and operate an Offshore Renewable Energy Installation (OREI) in U. S. navigable waters.

As well as the Beacon Wind OSC-A 0520 Lease Area-specific assessment, the USCG has also completed three studies focusing on navigation within areas applicable to the Project and routes between Atlantic coast port approaches and international entry and departure transit areas. The USCG's *Atlantic Coast Port Access Route Study* (ACPARS), the *Port Access Route Study: The Areas Offshore of Massachusetts and Rhode Island*, or MARIPARS, (Final Report, USCG 2020a and Docket No. USCG-2019-0131), and the Northern New York Bight Port Access Route Study, or NNYBPARS, (Final Report, USCG 2022, and Docket No. USCG-2020-0278) speak to navigation assessments made in consideration of offshore wind development in the northeast U. S. The MARIPARS study was conducted to determine navigational safety concerns specific to the MA/RI WEA and to determine whether changes were needed to existing shipping routes and waterway uses. The MARIPARS included several recommendations including the following:

- The MA/RI WEA's wind turbine layout should be developed along a standard and uniform grid pattern with at least three lines of orientation and standard spacing to accommodate diverse waterway uses;
- Lanes for vessel transit should be oriented on a diagonal (northwest to southeast) and be 0.6 nm (1.1 km) to 0.8 nm (1.5 km) wide;
- Lanes for commercial fishing vessels should be oriented east to west and be 1 nm (1.9 km) wide; and
- Lanes for USCG search and rescue should be oriented north-south and east-west and be 1 nm (1.9 km) wide (USCG 2020a).

This guidance is reflected in the 2019 collaborative regional layout for wind turbines across the seven leases in the MA/RI WEA adopted by the leaseholders, inclusive of Beacon Wind's Lease Area. The regional layout plan would require each structure to be spaced 1 nm (1.9 km) apart in fixed east-to-west rows and north-to-south columns to create the 1x1 nm (1.9x1.9 km) grid arrangement preferred by many stakeholders, including fishermen operating in the region. The USCG concluded that the adoption of a standard and uniform grid pattern will likely eliminate the need for formal or informal routing measures within the MA/RI WEA. BOEM has subsequently established the 1x1 nm (1.9x1.9 km) layout configuration as the preferred alternative in the Final Environmental Impact Statement for the Vineyard Wind Project and its Record of Decision (ROD) for COP Approval as well as established within the South Fork Wind Farm Project ROD for COP approval (BOEM 2021a, b, c).

The second study is titled Shipping Safety Fairways Along the Atlantic Coast (Docket No. USCG-2019-0279) and includes the Long Island Sound Eastern Entrances; the Port of Groton, Connecticut; the Port of New Haven, Connecticut; and Narragansett Bay, Rhode Island. The study proposes the creation of safe transit fairways to facilitate the save navigation of vessels into and out of port. Among these is the proposed Long Island Shipping Safety Fairway; this fairway overlaps the proposed Beacon Wind submarine cable route. The Notice of Proposed Rule Making is scheduled to be posted in May 2022. It should be noted that the final NNYBPARS report also proposed the Long Island Shipping Safety Fairway consistent with the submarine export cable overlap, discussed above, and will be considered by USCG Headquarters within the proposed rule-making process. A Commandant Instruction (COMDTINST 16003.2A) was published in 2016 as a policy document to provide further guidance for marine planning, including a discussion about recommended navigational safe distances. This document was updated in 2019 as COMDINST 16003.2B (USCG 2019b).

The USCG *Marine Planning Guidelines* are based on the United Kingdom Maritime Guidance Note (MGN) 371 as well as the Confederation of European Shipmaster's Associations (CEMSA), the World Shipping Council (WSC), and the *Guidelines for the Design, Marking and Operation of Wind Generators in the Area of Responsibility of the Federal Waterways and Shipping Directorates North-West and North to Guarantee the Safety and Efficiency of Vessel Traffic*. These Guidelines are available to developers as a tool in a marine spatial planning toolkit and within the NSRA process. In utilizing these guidelines and policy documents, assessments of Project impacts and design require case-by-case analysis and the application of appropriate mitigations to reduce risk to ALARP as displayed within **Appendix BB Navigation Safety Risk Assessment**.

Data Relied Upon and Studies Completed

To satisfy the information requirements of 30 CFR § 585.627(a)(8), Beacon Wind contracted Anatec, Inc. (Anatec) to prepare an NSRA in support of the COP. The BOEM relies on the USCG to review the NSRA and advise BOEM on its adequacy and the adequacy of any proposed navigational safety mitigation measures. Anatec has successfully completed the navigation risk assessments for several developers with lease areas for both offshore wind and oil and gas projects in the U.S. and around the world. A full description of the methodology, information gathered and processed, and results of the analysis are presented in greater detail within the NSRA (**Appendix BB Navigation Safety Risk Assessment**). The results of the NSRA were used to supplement this section, as detailed below. The NSRA was prepared in accordance with:

- BOEM's *Guidelines for a Renewable Energy Construction and Operations Plan* (BOEM 2020);
- USCG NVIC No. 01-19, Guidance on the Coast Guard's Roles and Responsibilities for OREI (USCG 2019a);
- Port Access Route Study: The Areas Offshore of Massachusetts and Rhode Island (MARIPARS) Final Report (USCG 2020a); and
- Revised Guidelines for Formal Safety Assessment (FSA) for Use in the IMO Rule-Making Process (IMO 2018).

The NSRA also considered the following guidance documents:

- Atlantic Coast Port Access Route Study Final Report (USCG 2016);
- Commandant Instruction (COMDTINST) 16003.2B (USCG 2019b);
- Federal Aviation Authority (FAA) Advisory Circular 70/7460-1M Chapter 13 - Marking and Lighting Wind Turbines (FAA 2020);
- *Guidelines for Lighting and Marking of Structures Supporting Renewable Energy Development* (BOEM 2021c);
- International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA)[9] O-139 Recommendation on the Marking of Man-Made Offshore Structures (IALA 2013);
- *MGN 654 (Merchant & Fishing) Safety of Navigation Offshore Renewable Energy Installations (OREIs) – Guidance on U.K. Navigational Practice, Safety and Emergency Responses* (MCA 2021);
- USCG Aids to Navigation Manual (COMDTINST Manual (CIM 16500.7A) (USCG 2015); and
- USCG District 1 Local Notice to Mariners Guidance on Lighting and Marking (USCG 2020b).

The USCG will review the NSRA to evaluate the following:

- The impact the Project will have on other marine users; and
- The potential for the Project to interfere with vessels, aircraft, or other authorized users of the air space (Search and Rescue) and the sea surface, water column, or sea bottom (for example, fisheries).

The key features of the NSRA include:

- An assessment of visual navigation and collision avoidance;
- Impacts on communications systems, radars, and positioning systems;
- Waterway characteristics such as weather, tides, currents, and ice;

[9] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

- Vessel traffic survey of 12 months of traffic data;
- Risk of collision, allision, and grounding;
- Safe clearance of wind turbine rotors for identified vessel types;
- Assessment of safe navigation within the wind farm;
- Impact on USCG missions;
- Analysis of marine environmental response incidents in the Lease Area;
- Analysis of dredging activities in the area that may be affected; and
- Risk mitigation strategies.

A complete list of the data used for the Project's assessment of marine transportation and navigation includes:

- Vessel traffic data:[10,11]
- AIS data recorded via satellite receivers between January and December 2019;
- AIS data recorded via coastal receivers between January and December 2019; and
- Visual observation data collected by the Project during 2019;

- Fishing specific data:
- VMS Fishing Density recorded between 2015 and 2016 – Northeast Ocean Data Portal (Northeast Ocean Data 2018); and
- VMS Transit Counts recorded during 2019 – Northeast Ocean Data Portal (Northeast Ocean Data 2020); and
- VMS Polar Histograms from January 2014 to August 2019 (BOEM 2021d);

- Maritime incident data:
- USCG Marine Information for Safety and Law Enforcement database (2011 to 2020) (USCG 2021); and
- Marine Accident Investigation Branch (MAIB) collision and allision incident data (2000 to 2019) (MAIB 2020);

- Navigational features:
- Code of Federal Regulations (CFR) (Office of the Federal Register 2021):
    - Title 30 – Mineral Resources;
    - Title 33 – Navigation and Navigable Waters;
    - Title 40 – Protection of Environment; and
    - Title 46 – Shipping.
- NOAA Nautical Charts 12300, 12339, 12363, 13003, 13200 (accessed November 2021);
- United States Coast Pilot 2 – 50th Edition (NOAA 2021);
- United Kingdom Hydrographic Office (UKHO) Pilot NP68 (UKHO 2016);
- Aids to Navigation (Office for Coastal Management [OCM] 2021a);
- Anchorage Areas (OCM 2021b);
- Artificial Reefs (OCM 2021c);
- Danger Zones and Restricted Areas (OCM 2021d);

[10] As indicated in **Appendix BB Navigation Safety Risk Assessment**, the vessel traffic dataset spans a 12-month period which predates the global impact of the COVID-19 pandemic on the shipping industry, and has been agreed upon by the USCG and BOEM as suitable for the purposes of establishing the vessel traffic baseline.

[11] Note: AIS data for fishing vessels are increased by 40% account for smaller vessels not using AIS and provide a more accurate estimate of fishing activity within the Lease Area.

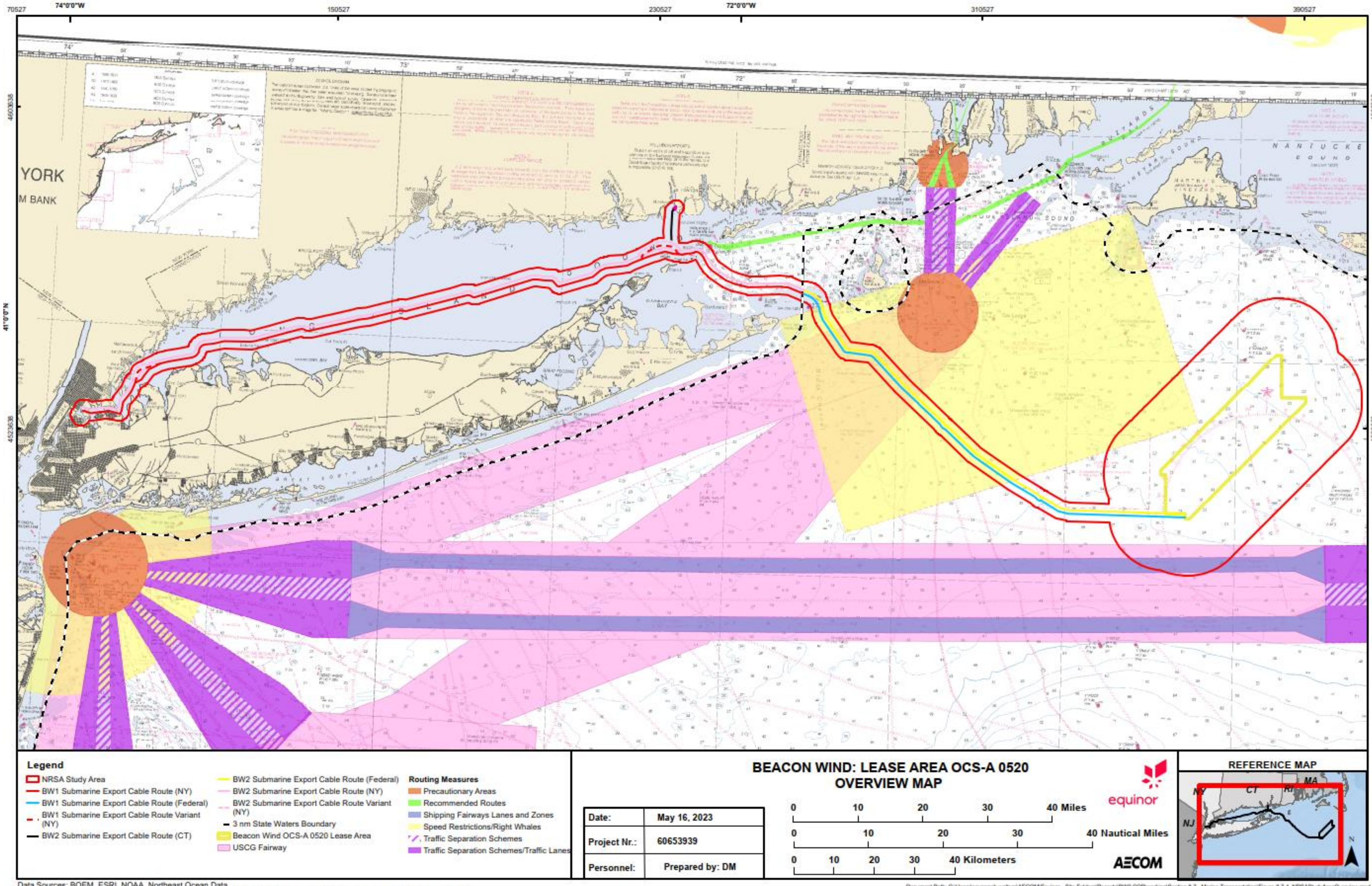
- Military Operating Area Boundaries: Atlantic/Gulf of Mexico (OCM 2021e);
- Military Submarine Transit Lanes: Atlantic/Gulf of Mexico (OCM 2021f);
- Ocean Disposal Sites (OCM 2021g);
- Pilot Boarding Areas (OCM 2021h);
- Pilot Boarding Stations (OCM 2021i);
- Regulated Navigation Areas (OCM 2021j);
- Submarine Cables (OCM 2021k);
- Shipping Fairways, Lanes, and Zones for U.S. waters (Office of Coast Survey 2021a);
- Automated Wreck and Obstruction Information System data (Office of Coast Survey 2021b);
- Meteorological and Oceanographic (Metocean) data;
- Nantucket Memorial Airport Weather Station data (Iowa Environmental Mesonet of Iowa State University 2021);
- Wave height data collected from the Global Reanalysis of Ocean Waves U.S. East Coast dataset – OceanWeather (Equinor 2020);
- Tidal stream data taken from UKHO charts 2456, 2860 and 2890 (UKHO 2021);
- International Best Track Archive for Climate Stewardship (IBTrACS) Project, Version 4 (NOAA National Centers for Environmental Information 2018) [accessed December 2021]; and
- Tropical Cyclone Wind Exposure for the North Atlantic 1900-2016 (OCM 2021l).

8.7.1 Affected Environment

The affected environment, as described below, is defined as the coastal and offshore areas in the vicinity of the of the Lease Area and the submarine export cable corridors where marine transportation and navigation activities are known to occur and have the potential to be directly or indirectly affected by the construction, operations, and decommissioning of the Project. The Study Area (see **Figure 8.7-1.**) used within the NRSA analysis refines the ‘affected environment’ to a 10-nm (18.5-km) buffer around the Lease Area and a 1-nm (1.9-km) buffer around the submarine export cable routes. A 1-nm (1.9-km) buffer was used due to the length of the cable corridor, the use of large buffer would ultimately aid in diluting the value of the assessment. The Study Area has been defined so that the focus is placed upon the vessel traffic of most relevance to the Lease Area and the submarine export cable routes in order to provide a comprehensive assessment of the vessel routing that could be impacted.

Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Beacon Wind expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards, which Beacon Wind will comply with in using the facilities. In an effort to fully capture the affected environment, the Project engaged with a number of stakeholders during the development phase to identify potential impacts related to the Project (see the outreach table provided in **Appendix B Summary of External Engagement Activities** and **Appendix BB Navigation Safety Risk Assessment**).

FIGURE 8.7-1. AFFECTED ENVIRONMENT AND NRSA STUDY AREA OVERVIEW



Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

8.7.1.1 Baseline Characterization

Beacon Wind is developing the Lease Area in accordance with the 1x1 nm (1.9x1.9 km) regional layout for wind turbines established across the MA/RI WEA. Under this layout, each turbine would be spaced 1 nm (1.9 km) apart in fixed east-to-west rows and north-to-south columns to create the 1x1 nm (1.9x1.9 km) grid arrangement. Offshore components of the Project will consist of up to 157 structures within the Lease Area (made up of up to 155 wind turbines and two offshore substation facilities), interarray cables within the Lease Area, and one submarine export cable route to Queens, New York and one submarine export cable route to Waterford, Connecticut or Queens, New York.

A NVIC 01-19 compliant breakdown of traffic is included within the NSRA (**Appendix BB Navigation Safety Risk Assessment**). In summary, throughout the 2019 survey period, an average of approximately 10 unique vessels per day was recorded within the Lease Area Study Area. The busiest month in 2019 was June, with an average of approximately 34 unique vessels per day, while the busiest day was July 17, 2019 with 57 unique vessels recorded. Vessel traffic was observed to be highest during the summer months, which is reflected in the high numbers of fishing vessels recorded in the data and which exhibited seasonal variation with higher vessel numbers between May and September.

The Astoria power complex and the onshore substation facilities are on the East River at the head of Long Island Sound. According to 2019 vessel counts, while the majority of shipping traffic entered into New York Harbor from the south, there was still significant marine traffic in the East River, near the location of the onshore substation facilities, in addition to along the pathway of the export cables within Long Island Sound, and to a lesser extent near the Lease Area.

The Waterford power complex and the onshore substation facilities are along Long Island Sound and adjacent to Niantic Bay. According to 2019 vessels counts, there is consistent traffic traversing the east coast of Niantic Bay and out into Long Island Sound; however, the volume of traffic within Niantic Bay is substantially less than traffic entering/exiting the Thames River to the east. Most traffic in Niantic Bay follows a pattern of entering/exiting the inner harbor and then traversing the bay along its eastern shore in close proximity to the landfall location.

The NSRA (**Appendix BB Navigation Safety Risk Assessment**) noted that, on average, 107 unique vessels per day were recorded within the submarine export cable route Study Area. The vessel density is highest in the areas close to the landfall location where smaller vessels such as push/pull vessels and recreational vessels operate in shallow waters. The vessel density is higher within Long Island Sound and gradually decreases as the submarine export cable route extends further offshore.

The following analysis highlights 2019 marine vessel counts and general navigation paths by vessel types and is based on values reported in the NSRA for the Study Area shown in **Figure 8.7-1.** See **Figure 8.7-1.** through **Figure 8.7-26** for general vessel traffic mapping to provide broader context to vessel traffic within the affected environment. Mapping is presented with a focus on the BW1 and BW2 landfall locations (shown in the Queens, New York figures) and the BW2 landfall location (shown in the Waterford, Connecticut figures), to highlight impacts within the constraints of the East River, as well as the entire area in the vicinity of the submarine export cable routes and Lease Area to assess possible conflicts. It's important to note that the mapping within the COP uses different data than NSRA and presents AIS data from the Northeast Ocean Data Portal.

Tug and Barge (Push/Pull) Navigation: Very low numbers of tug and barge traffic were recorded within the Lease Area Study Area (less than one percent of total traffic volumes). There was significant tug traffic in the East River, with vessel counts exceeding 500. Most tug traffic was limited to the main channel of the East River; however, limited tug and barge traffic did traverse in front of the Astoria power complex and appeared to service the eastern side of the proposed location of the onshore substation facilities. However, the pathway of the submarine export cables is in close proximity to an area where dense tug traffic was observed. East of Norwalk, Connecticut, tug and barge traffic diminished significantly in the vicinity of the proposed submarine export cable routes with vessel counts reported in the 60 to 200 vessel range. The change in traffic density east of Norwalk is likely the result of the traffic spreading and taking more direct paths to their final destinations as they exit the more constrained channel of the East River.

For the potential BW2 Waterford, Connecticut landfall and submarine export cable route, there is generally limited tug and barge activity, with very low activity within Niantic Bay and between 1 and 20 vessels recorded further out in Long Island Sound.

Passenger Vessel Navigation: Very low numbers of passenger vessel traffic were recorded within the Lease Area Study Area (one percent of total traffic volumes) with the majority passing the west of the MA/RI WEA. There was significant passenger vessel traffic in the East River; the 2019 vessel counts exceeded 500. Passenger vessels primarily included ferry services, charter services, and cruises. In the vicinity of the Astoria power complex, most passenger vessel traffic was limited to the main channel of the East River and did not traverse in front of the Astoria power complex. However, the pathway of the submarine export cables is near an area where dense passenger vessel traffic was observed in the East River and lower Long Island Sound. Further east, outside of the East River, the greatest passenger vessel density occurred at the ferry crossings between Bridgeport, Connecticut and Port Jefferson, New York, and New London, Connecticut and Orient Point, New York.

For the potential BW2 Waterford, Connecticut landfall and submarine export cable route, there is some passenger vessel activity (100 to 500 vessels) in close proximity to the landfall location and submarine export cable route in Niantic Bay. Traffic further out in the bay and into Long Island Sound generally disperses towards lower traffic densities.

Fishing Vessel Navigation: Fishing vessels were recorded both in transit through the Lease Area Study Area and engaged in fishing activity (i.e., gear deployed). It is also known that non-Automatic Identification System (AIS) fishing activity does take place within the southern portion of the Lease Area and, therefore, active fishing activity is likely to be underrepresented in the data. To accommodate this, the assessment also incorporated visual survey data, VMS data, visual observations and other sources to appropriately account for non-AIS vessels (additional detail can be found in **Appendix BB**). Based on the data available and when considering only those vessel tracks intersecting the Lease Area, fishing vessels are the most frequently recorded vessel type accounting for 56 percent of vessel traffic. Throughout the NRSA survey period, an average of five to six unique fishing vessels per day was recorded within the Lease Area Study Area, with two per day recorded intersecting the Lease Area itself. The fishing vessel traffic levels recorded are predominantly due to a northwest – southeast transiting fishing route passing through the northern part of the Lease Area, headed for fishing grounds located within the Ambrose/Nantucket Safety Fairway.

There was limited fishing vessel traffic in the East River in 2019; vessel counts were between one and 20. The data indicated no fishing vessel traffic in front of the Astoria power complex and limited fishing vessel traffic in the main channel of the East River. Similar conditions existed along the submarine export cable routes throughout Long Island Sound, with a minimal increase between Fisher’s Island and Little Gull (along COLREGS Demarcation Line 80.155b).

For the potential BW2 Waterford, Connecticut landfall and submarine export cable route, there are no AIS recorded fishing activity within Niantic Bay and only very limited activity along the submarine export cable route further out in Long Island Sound. It is likely that there is more significant recreational fishing activity taking place within the bay and in close proximity to the submarine export cable route than is recorded by AIS.

Recreational Vessel Navigation: The waters of Long Island Sound and coastal New England have a history of recreational boating, particularly during the summer months. Recreational vessels accounted for approximately four percent of traffic within the Lease Area Study Area and seven percent within the Lease Area. It is noted that recreational vessels include small, privately-chartered fishing excursions (transiting only). The busiest months for recreational vessels within the Lease Area Study Area were June and July 2019, with two vessels per day recorded on average, while no month between October and May recorded more than one vessel per week. A total of 68 recreational vessels were recorded via AIS within the Lease Area during the year of data analyzed, with the vast majority recorded in June and July. The majority of these were small, privately-owned sailing vessels or motor yachts averaging 50 ft (15.2 m) in length (noting this excludes any vessel that did not transmit length information via AIS). It is likely that a notable proportion of recreational vessels operating in the region do not broadcast on AIS and, therefore the tracks are considered to provide only an indication of the recreational activity in the area.

There was significant pleasure craft and sailing vessel traffic in the East River in 2019 with vessel counts exceeding 500. Most vessel traffic was limited to the main channel of the East River and did not traverse in front of the Astoria power complex. However, pleasure craft and sailing vessel traffic remained high throughout much of the rest of Long Island Sound, with density increasing in the eastern end, including in the path of the submarine export cable routes.

For the potential BW2 Waterford, Connecticut landfall and submarine export cable route, there is generally dispersed, but low-density activity throughout Niantic Bay and in close proximity to the submarine export cable route and landfall location. Vessel traffic becomes denser and more consistent further offshore in Long Island Sound.

Tanker Navigation: Tankers accounted for approximately 12 percent of traffic within the Lease Area Study Area and five percent within the Lease Area. Tankers were most prominently recorded within the Ambrose/Nantucket Safety Fairway, with a smaller proportion transiting northwest - southeast through the central and southern portions of the Lease Area. There was limited tanker vessel traffic in the East River, with 2019 vessel counts totaling below 40. Tanker vessel traffic was limited to the main channel of the East River and the main channel of western Long Island Sound. The data indicated that no tanker vessel traffic directly traversed in front of the Astoria power complex. Tanker traffic increased in eastern Long Island Sound close to the future location of the submarine export cables.

For the potential BW2 Waterford, Connecticut landfall and submarine export cable route, there is no recorded tanker activity occurring in Niantic Bay in close proximity to the submarine export cable or landfall location. There is limited activity further offshore in Long Island Sound along the submarine export cable route.

Cargo Vessel Navigation: Container vessels were the most frequently recorded cargo vessel type within the Lease Area Study Area (61 percent) followed by vehicle carriers (21 percent) and bulk carriers (12 percent) (according to the NSRA survey period). The vast majority of cargo vessels were recorded transiting westbound within the Ambrose/Nantucket Safety Fairway south of the Lease Area. Cargo vessel traffic counts in the East River totaled between 200 and 500 in 2019. While most cargo vessel traffic was limited to the main channel of the East River, there was some cargo vessel traffic to/from the eastern side of the proposed site of the onshore substation facilities. The planned submarine export cable routes may overlap with this traffic. Cargo vessel traffic diminished significantly east of the Whitestone Bridge and there was limited cargo vessel activity in most of Long Island Sound. Vessel density increased near the COLREGS Demarcation Line 80.155b (between Fisher's Island and Little Gull) and along the north/south corridor between Newport, Rhode Island and the westbound shipping lane.

For the potential BW2 Waterford, Connecticut landfall and submarine export cable route, there is no recorded cargo vessel activity occurring in Niantic Bay in close proximity to the submarine export cable route or landfall location. There is limited activity father offshore in Long Island Sound along the submarine export cable route.

Anchorage Areas and Cable Routing: An anchorage area is a location where vessels can safely anchor. Anchorage areas are defined in navigable waterways to promote safe navigation of transiting craft; anchoring can occur outside of designated areas in navigable waterways. Vessels at anchor have primarily been identified based on navigational status transmitted via AIS. However, given that this requires manual input into the vessel's AIS unit, an incorrectly transmitted navigational status is commonly observed. Therefore, the vessels transmitting a status other than "At Anchor" were filtered using a set of behavioral criteria (see **Appendix BB Navigation Safety Risk Assessment** for more detail) to identify further potential anchored vessels. The vessels identified via both methods were then manually checked so that any vessels clearly not at anchor were removed from the count. There were no vessels recorded within the Lease Area Study Area deemed to be at anchor based on the criteria applied.

The various anchorage areas within navigable waterways carry different designations, which modify their usage and may place certain restrictions so that anchored vessels are not a hazard to transiting vessels. For the Queens, New York landfall location the majority of the anchorages in the East River are governed by 33 CFR 110.155 (Unrestricted) (unrestricted anchorages are numbered in **Figure 8.7-22** and 33 CFR 110.60 and 110.1 [Special Use]). The anchorages in proximity to submarine export cabling within Long Island Sound are governed by 33 CFR 110.146 (Temporary). The Lease Area is not proximal to anchorage areas. The region of the East River and western Long Island Sound experiences significant and diverse marine traffic, with the densest traffic occurring in close proximity to the submarine export cable routes due to its general alignment within the primary channel in the region.

For the potential BW2 Waterford, Connecticut landfall and submarine export cable route, there is only a single restricted anchorage within Niantic Bay, which is not proximal to either the submarine export cable route or the landfall location.

FIGURE 8.7-2. TUG AND BARGE ACTIVITY – QUEENS, NEW YORK

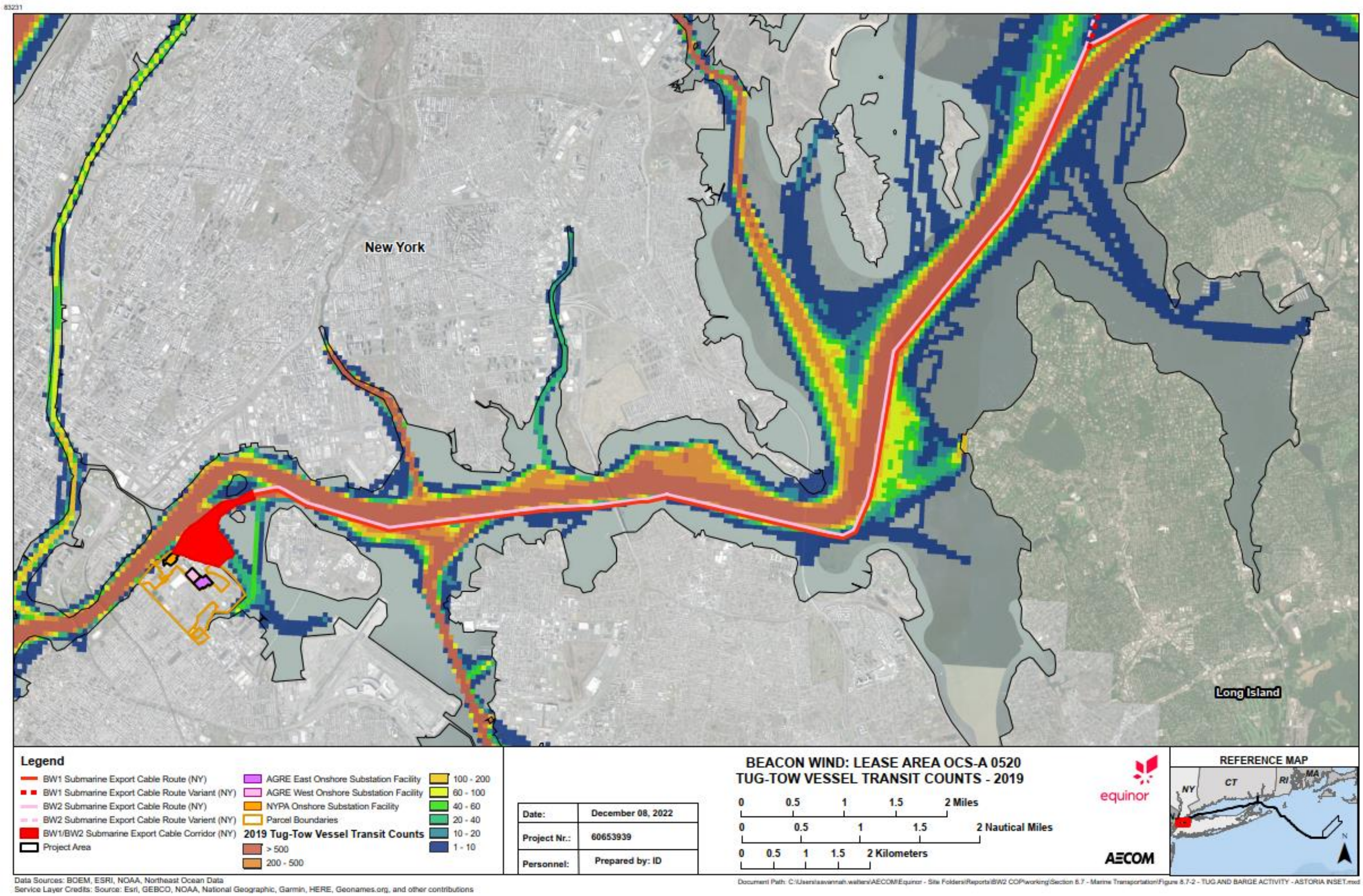


FIGURE 8.7-3. TUG AND BARGE ACTIVITY — WATERFORD, CONNECTICUT

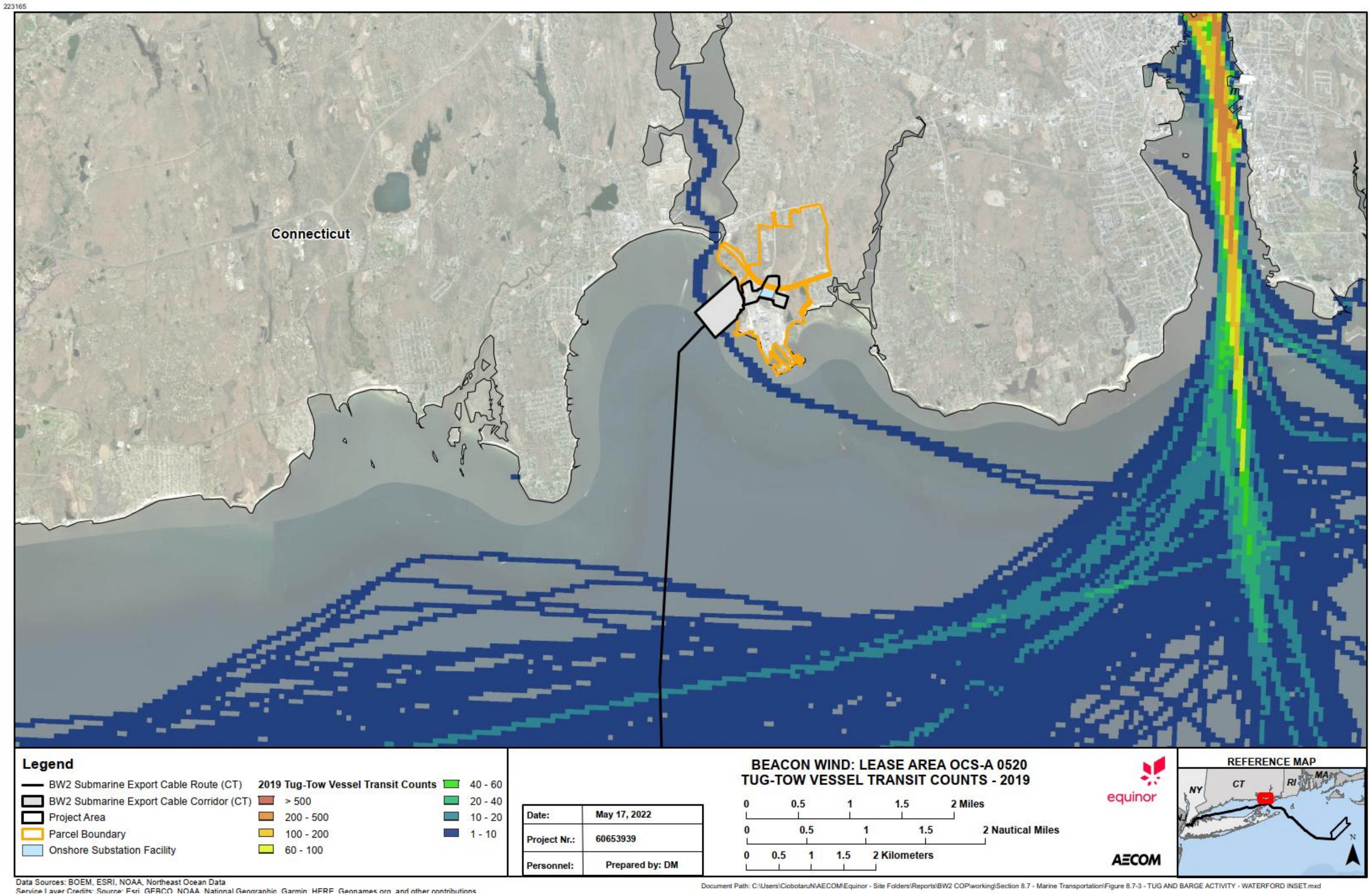


FIGURE 8.7-4. TUG AND BARGE ACTIVITY IN THE VICINITY OF THE SUBMARINE EXPORT CABLE ROUTES AND LEASE AREA

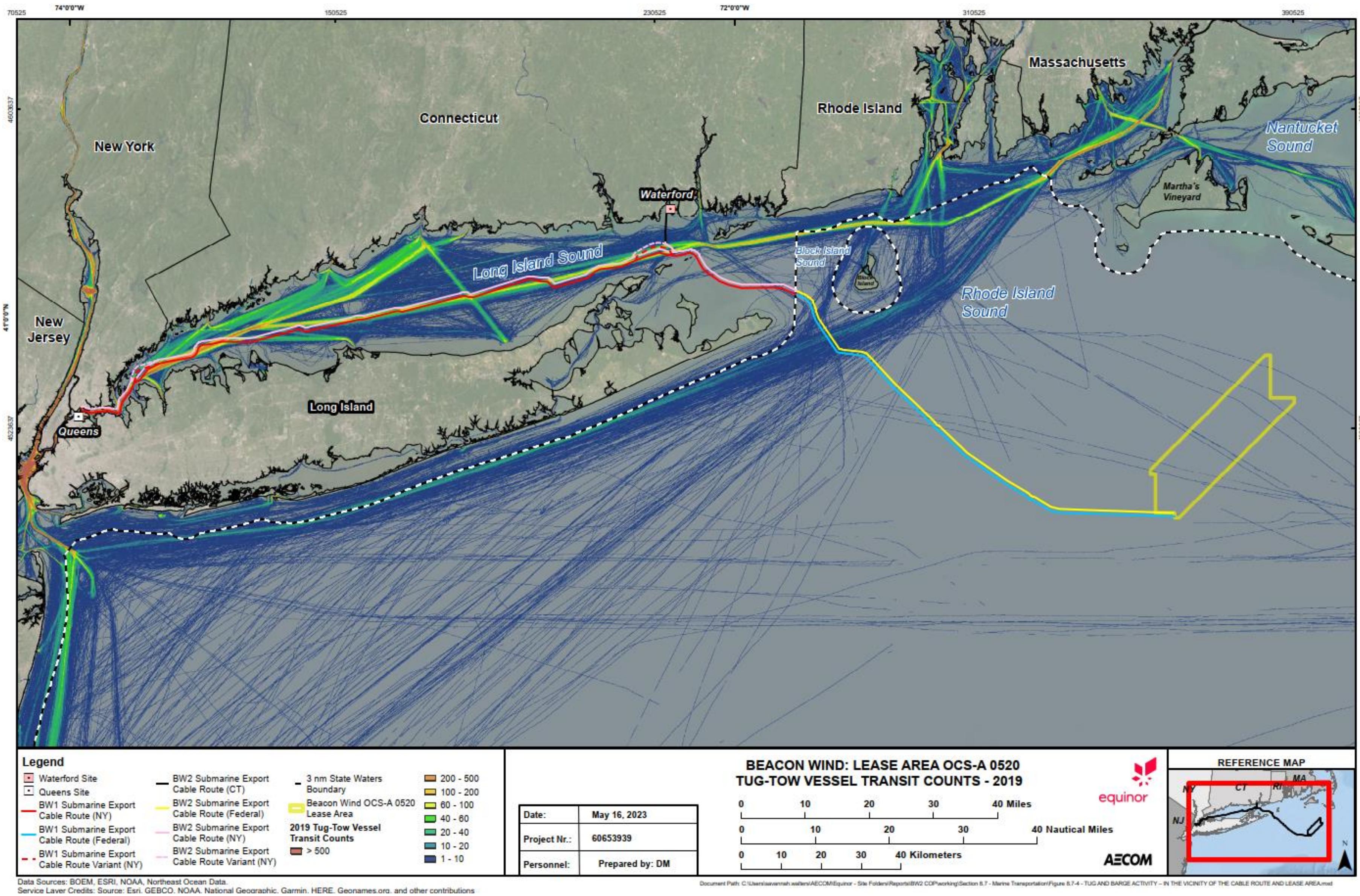


FIGURE 8.7-5. PASSENGER VESSEL ACTIVITY – QUEENS, NEW YORK

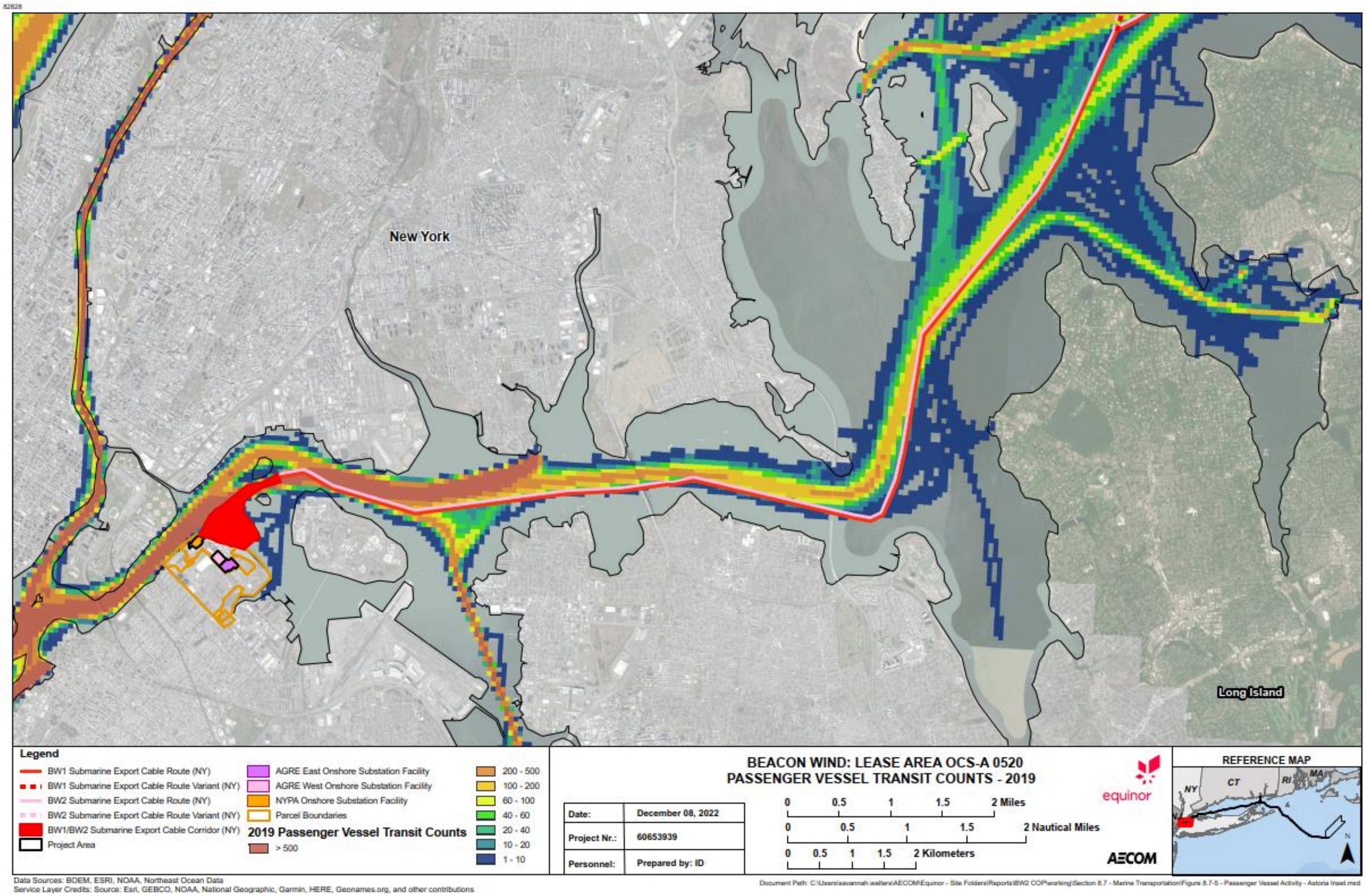


FIGURE 8.7-6. PASSENGER VESSEL ACTIVITY — WATERFORD, CONNECTICUT

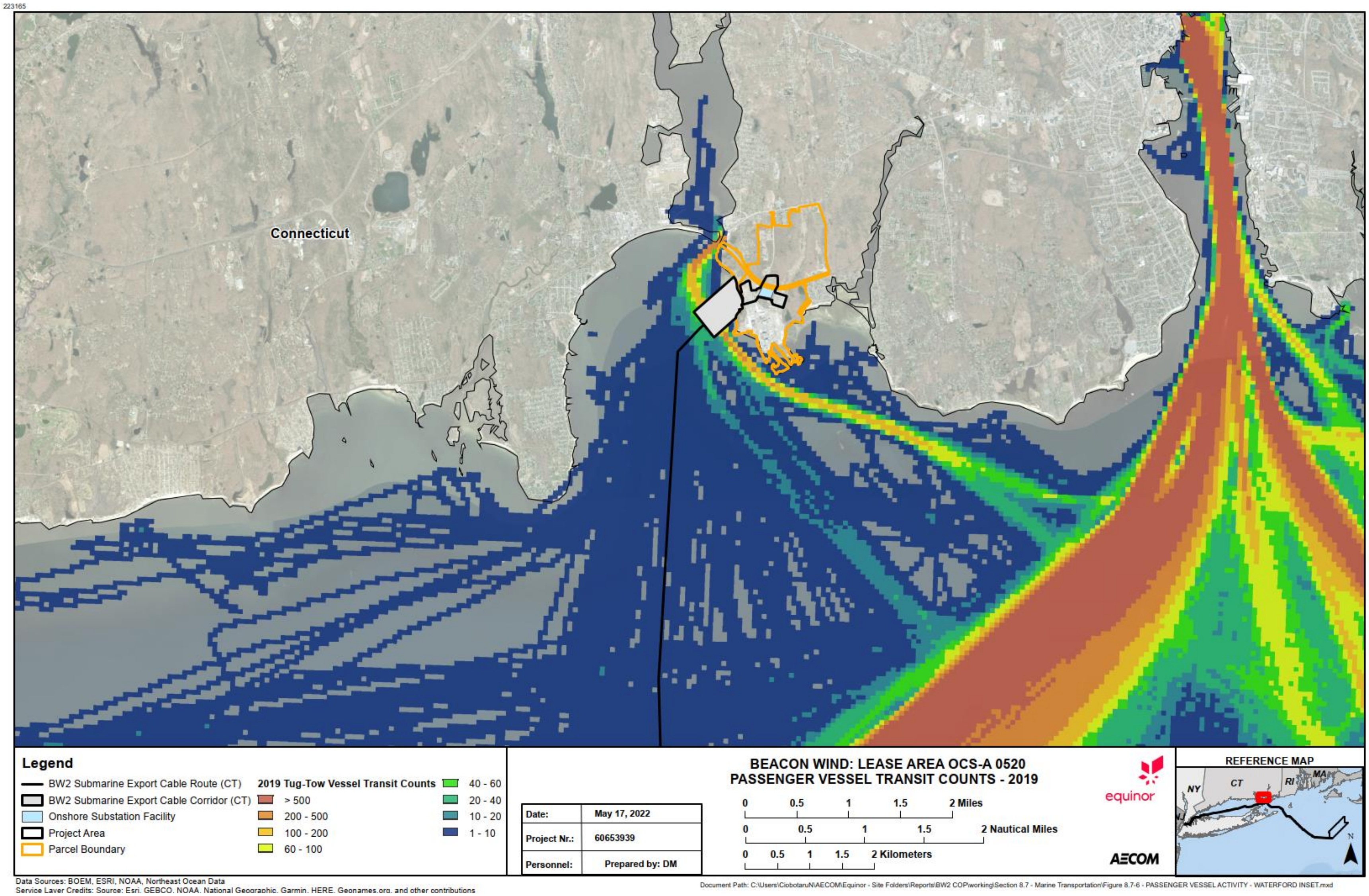


FIGURE 8.7-7. PASSENGER VESSEL ACTIVITY IN THE VICINITY OF THE SUBMARINE EXPORT CABLE ROUTES AND LEASE AREA

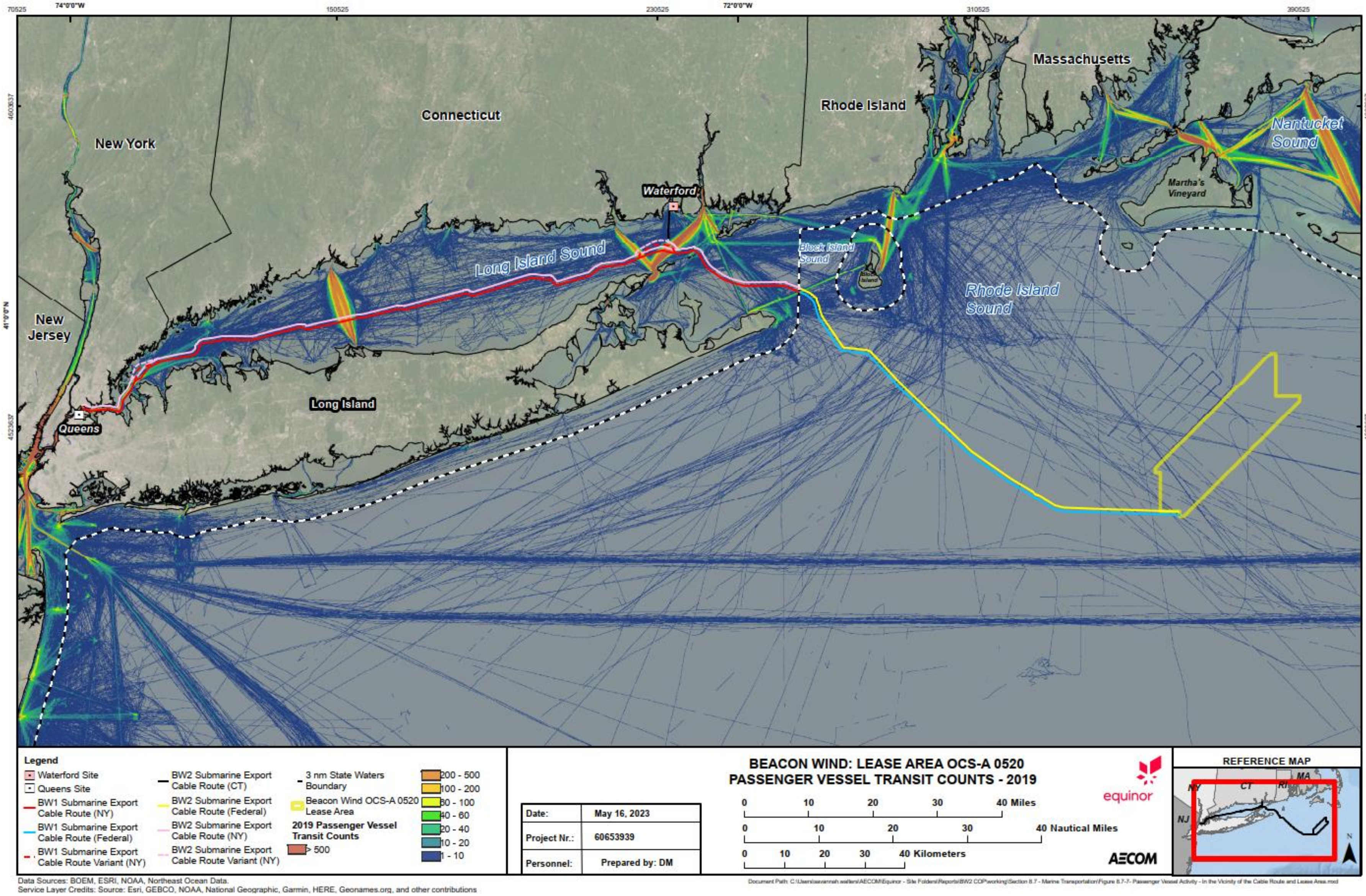


FIGURE 8.7-8. FISHING VESSEL ACTIVITY- QUEENS, NEW YORK

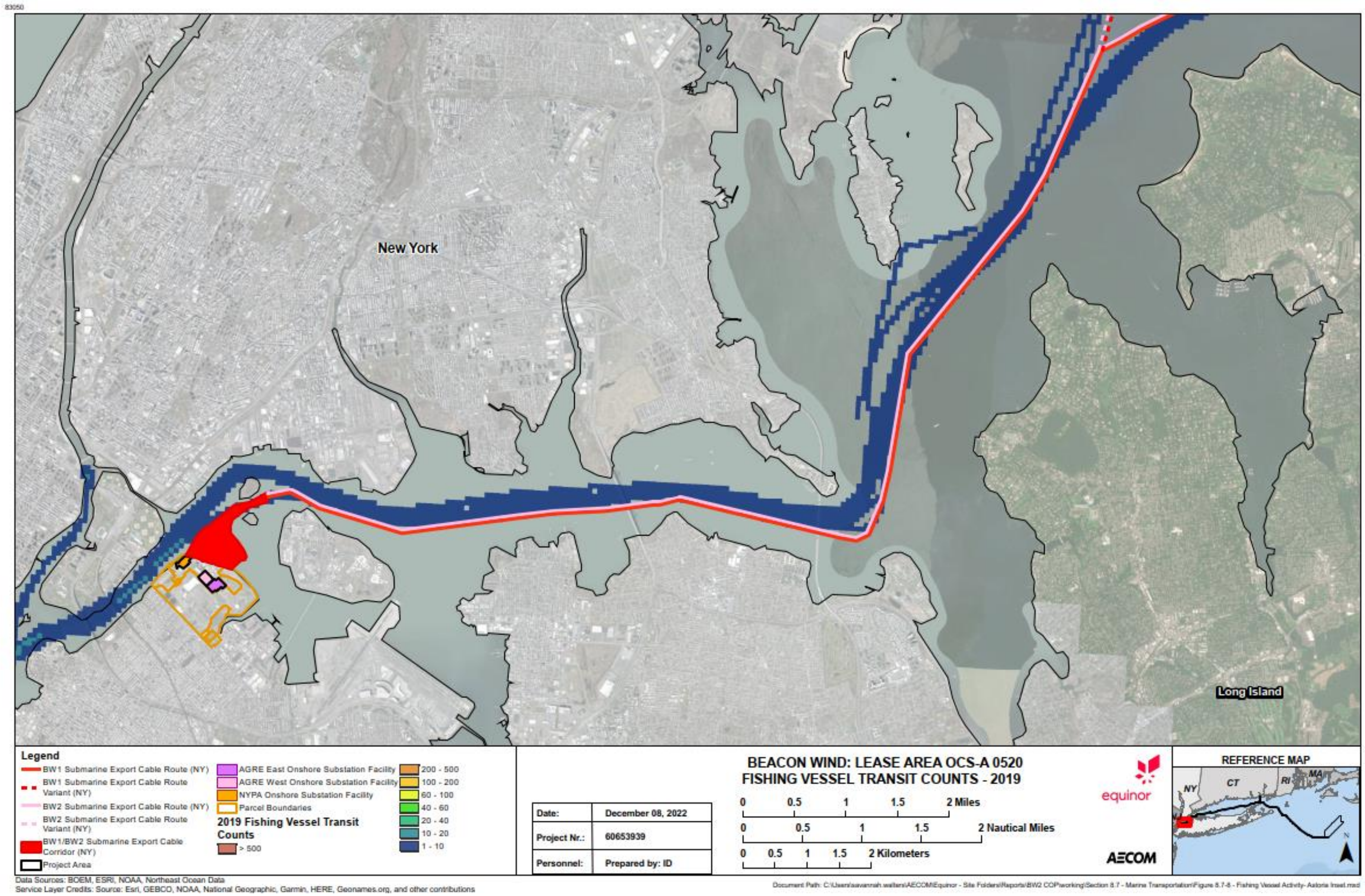


FIGURE 8.7-9. FISHING VESSEL ACTIVITY — WATERFORD, CONNECTICUT

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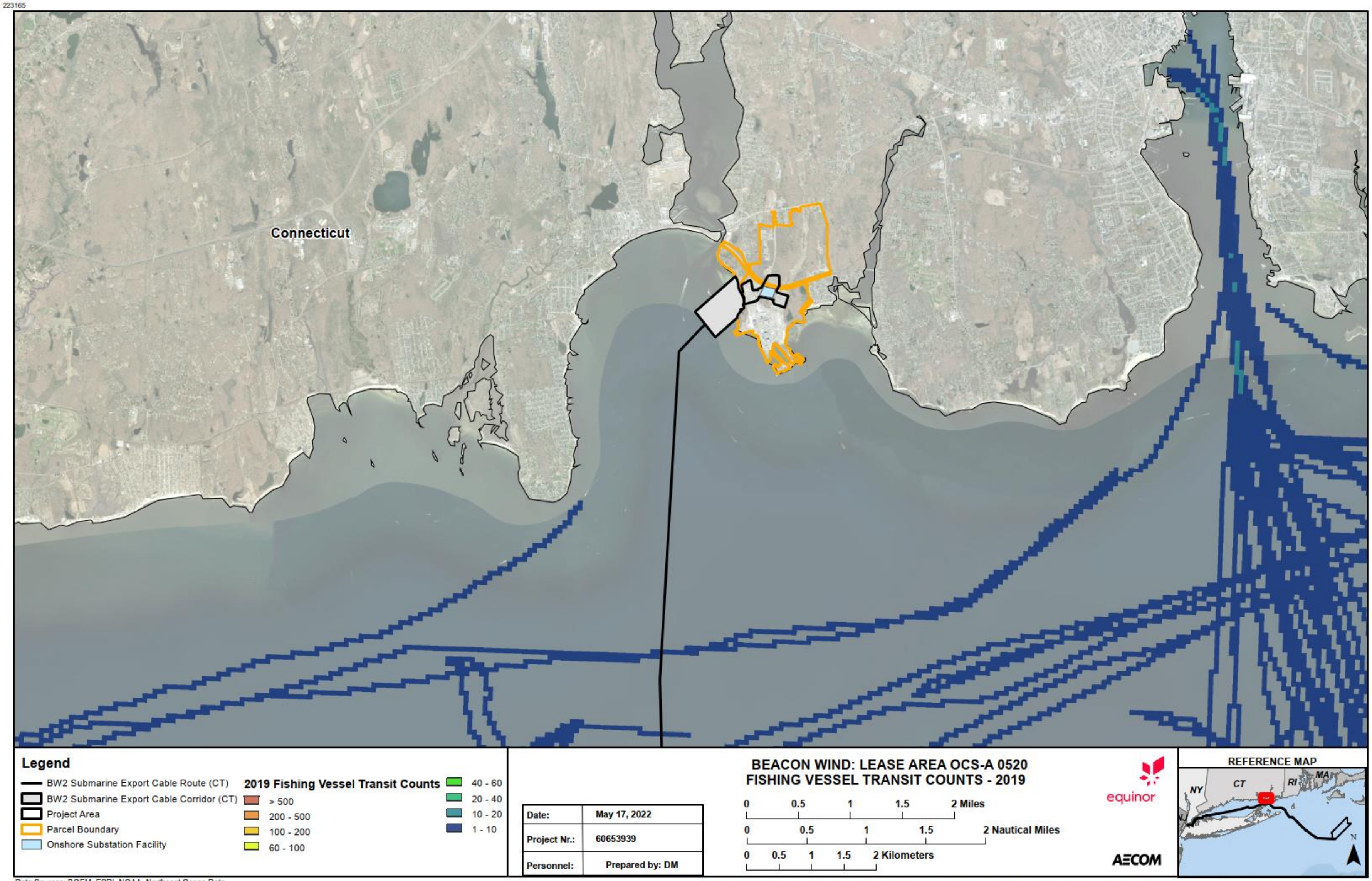
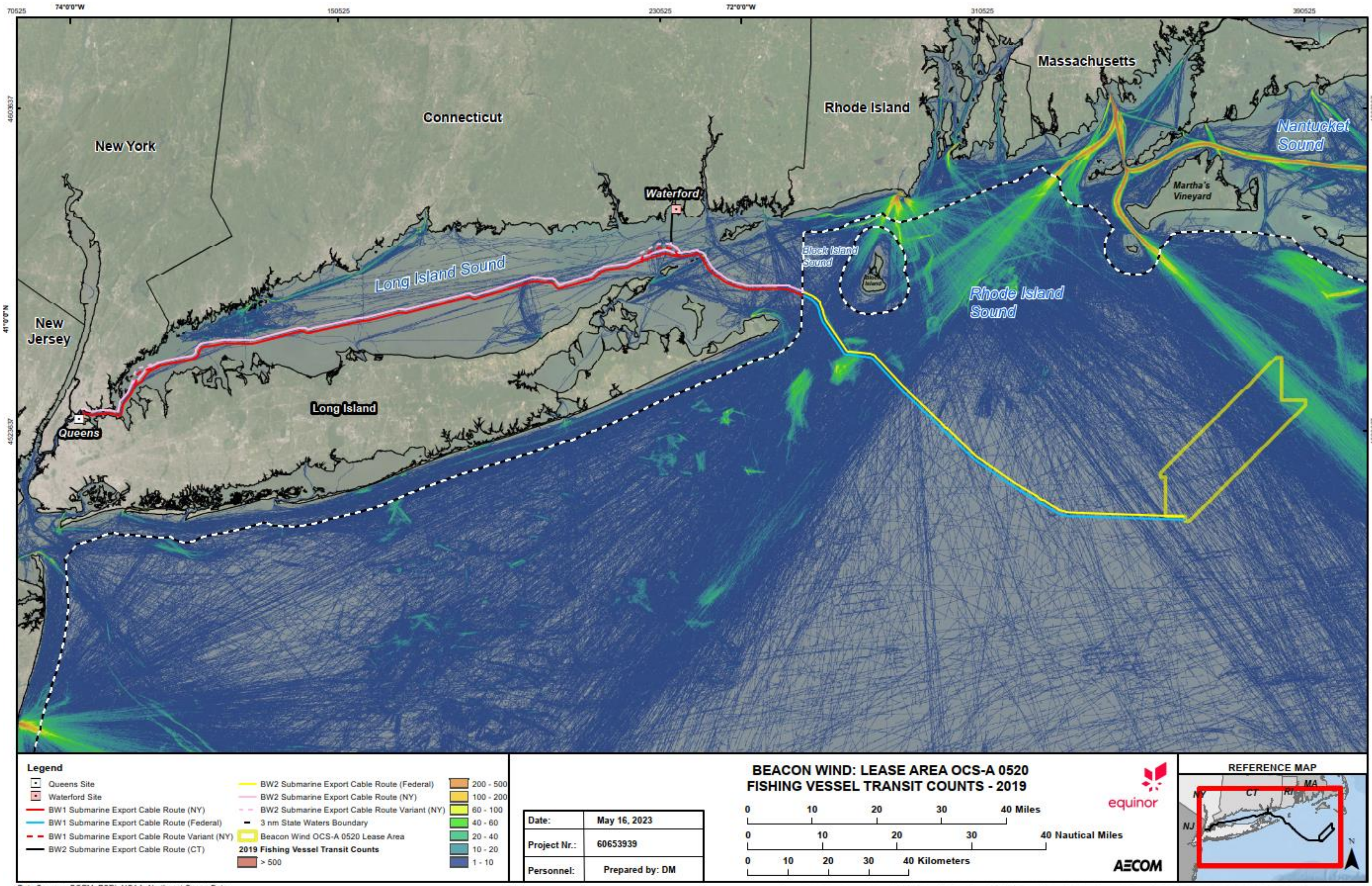


Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

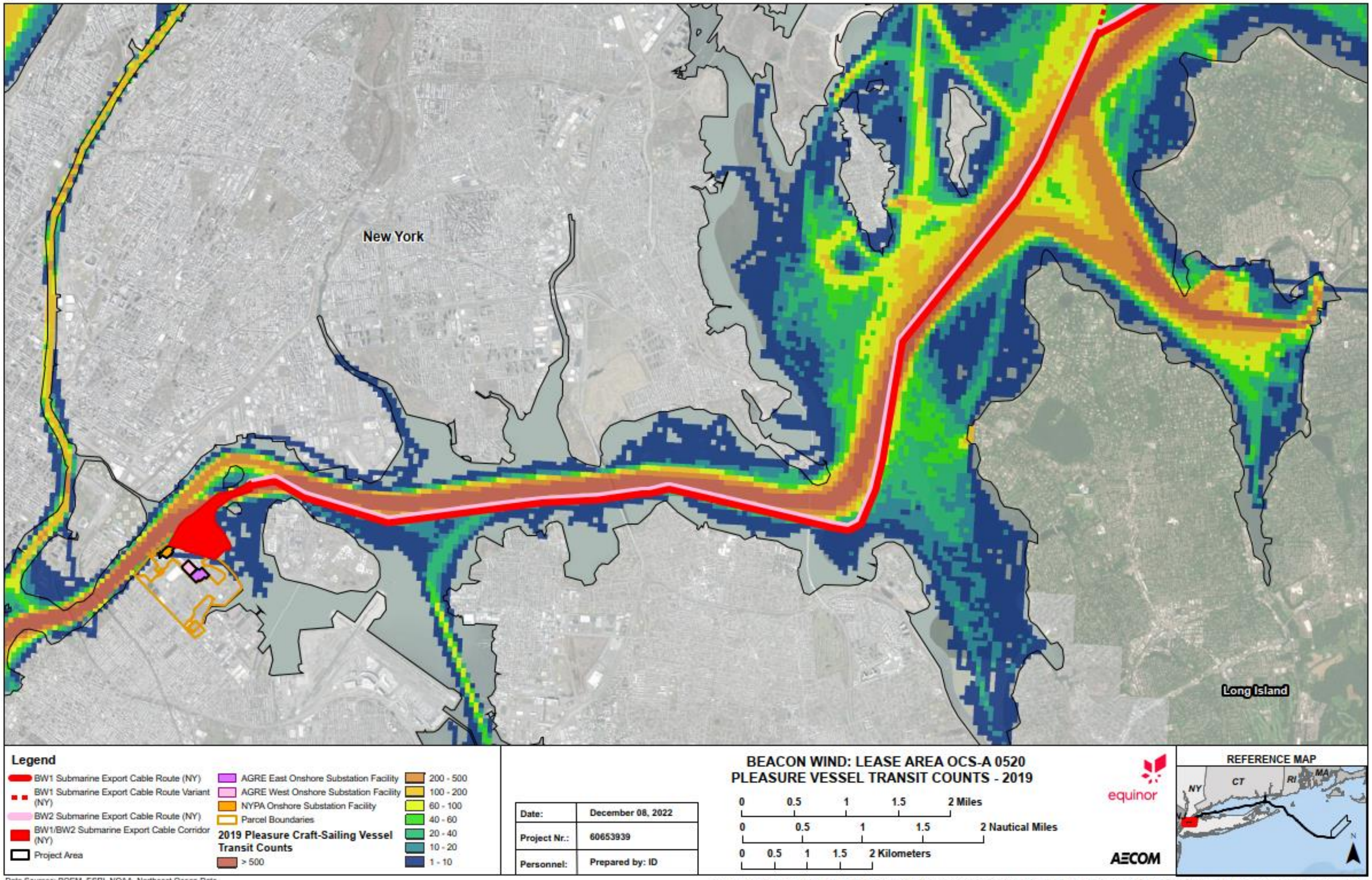
Document Path: C:\Users\CiobotaruN\AECOM\Equinor - Site Folders\Reports\BW2 COP\working\Section 8.7 - Marine Transportation\Figure 8.7-9 - FISHING VESSEL ACTIVITY - WATERFORD INSET.mxd

FIGURE 8.7-10. FISHING VESSEL ACTIVITY IN THE VICINITY OF THE SUBMARINE EXPORT CABLE ROUTES AND LEASE AREA



Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

FIGURE 8.7-11. PLEASURE CRAFT AND SAILING VESSEL ACTIVITY – QUEENS, NEW YORK



Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

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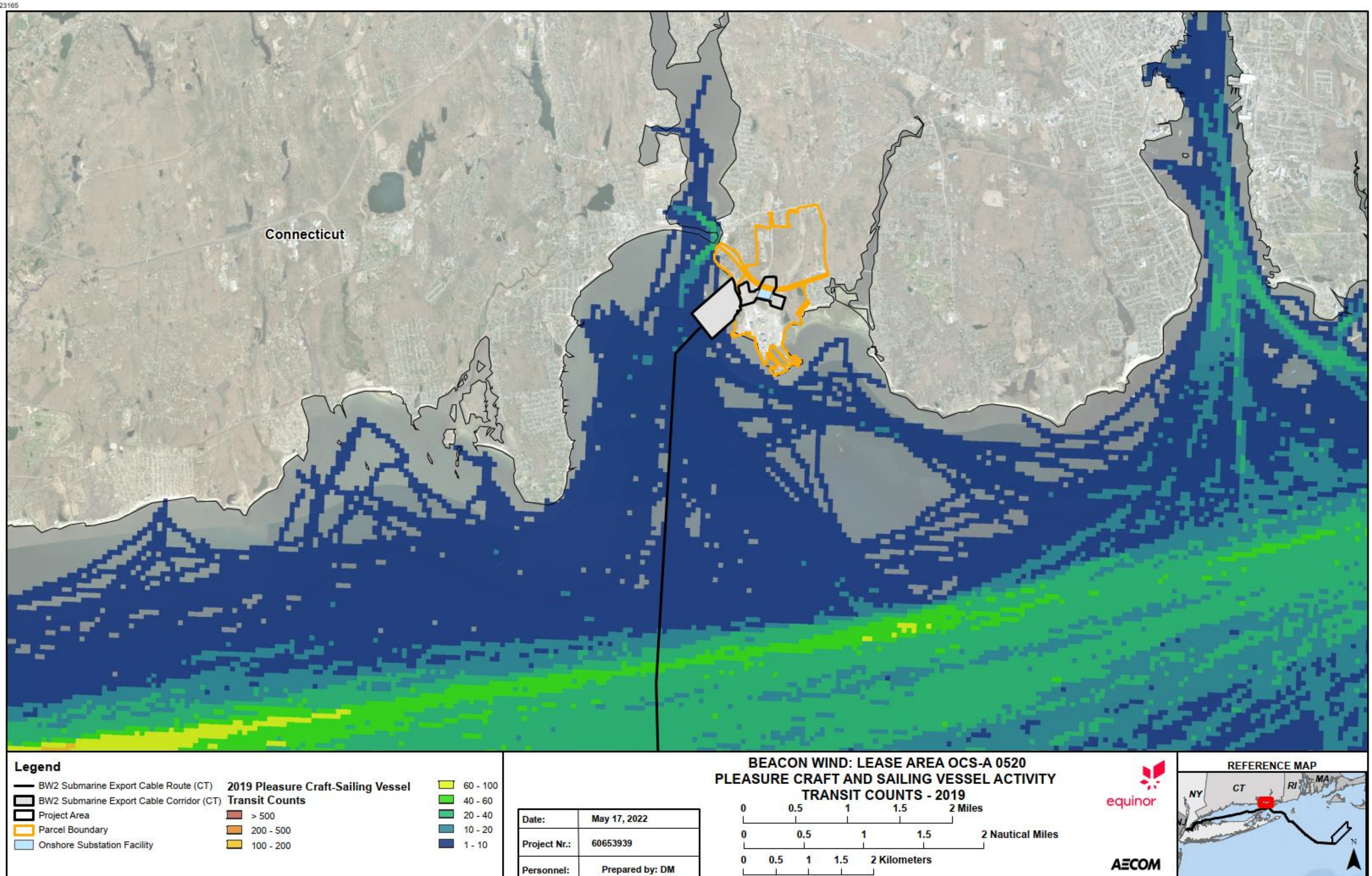
Figure 8.7-12. Pleasure Craft and Sailing Vessel Activity — Waterford, Connecticut

223165



Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

Document Path: C:\Users\CiobotaruN\AECOM\Equinor - Site Folders\Reports\BW2 COP\working\Section 8.7 - Marine Transportation\Figure 8.7-12 - PLEASURE CRAFT AND SAILING ACTIVITY - WATERFORD INSET.mxd

FIGURE 8.7-13. PLEASURE CRAFT AND SAILING VESSEL ACTIVITY IN THE VICINITY OF THE SUBMARINE EXPORT CABLE ROUTES AND LEASE AREA

