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February 28, 2019

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Bureau of Ocean Energy Management
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Lars Pedersen, CEO
Vineyard Wind, LLC
700 Pleasant Street, Suite 510
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Re: Federal Consistency review of proposed Vineyard Wind, LLC 800MW offshore wind farm
Docket No. BOEM-2018-0069; CRMC File 2018-04-055

Dear Messrs. Cruikshank, Bennett and Pedersen,

The purpose of this letter is to inform you that, pursuant to the federal Coastal Zone Management Act ("CZMA") and CZMA regulations (15 CFR part 930, subpart E), the Rhode Island Coastal Resources Management Council ("CRMC") **concurs with** the CZMA consistency certification filed by Vineyard Wind, LLC[1] ("Vineyard Wind") on April 6, 2018. Vineyard Wind's consistency certification is for a proposed 800 megawatt ("MW") offshore wind farm located within the northern portion of Bureau of Ocean Energy Management ("BOEM") Lease Area OCS-A 0501. The CRMC finds that the proposed activity complies with the enforceable

[1] Vineyard Wind, LLC is a joint venture of Avangrid Renewables and Copenhagen Infrastructure Partners. Avangrid is a major US energy company and is 81.5% owned by Iberdrola S.A., based in Europe. Avangrid Renewables and Copenhagen Infrastructure Partners (also based in Europe) each have a 50 percent ownership interest in Vineyard Wind, LLC.

policies of the Rhode Island coastal management program. The CRMC's CZMA consistency analysis and findings are described in detail in the enclosure CRMC Staff Project Review and Federal Consistency Analysis.

The CRMC, the CRMC's Fishermen's Advisory Board ("FAB"), and Vineyard Wind conducted extensive negotiations from February 7, 2019, through February 15, 2019. These discussions resulted in an agreement between the CRMC and Vineyard Wind in which Vineyard Wind will provide mitigation in the form of monetary compensation to offset adverse impacts to the Rhode Island-based commercial fishing industry from the construction and operation of the proposed wind farm.

Through multiple discussions and negotiations, the CRMC and Vineyard Wind have resolved issues for consistency with the enforceable policies of the Rhode Island coastal resources management program. Vineyard Wind has agreed to provide fisheries mitigation as required by enforceable policies §§ 11.10.1(C), (G) and (H), which includes $4.2 million for direct compensation for costs associated with loss of equipment or claims of direct impact, which is a liability fund needed to meet BOEM requirements. There is an additional mitigation fund to compensate Rhode Island fishermen for loss of access or reduction of harvest of $12.5 million.[2] The fisheries mitigation was negotiated between the CRMC, Vineyard Wind and the FAB in accordance with enforceable policy § 11.10.1(H).

In addition, Vineyard Wind provided to the CRMC on February 18, 2019, a commercial fisheries biological assessment monitoring plan summary required by enforceable policies §§ 11.10.5(C)(2)(f)(1) and 11.10.9(C)(1) and (2) that included proposed sampling methodology to obtain the necessary fisheries assessment for commercially targeted species within the project area. See Appendix 26 of the enclosure. Sampling will be conducted four times: pre-construction to assess baseline conditions; during construction; and at two different intervals during operation

[2] For the $12.5 million compensation fund, the state and the FAB will create a "Rhode Island Fishermen's Future Viability Trust" as detailed in the Vineyard Wind Fisheries Mitigation Proposal Term Sheet dated Final February 15, 2019. The CRMC and Vineyard Wind executed an agreement on February 21, 2019, to specify the trust. This agreement is not needed or part of the CZMA federal consistency process. Rather, the trust is for state purposes with disputes to be remedied under Rhode Island state law. See Appendix 25 of the enclosure.

(i.e., one (1) year after construction and then post-construction). Each of these four assessment periods will capture all four seasons of the year. Vineyard Wind expects to commence pre-construction sampling in spring 2019 and to provide the biological assessment to the CRMC in accordance with the enforceable policies.

Vineyard Wind filed its consistency certification pursuant to 15 CFR § 930.76. The CRMC review period commenced on April 6, 2018. The CRMC subsequently issued a three-month notice as required by 15 CFR § 930.78(a) to Vineyard Wind on July 2, 2018, with a copy to BOEM that described the status of the CRMC's federal consistency review, issues that Vineyard Wind needed to address for consistency with CRMC's enforceable policies, and additional information necessary for the CRMC's review. The CRMC's three-month notice also provided an alternative layout for the proposed wind farm that would minimize significant adverse impacts to Rhode Island-based commercial fishermen. See Appendix 5 of the enclosure.