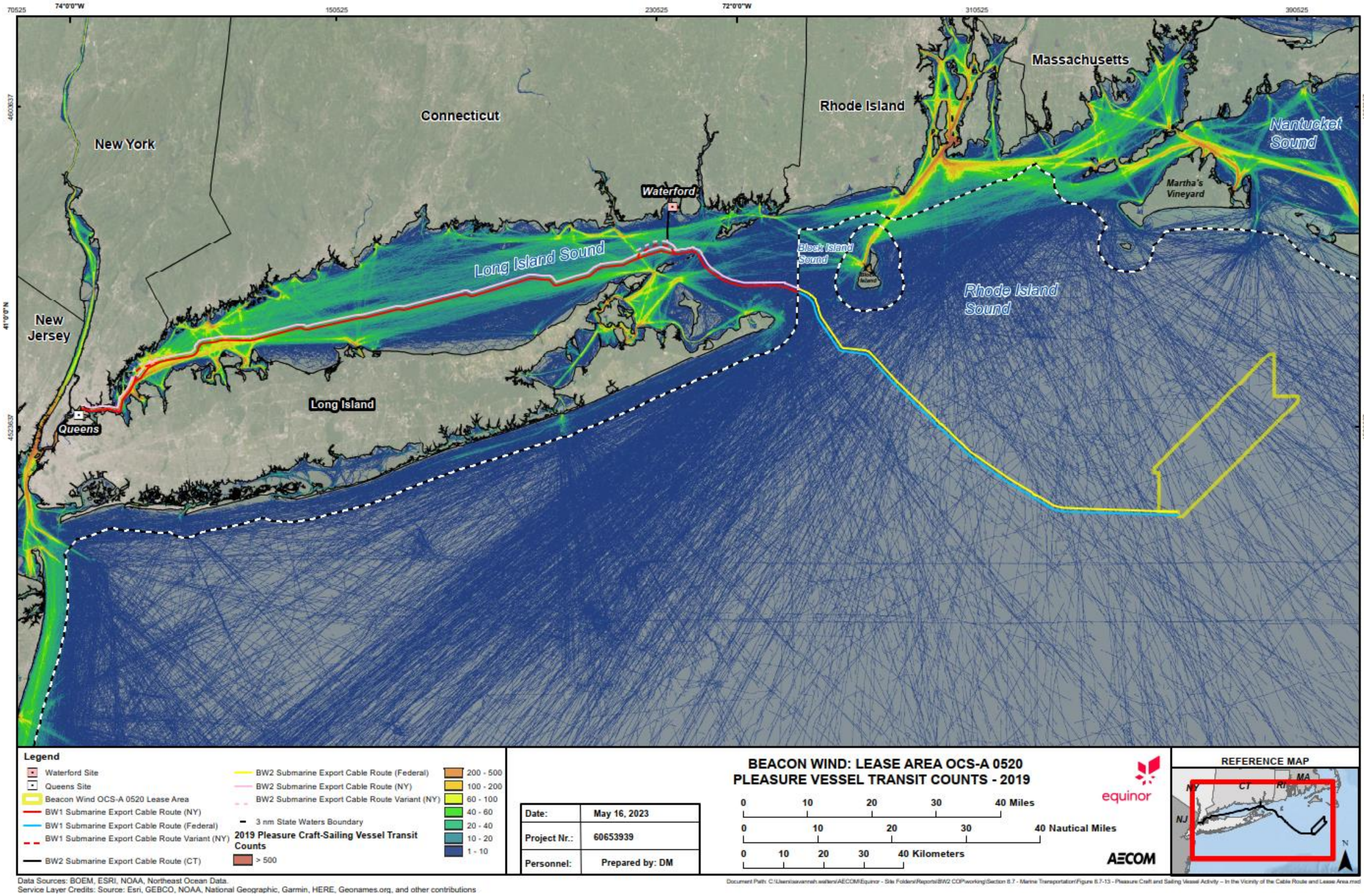


FIGURE 8.7-14. TANKER VESSEL ACTIVITY – QUEENS, NEW YORK

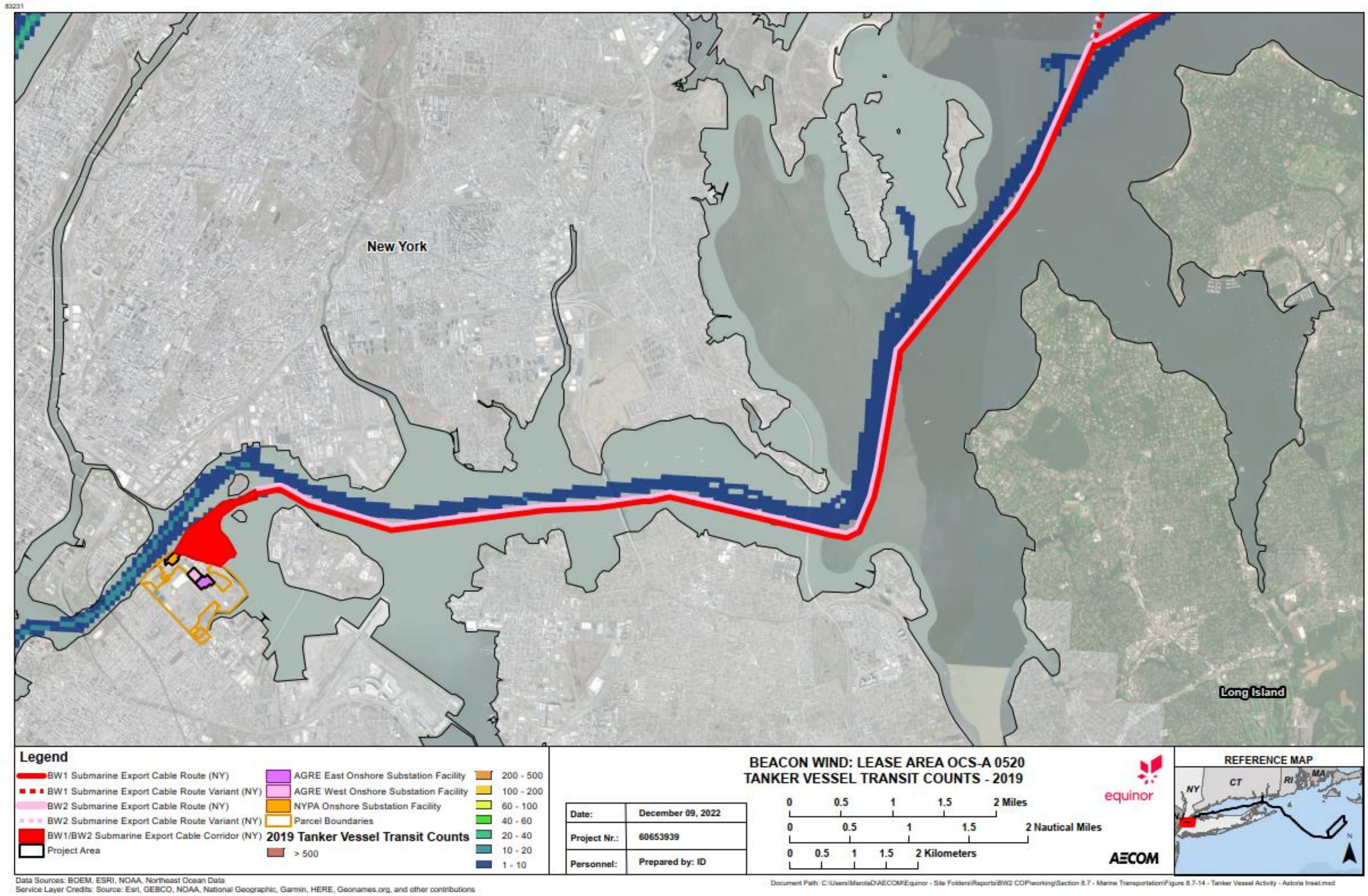


FIGURE 8.7-15. TANKER VESSEL ACTIVITY — WATERFORD, CONNECTICUT

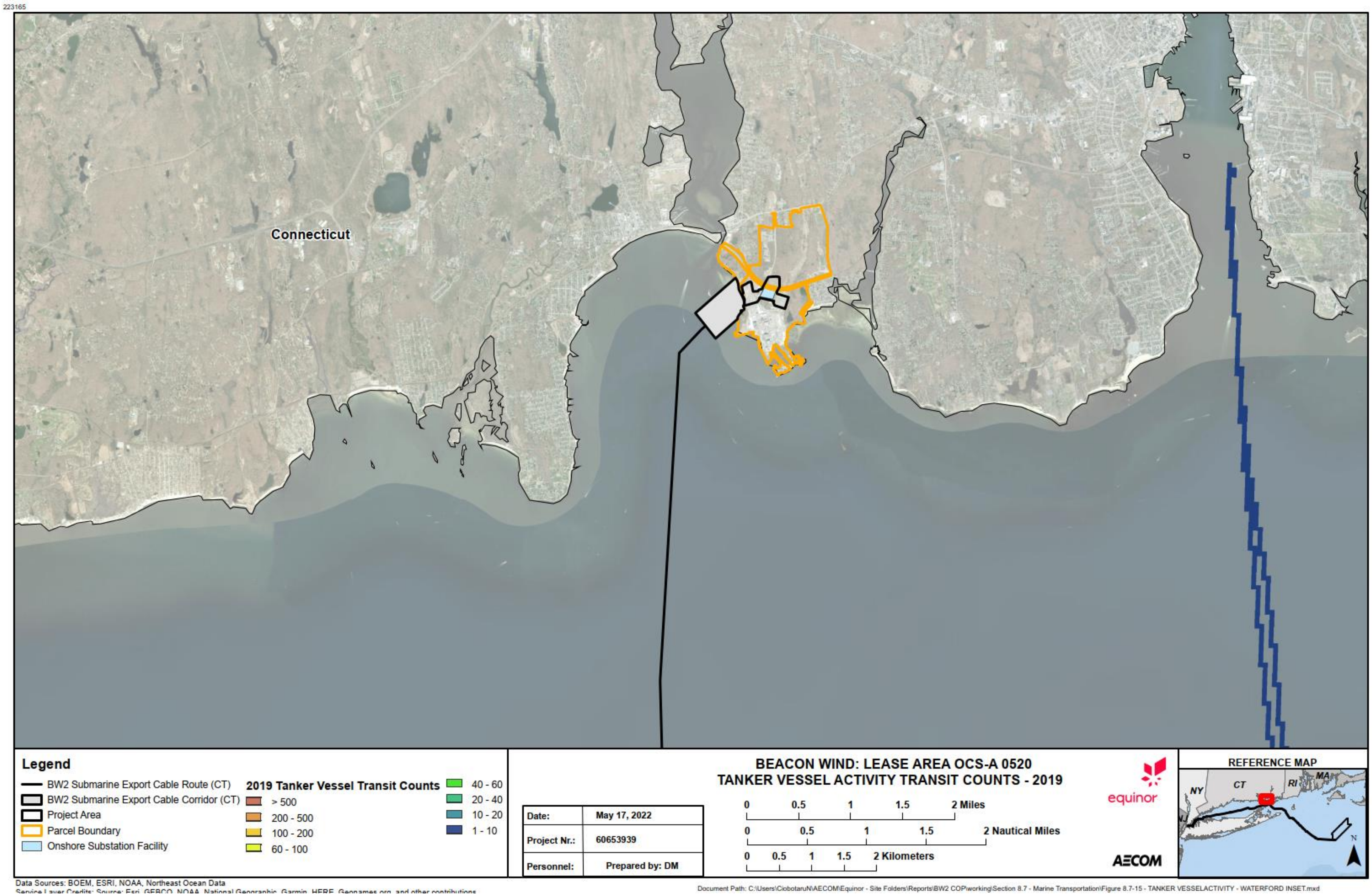


FIGURE 8.7-16. TANKER VESSEL ACTIVITY IN THE VICINITY OF THE SUBMARINE EXPORT CABLE ROUTES AND LEASE AREA

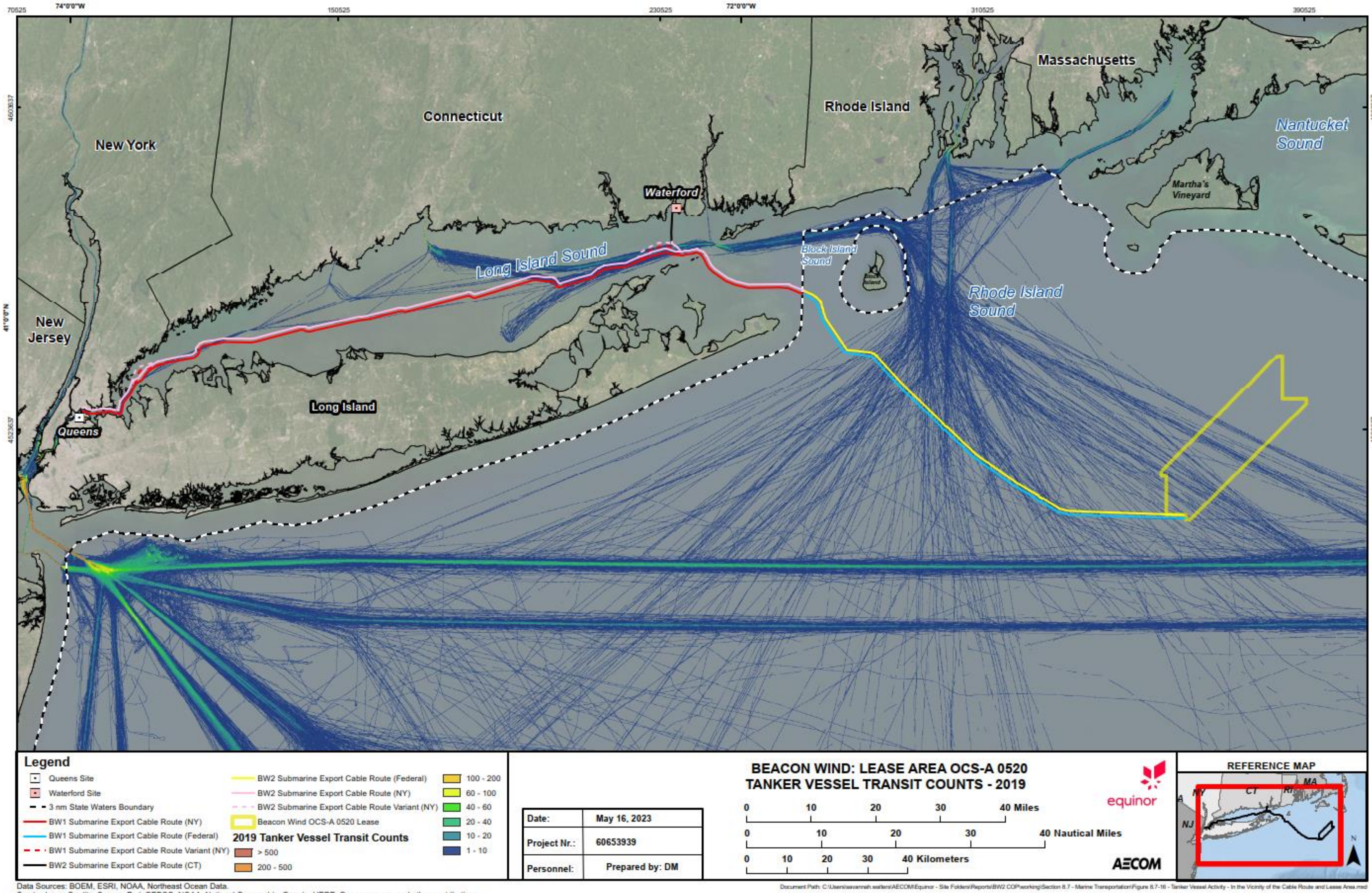
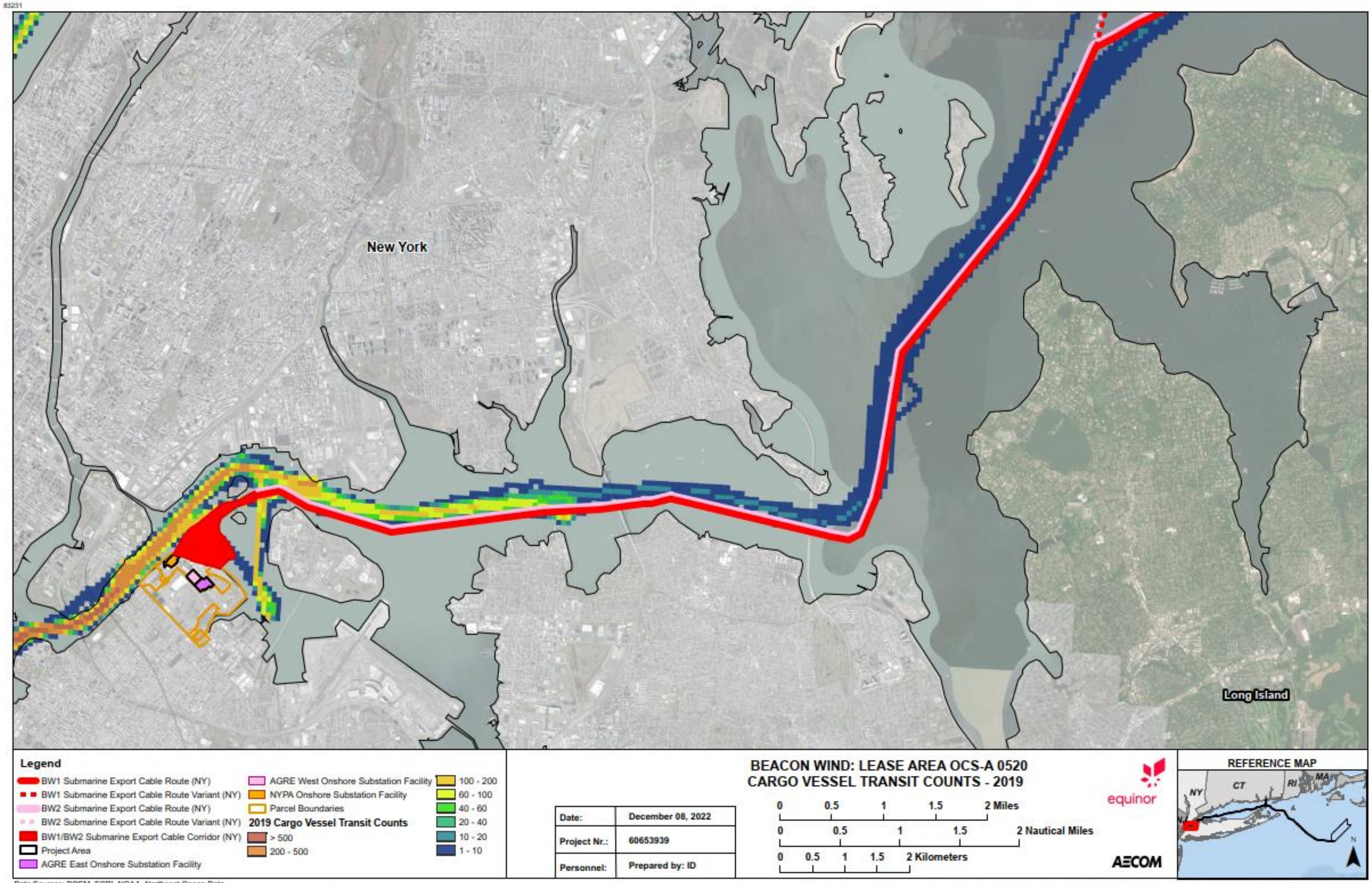


FIGURE 8.7-17. CARGO VESSEL ACTIVITY – QUEENS, NEW YORK



Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

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FIGURE 8.7-18. CARGO VESSEL ACTIVITY — WATERFORD, CONNECTICUT

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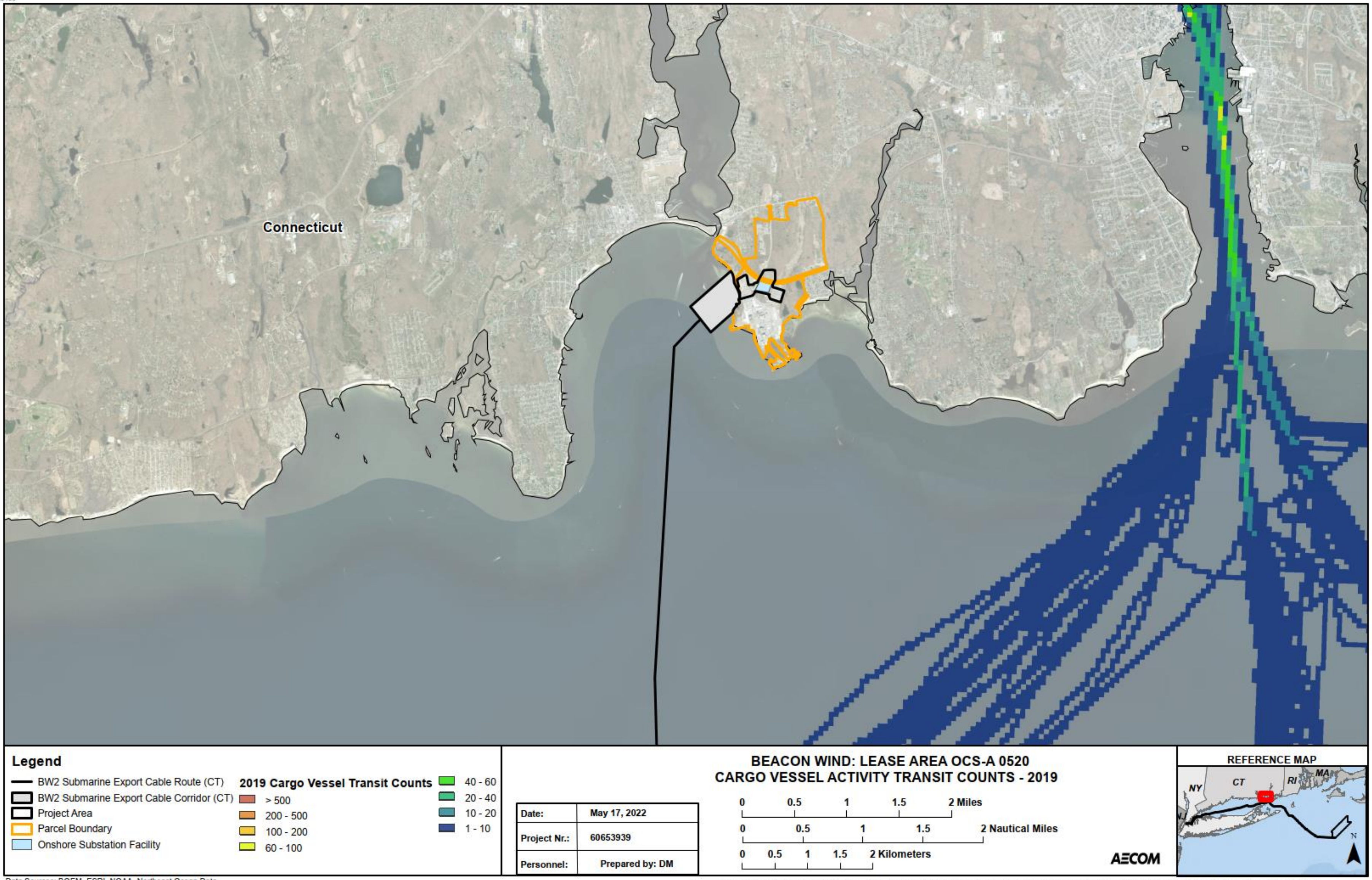

Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

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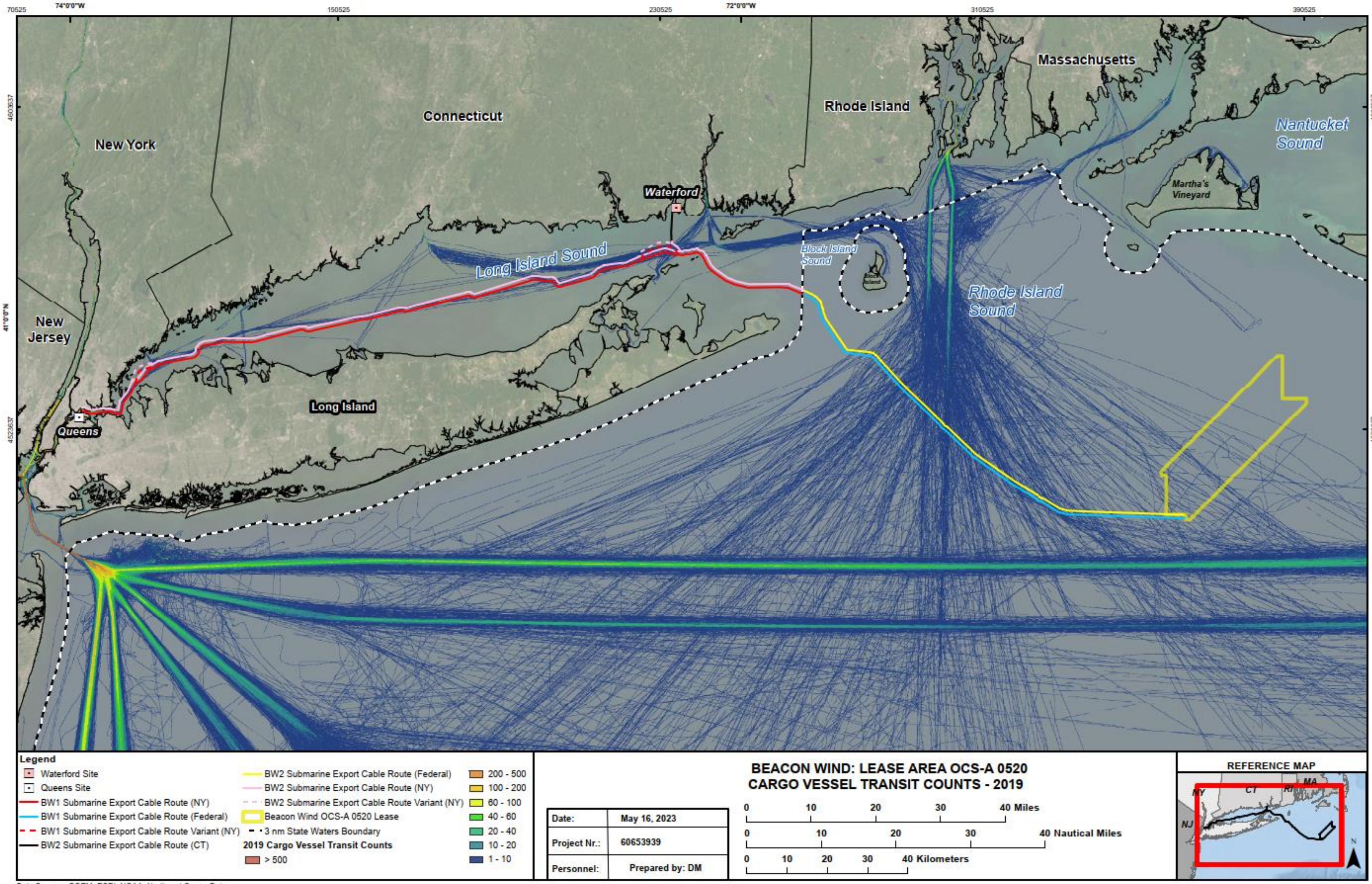
FIGURE 8.7-19. CARGO VESSEL ACTIVITY IN THE VICINITY OF THE SUBMARINE EXPORT CABLE ROUTES AND LEASE AREA



Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data.
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

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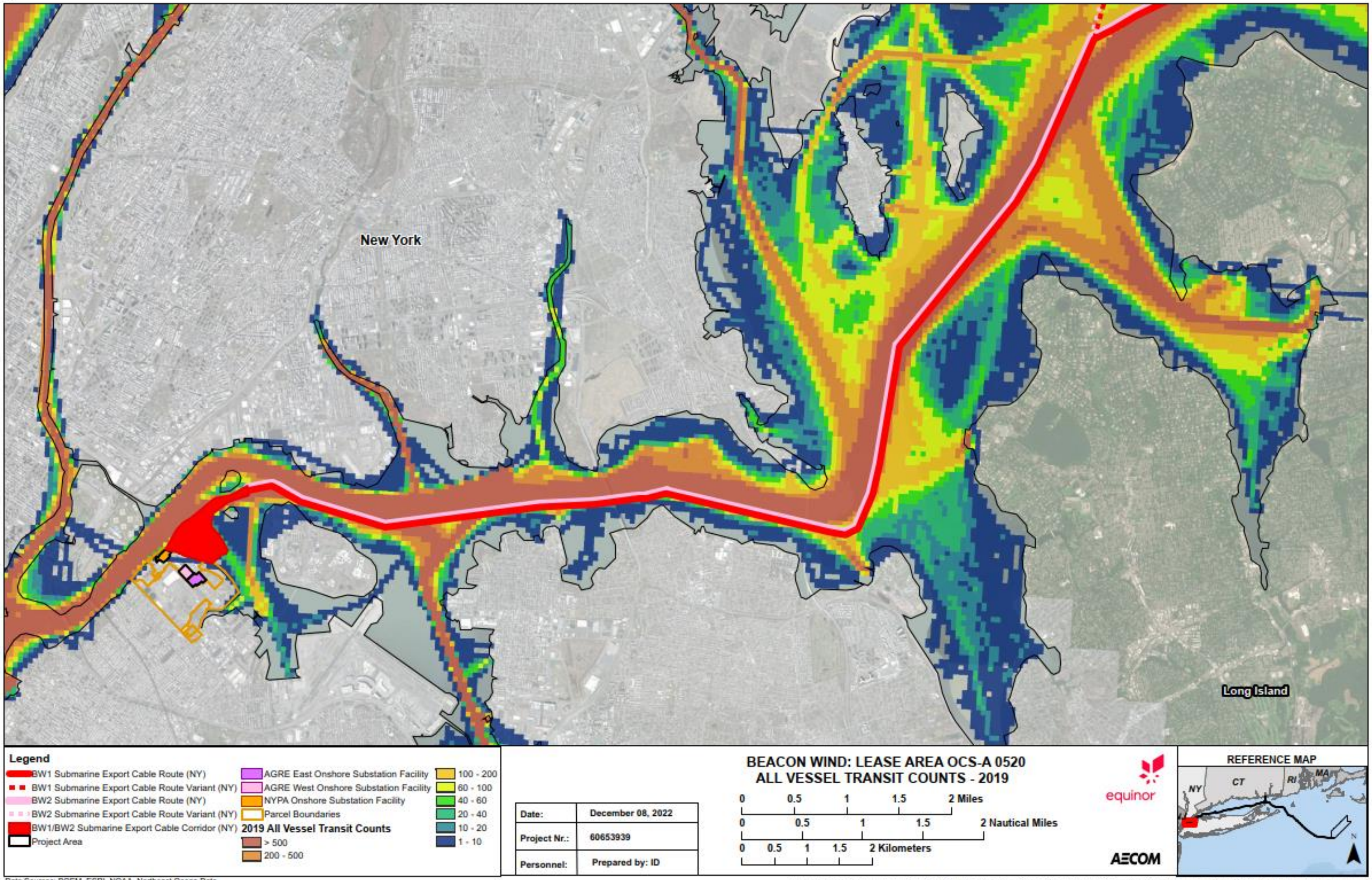
FIGURE 8.7-20. TOTAL VESSEL ACTIVITY – QUEENS, NEW YORK

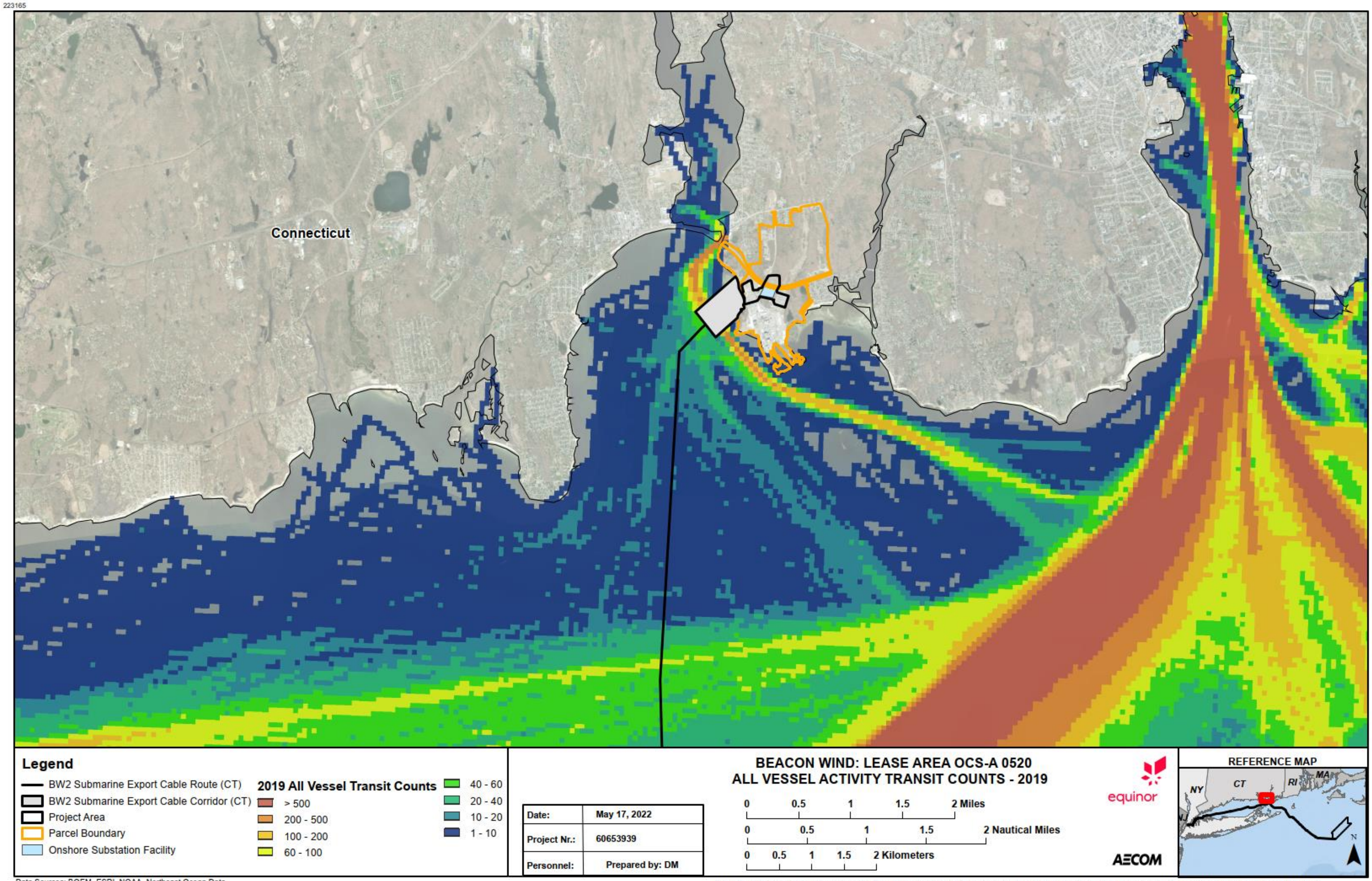


Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

Document Path: C:\Users\savannah.walters\AECOM\Equinor - Site Folders\Reports\BW2 COP\working\Section 8.7 - Marine Transportation\Figure 8.7-20 - All Vessel Activity - Astoria Inset.mxd

FIGURE 8.7-21. TOTAL VESSEL ACTIVITY - WATERFORD, CONNECTICUT

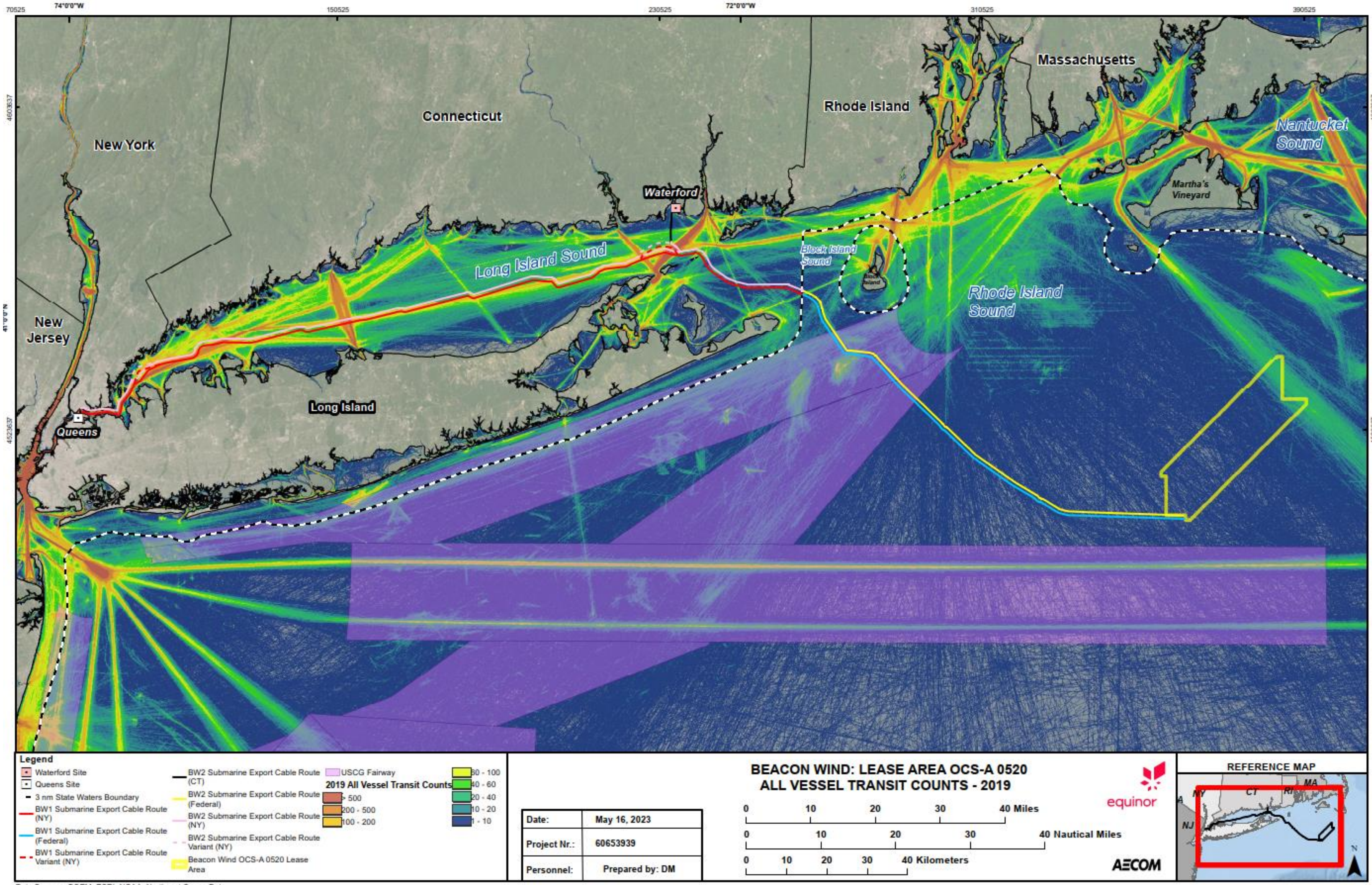
223165



Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

Document Path: C:\Users\CiobotaruN\AECOM\Equinor - Site Folders\Reports\BW2 COP\working\Section 8.7 - Marine Transportation\Figure 8.7-21 - ALL VESSELACTIVITY - WATERFORD INSET.mxd

FIGURE 8.7-22. TOTAL VESSEL ACTIVITY IN THE VICINITY OF THE SUBMARINE EXPORT CABLE ROUTES AND LEASE AREA



Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data.
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

FIGURE 8.7-23. ANCHORAGE AREAS – QUEENS, NEW YORK

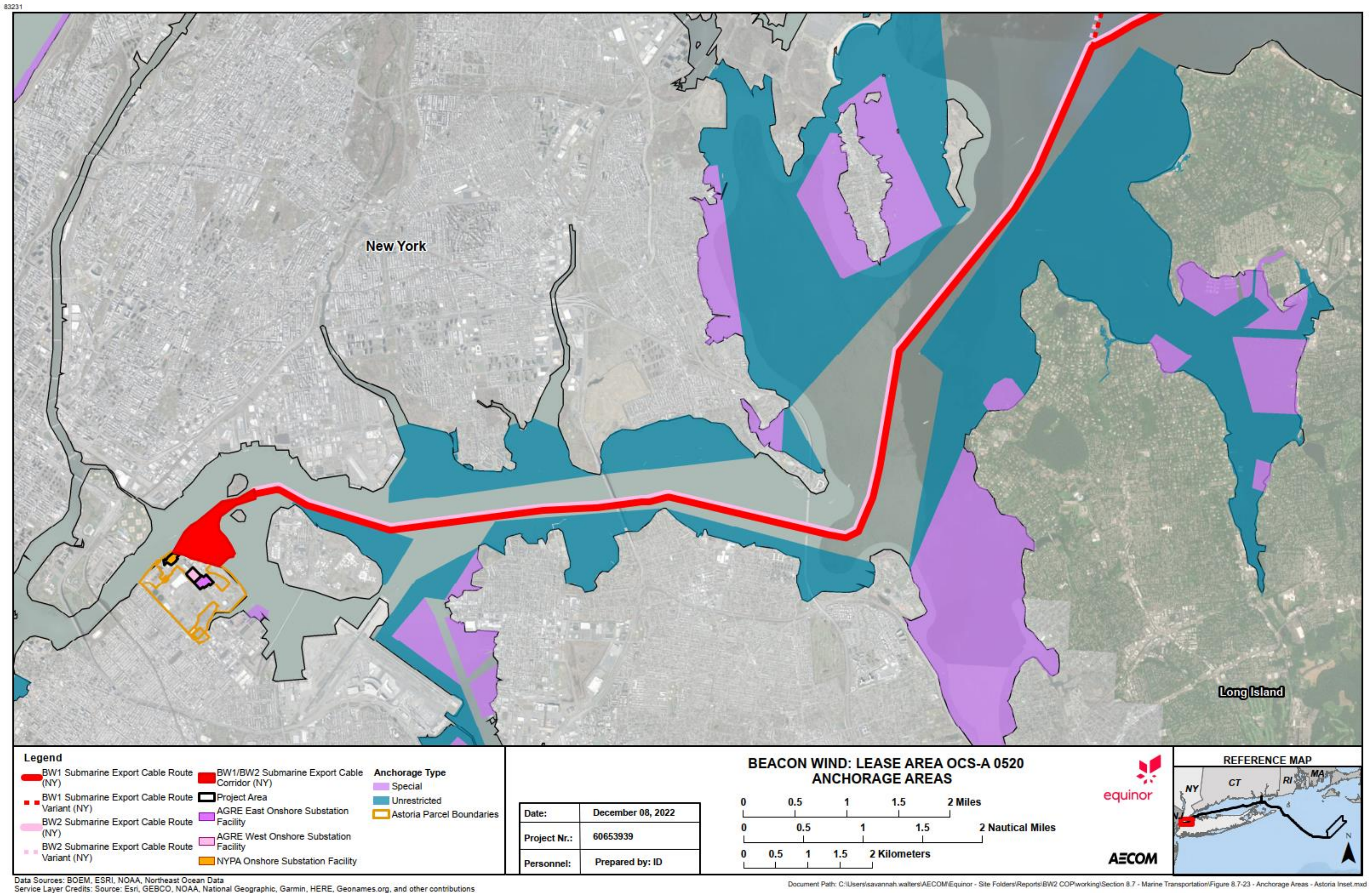
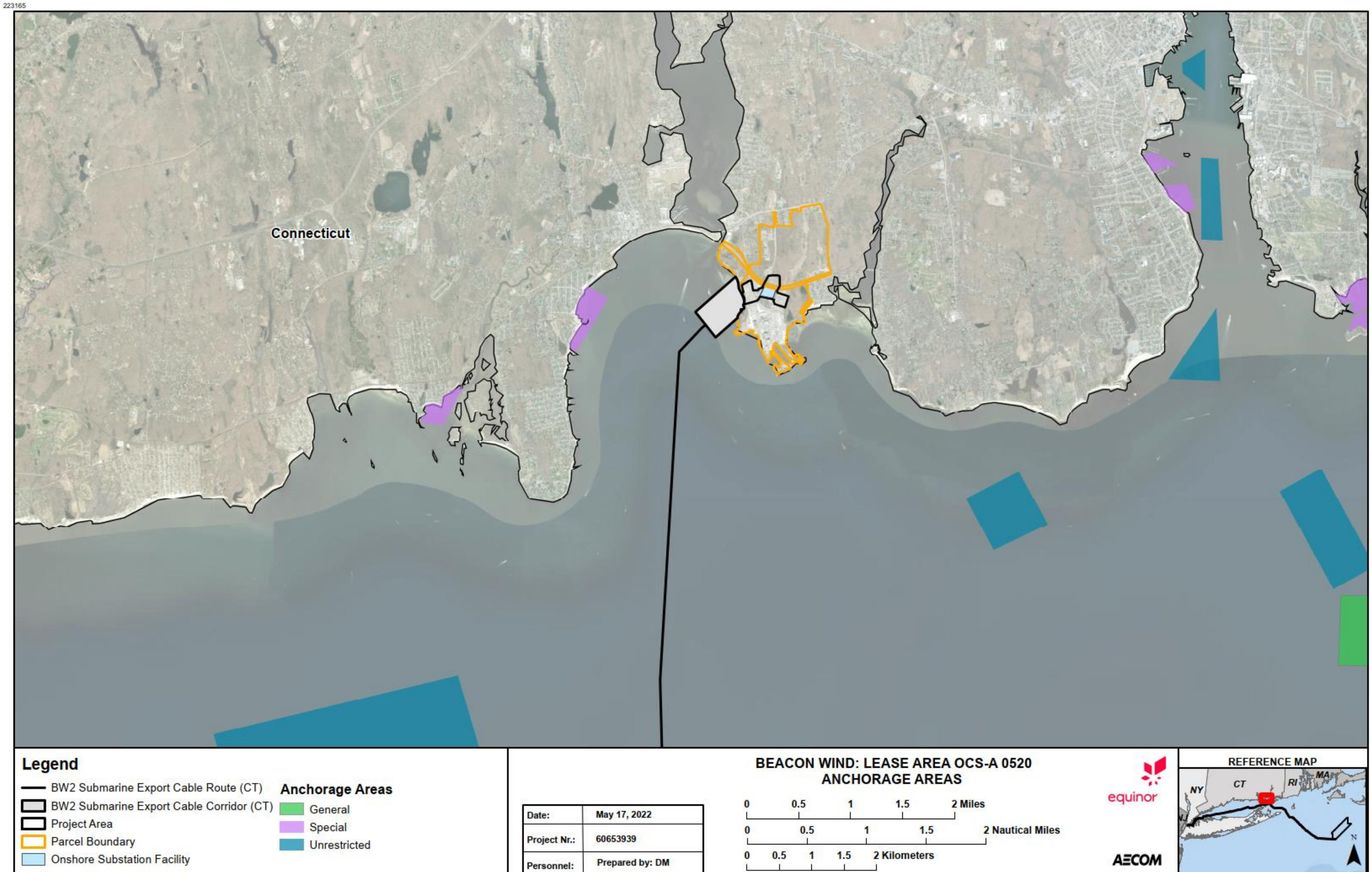


Figure 8.7-24. Anchorage Areas – Waterford, Connecticut

223165



Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

Document Path: C:\Users\CiobotaruN\AECOM\Equinor - Site Folders\Reports\BW2 COP\working\Section 8.7 - Marine Transportation\Figure 8.7-24 - ANCHORAGE AREAS - WATERFORD INSET.mxd

FIGURE 8.7-25. ANCHORAGE AREAS IN THE VICINITY OF THE SUBMARINE CABLE ROUTES AND LEASE AREA

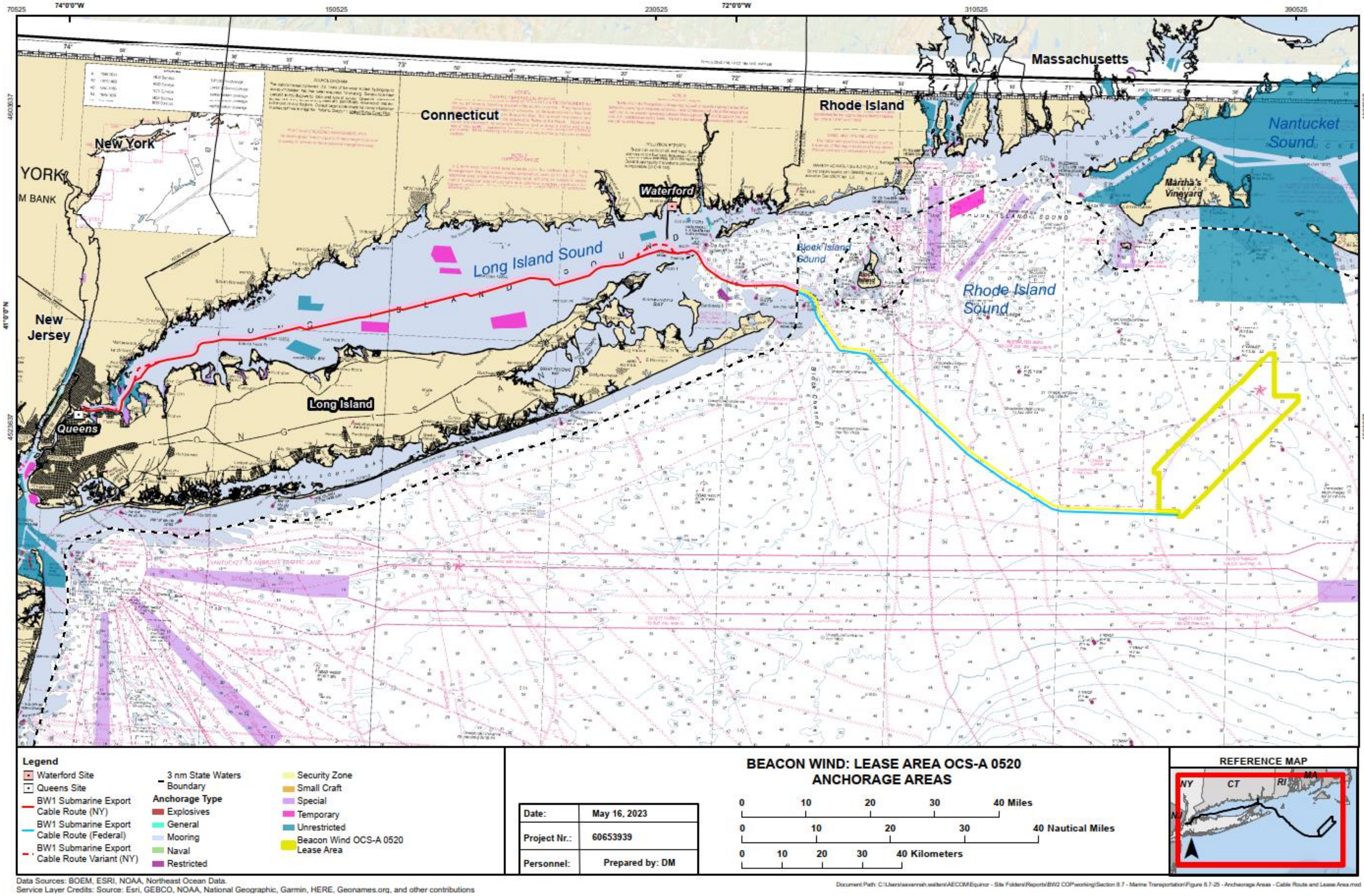
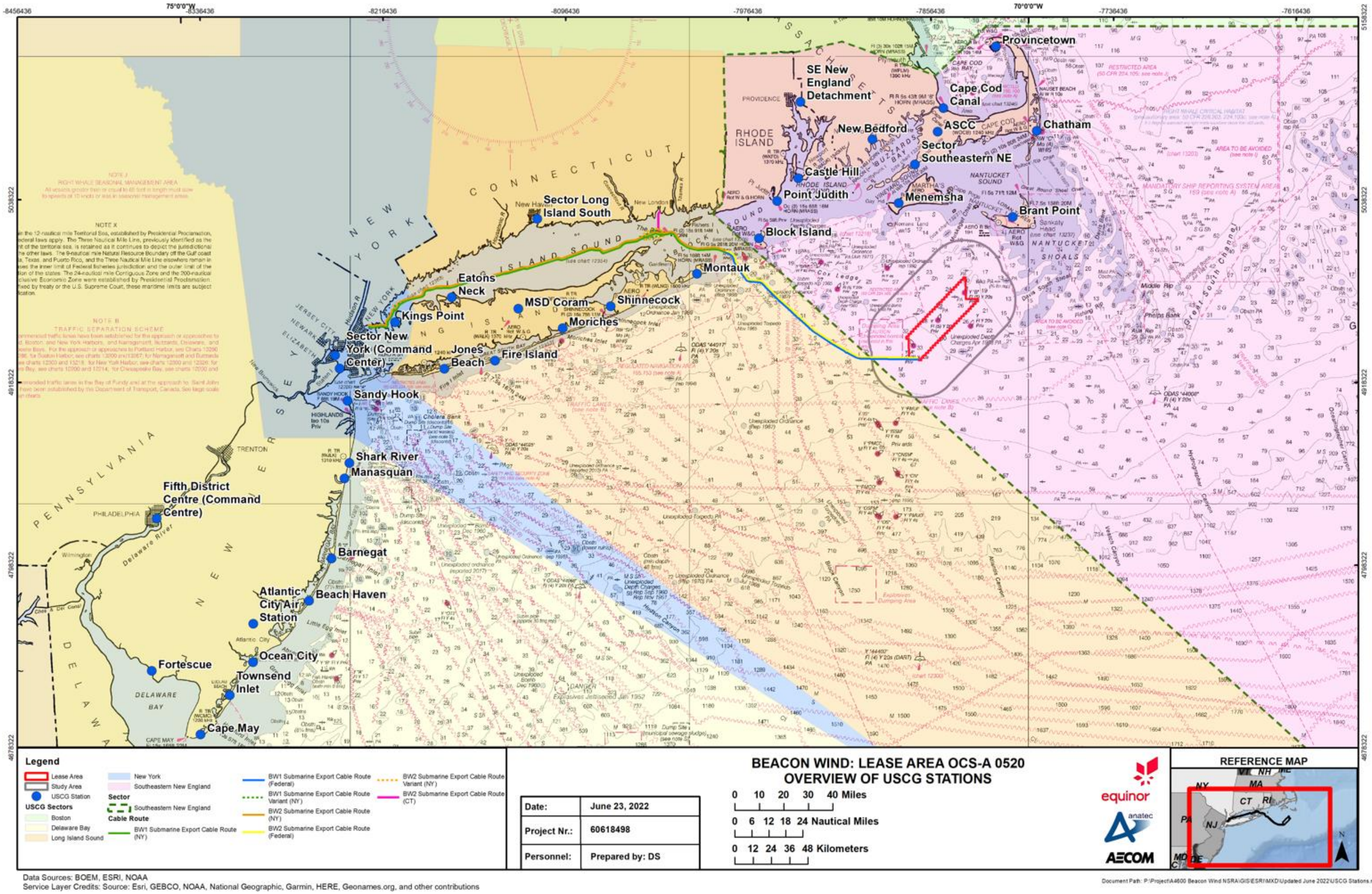


FIGURE 8.7-26. UNITED STATES COAST GUARD STATIONS



8.7.2 Impacts Analysis for Construction Operations and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For marine transportation and navigation, the maximum design scenario is the presence of new fixed structures offshore (maximum number of wind turbine generators and offshore substation facilities) as well as the maximum number of submarine export cables, as described in **Table 8.7-1**. The parameters provided below represent the maximum potential impact from full Lease Area build-out. This design incorporates a total of up to 157 structures within the Lease Area (made up of up to 155 wind turbines and two offshore substation facilities) and one submarine export cable route for BW1 to Queens, New York and one submarine export cable route for BW2 to Queens, New York or to Waterford, Connecticut.

TABLE 8.7-1. SUMMARY OF MAXIMUM DESIGN SCENARIO PARAMETERS FOR MARINE NAVIGATION AND TRANSPORTATION

Parameter	Maximum Design Scenario	Rationale
Construction		
Offshore structures	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities).	Representative of the maximum number of structures for BW1 and BW2.

Submarine export cables	Based on full build-out of the Project (BW1 and BW2):
	• BW1 to Queens, New York (202 nm [375 km])
	• BW2:
	  ○ To Queens, New York (202 nm [375 km]) or
	  ○ To Waterford, Connecticut (113 nm [209 km]).
		Representative of the maximum length of new submarine export cables to be installed, which would result in the maximum potential interactions with maximum number of associated Project-related vessels.

Foundations allision Risk	Presence of partially-installed structures/ partially completed wind farms.	Representative of the longest exposure to partially-installed structures, contributing to the greatest risk of allision.
Project-related vessels collision risk	Based on full build-out of the Project (BW1 and BW2), which corresponds to the maximum number of structures (155 wind turbines and two offshore substation facilities) and maximum associated vessels.	Representative of the maximum predicted Project-related vessels for collision risk.

Parameter	Maximum Design Scenario	Rationale
Operations and Maintenance		
Offshore structures	Based on the full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities).	Representative of the maximum number of structures/maximum overall footprint for vessel displacement (collision risk) and vessel to structure allision. Representative of the maximum effects on the ability to perform search and rescue (SAR) operations. Representative of the maximum effect on navigation equipment (e.g., radar).
Wind turbine foundation	Suction bucket jacket/Piled jacket	Representative of the maximum physical footprint, which would result in the maximum risk to vessel to structure allision.
Offshore substation facilities	Maximum topside dimensions	Representative of the maximum physical footprint, which would result in the maximum risk to vessel to structure allision
Project-related vessels collision risk	Based on full build-out of the Project (BW1 and BW2), which corresponds to the maximum number of structures (155 wind turbines and two offshore substation facilities) and maximum number of vessels and movements for servicing and inspections.	Representative of the maximum number of predicted Project-related vessels for collision risk.
Offshore O&M activities	Based on full build-out of the Project (BW1 and BW2). Based on the maximum number of structures (155 wind turbines and two offshore substation facilities) and the longest operational duration, the maximum amount of Project-related activities expected per year.	Representative of the maximum amount of activities from the Project during the O&M phase.

Parameter	Maximum Design Scenario	Rationale
Interarray cables	Based on full build-out of the Project (BW1 and BW2), with the maximum number of structures (155 wind turbines and two offshore substation facilities) to connect: BW1: 162 nm (300 km). BW2: 162 nm (300 km).	Representative of the maximum length of interarray cables, which would result in the maximum condition for risk of interactions with vessels anchors. Representative of the maximum extent of reduced draft and risk for interactions with vessel anchors. (Snagging of commercial fishing gear is covered separately in **Section 8.8 Commercial and Recreational Fishing**).
Submarine export cables	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (202 nm [375 km]). • BW2: ○ To Queens, New York (202 nm [375 km]) or ○ To Waterford, Connecticut (113 nm [209 km]).	Representative of the maximum number and length of submarine export cables, representative of the maximum extent of reduced draft and risk for interactions with vessel anchors.
Coverage of submarine export and interarray cables	Based on 10 percent of submarine export and interarray cables requiring remedial surface protection (other 90 percent achieving suitable burial depth).	Representative of the maximum portion of the submarine export cables that would require remedial surface cable protection.

8.7.2.1 Impacts Assessed within NSRA

The NSRA (**Appendix BB Navigation Safety Risk Assessment**) is prepared for the purpose of assessing those risks to shipping and navigation users from the Project are as low as reasonably practical (ALARP). The assessment addresses the Lease Area, Submarine Export Cable Corridors, and areas adjacent to the proposed landfall location for both BW1 (Queens, New York) and BW2 (Waterford, Connecticut or Queens, New York). The assessment assumes that "embedded mitigations"[12] will be in place (e.g., access to anchorage areas, no main route deviations, use of TSS lanes, and layout considerations) and identifies risks as: Broadly Acceptable (impacts are acceptable and do not require further mitigations); Tolerable (impacts are acceptable, assuming they are ALARP

[12] Embedded mitigation refers to measures put in place and committed to at this stage of development; therefore, they can be considered as part of the risk assessment process.

[additional mitigation may therefore be necessary: “tolerable with mitigation”]); or Unacceptable (impacts must be mitigated to within “tolerable” levels).

The NSRA (**Appendix BB Navigation Safety Risk Assessment**) identified and assessed impacts via the IMO FSA in line with best industry practices for marine risk assessment. The FSA assessed each identified impact by user (i.e., vessel type), with each impact determined to be of Broadly Acceptable, Tolerable, or Unacceptable risk. **Table 8.7-2** summarizes the FSA output and provides an overview of the risk levels associated with each of the impacts and vessel types from the NSRA. Impacts to Ports and Services and Emergency Responders were also assessed under a different set of factors and the impacts were found to be either Broadly Acceptable or Tolerable with Mitigation. Impacts associated with the addition of a potential BW2 to Waterford, Connecticut are considered to less than or similar to impacts associated with BW1 to Queens, New York. Impacts associated with a BW2 to Queens, New York would be the same as BW1.

It is noted that the NSRA also considered impacts to navigation equipment, communication equipment, and position-fixing equipment. The associated impacts to this equipment were screened out of the FSA based on the NSRA findings (i.e., the impacts were within Broadly Acceptable and ALARP parameters). The NSRA noted that, given the very low frequency of occurrence within the Study Area and relatively high level of awareness military vessels should have of ongoing developments, there are not considered to be any associated impacts for military vessels. For a full analysis of the impacts assessed within the NSRA, please see **Appendix BB Navigation Safety Risk Assessment**.

TABLE 8.7-2. OVERVIEW OF IMPACTS AND VESSELS ASSESSED WITHIN THE NSRA

Impact Type	Commercial Vessels	Commercial Fishing Vessels	Recreational Vessels	Anchored Vessels	Cumulative Impacts
Vessel deviation	Broadly Acceptable	Tolerable	Broadly Acceptable	N/A	Tolerable
Increased vessel to vessel collision risk	Broadly Acceptable	Broadly Acceptable	Broadly Acceptable	N/A	Broadly Acceptable
Powered vessel to structure allision risk	Broadly Acceptable	Tolerable	Broadly Acceptable	N/A	Tolerable
Drifting vessel to structure allision risk	Broadly Acceptable	Tolerable	Broadly Acceptable	N/A	Tolerable
Displacement of anchoring	N/A	N/A	N/A	Tolerable	N/A
Anchor interaction with subsea cables	N/A	N/A	N/A	Tolerable	N/A

Note: N/A – Not Applicable

8.7.2.2 Lease Area Layout

As described in **Section 3.1 Regional Array for Fixed Structures**, Beacon Wind is developing the Lease Area in accordance with the 1x1 nm (1.9x1.9 km) regional layout for offshore structures established across the MA/RI WEA. Under this layout, each foundation would be spaced 1 nm (1.9 km) apart in fixed east-to-west rows and north-to-south columns to create the 1x1 nm (1.9x1.9 km) grid arrangement. For Beacon Wind, a total of up to 155 wind turbines and supporting tower structures, and two offshore substation facilities, using up to 157 foundations will be established within the Lease Area.

8.7.2.3 Construction

During construction, the potential impact-producing factors to marine transportation and navigation may include:

- Increase in Project-related vessel traffic;
- Introduction of partially-installed structures; including foundations; and
- Presence of safety zones/safe passing distances.

The following impacts may occur as a consequence of the factors identified above:

- Short-term increase in Project-related vessel traffic resulting in the displacement of existing vessel traffic and increased collision risk;
- Short-term presence of partially-installed structures presenting allision risk; and
- Presence of partially-installed structures and short-term implementation of safety zones/safe passing distances around construction vessels, partially-installed structures and installation activities creating deviations to vessel routes.
- Refer to **Appendix BB Navigation Safety Risk Assessment** for additional detail on these potential impact-producing factors and mitigation strategies.

Short-term increase in construction vessel traffic*:* An increase in vessel traffic associated with Project-related construction and support vessels within the Lease Area and along the submarine export cable routes is anticipated during construction. This increase in vessel traffic could lead to the displacement of existing vessel traffic to other trafficked areas with an indirect consequence of increased collision risk there, as well as the direct risk of collisions with Project vessels. Potential impacts are further discussed in the NSRA (**Appendix BB Navigation Safety Risk Assessment**) and include risks of deviations, increased encounters, collision, allision, and displacement of anchoring ability, which were deemed either Broadly Acceptable or Tolerable in the NSRA. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate these potential impacts (which are also described in the NSRA):

- Continued consultation with stakeholders, including but not limited to: the USCG, New York Vehicle Traffic Service (NYVTS), and the USACE, on best practices;
- Highly visible marking and lighting of active construction sites;
- Compliance by vessels associated with the Project with international and flag state regulations including the COLREGs and the International Convention for the Safety of Life at Sea (SOLAS);
- Utilization of existing TSSs, maintained channels, and transit lanes by vessels associated with the Project to comply with existing uses and management of the surrounding waterway, to the extent practicable;
- Completion of a Cable Installation Plan, detailing how cable installation will be managed so that disruption is minimized, in particular within port approaches;

- Completion of a Construction Method Statement, detailing specific construction logistics between New York ports and the Lease Area, inclusive of transport configuration, vessels, and schedule of transport operations;
- Inclusion by Beacon Wind of a requirement in contracts that construction vessels be equipped with working AIS transceivers at all times;
- Regular updates to the local marine community through social media, the USCG LNM, and active engagement with Maritime Association of the Port of New York and New Jersey, and the Connecticut Maritime Association;
- Marine coordination for vessels associated with the Project (i.e., a central coordination hub from which Project vessel movements will be managed, and third-party traffic will be monitored);
- Minimum advisory safe passing distances for cable laying vessels (where feasible); and
- Monitoring of third-party vessel traffic by AIS.

Short-term presence of partially-installed structures: During construction, new, partially-installed structures will be incrementally added to the Lease Area, varying in completion status as the construction phase progresses; for example, there may be periods of partially-installed wind turbines and periods where parts of the Lease Area have structures before other parts of the Lease Area. Construction vessels conducting heavy-lift activities (e.g., foundation installation) will temporarily establish fixed positions and be immovable for a period of time (hours to days, depending on the activity). Additionally, as wind turbines and offshore substation platforms are installed, the construction sequence may result in a period of time between installation of the foundations and the super structure. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate these potential impacts:

- The implementation of up to a 1,640-ft (500-m) safety zone around active construction sites (including partially-installed wind turbines), pending agreement with USCG;
- Highly-visible marking and lighting of active construction sites;
- Turbine spacing will occur in fixed east-to-west rows and north-to-south columns to create the 1x1 nm (1.9x1.9 km) grid arrangement;
- Marine coordination for vessels associated with the Project (i.e., a central coordination hub from which Project vessel movements will be managed, and third-party traffic will be monitored);
- Minimum advisory safe passing distances for cable laying vessels (where feasible);
- Monitoring of third-party vessel traffic by AIS;
- Regular updates, including the positions of installed and partially-installed structures, to the local marine community through social media, the USCG LNM, and active engagement with the Maritime Association of the Port of New York and New Jersey Harbor Safety, Navigation, and Operations Committee and the Connecticut Maritime Association;
- Ongoing consultation with stakeholders, in particular, in relation to the submarine export cables; and
- The potential use of buoys and/or support vessels to mark temporary working areas or potential hazards (e.g., partially-installed structures), determined in consultation with the USCG and BOEM. Beacon Wind successfully utilized support vessels during survey activities to identify fixed fishing gear and coordinate with fishing vessels active in the area.

Implementation of temporary safety zones: During construction, Beacon Wind proposes to work with the USCG to establish temporary safety zones in active construction areas within 12 nm (22.2 km) of the coast, depending on the nature and extent of construction activity. These zones would extend approximately 1,640 ft (500 m) around relevant structures, activities, and vessels. This approach for establishing safety zones is consistent with the FEIS for the Vineyard Wind project (BOEM 2021a). Should USCG Safety Zone authorities not extend beyond 12 nm (22.2 km) at the time of construction, Beacon Wind will utilize a combination of safety vessels, Local Notices to Mariners (LNMs), and COLREGS to promote both awareness of these activities and the safety of the construction equipment and personnel. Areas will be marked and lit in accordance with BOEM (2021c) and USCG requirements and monitored by a security boat that will be available to assist local mariners. As stated above, the locations of the safety zones will be posted in LNMs, as well as on the Project website. Vessels will not be permitted to enter the safety zone without express consent from Beacon Wind.

Marine users associated with the “affected environment,” will likely be restricted by the application of these safety zones, which may require re-routing and may be considered a displacement impact; however, these restrictions will only be temporary and are a form of mitigation. Furthermore, given that these safety zones will only be placed around active construction sites, the extent of the affected area will be minimized, and marine users will be able to access the remainder of the offshore area. Beacon Wind proposes to implement the following measures to minimize impacts from Project-related safety zones to the greatest extent practicable:

- The operation of Project Support Vessels monitoring and communicating with vessels operating in the area;
- Highly-visible marking and lighting of active construction sites;
- Regular safety zone updates to the local marine community through social media, the USCG LNM, and active engagement with the Maritime Association of the Port of New York and New Jersey Harbor Safety, Navigation, and Operations Committee, and the Connecticut Maritime Association;
- Dynamic construction and safety zones where feasible, focusing on sites being actively worked on, to minimize the extent of the affected area;
- Marine coordination for vessels associated with the Project (i.e., a central coordination hub from which Project vessel movements will be managed, and third-party traffic will be monitored); and
- Monitoring of third-party vessel traffic by AIS.

8.7.2.4 Operation and Maintenance

During operations, the potential impact-producing factors to marine transportation and traffic may include:

- New fixed structures (e.g., wind turbines and offshore substations);
- Operations and maintenance vessel traffic; and
- Presence of Project-related electrical cables, including in proximity to anchorage areas.

The following impacts may occur as a consequence of the factors identified above:

- Long-term presence of new fixed structures (e.g., wind turbines and offshore substations) in the Lease Area;
- Long-term presence of Project-related vessel traffic;
- Submarine export cable and interarray cable snagging by anchors, including in anchorage areas; and
- Long-term impacts to marine radar/navigation instruments due to the presence of wind turbines.
- Refer to **Appendix BB Navigation Safety Risk Assessment** for additional detail on these potential impact-producing factors and mitigation measures.

Long-term presence of new fixed structures: The presence of new fixed structures within the Lease Area has the potential to require the long-term modification of vessel route patterns in proximity to the Lease Area, with consequential indirect collision risk as vessels are displaced to other trafficked areas and potential increased transit times. The presence of established navigation patterns (i.e., TSS lanes) south of the Lease Area, with a high level of fidelity to the TSS from larger vessels as shown in the vessel activity data (as shown on **Figure 8.7-5**, **Figure 8.7-14**, **Figure 8.7-17**, and **Figure 8.7-20**), either already avoids or mitigates this impact, or provides alternative highly-regulated shipping routing measures for smaller vessels that may elect to deviate. Increased collision risk due to displacement is addressed in the NSRA and was found to not exceed “Broadly Acceptable.”

In addition, the presence of new structures in an area previously free of fixed obstacles will present a potential allision risk to existing maritime users, both from the presence of foundation structures and the wind turbine blades. Allision risk applies both for those vessels currently transiting past or through the Lease Area and those vessels that currently utilize the areas within the Lease Area. Vessel-count data indicates that most maritime activity within the Lease Area is transit activity, with vessels entering or leaving the TSS lanes to the south or for fishing activity, as noted in **Section 8.7.1.1**. Within the NSRA, an increased risk in allisions, both for powered vessels and drifting vessels, was found to be “Tolerable” for fishing vessels and “Broadly Acceptable” for the other vessel types assessed. Appreciating the sensitivity around allisions from vessels using the TSS, Beacon Wind applied embedded mitigation to the Project in the form of a 1-nm (1.9-km) setback from the edge of the Ambrose/Nantucket TSS and the Ambrose/Hudson Canyon TSS to the edge of the “Developable Area.” The 1-nm (1.9-km) setback was informed by a “Buffer Sensitivity Analysis” conducted by Anatec, focusing on allision risk using representative AIS data, with the 1-nm (1.9-km) setback carried forward into the NSRA for further analysis. In addition, Beacon Wind applied further embedded mitigation through the use of the regional 1x1 nm (1.9x1.9 km) grid, with straight wind farm perimeters being of relevance to allision risk. Effective marking and lighting and provision of structure locations on nautical chats will also lower the likelihood of an allision event. The new fixed structures will also be exposed to environmental factors including the accumulation of ice on surfaces which may lead to ‘ice throw’ striking proximal vessels (see **Section 5.3.6** of the NSRA for additional detail). Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate these potential impacts:

- The wind turbines and offshore substation facilities will be properly marked and lit in accordance with FAA Advisory Circular 70/7460-1M (FAA 2020), BOEM’s *Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development* (BOEM 2021d), IALA Recommendation O-139 on The Marking of Man-Made

Offshore Structures (IALA 2013),[13] and USCG LNM entry 44-20 guidance (**Section 3 Project Description** contains additional details on the proposed marking and lighting measures);

- Project-enacted 1x1 nm (1.9x1.9 km) grid will facilitate a 1-nm (1.9-km) separation distance from vessel traffic within neighboring TSS lanes;
- Information will be provided to NOAA so that charts (nautical and electronic) can be updated with the location of applicable Project infrastructure; and
- Wind turbines will have a minimum blade clearance of 85 ft (26 m) above Mean Higher High Water (MHHW); and
- Wind turbine towers and offshore substations will use uniform alphanumeric markings across the MA/RI WEA to aid the navigation of transiting vessels.

See **Section 8.8 Commercial and Recreational Fishing** for additional discussion regarding potential impacts to commercial and recreational fisheries.

Long-term presence of operations and maintenance vessel traffic: The routine operations and maintenance of the Project may involve a combination of CTVs, SOVs, and smaller support vessels with the maximum design scenario of the maximum number of wind turbines (155), offshore substations (two), and submarine export cables (two). The increase in vessel traffic from operations and maintenance activities associated with the Project is negligible in comparison to the average traffic observed in vicinity of the submarine export cable routes and Lease Area due to generally high vessel traffic in the region. Beacon Wind's preferred operations and maintenance solution for each phase of the Project is a SOV, supported by CTVs or smaller support vessels. The SOV is expected to remain offshore in the Project site for a period of approximately two weeks, returning to the O&M Base every two weeks for 24 hours for refueling, re-supplying, and crew changes. Therefore, the SOV concept significantly reduces the overall vessel transits from Project site to the O&M Base, compared to the maximum design scenario of multiple CTVs making daily return trips. Under these conditions, there is a resulting reduction of vessel traffic that will reduce the risk of displacement and collision. However, Beacon Wind requires the ability to select alternatives, as described in the PDE and to be assessed in the EIS, should an SOV concept not be technically and commercially suitable. In addition to the potential adverse impacts, the presence of Project-related vessels is also deemed to have beneficial impacts, for example, in the provision of trained first responders and on scene emergency response coordination for mariners in distress, as available. The NSRA concluded that the impacts associated with collision risk from Project-related vessels during operations would not exceed "Broadly Acceptable." Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate these potential impacts:

- Compliance by vessels associated with the Project with international and flag state regulations including COLREGs and SOLAS;
- The development and implementation of an Emergency Response Plan;
- Marine coordination for vessels associated with the Project (i.e., a central coordination hub from which Project vessel movements will be managed, and third-party traffic will be monitored);

[13] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

- Utilization of existing TSSs, maintained channels, and transit lanes by vessels associated with the Project to comply with existing uses and management of the surrounding waterway, to the extent practicable;
- The development of a marine pollution contingency plan (e.g., **Appendix E Oil Spill Response Plan**);
- The establishment of operational procedures for operations and maintenance vessels transiting to and from the Lease Area such as entry/exit points and designated routes; and
- Provision of self-help capability (i.e., any onshore or vessel/turbine-based resources or facilities available to Beacon Wind that may assist in the event of an emergency).

Long-term presence of electrical cables: The presence of buried, partially-buried, or surface-protected Project-related electrical cables has the potential to impact on anchoring activities, either acting as a deterrent to the use of anchoring sites or presenting a potential snagging risk (e.g., anchors snagging on electrical cables and/or cable protection). Beacon Wind has to the extent feasible avoided active anchorage areas for the submarine export cable routes. This was achieved through a combination of constraint mapping, stakeholder consultation, and physical surveys. A description of the submarine export cable routing efforts can be found in **Section 2 Project Design Development**. Beacon Wind conducted extensive geophysical and geotechnical surveys along the submarine export cable routes to identify seabed characteristics that were conducive to sufficient cable burial using standard burial techniques, so that a barrier, in this case coverage of seabed, will further mitigate the likelihood of anchor snagging or the requirement of remedial surface cable protection that may present a snagging risk. However, where avoidance has not been wholly feasible, further mitigation, such as deeper cable burial, is applied.

Target burial depth is anticipated to be 3-6 ft (0.91-1.8 m) in areas not under federal management (i.e., outside of navigational channels and anchorages) and 15 ft (4.6 m) below the authorized depth within federally-managed areas. Additionally, the Project may implement an additional target burial depth where appropriate, for example a target burial depth of at least 3 to 6 ft (0.9 to 1.8 m) may be appropriate in areas identified for use in clam dredging activities. Target burial depths will be defined based on a Cable Burial Risk Assessment (CBRA), stakeholder feedback (i.e., USACE), and geotechnical conditions.

The submarine export cables cross at least 18 NOAA-charted submarine cables and/or cable and pipeline areas on the route from the Lease Area to Queens, New York. No additional submarine cable or pipeline crossings are added with the submarine export cable route to Waterford, Connecticut. There is substantial experience regarding recommended cable burial and fishing interactions in the Long Island Sound corridor. The North American Submarine Cable Association (NASCA) is a group of more than twenty cable owners. In September 2019, NASCA indicated that "Submarine telecommunications cables have landed at sites along the Northeast Coast of the United States for decades. During the 1980s and 1990s, submarine telecom cables located in the Northeast United States seaboard suffered several cases of damage from hydraulic clam dredges. During that period the typical target burial depth for telecom cables in this region was 2 to 3 ft (0.6 to 0.9 m). In response to this external threat, since the year 2000, submarine cable systems have been buried to a typical target depth of 5 to 6 ft (1.5 to 2 m), where seabed conditions permit. Shallower burial in hard, dense seabed has been sufficient to protect the cable. Since this change, the subsea telecom cable regional damage rates resulting from fishing and hydraulic clam dredging operations have been reduced to near zero."[14]

Beacon Wind will implement the following measures to avoid, minimize, and mitigate these potential impacts:

- Conduct a cable-routing study, including geophysical and geotechnical surveys, stakeholder input, and environmental and social constraints to develop submarine export cable routes that avoid or minimize interactions with anchorage areas;
- Completion of a Cable Installation Plan, detailing how cable installation will be managed so that disruption is minimized, in particular within port approaches, and monitored once installation is complete;
- Completion of a CBRA to identify appropriate cable burial depths and to identify any needs for additional cable protections;
- Potential real-time monitoring of Project cable assets using AIS to proactively notify vessels of potential interactions;
- Periodic monitoring of export cable routes through surveys or other means as appropriate to verify burial; and
- Information will be provided to NOAA so that charts (nautical and electric) can be updated with the location of applicable Project infrastructure.

Long-term impacts to marine radar/navigation instruments: Effects on navigation and communication equipment of vessels operating in the area that may arise from the structures and cables associated with the Project have been discussed within **Section 8** of the NSRA (**Appendix BB Navigation Safety Risk Assessment**). The section assessed the following factors using U.S. and United Kingdom trials, extensive consultation, experience from existing projects, and expert opinion:

- Interference with communication equipment (i.e., Very High Frequency [VHF] Direction Finding [DF], Rescue 21, AIS, Navigational Telex [NAVTEX], GPS);
- Electromagnetic interference on magnetic compass;
- Impact of structures within the Lease Area on marine radar; and
- Impacts of noise on use of vessel sonar.

Of those identified types of navigation and communication equipment, only marine radar was found to have any quantifiable effect within 1.5 nm (2.7 km) of a structure. When considered against the proposed Lease Area, some vessels may pass within 1.5 nm (2.7 km) of the wind farm infrastructure and, therefore, may be subject to a minor level of radar interference. However, outputs of the assessment note that any impact can be mitigated firstly by presence of sufficient sea room allowing vessels to distance themselves from peripheral turbines and, if required, by minor adjustment of marine radar controls.

The North Hoyle Wind Farm trials, a desk-based study undertaken for the Horns Rev 3 offshore wind farm in Denmark in 2014, concluded that there was not expected to be any conflicts between point-to-point radio communications networks and no interference upon VHF communications (Energinet.dk 2014). Because Rescue 21 is a VHF system and because DF impacts were only seen with equipment

[14] https://www.n-a-s-c-a.org/

very close to the wind farm array, it is not anticipated that Rescue 21 DF functions would be affected. Throughout the 2005 SAR trials carried out at North Hoyle Wind Farm, the Sea King radio homer system was tested. With the aircraft and the target vessel within the wind farm, at a range of approximately 1 nm (1.9 km), the homer system operated as expected with no apparent degradation.

Vessels navigating within the array will also be subject to a level of interference with impacts becoming significant in close proximity to the turbine (within 0.5 nm [0.9 km]). It was noted that this would require additional mitigation by any vessels (adjustment of radar controls) including consideration of the navigational conditions (i.e., visibility) when passage planning and compliance with COLREGS will be essential. Looking at existing experience within United Kingdom and European windfarms (see **Appendix BB Navigation Safety Risk Assessment**), vessels navigate safely within arrays including those with spacing significantly less than those proposed for the Project. Beacon Wind will implement the following measures to avoid, minimize, and mitigate these potential impacts:

- The wind turbines and offshore substation facilities will be properly marked and lit in accordance with FAA Advisory Circular 70/7460-1M (FAA 2020), BOEM's *Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development* (BOEM 2021d), IALA Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA 2013),[15] and USCG LNM entry 44-20 guidance (see **Section 3 Project Description** for additional details on the proposed marking and lighting measures);
- Project-enacted 1x1 nm (1.9x1.9 km) grid which will facilitate navigation within the Lease Area; and
- Information will be provided to NOAA so that charts (nautical and electronic) can be updated with the location of applicable Project infrastructure to assist in passage planning.

For general navigation, it is noted that the intolerable effects do not block targets from being seen, but instead could create multiple echoes; however, this would need the vessel (radar scanner) and target to be within close proximity to the turbines, at which point visual observations are likely. This situation is considered similar to navigation within an enclosed waterway whereby shore-based features could interfere with radar returns. The same mitigations would apply for SAR operations.

8.7.2.5 Decommissioning

Impacts during decommissioning are expected to be similar or less than those experienced during construction, as described in **Section 8.7.2.3**. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Beacon Wind anticipates will be needed for the Project, please see **Section 3 Project Description**.

[15] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

8.7.3 Summary of Avoidance, Minimization, and Mitigation, Measures

In order to mitigate the potential impact-producing factors described in **Section 8.7.2**, Beacon Wind is proposing to implement the following avoidance, minimization, and mitigation measures.

8.7.3.1 Construction

During construction, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.7.2.3**:

- Continued consultation with stakeholders, including but not limited to the USCG, NYVTS, and the USACE, on best practices;
- Highly-visible marking and lighting of active construction sites;
- Compliance by vessels associated with the Project with international and flag state regulations including COLREGs and SOLAS;
- Utilization of existing TSSs, maintained channels, and transit lanes by vessels associated with the Project to comply with existing uses and management of the surrounding waterway, to the extent practicable;
- Completion of a Cable Installation Plan, detailing how cable installation will be managed so that disruption is minimized, in particular within port approaches;
- Completion of a Construction Method Statement, detailing specific construction logistics between New York ports and the Lease Area, inclusive of transport configuration, vessels, and schedule of transport operations;
- Inclusion by Beacon Wind of a requirement in contracts that construction vessels be equipped with working AIS transceivers at all times;
- Marine coordination for vessels associated with the Project (i.e., a central coordination hub from which Project vessel movements will be managed, and third-party traffic will be monitored);
- Minimum advisory safe passing distances for cable laying vessels (where feasible);
- Monitoring of third-party vessel traffic by AIS;
- The implementation of up to a 1,640-ft (500-m) safety zone around active construction sites (including partially-installed wind turbines) pending agreement with USCG;
- Creation and implementation of a Safety Management System (SMS) (**Appendix F Safety Management System**);
- Regular updates, including the positions of installed and partially-installed structures, to the local marine community through social media, the USCG LNM, and active engagement with the Maritime Association of the Port of New York and New Jersey Harbor Safety, Navigation, and Operations Committee, and the Connecticut Maritime Association;
- Ongoing consultation with stakeholders, in particular, in relation to the submarine export cables;
- The potential use of buoys and/or support vessels to mark temporary working areas or potential hazards (e.g., partially-installed structures), determined in consultation with the USCG and BOEM;
- The operation of Project Support Vessels monitoring and communicating with vessels operating in the area;
- Regular safety zone updates to the local marine community through social media, the USCG LNM, and active engagement with Maritime Association of the Port of New York and New

Jersey Harbor Safety, Navigation, and Operations Committee, and the Connecticut Maritime Association; and
- Dynamic construction and safety zones where feasible, focusing on sites being actively worked on, to minimize the extent of the affected area.

Refer to **Appendix BB Navigation Safety Risk Assessment** for additional detail on mitigation measures.

8.7.3.2 Operations and Maintenance

During operations, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.7.2.4**:

- The wind turbines and offshore substation will be properly marked and lit in accordance with FAA Advisory Circular 70/7460-1M (FAA 2020), BOEM's *Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development* (BOEM 2021d), IALA Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA 2013),[16] and USCG LNM entry 44-20 guidance (see **Section 3 Project Description** for additional details on the proposed marking and lighting measures);
- Wind turbine towers and offshore substation facilities will implement the uniform alphanumeric marking system designed for the entire MA/RI WEA to aid in the navigation of transiting vessels;
- Project-enacted 1x1 nm (1.9x1.9 km) grid which will facilitate navigation within the Lease Area;
- Information will be provided to NOAA so that charts (nautical and electronic) can be updated with the location of applicable Project infrastructure;
- Wind turbines will have a minimum blade clearance of 85 ft (26 m) above MHHW;
- Compliance by vessels associated with the Project with international and flag state regulations including COLREGs and SOLAS;
- The development and implementation of an Emergency Response Plan;
- Marine coordination for vessels associated with the Project (i.e., a central coordination hub from which Project vessel movements will be managed, and third-party traffic will be monitored);
- Utilization of existing TSSs, maintained channels, and transit lanes by vessels associated with the Project to comply with existing uses and management of the surrounding waterway, to the extent practicable;
- Closed circuit television installed on certain structures within the array for the purpose of monitoring activity within the site;
- Locations of the wind farm structures will be provided directly to fishermen for the purpose of displaying the wind farm electronically via their on-board equipment;
- Facilitation of USCG SAR trials within and near the Lease Area;
- Operational SAR Procedures in place that detail how the Project will cooperate with USCG in the event of an emergency situation;

[16] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

- The development of a marine pollution contingency plan (e.g., **Appendix E Oil Spill Response Plan**);
- The establishment of operational procedures for Project vessels such as entry/exit points and designated routes;
- Provision of self-help capability (i.e., any onshore or vessel/turbine-based resources or facilities available to Beacon Wind that may assist in the event of an emergency);
- Conduct a cable routing study, including geophysical and geotechnical surveys, stakeholder input, and environmental and social constraints to develop submarine export cable routes that avoid or minimize interactions with anchorage areas;
- Completion of a Cable Installation Plan, detailing how cable installation will be managed so that disruption is minimized, in particular within port approaches, and monitored once installation is complete;
- Completion of a CBRA to identify appropriate cable burial depths and to identify any needs for additional cable protections; and
- Periodic monitoring of cable burial and protection measures so that they remain effective, with regular monitoring of protection in vicinity of areas of existing anchoring as identified within the cable burial risk assessment.

Refer to **Appendix BB Navigation Safety Risk Assessment** for additional detail on mitigation strategies

In addition, during operations, Beacon Wind will consider the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.7.2.2**:

- Consider potential real-time monitoring of Project cable assets using AIS to proactively notify vessels of potential interactions.

8.7.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in **Section 8.7.3.1** and **Section 8.7.3.2**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

8.7.4 References

TABLE 8.7-3. SUMMARY OF DATA SOURCES

Source	Includes	Available at	Metadata Link
BOEM	Lease Area	https://www.boem.gov/BOEM-renewable-Energy-Geodatabase.zip	NA
Northeast Ocean Data	2019 Vessel Transit Counts	https://www.northeastoceandata.org/	https://www.northeastoceandata.org/files/metadata/Themes/AIS/AllAISVesselTransitCounts2019.pdf

Source	Includes	Available at	Metadata Link
Northeast Ocean Data	2019 Cargo Vessel Counts	https://www.northeastoceandata.org/	https://www.northeastoceandata.org/files/metadata/Themes/AIS/CargoAISVesselTransitCounts2019.pdf
Northeast Ocean Data	2019 Passenger Vessel Counts	https://www.northeastoceandata.org/	https://www.northeastoceandata.org/files/metadata/Themes/AIS/PassengerAISVesselTransitCounts2019.pdf
Northeast Ocean Data	2019 Tug-Tow Vessel Transit Counts	https://www.northeastoceandata.org/	https://www.northeastoceandata.org/files/metadata/Themes/AIS/TugTowAISVesselTransitCounts2019.pdf
Northeast Ocean Data	2019 Fishing Vessel Counts	https://www.northeastoceandata.org/	https://www.northeastoceandata.org/files/metadata/Themes/AIS/FishingAISVesselTransitCounts2019.pdf
Northeast Ocean Data	2019 Tanker Vessel Counts	https://www.northeastoceandata.org/	https://www.northeastoceandata.org/files/metadata/Themes/AIS/TankerAISVesselTransitCounts2019.pdf
Northeast Ocean Data	2019 Pleasure Craft-Sailing Vessel Transit Counts	https://www.northeastoceandata.org/	https://www.northeastoceandata.org/files/metadata/Themes/AIS/PleasureCraftSailingAISVesselTransitCounts2019.pdf
Marine Cadastre National Viewer	Anchorage Areas	https://marinecadastre.gov/nationalviewer/	https://www.fisheries.noaa.gov/inport/item/48849

BOEM (Bureau of Ocean Energy Management). 2021a. Vineyard Wind 1 Offshore Wind Energy Project Final Environmental Impact Statement Volume I. Available online at: https://tethys.pnnl.gov/sites/default/files/publications/Vineyard-Wind-1-FEIS-Volume-1.pdf.

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8.8 Commercial and Recreational Fishing

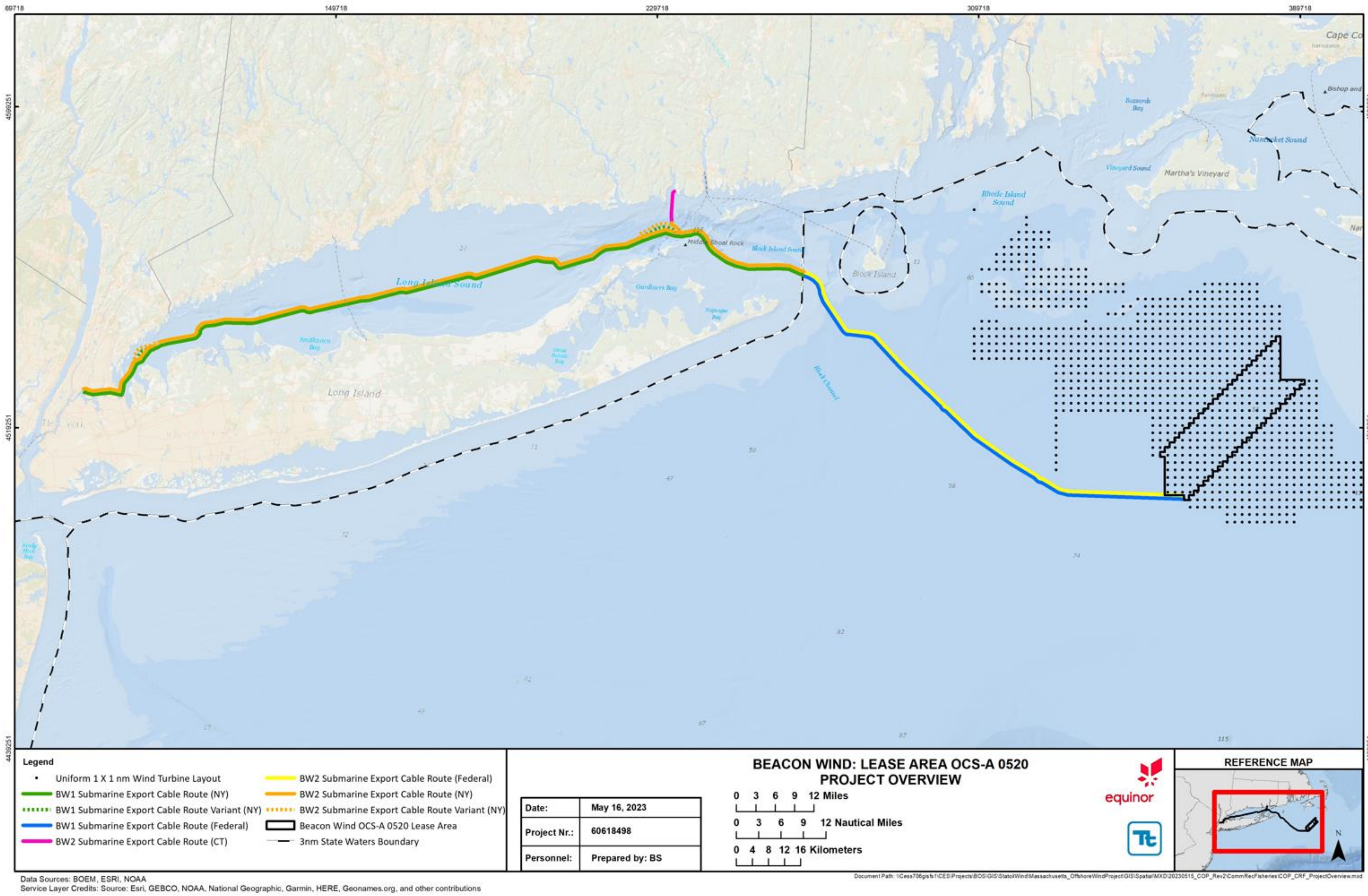
This section provides an overview of the regulatory environment for commercial and recreational fishing, summarizes fisheries outreach activities, and describes the commercial and recreational fishing resources within the Project Area (Lease Area and BW1 and BW2 submarine export cable routes) shown in **Figure 8.8-1**. Potential impacts to commercial and recreational fishing from construction, operations, and decommissioning are discussed as well. Proposed Project-specific measures adopted by Beacon Wind as a result of outreach and engagement are also described, which are intended to avoid, minimize, and/or mitigate potential impacts to commercial and recreational fishing. Other sections related to commercial and recreational fishing activity include:

- Physical and Oceanographic Conditions (**Section 4.1**);
- Water Quality (**Section 4.2**);
- Underwater Acoustics (**Section 4.4.2**);
- Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat (**Section 5.5**);
- Recreation and Tourism (**Section 8.3**);
- Marine Transportation and Navigation (**Section 8.7**);
- Benthic Resource Characterization Reports – Lease Area and Submarine Export Cables and Mapbooks (**Appendix S**);
- Essential Fish Habitat Technical Report (**Appendix T**);
- Fisheries Mitigation Plan (will be made available on the NYSERDA Website); and
- Navigation Safety Risk Assessment (**Appendix BB**).

As described in **Section 5.5 Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat**, NOAA Fisheries is responsible for managing marine and anadromous fisheries within the U.S. EEZ, which extends from 3 to 200 nm (5.6 to 370.4 km) off the coast of the U.S. Individual states are responsible for fishery management from their coastline out to 3 nm (5.6 km). NOAA Fisheries works with federal, regional, state, and territorial agencies to promote the sustainable management of U.S. fisheries in the EEZ.

In federal waters, most fisheries resources are managed under the MSFCMA, 16 U.S.C. §§ 1801 et seq., through eight Regional Fishery Management Councils (FMCs) that develop species-specific FMPs. These FMPs establish fishing quotas, seasons, and closure areas, as well as protecting EFH. The Regional FMCs work in conjunction with NOAA Fisheries to assess and predict the status of fish stocks, set catch limits, promote compliance with fisheries regulations, and reduce bycatch. The NOAA Fisheries Office of Sustainable Fisheries, Atlantic Highly Migratory Species Management Division is responsible for tunas, sharks, swordfish, billfish and other species that travel long distances across domestic and international boundaries in U.S. Atlantic Ocean, Gulf of Mexico, and Caribbean waters (NOAA Fisheries 2017a). The Highly Migratory Species Division also liaises with international agencies such as the International Commission for the Conservation of Atlantic Tunas, which is responsible for the conservation of tunas and tuna-like species in the Atlantic Ocean and adjacent seas.

FIGURE 8.8-1. BEACON WIND PROJECT AREA OVERVIEW RELATIVE TO THE MASSACHUSETTS RHODE ISLAND WIND ENERGY AREA (MA/RI WEA)



Some major fisheries in the Project Area occur in both the Mid-Atlantic and New England regions. To avoid redundancy and conflict, each species is managed by only one FMC (for example, the MAFMC manages longfin squid, surfclam, and summer flounder while the NEFMC manages sea scallop, monkfish, and herring). The FMC management areas are depicted in **Figure 8.8-2**. A complete list of managed species with EFH in the Project Area is provided in **Appendix T Essential Fish Habitat Technical Report**. In addition, the ASMFC contributes to the management of surfclam, striped bass, lobster, Jonah crab, and several other commercial and recreational fisheries of economic importance to Atlantic coastal states. Congress amended the MSFCMA by enacting the Modernizing Recreational Fisheries Management Act of 2018 (S. 1 520, “Modern Fish Act”) to expand recreational fishing opportunities through enhanced marine fishery conservation and management. The Modern Fish Act recognizes the different science-based conservation and management approaches required for the recreational and commercial fishing, with both sectors providing substantial cultural and economic benefits.

Within and adjacent to the Project Area, commercial and recreational fisheries are further managed by state regulatory agencies under various ocean management plans—developed at the state level (New York, Connecticut, Rhode Island, Massachusetts, and New Jersey; relevant to this Project), or at the regional level (NEFMC, MAFMC). Each coastal state has its own structure of agencies and plans that govern fisheries resources:

- In New York, the NYSDEC’s Division of Marine Resources (DMR) administers all laws relating to marine fisheries (NYCRR § 6:1 Subchapter C – Fishing) and is responsible for the development and enforcement of regulations pertaining to marine fish and fisheries in New York state waters. The DMR is divided into three Bureaus: Marine Fisheries, Shellfisheries, and Marine Habitat.
- In Connecticut, the CTDEEP Fishing Division administers all laws regarding marine fisheries in the state and runs several programs, such as Habitat Conservation and Enhancement, Interstate Marine Fisheries Management, and Sport Fish Restoration (CTDEEP 2021).
- In Rhode Island, the RIDEM Marine Fisheries Division administers all laws pertaining to the state’s marine resources including finfish, shellfish, aquaculture, and recreational fishing. The RICRMC is a state management agency with regulatory authority from the territorial sea limit (3 nautical miles offshore) to two hundred feet inland (RICRMC 2021).
- In Massachusetts, the Massachusetts Department of Marine Fisheries (MA DMF) is the regulatory authority that manages the state’s commercial and recreational saltwater fisheries and oversees other services that support the marine environment and fishing communities (MA DMF 2021a).
- In New Jersey, the NJDEP’s Bureau of Marine Fisheries administers all laws relating to marine fisheries (§ 7:25, Subchapter 18 – Marine Fisheries) and is responsible for the development and enforcement of state and federal regulations pertaining to marine fish and fisheries in New Jersey state waters, including the management of diadromous species (e.g., American eel, striped bass, river herring, sturgeon).

The MA DMF, RIDEM, RICRMC, CTDEEP, NYSDEC DMR, and NJDEP all work in cooperation with adjoining states and federal agencies concerning marine fisheries regulations through the ASMFC, a formally recognized embodiment of the interstate cooperative principle. Each of the state agencies leverage a team of experienced fisheries management professionals who initiate, evaluate, select, and implement fisheries management policy and regulations. The ASMFC also manages the lobster fishery within inter-state waters (ASMFC 2019a). This fishery is currently managed under Amendment 3, Addenda I-XXVI to the Interstate FMP for American Lobster. Since 2015, the ASMFC has also managed the Jonah crab fishery within this same range under the Interstate FMP and Addenda I-III (ASMFC 2019b). Under the Jonah crab FMP, only lobster permit holders can participate in the directed fishery for this species. Lobsters are managed under three separate stocks: Gulf of Maine, Georges Bank, and Southern New England, divided into seven management areas. The Project Area is located within the Southern New England Stock and spans portions of Management Areas 6, 3, 2, and the 2/3 Overlap Area. The Coastal Zone Management (CZM) programs for each state are primarily concerned with impacts to coastal habitat, including fish habitat, and work closely with the state fisheries management agencies.

The New York Ocean Action Plan was published in 2016 and serves as the blueprint for protection and sustainable use of the state's marine waters. The plan has four interconnected goals that include: (1) Ensure the ecological integrity of the ocean ecosystem, (2) Promote economic growth, coastal development, and human use of the ocean in a manner that is sustainable and consistent with maintaining ecosystem integrity, (3) Increase resilience of ocean resources to impacts associated with climate change, and (4) Empower the public to actively participate in decision-making and ocean stewardship. In New York waters, the DMR is charged with oversight of marine habitat and fisheries and with implementing the Ocean Action Plan within the framework of existing regulations.

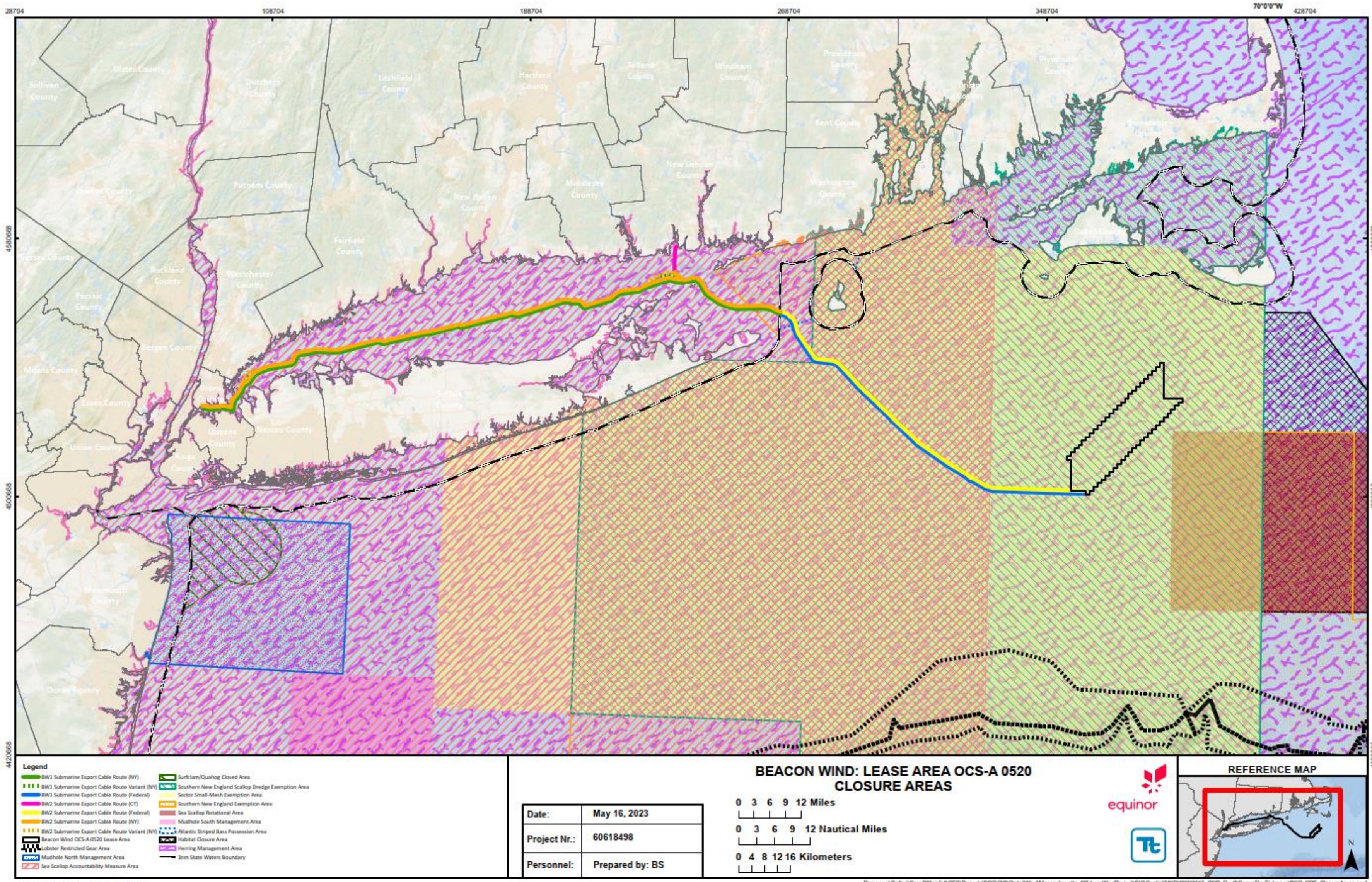
The Rhode Island Ocean Special Area Management Plan (SAMP) serves as a federally recognized coastal management tool that provides a balanced approach to the development and protection of Rhode Island's ocean resources (RICRMC 2010). The SAMP has three different approaches: research, policy making, and public engagement research and plan for the development of the area five hundred feet seaward of the state's coastline up to thirty miles offshore (McCann and Schumann, 2013).

The Massachusetts Ocean Management Plan protects critical marine habitat and important water-dependent uses and sets standards for new ocean-based projects in Massachusetts (Commonwealth of Massachusetts, 2021). As part of the Ocean Management Plan process, six technical working groups covering habitat, fisheries, transportation and navigation, sediment and geology, cultural heritage and recreational uses, and energy and infrastructure provide individual updates that are included within the 2021 edition of the Plan. The drafting and publication of each edition of the Plan is led by the Massachusetts office of Coastal Zone Management (Commonwealth of Massachusetts, 2021).

The New Jersey Offshore Wind Strategic Plan serves as a roadmap for successful implementation of New Jersey's offshore wind energy goals, with a focus on the following areas of analysis, (1) Environmental and natural resource protection, (2) Commercial and recreational fisheries, (3) Supply chain and workforce development, (4) Ports and harbors, and (5) Energy markets and transmission.

At the regional level, the Mid-Atlantic Regional Ocean Action Plan was developed in 2016 (Mid-Atlantic Regional Planning Body 2016). New York, Connecticut, Rhode Island, Massachusetts, and New Jersey, participated in the NROC and MARCO during the plans' development to ensure that it would include a management framework designed to be implemented within the existing regulatory structure, with the relevant agencies coordinating review and approval of proposed ocean projects.

FIGURE 8.8-2. FISHERIES MANAGEMENT AREAS WITHIN THE BEACON WIND PROJECT AREA



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

8.8.1 Data Sources

8.8.1.1 Fishing Vessel Monitoring Systems

NOAA Fisheries uses a VMS to keep track of some fisheries under its jurisdiction (50 CFR § 660.14). Many types of commercial fishing vessels are monitored with installed equipment that provides position and activity information while operating. Data from the monitoring systems are relayed to the regulatory agencies (e.g., NOAA Fisheries) to provide input to management decisions that affect the fishery. Publicly available data from several monitoring systems were evaluated and incorporated into this document to help characterize fishing activities in the Project Area, as described in **Table 8.8-1** and in the following sections.

TABLE 8.8-1. MONITORING SYSTEMS USED IN THE GARFO REGION

Monitoring System	Vessel Size	Fisheries Monitoring System Requirements in the Greater Atlantic Region Fisheries Office (GARFO) Region
VMS	All sizes	• Regularly records/reports location via satellite transmitter. • Required under the following federal permits: ○ Full-time or part-time limited access scallop, or limited access general category scallop permit. ○ Occasional limited access scallop permit when fishing under the scallop area access program. ○ Limited access monkfish, occasional scallop, or combination permit electing to provide VMS notifications. ○ Limited access multispecies permit when fishing on a category A or B day at sea. ○ Surfclam or ocean quahog open access permit. ○ Maine mahogany quahog limited access permit. ○ Limited access monkfish vessel electing to fish in the Offshore Fishery Program. ○ Limited access herring permit. ○ Open access herring Areas 2 and 3 permit. ○ Limited access mackerel permit. ○ Longfin squid/butterfish moratorium permit.
Vessel Trip Reports (VTR)	All sizes	• Required of all operators of NOAA Fisheries GARFO-permitted-vessels (except for those vessels that possess only a commercial lobster permit). • Single, self-reported latitude/longitude location, with no required interval (multiple tows can be included in a single VTR). • VTR must be issued for each change in fishing area or fishing gear type, and must include the haul back location. • Vessels are only required to have an additional VTR if they move outside a NOAA grid block or switch gear type.
Automatic Identification System (AIS)	> 65 ft. (20 m)	• Only required for vessels > 65 ft (20 m) length, within 12 nm (22 km) of coastline. • Class A: all passenger vessels, as well as all commercial vessels over 299 gross tons that travel internationally (required).

Monitoring System	Vessel Size	Fisheries Monitoring System Requirements in the Greater Atlantic Region Fisheries Office (GARFO) Region
		• Class B: smaller vessels, including many U.S. fishing boats (not required). • Signal transmitted every 30 seconds or 3 minutes. • Some fishing vessels classify themselves as "other" so AIS data for fishing may underrepresent the actual fishing effort across some FMPs.

Some fisheries stakeholders have questioned the accuracy of agency vessel monitoring data in that it may not adequately represent what is occurring in each fishery. To address this potential data gap, Beacon Wind incorporated stakeholder feedback and local fisheries-specific knowledge in this section, in addition to the agency data, which provides additional context and understanding of the available data. While no single dataset is ideal for mapping activity independently, each provides initial indications for further research regarding specific fisheries and their geospatial locations. The Mid-Atlantic and the Northeast Ocean Data Portal's VMS and VTR data density maps for commercial fishing provide several data limitation disclaimers, including the inability to distinguish among fishing activity, vessel transit, and other vessel activities in density grid products (NROC and MARCO 2021). Although industry input was used to indicate the speed threshold best correlated with actual fishing the maps likely include some non-fishing activities that occur at low speeds, such as processing catch, sorting, drifting, or idling. The most accurate interpretation of these map products is relative vessel presence related to fishing activity.

8.8.1.1.1 Vessel Monitoring System

The VMS is a satellite surveillance tracking system primarily used to monitor the location and movement of commercial fishing vessels in the U.S. EEZ. The system uses satellite-based communications from onboard transceiver units, which certain vessels described in this section are required to carry. The transceiver units send position reports that include vessel identification, time, date, and location, and are mapped and displayed on the end user's computer screen (NOAA Fisheries 2018a). The publicly available heat maps of VMS datasets broadly characterize commercial fishing vessel activity in the Northeast and Mid-Atlantic U.S. regions. The relative amount of vessel activity is indicated qualitatively from high (red) to low (blue) (NROC and MARCO 2022). VMS data is one way to obtain spatial and temporal information and indications of intensity regarding commercial fishing. Vessels typically send VMS positions once per hour, but the interval may be shorter in some cases. This provides valuable information for fisheries management, but the intervals between signals make tracking less precise than that achieved by the Automatic Identification System (AIS).

According to available NOAA VMS data, fishing activity for the years 2015 through 2018 ranged from no detected fishing to high levels of fishing vessel activity within portions of the Project Area for species regulated under FMPs. Maps that infer fishing activity by filtering out vessel speeds less than 4 to 5 knots (7.4 to 9 kilometers per hour [km/hr]) are included for each of the FMPs in **Section 8.8.3.2**. Commercially harvested species are caught using a variety of gear types within the Project Area, several of which are described in **Section 8.8.3.2**. Maps of collective annual VMS data for all presumed fishing activity, compiled from the most recent years available, are shown in each of the "Occurrence in the Project Area" sections within **Section 8.8.2.2**. VMS data (2014-2019) are also available in the form of 'polar histograms', to provide a visual representation of fishing vessel orientation while transiting or fishing within the Lease Area, with most fishing vessel traffic in the Lease Area recorded at transiting speed in a NW-SE direction, as opposed to actively fishing (see **Appendix BB Navigation Safety Risk Assessment**). Note however, that not all fisheries require VMS and the implementation of that requirement within each fishery varies. As such, these data are not fully representative of all fishing activity.

8.8.1.1.2 Vessel Trip Reports

Vessel Trip Reports (VTRs) are required of all operators of NOAA Fisheries GARFO-permitted vessels (except for those vessels that possess only a commercial lobster permit) and are required for every fishing trip regardless of where the fishing occurred or what species are targeted. In general, a VTR includes information regarding what type of trip occurred (head boat, charter boat, commercial, private operation), one set of coordinates per chart area where fishing occurred, gear type, and vessel and operator permit numbers. Vessel operators are required to complete and sign a VTR at the conclusion of all trips (NOAA Fisheries 2018b).

Unlike VMS, which continuously monitors vessels, VTRs include a single, self-reported latitude/longitude location based on where a vessel began to haul back their gear. These locations are identified within an established 3-digit NOAA Fisheries chart area. For a given trip, an additional VTR is required only if the vessel moves their fishing location to a new chart area or changes the type of gear, mesh size, or ring size they are using (NOAA Fisheries 2018b). VTR data may therefore be more indicative of a general location where a vessel is actively fishing, compared to more continuous monitoring methods such as VMS or AIS.

National Oceanic and Atmospheric Administration (NOAA) Fisheries has published VTR data from 2007 to 2019 within all northeast Wind Energy Areas (WEAs). This data shows the amount (pounds) and value of catch by gear type, port, and FMP within all discrete BOEM lease areas off the Atlantic Coast, including for the Beacon Wind Lease Area (NOAA Fisheries 2021a). The VTR data from this report covering the Lease Area are provided in **Table 8.8-10**, **Table 8.8-11**, and **Table 8.8-12** to characterize the potential of exposure for applicable gear types, ports, and FMPs to development of the Lease Area (see **Section 8.8.2.2.3**).

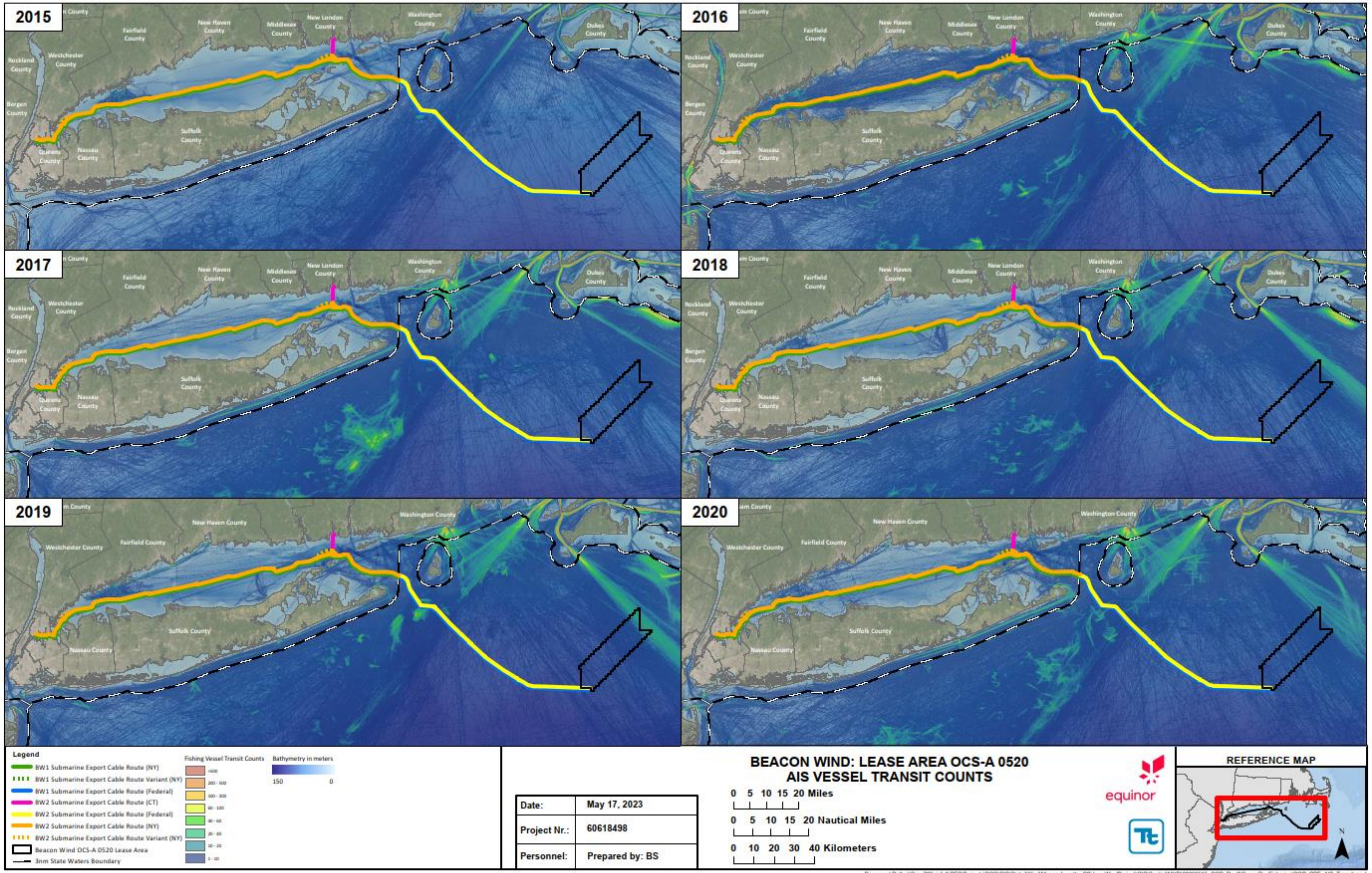
8.8.1.1.3 Automatic Identification System

The AIS is an automated, autonomous tracking system that is used extensively in the maritime world for the exchange of navigational information between AIS-equipped terminals. Static and dynamic vessel information can be electronically exchanged between AIS receiving stations (onboard, ashore, or satellite). Since December 2004, the IMO requires all passenger vessels, as well as all commercial vessels over 299 gross tons that travel internationally, to carry a Class A AIS transponder. Smaller vessels, including many U.S. fishing boats, can also be equipped with a Class B AIS transponder.

As a system originally designed in large measure to support collision avoidance, in many areas AIS enables very precise vessel tracking. One advantage of AIS over VMS is that AIS signals are sent by a vessel at intervals ranging from a few seconds to three minutes. This can enable precise tracking of individual vessels, with identification, position, speed, heading, and other data. These VHF radio signals are public, received by antennas of other vessels as well as coastal receivers. Where sufficient data quality and software are available, history tracks of vessels using different fishing gear types can be recorded and measured with a high degree of precision, to show fishing grounds, towing speeds, patterns, and maneuverability.

Since 2016, U.S. commercial fishing vessels over 65 ft (20 m) long have been required to carry AIS but are only required to transmit within 12 nm (22 km) of the coast. Networks of coastal antennas and satellite antennas have made real-time and historic data available for detailed analysis. A substantial portion of the fishing fleet does not broadcast AIS, but the vessels that do broadcast provide valid and valuable information. In addition, they enhance the safety of all vessels in the area—collision avoidance was a fundamental motivation for development of AIS. Publicly-available AIS fishing vessel transit data in the Project Area are available from the Northeast Ocean Data portal and depicted for 2015 to 2020 in **Figure 8.8-3**, with additional figures in **Section 8.8.2**.

FIGURE 8.8-3. ANNUAL 2015-2020 AIS DATA INDICATING FISHING VESSEL TRANSITS AND ACTIVITY WITHIN AND ADJACENT TO THE PROJECT AREA (NROC AND MARCO 2021)



Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

8.8.1.2 Fishing Activity Survey

In addition to the datasets described above, and to better understand the level of commercial and recreational fishing effort that takes place within the Project Area, Beacon Wind initiated a Fishing Activity Survey in 2020 and continuing through 2022, consisting of Offshore Fisheries Liaison Representatives (OFLRs) during the geophysical and geotechnical surveys to document fishing activity within the Project Area during survey activities. Beacon Wind actively recruited OFLRs from fishermen spanning from New Jersey to Maine. The survey vessels included a rotating team of OFLRs, selected from members of the commercial and recreational fishing industries (12 total; one from Maine, one from Massachusetts, one from New Jersey, and nine from Rhode Island) to report on fishing activities observed. To help avoid potential conflicts during surveys, Beacon Wind Fisheries Liaison Officers (FLOs) conducted extensive pre-survey outreach to area fishermen, including mass e-mail updates, phone calls, dock visits, and both group and independent consultations.

The primary role of the OFLRs was to ensure good communications with fishing vessels encountered on site, such as disseminating information, responding to queries from fishing vessels and acting as a conduit for information offshore between the FLO and fisheries stakeholders within or near the site. Additional responsibilities of the OFLR were to:

1. To maintain daily contact with, and keep records of, fishing vessels observed to be within the vicinity of the work areas of Project-related vessels;
2. To keep the masters and watch officers of Project-related vessels informed of fishing vessels in the vicinity of their working area, and the gears and modes of operation of such fishing vessels;
3. To keep fishing vessels advised of the Project-related vessels' locations, operations, schedules, safety zones, and health and safety restrictions;
4. To provide on-site ad-hoc assistance and advice to wind farm-related vessel officers with the objective of minimizing hindrance to fishing activities, avoid conflicts, and ensure the commitments in the coexistence plan are adhered to; and
5. Provide daily reports to Beacon Wind FLO.

On survey vessels, OFLRs provided information on seabed characteristics and fishing grounds, based on their experience and subject to confidentiality of fishermen's operations. This information helped to identify areas with minimal interactions with fishing. In some cases, where fishing activity or gear was present, Beacon Wind survey activities were postponed or rescheduled to minimize interactions. A top priority is to safeguard the confidentiality of information considered sensitive by individual fishermen and/or groups of fishermen. OFLRs typically provide non-confidential information that is common knowledge among area fishermen, but not otherwise available to the general public.

During the 2020 and 2021 geophysical and geotechnical surveys, Beacon Wind also monitored AIS data continuously in and around the Project Area. Beacon Wind understands that many fishing vessels in the region do not broadcast AIS; however, a substantial number do. As part of the **Navigation Safety Risk Assessment (Appendix BB)**, approximately 17 percent of fishing vessels were observed as not broadcasting AIS, which is substantially less than the BOEM-estimated value of 40 percent, as described in **Section 3.1 Regional Array for Fixed Structures**. This provides Beacon Wind the potential to identify a considerable proportion of the fleet that may be approaching or working along offshore installation corridors that the surveys may come into conflict with. Beacon Wind's standing orders to survey vessels specify that the survey should avoid interference with active mobile and static gear. To accomplish this, survey vessels were provided all available information about local fishing, including daily 24-hour history of area AIS tracks. No negative interaction with fishing vessels has been reported on any surveys to date, apart from gear that appears to have been abandoned/lost or considered derelict. Occasional contact with GARFO for non-confidential, general fleet information provided another source of timely fleet movement data. These sources, coupled with onboard radar and visual watch by fishermen representatives, and effective communications with the fishing industry has provided a comprehensive picture of real-time fishing activity in the Project Area for the duration of marine surveys to date.

The OFLR program is an important part of fisheries outreach, both to avoid potential conflicts between surveys and fishermen at sea, and to enable fishermen from different ports to understand the Project firsthand. Through Project engagement efforts during these survey periods, local fishermen are expected to have become increasingly familiar with Project staff, Project outreach efforts, and the measures taken to gather detailed information about the Project Area.

In areas where Beacon Wind has reason to expect concentrations of static fishing gear, such as lobster and conch pots and gillnets, Beacon Wind has also chartered fishing vessels as a scout boat to examine the area prior to survey arrival and in some cases shadow and assist 24/7 scout support to survey vessel. The duties of such a vessel may include identifying gear set in the survey area, reporting its location to the survey vessel, helping to determine whether it is likely to interact with planned activities, informing Beacon Wind and/or the survey vessel, and possibly contacting the gear owner to consider a request to move the gear temporarily. Scout boats support positive and cooperative relationships between fishing vessels and survey vessels.

The effectiveness of such measures has been demonstrated since the 2020 commencement of the Beacon Wind surveys both within the Beacon Wind Lease Area and along the Beacon Wind submarine export cable routes. Up to three scout boats have been deployed at different times to monitor the survey area of static gear and mobile fishing activity prior to survey vessel arrival and activity. One scout vessel supporting in the Beacon Wind Lease Area worked over seven months with the survey vessel to ensure no gear conflicts. Respectful, frequent, and effective communications of scout boat captain(s) and active fishermen has enabled Beacon Wind to have no gear claims since surveys were initiated in 2020 both within the Lease Area and along the submarine export cable routes. A gear claim would be considered in the event there is fishing gear loss or damage caused by, or resulting from, Beacon Wind activities.

8.8.1.3 Outreach and Engagement

Since obtaining the Lease in 2018, Beacon Wind has coordinated with stakeholders with an interest in commercial and recreational fishing. Agency outreach is detailed in **Appendix B Summary of External Engagement Activities.** Project-specific fisheries stakeholder outreach initiatives are summarized in **Table 8.8-2** and Beacon Wind's regularly updated Fisheries Communication Plan available on the NYSERDA Website.

8.8.1.3.1 Fishing and Offshore Wind Coexistence

Beacon Wind's approach and philosophy to Project development is premised on the belief that through cooperation, the fishing industry and offshore wind energy developments can co-exist in a sustainable manner. Beacon Wind believes that co-existence can be achieved by carefully evaluating existing uses of the Project Area, avoiding impacts where feasible, or reducing impacts through mitigation. Marine users will not be restricted from fishing or transiting throughout the operational wind farm areas. Restrictions, if applicable, will likely be limited to the application of standard safety zones during the construction phase, and operational safety zones around manned or sensitive offshore platforms, or in some cases specific access points to turbines (as discussed in **Section 8.8.4**). A successful coexistence strategy will require open and regular communication between Beacon Wind and the fishing industry starting with the development and survey phase, permitting, construction, operation, and decommissioning of the wind farm(s).

Beacon Wind FLO(s) have more than 50 years of combined experience working with fisheries in the Northeast. The FLOs coordinate with fisheries stakeholders to facilitate access to regional and local fishing data that helped inform the description of the Affected Environment (**Section 8.8.3**). Transparency is a cornerstone of Beacon Wind's core values and forms the basis of Beacon Wind's fisheries liaison philosophy. Regular, open consultation is key to ensuring all parties are well informed, are able to contribute to the discussions, and can work towards the joint objective of coexistence. The identification of potential impacts on the fishing industry may change if the Project's wind farm design and installation methodology changes or becomes more detailed during the various phases of development. The function of the FLOs is designed to consult and coordinate activities appropriate to the life cycle of the Project throughout the permitting, construction, operation, and decommissioning phases, where the requirements and potential impacts may vary in each of these phases. Liaison activities are primarily based on best practice guidance and feedback from the fishing industry through consultation. The FLOs also draw on consultation with organizations, working groups and individual state and federal regulators, ports and harbors, and legislation, as well as the previous experience of Beacon Wind with fisheries liaison work in the offshore wind, and subsea cable industries. The best practice guidance includes, but is not limited to:

- Development of Mitigation Measures to Address Potential Use Conflicts between Commercial Wind Energy Lessees/Grantees and Commercial Fishermen on the Atlantic Outer Continental Shelf (BOEM 2014a);
- Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison – Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW), U.K. (FLOWW 2014);
- Fishing and Submarine Cables Working Together – published by the International Cable Protection Committee (ICPC 2009); and
- Offshore Wind Best Management Practices Workshop (MAFMC 2014).

Effective dialogue and consultation have been facilitated by the establishment of a comprehensive contact list of over 400 contacts which includes local and regional fisheries associations, societies, groups, individual fishermen, industry organizations, local, state, and federal agencies, academia and interested citizens. This contact list is maintained and regularly updated by the FLOs in conjunction with Beacon Wind, and used solely for the purposes of Beacon Wind's fisheries liaison activities and will not be made available to any individual or group outside of Beacon Wind's specific requirements. It is acknowledged and appreciated that some fisheries information, such as fishing sites, can be commercially sensitive. In these circumstances, Beacon Wind will work with the individual fishing organization/fisherman to establish confidentiality agreements for the purpose of sharing information with the objective of using it to work towards the objective of coexistence.

Beacon Wind has hired in-house and contracted FLOs with the appropriate level of knowledge and first-hand experience in the fishing industry of the region to aid in communication with, and the dissemination and gathering of information between, Beacon Wind and the fishing industry. The FLOs will also support Beacon Wind in the identification of potential impacts, potential mitigation measures, and support with data gathering to inform the environmental and social impact assessments related to commercial and recreational fishing. The FLOs will be acting on Beacon Wind's behalf throughout all development stages, including during surveys and the operation and decommissioning phases. The primary roles and responsibilities of the FLOs are to:

- Serve as the primary point of contact between the Project and the commercial and recreational fishing fleets;
- Log all interactions between the Project and fisheries representatives accurately and in a way that can be shared by Beacon Wind;
- Maintain a fisheries stakeholder database and contacts list for all identified fisheries operating within the vicinity of the offshore Project Area throughout all stages of the Project, covering the following details:
  - Vessel names, owners, registrations, and base ports.
  - Vessel radio call sign.
  - Dominant method(s) of fishing and any new technology developing within the fisheries.
  - Static gear surface marker details where applicable.
  - Target species as well as key by-catch species.
  - Fishing grounds relevant to the Project.
  - Fishing periods and operating practices of each key fishery.
  - Feedback, comments and concerns voiced within consultations.
- Arrange meetings with the fishing industry throughout all stages of Project development, with frequency, timings, and method of communication appropriate to the level of activity at the time;
- Consult the relevant Fishing Industry Representatives;
- Maintain regular liaison with relevant fishermen's associations, organizations, individual captains, crewmen and vessel owners, NEFMC, MAFMC, and any relevant fisheries regulatory bodies as appropriate;
- Disseminate Project-related activities that could potentially interact with fisheries stakeholders, which will include:
- A description of the survey activity or other works to be conducted;
- The location and timing of survey activities;
- The coordinates of partially and/or fully installed infrastructure;
- A preview of the schedule of works, where available;
- Details of the vessels involved in the works, including the vessels contact details;
- Survey and installation vessel transit routes to and from site;
- The locations and timings of safety exclusion zones that may be required during installation or maintenance activities;
- Conflict avoidance response procedures and reporting procedures; and
- Beacon Wind-hosted meetings, webinars, and open houses for fisheries consultations and Project updates.

- Be available to receive and relay back to Beacon Wind all relevant concerns from the fisheries stakeholders in respect of the various activities associated with the Project;
- Keep fisheries stakeholders updated of any changes in Project design or scheduling;
- Assess and advise Beacon Wind on the need for, and subsequently support Beacon Wind in organizing, scout/guard vessels and OFLRs;
- Monitor fishing activity within the wind farm site and submarine export cable routes during all phases of the Project, including during survey activities, to minimize disruption to fishing activities;
- Support Beacon Wind in making wind farm survey, installation, and operations and maintenance contractors aware of relevant fishing activities, including any relevant fishermen's sensitivities, and procedures for communicating with fishing vessels at sea; and
- Advise and support Beacon Wind on the procurement of OFLRs to be present offshore during survey activity.

8.8.1.3.2 Local/Regional Direct Outreach

This section focuses on outreach within the fishing industry, with an emphasis on local/regional vessels and ports nearest to the Project Area, as well as both local and regional fishing activities based in ports that use the Project Area for harvest or transits. For the purpose of this analysis, the Project reviewed activity associated with ports in New York, Connecticut, Rhode Island, Massachusetts, and New Jersey. These ports were selected based on observations and outreach, including the following:

- Initial outreach during 2020 to various stakeholders prior to the designation of an FLO, including several fleet owners, individual vessel operators, and other organizations (**Appendix B Summary of External Engagement Activities**);
- The presence and activities of vessels observed by qualified field personnel and industry representatives fishing in, and transiting through, the Project Area since 2020, as described in **Section 8.8.2.2**; and
- Beacon Wind outreach, especially through the FLO, to gather input from fishing community leaders, fishing individuals and associations. Outreach efforts have included dock visits, written, and spoken correspondence, open houses, attendance at council meetings and fisheries working groups.

Fisheries outreach has included more than 400 individuals, associations, companies, and agencies from Massachusetts to New Jersey. During the height of the COVID pandemic, outreach continued via emails, letters, phone calls, texts, and video calls. Beacon Wind plans to continue to expand these efforts for the life of the Project. Commercial fishing interests across the region have been engaged through outreach to fishing companies, fleet managers, vessel owners, crewmen, agencies, and fishermen's associations. Recreational fishermen have also been engaged extensively, through presentations to fishermen's associations, trade shows, and meetings with small groups and individuals. The Beacon Wind FLOs have networked with prominent leaders in commercial ports. These networks continue to expand to reach as many interested parties as feasible. Beacon Wind representatives, including FLOs, are regular attendees at the New England and Mid-Atlantic Fishery Management Council meetings, taking the opportunity to present Project updates and use the events to solicit feedback with relevant stakeholders. Finally, the Beacon Wind FLOs also provided regular updates to the Massachusetts Fisheries Working Group and New York Fisheries Technical Working

Group. A summary list of fisheries stakeholders contacted by Beacon Wind since 2020 is provided in **Table 8.8-2**, with individual fishermen and vessel owners are excluded from the list to maintain privacy.

TABLE 8.8-2. FISHERIES OUTREACH CONDUCTED TO-DATE, BY ORGANIZATION/STAKEHOLDER

Organizations	NY	CT	RI	MA	NJ	Regional
Anglers for Offshore Wind Power						X
Atlantic Offshore Lobsterman's Association						X
Atlantic Queen Incorporated						X
Baird Symposium			X			
Barrington Town Council			X			
Bureau of Ocean Energy Management						X
Charles River Laboratories				X		
Citizens Campaign for the Environment	X					
Climate Jobs NY	X					
Coastal Debris Grappling Inc	X					
Coastal Resource Management Council			X			
Commercial Fisheries Center of RI			X			
Commercial Fisheries Research Foundation						X
Commercial fishing industry						X
Connecticut Association of Conservation Districts		X				
Coonamessett Farm Foundation				X		
Cornell Cooperative Extension	X					
CT Chamber Of Commerce Eastern CT		X				
CT Department of Energy and Environmental Protection		X				
Department of Energy				X		
East Hampton Town Council	X					
Eastern New England Scallop Association						X
EOM Offshore				X		
Fisheries Survival Fund						X
Fishery Applications Consulting Team, LLC				X		
Fishing Community						X
Freeport Tuna Club (NY)	X					
Friends of the Bay	X					
Handrigan's Seafood			X			
Inlet Seafood	X					
Ithaca Clean Energy	X					
Long Island Association	X					
Long Island Commercial Fishing Association	X					
Long Island Federation of Labor	X					
Long Island Fishing Charters	X					
Long Island Sound Lobsterman's Association						
Long Island Sound Study	X					
Lund's Fisheries					X	
Long Island Traditions	X					

Organizations	NY	CT	RI	MA	NJ	Regional
Massachusetts Lobstermen's Association				X		
McQuilling Partners	X					
Mid-Atlantic Fishery Management Council						X
Mid-Atlantic Regional Council on the Ocean						X
Montauk Boatmen and Captains Association	X					
Montauk Grand Slam tournament	X					
Mystic Aquarium		X				
National Renewable Energy Laboratory						X
Natural Resources Subcommittee on Water, Oceans, and Wildlife						X
New Bedford Commercial Fishing Stakeholders				X		
New Bedford Port Authority				X		
New Bedford Seafood Consulting				X		
New England Fishery Management Council						X
New England Fisheries Management Council Habitat Advisory Panel						X
New Jersey Department of Environmental Protection					X	
New London Seafood Distributors		X				
New York League Of Conservation Voters	X					
New York State Department of Environmental Conservation	X					
New York State Department of Environmental Conservation – Licensed Commercial Fishing Permit Holders	X					
New York State Department of Public Service/Public Service Commission	X					
New York State Department of Transportation	X					
New York State Energy Research and Development Authority	X					
New York State Office of General Services	X					
New York State Parks	X					
NOAA- National Marine Fisheries Service						X
NOAA Fisheries Greater Atlantic Region Fisheries Office						X
Northeast Regional Ocean Council						X
NYS DEC Enforcement	X					
NYS DOS	X					
Oak Bluffs Blue Water Classic				X		
Offshore Wind Support Services						X
Operation Splash	X					
Orsted						X
PBS						X
Responsible Offshore Development Alliance						X
Responsible Offshore Science Alliance						X

Organizations	NY	CT	RI	MA	NJ	Regional
Rhode Island Department of Environmental Management (RIDEM)			X			
Rhode Island Saltwater Anglers Association			X			
Rutgers Marine Extension Program	X					
Save the Sound		X				X
Sea Watch International						X
Southern New England Lobstermen and Fishermen Association		X				
Stove Boat Communications						X
Suffolk County Marine Industry Revitalization Advisory Council	X					
The Nature Conservancy						X
The Public's Radio			X			
The Rhode Island Saltwater Anglers Association			X			
The Town Dock			X			
University of Connecticut		X				
US Coast Guard						X
US Fish and Wildlife Service						X
Vineyard Wind				X		X

During 2020 and 2021 Beacon Wind attended meetings with FMCs, federal and state agencies, USCG, Harbor Safety Committees, and other groups; and made presentations at several of these. For more in-depth discussions regarding fishermen's concerns, coexistence, technical issues, and practical solutions, individual and small group meetings were conducted at vessels, docks, and fishing companies, as these were deemed to be more productive.

In 2020, Beacon Wind was scheduled to host booths at the Rhode Island Saltwater Anglers Association and Massachusetts Lobsterman's Association trade shows but were cancelled due to the COVID pandemic. Beacon Wind plans to continue hosting booths at fisheries events annually, including up to and during the wind farm construction period, and into the operations phase if still appropriate and helpful. Beacon Wind hosted booths at the March 2022 Rhode Island Saltwater Anglers Association Expo in Providence, Rhode Island and the New Jersey Fishing Expo in Edison, New Jersey. Future planned outreach events will include, but are not limited to, the Connecticut Fishing & Outdoor Show, the Connecticut Maritime Heritage Festival, and various fishing tournaments in Massachusetts, Rhode Island, Connecticut, New York, and New Jersey when able.

Beacon Wind has made Project introductions, updates, and calls for information presentations at the following venues and/or to the following groups:

- NEFMC
- American Fisheries Society
- Mid Atlantic Ocean Forum MARCO Portal Panel
- Recreational Anglers and Offshore Wind Forum, Toms River, New Jersey
- Freeport Tuna Club, New York
- Point Lookout Fishing Club, New York

- Atlantis Anglers Association, New York
- Operation Splash, New York
- Montauk Boatsman Association
- Long Island Sound Lobsterman's Association
- Long Island Commercial Fisherman's Association
- Long Island FlyRodders
- Commercial Fisheries Center of Rhode Island
- New Bedford Port Authority
- Massachusetts Lobsterman's Association
- Responsible Offshore Development Alliance
- New London Seafood
- Anglers for Offshore Wind Power Forum, New Jersey
- New York Department of Environmental Conservation Marine Fisheries Section
- New Jersey Department of Environmental Protection Marine Fisheries Section
- Rhode Island Department of Environmental Management Fisheries Specialist
- Massachusetts Division of Marine Fisheries Offshore Wind Energy Working Group
- BOEM Task Force meetings
- New York Harbor Safety Committee

Beacon Wind has also made contacts within the Recreational and For-Hire Fishing community from New Jersey to Massachusetts. The most intensive recreational fisheries liaison outreach has been conducted within the areas of Massachusetts, Rhode Island, northern New Jersey and Long Island, focusing on nearby ports whose fishermen are more likely to fish in proximity to the Project Area. Beacon Wind has participated in two fishing trips to the Block Island Wind Farm, organized by the National Wildlife Federation and Anglers for Offshore Wind, to glean additional information from regional recreational anglers.

Beacon Wind endorses the notion that decisions should be made based on science and evidence. Experience has shown that technical approaches to such concerns, developed jointly by project developers, project engineers/scientists, and fishermen, can lead to the best outcomes when all parties keep in mind the goal of coexistence. In this context, much of the information below will focus on the technical aspects of fishing, which Beacon Wind sees as key factors in achieving coexistence.

Beacon Wind continues to seek all feasible opportunities to engage with fishermen in outreach. These efforts have been sensitive to stakeholder fatigue and use organized forums to communicate consistently across the various fishing interests. In 2019, Equinor Wind entered into an Agreement with the Responsible Offshore Development Alliance (RODA), as part of the Joint Industry Task Force, with the expectation that it may help to provide a channeled voice for commercial fishermen, while overcoming a degree of stakeholder fatigue and opposition to engagement that has been experienced in outreach to certain fishing communities. While the joint industry task force is not currently active, Equinor Wind and Beacon Wind remain engaged with RODA membership and other fishing industry stakeholders through FLO activities identified in this section. Additionally, Beacon Wind has representation and active participation on the Responsible Offshore Science Alliance (ROSA) board of directors.

Additional outreach within the fishing industry occurs through the Project's Fishing Industry Representatives (FIRs) that may serve as the main point of contact within a fishing industry organization. The FIRs should represent the views, and have the backing and support, of the fisheries stakeholders they represent. The FIRs disseminate information from the FLO or the Project to the fishing community and vice versa on a timely and all-inclusive basis. The FIR is normally a fishing organization or an individual who has worked extensively within or currently represents the industry in that particular sector, port, or region. Additional roles and responsibilities of the FIR are described in the Fisheries Communication Plan.

8.8.1.4 Additional Data Input

In addition to the fishing monitoring data, fishing activity survey, and outreach/engagement, the following documents provide meaningful input into the assessment of potential impacts of the Project on commercial and recreational fishing:

- Spatiotemporal and Economic Analysis of Vessel Monitoring System Data Within Wind Energy Areas in the Greater North Atlantic (RIDEM 2018);
- Economic Impact of Rhode Island's Fisheries and Seafood Sector (CFRF 2018);
- Socio-Economic Impact of Outer Continental Shelf Wind Energy Development on Fisheries in the U.S. Atlantic (Kirkpatrick et al. 2017), funded by BOEM to analyze the potential impact of offshore wind farms on fisheries and ports; and
- Socioeconomic Impacts of Atlantic Offshore Wind Development (reports summarizing previous fishing activity within each offshore wind lease area [NOAA Fisheries 2021a]).

8.8.2 Baseline Characterization

The affected environment, as described below, is defined as the coastal and offshore areas where recreational and commercial fishing occur and have the potential to be directly or indirectly affected by the construction, operation, and decommissioning of the Project. The Lease Area is located within an area of continental shelf that lies approximately 17 nm (32 km) south of Nantucket, Massachusetts and approximately 52 nm (97 km) east of Montauk, New York. This area is part of the broader Northeast Continental Shelf Large Marine Ecosystem, with more than 300 marine fish species that utilize the highly productive area for feeding, growth, and reproduction (Aquarone and Adams 2009; Froese and Pauly 2019). The Project's 202-nm (375-km) BW1 and BW2 submarine export cable route runs west from the Lease Area, then turns northwest entering Block Island Sound between Montauk, New York and Block Island, Rhode Island, then entering Long Island Sound between Plum Island and Fishers Island, New York. The BW2 submarine export cable route may turn north shortly after entering Long Island Sound to make landfall in Waterford, Connecticut instead of Queens, New York. This BW2 submarine export cable route option is 113 nm (209 km) in length. The biology and life history of fish and invertebrate species that are commercially and recreationally fished in this region is fully described in **Section 5.5 Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat**.

8.8.2.1 Recreational Fishing

Recreational saltwater anglers from New York, Connecticut, Rhode Island, Massachusetts, and New Jersey fish in or transit the grounds in and around the Project Area while targeting several different fisheries. Recreational fishing in the Project Area is accessed by privately owned recreational boats, for-hire boats including charter boats, and "head boats," from various ports and inlets located in northern New Jersey, the New York City metropolitan area, Long Island, and along the coasts of Connecticut, Rhode Island, and Massachusetts.

Within the Lease Area, recreational fishing is concentrated near areas of structured habitat, such as “The Star” located in the northeastern portion of the Lease Area, or “The Dump,” a former Disposal Area located west of the Lease Area. Recreational fishing boats may also transit through the Lease Area to reach a site, but their exact transit routes are not represented on commonly used, publicly available datasets, as these vessels do not have the VMS or VTR requirements discussed previously for commercial fishing vessels. Similarly, many recreational fishing vessels do not utilize AIS and are not represented in datasets summarizing AIS vessel activity. There are several known/documented fishing locations in the vicinity of the Lease Area, including artificial reefs, offshore disposal areas, and shipwrecks (**Figure 8.8-9**). Commonly targeted species include black sea bass, scup, summer flounder, tautog, and striped bass.

Within the submarine export cable routes, recreational fishing is also concentrated near areas of known structure, such as “Six Mile Reef,” “Stratford Shoal,” “Execution Rocks,” and multiple active and former Dredged Material Disposal Areas located in the Long Island Sound portion of the submarine export cable routes. Recreational fishing effort of anglers from three states occurs in Long Island and Block Island Sounds. New York, Connecticut, and Rhode Island have reciprocal agreements that allow licensed or registered anglers to fish throughout these shared waterbodies (NYSDEC n.d.). **Figure 8.8-9** depicts the many wrecks, artificial reefs, and other popular recreationally fished features in the Long Island Sound. Recreational fishing boats may also transit through the submarine export cable routes to reach a site, but their exact transit routes are not represented on commonly used, publicly available datasets, for reasons stated above. Commonly targeted species include black sea bass, scup, summer flounder, bluefish, tautog, striped bass, and cunner.

8.8.2.1.1 Regional Economic Overview

The economic value associated with recreational saltwater fishing is driven by angler expenditures. In 2019, there were a total of 7.4 million recreational angler trips in Massachusetts, 3.7 million recreational angler trips in Rhode Island, 3.8 million recreational angler trips in Connecticut, 13.4 million recreational angler trips in New York, and 13.4 million recreational angler trips in New Jersey (NOAA Fisheries 2021d). Based on data provided by the Fisheries Economics of the United States Report, in 2018, the estimated trip expenditures for all angler trips in was $260.9 million in Massachusetts, $58.3 million in Rhode Island, $107 million in Connecticut, $363.8 million in New York, and $467.3 million in New Jersey (NOAA Fisheries 2021e). The Fisheries Economics Report is published by NOAA and provides a comprehensive valuation of commercial and recreational fisheries and other marine-related sectors on a state, regional, and national basis (NOAA Fisheries 2021e). The Report combines a multitude of data sources from the NOAA Fisheries Statistics Division and state partners providing an extensive comprehensive approach to calculating socioeconomic valuation of the industry (NOAA Fisheries 2021e). Since the majority of recreational fishing effort occurs on shore followed by private boats, Massachusetts and Rhode Island will be the two states with the highest recreational exposure near the Lease Area (**Figure 8.8-4** and **Figure 8.8-5**). Adjacent states Connecticut, New York, and New Jersey may also have recreational fishing effort within the Project Area, especially near the submarine export cable routes (**Figure 8.8-6**, **Figure 8.8-7**, and **Figure 8.8-8**.)