The CRMC's original due date for its federal consistency decision was October 6, 2018. However, pursuant to 15 CFR § 930.60(b), the CRMC and Vineyard Wind mutually agreed to and entered into five (5) separate sequential agreements[3] to stay the CRMC six-month review period. The fifth and final stay agreement executed by the CRMC and Vineyard Wind on February 11, 2019, provided additional time for fisheries mitigation discussions between Vineyard Wind, the FAB and CRMC and for Vineyard's submission of the required biological assessment commercial fisheries monitoring plan to meet the enforceable policies. The final stay agreement extended the CRMC's consistency determination due date to **March 1, 2019**.

The CRMC has carefully evaluated Vineyard Wind's consistency certification, the Construction and Operation Plan (last revision dated October 22, 2018, as provided by Vineyard Wind to the CRMC, and additional materials provided by Vineyard Wind and other interested

[3] The first stay agreement was executed on July 30, 2018, and extended the CRMC decision date until December 6, 2018. The second stay agreement was executed on November 29, 2018, and extended the CRMC decision date until January 28, 2019. The third stay agreement was executed on January 15, 2019, and extended the CRMC decision date until February 1, 2019. The fourth agreement was executed on January 25, 2019, and extended the CRMC decision date until February 19, 2019. And, the fifth agreement was executed on February 11, 2019, which extended the CRMC decision date until March 1, 2019.

parties, including public comments, over the course of CRMC's consistency review. Additionally, the CRMC has considered in its analysis other relevant sources of information available from the Vineyard Wind website (https://www.vineyardwind.com/), from the State of Massachusetts Executive Office of Energy and Environmental Affairs (http://www.mass.gov/eea) and from the State of Massachusetts Department of Public Utilities (https://www.mass.gov/orgs/department-of-public-utilities).

CRMC staff have reviewed all other applicable enforceable polices of the Ocean SAMP not identified above and have determined that the Vineyard Wind project is consistent with those enforceable policies. See Appendix 24 of the enclosure. Therefore, the Project is consistent with the enforceable policies contained in CRMC's federally approved coastal resources management program.

Sincerely,

Grover J. Fugate
CRMC Executive Director

Enclosure: CRMC Staff Project Review and Federal Consistency Analysis

cc: Jeffrey L. Payne, Ph.D., Director, NOAA OCM
Governor Gina Raimondo
RI Congressional delegation
CRMC members

CRMC Staff Project Review and Federal Consistency Analysis

Without mitigation Vineyard Wind's proposed wind turbine layout would result in significant adverse impacts to commercial fisheries within approximately 90 square miles of prime fishing grounds over the 30-year life of the project. The inadequate spacing between turbines of less than 1 nautical mile ("nm") combined with turbine rows oriented in a northwest-southeast direction create significant impacts. The combined effects of turbine row orientation and spacing conflict with existing commercial fishing practices and will cause navigational safety risks as well as unnecessary challenges for fixed and mobile gear fishing vessels struggling to operate in a safe, cooperative and effective manner. BOEM's DEIS concludes that absent mitigation the proposed activity "would still have moderate to major impacts on commercial fisheries." See BOEM DEIS at 3-190.

Numerous meetings were held between CRMC and Vineyard Wind over the course of the CRMC's consistency review in an effort to modify Vineyard Wind's proposed project to avoid significant adverse impacts in conformance with the enforceable policies of the Rhode Island coastal management program. Regrettably, Vineyard Wind has been steadfast and intractable in their position in that they would not modify the proposed wind turbine layout in its entirety to an east-west alignment with a minimum 1 nm spacing between turbines and turbine rows to avoid significant adverse impacts to Rhode Island-based commercial fishermen that have been harvesting fishery resources from the Vineyard Wind lease area for decades. However, Vineyard Wind has agreed to mitigation and has committed to constructing all future phases of turbines within the remainder of its lease block (OCS-A 0501) in an east-west alignment with 1 nm spacing between rows. See Appendix 14.

The CRMC proposed alternative of an east-west turbine alignment with a minimum 1 nm spacing between **all** turbines[4] (not just between rows) is a compromise on part of the Rhode Island commercial fishing industry. Importantly, if the CRMC proposed alternative is adopted by the entire offshore wind energy industry for southern New England offshore waters, then a

[4] The alternative wind farm layout was included as Figure 3 in CRMC's July 2, 2018 letter to Vineyard Wind that was issued to meet the requirements of 15 CFR § 930.78(a).

majority of Rhode Island-based commercial fishing operations would be able to continue harvesting activities with some exceptions and adjustments to fishing gear and methods, and coexist with the offshore wind energy industry. Nevertheless, the alternative east-west layout with 1 nm spacing between all turbines will require Rhode Island commercial fishermen to modify their gear and operations in order that fixed and mobile gear operations can continue to safely harvest fishery resources in an effective and cooperative manner. A combination of Alternatives D1 and D2 as presented in the BOEM Draft Environmental Impact Statement ("DEIS") dated December 2018 would largely achieve the CRMC's proposed alternative layout supported by Rhode Island commercial fishermen. See BOEM DEIS at 2-11.