FIGURE 8.8-4. RECREATIONAL SALTWATER ANGLER TRIPS IN MASSACHUSETTS SINCE 2009 (DATA FROM NOAA FISHERIES 2021B)

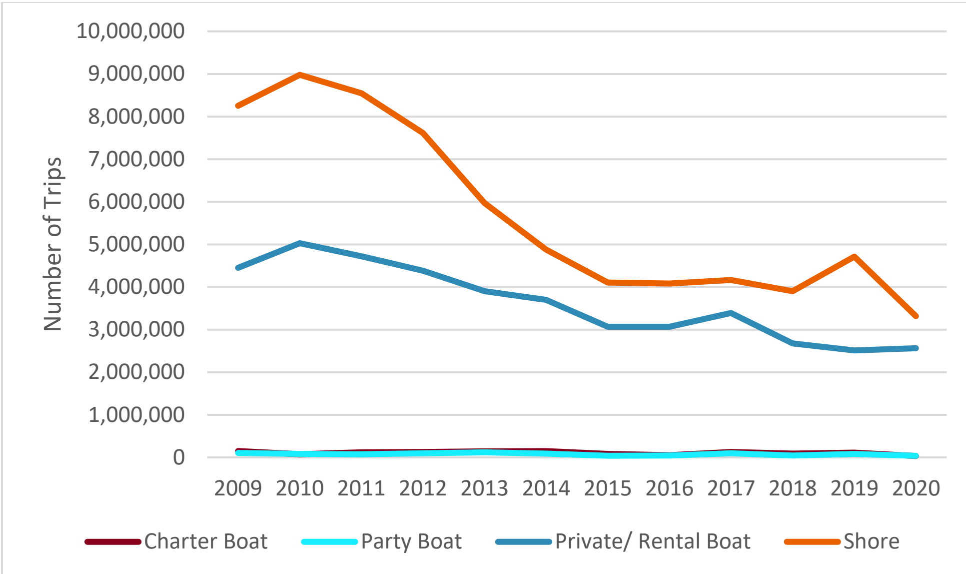


FIGURE 8.8-5. RECREATIONAL SALTWATER ANGLER TRIPS IN RHODE ISLAND SINCE 2009 (DATA FROM NOAA FISHERIES 2021B)

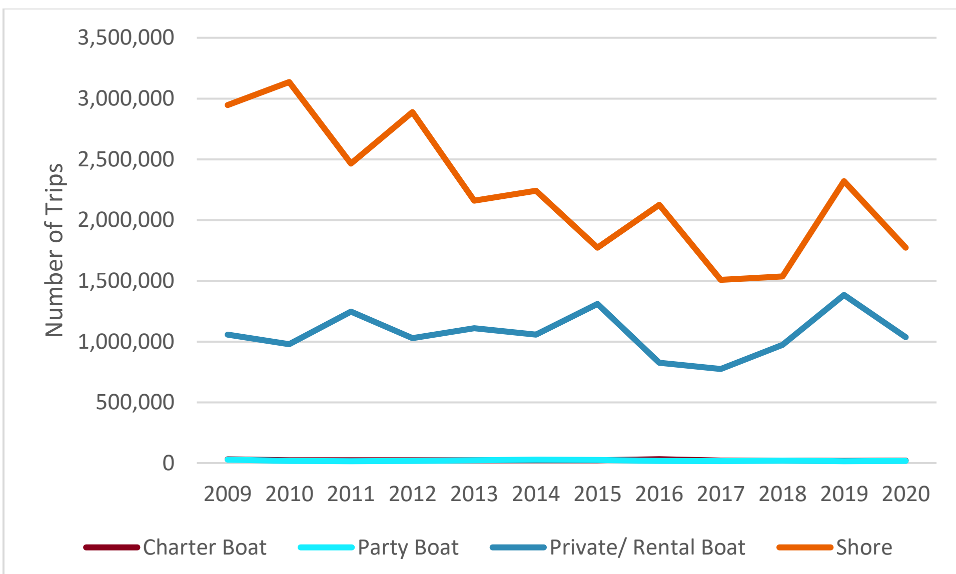


Figure 8.8-6. Recreational Saltwater Angler Trips in Connecticut since 2009 (data from NOAA Fisheries 2021b)

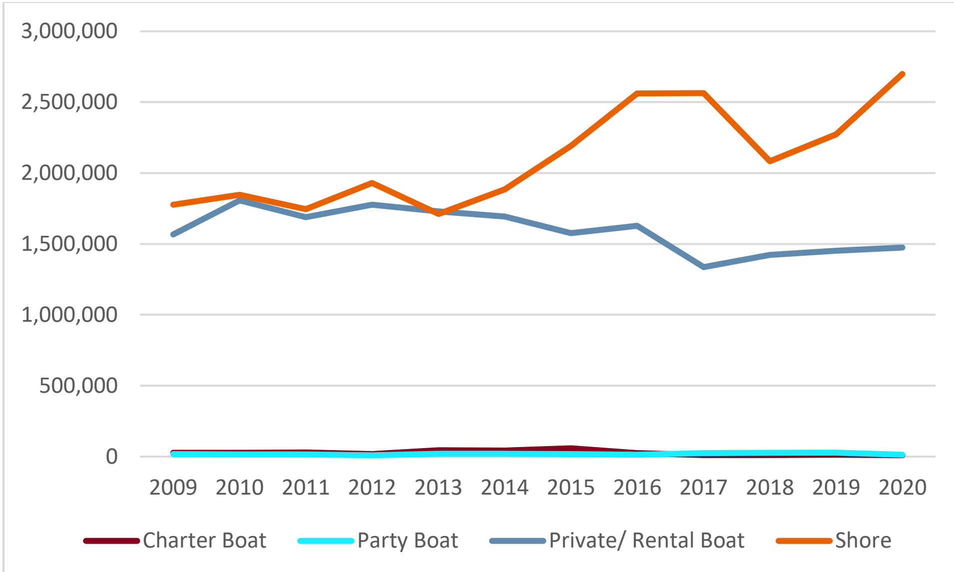


Figure 8.8-7. Recreational Saltwater Angler Trips in New York since 2009 (data from NOAA Fisheries 2021b)

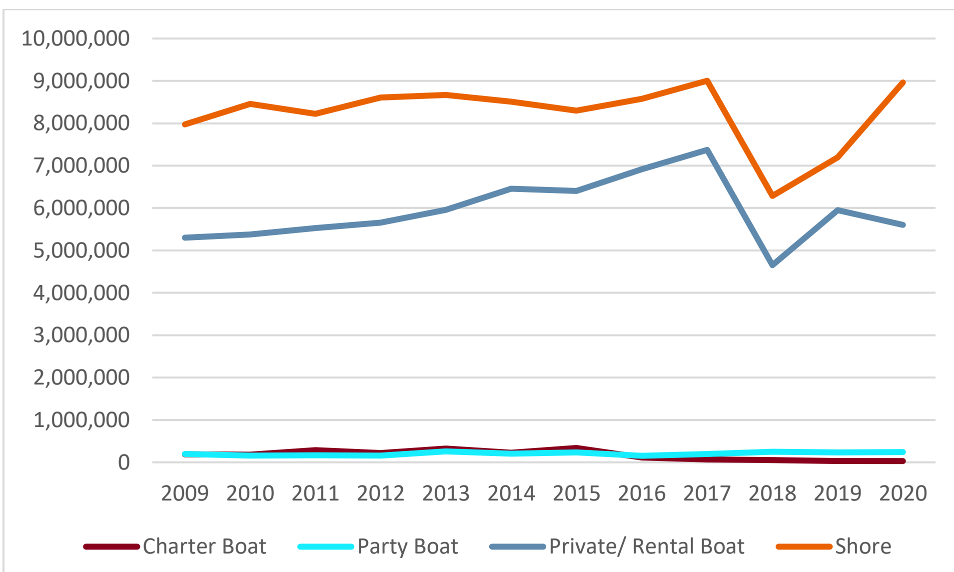
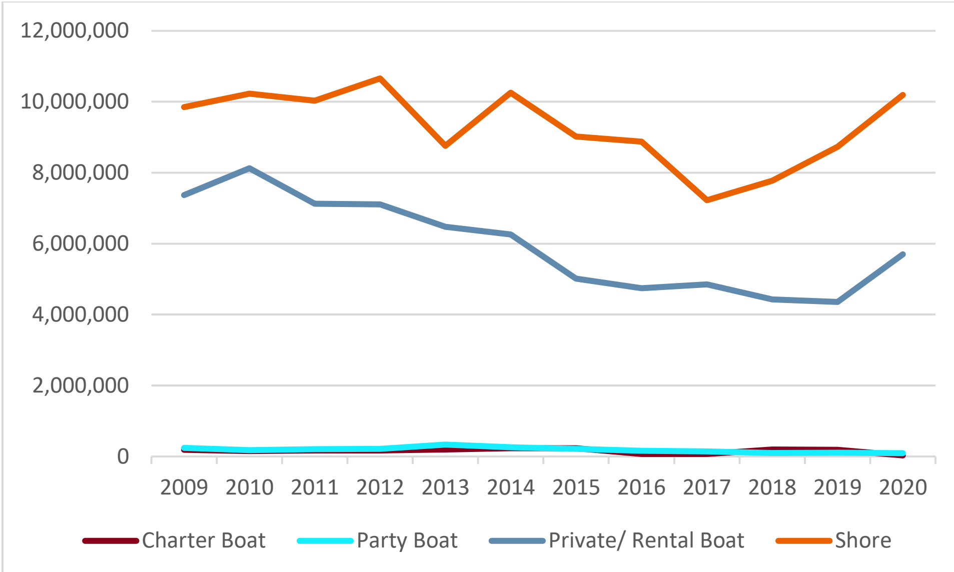


FIGURE 8.8-8. RECREATIONAL SALTWATER ANGLER TRIPS IN NEW JERSEY SINCE 2009 (DATA FROM NOAA FISHERIES 2021B)



Recreational saltwater fishermen travel from within, and outside of, New York, Connecticut, Rhode Island, Massachusetts, and New Jersey to fish. Recreational saltwater fishing in this analysis includes tournaments and individual trips on pleasure boats, charter boats, or head boats; as well as surf casting and shore fishing. The trends in recreational saltwater fishing at the North Atlantic regional level are similar to those observed at the local level in New York, Connecticut, Rhode Island, Massachusetts, and New Jersey. In 2020, recreational fishing for the North-Atlantic region primarily comprised shore-based fishing (61 percent), followed by private vessels/rentals (37 percent). Party/charter trips comprised two percent recreational saltwater fishing activities (NOAA Fisheries 2021). Recreational saltwater fishing in the region occurs year-round with the most intensity during warmer months when the seasons for many recreational finfish open for fishing activity (April/May through September/October) (MA DMF 2021b).

8.8.2.1.2 Target Species

The most highly targeted species for recreational saltwater fishing activities in the Project Area include but are not limited to Atlantic mackerel, haddock, menhaden, black sea bass, scup, and tautog as shown in **Table 8.8-3** through **Table 8.8-7**. Specifically, in Long Island Sound, anglers from vessels and shorelines of New York, Connecticut, and Rhode Island target bluefish, striped bass, black sea bass, tautog, summer flounder, winter flounder, scup, and weakfish (CTDEEP n.d.). Recreational shell fishing and crabbing also occurs (predominantly in state waters and estuaries) and commonly targets species such as scallops, quahogs, Atlantic surfclam, softshell clams (steamers), and blue crabs. See **Section 5.5 Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat** for a discussion of habitat and potential impacts for these species.

TABLE 8.8-3. RECREATIONAL SALTWATER CATCH FOR CONNECTICUT DURING 2020

Species	Total Catch
Scup	2,951,992
Tautog	1,462,244
Black Sea Bass	905,155
Striped Bass	830,451
Bluefish	594,552
Summer Flounder	387,745
Striped Searobin	60,687
Atlantic Menhaden	42,521
Northern Kingfish	32,194
Spanish Mackerel	10,820
All other species	25,400
Total	**7,303,761**

Source: NOAA Fisheries 2021b

TABLE 8.8-4. RECREATIONAL SALTWATER CATCH FOR MASSACHUSETTS DURING 2020

Species	Total Catch
Atlantic Mackerel	1,945453
Haddock	1,579,236
Black Sea Bass	1,538,008
Scup	1,174,805
Striped Bass	776,125
Tautog	692,596
Bluefin Tuna	641,147
Bluefish	553,248
Atlantic Menhaden	527,580
Pollock	330,720
All other species	880,120
Total	**10,639,038**

Source: NOAA Fisheries 2021b

TABLE 8.8-5. RECREATIONAL SALTWATER CATCH FOR NEW JERSEY DURING 2020

Species	Total Catch
Striped Bass	6,584,450
Yellowfin Tuna	6,319,397
Summer Flounder	5,491,742
Bluefish	1,808,568,
Scup	1,200,954
Black Sea Bass	1,147,613
Bluefin Tuna	1,116,717
Tautog	1,010,022
Albacore Tuna	704,638
Gray Triggerfish	599,947
All other species	3,441,908
Total	**27,617,388**

Source: NOAA Fisheries 2021b

TABLE 8.8-6. RECREATIONAL SALTWATER CATCH FOR NEW YORK DURING 2020

Species	Total Catch
Scup	6,253,547
Black Sea Bass	2,808,755
Summer Flounder	2,389,716
Striped Bass	2,201,913
Yellowfin Tuna	2,045,836
Tautog	1,734,014
Bluefish	1,478,736
Atlantic Menhaden	1,184,551
Bluefin Tuna	1,177,490
Shortfin Mako Shark	1,117,665
All other species	3,711,459
Total	**26,103,682**

Source: NOAA Fisheries 2021b

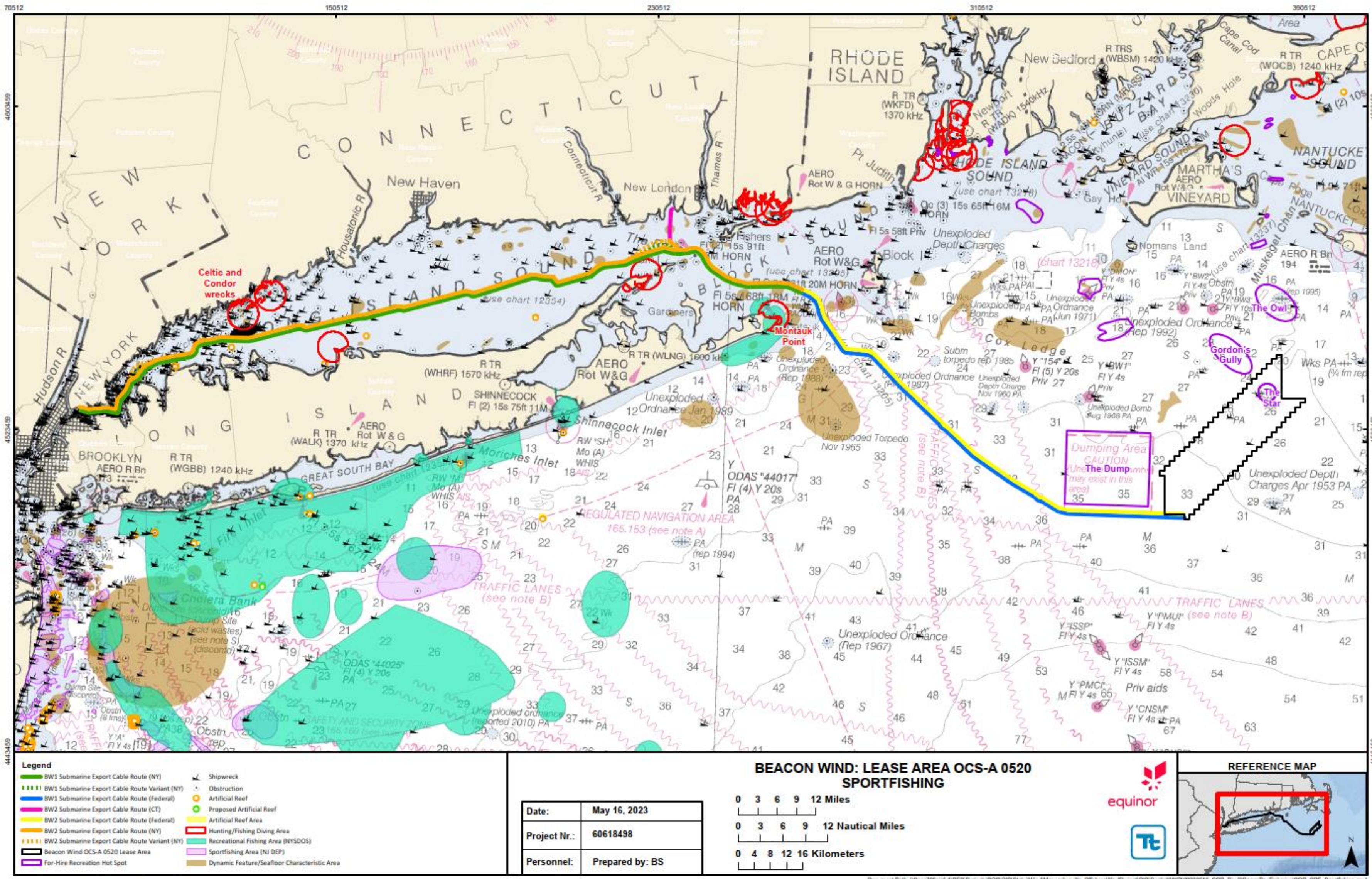
TABLE 8.8-7. RECREATIONAL SALTWATER CATCH FOR RHODE ISLAND DURING 2020

Species	Total Catch
Black Sea Bass	1,480,798
Scup	1,330,414
Tautog	853,478
Bluefish	508,232
Striped Bass	482,722
Summer Flounder	479,596
Little Tunny Tuna	134,727
Bluefin Tuna	96,375
Mackerel Chub	69,338
Striped Searobin	67,589
All other species	181,506
Total	**5,684,775**

Source: NOAA Fisheries 2021b

Massachusetts and Rhode Island host many annual saltwater fishing tournaments that target a variety of species, including striped bass, bluefish, shark, fluke, black sea bass, and tautog (On the Water 2021). **Figure 8.8-9** shows coastal features in the proximity of the Project Area, including sportfishing areas, shipwrecks, artificial reefs, diving areas, recreational fishing areas, and others. There is one documented recreational fishing hot-spot within the Lease Area and at least three charted shipwrecks. There are various coastal features along the submarine export cable routes, including shipwrecks, one diving area, and other features where recreational fishing activity is concentrated (**Figure 8.8-9**). While none of these areas are located within the Project Area, fishermen targeting these areas for sportfishing may transit through or fish within the Project Area.

FIGURE 8.8-9. OFFSHORE AND COASTAL FEATURES ASSOCIATED WITH RECREATIONAL FISHING



Data Sources: BOEM, ESRI, NJ DEP, NOAA, NYSDOS
Service Layer Credits: NOAA RNC 13003

8.8.2.1.3 Fishing Techniques

Most saltwater recreational fishing involves the use of hook and line (rod and reel), either from a boat, or from a shoreline access point (beach, jetty, pier, bulkhead, etc.). Recreational hook and line techniques generally fall into the following categories:

- Bait fishing – live or cut bait set at a specific depth, on the seafloor or adrift, using a combination of terminal tackle (hooks, weights, spoons, swivels, leaders, etc.).
- Bottom jigging – weighted lure set on/near the seafloor; often used to target groundfish and flounder species.
- Casting lures – topwater (floating), metal (sinking), or diving lures with “action” designed to mimic baitfish, for targeting pelagic species.
- Fly fishing – similar to casting lures, but smaller and lighter lures (flies) used with a fly rod and fly line.
- Trolling – use of either gunnel-mounted rod holders, a downrigger, or outriggers to set a lure or bait at a particular depth or location, while fishing from a boat moving at slow speeds (3 to 8 knots [5 to 15 km/hr]). This setup is designed such that the line releases from the downrigger/outrigger upon strike, so that the line can be reeled in by rod/reel.
- Spearfishing – use of a spear, harpoon, or other missile while completely submerged in the marine waters of the state for any species, generally excluding lobster.
- Shellfishing – use of crab pots for blue crab, or hand digging tools for “clamming” (hard and soft clams, oysters, surf clams, bay scallops and mussels).

8.8.2.2 Commercial Fishing

Massachusetts/Rhode Island commercial fisheries include groundfish, pelagic species, and a variety of macroinvertebrates including lobster and scallop. These stocks attract commercial and recreational fishermen from New York, Connecticut, New Jersey, and other locations.

Commercial fishermen from New York, Connecticut, Rhode Island, Massachusetts, New Jersey, and other locations fish in or transit the grounds in and around the Project Area while targeting several different fisheries. Commercial fishing transits are not concentrated in the Lease Area, as shown in **Figure 8.8-3**. Insight on commercial fishing activities within the Project Area was obtained from AIS, VMS, VTR, landings data, and outreach activities. Targeted species include; groundfish, pelagic species, and a variety of macroinvertebrates including lobster and conch (knobbed/channeled whelk are locally referred to as conch). Within the submarine export cable routes, commercial fishing is concentrated near the south fork of Long Island and near Block Island. While the VMS, VTR, and landings data cover some portions of Long Island Sound, additional insight for these New York and Connecticut State Waters is also included, obtained by CTDEEP, NYSDEC, and outreach activities. Targeted species within Long Island Sound include; bay scallop, eastern oyster, northern quahog, softshell clam, surfclam, lobster, longfin squid, horseshoe crab, and conch.

8.8.2.2.1 Regional Economic Overview

Commercial and recreational fishing are important to the economies of the states immediately surrounding the Project Area. In 2020, three of the top-twenty U.S. fishing ports (by weight and by dollar value landed) were located within a 124 mi (200 km) radius of the Lease Area (New Bedford, Massachusetts; Gloucester, Massachusetts; and Point Judith, Rhode Island), with other important fishing ports located in New York, Rhode Island, Massachusetts, and New Jersey. The top regional ports by landing value and weight are provided in **Table 8.8-8**. Note that as these ports are located in the greater North Atlantic region; these landings also reflect catches from outside of the Project Area.

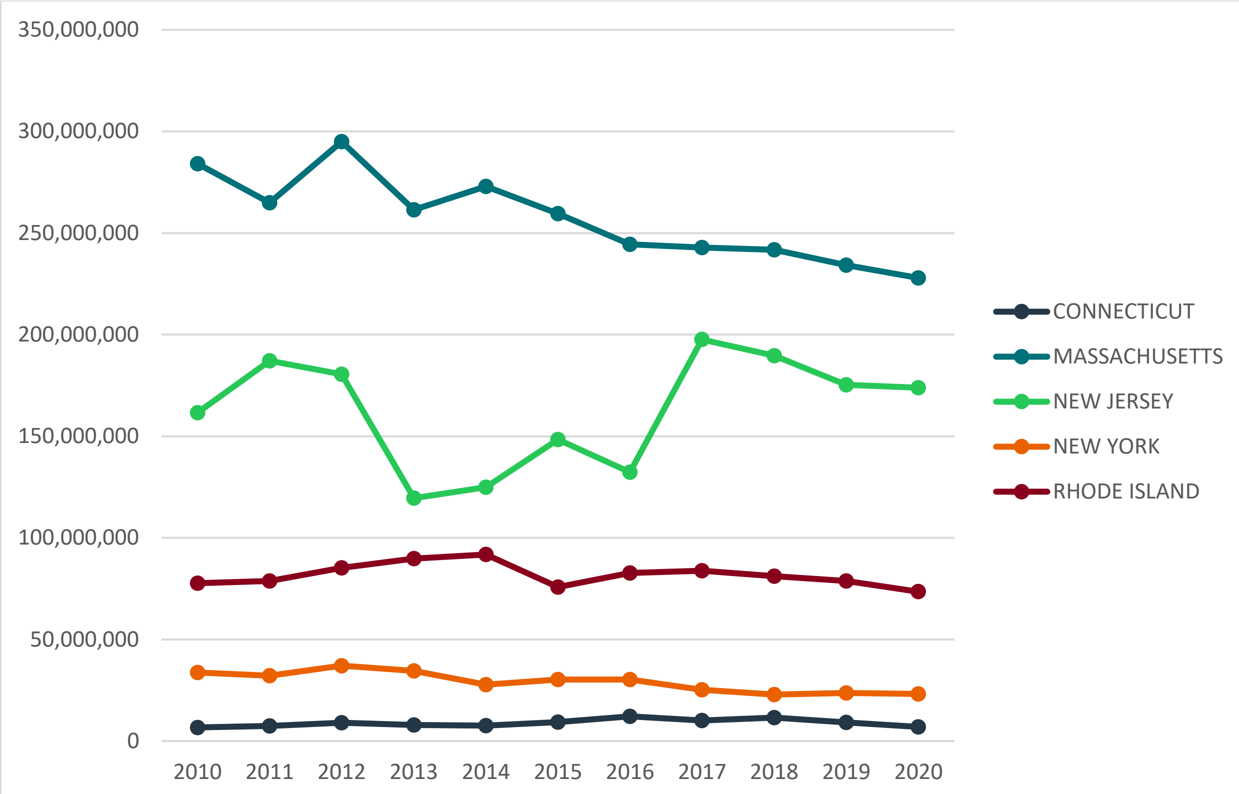
TABLE 8.8-8. TOP REGIONAL FISHING PORTS IN 2020 (NY, RI, MA, CT, NJ) BY TOTAL LANDING VALUE AND WEIGHT; CATCHES FROM ALL WATERS

Top Regional Ports by Landing Weight			Top Regional Ports by Landing Value		
U.S. Rank	Port	Pounds (millions)	U.S. Rank	Port	$ (millions)
11	New Bedford, MA	115.4	1	New Bedford, MA	376.6
14	Cape May-Wildwood, NJ	103.7	6	Cape May-Wildwood, NJ	92.8
16	Gloucester, MA	48.8	16	Gloucester, MA	50.1
17	Point Judith, RI	42.6	18	Point Judith, RI	46.7
19	Point Pleasant, NJ	35.3	25	Point Pleasant, NJ	35.7
27	Provincetown-Chatham, MA	21.0	33	Provincetown-Chatham, MA	25.1
31	North Kingston, RI	19.6	35	Long Beach-Barnegat, NJ	21.7
33	Atlantic, City, NJ	17.5	49	Boston, MA	16.5
36	Boston, MA	16.7	56	Montauk, NY	14.7
53	Montauk, NY	10.0	57	North Kingstown, RI	14.4
72	Long Beach-Barnegat, NJ	5.6	66	Atlantic City, NJ	12.4
74	Newport, RI	5.2	92	Newport, RI	7.0
77	Little Compton, RI	4.7	103	Fairhaven, MA	5.0
85	Hampton Bay-Shinnecock, NY	3.6	104	Hampton Bay-Shinnecock, NY	4.3
90	Fairhaven, MA	3.1	108	Little Compton, RI	2.8
93	Belford, NJ	2.8	112	Belford, NJ	1.5

Source: NOAA Fisheries 2020

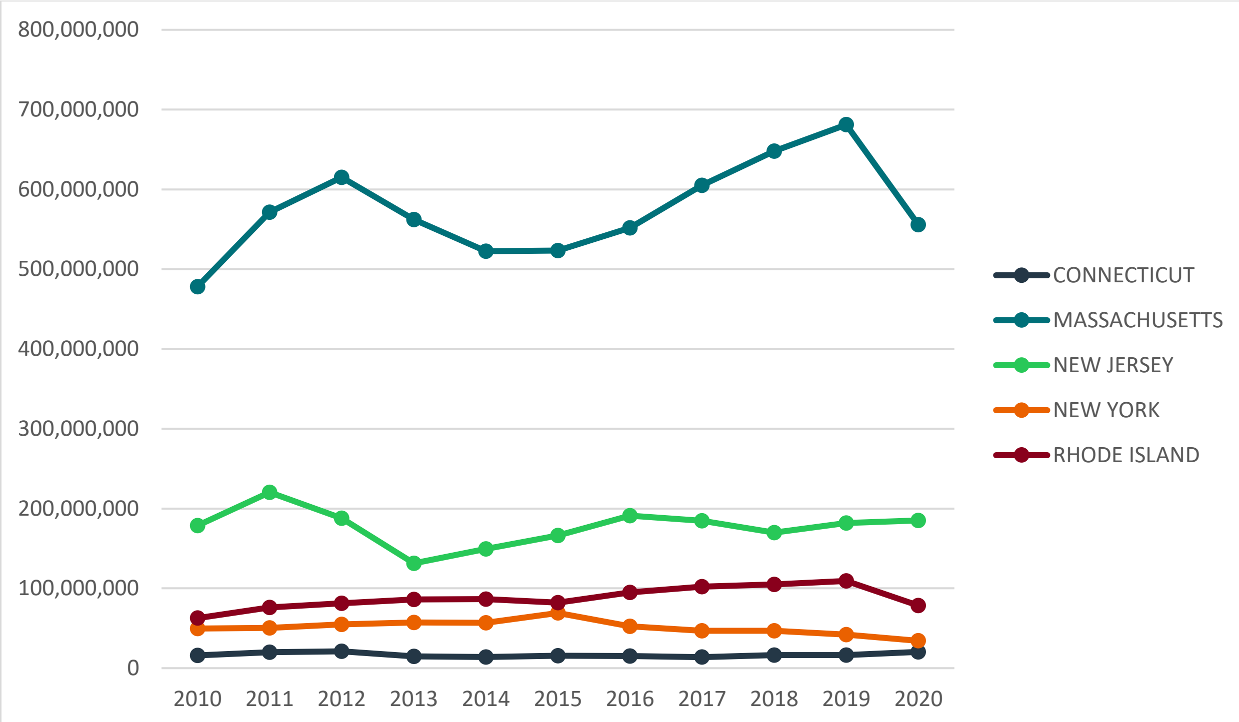
NOAA Fisheries data from 2008 to 2020 (NOAA Fisheries 2021c) reported total landings for New York, Connecticut, Rhode Island, Massachusetts, and New Jersey as shown in **Figure 8.8-10** (pounds) and **Figure 8.8-11** (value). For this same time period (2008 to 2020), the top commercial fish species by weight are listed in **Table 8.8-9**, which included sea scallop and haddock in Massachusetts; Ilex squid and Loligo squid in Rhode Island; scallop and scup in Connecticut; ilex squid and Loligo squid in New Jersey, and scup and menhadens in New York. The predominant species based on landings value during the same period (also listed in **Table 8.8-9**) was dominated by sea scallop and American lobster in Massachusetts; sea scallop and Loligo squid and sea scallops in Rhode Island; sea scallop and Loligo squid in Connecticut; quahog clam and scup in New York; and sea scallop and Loligo squid in New Jersey.

FIGURE 8.8-10. TOTAL POUNDS LANDED FROM ALL WATERS BY STATE FOR ALL COMMERCIAL SPECIES, 2010 TO 2020



Source: NOAA Fisheries 2021c

FIGURE 8.8-11. TOTAL DOLLAR VALUE FROM ALL WATERS BY STATE FOR ALL COMMERCIAL SPECIES, 2010 TO 2020



Source: NOAA Fisheries 2021c

8.8.2.2.2 Regional Target Species

The top ten species by weight and by value on a regional basis (not specific to the Project Area) for New York, Connecticut, Rhode Island, Massachusetts, and New Jersey for the most recent year available are listed in **Table 8.8-9**.

TABLE 8.8-9. TOP COMMERCIAL FISH SPECIES IN NEW YORK, CONNECTICUT, RHODE ISLAND, MASSACHUSETTS, AND NEW JERSEY. RANKED BY WEIGHT AND BY VALUE FOR 2020

Rank	Species	Weight (lbs.)	Species	Value ($)
New York				
1	Scup	4,819,805	Northern Quahog Clam	5,133,930
2	Menhadens a/	4,400,250	Scup	4,015,555
3	Longfin Loligo Squid	2,736,284	Longfin Loligo Squid	3,615,329
4	Silver Hake	1,708,083	Golden Tilefish	3,605,367
5	Northern Quahog Clam	1,109,115	Eastern Oyster	3,197,868
6	Goosefish	1,018,808	Summer Flounder	2,965,412
7	Winter Skate	1,012,035	Silver Hake	1,682,909
8	Golden Tilefish	996,388	Sea Scallop	1,277,198
9	Summer Flounder	870,946	Black Sea Bass	1,134,520

Rank	Species	Weight (lbs.)	Species	Value ($)
10	Black Sea Bass	415,017	Tautog	800,110
Connecticut				
1	Sea Scallop	1,350,628	Sea Scallop	13,825,469
2	Scup	990,091	Longfin Loligo squid	1,238,674
3	Longfin Loligo Squid	938,434	Summer Flounder	1,114,283
4	Winter Skate	629,201	American Lobster	826,413
5	Silver Hake	466,445	Scup	770,406
6	Little Skate	419,800	Conchs a/	463,391
7	Rajidae (Family) Skates a/	398,488	Silver Hake	393,490
8	Summer Flounder	370,467	Black Sea Bass	229,805
9	Menhadens a/	217,110	Rajidae (Family) Skates a/	207,077
10	Conchs a/	183,913	Channeled Whelk	193,546
Rhode Island				
1	Squid, Shortfin Illex	21,772,706	Squid, Longfin Loligo	13,640,903
2	Squid, Longfin Loligo	11,692,093	Scallop, Sea	11,338,643
3	Skate, Winter	5,200,678	Squid, Shortfin Illex	11,203,586
4	Hake, Silver	4,727,092	Lobster, American	9,533,594
5	Skate, Little	4,604,097	Flounder, Summer	4,704,102
6	Butterfish	4,570,943	Clam, Quahog, Northern	3,392,338
7	Scup	4,290,954	Butterfish	3,032,576
8	Crab, Jonah	3,319,652	Oyster, Eastern	2,992,046
9	Mackerel, Atlantic	2,582,554	Hake, Silver	2,894,879
10	Goosefish	2,072,591	Crab, Jonah	2,763,949
Massachusetts				
1	Sea Scallop	31,689,735	Sea Scallop	313,956,986
2	Haddock	21,876,728	American lobster	78,308,712
3	Shortfin Illex Squid	19,123,638	Haddock	21,736,453
4	American lobster	15,711,498	Eastern Oyster	17,740,839
5	Winter skate	13,656,580	Atlantic Surf Clam	14,045,033
6	Acadian Redfish	12,882,574	Acadian Redfish	7,058,214
7	Goosefish	12,273,549	Soft Clam	7,044,591
8	Atlantic Surf Clam	12,077,683	Jonah Crab	6,997,154
9	Ocean Quahog Clam	9,677,721	Ocean Quahog Clam	6,959,044
10	Menhadens a/	8,821,142	Shortfin Illex Squid	6,721,935
New Jersey				
1	Shortfin Ilex Squid	21,772,706	Longfin Loligo Squid	13,640,904
2	Longfin Loligo Squid	11,692,093	Sea Scallop	11,338,643
3	Winter Skate	5,200,678	Shortfin Illex Squid	11,203,586
4	Silver Hake	4,727,092	American Lobster	9,535,694
5	Little Skate	4,604,097	Summer Flounder	4,704,102

Rank	Species	Weight (lbs.)	Species	Value ($)
6	Butterfish	4,570,943	Northern Quahog Clam	3,392,338
7	Scup	4,290,954	Butterfish	3,032,576
8	Jonah Crab	3,319,652	Eastern Oyster	3,004,871
9	Atlantic Mackerel	2,582,554	Silver Hake	2,894,879
10	Goosefish	2,072,591	Jonah Crab	2,763,949

Note:
a/ These names represent aggregations of more than one species. They are not inclusive, but rather represent landings where we do not have species-specific data. Selecting "Flatfish," for example, will not return all flatfish but only those where we do not have more specific information.
Source: NOAA Fisheries 2021c

8.8.2.2.3 Lease Area Exposure

While the data presented in the Regional Economic Overview section is important to establish overall trends in landings data, "exposure" is defined as the potential for an impact from wind energy development on a particular port, FMP, or gear type based on VTR landings data (Kirkpatrick et al. 2017). In this context, *exposure* describes "the individuals and groups likely to be affected by WEA development," while *impacts* describe "the magnitude and direction (gain or loss) of the WEA's impact on those potentially affected individuals and groups" (Kirkpatrick et al. 2017). Since the Kirkpatrick et al. (2017) report, WEAs have been further broken-out by BOEM into individual lease areas, and leased out for development, in many cases. Exposure viewed as a percentage of landings can be assessed as the percentage of the total catch for a given port, gear type, or FMP that can be attributed to a particular lease area. For example, a hypothetical FMP with an exposure of one percent would represent a relatively small fractional proportion of landings from the entire U.S. under that FMP that can be attributed to that lease area, with presumably low impacts to that FMP. By contrast an FMP with an exposure of 90 percent would be a substantial proportion of landings for that FMP can be attributed to that lease area, with presumably high impacts to that FMP.

Fish caught within the Beacon Wind Lease Area may be landed in any number of ports within the region, depending on a variety of market conditions. The Kirkpatrick (2017) study established this approach at the Wind Energy Area (WEA) level and in 2021, NOAA Fisheries used this same approach for evaluating exposure within individual lease areas, including Beacon Wind (NOAA Fisheries 2021a). The total landings and values, attributed to catches within the Lease Area during a 12 year period between 2008 to 2019 are shown by port (**Table 8.8-10**), by gear type (**Table 8.8-11**), and by FMP (**Table 8.8-12**). While recognizing that landings fluctuate on an interannual basis, these data show relatively low exposure of most ports, gear types, and FMPs to the Lease Area. Small ports with small average annual landings (i.e., Menemsha, Massachusetts; Harwichport, Massachusetts; Little Compton, Rhode Island, etc.) exhibited exposures between 1.05 to 4.43 percent, while most of the ports had less than 1.00 percent of their average annual percentage of landings attributed to the Lease Area. Various gear types are fished in different areas of the ocean. Midwater trawl, lobster pot, and gillnet exhibited average annual exposures between 0.27 to 0.52 percent, with the remaining gear types at 0.20 percent or less of their average annual percentage of landings attributed to the Lease Area, with scallop dredges and clam dredges notably low. Similarly, for FMPs, those species are targeted within a variety of regions, habitats, and other factors that vary between fishermen, and vessel types. Small-Mesh Multispecies and Jonah Crab were the only FMPs with average annual exposures greater than 0.50 percent, with all other FMPs below 0.35 percent of their average annual percentage of landings attributed to the Lease Area.

TABLE 8.8-10. TOP EXPOSED FISHING PORTS TO THE BEACON WIND LEASE AREA, BASED ON AVERAGE ANNUAL PERCENTAGE OF LANDINGS BY PORT, 2008 TO 2019

Port	Minimum Annual Landings (lbs.)	Maximum Annual Landings (lbs.)	Average Annual Landings (lbs.)	Average Annual Value	Average Annual Percentage of Landings (Exposure) a/
Menemsha, MA	5,671	5,671	5,671	$2,566.00	4.43%
Harwichport, MA	14,379	16,223	15,301	$13,946.00	3.14%
Little Compton, RI	671	64,533	23,846	$20,620.64	1.35%
Fairhaven, MA	9,746	52,022	35,296	$29,245.25	1.06%
Westport, MA	2,088	18,764	8,737	$10,261.17	1.05%
Tiverton, RI	768	30,266	10,421	$2,864.50	0.82%
Montauk, NY	14,149	171,831	58,145	$59,263	0.53%
Wanchese, NC	48	8,763	2,558	$6,130	0.52%
Point Judith, RI	133,208	433,007	208,655	$177,634	0.51%
Fall River, MA	5,862	28,022	14,538	$3,874	0.44%
Newport, RI	12,252	40,271	20,960	$18,468	0.36%
Beaufort, NC	1,627	12,337	4,243	$11,962	0.30%
Hyannis, MA	3,422	3,422	3,422	$5,077	0.22%
Chatham, MA	5,248	50,733	18,507	$17,968	0.20%
Chilmark, MA	104	318	239	$645	0.19%
Woods Hole, MA	343	343	343	$310	0.15%
Barnstable, MA	228	5,167	2,253	$2,161	0.14%
New Bedford, MA	55,414	594,168	163,473	$111,667	0.14%
Hampton Bay, NY	186	4,515	1,813	$2,306	0.09%
Hampton, NH	1,038	8,998	2,853	$5,563	0.08%
Newport News, VA	41	5,911	2,030	$3,817	0.06%
North Kingstown, RI	15,272	15,272	15,272	$5,876	0.06%
Boston, MA	513	13,103	4,930	$4,846	0.05%
Gloucester, MA	105	118,863	27,024	$3,690	0.04%
Shinnecock, NY	92	2,715	926	$1,158	0.03%
Chincoteague, VA	728	728	728	$1,293	0.03%
Barnegat, NJ	1,193	1,193	1,193	$8,009	0.02%
Point Pleasant, NJ	216	7,008	2,532	$4,108	0.01%
Cape May, NJ	336	3,318	1,827	$14,437	< 0.01%
All Others	15,320	112,275	55,423	$40,194	--

Note:
a/ Exposure is measured by the average percentage of landings by port attributed to the Lease Area
Source: NOAA Fisheries 2021a

TABLE 8.8-11. TOP EXPOSED FISHING GEAR TYPES TO THE BEACON WIND LEASE AREA, BASED ON AVERAGE PERCENTAGE OF LANDINGS BY GEAR TYPE, 2008 TO 2019

Gear Type	Minimum Annual Landings (lbs.)	Maximum Annual Landings (lbs.)	Average Annual Landings (lbs.)	Average Annual Value	Average Annual Percentage of Landings (Exposure[1])
Midwater Trawl	594,414	594,414	594,414	$42,888	0.52%
Lobster Pot	54,366	148,729	86,063	$88,753	0.27%
Sink Gillnet	38,139	148,902	83,366	$68,211	0.27%
Bottom Trawl	201,029	633,208	335,749	$279,143	0.20%
Bottom Longline	300	15,022	3,254	$10,391	0.07%
Other Pots	7	5,894	1,772	$1,414	0.07%
Clam Dredge	8,005	15,613	10,458	$8,118	0.01%
Scallop Dredge	300	3,290	1,804	$17,165	< 0.01%
All Others	5,863	136,349	39,648	$29,011	--

Note:
a/ Exposure is measured by the average percentage of landings by gear type attributed to the Lease Area
Source: NOAA Fisheries 2021a

TABLE 8.8-12. TOP EXPOSED FMPS TO THE BEACON WIND LEASE AREA, BASED ON AVERAGE PERCENTAGE OF LANDINGS BY FMP, 2008 TO 2019

Fishery Management Plan (FMP)	Minimum Annual Landings (lbs.)	Maximum Annual Landings (lbs.)	Average Annual Landings (lbs.)	Average Annual Value	Average Annual Percentage of Landings (Exposure) a/
Small-Mesh Multispecies	3	233,969	49,901	$27,244	0.87%
Jonah Crab	46,028	145,700	75,480	$58,758	0.63%
Monkfish	18,303	68,344	32,893	$46,316	0.34%
Skates	18,375	130,042	61,532	$27,424	0.28%
Mackerel, Squid, and Butterfish	121	302,240	29,093	$31,500	0.23%
Golden and Blueline Tilefish	1	29,737	2,955	$11,228	0.21%
Summer Flounder, Scup, Black Sea Bass	75	149,204	21,602	$24,361	0.20%
No Federal FMP	1	27,348	643	$411	0.14%
Bluefish	828	4,089	1,785	$1,246	0.11%
Spiny Dogfish	767	19,759	8,160	$1,756	0.06%
Atlantic Herring	87	629,308	96,018	$9,029	0.06%
American Lobster	1,187	14,314	6,743	$28,302	0.04%
Northeast Multispecies	1	8,392	404	$631	0.02%

Fishery Management Plan (FMP)	Minimum Annual Landings (lbs.)	Maximum Annual Landings (lbs.)	Average Annual Landings (lbs.)	Average Annual Value	Average Annual Percentage of Landings (Exposure) a/
Sea Scallop	334	3,772	1,838	$16,847	0.01%
(blank)	2,200	63,898	19,023	$12,709	--

Note:
a/ Exposure is measured by the average percentage of landings by FMP attributed to the Lease Area
Source: NOAA Fisheries 2021a

8.8.2.2.4 Fishing Techniques

Commercial fishing activity has both seasonal and interannual variation based on individual fishing preferences, vessel types, target species, regulatory restrictions, market demands, and weather. Fishing activity also varies in location and intensity throughout the year as fishermen follow target species along seasonal migration routes and adhere to regulatory closures.

Commercial fishing occurring within the Project Area can generally be categorized as either mobile or fixed-gear fishing. Mobile commercial fishing gear utilized in the Project Area includes bottom trawls, midwater trawls, scallop dredges, and clam dredges. The most commonly deployed fixed fishing gear types within the Project Area include lobster pots, other pots, longlines, and clam dredges (**Table 8.8-11**). The data sources described in **Section 8.8.1** and discussions with the fishing industry have helped identify the extent of fishing activity and the various gear types used in the Project Area, including trawls, dredges, traps, and gillnets, as described within this section.

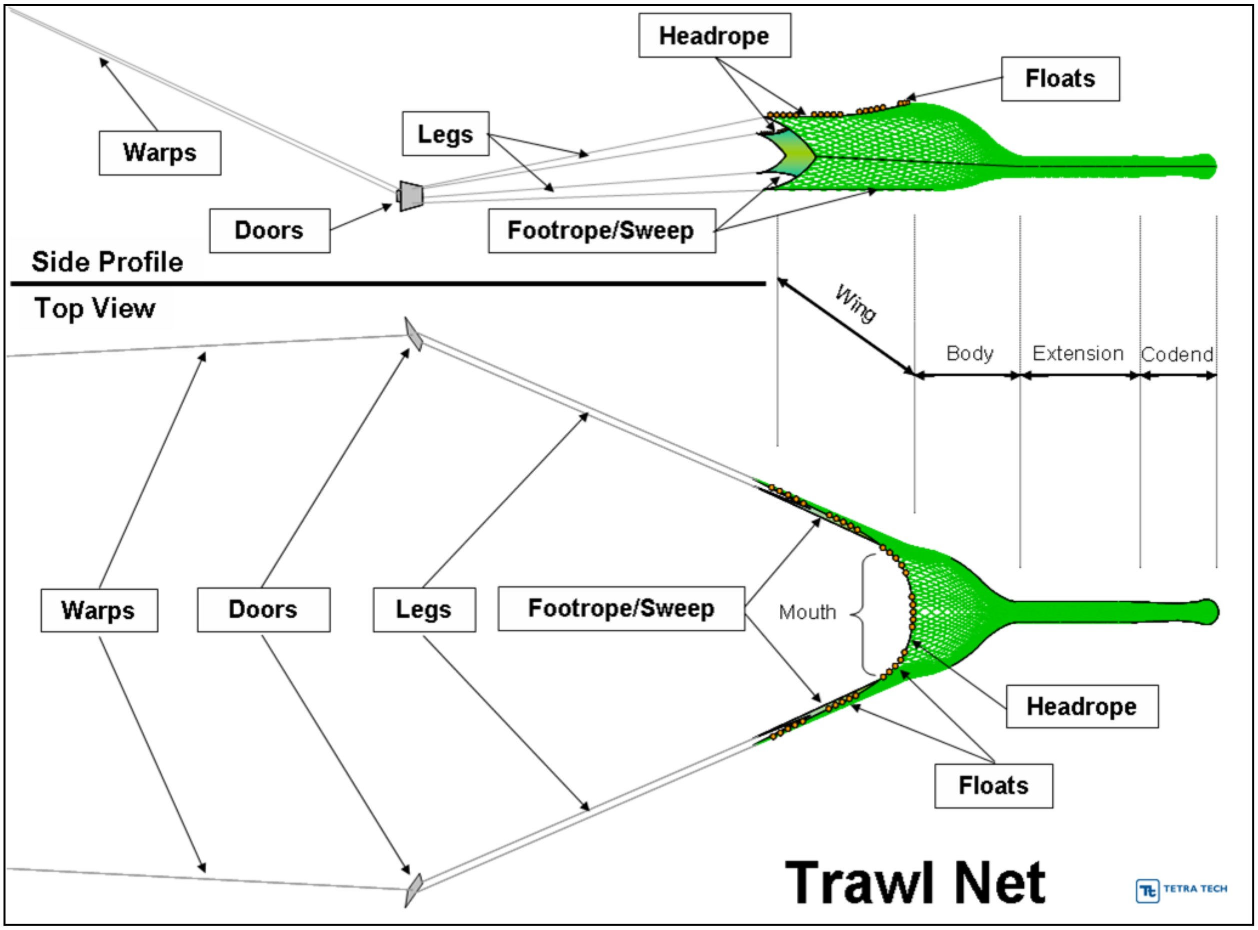
Each species-specific subsection below includes a description of the main fishing methods employed, spatial and temporal occurrence in the Project Area, and a summary of feedback from commercial and recreational fishermen related to these species. Additional detail regarding engagement with the fishing industry is provided in **Appendix B Summary of External Engagement Activities**. Fisheries data will continue to be carefully evaluated for quality and completeness, and discussions with fisheries stakeholders will continue for the life of the Project.

8.8.2.2.4.1 Otter Trawling – Multispecies, Squid, and Other Benthic/Pelagic Species

Methodology

Otter trawling is the act of towing a net along the seabed with trawl doors (i.e., otter boards) using hydrodynamic forces to open the net horizontally and a buoyant head rope and weighted foot rope (sweep) designed to hold the net open vertically (**Figure 8.8-12**). Gear is designed specifically to capture the target species for each trawl fishery (i.e., various mesh sizes, often different within various panels of the same net; different panel configurations; various sizes and designs; and varied doors and door spreads). Modern trawling operations may employ sensors to monitor that the gear is properly deployed and fishing effectively as it is towed.

FIGURE 8.8-12. TYPICAL OTTER TRAWL NET DIAGRAM



In general, squid trawling methods used in the Project Area conform to the otter trawling methods described above. Squid trawling uses a wide trawl door spread to create a herding effect to capture this mobile target. The distance between doors represents the widest spread of the gear while towing. During outreach, squid captains using typical trawls reported door spreads of 40-54 fathoms (73-99 m). Due to the generally small and flexible anatomy of local shortfin and longfin squid, squid trawling requires smaller mesh sizes. Technological advancements used in the squid trawl fishery include separator trawls (a trawl net with a horizontal panel of mesh dividing the net vertically into upper and lower), which allow fish to escape towards the bottom and squid to be captured on the top. Similarly, trawls with raised footropes can allow fish to escape a small-mesh squid net while fishermen remain effective in capturing the target species.

Midwater trawls are another type of otter trawl method that primarily targets pelagic species, mainly herring and mackerel, towing a large net through the water column with little or no seabed contact. Nets vary in length, mesh size, and material depending on size of the vessel and target species. The vessels and gear in this fishery are generally larger than those in bottom trawling. They typically tow at speeds of 3-4 knots (5.6-7.4 km/hr). Midwater trawl vessels may also engage in paired trawling, where two boats tow a single net through the water column. As one boat tows each side of the trawl, the net is held open by the vessels' distance apart. Trawl doors are not typically used, therefore reducing drag and increasing efficiency. Paired trawlers are sometimes utilized in midwater trawling; typically large vessels for the high-volume fisheries and can be 200 ft (61 m) in length. Nets can vary in width between 200-400 ft (61-121 m). Vessels generally fish in depths of 11-60 fathoms (20-110 m). These vessels usually tow at 3-4 knots (5. 6-7. 4 km/hr). No VMS maps of midwater trawling fishing activity are available because this method of fishing overlaps fish species targeted under several different fishery management plans and is not reported as “midwater trawling” in the VMS data available on the NROC and MARCO databases.

Size and Configuration

Dimensions of vessels and gear vary according to the captain’s preference, target species, fishing conditions and other factors. Additionally, it is understood that weather, visibility, currents, congestion, seabed obstacles and other factors may influence a captain’s decision of whether to fish in a developed lease area. The dimensions of typical squid trawl size and configuration are shown in **Table 8.8-13**.

A working squid trawler towing gear has a much larger footprint than a scallop or clam dredger (described below). Tow speeds generally range around 3 knots (5.6 km/hr). Turns can be made with the gear on the seabed, or partially or fully hauled back. During a turn, the trawl generally catches less efficiently than when towing straight as the net’s geometry is impacted by the irregular forces on the two trawl warps, ground gear, and trawl doors. Moreover, trawler turns take time. With competitive fishing often regulated, in part, by time at sea, it is reported that an increasing number of vessels are likely to haul the gear and turn sharply, rather than turn more slowly with the gear on the seabed. This also helps the boat to stay on or near a previous tow track to repeat a productive tow, or stay on a steep edge, near hard bottom banks or other features such as a specific depth contour. As previously discussed, fishing data and feedback indicates squid trawling will mainly follow bathymetric contours; however due to the highly mobile nature of the squid species, trawl direction may vary for a number of reasons.

TABLE 8.8-13. TYPICAL SQUID TRAWL SIZE AND CONFIGURATION

Parameter	Value
Vessel length	87 ft (26.5 m)
Towing wire ratio	5.43:1
Typical wire out	125 fathoms (228.6 m)
Ground cables and legs	80 fathoms (146.3 m)
Door Spread	55 fathoms (100.5 m) (fishermen’s responses ranged from 40-54 fathoms)
Net length	240 ft (73.2 m)
Total (bow to cod end)	1,562 ft (476 m)

Occurrence in the Project Area

The otter trawl ground fishery (mobile gear) in and around the Project Area targets a variety of species, including but not limited to butterfish, squid, yellowtail flounder, scup, summer flounder, silver hake, monkfish, and winter flounder. Otter trawling is used to catch a variety of species under many different regulatory regimes and management tools, with target species overlapping with other fishing methods (gillnets are also used to capture some of the same species). Also, annual periods for various regulations do not always start at the beginning of a calendar quarter on January 1. Instead, each annual period for fisheries management coincides with the most appropriate starting point for an individual species or fishery, often driven by the life history or migratory patterns of target species.

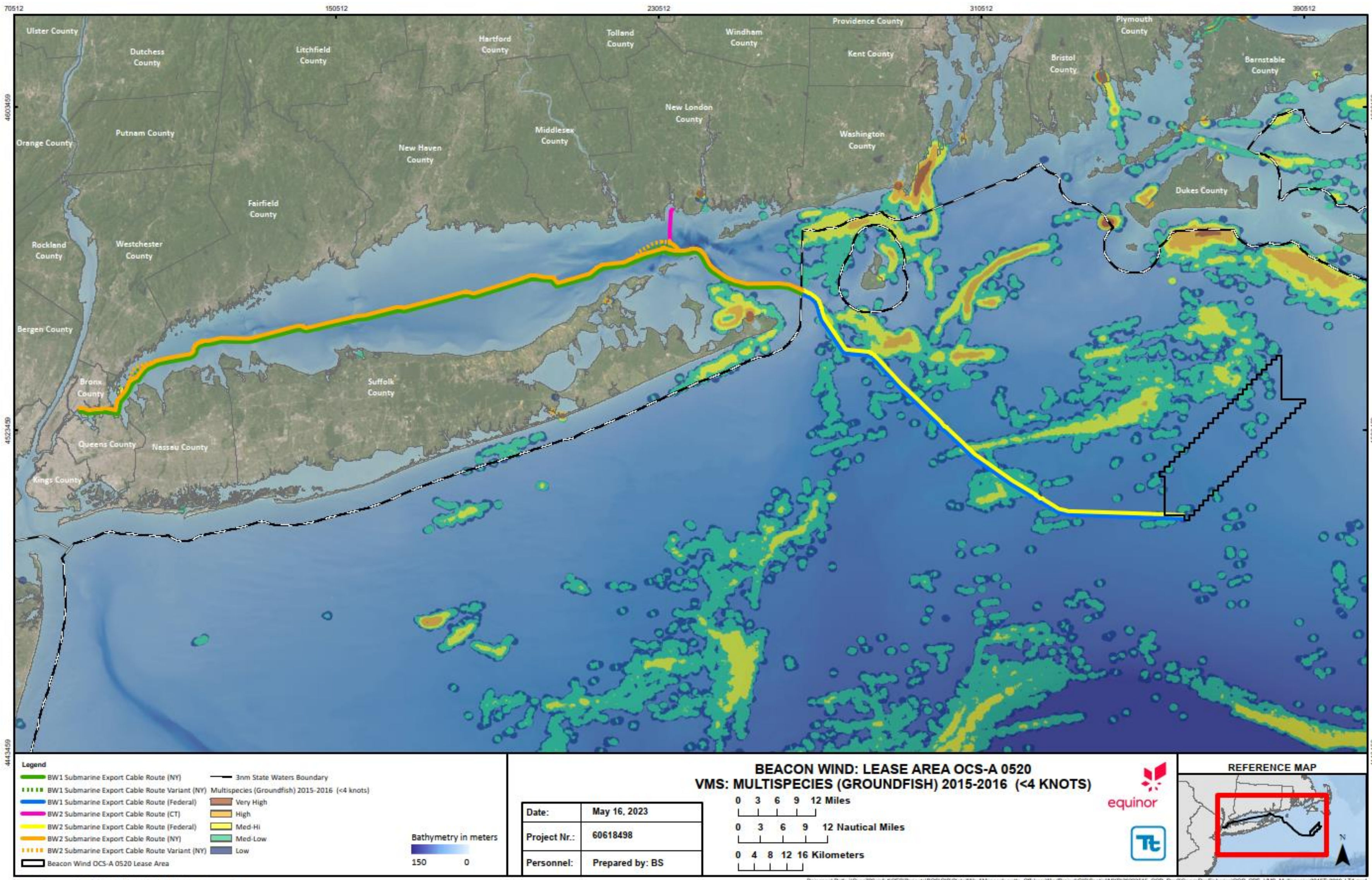
Between 2008 and 2019, the average yearly landings of fish caught within the Lease Area by bottom trawl was 335,749 lbs. valued at $279,143 (**Table 8.8-11**). **Figure 8.8-13** and **Figure 8.8-14.** show bottom trawling multispecies groundfish and squid fishing activity (fishing assumed at <4 knot [7.4 km/hr] speeds) during 2015 to 2016, which is the most recent publicly available multispecies trawl dataset available on the NROC and MARCO portals (raw VMS data for all fisheries/vessels is subject to confidentiality restrictions, therefore the NROC and MARCO portals are the most up-to-date and consistent data source available for all of the maps in **Section 8.8.3.2**). Bottom trawling occurs throughout the year and is present in low to medium/low levels throughout the Project Area based on NOAA Fisheries VMS data published by NROC and MARCO, shown in **Figure 8.8-13** and **Figure 8.8-14.** Within the submarine export cable routes, bottom trawling activity is generally limited to areas outside of Long Island Sound, in federal waters between Montauk Point and the Lease Area.

Between 2008 and 2019, the average annual landings of fish caught within the Lease Area by midwater trawl was 594,414 lbs. valued at $42,888 (**Table 8.8-11**). While this fishing method yielded the highest average annual landings from within the Lease Area by gear type, the fishing activity cannot be displayed on a map to show the spatial extent of this gear type, since it is not provided in that format.

Squid species comprise two of the major target species in the region, supporting trawlers based in ports from New Jersey to Massachusetts and beyond. Commercial squid trawling comprises a significant percentage both by value and by weight of commercial catch landed in the State of Rhode Island (as well as other states, though to a lesser degree; **Table 8.8-9**) (Liberman 2017). Squid are captured by trawling in either a directed fishery or a mixed species fishery, often with mackerel and/or butterfish. Between 2008 and 2019, fishermen with mackerel, squid, and butterfish permits on average landed 29,093 pounds per year within the Lease Area valued at $31,500 – approximately 0.23 percent of the entire Mackerel, Squid, and Butterfish fishery (**Table 8.8-12**), note however, that Lease Area specific squid landings can’t be separated-out from other species within the FMP in this dataset.

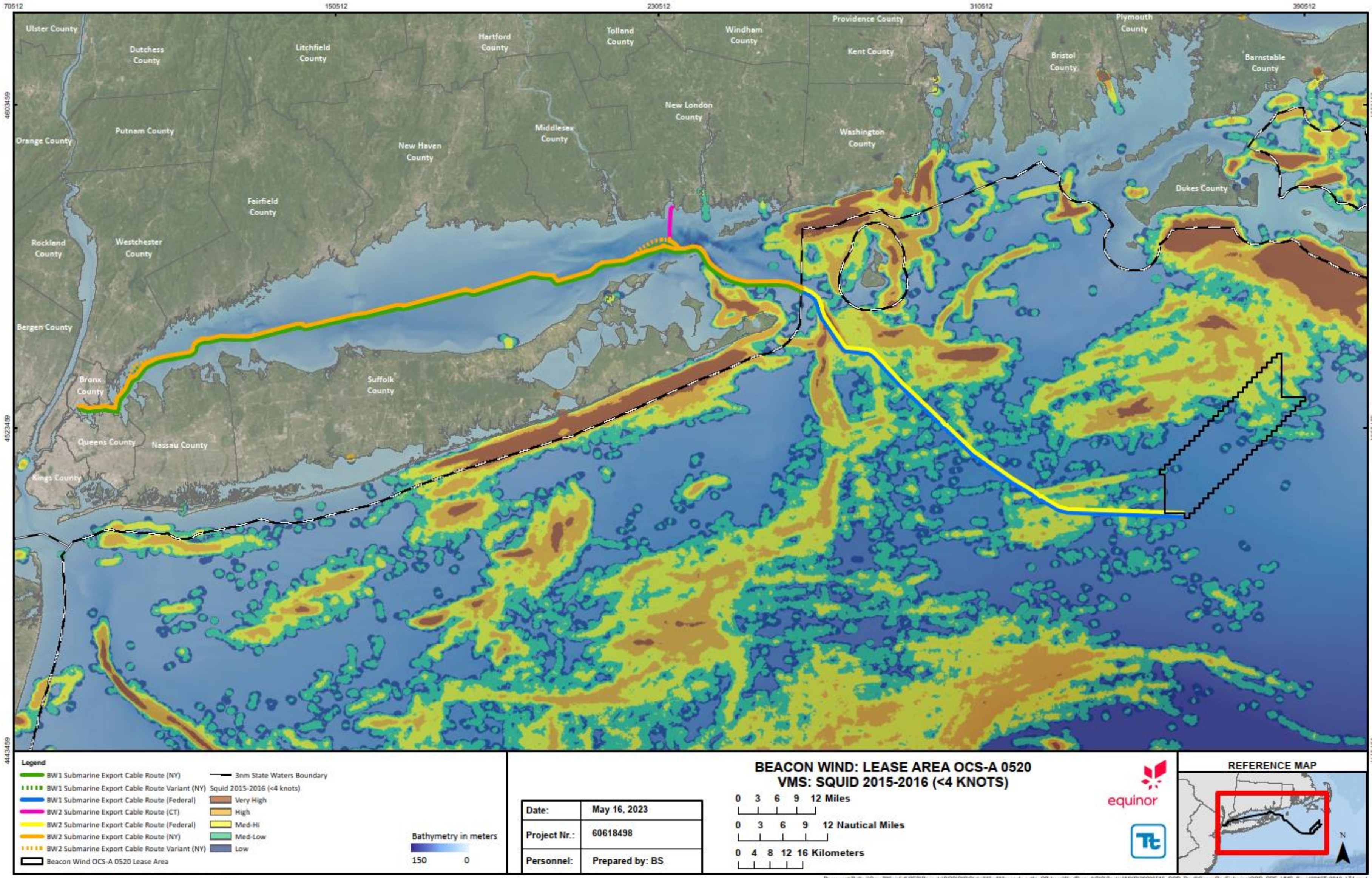
Squid trawling within the Project Area generally occurs in areas of federal waters, as well as waters of Massachusetts and Rhode Island, as shown in **Figure 8.8-14.**, which depict squid trawling data from 2015 and 2016 using VMS data combined from those years. Based on this specific timeseries, squid trawling activity was low to high in the Project Area with the highest concentration in the northernmost corner of the Lease Area. However, squid assemblages vary year to year. Both shortfin and longfin squid live for just a single year, therefore squid assemblage locations are generally not predictable from previous seasons (NOAA Fisheries 2017b). In the southern New England, New York Bight, and Mid-Atlantic region, squid tend to appear in large quantities in locations that may shift substantially from one year to the next. A few key squid grounds near the Project Area include south of Nantucket.

FIGURE 8.8-13. MULTI-SPECIES GROUNDFISH OTTER TRAWLING A <4 KNOTS (7.4 KM/HR), 2015-2016 VMS DATA



Data Sources: BOEM, ESRI, NOAA NCEI, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

FIGURE 8.8-14. SQUID TRAWLING AT < 4 KNOTS (7.4 KM/HR), 2015-2016 VMS DATA



Data Sources: BOEM, ESRI, NOAA NCEI, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

In the federal waters off southern New England, mid-water trawlers from New York, Rhode Island, and Massachusetts ports target herring and mackerel during the fall and winter months (RICRMC 2010), using both single and paired nets (RIDEM 2018). The fishery for Atlantic mackerel occurs primarily from southern New England through the mid-Atlantic from January-March (NOAA Fisheries 2021d). In Connecticut, the summer flounder and scup annual quota is typically filled exclusively from trawling activity in Long Island Sound (CTDEEP 2015), despite some area/seasonal trawling prohibitions in Connecticut and New York §§ NY Environmental Conservation Law 13-0341.

Beacon Wind will avoid, minimize, or mitigate construction, operation, and decommissioning impacts on the fisheries that utilize otter trawling methods, as discussed in **Section 8.8.4**.

Information Acquired Through Outreach

Trawl fishermen engaged by Beacon Wind expressed concern about whether offshore obstructions (wind turbines, submarine cables, and offshore substation facilities) would interfere with their ability to operate efficiently within the multiple fisheries that exist and operate in the Project Area. Many trawl fishermen participate in several different fisheries in several different locations at various times of year to comprise their annual revenue. Depending on the target species, bottom type, time of year, and regulations, trawl fishermen may be found within the Project Area in various locations. These mobile gear fishermen shared many of the same concerns as the squid trawlers in that they target their harvest within the Lease Area on the long-range navigation (LORAN) 0 and 5 lines to accommodate the static gear fishermen, also known as the "gentleman's agreement." If there is no fixed gear present, fishermen will target depth contours where commercially viable densities of mobile fish species can more often be captured efficiently. Another concern raised by this fleet was the potential increased possibility of gear snags due to scour protection around wind turbines and offshore substation facility foundations or on cable protection at cable crossings or areas where cable protection might be used. Concerns from these fisheries were centered around development of a wind farm layout that would allow for continued access and safe fishing.

As discussed in **Section 8.8.1**, not all trawl FMPs require VMS reporting. For example, vessels that target squid during the day (and are reporting through VMS), may target other species at night such as whiting or scup, for which FMPs do not require the use of VMS. Trawl fishermen expressed concern that complex fisheries such as these are not adequately captured in data on fishery distribution or economic analyses and, therefore the importance of the diverse mix of fisheries occurring in the Project Area is not fully captured in the published data. The most recent agency-published public catch and effort data from within the Lease Area are available through 2019 (NOAA Fisheries 2021a).

In discussions with fishermen the greatest concerns expressed by squid trawlers relate to access and feasibility of trawling among wind turbines, particularly during certain years when squid may appear within the Project Area. Trawl size and technology, wind turbine spacing, and wind farm layouts are key concerns for these fishermen to ensure continued safe access to squid during wind farm operations. Beacon Wind's approach to avoid, minimize and/or mitigate these impacts is described in **Section 8.8.4**, with a discussion of the 1x1 nm (1.9x1.9 km) layout included in **Section 8.8.3.2.1.3**. Many fishermen and their representatives expressed reluctance or refusal to fish in wind farms.

Squid fishermen engaged by Beacon Wind stated that squid have historically exhibited fidelity to discrete areas and depth contours that vary year on year and even within a given season, as shown in **Figure 8.8-14.** Similar patterns can be identified away from the Project Area (south of Long Island

and eastward to Nantucket). In addition, the data closely align with the details provided by fishermen. Due to the unpredictable nature of squid assemblages, this fishing effort is quite widespread throughout the waters south of Long Island and east to Nantucket; outside of the Project Area.

Most squid trawlers in the region tow a single net behind one boat. The horizontal spread of the gear is maintained by two trawl doors also called otter boards. These are normally in contact with the seabed, along with the ground cables and the footrope of the net. Significant seabed penetration is avoided because it can decrease catch and increase costs. Regional squid fishermen and gear makers have indicated that typical door spread is 40 to 54 fathoms (73.2 to 98.8 m). During outreach, squid fishermen indicated that the density of vessels concentrated in small areas where the squid are aggregated, reinforces the notion of ensuring that the wind farm layout provide adequate space between wind turbines to allow for this activity to occur.

For single-net squid trawlers in and around the Project Area, towing speeds are reported and observed to be around 3 knots (5.6 km/hr). The Beacon Wind FLOs evaluated AIS plotter tracks from a subset of squid trawlers over multiple years. The AIS data corroborate fishermen's statements indicating that towing directions of trawlers and clam dredgers often follow a consistent water depth, for example the 12-20 fathom (22-37 m) bathymetric curve, particularly west of Nantucket Shoals. As discussed above, where fixed gear and mobile gear overlaps within federal waters south of Massachusetts and Rhode Island, gear interactions have been minimized by a longstanding "gentlemen's agreement" among fishermen. In general terms, mobile gear fishermen typically avoid towing through fixed gear and similarly, fixed gear fishermen typically avoid dredgers and trawlers to minimize gear damage/loss to both parties. This agreement dictates that fixed gear fishermen set their gear on certain LORAN lines ("the 0s and 5s"), leaving approximately a 0.7 nm (1.3 km) of space between fixed gear sets that mobile gear fishermen tow between. The general east-west orientation of the LORAN lines minimizes gear interactions while allowing mobile gear fishermen to maintain fidelity to preferred depth contours where commercially viable densities of their target species occur.

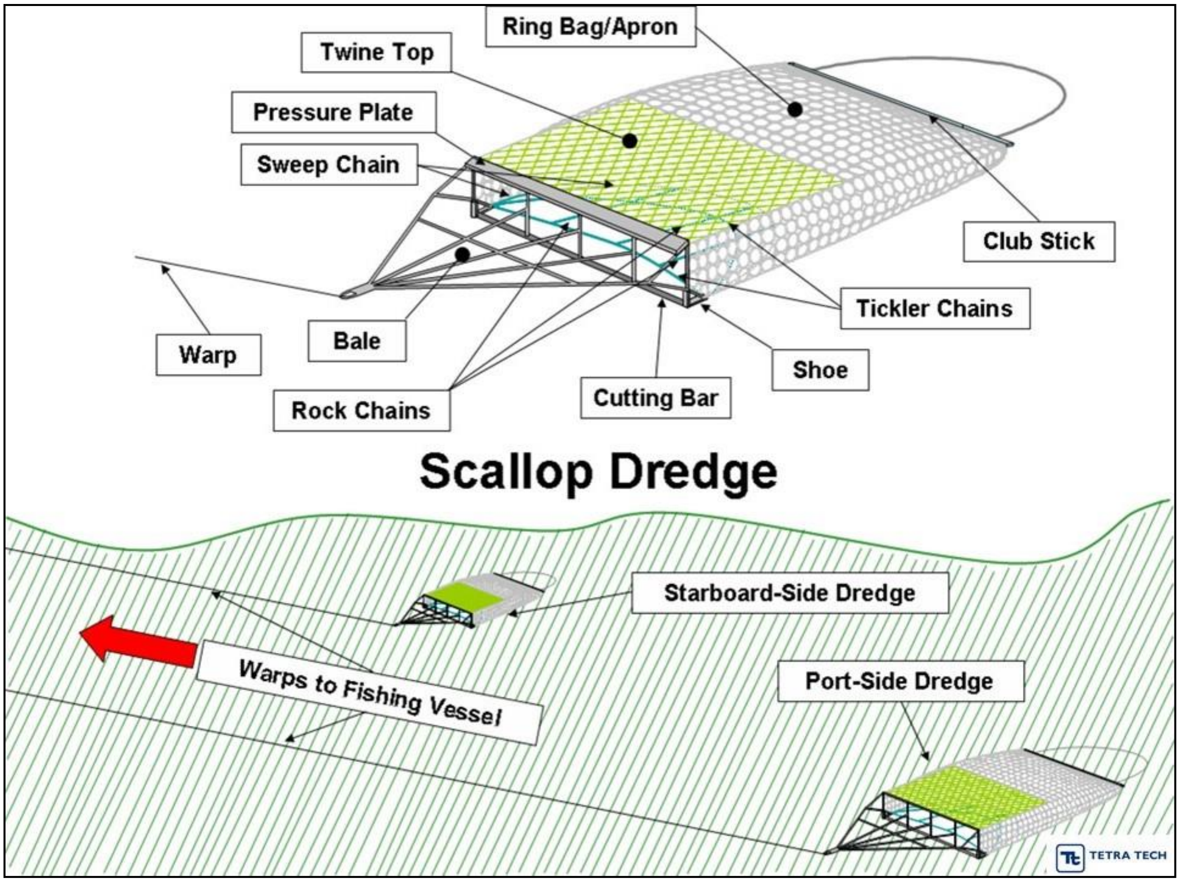
8.8.2.2.4.2 Scallop Dredging

Methodology

Scallop harvesters can generally be divided into two different groups; the trip boat fleet and the dayboat fleet Day boats are usually smaller vessels that fish daytrips closer to shore, while trip boats are usually larger vessels that may remain offshore for a week or more and fish in distant locations such as the Hudson Canyon Scallop Access Area, other rotational scallop access areas, and other open areas offshore.

In the northwest Atlantic, scallop vessels often range from 80 to 120 ft (24.4 to 36.6 m) in length. A large commercial scallop dredge is made of steel with an opening approximately 15 ft (4.6 m) wide and is towed along the seabed to collect scallops sitting on, but not buried within, the seabed substrate (**Figure 8.8-15**). Day boats may tow smaller dredges and some harvest scallops with otter trawls. Larger vessels operating in the region typically tow two dredges at once, up to 31 ft (9 m) in combined width, to cover more ground per tow. Towing speeds typically range from 4.5 to 5.5 knots (8.3 to 10.2 km/hr). Major ports for sea scallop operations include New Bedford/Fairhaven, Massachusetts and Cape May and Point Pleasant, New Jersey. These ports are equipped with the necessary infrastructure required to purchase, process, and ship scallops as well as the ancillary supply chain to make necessary purchases or repairs.

FIGURE 8.8-15. TYPICAL COMMERCIAL SCALLOP DREDGE AND CONFIGURATION



Size and Configuration

The dimensions of typical scallop dredge size and configuration are shown in **Table 8.8-14**.

TABLE 8.8-14. TYPICAL SCALLOP DREDGE SIZE AND CONFIGURATION

Parameter	Value
Vessel length	87 ft (26.5 m)
Towing wire ratio	3.4:1
Typical wire out	78 fathoms (142.6 m)
Width of each dredge	15 ft (4.6 m)
Length of each dredge	37.5 ft (11.4 m)
Number of dredges	2
Total (bow to club stick)	559 ft (170.4 m)

Towing speeds of large scallop dredges are often 4 to 5 knots (7.4 to 9.3 km/hr). Scallopers generally tow faster and are more maneuverable than other regional commercial mobile gear types. Their footprint is much smaller than that of an otter trawl, and haul back and set are relatively fast. At the end of the desired tow length, they may haul back, empty the catch, turn sharply and set in, or they may turn while towing the dredges on the seabed, a process that is generally easier for scallopers than otter trawlers. Although scallop fishermen have similar technical concerns as otter trawl fishermen (e.g., maneuverability, safety), there are some special characteristics of scallop gear as they tow (e.g., small dredge size, no doors, single tow cable per dredge, and shorter tow cable length) which lead to different access requirements in this fishery compared to otter trawling.

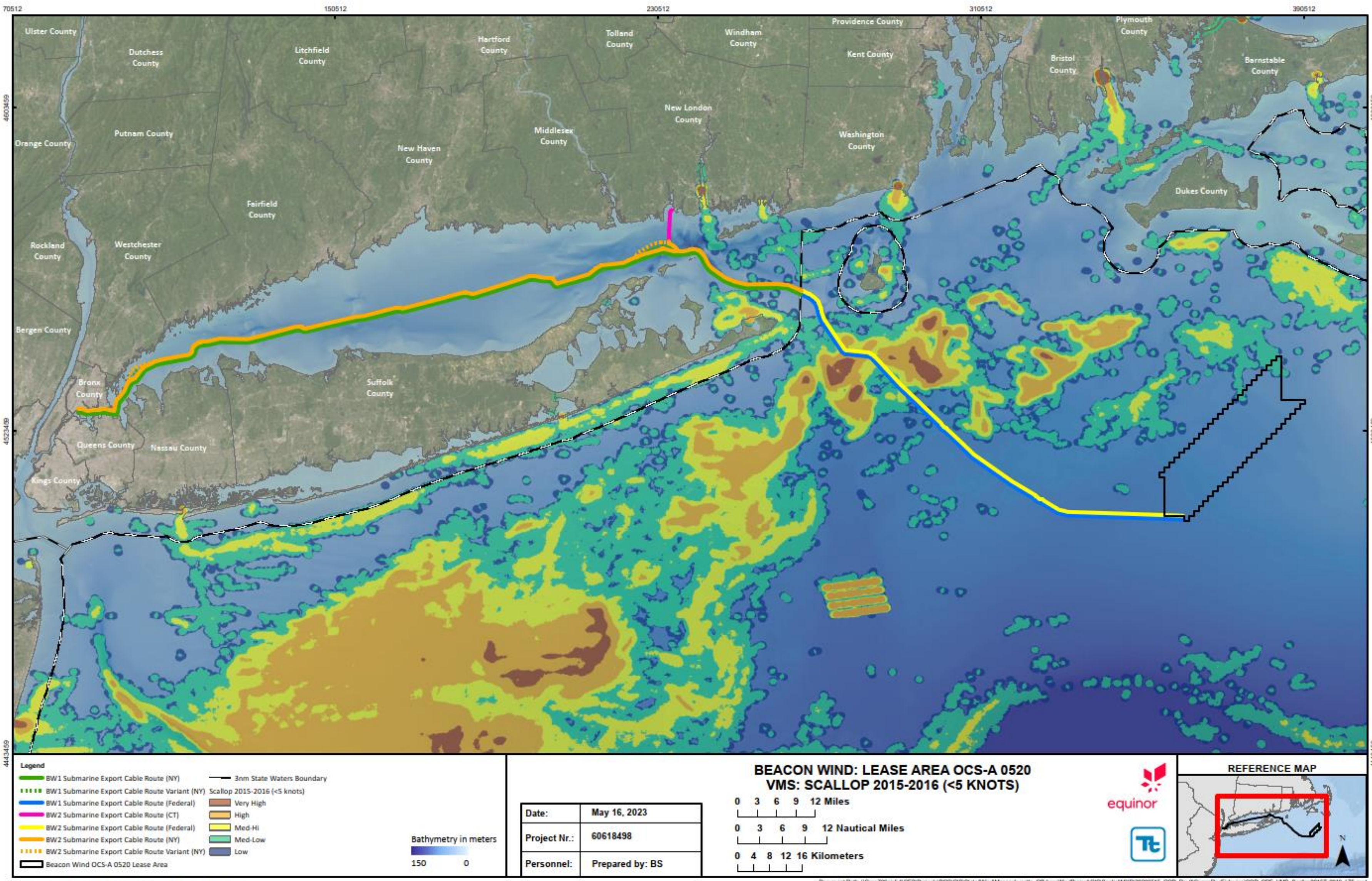
Occurrence in the Project Area

Scallop grounds are widespread from the Mid-Atlantic through Georges Bank (**Figure 8.8-16.**). The preferred water depths for larger scallop vessels generally range from 25 to 55 fathoms (46 to 101 m). The water depth of the Lease Area ranges from approximately 20 to 33 fathoms (37 to 61 m). Between 2008 and 2019, an average of 1,838 pounds of sea scallop were caught within the Lease Area per year valued at $16,847 (**Table 8.8-11**). Relative to other fishery management plans, sea scallop had the least exposure within the Lease Area compared to other species with only 0.01 percent of the total fishery landings caught within the Lease Area (**Table 8.8-12**). Additionally, sea scallop dredges were the least exposed gear type in the Lease Area between 2008 and 2019 with < 0.01 percent of total fishery landings being caught within the Lease Area (**Table 8.8-11**). Beacon Wind recognizes this is subject to change; therefore, Beacon Wind has a continuing interest in planning and installing arrays that allow safe and productive commercial scalloping (as well as trawling and clam dredging). The recent and unique recruitment events that have caused increased landings in the scallop fishery have also been examined (Bethoney et al. 2016). The data below; however, shows that the majority of the scallop harvest in recent years occurs outside of the Project Area. Within the submarine export cable routes, scallop dredging activity is limited to areas outside of Long Island Sound, in federal waters south of Block Island.

As reported to Beacon Wind, the scallop fishery community generally agrees that VMS is used routinely within the scallop dredging industry, and therefore, its fishing areas are well understood and represented. In addition, research has been executed within and on behalf of the scallop fishery due to a unique funding set-aside program. Research set-aside programs are unique to federal fisheries in the Greater Atlantic Region. No federal funds are provided to support the research; instead, research funds are generated through the sale of set-aside allocations for quota managed or days-at-sea managed fisheries. There are active research set-aside programs established under the Atlantic Sea Scallop, Atlantic Herring, and Monkfish Fishery Management Plans (NOAA Fisheries 2018c). For the scallop research set-aside program, the NEFMC reserves 1.25 million pounds of scallops per year. This generates approximately $15 million; of which approximately $3 million supports research projects that are designed to benefit the fishery (NOAA Fisheries 2018c).

Beacon Wind will avoid, minimize, or mitigate construction, operation, and decommissioning impacts on the scallop fishery, as discussed in **Section 8.8.4**.

FIGURE 8.8-16. SCALLOP FISHING ACTIVITY AT < 5 KNOTS (9.3 KM/HR), 2015-2016 VMS DATA



Data Sources: BOEM, ESRI, NOAA NCEI, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

Information Acquired Through Outreach

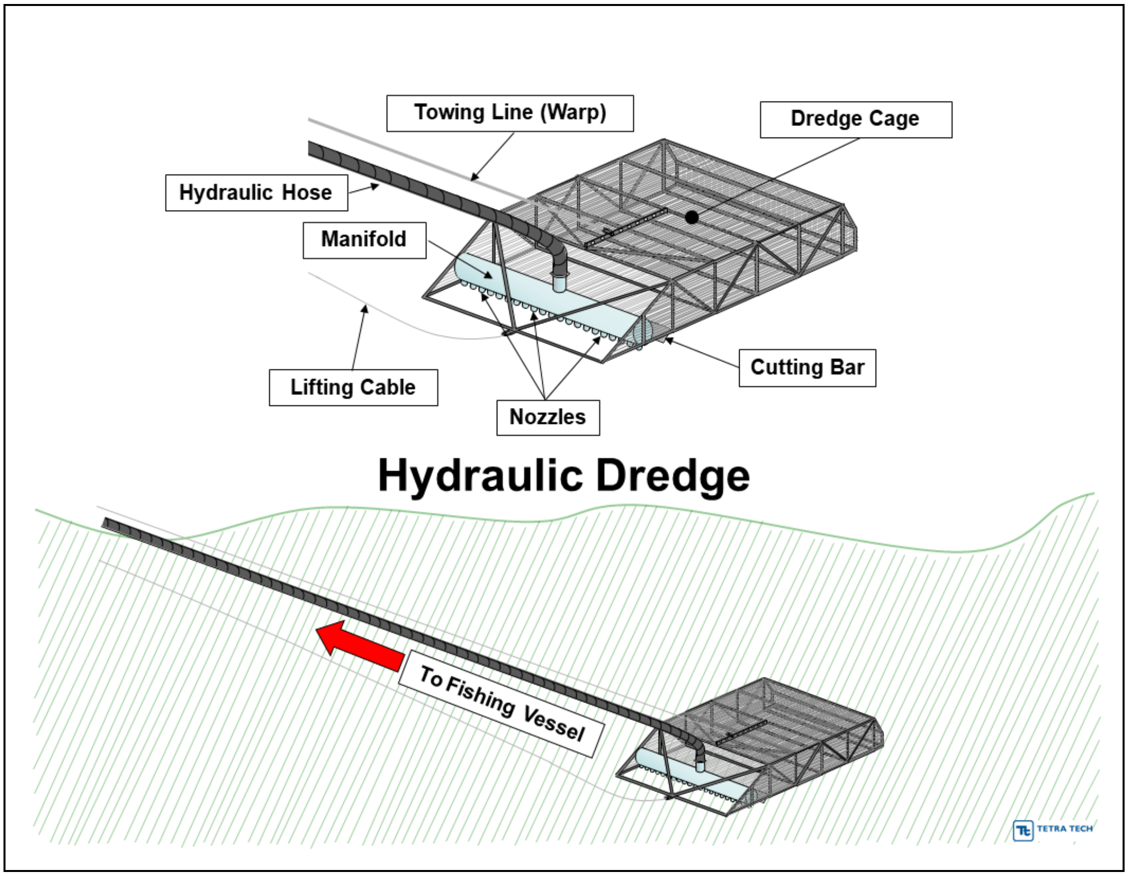
Based on outreach with members of the industry, there is limited concern over impacts to the scallop fishing industry from development of the Project Area. As with other gear types, a major concern from fishermen is continued access to fishing grounds. Additionally, as with other types of fishing, it is understood that weather, visibility, currents, congestion, seabed obstacles, and other factors may influence a captain's decision of whether to fish in an offshore wind area.

8.8.2.2.4.3 Hydraulic Clam Dredging

Methodology

Hydraulic clam dredges harvest bivalve shellfish from the soft bottom sediments in which they are buried. This technique of harvesting surfclams and ocean quahogs is utilized in southern New England and Mid-Atlantic waters where bottom conditions allow. The hydraulic dredges are dragged along the bottom by the fishing vessel as a large hydraulic pump on the vessel forces sea water through a hose to a manifold on the front of the dredge (**Figure 8.8-17**). The manifold jets the water into the sand, temporarily fluidizing the sand and allowing the dredge to penetrate the sediment to approximately 1 ft (0.3 m) in depth to capture bivalves and any bivalve-sized items (rocks, debris, fish) in the process. Average towing speed is between 3.2 and 3.6 knots (5.9 and 6.7 km/hr), with some tows ranging in speed from 2.2 to 4.0 knots (4.1 to 7.4 km/hr). Typical dredge width may be 20 ft (6 m), but newer, larger vessels can tow a larger dredge or two dredges whose total width exceeds that. A typical ratio for tow rope to water depth would be 2.5:1.

FIGURE 8.8-17. TYPICAL HYDRAULIC CLAM DREDGE GEAR



Size and Configuration

The dimensions of typical hydraulic clam dredge size and configuration are shown in **Table 8.8-15**. As with other types of fishing, it is understood that weather, visibility, currents, congestion, seabed obstacles and other factors may influence a captain's decision of whether to fish in an offshore wind area.

TABLE 8.8-15. TYPICAL HYDRAULIC CLAM DREDGE SIZE AND CONFIGURATION

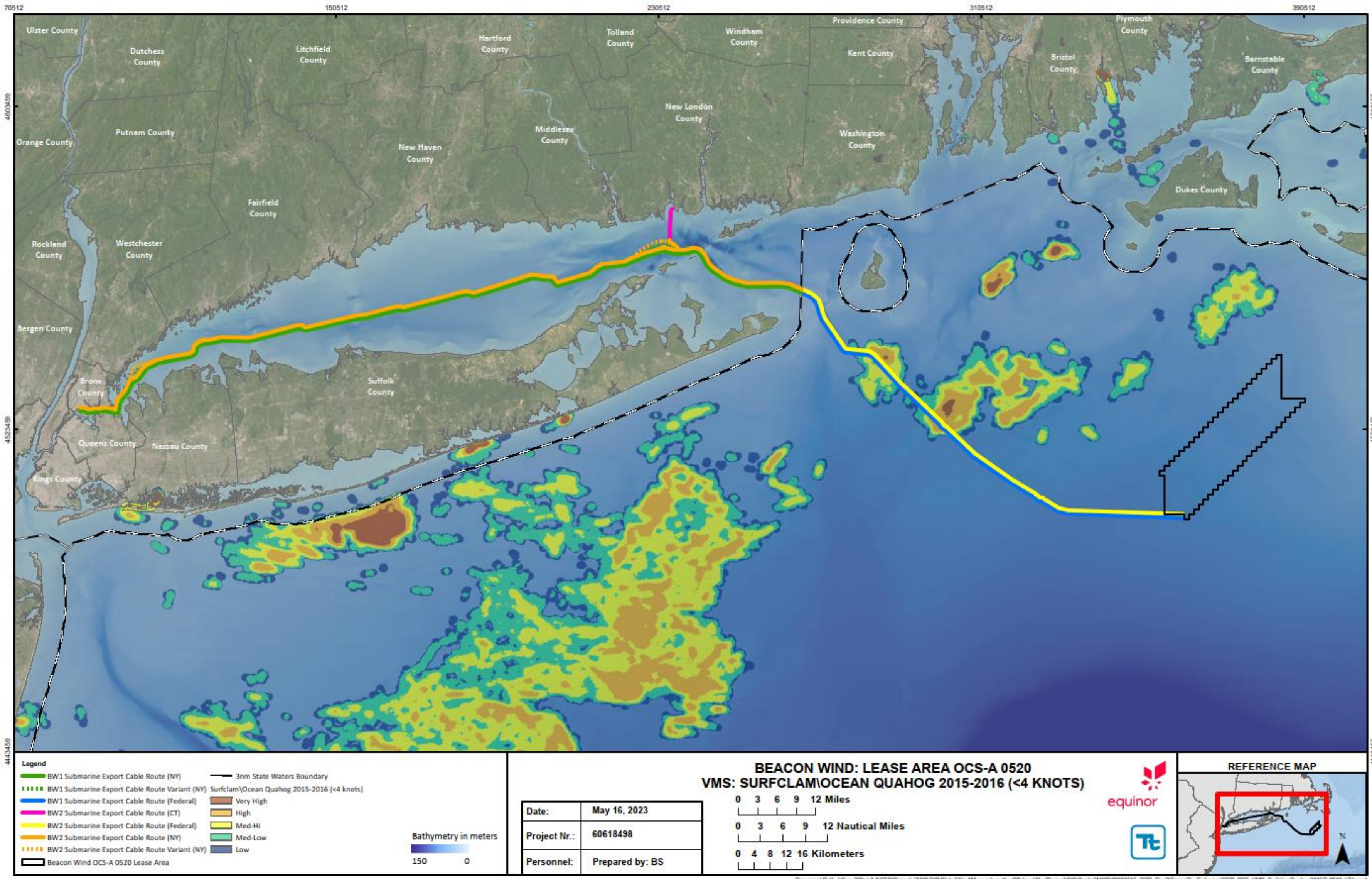
Parameter	Value
Vessel length	120 ft (36.6 m)
Towing wire ratio	2.5:1
Typical wire out	57.5 fathoms (105.2 m)
Width of dredge	20 ft (6.1 m)
Length of dredge	45 ft (13.7 m)
Number of dredges	1

Occurrence in the Project Area

Historically, clam dredging has been conducted in a variety of locations throughout the region. Through outreach communication, most clam dredge fishermen consulted during Project outreach indicate that the Project Area has not been productive in recent years, with no fishing effort shown in the most recent VMS data available (2015-2016; **Figure 8.8-18.**). However, both surfclams and quahogs are among the top species by weight and revenue for New York, Rhode Island, Massachusetts, and New Jersey ports (**Table 8.8-9**). Clam dredging occurs in areas northeast and northwest of the Project Area with very little transit activity occurring through the Lease Area (**Figure 8.8-18.**). Between 2008 and 2019, the average yearly landings within the Lease Area by clam dredges was 10,458 pounds valued at $8,118 (**Table 8.8-11**). Compared to other gear types, clam dredging was the second-least exposed gear type in the Lease Area at 0.01 percent of fishery landings per year (with scallop dredging being the least) (**Table 8.8-11**). While the Lease Area does include water depths preferred for surfclam dredging, Beacon Wind is interested in preserving that harvest opportunity for potential future use, by ensuring appropriate cable burial depths (as described in **Section 8.8.4**) and will continue to engage with fishermen on this topic. Within the submarine export cable routes, hydraulic clam dredging activity is limited to areas outside of Long Island Sound, in federal waters south of Block Island.

Beacon Wind will avoid, minimize or mitigate construction, operation, and decommissioning impacts on the surfclam fishery, as discussed in **Section 8.8.4**. Hydraulic dredges penetrate the seabed more than other mobile gear types such as scallop dredges and otter trawls. Stevenson et al (2004) present summaries of numerous studies that have examined seabed penetration of these gear types. A key consideration is that a single pass by a hydraulic dredge penetrates more deeply than most commercial gear types, and it is common for a dredge or dredge fleet to continue fishing in discrete areas where a commercially viable number of clams is found. Therefore, it should be noted that some areas of seabed may experience impacts from repeated passes of a clam dredge, rather than a single dredge pass each time.

FIGURE 8.8-18. SURFCLAM/QUAHOG FISHING ACTIVITY AT < 4 KNOTS (7.4 KM/HR), 2015-2016 VMS DATA



Data Sources: BOEM, ESRI, NOAA NCEI, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

Information Acquired Through Outreach

As with other gear types, a major concern expressed by hydraulic clam dredge fishermen is continued access to fishing within the operational wind farms and over submarine export cables. The technical issues include seabed penetration, maneuverability and space required for safe and effective fishing. Clam dredgers have also raised concerns over future access to fishing grounds in operational wind farms, with wind turbine spacing being an issue. Some have requested a minimum 2 nm (3.7 km) spacing between turbines.

Captains, fleet managers and their representatives have shared their experiences and concerns about offshore wind including burial depth of offshore wind electrical cables due to snagging risk and/or liabilities. The industry and Beacon Wind have a shared goal of avoiding interactions between gear and all submarine infrastructure. A formal CBRA will consider risks of contact from fishing, ship anchors and other sources (discussed further in **Section 8.8.4**).

8.8.2.2.4.4 Gillnetting

Methodology

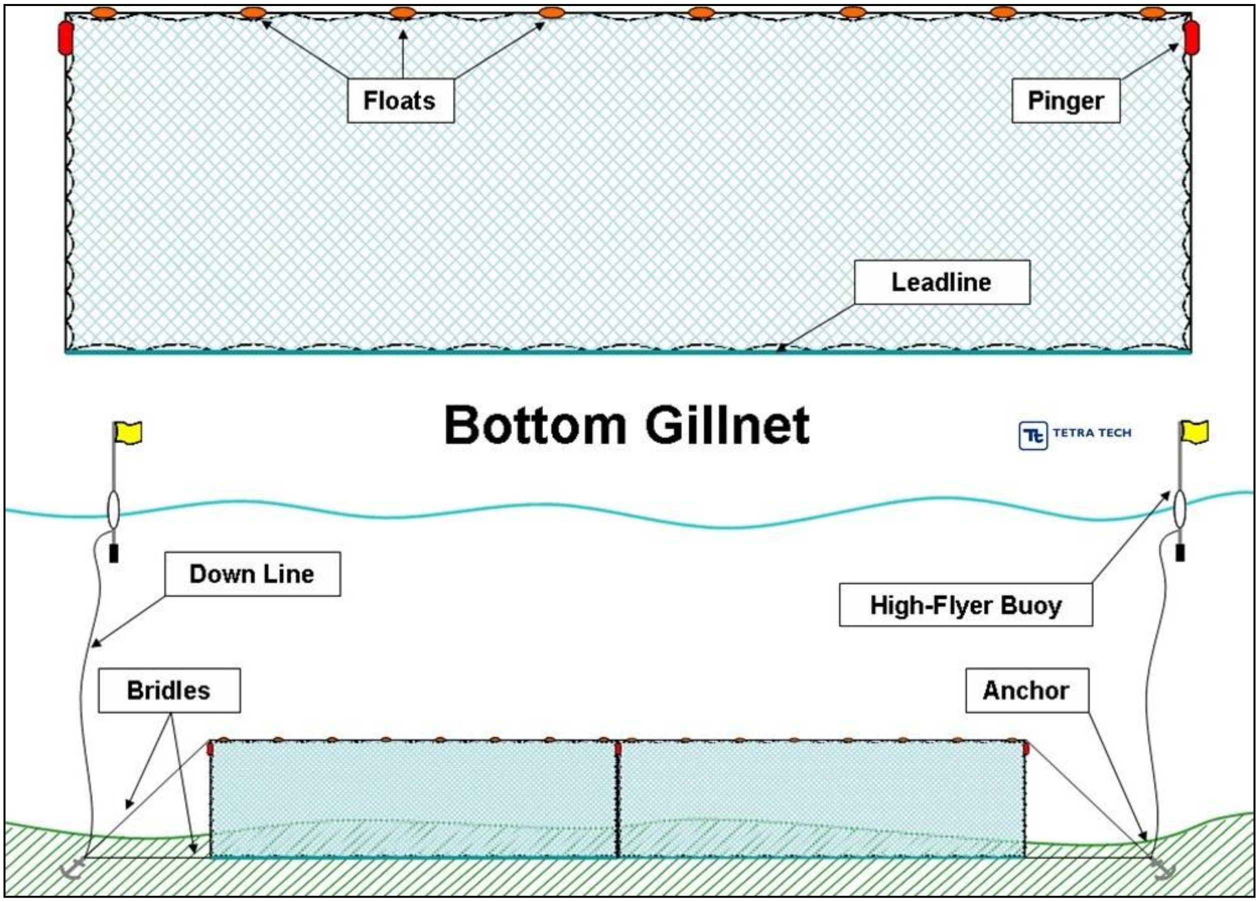
Gillnets are composed of a wall or panels of netting used to capture fish by either wedging or entangling. The netting is typically composed of high-strength monofilament or multi-filament line. Gillnets can be configured in a variety of ways, but typically consist of floats along the top of the net and weights or anchors (lead line) along the bottom to keep the panel aligned vertically in the water column (**Figure 8.8-19**). The height of the net is dictated by regulation and can vary by fishery. Careful selection of the timing and location of the net, the depth of the net wall, and the size of the net mesh, allows gillnetters to effectively target specific species and sizes.

Anchored gillnets set close to the seabed are known as “bottom gillnets,” “demersal gillnets,” or “sink gillnets” and represent the most common type of gillnetting in the northeastern commercial fishing industry (NOAA Fisheries 2021d, Pol and Carr 2000). Bottom gillnets are typically tended on a daily to semi-weekly basis for groundfish. When the target species is monkfish, for example, the nets are usually tied down by connecting the float line and lead line with a line shorter than the overall height of the net. Therefore, the netting, which would extend further upward if fully stretched, may form a looser bag shape more effective for catching fish that generally stay on or very near the seabed.

Occurrence in the Project Area

In the Project Area, gillnet fishing activity and monkfish fishing activity are low as shown in **Figure 8.8-20** and **Figure 8.8-21**. Between 2008 and 2019, average of 83,366 pounds were caught in the Lease Area by sink gillnets valued at $68,211 per year (**Table 8.8-11**). On average, 0.27 percent of the total sink gillnet fishery landings were caught within the Lease Area. Gillnets are the primary gear type used for the monkfish and between 2008 and 2019, an average of 32,893 pounds of monkfish were caught in the Lease Area valued at $46,316 per year (**Table 8.8-11**). On average, 0.34 percent of the total monkfish landings were caught within the Lease Area. If prices and conditions for monk fishing improve it is likely that gillnet fishermen will increase their activity in the Project Area and/or along cable routes. Within the submarine export cable routes, gillnetting activity is limited to areas outside of Long Island Sound, in federal waters between Montauk Point and the Project Area.

FIGURE 8.8-19. GILLNETTING ILLUSTRATION

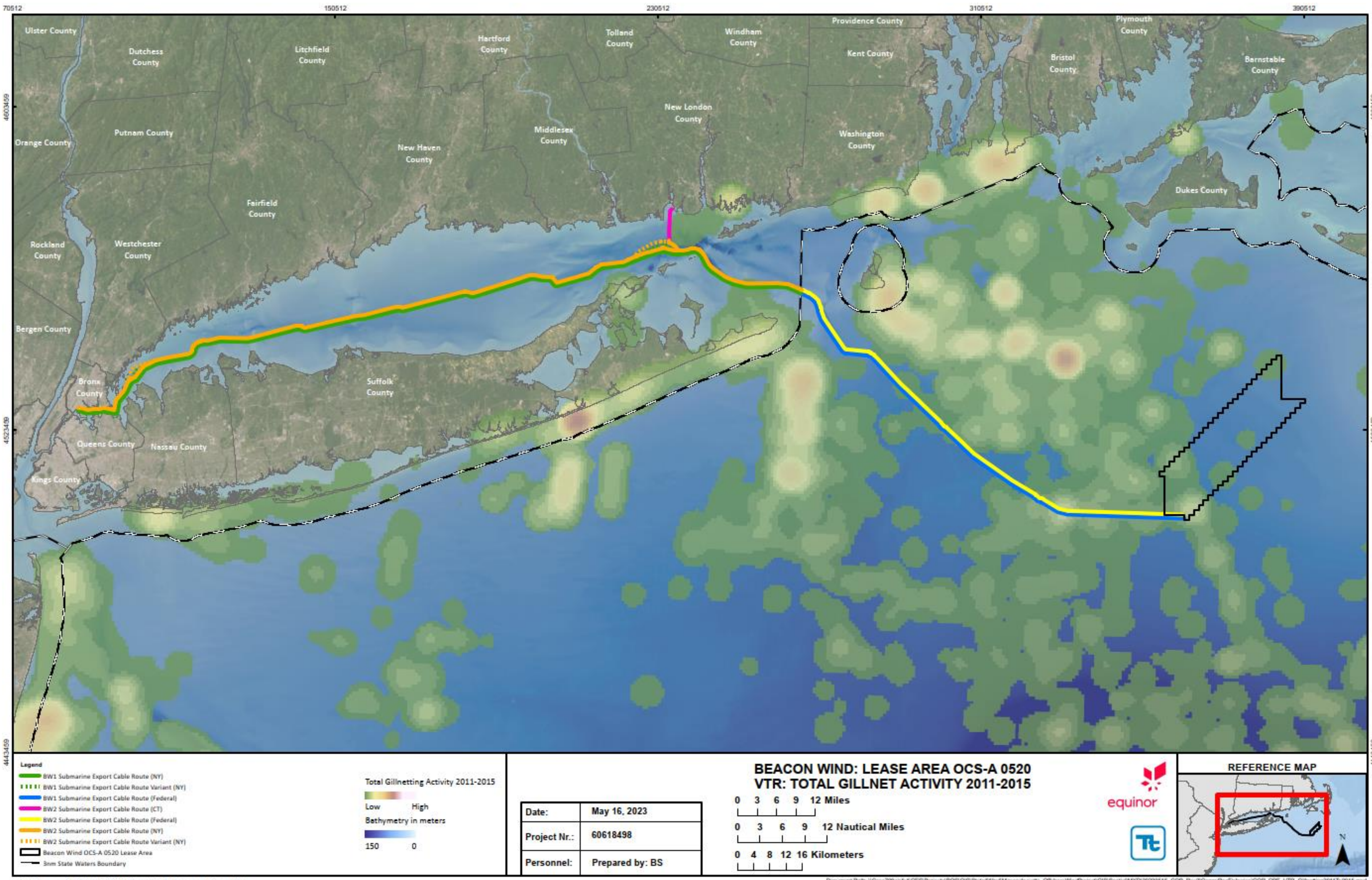


Beacon Wind will avoid, minimize, or mitigate construction, operation, and decommissioning impacts on the fisheries that utilize gillnetting methods, as discussed in **Section 8.8.4**.

Information Acquired Through Outreach

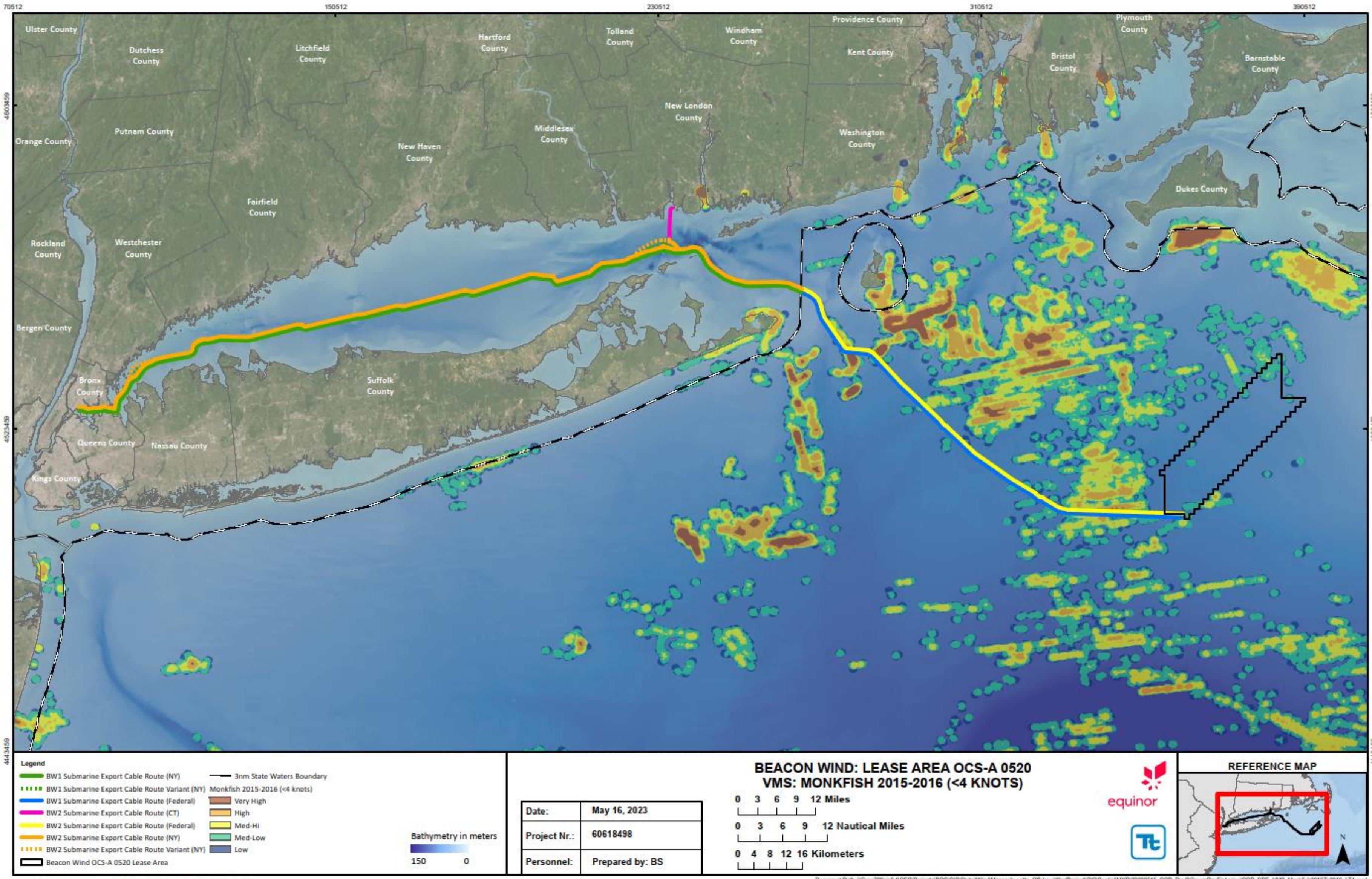
There is very little gillnetting within the Project Area, based on outreach with gillnet fishermen.

FIGURE 8.8-20. GILLNET ACTIVITY AT < 4 KNOTS (7.4 KM/HR), 2011-2015 VTR DATA



Data Sources: BOEM, ESRI, NOAA NCEI, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

FIGURE 8.8-21. MONKFISH ACTIVITY AT < 4 KNOTS (7.4 KM/HR) , 2011-2015 VMS DATA



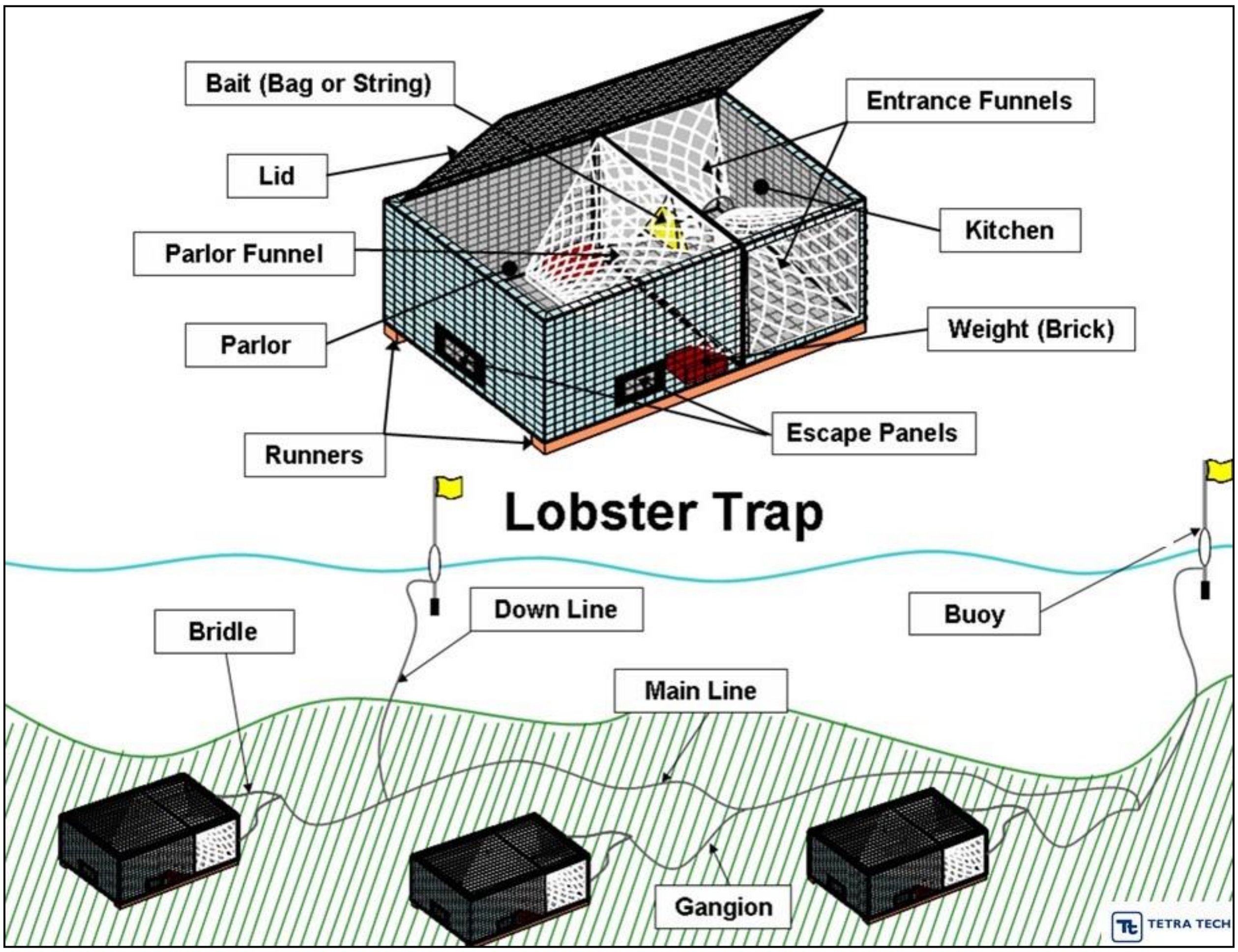
Data Sources: BOEM, ESRI, NOAA NCEI, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

8.8.2.2.4.5 Traps and Pots

Methodology

Species targeted in the Project Area using pot and trap gear includes lobster, conch, and black sea bass. Offshore lobster fishing is accomplished using "pot strings" (sometimes called trawls) (**Figure 8.8-22**) that are set both in a general north to south direction and east to west. Lobstering in the Project Area generally involves fishing strings of vinyl-coated steel traps, baited and then evenly spaced along the seabed between two surface buoys. Offshore lobster fishing generally involves larger vessels setting longer strings of larger traps (4 ft [1.2 m]) and high-flyer buoys on the surface. Nearshore lobstering generally involves smaller vessels deploying shorter strings of smaller traps and smaller foam surface buoys. Lobsters are harvested year-round throughout the Project Area and the commercial catch predominantly comprises mature male lobsters (and marketable crabs, such as Jonah crab) (ASMFC 2015).

FIGURE 8.8-22. TYPICAL OFFSHORE LOBSTER TRAP SETUP AND ARRANGEMENT IN "POT STRINGS"



Similar to lobster, conch and black sea bass are fished in generally the same way with slight differences in gear setup (**Figure 8.8-23**, **Figure 8.8-24**), deployment locations/depths, and soak-times. Lobster and conch gear is generally set within soft bottom habitats (either nearshore or offshore), while black sea bass gear is often set near structured habitat such as hard bottom, artificial reefs, wrecks, or other benthic features. Black sea bass pots are typically fished repeatedly where successful. Conch are sometimes fished using lobster pots or with a modified open-top trap designed for this fishery (**Figure 8.8-24**). As for black sea bass, conch gear may also be set near structure but may also target less defined benthic features such as sand ridges, troughs, etc., depending on catch rates.

FIGURE 8.8-23. TYPICAL BLACK SEA BASS POT SETUP AND ARRANGEMENT IN "POT STRINGS"

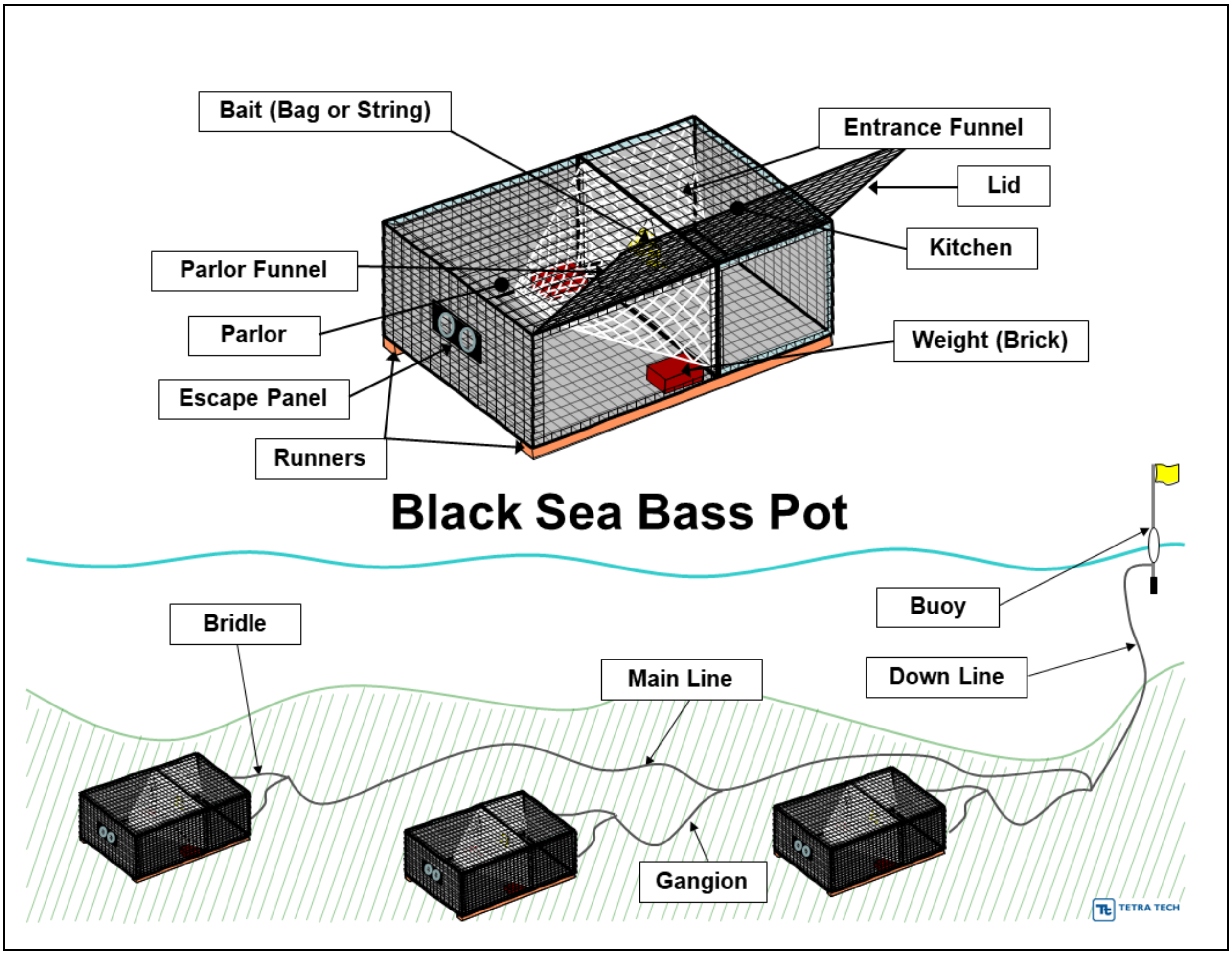
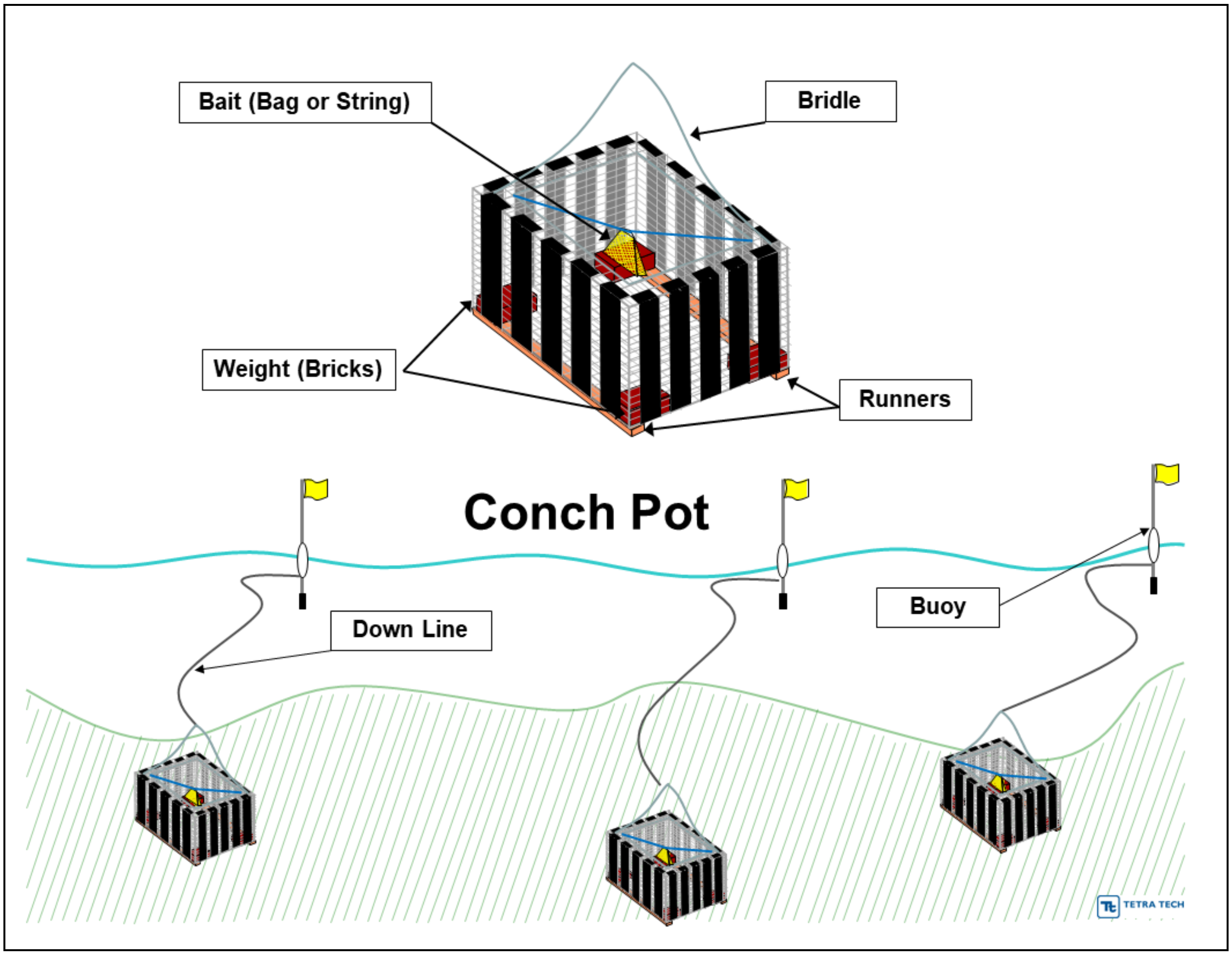


FIGURE 8.8-24. TYPICAL CONCH POT SETUP AND ARRANGEMENT IN "POT STRINGS"



Occurrence in the Project Area

Within the Project Area, lobster/conch/fish traps may occur in areas in and around hardbottom where trawling is unlikely to occur, particularly in discrete areas of hard bottom. Lobster pot fishing is common throughout the Project Area in locations that vary by season. Heat maps and reliable tracking mechanisms are unavailable for this fishery as the participating fishermen are only required to file a VTR if they simultaneously possess other commercial fishing permits. Data from Kirkpatrick et al. (2017) suggests that lobster fishing activity as measured by revenue intensity indicates low levels of activity within the Project Area, with the highest intensities concentrated outside of the Project Area; within Rhode Island Sound, between Block Island and Martha's Vineyard, and also to the southwest of the Lease Area. However, lobster landings may be underestimated because of incomplete reporting based on vessel type or discrete gear location within a given offshore lobster fishing trip that may cover hundreds of miles; as gear is typically placed across wide areas of seabed at certain times of year. Therefore, directed outreach within this fishery is critical to obtain accurate spatial and temporal fishing effort data.

Between 2008 and 2019, fishermen engaged in the lobster pot fishery on average landed 86,063 pounds valued at $88,753 per year within the Lease Area (**Table 8.8-11**). An average of 0.27 percent of the total lobster pot fishery was landed within the Lease Area per year (**Table 8.8-11**). Fishermen with American Lobster permits on average landed 6,743 pounds per year within the Lease Area valued at $28,302—approximately 0.04 percent of the entire American Lobster fishery (**Table 8.8-12**).

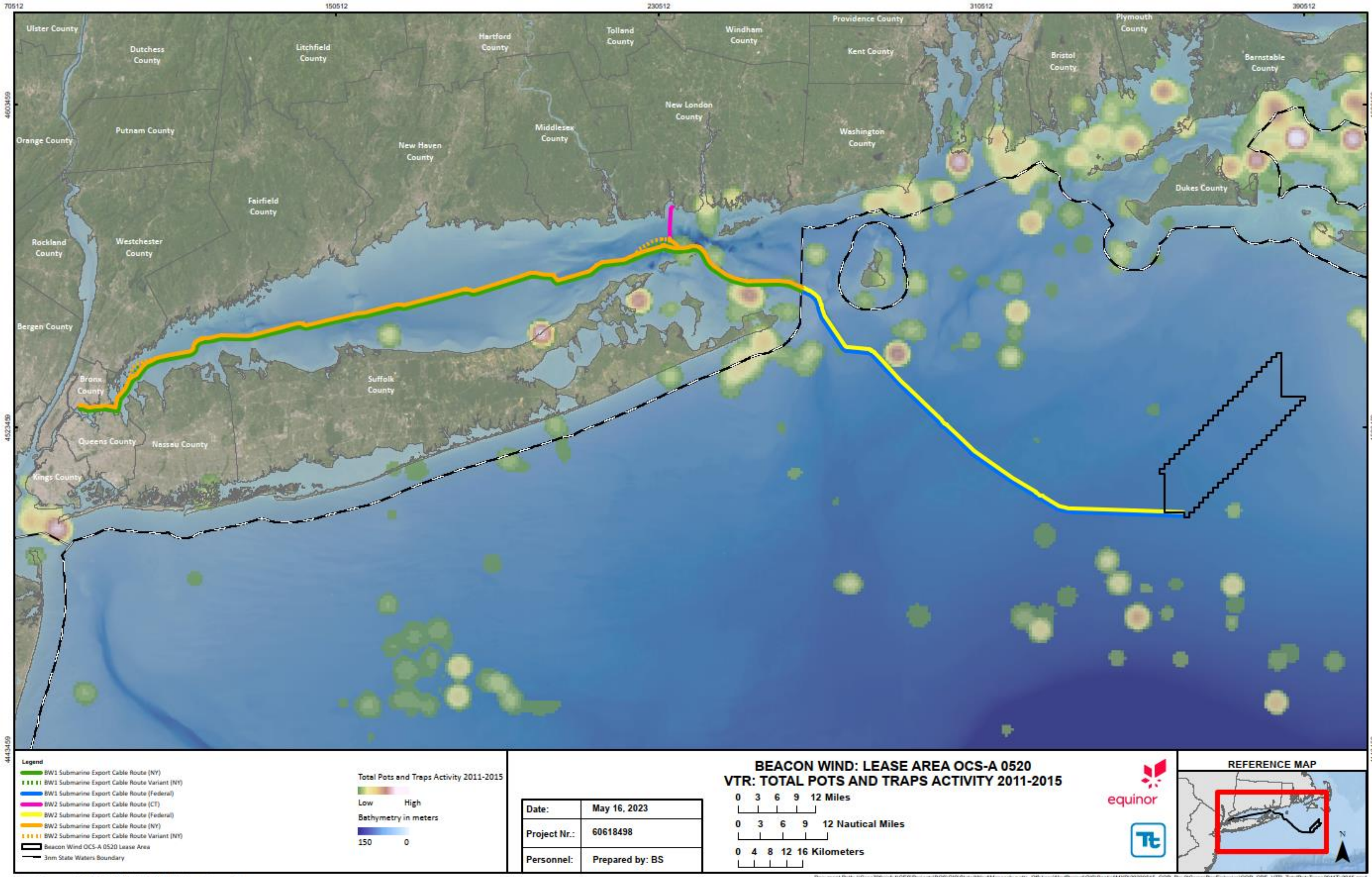
Between 2008 and 2019, fishermen engaged in “other pot” fisheries (crab, conch, etc.) on average 1,772 pounds valued at $1,414 per year within the Lease Area (**Table 8.8-11**). An average of 0.07 percent of the total “other pot” fishery was landed within the Lease Area per year (**Table 8.8-11**). Fishermen with Jonah crab permits on average landed 75,480 pounds per year within the Lease Area valued at $58,758—approximately 0.63 percent of the entire Jonah crab fishery (**Table 8.8-12**). Data for conch is not specified as part of this dataset. Between 2008 and 2019, fishermen with summer flounder, scup, and black sea bass permits on average landed 21,602 pounds per year within the Lease Area valued at $24,361—approximately 0.20 percent of the entire Jonah crab fishery (**Table 8.8-12**). Data for black sea bass cannot be isolate from summer flounder and scup within this dataset.

Trap and pot fisheries have been dynamic in the Project Area within the past few decades since lobster stocks began to fall in the early 2000’s due to lobster shell disease and other factors. As shown in **Figure 8.8-25**, there was no pot and trap activity within the Project Area and very little activity along the submarine export cable routes. Within the Long Island Sound and Block Island Sound portions of the submarine export cable routes, lobster abundance and commercial landings are a small fraction of previous levels, following widespread lobster declines in the early 2000s attributed to shell disease, water quality, and other factors (Giannini and Howell 2010; Gomez-Chiarri and Cobb 2012). These trends are consistent with the long-term monitoring of lobster populations in Eastern Long Island Sound, associated with the lobster surveys at the Millstone Power Plant (in central Long Island Sound, located near the submarine export cable routes), with peak lobster abundances observed in 1992 and 1999, then declining by 60 percent of those levels by 2002, with abundances remaining at or below 2002 levels through 2019 (Dominion Energy 2021).

Since 2013, ASMFC implemented a LIS fall fishery closure in CT and NY between September–November to conserve remaining populations (ASMFC 2012). This decline resulted in lobster fishermen, particularly in Long Island Sound and Block Island Sound, to shift their effort towards other species such as conch and black sea bass (CTDEEP 2015), with the remaining lobstering activity concentrated in Block Island Sound, which aligns with a similar increase in conch effort in Eastern Long Island Sound (National Fisherman 2014; Tetra Tech 2014). In Connecticut, the black sea bass annual quota is typically filled exclusively from trawling activity in Long Island Sound (CTDEEP 2015).

Beacon Wind will avoid, minimize or mitigate construction, operation, and decommissioning impacts on trap and pot fisheries, as discussed in **Section 8.8.4**.

FIGURE 8.8-25. TOTAL POT AND TRAP ACTIVITY 2011-2015



Data Sources: BOEM, ESRI, NOAA NCEI, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

Information Acquired Through Outreach

Before the Lease Area and submarine export cable routes geophysical and geotechnical surveys began in 2020 and 2021 Beacon Wind FLOs had regular and constant communications with the fixed gear fishermen to provide survey updates and schedules. Extensive communications such as dock visits, calls, texts and emails were conducted and in May 2021, an Open House in Mt. Sinai, Long Island was hosted to address concerns of the Long Island Sound lobster and conch fisherman. The NYSDEC requested Beacon Wind to send out a hardcopy mailing to all New York marine fisheries permit holders which consisted of 2,500 contacts. Other ports to reach Long Island Sound fishermen included Stonington, Connecticut; Guilford, Connecticut; Bridgeport, Connecticut; New London, Connecticut; Northport, New York; Mattituck, New York; Greenport, New York; Montauk, New York; and New Bedford and Fairhaven Massachusetts.

The team has encountered no lobstermen coming from more distant ports to fish in the Project Area. Since there is some potential for towed survey instruments to contact lobster pot buoy lines, this fishery has received considerable attention from Beacon Wind leading up to and during offshore survey activity (per the Fisheries Communication Plan). There were no negative interactions experienced in the 2 years of survey effort to date.

8.8.2.2.4.6 Other Commercial Fisheries – Rod and Reel

Rod and reel fishermen commercially harvest scup, black sea bass, tautog, summer flounder, bluefish, and striped bass, as well as several highly migratory species in and around the Project Area. Beacon Wind is currently supporting the funding of a study of highly migratory species associated with the MA-RI Lease Areas, with other developers. This study, being conducted by the Anderson Cabot Center for Ocean Life at the New England Aquarium, will provide additional insight into this fishery. Rod and reel fishing occurs year-round, and throughout the Project Area depending on the location of target species, but increases in intensity from April through November.

The inshore rod and reel fishery typically target bottom habitats that provide structure and ambush points for inshore fish to feed in. The offshore rod and reel fishery more often target areas of depth changes such as shoals, ridges, lumps, banks, shipwrecks, and reefs. These areas of seabed relief can create upwellings that, in turn, create rapid changes in temperature, which become aggregation points for prey species that attract migratory species targeted in the rod and reel fishery, such as tuna and shark. These areas of complex seabed are generally not conducive to wind turbine or submarine cable installation and therefore there is generally a natural separation between offshore wind farms and these types of fishermen. Additionally, many recreational angling associations are embracing the concept of offshore wind development in that it will bring structure to new areas that have generally been fairly featureless and that turbine foundations and scour protection, as seen for other offshore wind facilities and artificial reefs on the east coast and oil facilities in the Gulf of Mexico, will likely increase species diversity and concentrate abundance of these species within and surrounding offshore wind facilities.

8.8.2.3 Regional Effects of Climate Change on Distributions of Fisheries Resources

Fisheries distributions in the Project Area, and across all New England and the Mid-Atlantic, are undergoing marked changes in response to ocean warming (Brander 2007; Hare et al. 2016) and decreases in the pH of ocean water (acidification) (Saba et al. 2016). Regional effects of climate change on distributions of finfish and shellfish are discussed in **Section 5.5 Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat** and summarized below.

The acidification of ocean water is associated with impacts on survival and health of bivalves and shellfish, including scallop (Cooley et al. 2015; Rheuban et al. 2018; Stevens and Gobler 2018); declines in economic value of affected species are predicted (Rheuban et al. 2018). Less is known about direct effects of acidification on cartilaginous and bony fishes, but effects on fishes that rely on calcareous species could follow.

Water temperatures in the Project Area are reported to be increasing over time (Friedland and Hare 2007), which has resulted in geographic shifts of the spatial distribution of fish and shellfish species. Dozens of groundfish species and lobster in the continental shelf of Mid-Atlantic waters and Southern New England waters have shifted northward and offshore in response to warming water (Nye et al. 2009; Pinsky et al. 2013) and more species are predicted to follow (Kleisner et al. 2017; Selden et al. 2018). As bottom temperatures become too warm to support lobster larval development in the mid-Atlantic and shell disease increases, lobster landings are expected to continue to decline (Collie and King 2016; Groner et al. 201 8; Jaini et al. 2018; Rheuban et al. 2017; Wahle et al. 2015). Egg-bearing female lobsters are expected to move farther offshore to spawn in cooler waters, which would disconnect the source of larval recruits from coastal habitats where they were once common (Carloni et al. 2018). Conversely, rising temperatures are making Mid-Atlantic water more suitable for some southern species, including bay anchovy and butterfish, while at the same time making this habitat less suitable for some northern species, including winter flounder and red hake (Oviatt 2004). Additionally, Atlantic surfclams are now found at deeper depths, with those in shallower depths exhibiting higher mortalities in recent years, possibly linked to increasing ocean temperatures (Weinberg 2005). Anadromous fish such as American shad, alewife, blueback herring, striped bass, endangered Atlantic sturgeon, and others are sensitive to adverse effects of climate change (Hare et al. 2016).

8.8.3 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts on commercial and recreational fishing activity resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For the purposes of this section, the parameters provided in **Table 8.8-16** represent the maximum design scenario associated with the full build-out of the Lease Area of BW1 and BW2 and incorporates a total of up to 157 structures within the Lease Area (made up of up to 155 wind turbines and two offshore substation facilities) with a submarine export cable routes to Queens, New York and a submarine export cable route for BW2 to either Queens, New York or to Waterford, Connecticut.

TABLE 8.8-16. SUMMARY OF MAXIMUM DESIGN SCENARIO PARAMETERS FOR COMMERCIAL AND RECREATIONAL FISHING

Parameter	Maximum Design Scenario	Rationale
Construction		
Offshore structures	Based on a full build-out of the Project (BW1 and BW2) of 155 wind turbines and two offshore substation facilities.	Representative of the maximum number of structures for BW1 and BW2.
Wind turbine foundation	Monopile	Representative of the foundation option that has an installation method that would result in the maximum introduction of underwater noise
Wind turbine foundation installation method underwater noise	Pile driving	Representative of the installation method that would result in the loudest underwater noise generated.
Submarine export cable	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (202 nm [375 km]) • BW2: o To Queens, New York (202 nm [375 km]), or o To Waterford, Connecticut (113 nm [209 km])	Representative of the maximum length of new submarine export cable to be installed and the associated Project-related vessels.
Interarray cables	Based on full build-out of BW1 and BW1, with the maximum number of structures (155 wind turbines and two offshore substation facilities) to connect. BW1: 162 nm (300 km) BW2: 162 nm (300 km)	Representative of the maximum length of new interarray cables to be installed and associated Project-related vessels.
Safety zones Project-related vessels and structures	Based on full build-out of the Project, which corresponds to the maximum number of structures (155 wind turbines and two offshore substation facilities) and maximum number of associated vessels and safety zones. 1,640 ft (500 m) around relevant structures, activities, and vessels.	Representative of the maximum cumulative area and duration in which marine users will be restricted from entering.

Parameter	Maximum Design Scenario	Rationale
Duration offshore installation	Based on full build-out of the Project which corresponds to the maximum number of structures (155 wind turbines and two offshore substation facilities) and maximum period of cumulative duration for installation.	Representative of the maximum period required to install the offshore components, which has the potential to impact resources in, access to, or enjoyment of the Project Area.
Operations		
Loss of habitat foundation type	Wind Turbines Based on suction bucket jacket, which represents the maximum overall footprint (155 x 3.0 ac [1.2 ha] with scour protection). Total 465 ac (188 ha) including scour protection. Offshore Substation Facilities Based on suction bucket jacket, which represents the maximum overall footprint (2 x 5.2 ac [2.1 ha] with scour protection). Total 10.4 ac (4.2 ha) including scour protection.	Representative of the maximum long-term loss of habitat and marine areas.
Offshore structures	Based on a full build-out of the Project (BW1 and BW2) of 155 wind turbines and two offshore substation facilities.	Representative of the presence of new fixed structures in an area that previously had none.
Project-related vessels collision risk	Based on full build-out of the Project (155 wind turbines, two offshore substation facilities, submarine export cable routes, and associated interarray cables and the maximum number of vessels and movements for servicing inspections). Based on maximum number of vessels and movements for servicing and inspections.	Representative of the maximum predicted Project-related vessels for collision risk.
Offshore O&M activities	Based on full build-out of the Project (155 wind turbines, two offshore substation facilities, submarine export cable routes, and associated interarray cables and the maximum amount of Project-related activities expected per year).	Representative of the maximum amount of activities, and associated vessels, from the Project during the O&M phase.
Interarray cables	Based on full build-out of the Project (up to 162 nm [300 km] for BW1 and 162 nm [300 km] for BW2).	Representative of the maximum length of interarray cables and associated surface protection, which would result in the maximum risk of interactions with vessels anchors. Representative of the maximum extent of reduced draft and risk for interactions with vessel anchors.

Parameter	Maximum Design Scenario	Rationale

Submarine export cables	Based on full build-out of the Project (BW1 and BW2):
	• BW1 to Queens, New York (202 nm [375 km]).
	• BW2:
	  o To Queens, New York (202 nm [375 km]) or
	  o To Waterford, Connecticut (113 nm [209 km]).
		Representative of the maximum number and length of submarine export cable and associated surface protection, which would result in the maximum risk of interactions with vessels anchors.
		
		Representative of the maximum extent of reduced draft and risk for interactions with vessel anchors.

8.8.3.1 Construction

During construction, the potential impact-producing factors for commercial and recreational fishing may include:

- Increase in Project-related vessel traffic;
- Installation of offshore components, including the foundations, submarine export cable, offshore substation facilities, interarray cables, and cofferdams;
- Introduction of partially installed structures, including the foundations; and
- Presence of safety zones.

The following impacts may occur as a consequence of the factors identified above:

- Short-term implementation of safety zones around construction vessels, partially installed structures and installation activities creating temporary loss of, or access to, fishing grounds;
- Short-term localized impacts on commercial target species (**Section 5.5 Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat**);
- Short-term localized suspension of sediment to the water column (**Section 4.2 Water Quality**)
- Short-term presence of partially installed structures presenting allision and snagging risk; and
- Short-term increased Project-related vessel traffic resulting in increased collision risk (**Section 8.7 Marine Transportation and Navigation**).

Cable installation activities, for both the submarine export cables and interarray cables, will overlap temporally and spatially with fishing activities. Pending expansion of USCG authorities, temporary safety zones during construction, or as required for maintenance, will be applied. Submarine export cable installation activities will utilize a narrow “rolling” construction zone (approximately 1,640 ft [500 m] wide) along the submarine export cable routes from landfalls out to the Lease Area, while interarray cable installation activities will be limited to areas of construction zones. However, both submarine export cable and interarray cable installation impacts are anticipated to predominantly represent short-term impacts to fisheries where cable installation activities occur. Once cable installation is complete, marine activities, including commercial and recreational fishing, will continue; bound by existing navigational regulations.

As described in **Section 3 Project Description** and **Section 8.12 Public Health and Safety**, to promote safety of the public, work crews, and equipment during construction, Beacon Wind proposes to utilize 1,640 ft (500 m) Safety Zones around relevant structures, activities, and vessels in a dynamic approach, as previously defined for the Block Island Wind Farm (81 FR 31862). Should USCG Safety Zone authorities not extend beyond 12 nm (1.9 km) at the time of construction, Beacon Wind will utilize a combination of safety vessels, LNMs, and Convention on the International Regulations for Preventing Collisions at Sea (COLREGS) to promote both awareness of these activities and the safety of the construction equipment and personnel. Further safety zones may be defined as appropriate, in coordination with the USCG and based on previous discussions with USCG (see **Appendix B Summary of External Engagement Activities**).

As demonstrated earlier in this section, much of the fishing effort (otter trawling, squid trawling, scallop dredging, hydraulic clam dredging, etc.) is concentrated outside of the Project Area, particularly in the most recent years for which data is available (see **Figure 8.8-13**, **Figure 8.8-14.**, **Figure 8.8-16.**, **Figure 8.8-18.**, **Figure 8.8-20**, and **Figure 8.8-25**). In addition, the surveys of the Project Area conducted by Beacon Wind, which included opportunistic observations by OFLRs to characterize the fishing effort expended within the Project Area, suggest that low levels of fishing activity currently exist within the Project Area. Therefore, although some years have higher densities of fishing, in other years the likelihood of interaction between fishing and interarray cable installation is likely to be low. OFLRs observed higher concentrations of trawling and clam dredging vessels outside of the Project Area. These observations are supported by reports from OFLRs and supplementary AIS records. With consideration to the direct observation data combined with AIS records and VMS data, the level of fishing activity within the Project Area is variable, but the most recent years indicate low levels of fishing activity; therefore, with rolling safety zones to minimize the effect of potential displacement from fishing areas, the potential for impacts due to loss of or access to grounds during construction is expected to be minimal.

Commercial and recreational fishermen seek assurance that they will have access to fish in, and transit through, the Project Area safely and effectively during construction. Beacon Wind and the federal and state agencies consulted throughout this process support this concept, in development of the 1x1 nm (1.9x1.9 km) layout, as discussed in **Section 8.8.3.2.1.3**. It should be noted, however, that there may be temporary safety exclusion zones around turbines during construction and installation, and around cables if exposed on a temporary basis. The potential hazards to navigation associated with construction of the Project, including increased vessel traffic associated with the construction of offshore structures, are discussed in **Appendix BB Navigation Safety Risk Assessment**. To support safe navigation through and fishing within the Project Area during construction and minimizing interactions with the commercial and recreational fishing industry, Beacon Wind has developed specific mitigation measures as part of a Fisheries Mitigation Plan (summarized in **Section 8.8.4**) to be implemented during construction of the Project.

As described in **Section 5.5 Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat**, construction activities may result in localized, short-term impacts on fish and invertebrate resources, including: short-term physical disturbance of habitat, short-term exposure to underwater noise during construction activity, and short-term increase in turbidity and sediment deposition. The analysis of potential impacts in **Section 5.5 Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat** supports the overall determination that construction activities associated with the Project would be unlikely to result in significant adverse impacts on demersal or pelagic life stages of fish or invertebrates. Impacts on demersal and pelagic life stages of fish and invertebrates are likely to be short-term, localized and not affect managed fishery stocks or populations.

8.8.3.2 Operations and Maintenance

During operations and maintenance, the potential impact-producing factors for commercial and recreational fishing may include:

- The presence of new fixed structures (e.g., wind turbines and offshore substation facilities);
- O&M vessel traffic;
- Presence of Project-related submarine export and interarray cables, and associated cable protection; and
- Installation and maintenance of scour and cable protection.

The following impacts may occur as a consequence of the factors identified above:

- The long-term presence of new fixed structures may result in loss of access to traditional fishing grounds, modification of habitat and displacement of target commercial species, including potential long-term positive beneficial increases in species biodiversity and abundance during operations;
- Hazards to navigation, including increased Project-related vessel traffic and long-term impacts to marine radar/navigation instruments due to the presence of wind turbines; and
- Change in target species availability. The total acreage lost depending on foundation type for wind turbines would be Monopile Foundation: 141.05 ac (57.08 ha), Pile Jacket Foundation: 294.5 ac (119.18 ha), or Suction Bucket Foundation: 651 ac (263.45 ha) and for offshore substation facilities would be Pile Jacket Foundation: 8.0 ac (3.2 ha) or Suction Bucket Foundation: 10.4 ac (4.1 ha). The maximum total acreage lost would be no more than 0.5% of the Lease Area.

8.8.3.2.1 Loss of Access to Traditional Fishing Grounds

As demonstrated in each of the fishing techniques sections, much of the fishing effort is concentrated outside of the Project Area, particularly in the most recent years for which data is available. In addition, observations during surveys conducted by Beacon Wind suggest that more recently there have been low levels of fishing activity within the Project Area. Observations and reports from onboard OFLRs and AIS records support this. With consideration to the direct observation data combined with AIS records and VMS data, the level of fishing activity within the Project Area is variable, but the most recent years indicate low levels of activity in several fisheries, therefore, the potential for impacts due to loss of grounds is expected to be minimal. Beacon Wind will mitigate to reduce impacts to loss of fishing grounds from the Project as described in **Section 8.8.4**.

Once operational, commercial, and recreational fishermen will continue to have the ability to transit safely and efficiently through the wind farm, as provided by the 1x1 nm (1.9x1.9 km) layout agreement' discussed in **Section 8.8.3.2** and **Appendix BB Navigation Safety Risk Assessment**, with the potential to seek alternate routes during bad weather.

8.8.3.2.1.1 Submarine Export Cable and Interarray Cables

The presence of Project-related submarine electrical cables in the operational wind farm is not expected to restrict access to traditional fishing grounds within the Lease Area or along the submarine export cable routes. As discussed in **Section 3 Project Description**, Beacon Wind will determine through a CBRA the appropriate target burial depth for submarine cables, informed by engagement with regulators and stakeholders (including commercial fisheries stakeholders), extensive experience with submarine assets, and based on an assessment of seabed conditions and activity (including fishing) in the area. The target burial depth accounts for seabed mobility and the risk of interaction with external hazards such as fishing gear and vessel anchors, while also considering other factors such as existing navigational routes.

The varying perception of fishing over subsea cables has been considered by Beacon Wind since it was initially raised during outreach. Some fishermen have indicated that they would be concerned about fishing over buried subsea cables, particularly through the Project Area where there are higher densities of interarray cables, regardless of how deeply the cables were buried, while other captains stated that they would have no concerns towing between interarray cables or avoiding these areas in favor of others. Other fishermen have advised they would fish over sufficiently buried cables.

Information from the subsea telecommunications cable sector can provide insight to the discussion of offshore wind cable burial depth. The proposed submarine export cables would cross up to seven existing fiber optic subsea telecommunications cables, and one existing power transmission cables – including the 24-mile-long HVDC Cross-Sound Cable (between New Haven, Connecticut and Shoreham, New York). During the 1980s and 1990s, regional submarine telecommunications cables experienced several cases of damage from hydraulic clam dredges. During that period the typical target burial for such a cable was 2 to 3 ft (0.6 to 0.9 m) into the sediment.

To confirm that the Project cable installation has achieved the target burial depth, the cables will be inspected as part of a post-lay inspection regime designed to provide Beacon Wind with as-laid documentation and to confirm depths of burial. Additionally, the location of submarine export cables and associated cable protection will be provided to NOAA's Office of Coast Survey after installation is completed so that they may be marked on nautical charts. As discussed in **Section 3 Project Description**, survey frequency thereafter will depend on the findings of the initial surveys (i.e., site seabed dynamics and sediment conditions). For example, a survey may be conducted after a major storm event. Surveys of the cables will most likely be conducted in coordination with the scour surveys at the foundations.