Summary

- The CRMC strongly supports offshore renewable wind energy as evidenced by development and implementation of the CRMC's Ocean Special Area Management Plan (Ocean SAMP) in 2010, which establishes requirements and procedures that permits offshore wind development while protecting the existing Rhode Island commercial fishing industry and State economic interests. Deepwater Wind successfully constructed the 30MW Block Island wind farm in 2016, the nation's first offshore wind farm, in a manner consistent with CRMC's Ocean SAMP.
- Rhode Island commercial fishermen have consistently stated since the initiation of CRMC's federal consistency review process that they want to be able to continue harvesting seafood from the Vineyard Wind lease area and coexist with the offshore wind energy industry.
- The proposed Vineyard Wind project would be the largest wind farm in the world covering approximately 90 square miles with 84 turbines (using the large 9.5MW turbine layout) and generating 800MW. Presently, the largest operational wind farm in the world is located off the west coast of England, the Walney Extension Offshore Wind Farm, which covers approximately 55 square miles with 87 turbines and generates 659MW.
- Some Rhode Island commercial fishermen have asserted that the proposed Vineyard Wind project layout with northwest-southeast orientation and average 0.86 nm spacing

between turbines will effectively create an exclusion zone for many commercial fishing vessels due to resulting navigational and operational safety risks.

- The CRMC proposed alternative layout of east-west orientation with minimum 1 nm spacing between turbines is a compromise by Rhode Island-based commercial fishermen that will require modification to their gear and operations, but would allow continued fishing for most commercial fishing operations within the Vineyard Wind lease area and result in both the commercial fishing and offshore wind energy industries to coexist.
- Vineyard Wind did not disclose the wind farm layout with the specific orientation and spacing of turbines to the CRMC or RI commercial fishermen until after the COP was filed with BOEM in December 2017. Despite Vineyard Wind having attended numerous meetings with commercial fishermen prior to and after the COP filing, Vineyard Wind did not show the specific wind farm layout to the CRMC's Fishermen's Advisory Board until April 11, 2018, which was four months after Vineyard Wind had filed its COP with BOEM.
- Vineyard Wind should have known that RI commercial squid vessels fished in the Vineyard Wind lease area primarily in an east-west direction when they were provided proprietary vessel chart plotter track information in August 2017 by Town Dock, a RI-based squid harvester and processing operation. Vineyard Wind had an opportunity to modify the project layout to meet the east-west orientation based on chart plotter tracking data provided by Town Dock in August 2017 and through input from the April 11, 2018 FAB meeting. Vineyard Wind had only conducted preliminary geotechnical work up to this time and detailed geotechnical work for turbine specific locations was just getting underway in April 2018 and continued through the summer of 2018.
- Vineyard Wind acknowledged at the November 19, 2018 CRMC Fishermen's Advisory Board meeting that they erred in not addressing the needs of Rhode Island-based commercial fishermen earlier in the project design process, essentially a declaration against interest, and they have since committed to an east-west orientation with 1 nm spacing between each turbine row for all their future wind farm projects.
- On February 15, 2019 Vineyard Wind provided a Fisheries Mitigation Proposal with Term Sheet to compensate for adverse impacts to the Rhode Island-based commercial fishing industry from the construction and operation of the proposed wind farm. The

CRMC Fishermen's Advisory Board on February 23, 2019 voted that the Vineyard Wind mitigation proposal was acceptable.

- On February 18, 2019 Vineyard Wind filed with the CRMC a commercial fisheries biological assessment monitoring plan summary.
- On February 26, 2019 the CRMC voted at a public meeting to accept the recommendation of CRMC staff that the Vineyard Wind project is consistent with the state's enforceable policies.

A. Introduction

The waters offshore of Rhode Island and Massachusetts are an ecologically unique region and are located at the boundary of two bio-geographic provinces, the Acadian to the north (Cape Cod to the Gulf of Maine) and the Virginian to the south (Cape Cod to Cape Hatteras). The area is dynamically connected to Narragansett Bay, Buzzards Bay, Long Island Sound, and the Atlantic Ocean via the Inner Continental Shelf. The unique positioning of this ecosystem, allows it to contain and host an interesting biodiversity of fish, marine mammals, birds, and sea turtles that travel throughout this region, thriving on its rich habitats, microscopic organisms, and other natural resources. The natural beauty of these offshore waters, along with its rich historic and cultural heritage, provides aesthetic, artistic, educational, and spiritual value. This natural beauty is part of the appeal that draws people to live, work, and play in Rhode Island and adds to the quality of life within the region.