The submarine export cable routes are engineered to minimize areas where burial might be hindered by seabed conditions including hard grounds, variable glacial tills, areas of steep slopes, and shallow or surficial hardbottom or ledge (see **Section 4.1 Physical and Oceanographic Conditions**). However, in certain locations where target burial depth is not achieved, cable protection may be required, as discussed in **Section 3 Project Description**. It is important to consider such instances on a case-by-case basis and consider the mobility of sediments in each area as well. For example, if target burial for a certain area were six feet (1.8 m), and firm seabed prevented achieving more than three feet, consideration might be given to avoiding extra measures that might cause snags (e.g., cable protection on the seafloor), depending on the seabed activities present (regulation permitting). The activities requiring deepest burial in the Project Area are ship anchoring and clam dredging. In areas where those are highly unlikely, three feet of cover may be appropriate protection, and this type of potential adjustment of burial depth would be discussed with permitting agencies, as appropriate. Furthermore, in areas where firm seabed prevents deep burial by specialized cable tools, it is less likely that common fishing gear including trawls and dredges would penetrate such firm seabed.

It is anticipated that cable protection will have minimal impact to the existing fisheries regime, as areas where the seabed dictates cable protection are often found in proximity to other natural snags, and therefore are not likely trawled or dredged. Should an area of surficial hardbottom or a subsea asset crossing necessitate external protection of the cables (i.e., crushed rock), that area of bottom could become a snag to trawling or dredging (i.e., due to the potential for gear hangs). These areas may have already been known seabed obstructions (snags) prior to construction, as they often represent pre-existing surficial obstructions to burial that were unavoidable; however, some loss of grounds is likely to occur due to cable protection methods. For example, Beacon Wind has identified multiple planned, active, or out-of-service pipelines and cables that will be crossed by the submarine export cable routes (see **Section 8.10 Marine Energy and Infrastructure**). Short sections of out-of-service cables may be removed, to facilitate appropriate burial of new cables. Other structures such as pipelines may remain in place. When a new cable is laid over a pipeline, normal burial may not be possible, and that area may be considered ground lost to mobile gear. However, in this Project Area, the available information indicates no pipelines in trawling or dredging grounds where such crossings would otherwise be required. Cable burial remediation techniques, when applied, will be designed to minimize the potential for gear snags, as feasible. Fixed gear fishing around such deployments would continue as normal or with the potential benefit of additional seabed structure. Further, additional mitigation to avoid and reduce impacts (e.g., route planning, burial depth surveys, feedback based on fisheries input, etc.) will minimize the impacts of submarine export cables and interarray cables, as described in **Section 8.8.4**.

8.8.3.2.1.2. Fixed Structures

Once the Project foundations are installed, a discrete area of seabed will be rendered inaccessible due to the physical presence of the foundation and the seabed scour protection surrounding it, if required. The habitat conversion, however, is proportionally smaller by orders of magnitude in comparison to the overall region, where there is similar seabed habitat throughout (see **Section 5.5 Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat**). Fixed gear fishermen such as the pot/trap and gillnet fleet will likely be asked to keep surface marker buoys at least 165 ft (50 m) away from the foundations within up to two service vessel approach corridors to allow for safe approach by service vessels, and gear on the seabed set at least 165 ft (50 m) from the foundations should not limit access (as long as the vessel follows all applicable USCG regulations). Traps and nets set in this manner have been productive in the British lobster fishery as the increased seabed structure can provide improved habitat for structure-oriented fish and invertebrate species, where such structure is otherwise limited.

Vessel access concerns during operations are different for recreational and commercial fishermen; as larger vessels and gear are typically associated with commercial fishing, and smaller vessels and gear are typically associated with recreational fishing. However, Beacon Wind, and as understood USCG, have no intention of prohibiting fishing activities within a wind farm. Fixed gear, such as demersal gillnets (anchored on the seabed), lobster/crab pots, and bottom longlines should find relatively few challenges fishing within the Project Area, as described in the MARIPARS (USCG 2020), therefore the coexistence of mobile and fixed gear should not be diminished by the Project.

There should be few, if any, barriers for recreational fishermen wanting to fish in the wind farm during operations. Mariners will be discouraged from physically contacting the foundations, for example to tie up to them. Otherwise, full access within the operational wind farm arrays should present few restrictions or barriers. Many recreational fishermen believe that the additional structure provided by the wind turbine foundations will provide an aggregating device to attract fish, known as the "reef effect," which could increase sport fishing into the area and provide a beneficial consequence. Charter and recreational fishermen report beneficial impacts for fishing trips to the Block Island Wind Farm (Providence Journal 2019). However, it is possible that in the full build-out of the two Projects, the two offshore substation facilities may have long-term safety and security exclusions during operations due to the nature of the substation facility infrastructure. This safety/security zone would represent a smaller space than the previously described temporary safety zones, encompassing only the immediate surrounding area. Overall impact should also be minimized as the Project has been designed to accommodate pre-existing activities and fishing patterns.

8.8.3.2.1.3 Spatial Planning

The size and scale of safe access and navigation of fishing vessels within offshore wind farm areas is of primary interest to fishermen and fishing industry stakeholders. As part of the New York Offshore Wind Master Plan (2017), NYSERDA produced scaled drawings to provide stakeholders with an understanding of the layout and spacing between wind turbines relative to typical vessel and gear dimensions, and to provide context for the scale of representative vessels (NYSERDA, 2017). Beacon Wind is cognizant of such concerns by fishermen, and is part of the uniform 1x1 nm (1.9x1.9 km) spacing agreement for wind turbine layouts within the southern New England Lease Areas (Joint Developers Letter to the USCG 2019). The proposed 1x1 nm (1.9x1.9 km) layout provides even greater separation between vessels and Project Components, reinforcing the concept that this layout will promote and allow for safe fishing operation (including vessel turns and other maneuvers) within the Lease Area. The findings of the MARIPARS (USCG 2020) and other studies suggest that commercial and recreational fishing vessels will be able to operate safely within the 1x1 nm (1.9x1.9 km) layout once the proposed Project is operational. This was later confirmed by the Northern New York Bight Port Access Route Study (NNYBPARS) developed by the USCG that concludes an adequate transit lane width for vessels up to 165 feet in length is 0.62 to 0.89 nm (1.1 to 1.6 km) (USCG 2021). A separate analysis conducted by Baird (Joint Developers Letter to the USCG 2019) concluded that an agreement of turbine spacing of 1x1 nm (1.9x1.9 km) will allow for fishing vessels to more easily maneuver through the southern New England Lease Areas, as compared to a non-grid layout optimized for power generation potential. These actions will facilitate safe access and navigation of fishing vessels within the Lease Area.

8.8.3.2.1.4 Wind Turbine Spacing

Based on Project information and regional assessments dedicated to the promotion of safe navigation, such as the MARIPARS and NNYBPARS, the 1x1 nm (1.9x1.9 km) layout agreement described above, the proposed minimum turbine spacing in any one direction for the Project is 0.70 nm (1.29 km), with the predominant spacing of 1 nm (1.9 km) in the N-S and E-W orientation. Based on available data, Beacon Wind believes that this spacing in the dominant trawl directions in the Lease Area will support safe, effective fishing and transit by the majority of fishing vessels and gear in the area, appreciating there are different fishing practices in different parts of the Lease Area. With such spacing, the Lease Area has the potential to support more than two gigawatts (2,000 MW) of capacity.

Beacon Wind believes the current plans achieve an optimal balance in consideration of all area stakeholders and activities.

8.8.3.2.2 Hazards to Navigation

Beacon Wind has completed a NSRA. The NSRA, consistent with BOEM requirements and regulatory guidance (USCG NVIC 02-19 and COMDTINST 16003.2B), contains an assessment of the impact of navigational transit hazards associated with the operation of the Project. Potential hazards relating to fishing vessels transiting within the Lease Area are qualified in **Appendix BB Navigation Safety Risk Assessment**. The review of existing developments assists in qualifying activity of vessels engaged in fishing within wind farm arrays and allows for further review of incidents and accidents of fishing allision. This risk assessment within the Lease Area is in line with the assessment methodology used for other shipping and navigation impacts, including the recommendation of any additional mitigations to support navigational safety.

Regarding the act of safe fishing within offshore wind farm areas, NYSERDA produced several drawings for its Offshore Wind Master Plan (2017), to provide stakeholders with a better understanding of the area between wind turbines relative to typical vessel and gear spreads and how vessels may fish and maneuver within offshore wind farms areas. NYSERDA indicated that the extended spacing is expected to increase opportunities for fishing within arrays, depending on gear types and other factors, when compared to European offshore wind farms that typically have closer spacing between wind turbines. The scaled drawings from the NYSERDA report, combined with the fact that Beacon Wind layout will include even greater spacing between turbines, reinforce the concept that there should be ample room for safe fishing operation (including vessel turns) within the Lease Area, based on those included in the NYSERDA Fish and Fisheries Study (NYSERDA 2017).

Additionally, in accordance with NVIC 02-07 and 01-19, the USCG will consider the areas of navigational safety, the traditional uses of the waterways, and impacts of USCG missions when evaluating the potential impacts of an offshore renewable energy installation. The USCG will help develop appropriate terms and conditions that provide for navigational safety and minimize potential impacts on other USCG missions.

With respect to financial impacts associated with increased overhead expenses, there are no documented cases of an insurance company or underwriter raising rates on vessels or fleets that work within offshore windfarms in Europe or at the Block Island Wind Farm.

A CBRA will be conducted, identifying areas where specific burial depths are recommended for both interarray cables and the submarine export cables. For areas that may be subject to fishing, including the entire Lease Area and much of the submarine export cable routes length, Beacon Wind will target cable burial between 3 to 6 ft (0.9 to 1.8 m), where seabed conditions allow. This is based on extensive studies of seabed penetration of fishing gear (Stevenson et al. 2004 and others) and experience with subsea telecom cables in the northeast and mid-Atlantic. During the nineteen eighties and nineties, submarine cables landing in New Jersey suffered a number of cases of damage related to ship anchors and hydraulic clam dredges. Since 2000, new subsea cables in the New York, New Jersey and Rhode Island have adopted a practice of burial to depths of 5 to 6 ft (1.5 to 1.8 m) into the sediment. During this period, rates of cable damage have been very low even with AIS records clearly showing clam dredges and other gear types working over and near subsea cables (NASCA 2019).

Further, clam dredgers have expressed concern that during haul back they lose directional control of the vessel. Since this could increase the risk of allision with a turbine it warrants further consideration. Local clam dredge captains have indicated that the process of hauling and setting the dredge typically takes less than five minutes. The minimum turbine spacing for this Project is proposed at 0.70 nm (1.29 km), with the predominant spacing of 1.0 nm (1.85 km) in the N-S and E-W orientation. A vessel drifting at 2 knots (3.7 km/hr) for 5 minutes will travel 1,000 ft (309 m).

Although efforts have been made to find areas suitable for cable burial during the spatial planning phase, in areas where target burial cannot be achieved due to firm sediment or technical limitations, shallower burial may be required, which may require surface protection as determined by the CBRA. Cable burial remediation techniques, when applied, will be designed to minimize the potential for gear snags, as feasible. Fishermen using mobile gear that penetrate the sediment (i.e., clam and scallop fisheries) in this area often avoid hard sediments. Their gear does not penetrate deeply in such areas, and it is likely to achieve less seabed penetration than a specialized cable installation tool designed for seabed penetration used to bury cables. Additionally, where target burial depth cannot be achieved, cable burial remediation techniques, when applied, will be designed to minimize the potential for gear snags, as feasible. In areas where there are significant risks from ship anchors, target burial will be adjusted appropriately, as informed by the CBRA.

8.8.3.2.3 Change in Target Species Availability

Installation of the wind turbine and offshore substation facility foundations will convert affected isolated areas of benthic habitat within the Lease Area to hard substrate through the foundation itself at the seabed, as well as through the use of scour protection materials on the seabed. After installation, operation of the Project will result in long-term modification of the habitat composition in the immediate area of the foundations through the addition of hard settlement areas and vertical habitat structures.

Beacon Wind will introduce structures into an area of relatively uniform substrate, especially in the Lease Area, with some exceptions along the submarine export cable routes. As described in **Section 5.5 Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat** and in **Appendix T Essential Fish Habitat Technical Report**, the foundations are expected to quickly become colonized by algae and invertebrates, creating an artificial reef effect shortly after the structures are installed (Causon and Gill 2018; Degraer et al. 2018; Fayram and de Risi 2007; Griffin et al. 2016; Hooper et al. 2017a, 2017b; Langhamer 2012; Langhamer et al. 2009; Steimle et al. 2002; Steimle and Zetlin 2000). Attached organisms would create secondary habitat, increase biodiversity, and attract mobile fish and invertebrates that feed on them (Causon and Gill 2018). The resulting increase in biodiversity and productivity on the foundations could influence the distribution and abundance of predatory fish and invertebrate species (Rein et al. 2013; Reubens et al. 2013). Benthic fish collected within and outside a wind farm in the North Sea had stomachs full of hardbottom prey, suggesting that fish associated with softbottom adjacent to the wind farm responded to the prey associated with the foundations (Degraer et al. 2016).

Because structured habitats in the Project Area are currently limited primarily to shipwrecks, artificial reefs, and occasional rocky hardbottom areas, some structure-oriented species (e.g., black sea bass, ocean pout, red hake, monkfish, and squid eggs) are expected to respond favorably to the habitat created by wind turbine foundations (Guida et al. 2017, NEFMC 2017). Mobile fish and macroinvertebrate species that prefer structure will likely increase near the foundations, which may enhance the quality of fishing for various industry sectors such as recreational and for-hire fishing, as has been well-documented at the existing U.S. offshore wind projects – Block Island Wind Farm and Coastal Virginia Offshore Wind Pilot Project, as well as other artificial offshore structures on the Atlantic Coast and in the Gulf of Mexico (Ball 2013; BSEE 2018; National Fisherman 2020; Smythe et al. 2020).

The lack of naturally occurring structured habitats in the Lease Area may limit the current distribution and abundance of benthic species that use hardbottom and structure, such as tautog and black sea bass (Guida et al. 2017). These and other species associated with structure and hardbottom may move into the Lease Area in response to the installation of foundations and scour. Lobster may also seek shelter in the crevices created by various protection methods offshore. Other species may not be attracted to the structures. For example, the distribution, abundance, and condition of seven flatfish species were found not to change following the construction of the Block Island Wind Farm; likewise, multispecies bottom trawl and lobster surveys showed no changes from pre-construction conditions (Carey 2017). Although local distributions of squid and finfish may respond to the presence of foundations, no population-level effects are expected. Benthic species that prefer open sandy bottoms, such as some flatfish, would not be affected by the introduction of structure because sandy bottom is ubiquitous in the Lease Area and surrounding areas of the seafloor.

The foundations are expected to attract mobile pelagic species such as tuna (Itano and Holland 2000) and schooling forage fish (Brown et al. 2010), as well as sea turtles (Blasi et al. 2016) and marine mammals (Rein et al. 2013). Highly migratory pelagic predators move throughout the oceans and some will likely encounter the wind turbine foundations. Tuna (e.g., yellowfin, bigeye, albacore) and sharks (e.g., dusky, whitetip, shortfin mako, common thresher) may be attracted by the abundant prey that congregate on the vertical structures for shelter, foraging, or other reasons. Most highly migratory species respond to offshore structures as well as to temperature and currents (NOAA Fisheries 2017a). Some highly migratory fish may visit offshore structures because the fish are using them as navigational landmarks (Taormina et al. 2018). The role of offshore structures in fish community ecology has not been extensively studied, as the structures are generally considered to enhance recreational fishing (Ball 2013; BSEE 2018; National Fisherman 2020; Smythe et al. 2020). Schooling forage species such as halfbeaks, butterfish, and mackerel are expected to attract valuable species that follow the Gulf Stream through southern New England, such as yellowfin, bluefin, and bigeye tuna; mahi; and wahoo. Recreational anglers in private vessels or charter boats currently venture as far as offshore canyons in late summer to target the highly migratory gamefish. Effects of the introduction of structure in the Lease Area may be adverse, beneficial, or mixed, depending on the species and location (van der Stap et al. 2016). Overall, adverse impacts on commercially and recreationally valuable species are expected to be negligible within the context of the Lease Area (NOAA Fisheries 2015; RICRMC 2010).

Another type of offshore structure associated with the Beacon Wind Project is an offshore converter station, located within the offshore substation facilities, that will utilize up to 10 million gallons per day (mgd) of once-through non-contact cooling water that may result in the entrainment of egg and larval stages of ichthyoplankton species, as discussed in **Section 5.5 Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat**. The flow required by the converter station is several orders of magnitude lower than the flow (500 to 2,900 mgd) required for similar cooling water intake structures for many coastal power plants throughout the northeast (EPA 2010). While individual eggs and larvae of commercially or recreationally-managed species in the immediate vicinity of the intake may be subject to entrainment through the cooling water system, this discrete intake location is not expected to result in measurable impacts to fish or shellfish populations or managed fisheries stocks on a local or regional scale. On the discharge side, the heated cooling water (discharge temperature range will be dependent upon engineering and permitting constraints, not yet determined) is expected to dissipate rapidly within the ambient sourcewater and is not expected to result in measurable impacts to fish or shellfish populations or managed fisheries stocks.

According to a recent meta-analysis of data from offshore wind farms in Europe, fishes occur at greater abundances within operational wind farm areas than at nearby reference locations (Methratta and Dardick 2019). It remains unclear whether artificial structures increase regional biomass, redistribute existing biomass, or have some effect on both processes (Brickhill et al. 2005; Powers et al. 2003; Rein et al. 2013, Smith et al. 2015). The incidence of fishing pressure also must be accounted for, as some European wind farms are closed to fishing vessels (Coates et al. 2016), which will not be the case for Beacon Wind, or elsewhere in the U.S. At some wind farms in the North and Baltic Seas, no measurable differences in community abundances within and outside of wind farms were observed (Degraer et al. 2016; Langhamer et al. 2018). In the U.S., neither the distribution, abundance, nor condition of individual fishes was altered by installation of wind turbines at Block Island Wind Farm, despite predicted impacts to demersal fishes and American lobster communities (Wilber et al. 2018).

Overall, it is likely that offshore structures will enhance, rather than diminish, recreational fishing opportunities in the Lease Area. This is especially likely for highly migratory fish such as tuna, billfish, sharks, mahi, and wahoo, and increased structure may also enhance the availability of other species in the Lease Area (black sea bass, summer flounder, hake, tautog, etc.). The foundations and scour protection will become artificial reefs when sessile benthic organisms and algae settle upon the surfaces. This happens rapidly as the materials used in these structures are completely benign. As offshore petroleum facilities have in the Gulf of Mexico, these structures will attract marine life, enhancing fisheries and contributing to recreational fishing and some commercial fishing economic activities. Recreational, and especially those commercial fishermen with enhanced fisheries, will adapt to harvest a richer diversity of marine life now assembled in a smaller area. These structures will provide habitat, shelter, food, and other necessary elements for enhanced biodiversity.

8.8.3.3 Decommissioning

Impacts during decommissioning are expected to be similar or less than those experienced during construction, as described in **Section 8.8.3.1**. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operational phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Beacon Wind anticipates will be needed for the Project, see **Section 3 Project Description**.

8.8.4 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors described in **Section 8.8.3**, Beacon Wind is proposing to implement the following avoidance, minimization, and mitigation measures.

8.8.4.1 Construction

During construction, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.8.3.1**:

- Continued consultation with regulatory authorities and fisheries stakeholders for the development and use of a Gear Loss Prevention and Claim Procedure;
- Complete appropriate cable route planning (e.g., Cable Installation Plan) to avoid areas of high fishing activity and ensure disruption is minimized along the submarine export cable routes. Where target burial depth cannot be reached, secondary protection shall be considered and cable burial remediation techniques will be designed to minimize the potential for gear snags, as feasible;
- Use highly visible marking and lighting of active construction sites, as approved by USCG;
- Use scout vessels to identify fixed gear or other fishing activities in advance of Project-specific activities;
- Compliance by Project-related vessels with international and flag state regulations including COLREGs and the SOLAS;
- Utilization of existing TSSs, maintained channels, and transit lanes by vessels associated with the Project to comply with existing uses and management of the surrounding waterway, to the extent practicable;
- Marine coordination for vessels associated with the Project (i.e., a central coordination hub from which all Project vessel movements will be managed, and third-party traffic will be monitored);
- Minimum advisory safe passing distances for cable laying vessels (where feasible);
- Monitor third-party vessel traffic by AIS;
- Implement up to a 1,640-ft (500-m) dynamic safety zone around active construction sites (including partially installed wind turbines) to minimize areas temporarily excluded from fishing, pending agreement with USCG;
- Regular updates, including the positions of installed and partially installed structures, to the local marine community through social media, the USCG LNM, and active engagement with fishing ports throughout the region;
- The potential use of buoys and/or support vessels to mark temporary working areas or potential hazards (e.g., partially-installed structures);
- Continue implementation of a Fisheries Mitigation Plan throughout the construction process to alert local fishing industries to relevant construction activities through the use of in-person communications, social media, website communications, and LNMs;
- FLO to continue active engagement and coordination with the fishing community (through emails, flyers, social media, and websites with appropriate details and contact information) on the planning, timing, schedule, and location of activities, such as temporary construction closures/re-openings, and to the extent possible minimize spatial/temporal overlap with high fishing activity (using adaptive management to the extent practicable) so that fishermen can plan accordingly;
- Continue to use offshore OFLRs on Project-related construction vessels to facilitate direct communications with the fishing community;
- Utilize a guard/safety vessel to alert mariners to safety zones and/or active construction areas where appropriate;
- Potentially use construction practices such as rolling construction safety zones in consultation with the appropriate regulators, fisheries working groups, and the fishing community, to minimize overall area of temporary closed areas;

- Implement mitigation and avoidance measures to protect water quality, such as spill prevention. Specifically, Beacon Wind will use appropriate measures for vessel operation and implementing an agency-reviewed OSRP, which includes measures to prevent, detect, and contain accidental release of oil and other hazardous materials. Project personnel will be trained in accordance with relevant laws, regulations, and Project policies, as described in **Appendix E Oil Spill Response Plan**;
- Maintain position of most construction vessels using dynamic positioning, limiting the use of anchors and jack-up features, where feasible; and
- Consider the use of HDD at the landfalls to minimize physical disturbance of coastal habitats. Beacon Wind would implement appropriate measures during HDD activities at landfalls to minimize potential release of HDD fluid. To minimize an inadvertent fluid return, an HDD Contingency Plan would be developed and implemented.

8.8.4.2 Operations and Maintenance

During operations and maintenance, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.8.3.2**:

- Continued consultation with regulatory authorities and fisheries stakeholders for the development and use of a Gear Loss Prevention and Claim Procedure;
- Complete appropriate cable route planning (e.g., CBRA) to avoid areas of high fishing activity, sensitive benthic habitats, and to maximize the likelihood of sufficient burial depth along the submarine export cable routes. Where target burial depth cannot be reached, secondary protection shall be considered;
- During maintenance activities within the offshore environment, alert the fishing industry to the occurrence of these activities. Communication methods will include the use of FLOs, social media, website communications, and LNM;
- Utilize the adopted 1x1 nm (1.9x1.9 km) layout in consultation with other developers in the RI/MA WEA to support active fishing agreement between static and mobile fishing gear to achieve consistent wind turbine spacing and N-S, E-W lines of orientation within the array that facilitate continued access to traditional fishing grounds;
- To minimize risk of anchors and fishing gear snagging the submarine export cables or interarray cables should be buried to a target burial depth of 3 to 6 ft (0.9 to 1.8 m) where clam dredging is known to occur in order to minimize the risk of snagging;
- Following installation of the submarine export cables and interarray cables, conduct cable burial surveys at appropriate intervals to assess if target burial depth is being maintained;
- Cable burial remediation techniques, when applied, will be designed to minimize the potential for gear snags to the extent practicable and cable burial remediation techniques will be designed to minimize the potential for gear snags, as feasible;
- Provide all submarine export cables, interarray cables, wind turbines, and offshore substation facility locations to NOAA for updates to nautical charts;
- To the extent practicable and in consultation with the fishing industry, mark turbine locations and cable routes on the most common types of software used by fishermen for navigation and fishing;
- Mark and light all wind turbines and offshore substation facilities in accordance with FAA Advisory Circular 70/7460-1M, BOEM's *Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development* (2021), IALA

Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA 2013), and USCG LNM;[17]

- Compliance by Project-related vessels with international and flag state regulations including the COLREGs and the SOLAS;
- Utilization of existing TSSs, maintained channels, and transit lanes by vessels associated with the Project to comply with existing uses and management of the surrounding waterway, to the extent practicable;
- Marine coordination for vessels associated with the Project (i.e., a central coordination hub from which all Project vessel movements will be managed, and third-party traffic will be monitored);
- Monitor third-party vessel traffic by AIS;
- Neither intend to restrict nor apply for broad-based restrictions on fishing activities within the operational wind farm. To the extent that any restrictions are necessary, these may be limited to operational safety zones around manned or sensitive offshore platforms or access points;
- FLO to continue active engagement and coordination with the fishing community (through emails, flyers, social media, and websites with appropriate details and contact information) on the planning, timing, schedule, and location of maintenance activities, such as temporary construction closures/re-openings, and to the extent possible minimize spatial/temporal overlap with high fishing activity (using adaptive management to the extent practicable) so that fishermen can plan accordingly;
- Conduct EMF modeling and assessments to identify potential mitigation requirements, such as the use of proper shielding and sufficient burial of submarine export cables and interarray cables (where feasible) to reduce EMF impacts. If depth cannot be reached, Beacon Wind may add protective materials over cable which allows fishing activity to occur, and cable burial remediation techniques will be designed to minimize the potential for gear snags, as feasible;
- Provide all submarine export cables, interarray cables, wind turbines, and offshore substation facility locations to NOAA for updates to nautical charts; and
- Implement mitigation and avoidance measures to protect water quality, such as spill prevention. Specifically, Beacon Wind will use appropriate measures for vessel operation and implementing an agency-reviewed OSRP, which includes measures to prevent, detect, and contain accidental release of oil and other hazardous materials. Project personnel will be trained in accordance with relevant laws, regulations, and Project policies, as described in **Appendix E Oil Spill Response Plan**.
- Support regional monitoring of wildlife and key commercial fish stocks equivalent to the specified value of $10,000 per MW. Half of this will support regional monitoring of key commercial fish stocks to better understand how offshore wind energy development is potentially altering the biomass and/or distribution of these stocks; and the other half will support regional monitoring of wildlife to better understand how offshore wind energy development effects distribution and abundance of sensitive species. These monitoring efforts may be committed via regional monitoring organizations (e.g., ROSA, Regional Wildlife Science Entity (RWSE) or similar) or independently by Beacon Wind.

[17] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

8.8.4.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in **Section 8.8.3.1**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

8.8.5 References

TABLE 8.8-17. SUMMARY OF DATA SOURCES

Source	Includes	Available at	Metadata Link
BOEM	Lease Area	https://www.boem.gov/BOEM-Renewable-Energy-Geodatabase.zip	N/A
BOEM	State Territorial Waters Boundary	https://www.boem.gov/Oil-and-Gas-Energy-Program/Mapping-and-Data/ATL_SLA(3).aspx	http://metadata.boem.gov/geospatial/OCS_SubmergedLandsActBoundary_Atlantic_NAD83.xml
NROC and MARCO	VMS Fishing Activity by Gear Type and FMP	https://oceandata.rad.rutgers.edu/arcgis/rest/services/	N/A
NOAA, NYSDEC	Artificial Reef	ftp://ftp.coast.noaa.gov/pub/MSP/ArtificialReefs.zip	https://inport.nmfs.noaa.gov/inport/item/54191
NOAA	Lobster Restricted Gear Area	https://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/Lobster_Restricted_Gear_Areas/Lobster_Restricted_Gear_Areas_20140915.zip	https://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/Lobster_Restricted_Gear_Areas/Lobster_Restricted_Gear_Areas_METADATA.pdf
NOAA	Sea Scallop Accountability Measure Area	http://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/Sea_Scallop_Accountability_Measure_Areas/Sea_Scallop_Accountability_Measure_Areas_20180419.zip	http://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/Sea_Scallop_Accountability_Measure_Areas/Sea_Scallop_Accountability_Measure_Areas_METADATA.pdf
NOAA	Surfclam/ Quahog Closed Area	https://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/Environmental_Degradation_Closures/Environmental_Degradation_Closures_20140501.zip	https://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/Environmental_Degradation_Closures/Environmental_Degradation_Closures_METADATA.pdf

Source	Includes	Available at	Metadata Link
NOAA	Southern New England Scallop Dredge Exemption Area	http://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/SNE_Scallop_Dredge_Exemption_Area/SNE_Scallop_Dredge_Exemption_Area_20150315.zip	http://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/SNE_Scallop_Dredge_Exemption_Area/SNE_Scallop_Dredge_Exemption_Area_METADATA.pdf
NOAA	Sector Small-Mesh Exemption Area	http://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/Sector_Small-Mesh_Exemption_Area/Sector_Small-Mesh_Exemption_Area_20190215.zip	http://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/Sector_Small-Mesh_Exemption_Area/Sector_Small-Mesh_Exemption_Area_METADATA.pdf
NOAA	Southern New England Exemption Area	http://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/SNE_Exemption_Area/SNE_Exemption_Area_20150315.zip	http://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/SNE_Exemption_Area/SNE_Exemption_Area_METADATA.pdf
NOAA	Sea Scallop Rotational Area	http://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/Sea_Scallop_Rotational_Areas/Sea_Scallop_Rotational_Areas_20180419.zip	http://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/Sea_Scallop_Rotational_Areas/Sea_Scallop_Rotational_Areas_METADATA.pdf
NOAA NCEI	Bathymetry	https://www.ngdc.noaa.gov/mgg/coastal/crm.html	N/A
Northeast Ocean Data	VMS and VTR Fishery Specific	https://devservices.northeastoceandata.org/neoddev/rest/services/	N/A
NROC and MARCO	VMS and AIS Fishing Transits/ Activity	https://portal.midatlanticocean.org/data-catalog/fishing/	https://www.northeastoceandata.org/files/metadata/Themes/CommercialFishing/VMSCommercialFishingDensity.pdf
NYSDEC	Proposed Artificial Reef	https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Biomass-Solar-Wind/Master-Plan/17-25g-Consideration-of-Potential-Cumulative-Effects.pdf	https://www.dec.ny.gov/docs/fish_marine_pdf/dmrreefguide.pdf.
NYSDOS	Recreational Fishing	https://opdgig.dos.ny.gov/#/search/browse	http://opdgig.dos.ny.gov/geoportal/catalog/search/resource/detailsnoheader.page?uuid={3B5083DA-2060-4F5D-8416-201A0A2B962B}

Source	Includes	Available at	Metadata Link
NY OPDGIG	Recreational Diving Wreck	https://opdgig.dos.ny.gov/#/search/browse	http://opdgig.dos.ny.gov/geoportal/catalog/search/resource/detailsnoheader.page?uuid={4990846B-A419-486B-AA9F-A7D770382832}

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8.9 Department of Defense and OCS National Security Maritime Uses

This section describes national security maritime uses that occur within and around the Project Area. Potential impacts to/conflicts with military activities resulting from construction, operations, and decommissioning of the Project are discussed. Proposed Project-specific measures adopted by Beacon Wind as a result of outreach and engagement are also described, which are intended to avoid, minimize, and/or mitigate potential impacts to national security maritime uses.

Other resources and assessments detailed within this COP that are related to national security maritime uses include:

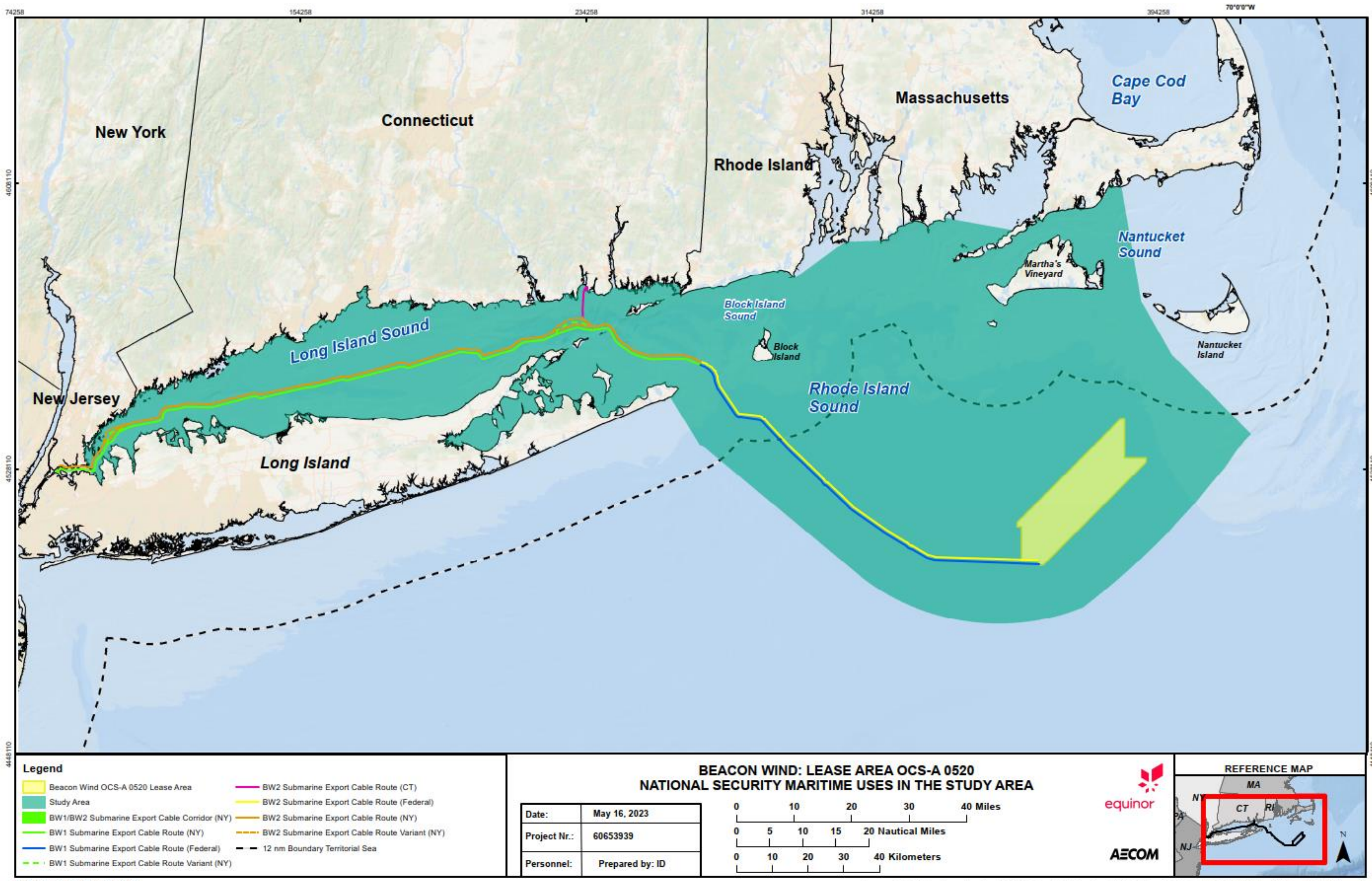
- Aviation (**Section 8.6**);
- Marine Transportation and Navigation (**Section 8.7**);
- Aircraft Detection Lighting System (ADLS) Analysis (**Appendix Y**);
- Obstruction Evaluation and Airspace Analysis (**Appendix Z**);
- Radar and Navigational Aid Screening Study (**Appendix AA**);
- Navigation Safety Risk Assessment (**Appendix BB**); and
- Air Traffic Flow Analysis (**Appendix FF**).

Data Relied Upon and Studies Completed

For the purposes of this section, the Study Area includes the offshore waters and coastlines within and in the vicinity of the Lease Area and the submarine export cable routes (**Figure 8.9-1**). This section relies upon navigation charts and maps, as well as information gathered during outreach and engagement activities.

Beacon Wind understands that certain national security activities are covert and not visible to the public. Therefore, Beacon Wind has been working with key stakeholders within the DoD and Homeland Security to maintain open communications during the development of this COP. This includes on-going coordination with the Military Aviation and Installation Assurance Siting Clearinghouse (DoD Siting Clearinghouse), U.S. Navy Fleet Forces Command, and U.S. Navy Seafloor Protection Office. On November 18, 2020, Beacon Wind submitted a request to the DoD Siting Clearinghouse to initiate informal review of the Project. A meeting was held on June 29, 2021, to kick-off the mitigation agreement process with the DoD mitigation response team and it was determined that the DoD would begin drafting a mitigation agreement for the Beacon Wind Project to be formalized following COP submittal. Through the mitigation agreement process, Beacon Wind provides detailed Project information, and the DoD identifies specific actions to mitigate impacts on military uses and missions. Beacon Wind remains committed to maintaining open lines of communication, and additional details regarding engagement efforts with key national security stakeholders are further described in this section.

FIGURE 8.9-1. NATIONAL SECURITY MARITIME USES IN THE STUDY AREA



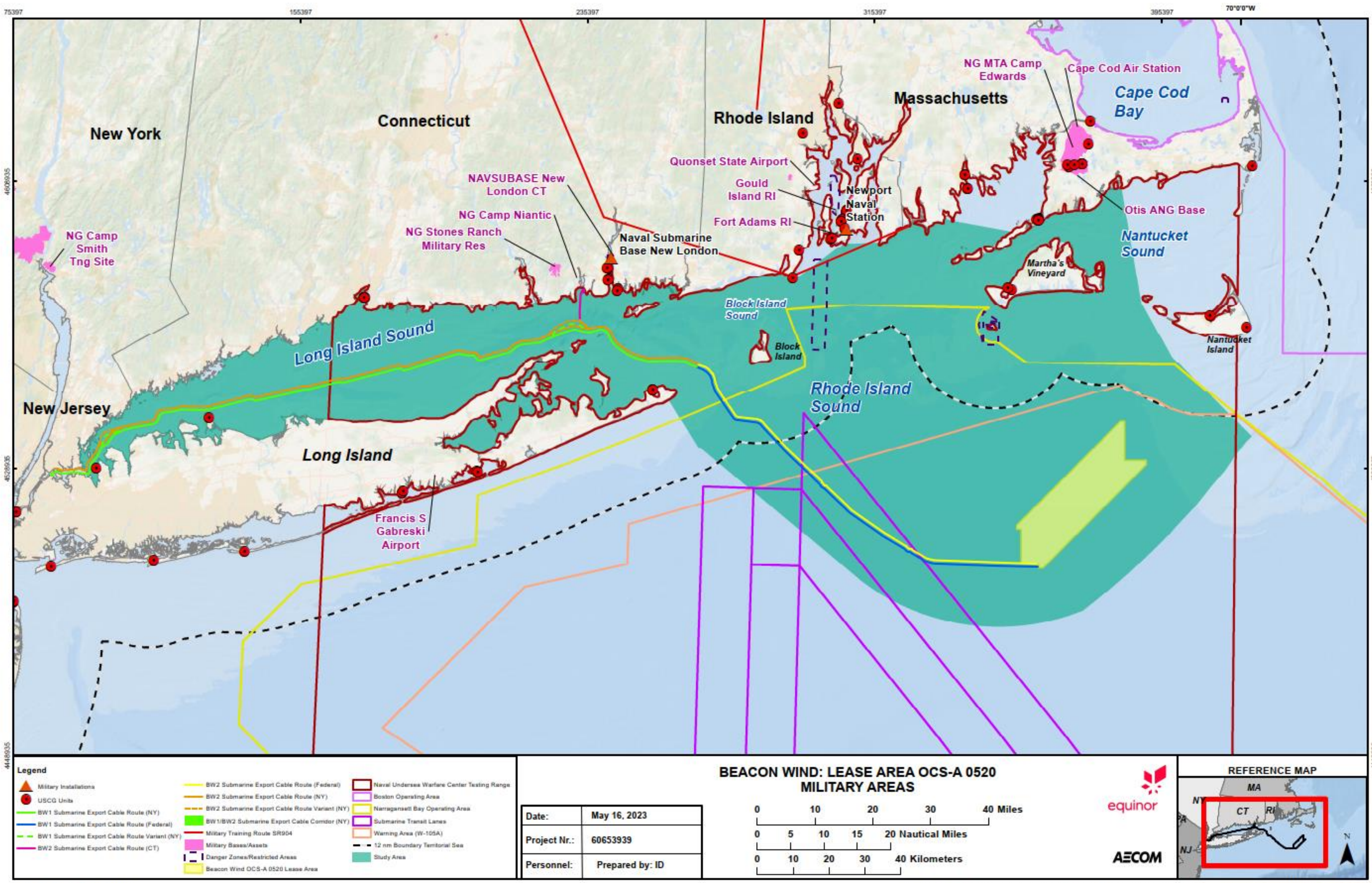
Data Source: BOEM, ESRI, NOAA
Service Layer Credits Source: ESRI, Maxar, GeoEye, Earth STar Geographics, CNES/Airbus DS, USGA, USGS, AeroGRID, IGN, and the GIS User Community

Document Path: C:\Users\savannah.walters\AECOM\Equinor - Site Folders\Reports\BW2 COP\working\Section 8.9 - DoD\8.91 National Maritime_in_Study_Area.mxd

8.9.1 Affected Environment

The affected environment is defined as areas where national security maritime activities are known to occur and have the potential to be directly or indirectly affected by the construction, operations, and decommissioning of the Project. This includes the Project Area defined as the Lease Area and submarine export cable routes. The Study Area is the area surrounding the Project Area that was considered for military activities. Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Beacon Wind expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards, which Beacon Wind will comply with in using the facilities. Known areas of national security maritime operation are illustrated in **Figure 8.9-1** and **Figure 8.9-2**.

FIGURE 8.9-2. MILITARY USE IN THE STUDY AREA



Data Source: BOEM, ESRI, NOAA
Service Layer Credits Source: ESRI, Maxar, GeoEye, Earth STar Geographics, CNES/Airbus DS, USGA, USGS, AeroGRID, IGN, and the GIS User Community

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8.9.1.1 Military Range Complex

There are two offshore Military Range Complexes that fall within the Study Area: the Boston Range Complex (Globalsecurity.org 2021a) and the Narragansett Bay Range Complex (Globalsecurity.org 2021b). These primarily consist of surface sea spaces and subsurface space located off the coasts of New York, Connecticut, Rhode Island, Massachusetts, Maine, and New Hampshire, and are controlled by the Fleet Area Control and Surveillance Facility, Virginia Capes Naval Air Station Oceana. Primary Navy installations operating in this complex are located in New London, Connecticut and Newport, Rhode Island. Both range complexes consist of danger zones, warning areas, and several restricted areas; however, the portion of the Boston Range Complex that falls within the Study Area does not contain any of these area designations.

As part of the range complex, the Boston Operating Area (OPAREA) extends from the shoreline seaward to approximately 67 nm (124 km) from land at its farthest point. The Narragansett Bay OPAREA extends further from land and is approximately 180 nm (333 km) from shore at its farthest point. The eastern portion of the Study Area overlaps with the Boston OPAREA; however, this overlap accounts for less than 0.5 percent of the total OPAREA. The southern part of the Study Area occupies a more significant portion of the Narragansett Bay OPAREA with more than 9.5 percent of the OPAREA falling in the Study Area boundaries. BOEM (BOEM 2018) indicated that military training exercises within this OPAREA occur in deeper offshore waters to the southeast of the Lease Area, though transit of military vessels may occur throughout the area.

8.9.1.2 Warning Areas

The Narragansett Bay Warning Area is actively used for U.S. Navy subsurface and surface training and testing activities, and to prepare submarines and their crews for formal voyages. Specifically, these Warning Areas are used to support special-use airspace, flight testing, surface-to-air gunnery exercises using conventional ordinance, antisubmarine warfare exercises, and air-intercept training (Globalsecurity.org 2021b). Special use airspace is an area designated for operations where limitations may be imposed on aircraft not participating in operations. Potential effects on aviation are discussed further in **Section 8.6 Aviation**. The southern portion of the Lease Area is located within a Narragansett Bay Warning Area (**Figure 8.9-2**). The DoD Siting Clearinghouse informal review of the Beacon Wind Project did not identify potential for impacts to the Narragansett Bay Warning Area resulting from the presence of the Project.

8.9.1.3 Danger Zones and Restricted Areas

Danger zones are defined by 33 CFR § 334.2 as “a defined water area (or areas) used for target practice, bombing, rocket firing or other especially hazardous operations, normally for the armed forces.” Restricted areas are those defined areas where public access is prohibited or limited due to general use by the U.S. government. There are six Danger Zones/Restricted Areas (DZ/RA) within the vicinity of the Study Area.

A large DZ/RA is located in the approaches to Narragansett Bay, Rhode Island and Buzzards Bay, Massachusetts and described on NOAA Chart 13218 (NOAA 2018) as the following:

> “A 2-mile-wide restricted area extends from the Northern limits of the Narragansett Bay…this restricted area within the precautionary area will only be closed to vessel traffic during periods of daylight and optimum weather conditions for torpedo range use.”

The second and third DZ/RAs are located off the southwest coast of Martha's Vineyard in the waters surrounding Nomans Land Island National Wildlife Refuge, a former Naval Training Facility (U.S. Fish and Wildlife Service 2010). A fourth DZ/RA is situated in Narragansett Bay and surrounds Gould Island, which was formerly the site of a torpedo-testing facility and still houses some associated infrastructure (Long 2019). The fifth and sixth DZ/RAs border each other in Coasters Harbor and Coddington Cove on the coast of Newport, Rhode Island, and act as barriers to the Newport Naval Station. Given the high security of this facility, a DZ/RA is established around the pier.

8.9.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For national security maritime uses, the maximum design scenario/greatest potential to conflict with military activities is the maximum number of wind turbines, offshore substation facilities, submarine export cables, and interarray cables, resulting in the maximum number of fixed structures in the water (see **Table 8.1-14**). The parameters provided in **Table 8.1-14** represent the maximum potential impact from full Lease Area build-out that incorporates a total of up to 157 structures (made up of up to 155 wind turbines and two offshore substation facilities) with the maximum length of interarray cabling, and one submarine export cable route for BW1 to Queens, New York and one submarine export cable route for BW2 to Queens, New York or to Waterford, Connecticut.

TABLE 8.9-1. SUMMARY OF MAXIMUM DESIGN SCENARIO PARAMETERS FOR NATIONAL SECURITY MARITIME USES

Parameter	Maximum Design Scenario	Rationale
Construction		
Offshore structures	Based on a full build-out of the Project (BW1 and BW2) of 155 wind turbines and two offshore substations.	Representative of the maximum number of structures for BW1 and BW2.
Wind turbine foundation	Monopile, Piled jacket	Representative of foundation options that have installation methods that would result in the maximum introduction of underwater noise.
Wind turbine foundation installation method	Pile driving	Representative of the installation method that would result in the loudest underwater and in-air noise generated.

Parameter	Maximum Design Scenario	Rationale

Submarine export cables	Based on full build out of the Project (BW1 and BW2):
	• BW1 to Queens, New York (202 nm [375 km])
	• BW2:
	  ○ To Queens, New York (202 nm [375 km]) or
	  ○ To Waterford, Connecticut (113 nm [209 km])
		Representative of the maximum length of new submarine export cables to be installed.

Interarray cables	Based on full build-out of the Project (BW1 and BW2) with the maximum number of structures (155 wind turbines and two offshore substation facilities) to connect: BW1: 162 nm (300 km) BW2: 162 nm (300 km)	Representative of the maximum length of interarray cables to be installed.
Safety zones Project-related vessels and structures	Based on full build-out of the Project (BW1 and BW2), with the maximum number of structures (155 wind turbines and two offshore substation facilities) and maximum number of associated vessels and safety zones. 1,640 ft (500 m) around relevant structures, activities, and vessels.	Representative of the maximum cumulative area and duration, which national security maritime users would experience the presence of these zones.
Duration offshore installation	Based on full build-out of the Project (BW1 and BW2) with the maximum number of structures (155 wind turbines and two offshore substation facilities) and the maximum period of cumulative duration for installation.	Representative of the maximum period required to install the onshore components, which has the potential to impact resources in, access to, or enjoyment of the Project Area.
Operations and Maintenance		
Offshore structures	Based on full build-out of the Project (BW1 and BW2) with the maximum number of structures (155 wind turbines and two offshore substation facilities).	Representative of the presence of new fixed structures in an area that previously had none.
Project-related vessels collision risk	Based on full build-out of the Project (BW1 and BW2) with the maximum number of structures (155 wind turbines and two offshore substation facilities) and associated interarray cables and submarine export cables (BW1 and BW2). Based on maximum number of vessels and movements for servicing and inspections.	Representative of the maximum predicted Project-related vessels for collision risk.

8.9.2.1 Construction

During construction, the potential impact-producing factors to national security maritime uses may include:

- Installation of the offshore components, including the wind turbines, offshore substation facilities, foundations, submarine export cables, and interarray cables;
- Staging activities and assembly of Project components at applicable facilities or areas; and
- The export cable landfall installations that may include trenchless (e.g., HDD, jack and bore, or micro-tunnel) and trenched (open cut trench) methods.

The following impacts may occur as a consequence of factors identified above:

- Short-term increase in Project-related vessel traffic during construction; and
- Short-term displacement of national security maritime training uses due to the presence of Project-related vessels and implementation of safety zones.

Increase in Project-related construction vessel traffic. An increase in Project-related construction and support vessel traffic transiting to, from, and within the Lease Area and the submarine export cable routes is anticipated during construction due to the presence of Project-related construction vessels. This increase has the potential to impact the frequency of vessel collisions as a result of the temporary increased congestion of the waterway. Project-related vessels are expected to travel in the existing traffic patterns and within the TSS lanes as much as possible to minimize impacts to other marine users and to be consistent with other waterway usage. Vessel traffic related to the Project is expected to be minimal in relation to the existing vessel traffic. In addition, no Project activities so far have resulted in interactions with national security operations in the Lease Area. Furthermore, based on the maritime data assessed in the Navigation Safety Risk Assessment, military vessel activity in the Study Area is considered low; therefore, the likelihood of Project construction vessel activity interfering with military activities is anticipated to be low (see **Section 8.7 Marine Transportation and Navigation** and **Appendix BB Navigation Safety Risk Assessment** for a further discussion of the potential impact to national security maritime vessel traffic).

Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- Project vessels will utilize transit lanes, fairways, and predetermined passage plans consistent with existing waterway uses, to the greatest extent practicable; and
- Regular communications and updates with key national security maritime stakeholders on Project-related construction and installation vessel activities.

Displacement/disturbance of national security maritime training uses due to the presence of Project-related construction vessels and implementation of temporary safety zones. There may be periods where safety zones are established to exclude the public during construction, but these are temporary in nature. These safety zones will likely be implemented around construction activities, as applicable, to promote the safety of local mariners, the work crew, and equipment. Beacon Wind proposes to utilize 1,640-ft (500-m) safety zones around relevant structures, activities, and vessels. This approach for establishing safety zones is consistent with the FEIS for the Vineyard Wind project (BOEM 2021a). Should USCG Safety Zone authorities not extend beyond 12 nm (22 km) at the time of construction, Beacon Wind will utilize a combination of safety vessels, LNMs, and COLREGS to promote both awareness of these activities and the safety of the construction equipment and personnel.

Beacon Wind understands that while these activities may impact training schedules, construction and safety zones will cease should national security users need to access the area due to an emergency. The areas will be marked and lit in accordance with USCG requirements and BOEM (BOEM 2021b) guidance and monitored by a Project support vessel, where appropriate. The location and timing of the safety zones will be posted within the LNM system, as well as on the Project website. Beacon Wind will continue to maintain contact with military users throughout the offshore construction period to minimize potential conflicts. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- Active engagement with key national security stakeholders, including U.S. Fleet Forces, the USCG, and U.S. Navy Office of Cable Protection. This engagement will be conducted through the DoD Siting Clearinghouse, with an increase in frequency expected as Beacon Wind moves closer to commencement of construction activities.
- Dynamic construction and safety zones where feasible, focusing on sites being actively worked on, to minimize the extent of the affected area; and
- Partially-installed structures and safety zones will be properly marked and lit in accordance with FAA Advisory Circular 70/7460-1M, BOEM's *Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development* (BOEM 2021b), International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA 2021),[18] and USCG LNM entry 44-20 guidance (**Section 3 Project Description** contains additional details on the proposed marking and lighting measures).

8.9.2.2 Operations and Maintenance

During operations, the potential impact-producing factors to national security maritime uses may include:

- The presence of fixed structures (e.g., wind turbines, offshore substation facilities, submarine export cables, and interarray cables).

The following impacts may occur as a consequence of factors identified above:

- Long-term modification of existing waterway uses; and
- Long-term presence of new fixed structures (e.g., wind turbines offshore substation facilities, submarine export cables, and interarray cables) in the Project Area.

Modified existing waterway use. The operation of the wind farm will create a new permanent navigational pattern within the Lease Area (**Section 8.7 Marine Transportation and Navigation** and **Appendix BB Navigation Safety Risk Assessment** contain additional information on navigation safety). However, national security maritime users will be free to transit throughout the wind farm and no changes to existing uses are expected along the submarine export cable routes. Temporary, up to 1,640-ft (500-m), safety zones may also be implemented during operations and maintenance activities

[18] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

(e.g., foundation locations and/or cable installation vessels); however, the likelihood of a temporary safety zone occurring in the operations phase in a location and time coinciding with national security marine uses is low. Beacon Wind proposes to implement the following measure to avoid, minimize, and mitigate impacts:

- Regular communications and updates will occur with key national security stakeholders, including the DoD Siting Clearinghouse on the timing and location of maintenance activities.

Presence of new fixed structures. The presence of new fixed structures within the Lease Area has the potential to disrupt military activities. The wind turbines and offshore substation facilities may create obstructions to radar installations and national security–related training. Through the DoD Siting Clearinghouse informal review, the North American Aerospace Defense Command (NORAD) indicated that the Project is within line of sight of two radars: Nantucket ASR-9 and Falmouth ASR-8. However, Nantucket ASR-9 has the capability to “self-adapt” to additional obstacles with its current software and does not require mitigation measures. Separately, Beacon Wind completed a Radar and Navigational Aid Screening Study (**Appendix AA Radar and Navigational Aid Screening Study**), which identified potential impacts to radar systems and potential mitigation options. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- Beacon Wind will light and mark the wind turbines and offshore substation facilities in accordance with FAA Advisory Circular 70/7460-1M, BOEM’s *Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development* (BOEM 2021b), IALA Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA 2021),[19] and USCG LNM entry 44-20 guidance (see **Section 3 Project Description** for additional details on the proposed marking and lighting measures). Additionally, Beacon Wind is considering the use of agency-approved Aircraft Detection Lighting System (ADLS; or similar system) to turn the aviation obstruction lights on and off in response to detection of a nearby aircraft and is actively completing an evaluation to determine the impacts of the implementation of this system. This commitment as a mitigation is subject to final Project evaluation and agency approval (see **Section 8.6 Aviation** for additional details);
- Provide as-built information to NOAA Office of Coast Survey to support necessary updates to navigation charts in coordination with NOAA and other stakeholders as needed;
- Beacon Wind will work with the USCG to facilitate training exercises within the operational wind farm, as requested;
- Beacon Wind will continue to engage in the mitigation agreement process with the DoD to identify mitigation measures required for the Project’s impacts on military uses and missions; and
- Regular communications and updates will occur with key national security stakeholders, including the DoD Siting Clearinghouse regarding Project-related activities that may affect national security operations.

[19] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

8.9.2.3 Decommissioning

Impacts during decommissioning are expected to be similar or less than those experienced during construction, as described in **Section 8.9.2.1**. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Beacon Wind anticipates will be needed for the Project see **Section 3 Project Description**.

8.9.3 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors described in **Section 8.9.2**, Beacon Wind is proposing to implement the following best management practices and mitigation measures.

8.9.3.1 Construction

During construction, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.9.2.1**:

- Project vessels will utilize transit lanes, fairways, and predetermined passage plans consistent with existing waterway uses, to the greatest extent practicable;
- Regular communications and updates will occur with key national security maritime stakeholders on Project-related construction vessel activities;
- Active engagement with key national security stakeholders including U.S. Fleet Forces, the USCG, and U.S. Navy Office of Cable Protection will take place. This engagement will be conducted through the DoD Siting Clearinghouse, with an increase in frequency expected as Beacon Wind moves closer to commencement of construction activities;
- Dynamic construction and safety zones will be implemented where feasible, focusing on sites being actively worked on, to minimize the extent of the affected area; and
- Partially-installed structures and safety zones will be properly marked and lit in accordance with FAA Advisory Circular 70/7460-1M, BOEM's *Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development* (BOEM 2021b), IALA Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA 2021),[20] and USCG LNM entry 44-20 guidance (see **Section 3 Project Description** for additional details on the proposed marking and lighting measures).

8.9.3.2 Operations and Maintenance

During operations, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures for offshore Project-related impacts described in **Section 8.9.2.2**:

- Beacon Wind will light and mark the wind turbines and offshore substations in accordance with FAA Advisory Circular 70/7460-1M, BOEM's Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development (BOEM 2021b), IALA

[20] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA 2021)[21] and USCG LNM entry 44-20 guidance (**Section 3 Project Description**). Additionally, Beacon Wind is considering the use of agency-approved ADLS, or similar system, to turn the aviation obstruction lights on and off in response to detection of a nearby aircraft and is actively completing an evaluation to determine the impacts of the implementation of this system. This commitment as a mitigation is subject to final Project evaluation and agency approval (see **Section 8.6 Aviation** for additional details);

- Provide as-built information to NOAA Office of Coast Survey to support necessary updates to navigation charts in coordination with NOAA and other stakeholders as needed;
- Beacon Wind will work with the USCG to facilitate training exercises within the operational wind farm, as requested;
- Beacon Wind will continue to engage in the mitigation agreement process with the DoD to identify mitigation measures required for the Project's impacts on military uses and missions; and
- Regular communications and updates will occur with key national security stakeholders, including the DoD Siting Clearinghouse on Project-related activities that may affect national security operations.

8.9.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in **Section 8.9.3.1** and **Section 8.9.3.2**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

8.9.4 References

TABLE 8.9-2. SUMMARY OF DATA SOURCES

Source	Includes	Available at	Metadata Link
NOAA	Danger Zone/Restricted Area	https://www.marinecadastre.gov/nationalviewer/	https://www.fisheries.noaa.gov/inport/item/48876
Northeast Ocean Data	Boston and Narragansett Bay Operating Areas	https://www.northeastoceandata.org/files/metadata/Themes/NationalSecurity.zip	https://www.northeastoceandata.org/files/metadata/Themes/Security/NEOPAREABoundary.pdf
Northeast Ocean Data	Boston and Narragansett Bay Range Complexes	https://www.northeastoceandata.org/files/metadata/Themes/NationalSecurity.zip	https://www.northeastoceandata.org/files/metadata/Themes/Security/NEMilitaryRangeComplex.pdf

[21] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

Northeast Ocean Data	Warning Areas	https://www.northeastoceandata.org/files/metadata/Themes/NationalSecurity.zip	https://www.northeastoceandata.org/files/metadata/Themes/Security/NEWarningAreas.pdf
Northeast Ocean Data	Naval Undersea Warfare Center Testing Range	https://www.northeastoceandata.org/files/metadata/Themes/NationalSecurity.zip	https://www.northeastoceandata.org/files/metadata/Themes/Security/NENUWCDIVNPTTestingRangeBoundary.pdf

BOEM (Bureau of Ocean and Energy Management). 2021a. "Vineyard Wind 1 Offshore Wind Energy Project Final Environmental Impact Statement Volume I." Available online at: https://tethys.pnnl.gov/sites/default/files/publications/Vineyard-Wind-1-FEIS-Volume-1.pdf.

BOEM. 2021b. "Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development. BOEM." April 2021. Available online at: https://www.boem.gov/sites/default/files/documents/renewable-energy/2021-Lighting-and-Marking-Guidelines.pdf. Accessed June 8, 2021.

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U.S. Fish and Wildlife Service. 2010. "Nomans Land Island National Wildlife Refuge Comprehensive Conservation Plan." Available online at: https://www.fws.gov/northeast/planning/nomansland/pdf/finalccp/EntireDocument_LowResolutionforWebPosting.pdf. Accessed June 8, 2021.

8.10 Marine Energy and Infrastructure

This section discusses marine energy and infrastructure within the Project Area. Potential impacts to marine energy and infrastructure uses resulting from construction, operations, and decommissioning of the Project are discussed. Proposed Project-specific measures adopted by Beacon Wind are also described, which are intended to avoid, minimize, and/or mitigate potential impacts to marine energy and infrastructure, which include:

- Offshore energy (renewables and fossil fuels);
- Sand borrow areas and dredge disposal sites;
- Cables and pipelines; and
- Scientific research and surveys.

Other resources and assessments detailed within this COP that are related to marine energy and infrastructure include:

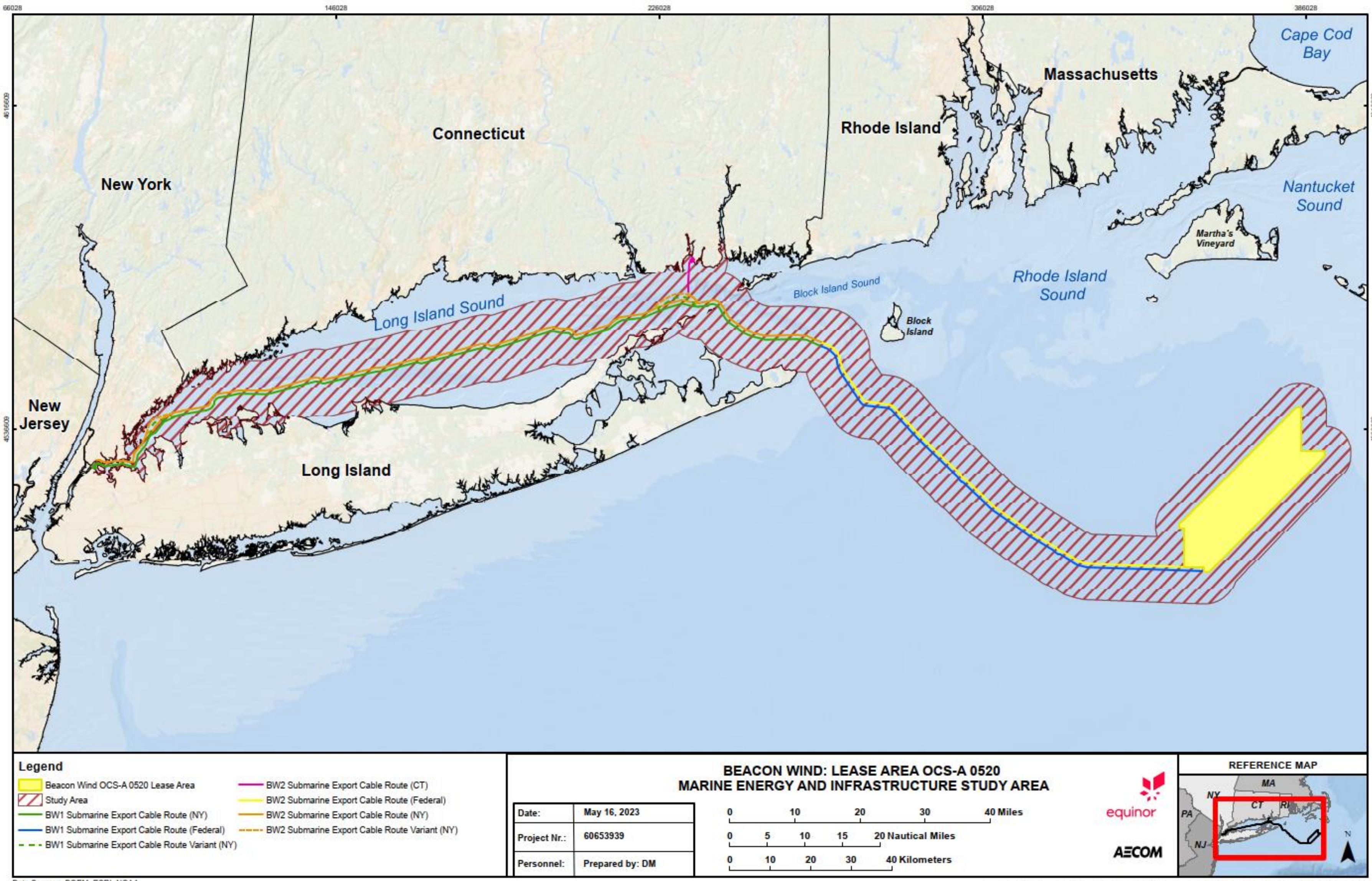
- Commercial and Recreational Fishing (**Section 8.8**);
- Department of Defense and OCS National Security Maritime Uses (**Section 8.8**);
- Other Marine Uses (**Section 8.11**); and
- Navigation Safety Risk Assessment (**Appendix BB**).

Data Relied Upon and Studies Completed

For the purposes of this section, the Study Area includes the offshore waters and coastlines within and in the vicinity of the Lease Area and submarine cable route (**Figure 8.10-1**).

These sections relied upon the publicly-available information provided by BOEM, the USACE, and NOAA, as well as geophysical data collected by Beacon Wind.

FIGURE 8.10-1. MARINE ENERGY AND INFRASTRUCTURE STUDY AREA



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

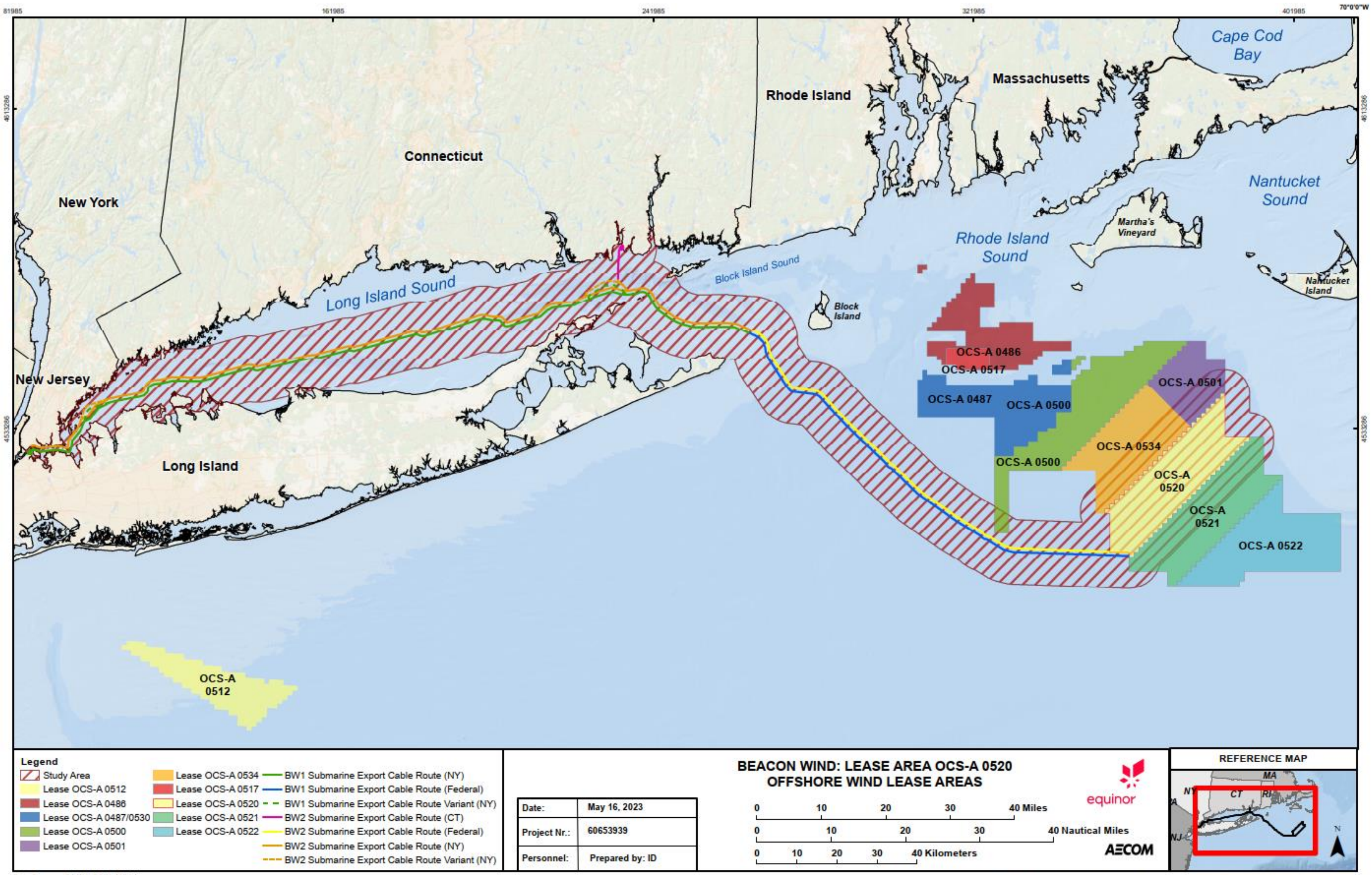
8.10.1 Offshore Energy

8.10.1.1 Affected Environment

8.10.1.1.1 Offshore Wind

The Project, located within Lease Area OCS-A 0520, is in proximity to several other offshore wind lease areas leased by BOEM (**Figure 8.10-2**). The lease areas were selected after a lengthy process informed by an intergovernmental task force with a goal of minimizing conflicts among existing uses, any future uses, and the environment. BOEM recently completed a FEIS and a ROD has been published for the Vineyard Wind Offshore Wind Energy Project (BOEM 2021d, BOEM 2021e), located adjacent to the Beacon Wind Lease Area in lease area OCS-A 0501. The proposed action for the Vineyard Wind project includes up to 100 wind turbines, each with an 8- to 14-MW generation capacity, up to two electrical service platforms, associated interarray and export cabling, and the generation of up to 800 MW of power. The FEIS estimated that approximately 22 GW of Atlantic offshore wind development, including the lease areas shown in **Figure 8.10-2**, are reasonably foreseeable. The FEIS estimated that the MA/RI WEA could have 775 offshore wind turbines and 20 electrical service platforms installed within a six to ten-year period, based upon the agreed upon 1x1 nm (1.9x1.9 km) layout for the MA/RI WEA with construction beginning in 2022 and continuing through 2030 (BOEM 2021e).

FIGURE 8.10-2. OFFSHORE WIND LEASE AREAS



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

8.10.1.1.2 Oil and Gas Operations

There are currently no active oil and gas leases in the North Atlantic planning area under the current OCS Oil and Gas Leasing 5-year program (**Figure 8.10-3**) (BOEM 2018). BOEM is currently leasing for OCS oil and gas exploration and production under the 2017 - 2022 National OCS program and no areas in the North Atlantic planning area are identified for future leasing under this plan. In addition, there are no pending or issued Geological and Geophysical permits for OCS oil and gas exploration in the North Atlantic OCS planning area (BOEM 2021a). Therefore, oil and gas operations are not anticipated to be proposed within the Beacon Wind Study Area and will not be considered further at this time.