The waters off the coasts of Rhode Island and Massachusetts have long served as an important and highly valuable environmental, economic and cultural hub for the people of this region. Commercial and recreational fishing, one of the oldest and most widespread human uses of the area, has sustained Rhode Island coastal communities by providing jobs to fishermen and supporting businesses and industries, as well as food for local consumption or export throughout the United States and overseas. Human activities have been taking place for hundreds of years in Rhode Island's offshore waters and as a result have influenced area resources and conditions, and yet it remains closely tied to its fishery heritage. It is the Rhode Island Coastal Resources Management Program's responsibility to ensure that decisions made concerning this area are well thought out and based on the best available science.

The Rhode Island General Assembly mandates the Rhode Island Coastal Resources Management Council (CRMC) to preserve, protect, develop, and where possible, restore the coastal resources of the state for this and succeeding generations through comprehensive and coordinated long range planning and management designed to produce the maximum benefit for society from these coastal resources; and that the preservation and restoration of ecological systems shall be the primary guiding principle upon which environmental alteration of coastal resources will be measured, judged and regulated. See R.I. Gen. Laws § 46-23-1(a)(2). One of the resources key to Rhode Island's economy, sense of being, history and social fabric is the fisheries that are present in the coastal communities and that ply the waters of the state and offshore. The Rhode Island Coastal Resource Management Program (RICRMP) is a federally approved coastal program under the federal Coastal Zone Management Act (16 U.S.C. § 1451 et seq.).

Accordingly, the CRMC is mandated to uphold all applicable sections of the federal Coastal Zone Management Act of 1972 (CZMA). The CZMA requires that the CRMC provide for the protection of natural resources within the coastal zone, including wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and fish and wildlife and their habitat, and must manage coastal development to improve, safeguard, and restore the quality of coastal waters, and protect existing uses of those waters. The CRMC must develop management plans that give full consideration to ecological, cultural, historic, and aesthetic values, as well as needs for compatible economic development. Special Area Management Plans (SAMPs) are identified in the CZMA as effective tools to meet this mandate. See 16 USC § 1452(3).

The CZMA finds that in order for the CRMC to uphold this mandate, it must actively participate in all federal programs affecting such resources and, wherever appropriate, develop state ocean resource plans as part of its federally approved coastal zone management program (16 USC § 1451). The CRMC is the state authority for federal consistency under the CZMA at 16 USC §1456(c). Federal consistency requires federal agencies to alter projects to be consistent to the maximum extent practicable with state coastal management program policies. In addition, the statute requires nonfederal applicants for federal authorizations and funding to be consistent with enforceable policies of state coastal management programs.

More recently, federal regulations per the CZMA have placed substantial energy-related planning responsibilities on states, such as requiring states to: (1) Identify energy facilities that are likely to locate in or which may affect the coastal region; (2) Develop a procedure for assessing the suitability of sites for such facilities; (3) Develop policies and techniques for managing energy facilities and their impacts; (4) Develop cooperative and coordinating arrangements between the states and other agencies involved in energy facility planning and siting; and (5) Identify legal techniques to be used in managing energy facility siting and related impacts. See 16 USC § 1455 and 15 CFR § 923.13.

The CRMC's Ocean Special Area Management Plan (Ocean SAMP) is the regulatory, planning and adaptive management tool that the CRMC is applying to uphold these regulatory responsibilities in the waters offshore of the state. Using the best available science and working with well-informed and committed resource users, researchers, environmental and civic organizations, and local, state and federal government agencies, the Ocean SAMP provides a comprehensive understanding of this complex and rich ecosystem. The Ocean SAMP also documents how the people of this region have used and depended upon these offshore resources for subsistence, work and play, and how the natural wildlife such as fish, birds, marine mammals and sea turtles feed, spawn, reproduce, and migrate throughout this region, thriving on the rich habitats, microscopic organisms, and other natural resources.

To fulfill the CRMC's mandate, the Ocean SAMP lays out the State's enforceable policies and recommendations to guide CRMC in promoting a balanced and comprehensive ecosystem-based management approach to the development and protection of Rhode Island's ocean-based resources within the waters offshore of Rhode Island. The Ocean SAMP policies and recommendations build upon and refine the CRMC's existing regulations presented in the RICRMP. The policies, standards, and definitions contained in the Ocean SAMP recognize that large portions of the waters off Rhode Island include important fishing grounds and fishery habitats, and the enforceable policies of the Ocean SAMP protect such areas from alterations and activities that threaten the vitality of Rhode Island fisheries.

The intent of the Ocean SAMP and its enforceable policies is to facilitate the development of compatible renewable energy projects in state and offshore waters while protecting state resources, marine users and our way of life shaped by centuries of reliance on the ocean. These goals and principles were developed in coordination with the Ocean SAMP stakeholder group. The following goals require engaging a well-informed, well-represented and committed public constituency to work with the Ocean SAMP project team to better understand the Ocean SAMP issues and the ecosystem, and provide input on Ocean SAMP policies and recommendations. Throughout the entire development of the Ocean SAMP document, the CRMC has been committed to engaging all sectors of the public through an extensive public process.