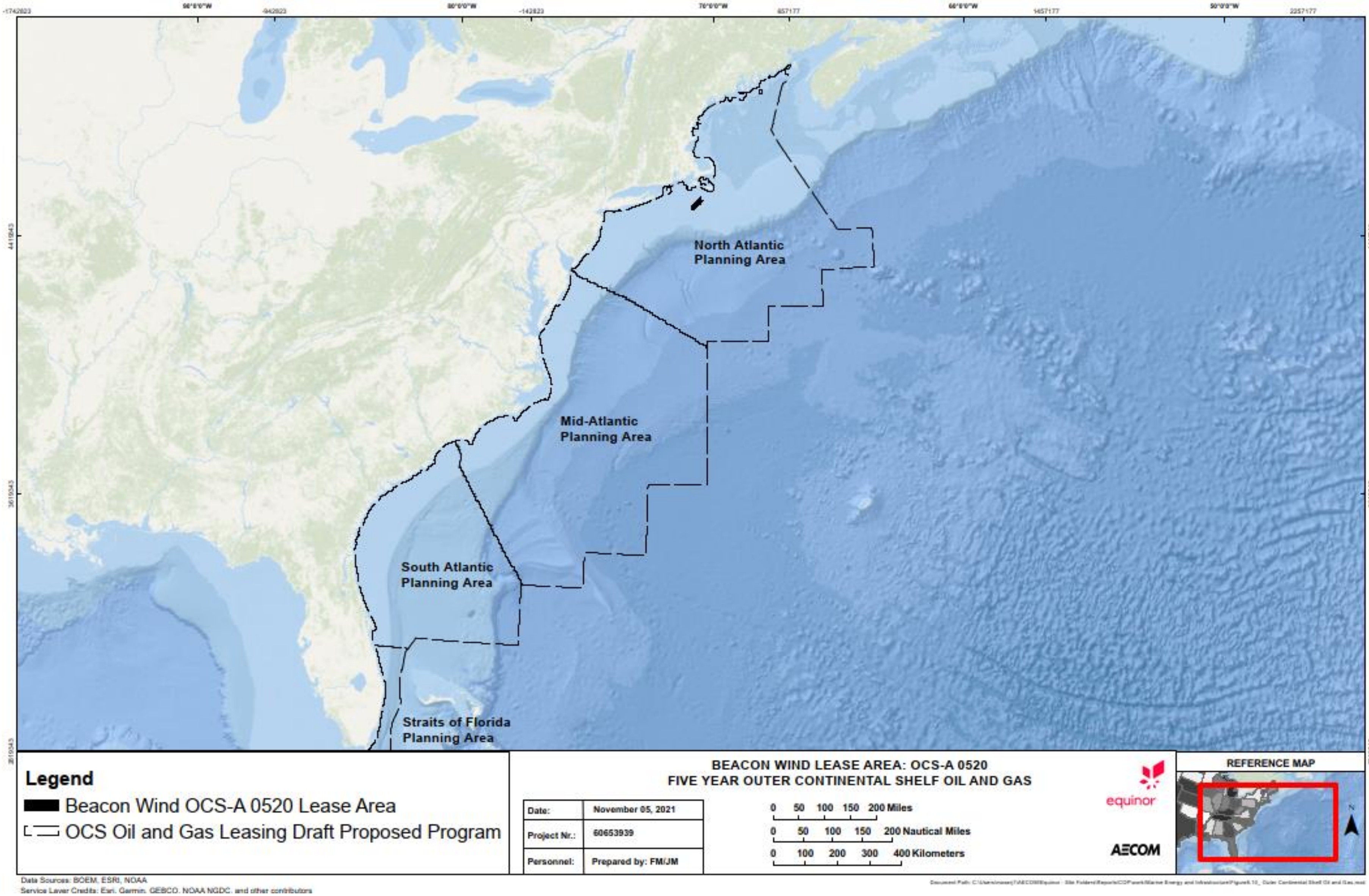
8.10.1.2 Impacts Analysis for Construction, Operations, and Decommissioning

Given the lack of other offshore energy assets in the vicinity of the Study Area at this time, no presence of oil and gas operations, and a low likelihood of future oil and gas exploration in the vicinity of the Study Area, there are no anticipated impacts associated with construction, operations, and decommissioning of the Project. Beacon Wind expects BOEM to consider cumulative impacts associated with permitting offshore wind projects within the lease areas identified in **Figure 8.10-3** as part of the ongoing leasing activity.

8.10.1.3 Summary of Avoidance, Minimization, and Mitigation Measures

As described in **Section 8.10.1.2**, as no impacts are anticipated to other offshore energy assets and oil and gas operations in the vicinity of the Study Area, avoidance, minimization, and mitigation measures are not proposed.

FIGURE 8.10-3. FIVE-YEAR OUTER CONTINENTAL SHELF OIL AND GAS PLANNING AREAS (2017-2022)



8.10.2 Sand Borrow Areas and Dredge Disposal Sites

8.10.2.1 Affected Environment

8.10.2.1.1 Sand Borrow Areas

BOEM's Marine Minerals Program works to mitigate and replenish erosion along coastlines and related terrain. Sand resource areas represent delineations of areas on the OCS where there is some likelihood that a usable sand resource exists, as identified by survey or some level of study. However, it does not indicate that there are any direct plans to utilize these resources at the present time.

BOEM funded offshore surveys between 2015 and 2017 through the Atlantic Sand Assessment Project to identify new sources of sand, including in federal waters offshore Massachusetts, Rhode Island, and New York (BOEM 2019). There are more than 10 requested and active OCS lease areas for marine minerals; none are in waters offshore of New York, Connecticut, Rhode Island, or Massachusetts (BOEM 2021c). The State of New York has also designated additional sand resource areas to help restore coastal erosion and damage that resulted from Superstorm Sandy (BOEM 2014). None of the identified sand resource areas are located in the Lease Area or the submarine export cable routes (**Figure 8.10-4**).

The Vineyard Wind FEIS (BOEM 2021e) evaluated sand and gravel resources in waters offshore Massachusetts and Rhode Island and stated that the offshore wind project would not impact marine minerals extraction. In addition, BOEM assumes that export cables associated with future offshore wind projects would avoid identified borrow areas recognized through consultation with the BOEM Marine Minerals Program and USACE prior to approval of the export cable routes, avoiding impacts on known borrow areas (BOEM 2021e).

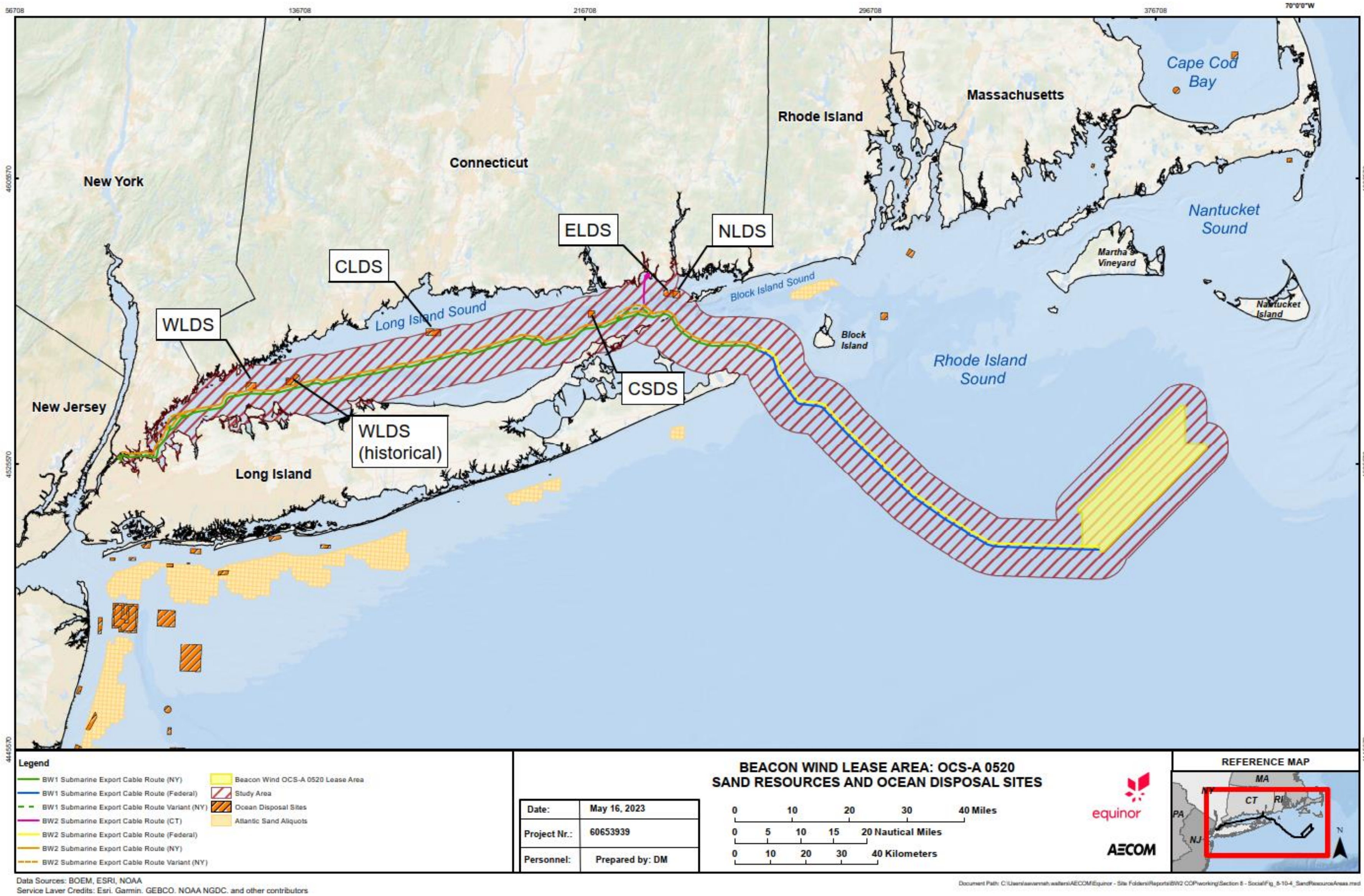
8.10.2.1.2 Dredge Disposal Sites

The use of ocean disposal sites for the dumping of uncontaminated dredged material is authorized through a permit issued by the USACE. The USACE relies on the EPA's ocean dumping criteria when evaluating permit requests for, and implementing federal projects involving, the transportation of dredged material for the purpose of dumping it into ocean waters. There are three dredge material disposal sites considered active within Long Island Sound (ERDC 2021; USACE New England District 2021). Several additional sites are categorized as inactive or infrequently used; none are located in the Lease Area (**Figure 8.10-4**).

Several ocean disposal sites are located throughout Long Island Sound. Two disposal sites are located in Connecticut waters south of New London, Connecticut to the east of the BW2 submarine export cable route to Waterford, Connecticut. These include the New London Disposal Site (NLDS) a 1,474-ac (596.5-ha) historic disposal area and the 1,101-ac (445.5-ha) Eastern Long Island Sound Disposal Site (ELDS) primarily used for dredged material disposal and available for use. The Cornfield Shoals Disposal Site (CSDS) is an approximately 848-acre (343.1-ha) historic disposal site located in Connecticut waters south of the mouth of the Connecticut River that has received predominantly sandy dredged material. The NLDS and ELDS are located approximately 4.4 nm (8.2 km) and 2.9 nm (5.4 km) east of the BW2 submarine export cable route to Waterford, Connecticut, respectively. The Central Long Island Sound Disposal Site (CLDS, also historically referred to as CLIS) is an approximately 2,051-acre (830-ha) dredged material disposal site located in Connecticut waters south of New Haven that is available for use. The CSDS and CLDS are located approximately 1.5 nm (2.9 km) and 3.3 nm

(6.1 km) north of the BW1 and BW2 submarine export cable routes to Queens, New York, respectively. The active portion of the Western Long Island Sound Disposal Site (WLDS, also historically referred to as WLIS) is an approximately 1,322-acre (535-ha) open water confined placement area in Connecticut waters near Norwalk Shoal. Inactive disposal areas associated with the WLDS are located to the east of the current active disposal area. Both the active and inactive WLDS disposal areas are located approximately 0.4 nm (0.74 km) north of the BW1 and BW2 submarine export cable routes to Queens, New York.

FIGURE 8.10-4. SAND RESOURCE AREAS AND OCEAN DISPOSAL SITES



8.10.2.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For sand resource areas and ocean disposal sites, the maximum design scenario is the maximum number of submarine export cables, as described in **Table 8.10-1**, The parameters provided in **Table 8.10-1** represent the maximum potential impact from full build-out with one submarine export cable route for BW1 to Queens, New York and one submarine export cable route for BW2 to Queens, New York or to Waterford, Connecticut.

TABLE 8.10-1. SUMMARY OF MAXIMUM DESIGN SCENARIO PARAMETERS FOR SAND RESOURCE AREAS AND OCEAN DISPOSAL SITES

Parameter	Maximum Design Scenario	Rationale
Construction		
Submarine export cables	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (202 nm [375 km]). • BW2: ○ To Queens, New York (202 nm [375 km]) or ○ To Waterford, Connecticut (113 nm [209 km]).	Representative of the maximum length of new submarine export cables to be installed.
Operations and Maintenance		
Submarine export cables	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (202 nm [375 km]) • BW2: ○ To Queens, New York (202 nm [375 km]) or ○ To Waterford, Connecticut (113 nm [209 km]).	Representative of the maximum number and length of submarine export cables to be installed.
Coverage of submarine export cable	Based on 10 percent of the submarine export cable requiring remedial surface protection (other 90 percent achieving suitable target burial depth).	Representative of the maximum portion of the submarine export cable that would require remedial surface cable protection.

8.10.2.2.1 Construction

During construction, the potential impact-producing factors to sand borrow areas and dredge disposal sites may include:

- Installation of the submarine export cables within these areas (or future areas).

The following impacts may occur as a consequence of the factors identified above:

- Short-term restricted access to sand resources and dredge disposal material.

To promote safe navigation, the USACE maintains dredged channels (**Section 8.7 Marine Transportation and Navigation**) and disposal areas which are present within the Study Area. Areas with depths of less than 60 ft (18.3 m) will have a minimal burial depth for subsea cables dictated by the USACE. USACE dredge channels within the Long Island Sound and in these locations, USACE will require a minimal burial depth of 15 ft (4.6 m) from the top of the cable to the authorized channel depth, for any submarine export cable crossing(s).

Restricted access to sand resources and dredge disposal material. Installation of the submarine export cables may result in installation vessels being present within the affected sand resource and dredge disposal sites for a period of time as cables are installed, with temporary restricted access to those areas as vessel safety zones are applied to promote maritime safety. During this time, extraction of sand resources or dumping will be temporarily restricted. Beacon Wind has proactively sited the submarine export cables to avoid active sand borrow and disposal sites to the extent practicable in an effort to avoid impacts. In the event that existing sand resource areas become designated sand borrow sites, Beacon Wind will work with the appropriate federal and state agencies to identify opportunities for mitigation.

8.10.2.2.2 Operations and Maintenance

During operations, the potential impact-producing factor to sand borrow areas and dredge disposal sites may include:

- Long-term presence of submarine export cables and associated remedial surface cable protection.

The following impact may occur as a consequence of the factors identified above:

- Long-term restricted use of these areas due to the presence of the submarine export cables and associated remedial surface cable protection.

Restricted use of these areas. During operations, users will be restricted from collecting sand resources from sand borrow areas within the vicinity of the submarine export cables, to avoid uncovering the buried cable or due to the presence of remedial surface cable protection. Furthermore, sampling required by the EPA within the dredge disposal sites will be restricted from occurring within the vicinity of the submarine export cables and/or remedial surface cable protection to avoid making contact with the cables and/or protection. Beacon Wind has proactively sited the submarine export cables to avoid active sand borrow sites and disposal sites to the extent practicable in an effort to avoid impacts. As indicated in **Figure 8.10-4**, none of the identified sand resource areas or dredge disposal areas are located in the Lease Area or along the submarine export cable routes. To avoid unintentional designation of sand borrow sites or dredging of resources over the installed submarine export cables, Beacon Wind will engage with NOAA so that nautical charts can be updated with the as-laid positions of Project-related cables. Beacon Wind will also engage with BOEM so that information is updated in Marinecadastre.gov and the National Offshore Sand Inventory portal.

8.10.2.2.3 Decommissioning

Impacts during decommissioning are expected to be similar or less than those experienced during construction, as described in **Section 8.10.2.2.1**. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Beacon Wind anticipates will be needed for the Project, please see **Section 3 Project Description**.

8.10.2.3 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors described in **Section 8.10.2.2**, Beacon Wind is proposing to implement the following avoidance, minimization, and mitigation measures.

8.10.2.3.1 Construction

During construction, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.10.2.2.1**:

- Siting of the submarine export cables to avoid sand resource and dredge disposal areas to the extent practicable; and
- Provision of regular installation schedule and location updates in relation to sand resource and dredge disposal areas with the appropriate federal and state agencies and dredge/disposal stakeholders.

8.10.2.3.2 Operations and Maintenance

During operations, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.10.2.2.2**:

- Siting of the submarine export cables to avoid sand resource and dredge disposal areas to the extent practicable;
- Siting of the submarine export cables to maximize the likelihood of sufficient cable burial;
- Provision of as-laid cable positions to NOAA for inclusion in nautical charts;
- Active engagement with the appropriate federal and state agencies in relation to designation of future sand borrow and disposal sites;
- Post installation submarine export cable monitoring report will be submitted within 45 days of complete installation;
- Cable burial risk assessment (CBRA) will be submitted to DOI for review;
- Post-storm monitoring plan will be followed; and
- Crossing agreements with active, in-service cables, and other infrastructure, will be provided to DOI.

8.10.2.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations as described in **Section 8.10.2.3.1** and **Section 8.10.2.3.2**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

8.10.3 Cables and Pipelines

8.10.3.1 Affected Environment

8.10.3.1.1 Cables

Telecommunication and power cables cross the continental shelf and connect coastal areas. Existing charted subsea cables are presented in **Figure 8.10-5**. There are no known cables within the Lease Area. The BW1 and BW2 submarine export cable routes to Queens, New York will each potentially cross eight different subsea cables (**Table 8.10-2**). The NASCA recognizes multiple utilities approaching the coast from the Atlantic Ocean and converge at Green Hill, Rhode Island, including one identified as a telephone line, one identified as a power line, and several identified as submarine cables. A telephone cable (Atlantic – 1 North Cable [Flagstone]) may be crossed twice by each submarine export cable route as the telephone cable approaches from the Atlantic Ocean, crosses Block Island Sound, continues through The Race and westward to a landfall on the north shore of Long Island near Northport, New York (NASCA 2009). The NOAA charted cables also include the Cross Sound Cable, a submarine power line that extends south from New Haven, Connecticut to Shoreham, Long Island. The BW2 submarine export cable route to Waterford, Connecticut would cross the same subsea cables identified for the BW1 and BW2 cable routes to Queens, New York, with the exception of the Cross Sound Cable. No new cable crossings are added by the alignment of BW2 to Waterford, Connecticut.

Requirements and methodologies for crossing subsea cables have been established by the International Cable Protection Committee (ICPC) (ICPC 2019). The committee has provided a series of best management practices. Where cable crossings are required, specific crossing methodology will be developed and engineered as the submarine export cable routes become finalized. Cable crossings will require a physical separation, such as a concrete mattress or an exterior protection product installed on the cable. Physical separation distance will be negotiated between Beacon Wind and the applicable asset owner; discussions are currently underway. See **Section 3 Project Description** for additional information on standard cable crossing methodologies.

Submarine export cables associated with the future development of offshore wind at other BOEM lease areas including Sunrise Wind, South Fork Wind, Vineyard Wind, Mayflower Wind, and Bay State Wind will also be considered during the routing of the BW1 and BW2 submarine export cables.. Some of these cables routes are publicly available; however, some projects have not yet published their planned cable routes (**Figure 8.10-6**). These export cables can be crossed using standard protection techniques during construction, operations and maintenance, and decommissioning. During project operational timeframes, impacts on submarine cables crossed by offshore wind cables would be limited to rare occasions when maintenance work at the cable crossings would be required. Impacts on submarine cables would be eliminated during decommissioning of offshore wind farms if export cables associated with those projects are removed.

TABLE 8.10-2. SUBMARINE CABLES INTERSECTING THE SUBMARINE EXPORT CABLE CORRIDORS

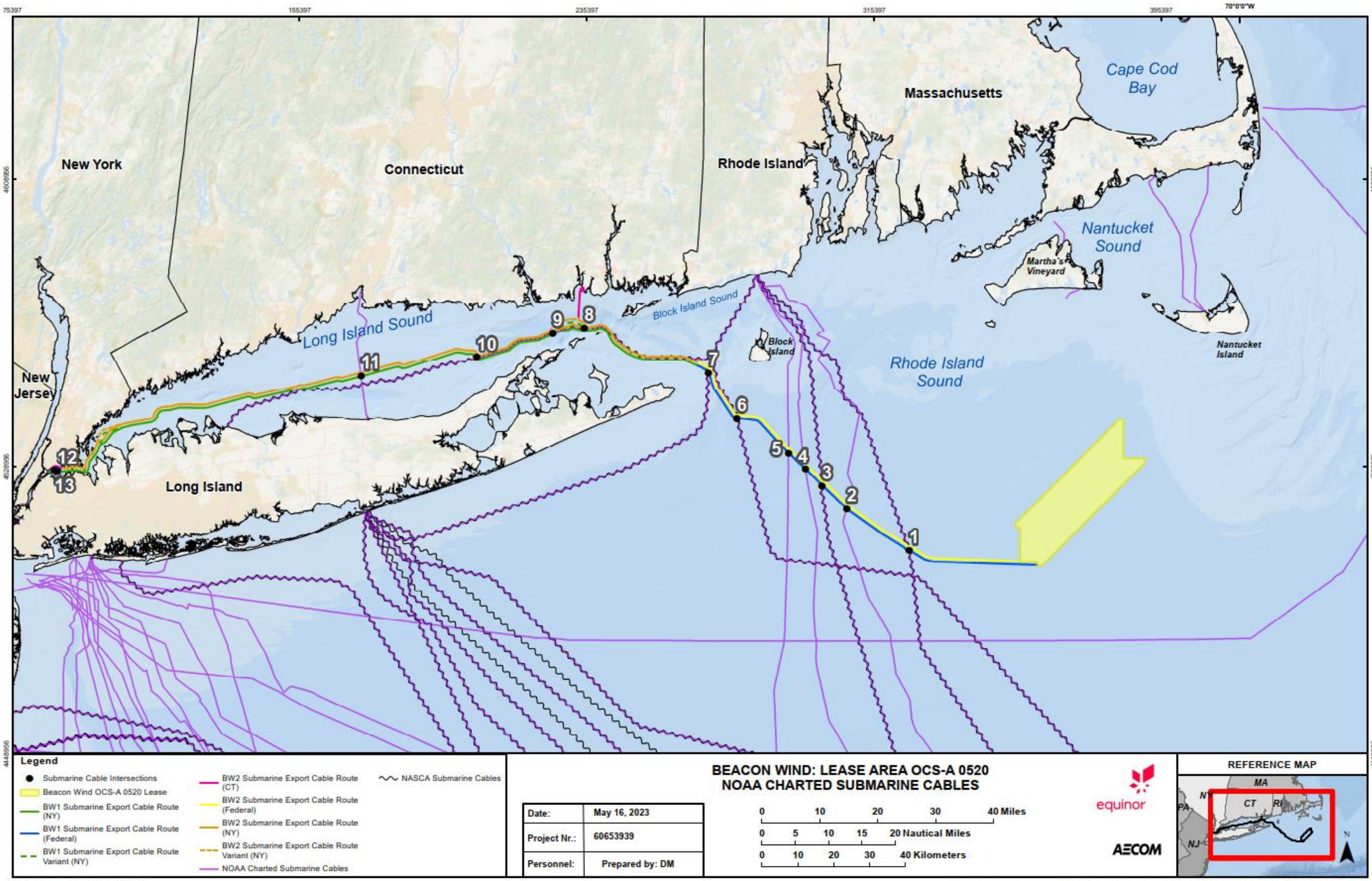
	BW1		BW2 to Queens, New York		BW2 to Waterford, Connecticut		
Ref	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Asset Information
1	40.683166	-71.068861	40.683635	-71.069099	40.683635	-71.069099	CB-1 (Verizon)
2	40.78407	-71.278353	40.784566	-71.278191	40.784566	-71.278191	TAT-6 (AT&T)
3	40.83979	-71.362427	40.840273	-71.362447	40.840273	-71.362447	TAT 12segE1 (AT&T)
4	40.879703	-71.417493	40.880426	-71.417665	40.880426	-71.417665	TAT 5 (AT&T)
5	40.91911	-71.474945	40.919737	-71.474974	40.919737	-71.474974	TAT 10 (AT&T)
6	41.003055	-71.649277	41.003507	-71.64944	41.003507	-71.64944	Flagstone (Reliance Globalcom)
7	41.114774	-71.748544	41.115396	-71.748539	41.115396	-71.748539	TAT 12-13 Interlink
8	41.215938 a/	-72.165487 a/	41.215976 b/	-72.164817 b/	41.215976	-72.164817	Flagstone (Reliance Globalcom)
9	41.200603 a/	-72.268687 a/	41.200492 b/	-72.269265 b/	--	--	Flagstone (Reliance Globalcom)
10	41.131836	-72.518376	41.131987	-72.517747	--	--	Flagstone (Reliance Globalcom)
11	41.07335	-72.897258	41.073762	-72.897358	--	--	Cross Sound Cable (Power line)
12	40.798116	-73.884056	40.798546	-73.883708	--	--	Communication Cable Corridor c/
13	40.799939	-73.893337	40.800262	-73.894065	--	--	Communication Cable Corridor c/

Note:

The cable intersections are shown on **Figure 8.10-5**.

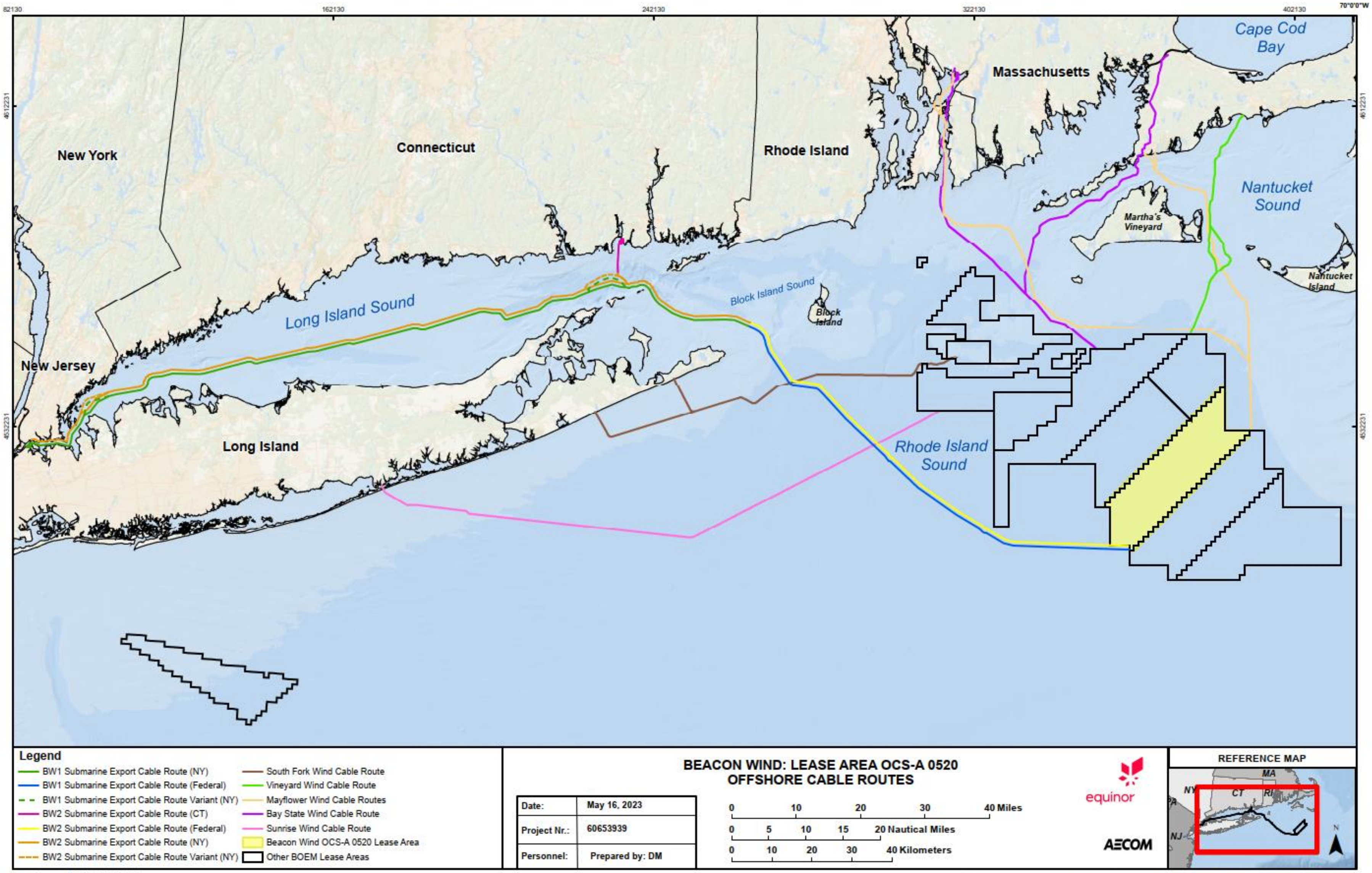
a/ These coordinates represent a crossing by the BW1 Submarine Export Cable Route Variant.
b/ These coordinates represent a crossing by the BW2 Submarine Export Cable Route Variant.
c/ Cable asset was identified through a Freedom of Information Act (FOIA) request; therefore, the entity name has been withheld.

FIGURE 8.10-5. CHARTED SUBMARINE CABLES



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

FIGURE 8.10-6. PROPOSED OFFSHORE WIND LEASE EXPORT CABLES



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

8.10.3.1.2 Pipelines

The NOAA has identified and charted known pipeline locations. Pipelines transporting liquid or gas products as well as outfall pipes from stormwater or treated effluent exist in the Study Area (**Table 8.10-3**). There are no known pipelines in the Lease Area (**Figure 8.10-7**). The BW1 and BW2 submarine export cable routes to Queens, New York will each cross multiple pipelines including the Iroquois Gas Transmission System pipeline, which extends from a point near Stratford, Connecticut to Asharoken, Long Island, and the Eastchester Extension pipeline extends from Asharoken westward to the Bronx, New York. Retired outfalls or non-iron-containing (e.g., concrete) buried pipes may be challenging-to-impossible to detect with geophysical techniques. Beacon Wind is attempting to identify additional information about pipeline locations through communication with asset owners and FOIA requests, as needed. The BW2 submarine export cable route to the Waterford, Connecticut landfall would cross pipelines in a total of three locations (i.e., the historical pipeline corridor to Block Island and two natural gas pipelines owned by Long Island Power Authority (LIPA) and KeySpan located to the southeast of Waterford, Connecticut).

Where pipeline crossings are required, specific crossing methodology will be developed and engineered as the submarine export cable routes become finalized. Pipeline crossings will require a physical separation, such as a concrete mattress or an exterior protection product installed on the cable. Physical separation distance will be negotiated between Beacon Wind and the asset owner; discussions are currently underway (see **Section 3 Project Description** for additional information on standard pipeline crossing methodologies).

TABLE 8.10-3. SUBMARINE PIPELINES INTERSECTING THE SUBMARINE EXPORT CABLE CORRIDORS

		BW1		BW2 to Queens, New York		BW2 to Waterford, Connecticut	
Ref	Asset Information	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude
1	Historical pipeline/cable corridor to Block Island d/	41.10468	-71.74122	41.104837	-71.740667	41.104837	-71.740667
		41.123333	-71.761436	41.123595	-71.760849	41.123595	-71.760849
2	Natural gas pipeline (LIPA, KeySpan) f/	41.21737	-72.10739	41.217852	-72.106977	41.217852	-72.106977
		41.216988	-72.111934	41.217471	-72.111541	41.217471	-72.111541
3	Natural gas pipeline (LIPA, KeySpan) f/	41.216103	-72.117984	41.216612	-72.117924	41.216612	-72.117924
		41.214863	-72.121797	41.215368	-72.121737	41.215368	-72.121737
4	MCI pipeline/cable corridor d/	41.09852	-72.76568	41.098851	-72.765229	--	--
		41.099657	-72.769261	41.099991	-72.768829	--	--
5	AT&T Cable area d/	41.058975	-72.962854	41.059402	-72.962623	--	--
		41.059513	-72.967428	41.059935	-72.967204	--	--
6	Iroquois Gas Pipeline f/	41.005809	-73.253597	41.006149	-73.25316	--	--
7	LIPA cable corridor f/	40.985813	-73.358784	40.980782	-73.381446	--	--
		40.980364	-73.381244	40.98621	-73.35898	--	--
8	Iroquois Gas Trans Co f/	40.947519	-73.563029	40.94733	-73.563655	--	--
9	New York Power Authority, self-contained fluid-filled cable corridor e/	40.890696	-73.716118	40.890853	-73.716694	--	--
		40.884236	-73.72204	40.88445	-73.722604	--	--
		40.896765 a/	-73.73547 a/	40.896599	-73.736918	--	--
		40.887478 a/	-73.740598 a/	40.887377	-73.741297	--	--

Ref	Asset Information	BW1 Latitude	BW1 Longitude	BW2 to Queens, New York Latitude	BW2 to Queens, New York Longitude	BW2 to Waterford, Connecticut Latitude	BW2 to Waterford, Connecticut Longitude
10	Asset Corridors	40.874813	-73.731523	40.875115	-73.731951	--	--
		40.873421	-73.734842	40.873775	-73.735277	--	--
		40.879146 a/	-73.742881 a/	40.876404 b/	-73.744305 b/	--	--
		40.876418 a/	-73.743753 a/	40.879202 b/	-73.743425 b/	--	--
11	Iroquois Gas Trans Co f/	40.825968	-73.776875	40.827822	-73.775831	--	--
12	Iroquois Gas Trans Co f/	40.822975	-73.778561	40.821602	-73.779358	--	--
13	Asset Corridor c/	40.798076	-73.883952	40.798525	-73.883718		
14	Asset Corridor c/	40.799955	-73.893254	40.800263	-73.894056	--	--
15	Brooklyn Union Gas Co e/	TBD g/	TBD g/	TBD g/	TBD g/	--	--

Note:

The listed pipelines lie within Cable and Pipeline Areas shown on **Figure 8.10-7.**

TBD – To be determined.

a/ These coordinates represent a crossing by the BW1 Submarine Export Cable Route Variant.

b/ These coordinates represent a crossing by the BW2 Submarine Export Cable Route Variant.

c/ Pipeline asset was identified through a FOIA request; therefore, the entity name has been withheld.

Sources:

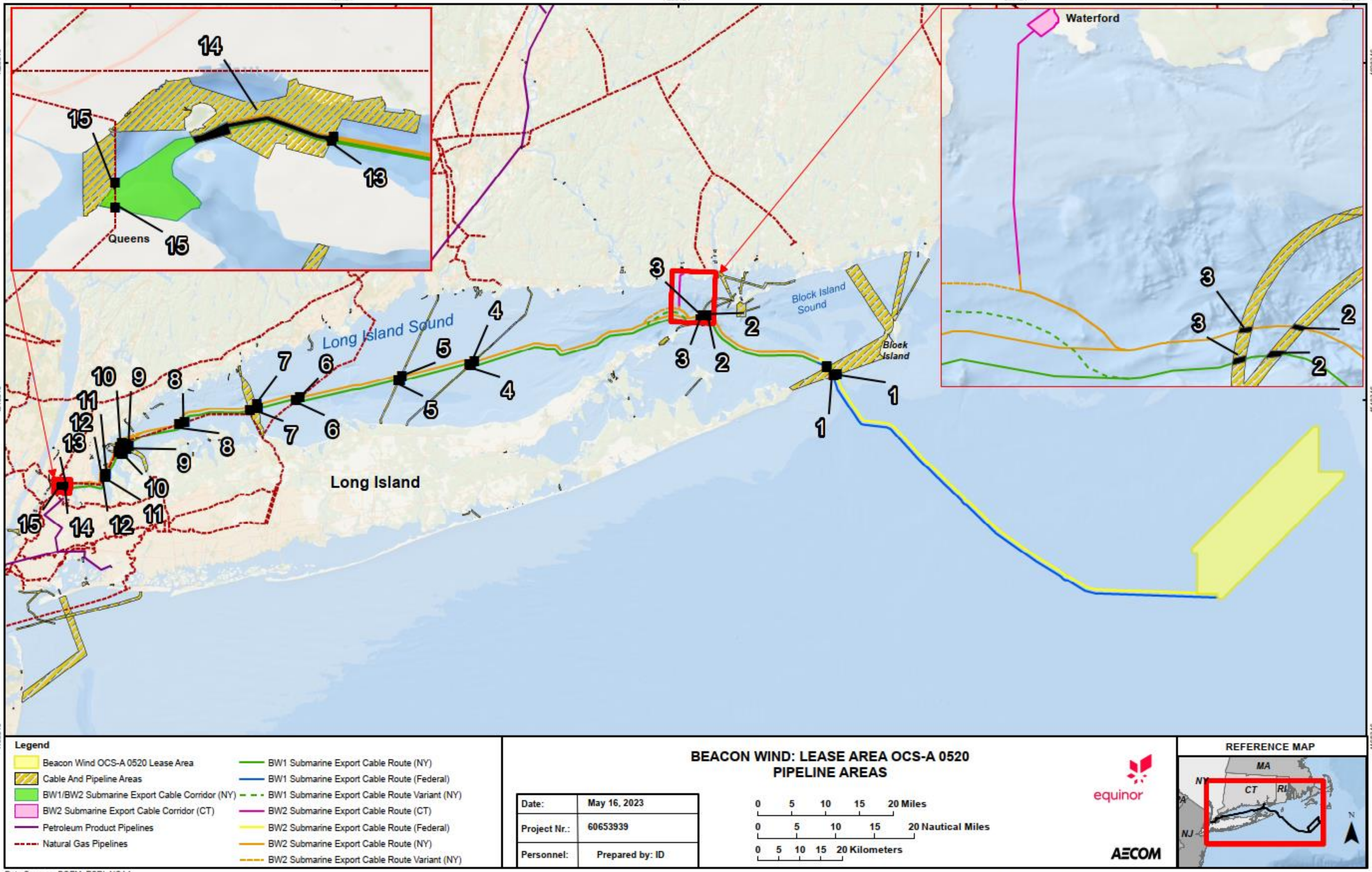
d/ North American Submarine Cable Association (NASCA) 2020.

e/ New York Power Authority (NYPA) 2021.

f/ Long Island Power Authority (LIPA) 2018.

g/ Crossing locations will be refined once the landfall approach is determined.

FIGURE 8.10-7. KNOWN PIPELINE LOCATIONS



Data Sources: BOEM, ESRI, NOAA

Service Layer Credits: Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

8.10.3.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For cables and pipelines, the maximum design scenario is the maximum number of submarine export cables and interarray cables and, therefore, fixed and buried structures, in the water, the parameters provided in **Table 8.10-4** represent the maximum potential impact from a full build-out. This design concept incorporates a total of 157 structures within the Lease Area (made up of up to 155 wind turbines and two offshore substation facilities) with one submarine export cable route for BW1 to Queens, New York and one submarine export cable route for BW2 to Queens, New York or to Waterford, Connecticut, and the maximum length of interarray cabling.

BOEM stated in the Vineyard Wind FEIS (BOEM 2021e) that the submarine export cable and an interarray cabling system within the Lease Area could preclude future submarine cable development through the lease area. Future submarine cables, including future offshore wind export cables, would need to be routed around the lease area during the operational timeframe. Space use conflicts could be eliminated during decommissioning if structures are removed. Any future crossings of the export cable and new submarine cables can be protected by standard techniques during construction, operations, and decommissioning (BOEM 2021e).

TABLE 8.10-4. SUMMARY OF MAXIMUM DESIGN SCENARIO PARAMETERS FOR CABLES AND PIPELINES

Parameter	Maximum Design Scenario	Rationale
Construction		

Submarine export cables	Based on full build-out of the Project (BW1 and BW1):
	• BW1 to Queens, New York (202 nm [375 km]).
	• BW2:
	  ○ To Queens, New York (202 nm [375 km]) or
	  ○ To Waterford, Connecticut (113 nm [209 km]).
		Representative of the maximum length of new submarine export cables to be installed, and the maximum number of cable and pipeline crossings.

Offshore structures	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities).	Representative of the maximum number of structures.
Interarray cables	Based on full build-out of the Project (BW1 and BW2), with the maximum number of structures (155 wind turbines and two offshore substation facilities): BW1 (162 nm [300 km]). BW2 (162 nm [300 km]).	Representative of the maximum length of interarray cables to be installed and maximum number of cable and pipeline crossings.
Anchor snags Project-related vessels	Based on full build-out of the Project (BW1 and BW2) consisting of 155 wind turbines and two offshore substation facilities, two submarine export cables and interarray cables.	Representative of the greatest risk of anchor snags on cables and pipelines from Project-related vessels.

Parameter	Maximum Design Scenario	Rationale
Operations and Maintenance		
Submarine export cables	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (202 nm [375 km]). • BW2: ○ To Queens, New York (202 nm [375 km]) or ○ To Waterford, Connecticut (113 nm [209 km]).	Representative of the maximum number and length of submarine export cables to be installed, maximum number of cable and pipeline crossings, and potential for future crossings over these assets.
Interarray cables	Based on full build-out of the Project (BW1 and BW2), with the maximum number of structures (155 wind turbines and two offshore substation facilities) to connect: BW1 (162 nm [300 km]). BW2 (162 nm [300 km]).	Representative of the maximum length of interarray cables to be installed and likelihood of cable and pipeline crossings.
Project-related vessels anchor snags	Based on full build-out of the Project (BW1 and BW2) consisting of 155 wind turbines and two offshore substation facilities, two submarine export cables and interarray cables. Based on maximum number of vessels and movements for servicing and inspections.	Representative of the maximum predicted Project-related vessels and associated risk of anchor snags on cables and pipelines.

8.10.3.2.1 Construction

During construction, the potential impact-producing factor to cables and pipelines may include:

- Pre-clearance and installation of the submarine export cables and interarray cables.

The following impact may occur as a consequence of the factors identified above:

- Damage to existing cables and pipelines during pre-clearance, crossings, and/or from Project-related vessels (e.g., anchor snags, jack-up footings).

Disturbance to existing cables and pipelines. During construction and installation, activities including pre-lay grapnel clearance, pre-sweeping and pre-trenching, the lay and burial of submarine export and interarray cables, and foundation installation activities are proposed to occur within the Lease Area and submarine export cable siting corridors. These seabed-disturbing activities have the potential to inadvertently impact existing, unidentified cables and pipelines, though this is unlikely due to the extensive survey reconnaissance performed by Beacon Wind. Beacon Wind has planned the routing of the submarine export cables to minimize and avoid cable and pipeline crossings to the greatest extent practicable. Where avoidance is not possible, Beacon Wind has planned submarine export cable routes to cross existing cables and pipelines at as close to right angles as possible to promote industry best practice crossings.

The known cables and pipelines potentially impacted by the Project will have engineered crossing methodologies established and documented through crossing agreements prior to construction. Therefore, impacts to existing assets are not anticipated. As described in **Appendix G Marine Site Investigation Report**,[22] Beacon Wind has conducted extensive high-resolution geophysical surveys, including seabed side-scan sonar imagery, marine magnetic mapping, and sub-bottom profiling throughout the Lease Area and along the submarine export cable routes to confirm the location of known assets and identify any unknown or mis-charted cables or pipelines. Furthermore, pre-installation surveys are proposed to occur along the submarine export cable routes. Additionally, Beacon Wind will require Project-related installation vessels hold briefings with supporting charts and/or geospatial data of the location of existing cables and pipelines to be avoided during anchoring and jack-up operations. Therefore, inadvertent impacts to unknown seabed assets are not anticipated.

Beacon Wind is seeking and will implement negotiated crossing agreements with the asset owner of any cable and pipeline to be crossed, which will use industry-standard techniques to protect both the existing cable or pipeline and Beacon Wind's submarine export cables. Beacon Wind is also seeking to minimize shoaling of the water depth, thereby minimizing risk or restriction for mariners in these areas, through the proposed design of these crossing agreements. Beacon Wind has approached the known asset owners to establish crossing principles and agreements and to seek further information on as-laid positions, depths, and additional engineering data. The crossing agreements will be microsited and engineered to avoid or minimize to the extent practicable the potential impacts to any critical features of the crossed asset of concern to the asset owner, such as anodes on a pipeline, or repeaters or other optical bodies in telecommunications cables. Additionally, Beacon Wind will provide adequate notice to the asset owner and allow for representation during installation operations at a crossed cable or pipeline. Beacon Wind has also reached out to subsea cable industry owners' organizations, such as the ICPC and the NASCA to provide the organization's members with the Lease Area and submarine export cable routes for consideration and comments regarding active or planned subsea cables, in accordance with BOEM recommendations within the COP Guidelines (BOEM 2020b).

8.10.3.2.2 Operations and Maintenance

During operations, the potential impact-producing factor to marine energy and infrastructure may include:

- The presence of Project-related cables and associated remedial cable surface protection.

The following impacts may occur as a consequence of the factor identified above:

- Restricted access for inspection, maintenance, and repairs to existing cables and pipelines; and
- Damage to existing cables and pipelines from Project-related vessels (e.g., anchor snags, jack-up footings) during routine and unscheduled maintenance.

Restricted access to existing cables and pipelines. During operations, Beacon Wind's submarine export cables will be permanently installed over existing cables and pipelines along the submarine export cable routes. The crossings on the submarine export cable routes will have been installed in

[22] This appendix will be provided in a supplemental COP filing.

accordance with the crossing agreements between Beacon Wind and the owner of the crossed asset. The crossing will result in new cable protection material and cables to be located on the seabed and over the cables and pipelines at the crossing. In the unlikely event of a fault to the existing third-party cables and pipelines, the presence of Beacon Wind's new cable protection material and submarine export cables will make it more difficult to make the necessary repairs. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- Negotiated agreements will be in place with the asset owner of any cable or pipeline to be crossed, which will use industry-standard techniques to protect both the existing cable or pipeline and the submarine export cables during routine maintenance activities; and
- Crossing locations and methodology will be microsited and engineered to avoid or minimize to the extent practicable the potential impacts to any critical features of the crossed asset of concern to the asset owner, such as anodes on a pipeline, or repeaters or other optical bodies in telecommunications cables.

Disturbance to existing cables and pipelines. During operations, Project-related vessels are proposed to occur within the Lease Area and along the submarine export cable routes during routine and unscheduled maintenance activities. These potential seabed-disturbing activities have the potential to inadvertently impact existing, unidentified cables and pipelines, though this is unlikely due to the extensive survey reconnaissance performed by Beacon Wind.

The known cables and pipelines potentially impacted by the Project will have engineered crossing methodologies established and documented through crossing agreements that will be in place during operations. Therefore, impacts to existing assets are not anticipated. Beacon Wind has conducted extensive high-resolution geophysical surveys, including seabed side-scan sonar imagery, marine magnetic mapping, and sub-bottom profiling throughout the Lease Area and along the submarine export cable routes to confirm the location of known assets and identify any unknown or mis-charted cables or pipelines.[23] Inadvertent impacts to unknown seabed assets are not anticipated.

8.10.3.2.3 Decommissioning

Impacts during decommissioning are expected to be similar or less than those experienced during construction, as described in **Section 8.10.3.2.1** It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Beacon Wind anticipates will be needed for the Project, please see **Section 3 Project Description**.

8.10.3.3 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors described for cables and pipelines, Beacon Wind is proposing to implement the following avoidance, minimization, and mitigation measures.

[23] The results of these surveys will be provided in a supplemental COP filing in **Appendix G Marine Site Investigation Report**.

8.10.3.3.1 Construction

During construction, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.10.3.2.1**:

- The siting of the offshore components to minimize and avoid cable and pipeline crossings to the extent practicable;
- When avoidance is not feasible, negotiated crossing agreements with the asset owner of any cable and pipeline to be crossed, which will use industry-standard techniques to protect both the existing cable or pipeline and the submarine export cables;
- When avoidance is not feasible, crossing of cables and pipelines at as close to right angles as possible following industry best practice;
- Crossing locations and methodology will be microsited and engineered to avoid or minimize to the extent practicable the potential impacts to any critical features of the crossed asset, such as anodes on a pipeline, or repeaters or other optical bodies in telecommunications cables. In addition, the crossing methodologies will be engineered to minimize shoaling of the water depth to reduce the navigational risk to mariners;
- Pre- and post-installation surveys at cable and pipeline crossing;
- Briefings with supporting charts and/or geospatial data of Project-related installation vessels of the location of existing cables and pipelines to be avoided during anchoring and jack-up operations; and
- Provision of adequate notice to the asset owner and allowance of representation during installation activities at a crossed cable or pipeline.

8.10.3.3.2 Operations and Maintenance

During operations, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described above in **Section 8.10.3.2.2**:

- Briefings with supporting charts and/or geospatial data for Project-related operations and maintenance vessels on the location of existing cables and pipelines to be avoided during anchoring and jack-up operations;
- Periodic inspections of cable and pipeline crossings to verify integrity of crossing materials and protection; and
- Inclusion of industry-standard terms of engagement, techniques for notification, and access requirements for scheduled and unscheduled maintenance, as part of the negotiated crossing agreement with the asset owner of any cable and pipeline to be crossed.

8.10.3.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations as described in **Section 8.10.3.3.1** and **Section 8.10.3.3.2**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

8.10.4 Scientific Research and Surveys

8.10.4.1 Affected Environment

Within Long Island Sound and Block Island Sound, various federal and state organizations regularly conduct scientific research, including aerial and ship-based scientific surveys. NYSERDA has conducted, and continues to conduct, a variety of pre-development, environmental, economic, infrastructure, social, and regulatory studies in support of offshore wind development (NYSERDA 2019). The LISS is a cooperative effort involving researchers, regulators, user groups, and other concerned organizations and individuals. The LISS examines a variety of parameters including benthic sea floor habitat. Additionally, extensive studies of the area have been conducted by NOAA and USACE, including seafloor substrate mapping and fisheries studies, which required ship-based surveys. Additional information on NOAA studies conducted in the Lease Area are discussed in **Section 5.5 Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat**.

8.10.4.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For scientific research and surveys, the maximum design scenario is the maximum number of wind turbines, submarine export cables, and interarray cables and, therefore, the maximum number of fixed and buried structures in the water, as described in **Table 8.10-5**. The parameters provided below represent the maximum potential impact from full build-out. This design concept incorporates a total of 157 structures within the Lease Area (made up of up to 155 wind turbines and two offshore substation facilities), interarray cable, with one submarine export cable route for BW1 to Queens, New York and one submarine export cable route for BW2 to Queens, New York or to Waterford, Connecticut.

TABLE 8.10-5. SUMMARY OF MAXIMUM DESIGN SCENARIO PARAMETERS FOR SCIENTIFIC RESEARCH AND SURVEYS

Parameter	Maximum Design Scenario	Rationale
Construction		
Offshore structures	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities).	Representative of the maximum number of structures.
Foundation	Monopile, Piled jacket	Representative of foundation options that have installation methods that would result in the maximum introduction of underwater noise.
Foundation installation method underwater noise	Pile driving	Representative of the installation method that would result in the loudest underwater noise generated.

Parameter	Maximum Design Scenario	Rationale
Safety zones for Project-related vessels and structures	Based on full build-out of the Project (BW1 and BW2), which corresponds to the maximum number of structures (155 wind turbines and two offshore substation facilities) and maximum number of associated vessels and safety zones. 1,640 ft (500 m) around relevant structures, activities, and vessels.	Representative of the maximum cumulative area and duration, which has the potential to impact marine users, who will be restricted from entering these areas.
Duration offshore installation	Based on full build-out of the Project (BW1 and BW2) which corresponds to the maximum number of structures (155 wind turbines and two offshore substation facilities), two submarine export cables, interarray cables, and maximum period of cumulative duration for installation	Representative of the maximum period required to install the offshore components, which has the potential to impact resources in, access to, or enjoyment of the Project Area.

Submarine export cables	Based on full build-out of the Project (BW1 and BW2):
	• BW1 to Queens, New York (202 nm [375 km])
	• BW2:
	  ○ To Queens, New York (202 nm [375 km]) or
	  ○ To Waterford, Connecticut (113 nm [209 km]).
		Representative of the maximum length of new submarine export cables to be installed.

Interarray cables	Based on full build-out of the Project (BW1 and BW2), with the maximum number of structures (155 wind turbines and two offshore substation facilities) to connect: BW1 (162 nm [300 km]). BW2 (162 nm [300 km]).	Representative of the maximum length of interarray cables to be installed.
Operations and Maintenance		
Loss of habitat foundation type	<u>Wind Turbine</u> Based on suction bucket jacket which represents the maximum overall footprint (155 x 3.0-ac [1.2-ha] with scour protection). Total 465 ac (188 ha) including scour protection. <u>Offshore Substation Facilities</u> Based on suction bucket jacket, which represents the maximum overall footprint (2 x 5.2 ac [2.1 ha] with scour protection). Total 10.4 ac (4.2 ha) including scour protection	Representative of the maximum long-term loss of seabed habitat.
Project-related vessels collision risk	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines, two offshore substation facilities, two submarine export cables, and associated interarray cables). Based on maximum number of vessels and movements for servicing and inspections.	Representative of the maximum predicted Project-related vessels for collision risk.

Parameter	Maximum Design Scenario	Rationale
Submarine export cables	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (202 nm [375 km]) • BW2: ○ To Queens, New York (202 nm [375 km]) • To Waterford, Connecticut (113 nm [209 km]).	Representative of the maximum length of submarine export cables to be installed.
Interarray cables	Based on full build-out of the Project (BW1 and BW2), with the maximum number of structures (155 wind turbines and two offshore substation facilities) to connect: BW1 (162 nm [300 km]). BW2 (162 nm [300 km]).	Representative of the maximum length of interarray cables to be installed.

8.10.4.2.1 Construction

During construction, the potential impact-producing factor to scientific and research activities may include:

- Installation of the offshore components, including the foundations, wind turbines, offshore substation facilities, submarine export cables, and interarray cables.

The following impacts may occur as a consequence of the factor identified above:

- Short-term displacement of scientific and research activities due to the implementation of safety zones around Project-related vessels and structures;
- Short-term increase in Project-related vessel traffic during construction;
- Short-term disturbance of local species targeted by scientific and research activities; and
- Short-term seabed disturbance in the Study Area.

Displacement of scientific and research activities due to the implementation of temporary safety zones. There may be periods where safety zones are established to exclude the public during construction, but these are temporary in nature. These safety zones will likely be implemented around construction activities, as applicable, to promote the safety of local mariners, the work crew, and equipment. Beacon Wind proposes to work with the USCG to establish temporary safety zones in active construction areas within 12 nm (22.2 km) of the coast, depending on the nature and extent of construction activity. This zone would extend approximately 1,640 ft (500 m) around relevant structures, activities, and vessels. This approach for establishing safety zones is consistent with the FEIS for the Vineyard Wind project (BOEM 2021e). Should USCG Safety Zone authorities not extend beyond 12 nm (22.2 km) at the time of construction, Beacon Wind will utilize a combination of safety vessels, LNMs, and COLREGS to promote both awareness of these activities and the safety of the construction equipment and personnel. Areas will be marked and lit in accordance with USCG requirements and BOEM (2021d) guidance and monitored by a project support vessel that will be available to assist local mariners. The locations of the safety zones will be posted in LNMs, as well as on the Project website. Vessels will likely not be permitted to enter the safety zone; however, this restriction will only be short-term. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- Provide regular updates to the local marine community through social media, the USCG LNM, and active engagement with applicable stakeholders;
- Use highly visible marking and lighting of active construction sites;
- Implement up to a 1,640-ft (500-m) safety zone around active construction sites; and
- Operate safety vessels to monitor and communicate with vessels operating in the area, as necessary.

Increase in Project-related construction vessel traffic. An increase in Project-related construction and support vessel traffic transiting to, from, and within the Lease Area and the submarine export cable routes is anticipated during construction due to the presence of Project-related construction vessels. This increase has the potential to impact the frequency of vessel collisions as a result of the temporary increased congestion of the waterway. Project-related vessels are expected to travel in existing traffic patterns and within TSS lanes or fairways as much as possible to minimize impacts to the other marine users. Potential impacts are further discussed in the NSRA (**Appendix BB Navigation Safety Risk Assessment**) and include risks of deviations, increased encounters, collision, allision, and displacement of anchoring ability, which were deemed either Broadly Acceptable or Tolerable in the NSRA. Beacon Wind proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- Project vessels will utilize transit lanes, fairways, and predetermined passage plans consistent with existing waterway uses, to the extent practicable;
- Regular communications and updates with scientific research and survey stakeholders, such as NYSERDA and NOAA, on Project-related construction vessel activities;
- Provide regular updates to the local marine community through social media, the USCG LNM, and active engagement with applicable stakeholders;
- Marine coordination will be implemented for all vessels associated with the Project, i.e., a central coordination hub from which all Project vessel movements will be managed and third-party vessel traffic monitored;
- All vessels associated with the Project will carry operational Automatic Identification System (AIS), pursuant to the USCG and AIS carriage requirements, to monitor the number of vessels and traffic patterns; and
- Use of safety vessel during the construction and decommissioning phases, where deemed appropriate via risk assessment. It is noted that safety vessels will have no law enforcement authority and will contact the USCG on VHF-CH 16 if necessary.

Disturbance of local species targeted by scientific and research activities. Construction activities may also temporarily disturb the distribution of local species, such as birds, marine mammals, and fish, which may impact the results of scientific surveys and research activities. As these species are mobile, they may relocate to nearby areas in order to avoid construction-related noise during these activities. This disturbance will only be temporary, and the species are expected to return to the areas following the completion of construction. See **Section 5.3 Avian Species, Section 5.4 Bat Species**, **Section 5.5 Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat**, **Section 5.6 Marine Mammals**, and **Section 5.7 Sea Turtles** for additional information on the species that have the potential to be temporarily disturbed during Project activities. In summary, it is expected that displaced mobile species will temporarily relocate to other suitable habitat areas within the wider Study

Area and with similar accessibility for the scientific research and survey activities. See **Section 8.8 Commercial and Recreational Fishing** for a discussion on impacts to fishing.

Disturbance of the seafloor. Installation of the foundations, wind turbines, offshore substation facilities, submarine export cables, and interarray cables will result in the temporary disturbance of the seafloor. As safety zones will be implemented during construction activities, marine users are expected to be outside of this potential area of effect and, therefore, are not anticipated to be affected by this temporary disturbance in the Study Area, other than temporarily being restricted from accessing these areas during construction activities.

8.10.4.2.2 Operations and Maintenance

During operations, the potential impact-producing factors to scientific research and surveys may include:

- The presence of fixed structures (e.g., wind turbines and offshore substation facilities); and
- Operations and maintenance vessel traffic.

The following impacts may occur as a consequence of the factors identified:

- Long-term modification of existing water uses;
- Long-term increase in vessel traffic; and
- Long-term presence of new fixed structures (e.g., wind turbines and offshore substation facilities) in the Lease Area.

Modification of existing water uses. The operation of the wind farm will create a new permanent navigational pattern within the Lease Area (see **Section 8.7 Marine Transportation and Navigation and Appendix BB Navigation Safety Risk Assessment** for a discussion of navigation safety). While marine users will be free to transit throughout the wind farm, existing scientific research and surveys may be required to modify patterns. In the Vineyard Wind FEIS (BOEM 2021e), BOEM stated that scientific research and surveys, in particular NOAA and NMFS surveys supporting commercial fisheries and protected species research programs, may be affected by the wind farm. Presence of structures would exclude certain areas within the Lease Area occupied by Project components (e.g., wind turbine foundations, cable routes) from potential vessel and aerial sampling, and by impacting survey gear performance, efficiency, and availability (BOEM 2021e). However, given the significant lead-time in the process prior to operations, federal and state organizations should have ample time to re-adjust patterns and activities to be able to work within the wind farm. No changes to existing uses are expected along the submarine export cable routes.

Temporary, localized safety zones may also be implemented around vessels during operations and maintenance activities (e.g., inspections and repairs), as well as a requirement for access of Project-related vessels and personnel to turbine access platforms during routine inspection and maintenance activities. Beacon Wind will regularly update the local marine community of temporary safety zones and wind turbine access requirements through the USCG LNM and active engagement with applicable stakeholders. In addition, Beacon Wind will mark and light wind turbines and offshore substation facilities in accordance with FAA Advisory Circular 70/7460-1M, BOEM's *Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development* (2021b), IALA Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA

2021),[24] and USCG LNM entry 44-20 guidance (see **Section 3 Project Description** for additional details on the proposed marking and lighting measures).

Presence of new fixed structures. The presence of new fixed structures within the Lease Area has the potential to exclude certain areas from survey activities (see Modification of existing water uses, above) or to attract new and/or additional scientific research and surveys. The foundations may act as artificial reefs and attract marine life, creating new opportunities for scientific research and surveys. This was observed following the installation of the Block Island Wind Farm (Brunetti 2018). Beacon Wind is not proposing to implement exclusion zones within the operational wind farm, with requested "clearance" zones limited to access ladders and platforms on the wind turbines and offshore substation facilities. Beacon Wind will supply the positions of fixed structures and safety and clearance zones for the inclusion in navigational charts.

8.10.4.2.3 Decommissioning

Impacts during decommissioning are expected to be similar or less than those experienced during construction, as described in **Section 8.10.4.2.1**. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time.

8.10.4.3 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors described in **Section 8.10.4.2**, Beacon Wind is proposing to implement the following avoidance, minimization, and mitigation measures.

8.10.4.3.1 Construction

During construction, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.10.4.2.1**:

- Provide regular updates to the local marine community through social media, the USCG LNM, and active engagement with applicable stakeholders;
- Use highly visible marking and lighting of active construction sites;
- Implement up to 1,640-ft (500-m) safety zones around active construction sites; and
- Operate safety vessels to monitor and communicate with vessels operating in the area, as necessary.

8.10.4.3.2 Operations and Maintenance

During operations, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.10.4.2.2**:

- Provide the location of above water structures for inclusion in NOAA charts;
- Properly mark and light wind turbines and offshore substation facilities in accordance with FAA Advisory Circular 70/7460-1M, BOEM's Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development (2021b), IALA

[24] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA 2021)[25] and USCG LNM entry 44-20 guidance (see **Section 3 Project Description** for additional details on the proposed marking and lighting measures); and

- Regularly update the local marine community through the USCG LNM and active engagement with applicable stakeholders.

8.10.4.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in **Section 8.10.4.3.1** and **Section 8.10.4.3.2**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

8.10.5 References

TABLE 8.10-6. SUMMARY OF DATA SOURCES

Source	Includes	Available at	Metadata Link
BOEM	Lease Area	https://www.boem.gov/BOEM-Renewable-Energy - Geodatabase.zip	N/A
BOEM	State Territorial Waters Boundary	https://www.boem.gov/Oil-and-Gas-Energy-Program/Mapping-andData/ATL_SLA(3).aspx	http://metadata.boem.gov/geospatial/OCS_SubmergedLandsActBoundary_Atlantic_NAD83.xml
BOEM	Sand and Gravel Borrow Area	http://www.boem.gov/Oil-and-Gas-Energy-Program/Mapping-andData/Federal-Sand-n-Gravel-LeaseBorrow-Areas_gdb.aspx	https://mmis.doi.gov/arcgis/rest/services/MMIS/PlanningandAdministration/MapServer/5
BOEM	Aliquots with sand Resources	https://www.boem.gov/Sand-Aliquots-Shapfile/	https://mmis.doi.gov/arcgis/rest/services/MMIS/PlanningandAdministration/MapServer/6
BOEM	BOEM Planning Area	https://www.boem.gov/Oil-and-Gas-Energy-Program/Mapping-andData/ATL_PLAN(3).aspx	http://metadata.boem.gov/geospatial/ATL_PLAN.xml
BOEM	Area of Interest	https://www.boem.gov/BOEM Renewable-Energy-Geodatabase.zip	N/A
BOEM	Wind Lease Area	https://www.boem.gov/BOEM-Renewable-Energy-Geodatabase.zip	N/A

[25] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

Source	Includes	Available at	Metadata Link
NOAA	Dredged Material Disposal Site	ftp://ftp.coast.noaa.gov/pub/MSP/Oc eanDisposalSites.zip	https://inport.nmfs.noaa.gov/inport/item/54193
NOAA NCEI	Bathymetry	https://www.ngdc.noaa.gov/mgg/coa stal/crm.html	N/A

BOEM (Bureau of Ocean Energy Management). 2021a. “Atlantic Permit Applications.” Available online at: https://www.boem.gov/sites/default/files/documents/Atlantic-Pending-Permit-Map_5.pdf. Accessed November 23, 2021.

BOEM. 2021b. “Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development.” April 2021. Available online at: https://www.boem.gov/sites/default/files/documents/renewable-energy/2021-Lighting-and-Marking-Guidelines.pdf. Accessed June 8, 2021.

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8.11 Other Coastal and Marine Uses

This section describes other coastal and marine uses, including offshore wildlife viewing, underwater recreational activities (i.e., diving), surface-based marine recreational activities, and recreational boating. Potential impacts to these coastal and marine uses resulting from construction, operations, and decommissioning of the Project are discussed. Proposed Project-specific measures adopted by Beacon Wind are also described, which are intended to avoid, minimize, and/or mitigate potential impacts to coastal and marine resources.

Other resources and assessments detailed within this COP that are related to coastal and marine uses include:

- Recreation and Tourism (**Section 8.3**);
- Marine Transportation and Navigation (**Section 8.7**);
- Commercial and Recreational Fishing (**Section 8.8**);
- Department of Defense and OCS National Security Maritime Uses (**Section 8.8**); and
- Marine Energy and Infrastructure (**Section 8.10**).

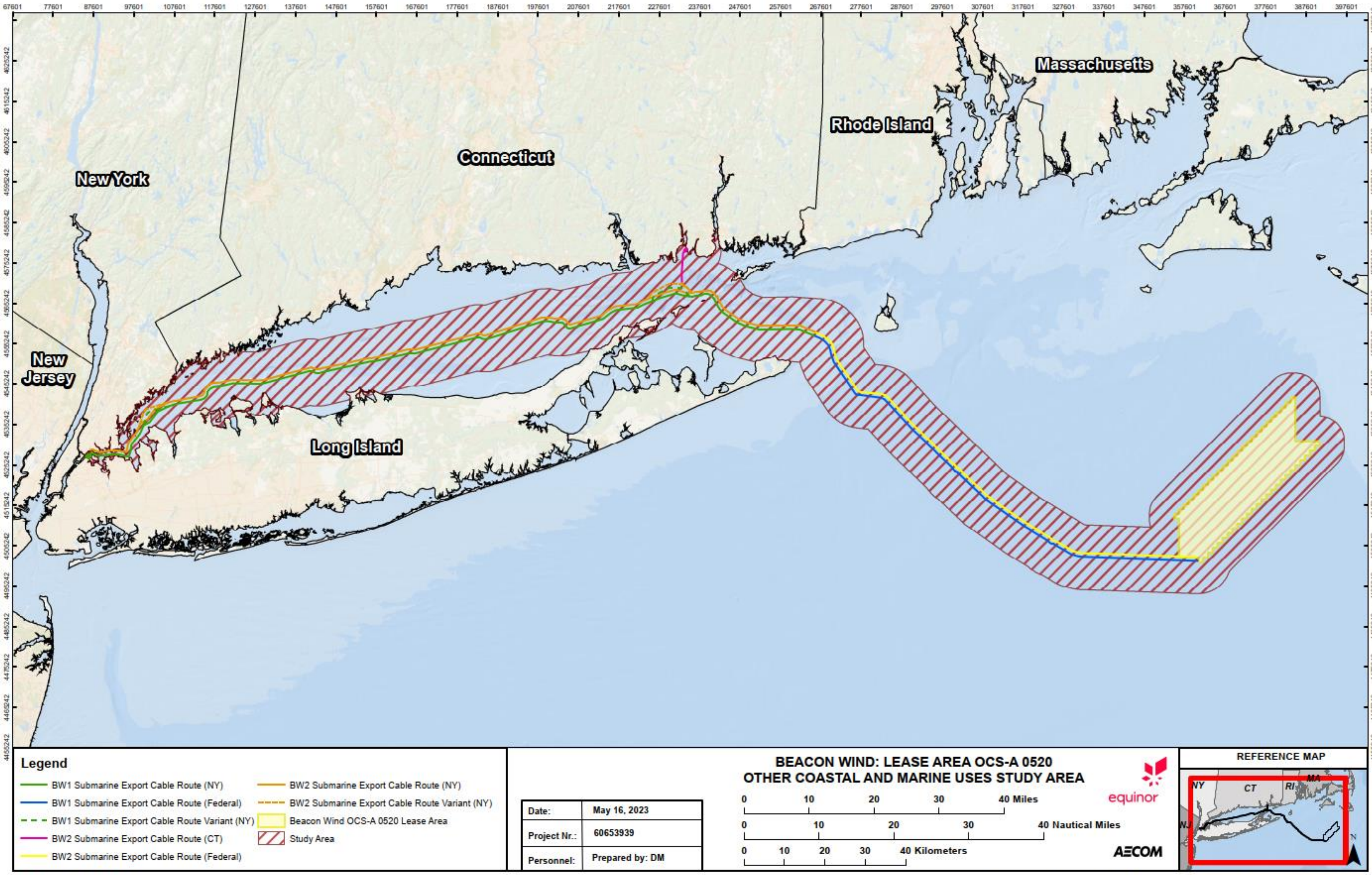
This section also addresses public enjoyment of natural and cultural resources that are further described and evaluated in the following sections:

- Water Quality (e.g., water activities) (**Section 4.2**);
- Avian Species (e.g., birds) (**Section 5.3**);
- Marine Mammals (e.g., whales) (**Section 5.6**);
- Marine Archaeological Resources (e.g., shipwrecks) (**Section 6.1**); and
- Visual Resources (**Section 7.0**).

Data Relied Upon and Studies Completed

For the purposes of this section, the Study Area includes the coastal and offshore areas that may be directly and/or indirectly impacted by the offshore components, including the foundations, wind turbines, offshore substation facilities, and the submarine export cables (see **Figure 8.11-1**).This section relied upon regional sources, including the Northeast Ocean Data Portal, and local state sources, including local press articles, the NYSERDA New York State Offshore Wind Master Plan studies and appendices, the Connecticut Department of Energy and Environmental Protection (CTDEEP), and the Rhode Island Ocean Special Area Management Plan (SAMP). The Vineyard Wind Lease Area (OCS-A 0501) DEIS and FEIS (BOEM 2018, BOEM 2021b) and the BOEM MA/RI WEA website (BOEM 2020) also provided supporting information for this section.

FIGURE 8.11-1. OTHER COASTAL AND MARINE USES STUDY AREA



Data Sources: BOEM, ESRI, NOAA
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

8.11.1 Affected Environment

The affected environment is defined as the coastal and offshore areas that have the potential to be directly affected by the construction, operations, and decommissioning of the Project. This includes the Lease Area and the submarine export cable routes. Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Beacon Wind expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards, which Beacon Wind will comply with in using the facilities.

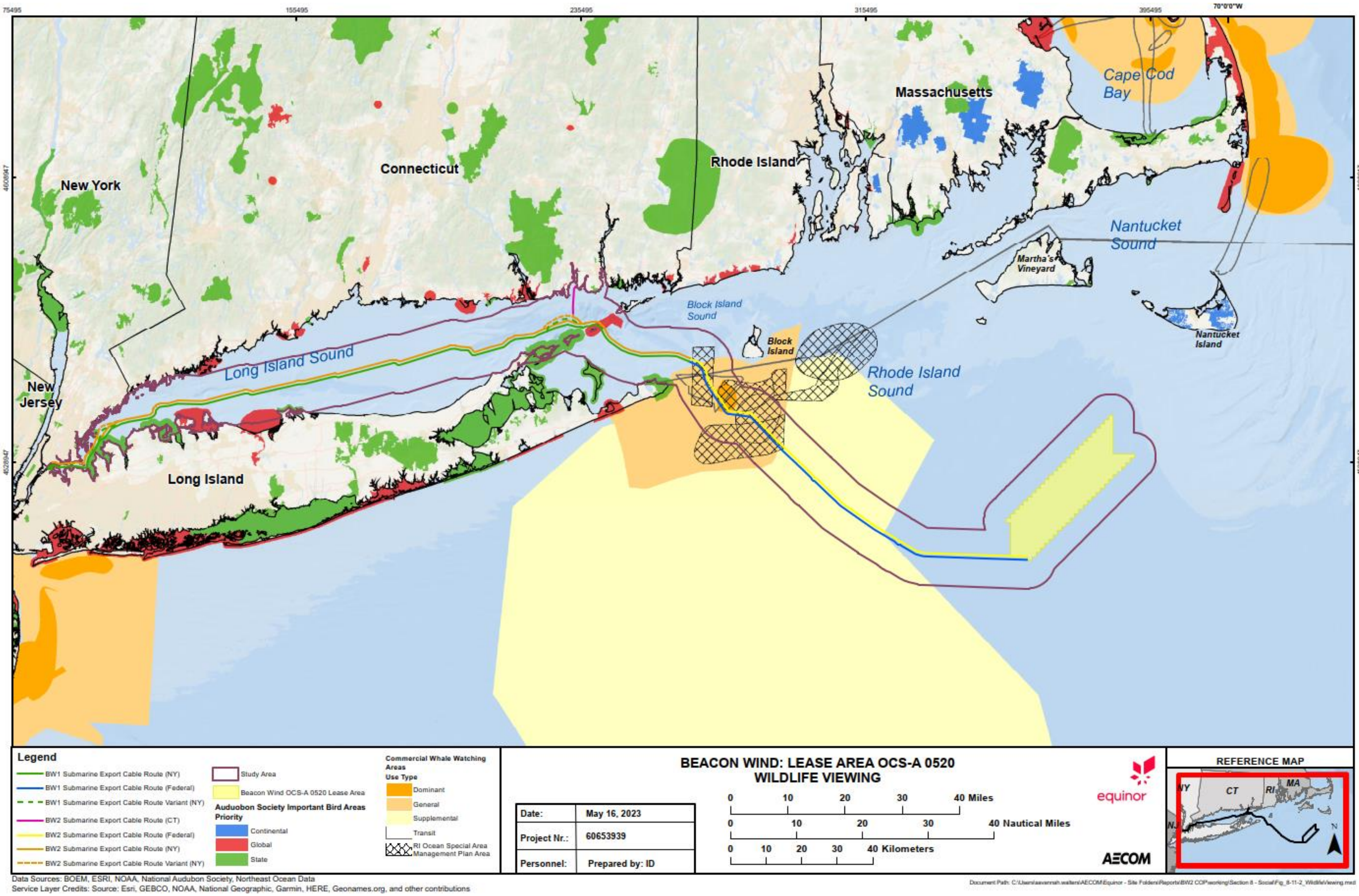
Similar to the Vineyard Wind FEIS (BOEM 2021b), construction and installation activities may affect offshore and onshore recreational activities, including those described below and in **Section 8.3 Recreation and Tourism** and **Section 8.8 Commercial and Recreational Fishing**, as well **Section 8.7 Marine Transportation and Navigation**, **Section 8.8 Department of Defense and OCS National Security Maritime Uses**, and **Section 8.10 Marine Energy and Infrastructure**, due to the presence of construction activity within the Lease Area, along the submarine export cable routes, and at the onshore landfall sites. Landfall sites for the Project have been selected to minimize effects on coastal and marine resources such a public beaches and boat launches and the 1x1 nm (1.9x1.9 km) layout of the wind turbines has been selected to minimize effects on marine navigation (including recreation, commercial fishing, and military uses).