The Ocean SAMP enforceable policies have been developed based on the Ocean SAMP goals detailed in Part 11.6:

1. Foster a properly functioning ecosystem that is both ecologically sound and economically beneficial;
2. Promote and enhance existing uses;
3. Encourage marine-based economic development that considers the aspirations of local communities and is consistent with and complementary to the state's overall economic development, social, and environmental needs and goals; and
4. Build a framework for coordinated decision-making between state and federal management agencies.

The principals articulated in Ocean SAMP Part 11.6 used to develop the enforceable policies are:

1. Develop the Ocean SAMP document in a transparent manner;
2. Involve all stakeholders;
3. Honor and protect existing activities;
4. Base all decisions on the best available science; and
5. Establish monitoring and evaluation that supports adaptive management.

The goals and principles of the Ocean SAMP speak to a very basic premise that our State and particularly our communities have been shaped and committed to the use of the states coastal resources. These resources and users must be protected in the process of developing new industries so we do not lose our character and commitment to the protection of these resources. Through both scientific and anecdotal research, the Ocean SAMP was developed to better understand the existing activities taking place within the offshore waters. The Ocean SAMP planning team worked with individuals and organizations representing those uses as well as individuals from around the globe working on similar issues to identify policies and actions that can both promote and enhance existing uses while ensuring that adverse impacts from future activities are avoided and, if they are unavoidable, are minimized and mitigated.

The finfish, shellfish, and crustacean populations targeted by Rhode Island fishermen are fundamental parts of the Ocean SAMP ecosystem. These species rely on the availability of appropriate habitats and food sources, and the viability of these fisheries is dependent upon these resources. The commercial fishing industries, and the habitats and biological resources of the ecosystem they are based on, are of vital economic, social, and cultural importance to Rhode Island's fishing ports and communities. Commercial and recreational fisheries are of great importance to Rhode Island's economy and to the quality of life experienced by both residents and visitors.

The commercial and recreational fisheries use is of such importance to Rhode Island that an entire chapter, Ocean SAMP Chapter 5 has been dedicated to this issue. The objectives of the Ocean SAMP relative to understanding the fisheries is to summarize existing information about current commercial and recreational fisheries resources and activities within the Ocean SAMP area; highlight the economic, social, cultural, and historic value of these activities to Rhode Island; and outline policies for managing these activities within the context of other existing and future uses.

Chapter 5 of the Ocean SAMP focuses primarily on commercially and recreationally important species that are targeted within the offshore water of Rhode Island fishermen. Commercial and recreational fisheries have a longstanding history in Rhode Island and are

closely tied to Rhode Island's coastal communities and economies and it has long be recognized that commercial fisheries have an economic impact through the sale and processing of seafood products. All of these fisheries activities rely on fisheries resources and habitats, and whereas future uses may impact these resources, existing activities and trends, including fishing and other uses of the area, are already having an impact on fisheries resources in the Ocean SAMP area. It is acknowledged that future uses of the Ocean SAMP area may have a variety of potential effects on fisheries resources and activities. The renewable energy section in the Ocean SAMP lists many, but not all of these potential adverse impacts.

These fisheries also form the basis of a large segment of the tourism economy, which is very important to the state. It must further be considered that fishery resources and fishing activities are not limited to state boundaries. Fishermen from other states, particularly Massachusetts, Connecticut, and New York, routinely transit through or harvest fishery resources within the Ocean SAMP area. Thus, fisheries displacement impacts will not just affect Rhode Island fisheries, but will negatively impact the fisheries of adjacent states. In addition, the fish species found in the Ocean SAMP area and the fishing activity that occurs here are undoubtedly of economic and cultural importance to these other states as well, and any impacts to fisheries resources and activities within the Ocean SAMP area could affect fishermen in other states.

The CRMC finds that large scale energy uses of the waters offshore Rhode Island and Massachusetts, could potentially displace commercial or recreational fishing activities or have other adverse impacts on commercial and recreational fisheries. See Ocean SAMP Parts 8.4.7 and 8.4.8. The CRMC's policy is to protect commercial and recreational fisheries within the waters offshore Rhode Island and Massachusetts, from the adverse impacts of other uses, while supporting actions to make ongoing fishing practices more sustainable.

It must also be recognized that scientific knowledge of the impacts of fishing on habitats and fish populations and the impacts of offshore wind project construction and operation are not well known, particularly for the New England area. A general goal of the CRMC is to constantly improve the health of the Ocean SAMP area ecosystem and the populations of fish and shellfish it provides. Cooperative research, utilizing the unique skills and expertise of the fishing

community, and working with this community to sustain its longevity is a cornerstone to this goal. Commercial and recreational fisheries activities are dynamic, taking place at different places at different times of the year due to seasonal species migrations and other factors. The CRMC recognizes that fisheries are dynamic, shaped by these seasonal migrations as well as other factors including shifts in the regulatory environment and market demand. The CRMC further recognizes that the entire Ocean SAMP area is used by commercial and recreational fishermen employing different fishing methods and gear types. Changes in existing uses, intensification of uses, and new uses within the area may cause adverse impacts to these fisheries.

In recognition of these complex factors and changing and needs, the CRMC shall: (1) In consultation with the Fishermen's Advisory Board, identify and evaluate prime fishing areas on an ongoing basis through an adaptive framework; and (2) Review any uses or activities that could disrupt commercial and recreational fisheries activities pursuant to Ocean SAMP §§ 11.10.1(E) and (F).

The Fishermen's Advisory Board (FAB) as described throughout Ocean SAMP Part 11 provides advice to the Council on the siting and construction of other uses within marine waters. The FAB is comprised of nine members, one representing each of the following six Rhode Island fisheries: bottom trawling; scallop dredging; gillnetting; lobstering; party and charter boat fishing; and recreational angling; and three members, including two commercial fishermen and one recreational fisherman, who are Massachusetts fishermen who fish in the Ocean SAMP area. The FAB's specific purpose is to provide the Council with an assessment of each offshore wind project for the following issues: fishermen and fisheries activities, and on issues including, but not limited to, the evaluation and planning of project locations, arrangements, and alternatives; micro-siting (siting of individual wind turbines within a wind farm to identify the best site for each individual structure); access limitations; and measures to avoid first then mitigate the potential impacts of such projects on the fishery.

The FAB may further aid the CRMC and its staff in developing and implementing a research agenda. As new information becomes available and the scientific understanding of the

Ocean SAMP planning area evolves, the FAB may identify new areas with unique or fragile physical features, important natural habitats, or areas of high natural productivity for designation by the Council as Areas of Particular Concern or Areas Designated for Preservation. See Ocean SAMP §§ 11.10.2 and 11.10.3.

In addition to the FAB, the Council shall work together with the federal agencies, other fishermen's organizations, marine pilots, recreational boating organizations, and other marine safety organizations to promote safe navigation, fishing, and recreational boating activity around and through offshore structures and developments, and along cable routes, during the construction, operation, and decommissioning phases of such projects. Commercial and recreational fishing and boating access around and through offshore structures and developments and along cable routes is a critical means of avoiding the potential adverse impacts of offshore structures on commercial and recreational fisheries and recreational boating. The Council requires that this approach is taken to the development of offshore wind, works to ensure that the waters surrounding offshore structures, developments, and cable routes remain open to commercial and recreational fishing, marine transportation, and recreational boating, except for navigational safety restrictions. See Ocean SAMP § 8.5.1.

The CRMC has further put federal agencies on notice that they should notify the CRMC as soon as is practicable of any federal action that may affect vessel access around and through offshore developments and along cable routes. Any changes affecting existing navigational activities may be subject to CZMA Federal Consistency review if the federal agency determines its activity will have reasonably foreseeable effects on the uses or resources of Rhode Island's coastal zone. See Ocean SAMP §§ 8.5.1 and 11.9.7.

In accordance with the Ocean SAMP's enforceable policies, the CRMC relies on the FAB for advice on fishing issues and potential impacts from offshore developments. The FAB has worked with CRMC staff frequently and has not deviated from their position that the alternative turbine layout proposed by the CRMC helps to minimize adverse impact to the Rhode Island fishing industry. The following sections of this federal consistency determination should be

reviewed in the context of the steady advice that the FAB has provided to the CRMC, Vineyard Wind and to BOEM.

B. Project Description

On April 6, 2018 Epsilon Associates, Inc. on behalf of Vineyard Wind, LLC filed via email with the Rhode Island Coastal Resources Management Council a federal consistency certification[5] for the proposed construction of an 800MW commercial-scale offshore wind energy facility ("the Project") to be located in offshore waters south of Martha's Vineyard, MA. The Project is located within the northern portion of Bureau of Ocean Energy Management (BOEM) Lease Area OCS-A 0501, which is part of the Massachusetts wind energy area (MA WEA). This northern portion of Vineyard Wind's lease, referred to in the Construction and Operation Plan (COP) as the wind development area (WDA), is the Project boundary and is 75,614 acres (306 km2) in size.

The Project as proposed in the COP will consist of up to 106[6] offshore wind turbine generators (WTGs) (each placed on a foundation support structure) arranged in a grid-like pattern oriented Northwest to Southeast (the average spacing between turbines is 0.86 nm), electrical service platforms (ESP), an onshore substation, offshore and onshore cabling, and onshore operations & maintenance facilities. The Project also includes approximately 180 linear miles of inter-array cables (connecting the WTGs to the ESPs) and inter-link cables (between ESPs), and approximately 140 linear miles of offshore export cables. Each WTG will independently generate 8 to 10 MW of electricity (depending on turbine size selected) and will

[5] Vineyard Wind filed a 37-page joint consistency certification for both Massachusetts and Rhode Island. Vineyard Wind states in its certification filing that its proposed offshore renewable energy project is "consistent to the maximum extent practicable" with the enforceable policies of Rhode Island's coastal management program (Emphasis added). See Vineyard Wind Consistency Certification at 1. However, 15 CFR §§ 930.57(a) and 930.76(c) require that projects seeking federal licenses or permits must be fully consistent with approved state management programs. A consistency certification must indicate that "the proposed activity complies with and will be conducted in a manner consistent with the management program." *Ibid*.