8.11.1.1 Offshore Wildlife Viewing

Offshore wildlife viewing, specifically for birds and whales, is a popular activity near the eastern entrance to Long Island Sound, around Block Island, and offshore Nantucket and Martha's Vineyard between the spring and fall migrations. Offshore wildlife viewing occurs both from onshore locations as well as through chartered trips. **Figure 8.11-2** shows areas identified by the Audubon Society and the Northeast Ocean Data Portal Working Group as popular wildlife viewing sites in relation to and within the vicinity of the Study Area. Within and surrounding the Study Area, offshore bird watching is typically conducted in conjunction with recreational boating and fishing activities and/or charter wildlife viewing activities (see **Figure 8.11-2**). Most charters take place during the seasonal bird migratory period starting in the spring and ending in the fall, though occasionally trips take place in January and February (NYSERDA 2017). Charters that take place following storms are also popular, as strong winds are known to bring rare offshore species in closer to shore (NYSERDA 2017; RICRMC 2010).

Shore-based bird watching is also a popular activity along Long Island Sound. Popular shore-based bird watching areas in New York include Montauk Point and Orient Point County Park on Long Island and the Marshlands Conservancy and the Edith G. Read Wildlife Sanctuary near the Connecticut border (White 2016a). In Connecticut, Stratford Point, the Sandy Point Bird Sanctuary, and Hammonasset Beach are popular areas for birdwatching along Long Island Sound (White 2016b).

FIGURE 8.11-2. WILDLIFE VIEWING



Whale watching in the vicinity of the Project predominately extends from Long Island Sound offshore onto the continental shelf (see 'general' commercial whale watching areas in **Figure 8.11-2**). Whale watching is not a popular activity within Long Island Sound. The use areas include the activity area within the last three to five years based on surveys reported by Point 97 et al. (Point 97 et al. 2015). The dominant use area nearest the cable route (**Figure 8.11-2**) is between the eastern tip of Long Island and Block Island. This dominant use area includes the areas routinely used during the majority of whale watching season (Point 97 et al. 2015). The comparatively large supplemental area shown on **Figure 8.11-2** covers an area extending to the south, where whale watching is either infrequent or supplemental to some other primary activity (Point 97 et al. 2015). Charters occur between the spring and fall migrations. Whale watching typically extends farther offshore than most of the bird watching areas (Point 97 et al. 2015).

Due to ideal weather conditions and an increased chance of viewing whales, July and August are the busiest months for whale watching from ports located in New York, Connecticut, and Rhode Island (NYSERDA 2017; Point 97 et al. 2015; RICRMC 2010). During this peak season, vessels can make multiple trips per day, most days of the week. Vessels offering whale watching range from small, semi-private charters accommodating up to six passengers that conduct a single voyage per day, to large charters carrying up to 400 passengers that conduct three to five trips per day (Point 97 et al. 2015). Typical commercial whale watching charter vessels are greater than 65 ft (20 m) in length and hold between 100 to 300 or more passengers (NYSERDA 2017). In Rhode Island, the vessels used most frequently for whale watching can carry approximately 100 to 150 people per trip and may make 40 trips per season (RICRMC 2010). Whale watching is more frequent in the vicinity of the submarine export cable routes south of the entrance to Long Island Sound (below Montauk in Suffolk County, New York) and Block Island, as compared to the Lease Area (**Figure 8.11-2**).

There are no known whale watching activities originating from Connecticut; however, there are small tour operators from the state who focus on more general nature viewing and may occasionally see small cetaceans during their excursions (Point 97 et al. 2015). The lack of whale watching operations from Connecticut is largely due to the relatively long travel times from Connecticut ports to areas known to be frequented by whales as large cetaceans do not regularly utilize Long Island Sound.

8.11.1.2 Underwater Recreation

In the waters off New York, Connecticut, Rhode Island, and Massachusetts, most of the underwater recreation (e.g., diving and snorkeling) activity occurs between May and October, when water visibility is good and the water is warmer (Nagiewicz and Segars 1986; NYSERDA 2017; RICRMC 2010). Shore-based diving may extend into November (NYSERDA 2017). Most of the underwater recreation in the vicinity of the Study Area is located within Long Island Sound and within 12 nm (22.2 km) of the coast and outside of the Lease Area (NYSERDA 2017; RICRMC 2010).

Recreational divers typically target shipwrecks, artificial reefs, and underwater wildlife to engage in photography, exploration, and fishing (NYSERDA 2017; RICRMC 2010). Popular recreational diving reefs can be found off the coast of New York and Connecticut and are typically located around or within the 3 nm (5.6 km) boundary. In August 2019, New York launched the second largest artificial reef expansion in state history (Office of Governor Cuomo 2019). The submarine export cable routes will not encounter any artificial reefs, although two occur within Long Island Sound (near Smithtown and Matinecock, New York; NYSDEC n.d.). Throughout Long Island Sound, there are an estimated 46 shipwrecks along the submarine export cable corridors (Galiano 2018). Across the Northeast, dive sites were reported to have at least 50 visitors per year (Point 97 et al. 2015). Popular reef and wreck dive sites are shown in relation to the Study Area in **Figure 8.11-3**. Diving locations identified by participants in the 2012 Northeast Recreational Boater Survey, conducted by SeaPlan and the NROC, are shown in **Figure 8.11-4**.

8.11.1.3 Surface-Based Marine Recreation

Surface-based marine recreation (e.g., swimming, surfing, kayaking/paddle boarding, windsurfing, and kite boarding) is popular throughout the shallower waters within the Study Area. Similar to underwater recreation, the majority of surface-based marine recreation is in the summer months (NYSERDA 2017; RICRMC 2010). Surfing occurs year-round, taking advantage of storm swells and vacant waters; however, it is more popular during summer months (RICRMC 2010). Locations identified by participants in the 2012 Northeast Recreational Boater Survey, conducted by SeaPlan and the NROC, for surface water-based activities are shown in **Figure 8.11-4**.

8.11.1.4 Fishing Areas

See **Section 8.8 Commercial and Recreational Fishing** for a detailed discussion of recreational fishing that may be affected by the Project.

FIGURE 8.11-3. UNDERWATER-BASED ACTIVITIES

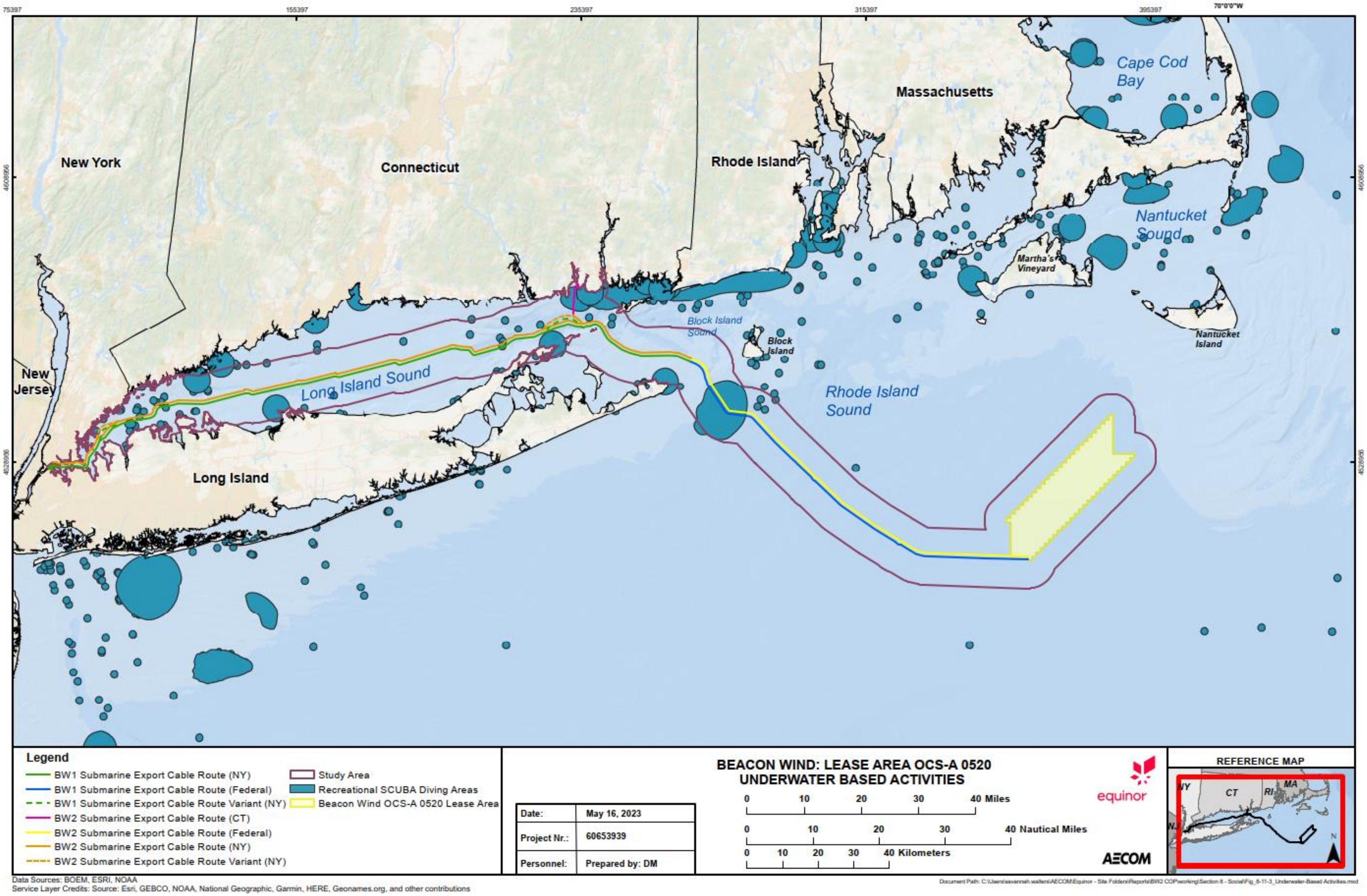
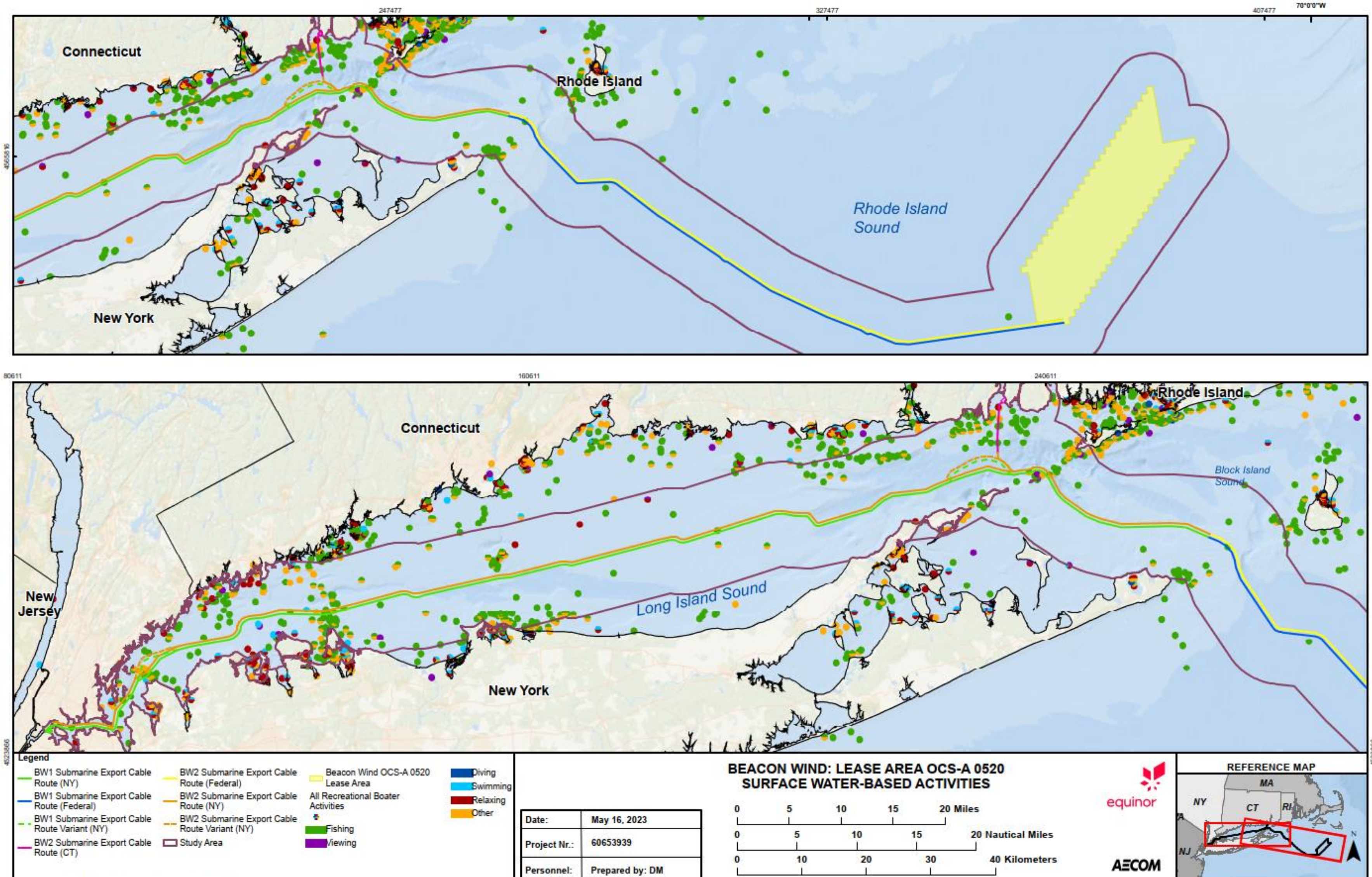


FIGURE 8.11-4. SURFACE WATER-BASED ACTIVITIES BASED ON 2012 NORTHEAST RECREATIONAL BOATER SURVEY



Data Sources: BOEM, ESRI, NOAA, Northeast Ocean Data
Service Layer Credits: Source: Esri, GEBCO, NOAA, National Geographic, Garmin, HERE, Geonames.org, and other contributions

8.11.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For marine and coastal uses, the maximum design scenario is the presence of new fixed structures offshore (i.e., wind turbines and offshore substation facilities) as well as the maximum number of submarine export cables and interarray cables, as described in **Table 8.11-1**. The parameters provided below represent the maximum potential impact from full Lease Area build-out. This design incorporates a total of up to 157 structures within the Lease Area (made up of up to 155 wind turbines and two offshore substation facilities) with the maximum length of interarray cabling, one submarine export cable route for BW1 to Queens, New York and one submarine export cable route for BW2 to Queens, New York or to Waterford, Connecticut.

TABLE 8.11-1. SUMMARY OF MAXIMUM DESIGN SCENARIO PARAMETERS FOR MARINE AND COASTAL USES

Parameter	Maximum Design Scenario	Rationale
Construction		
Offshore structures	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities).	Representative of the maximum number of structures.
Foundation	Monopile, Piled jacket	Representative of foundation options that have installation methods that would result in the maximum introduction of underwater noise.
Foundation installation method	Pile driving	Representative of the installation method that would result in the loudest underwater noise generated.
Export cable landfall installation	Trenched (open cut trench) methods	Representative of the maximum disturbance associated with export cable landfall installation, which would potentially impact the enjoyment of nearshore resources.
Safety zones for Project-related vessels and structures	Based on full build-out of the Project (BW1 and BW2), which corresponds to the maximum number of structures (155 wind turbines and two offshore substation facilities) and maximum number of associated vessels and safety zones. 1,640 ft (500 m) around relevant structures, activities, and vessels.	Representative of the maximum cumulative area and duration, which has the potential to impact recreation and tourism users, who will be restricted from entering marine areas.

Parameter	Maximum Design Scenario	Rationale
Duration offshore installation	Based on full build-out of the Project (BW1 and BW2), which corresponds to the maximum number of structures (155 wind turbines and two offshore substation facilities).	Representative of the maximum period required to install the offshore components, which has the potential to impact resources in, access to, or enjoyment of the Project Area.
Operations and Maintenance		
Offshore structures	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities).	Representative of the presence of new fixed structures in an area that previously had none.
Project-related vessels collision risk	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines, two offshore substation facilities, two submarine export cables, and associated interarray cables). Based on maximum number of vessels and movements for servicing and inspections.	Representative of the maximum predicted Project-related vessels for collision risk.
Offshore operations and maintenance activities	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines, two offshore substation facilities, two submarine export cables, associated interarray cables) and the maximum amount of Project-related activities expected per year.	Representative of the maximum amount of activities from the Project during the operations and maintenance phase.

8.11.2.1 Construction

During construction, the potential impact-producing factors to marine uses may include:

- Installation of the offshore components, including the foundations, submarine export cables, and interarray cables; and
- Export cable landfall installation that may include trenchless (e.g., HDD, jack and bore, or micro-tunnel) and trenched (open cut trench) methods.

The following impacts may occur as a consequence of the factors identified above:

- Short-term increase in Project-related vessel traffic during construction;
- Short-term displacement of marine users due to the implementation of safety zones around Project-related vessels and structures;
- Short-term disturbance of and restriction to onshore and nearshore areas during export cable installation;
- Short-term changes in water quality;
- Short-term disturbance and displacement of local species targeted for wildlife viewing; and
- Short-term habitat disturbance in the Project Area.

Increase in construction vessel traffic. An increase in Project-related construction and support vessel traffic transiting to, from, and within the Lease Area, ports, and the submarine export cable routes is anticipated during construction. Project-related vessels are expected to travel within existing

TSS lanes and fairways as much as possible to minimize impacts to the other marine users described above. The 2012 Northeast Recreational Boater Survey, conducted by SeaPlan and the NROC, surveyed the boating patterns and economic activity of 373,766 qualified registered boaters from New York, Connecticut, Rhode Island, Massachusetts, Maine, and New Hampshire and found that the majority of recreational boating occurs within 3 nm (5.6 km) of shore and within state waters (Starbuck and Lipsky 2013). Over one-third of the recreational boating activity reported in the survey occurred within the Study Area (approximately 2,224 of the 5,114 boating routes and 1,649 of the 4,635 recreational boater activity areas) (Starbuck and Lipsky 2013).

Potential impacts from an increase in Project-related vessel traffic to commercial and recreational vessel traffic are further discussed in the **Section 8.7 Marine Transportation and Navigation** and **Appendix BB Navigation Safety Risk Assessment**. As described further in **Section 8.7 Marine Transportation and Navigation**, the change in vessel numbers transiting to/from the Lease Area against baseline levels is anticipated to be insignificant and is unlikely to be noticed by other coastal and marine users during construction.

Beacon Wind will provide regular updates of construction activity and potentially closed areas to the local marine community through the Project website, social media, the USCG LNM, and active engagement with other stakeholders.

Displacement of marine users due to the implementation of temporary safety zones. During construction activities, Beacon Wind proposes to implement safety zones around relevant structures, activities, and vessels to promote the safety of local mariners, the work crew, and equipment. Beacon Wind proposes to work with the USCG to establish temporary safety zones in active construction areas within 12 nm (22.2 km) of the coast, depending on the nature and extent of construction activity. This zone would extend approximately 1,640 ft (500 m) around relevant structures, activities, and vessels. This approach for establishing safety zones is consistent with the FEIS for the Vineyard Wind project (BOEM 2021b). Should USCG Safety Zone not extend beyond 12 nm (22.2 km) at the time of construction, Beacon Wind will utilize a combination of safety vessels, LNMs, and COLREGS to promote both awareness of these activities and the safety of the construction equipment and personnel. Areas will be marked and lit in accordance with BOEM (BOEM 2021a) and USCG requirements and monitored by a security boat that will be available to assist local mariners. The locations of the safety zones will be posted in USCG LNMs, as well as on the Project website. Pending expansion of existing USCG authorities, vessels will not be permitted to enter the safety zone without express consent from Beacon Wind. This is intended for the safety of all marine users.

Marine users associated with the “affected environment” will likely be restricted from accessing marine locations by the application of these safety zones; however, these restrictions will only be short-term, localized, and temporary. Water trails (also called “blueways”) are recreational water routes in navigable waterways often used by canoers and other paddle sports. The Bronx River Blueway in the Bronx, New York is located near the Queens, New York cable landfall site, the Niantic River Kayak Trail is in the Niantic River estuary northwest of the Waterford, Connecticut cable landfall site, and other fishing and boating activities occur in the vicinity of the Waterford, Connecticut landfall site (Northeast Ocean Data 2021). Access to these resources could be temporarily impacted by the use of safety zones. Beacon Wind will provide regular updates of construction activity and safety zones to the local marine community through the Project website, social media, the USCG LNM and active engagement with other stakeholders.

Short-term disturbance of and restriction to onshore and nearshore areas during export cable installation. The export cable landfalls are both proposed to occur on privately-owned property which already restrict public access and activities will be consistent with other industrial activities that may be occurring in this area. In addition, these nearshore areas do not support use for recreational bathing, surfing, and other recreation watersports. To promote the safety of the public during onshore construction activities, safety zones around the construction staging areas will be set up, in which the public (including workers present within the Astoria power complex and the Waterford power complex but not associated with BW1 or BW2 construction) will not be allowed to enter for their own safety. However, these safety zones will be temporary. Beacon Wind will also provide regular updates of onshore and nearshore construction activity and safety zones to the local communities through the Project website, social media, the USCG LNM, and active engagement with Maritime Association of the Port of New York / New Jersey Harbor Safety, Navigation, and Operations Committee and the Connecticut Port Authority.

Short-term changes in water quality. During construction, water quality has the potential to be impacted through the potential introduction of contaminants, including through the disturbance of seafloor sediment, potential for oil and fuel spills and releases, and the potential for inadvertent returns associated with HDD activities (see **Section 4.2 Water Quality** for additional information). Potential impacts to water quality during construction are expected to be short-term and localized. Project-related vessels will be subject to USCG regulations regarding wastewater and discharges and will operate in compliance with oil spill prevention and response plans that meet USCG requirements. Beacon Wind will also develop an Oil Spill Response Plan (**Appendix F Oil Spill Response Plan**) and an Inadvertent Return Plan, which detail measures proposed to avoid inadvertent releases and spills and a protocol to be implemented should a spill event occur. Decreases in water quality have the potential to impact marine users along the export cable's nearshore areas, as some areas along the East River and in the vicinity of the Waterford, Connecticut landfall (e.g., Niantic Bay) may be used for recreation watersports (e.g., recreational boating in "blueways" along the East River). Water quality impacts on these recreational uses during construction will be temporary, short-term, and localized. The nearshore area surrounding the Queens, New York landfall does not support these recreational activities and impacts to marine users in this area are expected to be negligible. Additional information can be found in **Section 8.12 Public Health and Safety**.

Short-term disturbance of local species of interest. Construction activities may temporarily disturb the distribution of local species, such as birds, wading birds, marine mammals, and fish, which may therefore impact the ability for marine users to enjoy these species. Short-term disturbance of these resources and the mitigation applied to avoid, reduce, or mitigate impacts are described further in **Section 5 Biological Resources**. In summary, it is expected that displaced mobile species will temporarily relocate to other suitable habitat areas within the wider Study Area and with similar accessibility for the marine user groups. Impacts to commercial and recreational fishing are discussed in **Section 8.8 Commercial and Recreational Fishing**.

Short-term disturbance of habitat. Installation of the foundations, wind turbines, offshore substation facilities, the submarine export cables, and interarray cables will result in the temporary disturbance of the seafloor. **Section 5.5 Benthic Resources and Finfish, Invertebrates, and Essential Fish Habitat** describes how potential impacts to habitats through disturbance will be addressed; for example, Beacon Wind will site Project-related components to avoid sensitive habitats, wrecks, reefs, and other structures that support offshore marine uses to the extent practicable.

8.11.2.2 Operations and Maintenance

During operations, the potential impact-producing factors to marine and coastal uses may include:

- The presence of fixed structures (e.g., wind turbines, offshore substation facilities, submarine export cables, and interarray cables); and
- Operations and maintenance vessel traffic.

The following impacts may occur as a consequence of the factors identified above:

- Long-term modification of existing water uses;
- Long-term increase in vessel traffic; and
- Long-term presence of new fixed structures (e.g., wind turbines and offshore substation facilities) in the Lease Area.

Modified existing water uses. The operation of the Project will create a new permanent navigational pattern within the Lease Area (see **Section 8.7 Marine Transportation and Navigation** and **Appendix BB Navigation Safety Risk Assessment** for a discussion of navigation safety). As recreational marine users will be free to transit throughout the wind farm, existing uses will be able to continue. Additionally, the Project has adopted the universal 1x1 nm (1.9x1.9 km) layout (see **Section 3 Project Description**) along with neighboring projects to aid in ease of navigation within the OCS-A 0520 Lease Area. No changes to existing uses are expected along the submarine export cable routes. In addition, the presence of Project-related vessels in close proximity to the operational Project is deemed to have beneficial impacts, for example, in the provision of trained first responders and on-scene emergency response coordination for mariners in distress, as available.

During operations and maintenance activities, Beacon Wind also proposes to utilize 1,640 ft (500 m) safety zones around relevant structures, activities, and vessels. This approach for establishing safety zones is consistent with the FEIS for the Vineyard Wind project (BOEM 2021b). Should USCG Safety Zone authorities not extend beyond 12 nm (22.2 km), Beacon Wind will utilize a combination of safety vessels, LNMs, and COLREGS to promote both awareness of these activities and the safety of the Project-related equipment and personnel. Beacon Wind will regularly update the local marine community of temporary safety zones and wind turbine access requirements through the USCG LNM and active engagement with Maritime Association of the Port of New York /New Jersey Harbor Safety, Navigation, and Operations Committee and the Connecticut Port Authority.

In addition, Beacon Wind will light and mark wind turbines and offshore substation facilities in accordance with FAA Advisory Circular 70/7460-1M, BOEM's *Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development* (2021a), IALA Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA 2021),[26] and USCG LNM entry 44-20 guidance (see **Section 3 Project Description** for additional details on the proposed marking and lighting measures).

Increase in vessel traffic: During operations and maintenance, Beacon Wind is proposing to utilize a combination of CTVs, SOVs, and smaller support vessels to complete operations and maintenance

[26] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

activities. The SOV is expected to remain offshore in the Project Area for a period of approximately two weeks, returning to shore every two weeks for 24 hours for refueling, re-supplying, and crew changes. Therefore, the SOV concept significantly reduces the overall vessel transits from Project Area to shore, compared to the maximum design scenario of multiple crew transfer vessels making daily return trips. The projected increase in vessel traffic associated with these vessels is negligible in comparison to the average traffic observed in the Study Area (see **Section 8.7 Marine Transportation and Navigation** and **Appendix BB Navigation Safety Risk Assessment** for additional information). In addition, the presence of Project-related vessels is also deemed to have beneficial impacts, for example in the provision of trained first responders and on scene emergency response coordination for mariners in distress, as available.

Presence of new fixed structures. The presence of new fixed structures within the Lease Area has the positive beneficial potential to attract new and/or additional marine users to the area. The wind turbines may create a new demand for sightseeing trips and charter tours. This was observed with the Block Island Wind Farm, which has seen an increase in tourism through the renting of vessel charter services and the creation of new businesses to support the new visitor demand (Brookins 2017; Carr-Harris and Lang 2019). Lilley et al. (2010) also found that recreation and tourism users have an interest in paying for a boat tour to see the offshore wind farm. Hy-Line Cruises, based in Hyannis, Massachusetts, had expressed interest in operating sightseeing vessels to other offshore projects with the expectation that such facilities will be popular tourist destinations (Cassidy 2011). This was also observed within the Block Island Wind Farm, with local vessel owners using their vessels full-time to take tourists to view the project (Brunetti 2018).

The presence of the new fixed structures is not anticipated to impact surface-based marine activities reliant on wind and other ocean conditions (e.g., surfing) due to wake effects (additional information on wake effect impacts is provided in **Section 4.1 Physical and Oceanographic Conditions**).

A 2020 study of recreational boaters found that it is unlikely that offshore wind activities in the MA/RI WEA would have significant impacts on recreational boating because the boaters surveyed preferred to use waters closer to the coast (BOEM 2021b; Dalton et al. 2020). Recreational boaters who venture further away from the coast in the direction of the Lease Area would benefit from the increased abundance of targeted fish species that has been observed near offshore wind facilities (BOEM 2021b). **Section 8.8 Commercial and Recreational Fishing** evaluates the potential impacts on recreational fishing activity resulting from the construction, operations, and decommissioning of the Project.

Impacts to existing wildlife viewing activities are not anticipated, on the basis that the Lease Area is not located within the dominant whale and bird watching areas (see **Section 8.11.1.1**) and that the operational submarine export cables will not impact access opportunities. Additionally, the foundations within the Lease Area may act as artificial reefs and attract marine life, creating new recreational dive sites and recreational fishing destinations.

Marine users in the Lease Area, such as fixed gear fishermen, will likely be asked to keep surface marker buoys at least 165 ft (50 m) away from the foundations within up to two service vessel approach corridors to allow for safe approach by service vessels, and gear on the seabed set in at least 165 ft (50 m) from the foundations should not limit access (as long as the vessel follows all applicable USCG regulations). Traps and nets set in this manner have been productive in the British lobster fishery as the increased seabed structure can provide improved habitat for structure-oriented fish and invertebrate species, where such structure is otherwise limited. Beacon Wind will supply the positions of fixed structures and safety and clearance zones for the inclusion in navigational charts.

8.11.2.3 Decommissioning

Impacts during decommissioning are expected to be similar or less than those experienced during construction, as described in **Section 8.11.2.1**. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Beacon Wind anticipates will be needed for the Project, please see **Section 3 Project Description**.

8.11.3 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors described in **Section 8.11.2**, Beacon Wind is proposing to implement the following avoidance, minimization, and mitigation measures.

8.11.3.1 Construction

During construction, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.11.2.1**:

- Implement safety zones up to 1,640 ft (500 m) around active construction sites;
- Operate security/support vessels, where appropriate, to monitor and communicate with vessels operating in the area during periods of construction activity;
- Use highly visible marking and lighting of active construction sites to meet BOEM Lighting and Marking guidelines (BOEM 2021a) and USCG First District LNM entry 44-20 guidelines (see **Section 3** Project Description for additional details on the proposed marking and lighting measures);
- Install operational AIS on vessels associated with Project construction;
- Provide regular updates to the local marine community through Project websites, social media, the USCG LNM, and active engagement with other stakeholders; and
- Site Project-related components to avoid sensitive habitats, wrecks, reefs, and other structures that support offshore marine uses to the extent practicable.

8.11.3.2 Operations and Maintenance

During operations, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.11.2.2**:

- Marking and lighting of wind turbines and offshore substation facilities in accordance with FAA Advisory Circular 70/7460-1M, BOEM's *Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development* (2021a), IALA Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA 2021),[27] and USCG LNM entry 44-20 guidance (see **Section 3 Project Description** for additional details on the proposed marking and lighting measures);

[27] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

- Install operational AIS on vessels associated with Project operations and maintenance;
- Vessels will not be restricted from entering the operational wind farm areas, and as a result these structures may attract local charters for site-seeing and recreational fishing;
- Provision of locations of structures for inclusion in NOAA charts; and
- Provide regular updates to the local marine community through the USCG LNM and active engagement with other stakeholders.

8.11.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in **Section 8.11.3.1** and **Section 8.11.3.2**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

8.11.4 References

TABLE 8.11-2. SUMMARY OF DATA SOURCES

Source	Includes	Available at	Metadata Link
BOEM	Lease Area	https://www.boem.gov/BOEM-renewable-Energy-Geodatabase.zip	N/A
BOEM	State Territorial Waters Boundary	https://www.boem.gov/Oil-and-Gas-Energy-Program/Mapping-andData/ATL_SLA(3).aspx	http://metadata.boem.gov/geospatial/OCS_SubmergedLandsActBoundary_Atlantic_NAD83.xml
NOAA	Recreational Diving Reef	ftp://ftp.coast.noaa.gov/pub/MSP/Artifici alReefs.zip	https://www.fisheries.noaa.gov/inport/item/54191
NOAA & NCEI	Bathymetry	https://www.ngdc.noaa.gov/mgg/coastal /crm.html	N/A
Northeast Ocean Data	Recreational Boater Activities	https://www.northeastoceandata.org/	https://www.northeastoceandata.org/files/metadata/Themes/Recreation/RecreationalBoaterActivities.pdf
Northeast Ocean Data	Commercial Whale Watching Area	https://www.northeastoceandata.org/	https://www.northeastoceandata.org/files/metadata/Themes/Recreation/CommercialWhaleWatchingAreas.pdf
Northeast Ocean Data	Important Bird Areas	https://www.northeastoceandata.org/	https://www.northeastoceandata.org/files/metadata/Themes/Avian/ImportantBirdAreas_Poly.pdf

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8.12 Public Health and Safety

This section describes the public health and safety issues relevant to the Project, including accidents, public access, hazardous materials, non-routine events, and electric and magnetic fields (EMF). Potential impacts to public health and safety resulting from construction, operations, and decommissioning of the Project are discussed. Proposed Project-specific measures adopted by Beacon Wind are also described; these measures are intended to avoid, minimize, and/or mitigate potential impacts to public health and safety.

Other resources and assessments detailed within this COP that are related to public health and safety include:

- Physical Oceanography and Meteorology (**Section 4.1.1**);
- Water Quality (**Section 4.2**);
- Air Quality (**Section 4.3**);
- Land Transportation and Traffic (**Section 8.5**);
- Aviation (**Section 8.6**);
- Marine Transportation and Navigation (**Section 8.7**);
- Commercial and Recreational Fishing (**Section 8.8**);
- Marine Energy and Infrastructure (**Section 8.10**);
- Oil Spill Response Plan (**Appendix E**);
- Safety Management System (**Appendix F**);
- Navigation Safety Risk Assessment (**Appendix BB**);
- Offshore Electric and Magnetic Field Assessment (**Appendix CC**); and
- Onshore Electric and Magnetic Field Assessment (**Appendix DD**).

Data Relied Upon and Studies Completed

For the purposes of this section, the Study Area includes the coastal areas that may be directly and/or indirectly impacted by the offshore components, including the foundations, wind turbines, and offshore substation facilities, the onshore components, including the onshore export and interconnection cable routes and the onshore substation facilities, and the staging and construction areas associated with the construction, operations, and decommissioning of the Project. This section relies upon publicly-available information related to public services such as hospitals, fire protection services, emergency medical services (EMS), and law enforcement services that may be needed to support the construction and operations and maintenance activities. The Project has conducted an EMF assessment for both the offshore and onshore components (see **Appendix CC Offshore Electric and Magnetic Field Assessment** and **Appendix DD Onshore Electric and Magnetic Field Assessment** for details).

8.12.1 Affected Environment

The affected environment is defined as the onshore and offshore areas that have the potential to be directly affected by the construction, operations, and decommissioning of the Project. The affected environment as it relates to public health and safety and the need for public services depends on the location of facilities in relation to existing infrastructure, public areas, and user and community groups that may be affected by health and safety risks associated directly or indirectly with the Project. This includes the Lease Area and associated infrastructure (e.g., the foundations, wind turbines, offshore substation facilities, and submarine export and interarray cables), and the onshore areas around the onshore export and interconnection cables and onshore substation facilities in Queens, New York and Waterford, Connecticut.

In addition, Beacon Wind intends to utilize several local ports and construction and staging areas to support construction and operation activities, as well as maintaining a staffed O&M Base. Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Beacon Wind expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards, which Beacon Wind will comply with in using the facilities (see **Section 3.4 Construction and Installation: Offshore Infrastructure** and **Section 3.5 Operations and Maintenance Activities** for additional information).

The affected environment for public services (hospitals, fire protection services, EMS, and law enforcement) includes the Lease Area, the BW1 and BW2 submarine export cables, and the onshore substation facilities in Queens, New York and Waterford, Connecticut. The following multi-hazard mitigation plans, or strategies, were referenced to identify public services providers for the areas:

- Public services for Queens (Queens County), New York City – NYC's Risk Landscape: A Guide to Hazard Mitigation (NYC Emergency Management 2019).
- Public services for Waterford, Connecticut– Hazard Mitigation Plan Update Annex for the Town of Waterford (Milone and MacBroom, Inc. 2012).
- Public services for Nantucket, Massachusetts – Town of Nantucket Natural Hazard Mitigation Plan (Milone and MacBroom, Inc. 2019).
- Public services for Suffolk County on Long Island, New York – Suffolk County's municipalities, tribes, and Water Authority have drafted a 2020 update to their Multi-Jurisdictional Multi-Hazard Mitigation Plan (Tetra Tech 2020).

Table 8.12-1 identifies the coastal community hospitals located closest to the Project construction and operations and maintenance activities.

Table 8.12-2 identifies the fire, EMS, and law enforcement agencies located closest to the Lease Area and the onshore substation facilities in Queens, New York and Waterford, Connecticut. These resources are shown on **Figure 8.12-1**. These resources could be needed for emergency response purposes during Project construction or operations and maintenance activities.

For the Queens, New York onshore substation facilities, the closest hospital is Mount Sinai Queens located approximately 6 mi (9.7 km) from the onshore substation facilities. Support for fire services and EMS are provided by the Fire Department of the City of New York, and law enforcement is provided by the New York Police Department. For the Waterford, Connecticut onshore substation facility, the closest hospital is Lawrence and Memorial Hospital in New London, Connecticut, approximately 5 mi (8.0 km) from the onshore substation facility. Support for fire services and EMS are provided by the Waterford Fire Department and Waterford Ambulance and law enforcement is provided by the Waterford Police Department.

The Nantucket Cottage Hospital is the closest hospital to the Lease Area. Support for fire services and EMS on Nantucket are provided by the Nantucket Fire Department and law enforcement is provided by the Nantucket Police Department. Stony Brook Southampton Hospital, with approximately 94 beds, is located near the eastern tip of Long Island along the BW1 and BW2 submarine export cable routes. Fire services, EMS, and law enforcement services based in Montauk, New York are closest to the submarine cable routes along Long Island. Additional law enforcement services in Suffolk County are provided by the seven precincts in the Suffolk County Police Department and the towns of Riverhead, Shelter Island, Southampton, and Southold (Tetra Tech 2020).

Further to the west on Long Island is the Stony Brook University Hospital, which is a large trauma center with over 700 beds. Other hospitals along the submarine export cable routes in Connecticut include Bridgeport Hospital, Norwalk Hospital, Greenwich Hospital, and the Lawrence and Memorial Hospital. Bridgeport Hospital and Norwalk Hospital are both regional trauma centers.

Table 8.12-1. Hospitals Closest to Project Construction and Operations and maintenance Activities

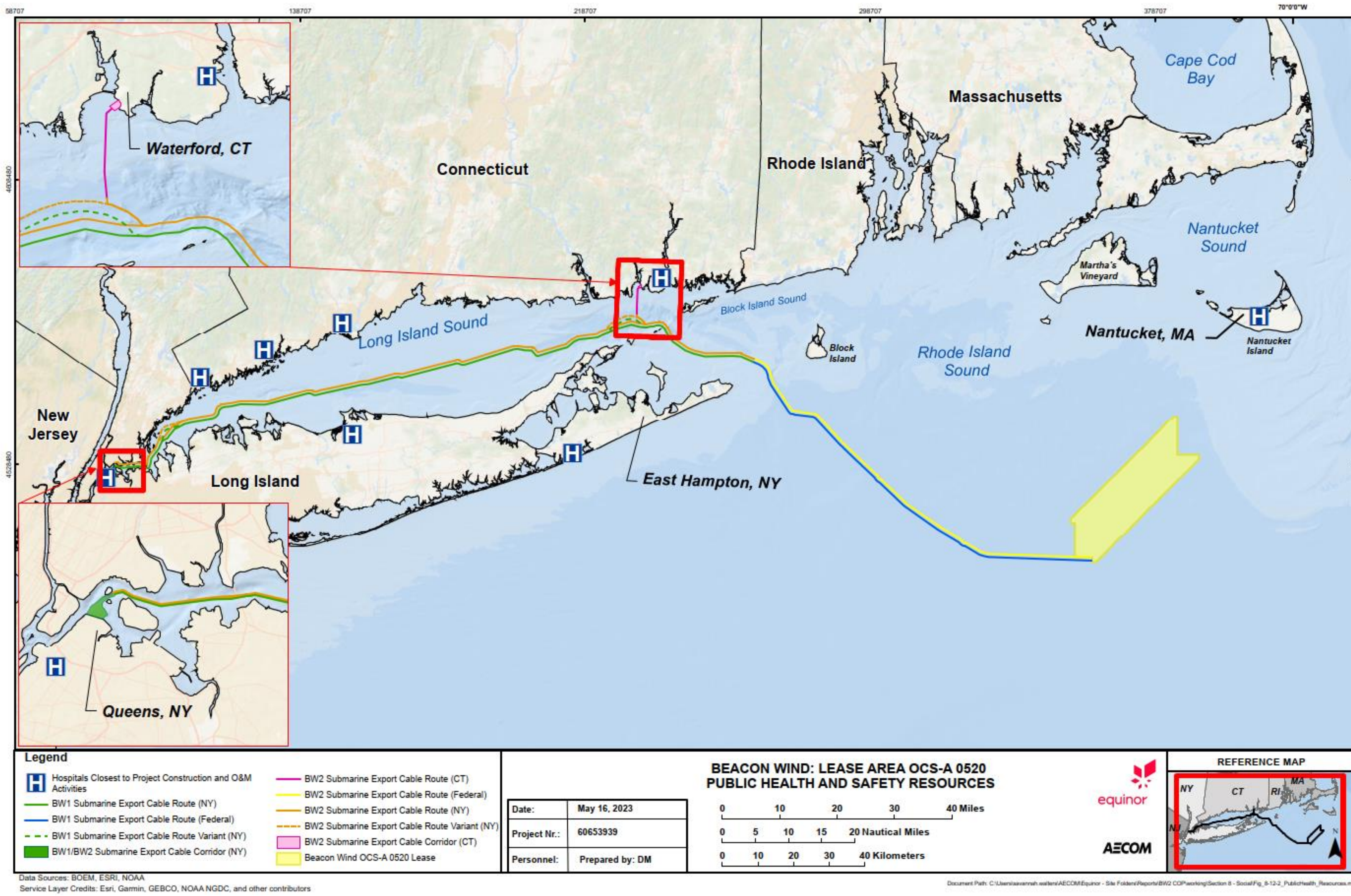
Area	Hospital	Address and Phone Number	Staffed Beds	Total Discharges
Queens, New York	Mount Sinai Queens	25-10 30th Avenue Queens, New York 11102 (718) 932-1000	235	9,108
Nantucket, Massachusetts	Nantucket Cottage Hospital	57 Prospect Street Nantucket, Massachusetts 02554 (508) 825-8100	19	444
Southampton, New York	Stony Brook Southampton Hospital	240 Meeting House Lane Southampton, New York 11968 (631) 726-8200	94	4318
Stony Brook, New York	Stony Brook University Hospital	101 Nicolls Road Stony Brook, New York 11794 (631) 689-8333	788	36041
Bridgeport, Connecticut	Bridgeport Hospital	267 Grant Street Bridgeport, Connecticut 06610 (203) 384-3000	387	19.997
Greenwich, Connecticut	Greenwich Hospital	5 Perryridge Road Greenwich, Connecticut 06830 (203) 863-3000	181	10,325
Norwalk, Connecticut	Norwalk Hospital	34 Maple Street Norwalk, Connecticut 06856 (203) 852-2000	255	10,693
Waterford, Connecticut	Lawrence and Memorial Hospital	365 Montauk Avenue New London, Connecticut 06320 (860) 442-0711	252	12,068

Source: American Hospital Directory 2021.

TABLE 8.12-2. FIRE, EMS, AND LAW ENFORCEMENT CLOSEST TO PROJECT CONSTRUCTION AND OPERATIONS AND MAINTENANCE ACTIVITIES

Area	Local Government	Provider of Fire Services	Provider of EMS Services	Provider of Law Enforcement Services
Queens, New York	New York City, New York	Fire Department of the City of New York	Fire Department of the City of New York EMS Team	New York Police Department
Nantucket, Massachusetts	Town and County of Nantucket, Massachusetts	Nantucket Fire Department	Nantucket Fire Department	Nantucket Police Department
East Hampton, New York	Town of East Hampton, New York	Montauk Fire Department	Montauk Fire Department, East Hampton Village Ambulance Association	East Hampton Town Police Department – Montauk Precinct
Waterford, Connecticut	Town of Waterford, Connecticut	Waterford Fire Department	Waterford Fire Department/ Waterford Ambulance	Waterford Police Department

FIGURE 8.12-1. PUBLIC HEALTH AND SAFETY RESOURCES



8.12.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (see **Section 3 Project Description**). For the purposes of public health and safety, the maximum design scenario is based on the full build-out of the Lease Area and incorporates a total of up to 157 structures within the Lease Area (up to 155 wind turbines and two offshore substations), with one submarine export cable route for BW1 to Queens, New York and one submarine export cable route for BW2 to Queens, New York or to Waterford, Connecticut, and associated onshore substation facilities. **Table 8.12-3** summarizes the maximum design scenario parameters for public health and safety.

TABLE 8.12-3. SUMMARY OF MAXIMUM DESIGN SCENARIO PARAMETERS FOR PUBLIC HEALTH AND SAFETY

Parameter	Maximum Design Scenario	Rationale
Construction		
Submarine export cables	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (202 nm [375 km]) • BW2: ○ To Queens, New York (202 nm [375 km]) or ○ To Waterford, Connecticut (113 nm [209 km]).	Representative of the maximum length of new submarine export cables to be installed.
Interarray cables	Based on full build-out of the Project (BW1 and BW2), with the maximum number of structures (155 wind turbines and two offshore substation facilities) to connect: BW1: 162 nm (300 km) BW2: 162 nm (300 km)	Representative of the maximum length of interarray cables to be installed.
Offshore structures	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities).	Representative of the maximum number of structures.
Foundation	Monopile, Piled jacket[28]	Representative of foundation options that have installation methods that would result in the maximum introduction of underwater noise.
Foundation installation method	Pile driving	Representative of the installation method that would result in the loudest underwater noise generated.

[28] The Project is actively completing **Appendix L Underwater Acoustic Assessment**, which will be filed as a supplement to the COP. These results will more accurately determine underwater acoustic impacts associated with each foundation option.

Parameter	Maximum Design Scenario	Rationale
Duration offshore installation	Based on full build-out of the Project (BW1 and BW2) which corresponds to the maximum number of structures (155 wind turbines and two offshore substation facilities) and maximum period of cumulative duration for installation.	Representative of the maximum period required to install the offshore components, which has the potential to impact access to the Project Area.
Project-related vessels collision risk	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines, two offshore substation facilities, two submarine export cables, and associated interarray cables). Based on maximum number of vessels and movements for construction.	Representative of the maximum predicted Project-related vessels for collision risk.
Onshore export and interconnection cables	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (0.93 mi [1.5 km]). • BW2: ○ To Queens, New York (0.93 mi [1.5 km]) or ○ To Waterford, Connecticut (0.55 mi [0.89 km]).	Representative of the maximum length of onshore export and interconnector cables to be installed.
Onshore substation facilities	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York (up to a 16 ac [6.5 ha] area). • BW2: ○ Queens, New York (up to a 16 ac [6.5 ha] area) or ○ Waterford, Connecticut (up to a 16 ac [6.5 ha] area). ○	Representative of the maximum area to be utilized to facilitate the construction of the onshore substation facilities.
Onshore construction duration	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York • BW2 to Queens, New York or Waterford, Connecticut. Construction and installation of submarine export cable landfalls, onshore export and interconnection cables, and onshore substation facilities.	Representative of the maximum period required to install the onshore components, which has the potential to temporarily impact resources in the Project Area.
Staging and construction areas, including port facilities, work compounds, and lay-down areas	Based on full build-out of the Project (BW1 and BW2). Maximum number of work compounds and lay-down areas required. Some ground disturbing activities may be anticipated at Queens, New York with grading and minor tree clearing at Waterford, Connecticut. Independent activities to upgrade or modify staging, construction areas, and ports prior to Project use will be the responsibility of the facility owner.	Representative of the maximum area required to facilitate the offshore and onshore construction activities.

Parameter	Maximum Design Scenario	Rationale
Operations and Maintenance		

Submarine export cables	Based on full build-out of the Project (BW1 and BW2):
	• BW1 to Queens, New York (202 nm [375 km])
	• BW2:
	  ○ To Queens, New York (202 nm [375 km]) or
	  ○ To Waterford, Connecticut (113 nm [209 km]).
		Representative of the maximum number and length of submarine export cables to be installed.

Interarray cables	Based on full build-out of the Project (BW1 and BW2) with the maximum number of structures (155 wind turbines and two offshore substation facilities) to connect: BW1: 162 nm (300 km) BW2: 162 nm (300 km).	Representative of the maximum length of interarray cables installed.
Offshore structures	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines and two offshore substation facilities).	Representative of the maximum number of structures for BW1 and BW2.
Project-Related Operations and Maintenance Vessels	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines, two offshore substation facilities, two submarine export cables, and associated interarray cables). Based on maximum number of vessels and movements for servicing and inspections.	Representative of the maximum condition for the peak number of operations and maintenance vessels affecting the area.
Offshore operations and maintenance activities	Based on full build-out of the Project (BW1 and BW2) (155 wind turbines, two offshore substation facilities, two submarine export cables, and associated interarray cables) and the maximum amount of Project-related activities expected per year.	Representative of the maximum amount of activities from the Project during the operations and maintenance phase.

Onshore substation facilities	Based on full build-out of the Project (BW1 and BW2):
	• BW1 to Queens, New York (up to a 7 ac [2.8 ha] area)
	• BW2:
	  ○ Queens, New York (up to a 7 ac [2.8 ha] area) or
	  ○ Waterford, Connecticut (up to a 7 ac [2.8 ha] area).
		Representative of the presence of a new structure in an area where there was previously none.

O&M Base	4.5 ac (1.8 ha) area.	Representative of the presence of an existing structure in an area that will have been

Parameter	Maximum Design Scenario	Rationale
		developed for this use.

Onshore export and interconnection cables	Based on full build-out of the Project (BW1 and BW2):
	• BW1 to Queens, New York (0.93 mi [1.5 km])
	• BW2:
	  ○ To Queens, New York (0.93 mi [1.5 km]) or
	  ○ To Waterford, Connecticut (0.55 mi [0.89 km]).
		Representative of the maximum length of new onshore export and interconnection cables installed.

Onshore operations and maintenance activities	Based on full build-out of the Project (BW1 and BW2): • BW1 to Queens, New York • BW2 to Queens, New York or Waterford, Connecticut. Longest operational duration, with the maximum amount of Project-related activities expected per year.	Representative of the maximum amount of activities from the Project during the operations and maintenance phase, which would have the potential to impact local traffic patterns and available parking in the Project Area.

8.12.2.1 Construction

During construction, the potential impact-producing factors to public health and safety may include:

- Installation of the offshore components, including foundations, wind turbines, offshore substation facilities, and submarine export and interarray cables at Project construction sites; and
- Construction and installation of the onshore components, including onshore export and interconnection cables, the onshore substation facilities, and other ancillary facilities.

The following impacts may occur as a consequence of factors identified above:

- Unauthorized access to Project construction sites;
- Accidental releases of hazardous materials;
- Non-routine events (e.g., extreme weather events, fire and gas leaks, and terrorist attacks); and
- Accidents.

Unauthorized access to Project construction sites. During construction, Project sites could present danger to public health and safety if not managed properly, both onshore and offshore. Potential dangers include public users coming in close proximity to the Project construction vessels and equipment, while in use and while inactive. Offshore, potential risks include allision with Project structures and equipment, including foundations and jack-up barges (see **Appendix BB Navigation Safety Risk Assessment** for additional information). Other risks include access to and/or on these structures by non-Project public while engaged in recreational or non-emergency activities. In order to mitigate this potential danger, where deemed appropriate, Beacon Wind proposes to work with the USCG to establish temporary safety zones in active construction areas within 12 nm (22.2 km) of the coast, depending on the nature and extent of construction activity. This zone would extend approximately 1,640 ft (500 m) around relevant structures, activities, and vessels. This approach for establishing safety zones is consistent with the FEIS for the Vineyard Wind project (BOEM 2021b). Should USCG Safety Zone authorities not extend beyond 12 nm (22.2 km) at the time of construction, Beacon Wind will utilize a combination of safety vessels, LNMs, and COLREGS to promote both awareness of these activities and the safety of the construction equipment and personnel. Furthermore, access to Project-related structures will be restricted. Offshore construction sites will also be properly marked and lit in accordance with USCG requirements and BOEM guidance (BOEM 2021a).

As indicated by BOEM (BOEM 2021b), offshore search and rescue (SAR) efforts by boats and aircraft may be affected by the presence of wind turbines. The 2020 Port Access Route Study (PARS) titled "Port Access Route Study: The Areas Offshore of Massachusetts and Rhode Island" (MARIPARS) was conducted in the MA/RI WEA to: 1) determine what, if any, navigational safety concerns exist with vessel transits in the study area; 2) determine whether to recommend changes to enhance navigational safety by examining existing shipping routes and waterway uses as any or all of the lease areas within the MA/RI WEA are partially or fully developed as wind projects; and 3) evaluate the need for establishing vessel routing measures. The study included several recommendations including that:

- The turbine layout within the MA/RI WEA should be developed along a standard and uniform grid pattern with at least three lines of orientation and standard spacing to accommodate vessel transits, traditional fishing operations, and SAR operations throughout the MA/RI WEA.
- Lanes for USCG SAR should be oriented in a north to south and east to west direction and be 1 nm (1.9 km) wide, as discussed in the MARIPARS report (USCG 2020).

The 1x1 nm (1.9x1.9 km) grid layout and the orientation of the turbines within the MA/RI WEA should allow USCG helicopters to conduct SAR operations in an area with multiple neighboring projects. This guidance was adopted by the leaseholders, including Beacon Wind, for the OSC-A 0520 Lease Area. The USCG concluded that the adoption of a standard and uniform grid pattern will likely eliminate the need for formal or informal routing measures within the MA/RI WEA. Additional information about SAR is provided in **Section 8.7 Marine Transportation and Navigation** and **Section 8.8 Commercial and Recreational Fishing**.

Onshore, Beacon Wind proposes to implement safety zones around active construction sites and employ the use of local liaison officers and security to help manage unauthorized access to the construction area. The Astoria power complex in Queens, New York is a gate-controlled facility with two access points, only site personnel and authorized guests are allowed access. Similarly, only site personnel and authorized guests would be allowed to access the Waterford, Connecticut onshore substation facility location. During inactive periods, Beacon Wind proposes to secure sites with locked areas surrounded by fences to prevent unauthorized access and potential injury from excavated grounds and/or Project related equipment. Furthermore, only authorized and qualified personnel will be allowed on-site. Access at port facilities will be managed by the owners of such facilities, and Beacon Wind will comply with or assist in implementing access restrictions at the site. Impacts on public services near the onshore substation facilities due to unauthorized access to the construction site are expected to be minimized using fencing, locks, and private security staff.

Accidental releases of hazardous materials. Construction activities will involve the use of various products that may contain chemicals or other potentially hazardous materials, which may present a danger to public health if they are improperly managed or released to the environment. Accidental releases can occur during Project activities such as vessel or equipment refueling and non-routine events occurring at or in proximity to the Project (see Non-Routine Events and Accidents, below, for additional information on these non-routine events). Hazardous materials that may be used during construction of the Project are provided in **Section 3 Project Description**.

The potential impact of a hazardous material depends on the quantity, concentration, and characteristics of the hazardous material. In order to mitigate this potential danger both offshore and onshore, construction personnel will also undergo training prior to the commencement of activities. As necessary, Project construction sites will use secondary containment for oils and greases in accordance with state and federal regulations, as well as contain spill response kits. In addition, hazardous materials will be transported to and from site in water-tight containers that are specially designed to prevent leaking, breakages, and spills.

Beacon Wind has provided and will implement a Project-specific SPCC Plan for onshore activities and OSRP (**Appendix E Oil Spill Response Plan**) for offshore activities that will be provided for agency review and approval, as applicable. Impacts on public services due to accidental releases during construction are expected to be minimized through the development of the SPCC and ORSP, personnel training, and the use of appropriate hazardous material handling practices. In the event of a significant accidental release, public emergency services or hospitals may be called upon to support a response.

Non-routine events. Non-routine events are events that, while they could occur, are unlikely to occur during the construction of the Project. Non-routine events may include:

- Extreme weather, including hurricanes and lightning strikes;
- Fire and gas leaks; and/or
- Terrorist attack or sabotage.

While Beacon Wind cannot implement measures to de-risk all potential non-routine events, Emergency Response Plans (ERPs), or similar type documents, will be developed to address the possibility of these events occurring. Relevant personnel will be provided training on the details on the ERPs, including the site-specific emergency evacuation routes, warning signals, locations of fire extinguishers and first aid kits, as well as the incident chain of command. Impacts on public services near the onshore substation facilities or other construction areas due to non-routine events are expected to be minimized through the development of ERPs and availability of emergency equipment at the facilities. In the event of a significant non-routine event, public emergency services or hospitals may be called upon to support a response. Weather-related measures are addressed in **Section 4.1.1 Physical Oceanography and Meteorology**.

Accidents. Accidents during construction, such as equipment failure, could potentially cause injury, damage property, and/or harm the environment. In order to mitigate potential offshore accidents, Beacon Wind proposes to utilize 1,640-ft (500-m) safety zones around relevant structures, activities, and vessels. This approach for establishing safety zones is consistent with the FEIS for the Vineyard Wind project (BOEM 2021b). Should USCG Safety Zone authorities not extend beyond 12 nm (22.2 km) at the time of construction, Beacon Wind will utilize a combination of safety vessels, LNMs, and

COLREGS to promote both awareness of these activities and the safety of the construction equipment and personnel.

Onshore, Beacon Wind proposes to implement safety zones around active construction sites and employ the use of local liaison officers and security to help manage unauthorized access to the construction area. Construction sites will be clearly marked and lighted in a manner sufficient to safeguard personnel and public safety, with onshore sites enclosed by fences, where possible. Furthermore, Project personnel will undergo a thorough health and safety training prior to the commencement of construction, to become familiar with the Project-specific activities and environments in which they are working (e.g., the handling of contaminated soils and rough sea conditions). Impacts on public services due to accidents during construction are expected to be minimized using security staff, proper lighting, fencing, and personnel training including development of risk management and safety plans. In the event of a significant accident, public emergency services or hospitals may be called upon to support a response.

8.12.2.2 Operations and Maintenance

During operations, the potential impact-producing factors to public health and safety may include:

- The presence of fixed structures offshore (e.g., wind turbines, submarine export and interarray cables and offshore substation facilities);
- The presence of fixed structures onshore (e.g., onshore export and interconnection cables, and onshore substation facilities); and
- Operations and maintenance of the Project, both offshore and onshore.

The following impacts may occur as a consequence of factors identified above:

- EMF associated with the submarine export cables and substation facilities;
- Unauthorized access to Project facilities;
- Accidental releases of hazardous materials;
- Non-routine events (e.g., extreme weather events, fire and gas leaks, and terrorist attacks); and
- Accidents.

EMF associated with submarine export cables and substation facilities. The transmission of the electricity generated by the Project causes electric and magnetic fields to be produced in the space surrounding the submarine export cables, interarray cables, offshore substation facilities, onshore export cables, interconnection cables, and the onshore substation facilities. In order to determine whether EMF fields associated with the offshore and onshore Project-specific components have the potential to cause impacts, the Project conducted an EMF assessment for both the offshore and onshore components as detailed in **Appendix CC Offshore Electric and Magnetic Field Assessment** and **Appendix DD Onshore Electric and Magnetic Field Assessment**.

Human exposures to Project-related EMF in the offshore environment are expected to be limited as the Project’s electrical transmission system is located offshore far away from residences and target burial depths for cables are such that potential impacts associated with EMF are minimized. At the offshore and onshore substation facilities, public access will be restricted, and personnel access limited to operations and maintenance activities. **Appendix DD Onshore Electric and Magnetic Field**

Assessment indicated that potential human health risks associated with exposure to project-related EMF from the BW1 and BW2 onshore electric transmission systems proposed for Queens, New York and Waterford, Connecticut are *de minimis*. Potential exposure of the general public to onshore components of the Project's electrical transmission are also anticipated to be limited, as both landfall locations (i.e., Queens, New York and Waterford, Connecticut) will occur at secure industrial properties away from residential housing. **Appendix DD Onshore Electric and Magnetic Field Assessment** indicated that maximum magnetic field strengths for HVDC onshore export cables and HVAC onshore interconnection cables are below International Commission on Non-Ionizing Radiation Protection and New York Public Service Commission exposure limits protective of human health. Thus, no impacts to the public or personnel resulting from Project-related EMF are anticipated. Public services are not expected to be affected by Project-related EMF.

Unauthorized access to Project facilities. During operations, public access to the Project facilities could present danger to public health and safety if not managed properly (e.g., falling from height, exposure to equipment, etc.). Offshore, access to the wind turbines and offshore substation facilities themselves will be restricted from public use; activities such as fishing from the structures and mooring of vessels to the structures will be prohibited. Access points into the wind turbines and offshore substation facilities will be locked, and only trained and qualified personnel will have the ability for access.

Onshore, Beacon Wind will mitigate this potential danger by securing the onshore substation facilities with a locked fence and security surveillance to prevent unauthorized access; only authorized and qualified personnel will be allowed onsite. Onshore cables from the offshore marine environment to the converter station may be installed using trenchless (e.g., HDD, jack and bore, or micro-tunnel) and/or trenched (open cut trench) methods, therefore those, onshore cable components will be buried underground to mitigate the potential for access. Some interconnection components from the onshore substation facilities to the POIs in Queens, New York and Waterford, Connecticut are proposed to be installed aboveground, but both locations consist of private property with fencing and security access requirements. Impacts on public services due to unauthorized access to the onshore and offshore Project facilities are expected to be minimized by the use of fencing, locks, and security surveillance.

Accidental releases of hazardous materials. Operations and maintenance activities will involve the use of various hazardous materials, which may present a danger to public health if they are improperly managed or released to the environment. Accidental releases can occur during Project activities such as vessel refueling, routine maintenance, and non-routine events occurring at or in proximity to the Project (see Non-Routine Events and Accidents, below, for additional information on these non-routine events). While unlikely, it is also possible that hazardous materials may leak from the wind turbines, offshore substation facilities, and onshore substation facilities. Hazardous materials that may be used during operations of the Project are discussed in **Section 3 Project Description**.

The potential impact of a hazardous material depends on the quantity, concentration, and characteristics of the hazardous material. In order to mitigate this potential danger both offshore and onshore, Beacon Wind has provided and will implement a Project-specific SPCC Plan for onshore activities and OSRP for offshore activities. Operations and maintenance personnel will undergo training prior to the commencement of activities. As part of the SPCC Plan and OSRP, Project-related sites will use secondary containment for oils and greases in accordance with state and federal regulations, as well as contain spill response kits. In addition, hazardous materials will be transported to and from site in containers that are specially designed to prevent leaking, breakages, and spills. Accidental releases from wind turbines, offshore substation facilities, and the onshore substation facilities will be mitigated through the implementation of secondary containment systems and routine checks and inspection of these structures for integrity and evidence of wear as well as development of safety protocols and procedures. Impacts on public services due to accidental releases of hazardous materials are expected to be minimized through development of the SPCC and ORSP, personnel training, and the use of appropriate hazardous material handling practices. In the event of a significant accidental release, public emergency services or hospitals may be called upon to support a response.

Non-routine events. Non-routine events are events that, while could occur, are unlikely to occur during the construction of the Project. Non-routine events may include:

- Extreme weather, including hurricanes and lightning strikes;
- Fire and gas leaks; and/or
- Terrorist attack or sabotage.

While Beacon Wind will implement measures in the design phase to mitigate these potential non-routine events to the extent practicable (e.g., by designing Project components to withstand site-specific conditions), it is possible that some non-routine events will be outside Beacon Wind's control. To prepare for these non-routine events, ERPs will be developed to address the possibility of these events occurring and personnel will be provided training on the details on the ERPs, including the site-specific emergency evacuation routes, warning signals, locations of fire extinguishers and first aid kits, as well as the chain of command. Furthermore, the wind turbines, offshore substation facilities, and the onshore substation facilities will be designed to withstand extreme weather conditions and will be protected both externally and internally by a lightning protection system (see **Section 3 Project Description** for additional information). Impacts on public services due to non-routine events are expected to be minimized through the development of ERPs and availability of emergency equipment at the facilities. In the event of a significant non-routine event, public emergency services or hospitals may be called upon to support a response.

Accidents. During the operations phase of the Project, accidental damage of Project-related facilities and/or equipment could potentially cause injury, property damage, and/or harm the environment. Safe operating policies and procedures will be developed in order to mitigate potential accidents offshore and onshore. In addition, personnel will undergo thorough health and safety training prior to the commencement of operations and maintenance activities, to become familiar with the Project-specific activities and environments in which they are working (e.g., rough sea conditions). Furthermore, Beacon Wind proposes to develop and implement an ERP. Personnel will be trained on how to handle these emergency situations, including next steps and the chain of command. Impacts on public services due to accidents are expected to be minimized through the development of ERPs and personnel training. In the event of a significant accident, public emergency services or hospitals may be called upon to support a response.

8.12.2.3 Decommissioning

Impacts to public health and safety during decommissioning are expected to be similar or less than those experienced during construction as described in **Section 8.12.2.1**. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Beacon Wind anticipates will be needed for the Project, please see **Section 3 Project Description**.

8.12.3 Summary of Avoidance, Minimization, and Mitigation Measures

The overall risks to public health and safety will be managed under a Project-specific SMS developed in accordance with 30 CFR §§ 585.810, 585.11, 585.627 (d), 614(b) and 651. The goal of the SMS is to identify Project-related activities that have the potential to affect human health or the environment and to provide the means in which to address them. The Project SMS will be a living document, which manages activities in respect to hazard identification, risk management and control procedures, and protection of personnel, contractors, and the public. A draft of the Project SMS is included in **Appendix F Safety Management System**.

Pursuant to 30 CFR §§ 585.627 (d) and 585.810, the SMS will address the following:

- Project health and safety policy for personnel and the public near or within Project facilities;
- Remote monitoring, control, and shutdown capabilities;
- Emergency response procedures;
- Fire suppression equipment;
- SMS testing procedures and schedule; and
- Training procedures and schedule.

In addition, the SMS will also address:

- Safe work practices;
- Standards and procedures;
- Transportation and logistics;
- Monitoring and implementation; and
- Other Project safety requirements.

The draft SMS will be finalized prior to construction in consultation with relevant regulatory agencies, including but not limited to the Occupational Safety and Health Administration, BOEM, the Bureau of Safety and Environmental Enforcement (BSEE), and the USCG. In accordance with 30 CFR § 585.11, approval of the SMS will be contingent upon Beacon Wind demonstrating that the SMS is fully functional. In order to further mitigate the potential impact-producing factors described in **Section 8.12.2**, Beacon Wind is proposing to implement the following avoidance, minimization, and mitigation measures.

8.12.3.1 Construction

During construction, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.12.2.1**:

- Project vessels will comply with U.S. or SOLAS standards, as applicable, with regards to vessel construction, vessel safety equipment, and crewing practices;
- Project infrastructure and equipment will be designed to be able to withstand extreme conditions, and will be protected both externally and internally by a lightning protection system;

- Development and implementation of an emergency evacuation plan that will be incorporated into the overall site ERP and the OSRP;
- Restrict access to both onshore and offshore work sites to authorized and qualified personnel;
- Implement up to a 1,640-ft (500-m) safety zone around active offshore construction sites;
- Implement safety zones around active onshore construction sites;
- Secure onshore construction sites with a fence and lock to prevent unauthorized access;
- Securing onshore construction equipment within fenced work areas;
- Use of security to monitor both onshore and offshore construction sites;
- Construction sites will contain spill response kits;
- Use of secondary containment for oils and greases in accordance with state and federal regulations;
- Transport hazardous materials in water-tight containers;
- Train Project personnel, as applicable, in accordance with relevant regulations and company policy, including the site-specific emergency evacuation routes, warning signals, locations of fire extinguishers and first aid kits, as well as the chain of command;
- Construction sites will be clearly marked and lighted, in a manner sufficient to safeguard personnel and public safety; and
- Development and implementation of a Project specific SMS.

8.12.3.2 Operations and Maintenance

During operations, Beacon Wind will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in **Section 8.12.2.2**:

- Project vessels will comply with U.S. or SOLAS standards, as applicable, with regards to vessel construction, vessel safety equipment, and crewing practices;
- Implementation of a SPCC Plan for onshore activities and OSRP for offshore activities that will be provided for agency review and approval, as applicable;
- Project infrastructure and equipment will be designed to be able to withstand extreme conditions, and will be protected both externally and internally by a lightning protection system;
- Implementation of an emergency evacuation plan that will be incorporated into the overall site ERP;
- Secure the onshore substation facilities with a fence and lock to prevent unauthorized access;
- Use of secondary containment for oils and greases in accordance with state and federal regulations;
- Transport hazardous materials in water-tight containers;
- Train Project personnel, as applicable in accordance with relevant regulations and company policy, including the site-specific emergency evacuation routes, warning signals, locations of fire extinguishers and first aid kits, as well as the chain of command;
- Marking and lighting of wind turbines and offshore substation facilities in accordance with FAA Advisory Circular 70/7460-1M, BOEM's *Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development* (2021a), IALA Recommendation O-139 on The Marking of Man-Made Offshore Structures (IALA 2021),[29] and

[29] Noted that the IALA O-139 guidance was updated in December 2021 to G1162/R139 (IALA, 2021). The updates are under review and liaison will be ongoing with USCG and BOEM in terms of any applicable updates to relevant U.S. lighting and marking guidance.

USCG LNM entry 44-20 guidance (see **Section 3 Project Description** for additional details on the proposed marking and lighting measures);

- Use of appropriate, agency-approved marking and lighting around the onshore substation facilities;
- Restrict access to the interior of the wind turbines and offshore substation facilities by a locked door at the base of the tower;
- Only trained and qualified personnel will be allowed access to the onshore substation facilities, wind turbines, and offshore substation facilities to perform operations and maintenance activities;
- Project sites will contain spill response kits; and
- Implementation of a Project-specific SMS.

8.12.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in **Section 8.12.3.1** and **Section 8.12.3.2**. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

8.12.4 References

TABLE 8.12-4. SUMMARY OF DATA SOURCES

Source		Includes	Available at
BOEM	Lease Area	https://www.boem.gov/BOEM-Renewable-Energy-Geodatabase.zip	N/A
CT.GOV	New London County	https://portal.ct.gov/DEEP/GIS-and-Maps/Geographic-Information-Systems	N/A
Mass.gov	Nantucket County	https://www.mass.gov/info-details/massgis-data-counties	N/A
NYC.GOV	Astoria Neighborhood Tabulation Areas	https://www1.nyc.gov/site/planning/data-maps/open-data/dwn-nynta.page	https://www1.nyc.gov/assets/planning/download/pdf/data-maps/open-data/nynta_metadata.pdf?ver=21b
Suffolk County, New York	East Hampton Town	https://opendata.suffolkcountyny.gov/datasets/town-polygon/explore?location=40.956650%2C-72.673950%2C10.33	N/A

American Hospital Directory. 2021. “Hospital Statistics by State.” Available online at https://www.ahd.com/state_statistics.html. Accessed May 4, 2021.

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BOEM. 2021b. “Vineyard Wind 1 Offshore Wind Energy Project Final Environmental Impact Statement Volume I.” Available online at: https://tethys.pnnl.gov/sites/default/files/publications/Vineyard-Wind-1-FEIS-Volume-1.pdf.

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New York City Emergency Management. 2019. “NYC’s Risk Landscape: A Guide to Hazard Mitigation.” Available online at: https://www1.nyc.gov/assets/em/downloads/pdf/hazard_mitigation/risklandscape2.0_2019_r2_digital_lowres.pdf. Accessed May 5, 2021.

Tetra Tech. 2020. “Suffolk County Multi-Jurisdictional Multi-Hazard Mitigation Plan 2020 Update.” Available online at: https://fres.suffolkcountyny.gov/respond/DraftHMP.aspx.

USCG (United States Coast Guard). 2020. Port “Access Route Study: The Areas Offshore of Massachusetts and Rhode Island. 85 Fed. Reg. USCG–2019–0131.” Available online at: 2020-11262.pdf (govinfo.gov). Accessed August 4, 2021.

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