[6] As of November 9, 2018 Vineyard Wind proposes to use the MHI Vestas V164 9.5 MW offshore wind turbine generator, which requires only 84 WTGs to meet the Project need of 800MW power output. However, project layout (northwest-southeast) and turbine spacing (less than 1 nm) remain the same.

interconnect with the ESPs via the inter-array submarine cable system. The offshore export cable transmission system connects the ESPs to a landfall location in Barnstable, Massachusetts.

C. Federal Consistency

Vineyard Wind filed its Construction and Operation Plan ("COP") with BOEM on December 20, 2017 for a federal license to construct and operate the proposed Project. Vineyard Wind subsequently filed a revised COP with BOEM on March 15, 2018. BOEM then issued its Notice of Intent ("NOI") on March 30, 2018 to prepare an Environmental Impact Statement ("EIS") for the COP consistent with the regulations implementing the National Environmental Policy Act ("NEPA") that would allow Vineyard Wind to construct and operate the Project. The publication of the NOI initiated the public scoping process and opened a 30-day public comment period. The EIS was assigned Docket No. BOEM-2018-0015.

The Vineyard Wind Project requires an approval or authorization from the Department of the Interior (BOEM), which is a federal license or permit activity listed in the federally approved Rhode Island coastal management program. The Project at the time of Vineyard Wind's consistency certification filing, however, was located outside of the Rhode Island coastal zone and the CRMC's 2011 geographic location description ("GLD"). Nevertheless, the CRMC determined that the Project would have reasonably foreseeable coastal effects on Rhode Island coastal uses, specifically Rhode Island-based commercial fishing operations, and CRMC would seek NOAA OCM approval for an unlisted activity. However, Vineyard Wind in keeping with its commitment expressed in a letter to CRMC on March 6, 2018 (see Appendix 1) voluntarily filed its federal consistency certification with the CRMC on April 6, 2018 (see Appendix 2) shortly after BOEM issued its NOI. Accordingly, Vineyard Wind is bound by all relevant provisions of the federal regulations pursuant to 15 CFR § 930.54.

In September 2018 during the CRMC consistency review period for the Vineyard Wind project, the CRMC filed for approval from the National Oceanic and Atmospheric Administration Office of Coastal Management ("NOAA OCM") of a new GLD that included the Vineyard Wind and Bay State Wind lease blocks. NOAA OCM granted approval to CRMC for the 2018 GLD on December 7, 2018 to include listed activities of any offshore wind facilities

and underwater cables. Accordingly, all future wind farm development projects within the CRMC's 2018 GLD, which includes BOEM lease blocks OCS-A 0500 and 0501, are automatically subject to CRMC federal consistency review.

The Vineyard Wind Project is subject to CRMC review authority pursuant to the federal Coastal Zone Management Act (CZMA) at 16 USC § 1456(c)(3)(A) and the CZMA's implementing regulations at 15 CFR Part 930, Subpart E - Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities. The Project meets the definition of a "large-scale offshore development" as specified in 650-RICR-20-05-11.3(H)(1)[7], formerly § 1160.1.1 of the CRMC's Ocean Special Area Management Plan or Ocean SAMP.

Pursuant to 15 CFR § 930.60(b), the CRMC on April 13, 2018 provided to Vineyard Wind a draft agreement to stay the CRMC review for a period of 6-months (until April 2019) in anticipation of additional time necessary for the CRMC to obtain and review supplemental materials that Vineyard Wind would need to file with the CRMC. Vineyard Wind, however, informed the CRMC on May 3, 2018 that it declined to enter into a stay agreement at that time.

The CRMC issued a public notice for the Project on May 25, 2018 that indicated public comments could be filed with the CRMC until June 25, 2018. See Appendix 4. Comments were filed on June 13, 2018 by the Commercial Fisheries Center of Rhode Island and on June 20, 2018 by a RI-based commercial fisherman concerning commercial fisheries issues. Additionally, combined comments were filed on June 25, 2018 by the Conservation Law Foundation, the Natural Resources Defense Council, the National Wildlife Federation and Save The Bay.

Over the course of the CRMC federal consistency review period for the Vineyard Wind consistency certification and the COP, the CRMC and Vineyard Wind mutually agreed to the stay agreements listed below in accordance with 15 CFR § 930.60(b). **We note for the record, however, that Vineyard Wind and the Massachusetts CZM program agreed several months**

[7] The enforceable policies of the Rhode Island coastal management program applicable to the Vineyard Wind Project are contained in the CRMC's Ocean Special Area Management Plan, which is codified in the Rhode Island Code of Regulations as 650-RICR-20-05-11. For purposes of federal consistency, enforceable policies are defined at 15 CFR § 930.11(h).

ago to a lengthy stay of the Massachusetts CZM consistency review and decision until June 6, 2019. See MACZM Stay Agreement (Appendix 23).

1st stay agreement executed on July 30, 2018 that extended the CRMC review and decision date until December 6, 2018;

2nd stay agreement executed on November 29, 2018 that extended the CRMC review and decision date until January 28, 2019;

3rd stay agreement executed on January 15, 2019 that extended the CRMC review and decision date until February 1, 2019;

4th stay agreement executed on January 25, 2019 that extended the CRMC review and decision date until February 19, 2019; and

5th stay agreement executed on February 11, 2019 that extended the CRMC review and decision date until March 1, 2019.

D. Background and Procedural Matters

Vineyard Wind met with CRMC on January 25, 2018 to provide a general overview of the Project and the COP, and then again on June 13, 2018 to specifically discuss consistency certification issues. See COP Vol. 1 at 6-1. Vineyard Wind and CRMC also met on July 24, July 31 and October 9, 2018 and again on November 1, 2018 with other Rhode Island state agency staff to further discuss the Project and in particular the wind turbine layout issues affecting Rhode Island-based commercial fishermen. Vineyard Wind attended CRMC Fishermen's Advisory Board meetings on July 24, 2017 and February 19, 2018, but Vineyard Wind did not show or discuss the wind turbine layout with the FAB at either of those meetings. See Appendix 6. It was at a presentation to the FAB on April 11, 2018 that Vineyard Wind presented the wind turbine layout to commercial fishermen, but this was four (4) months after Vineyard Wind had filed its COP with BOEM (December 20, 2017). Commercial fishermen immediately objected to the proposed northwest-southeast layout of the wind turbines and the minimal (less than 1 nautical mile) spacing between turbine foundations, as it would result in a disruption of the existing fishing patterns established for the past two decades between fixed gear (traps and gillnets) and mobile gear (trawl nets) fishermen within the WDA. Then on April 19, 2018, prior to the BOEM public scoping meeting in Rhode Island for the Vineyard Wind COP, CRMC FAB

members met with James Bennett, Chief of the BOEM Office of Renewable Energy Programs, to object to the Project and presented an alternative east-west layout with 1 nm spacing of the Vineyard Wind WTGs that would be consistent with existing RI-based commercial fishing operations (see further discussion in Section H below).

The CRMC prepared a memorandum for a scheduled June 13, 2018 meeting between the CRMC and Vineyard Wind to aid Vineyard Wind in understanding what supplemental information was necessary for its federal consistency certification filing. At the June 13 meeting, CRMC staff strongly advised Vineyard Wind that a substantial redesign of the WTG layout would be necessary to minimize significant adverse effects on Rhode Island-based commercial fishermen. Following the June 13 meeting with Vineyard Wind the CRMC on July 2, 2018 issued a 3-month consistency review status letter in accordance with 15 CFR § 930.78(a) that provided an alternative wind turbine layout[8] as discussed during the meeting of June 13, 2018. The CRMC alternative presented in the 3-month consistency review status letter showed an east-west orientation for the Project with minimum spacing of 1 nm between turbines and all turbine rows that did not reduce the overall number of proposed turbines, but importantly would lessen the adverse effects on RI-based commercial fisheries (coastal uses) and meet the enforceable policies of the state coastal management program.

Vineyard Wind electronically provided the CRMC with a revised COP dated July 23, 2018 including confidential proprietary materials to aid in CRMC's Project review. On July 24, 2018 the CRMC and Vineyard Wind met again to discuss the revised COP, Project layout, fisheries issues and the scheduled July 26, 2018 combined meeting of the CRMC Habitat Advisory Board (HAB) and the Fishermen's Advisory Board. The July 26, 2018 FAB/HAB meeting was held specifically to address the Vineyard Wind federal consistency filing and the Project layout. The FAB/HAB meeting was held at Vineyard Wind's request to meet one of the applicable enforceable policy requirements of the Rhode Island coastal management program, the Ocean SAMP §11.10.1(E) (formerly § 1160.1.1.5). The July 26 FAB/HAB meeting was also

[8] The alternative wind farm layout graphic was prepared by Julia Livermore of the RI Department of Environmental Management (RIDEM) Division of Marine Fisheries as requested by and on behalf of the Commercial Fisheries Center of Rhode Island, which represents a diverse group of RI-based commercial fixed and mobile gear fishing interests.

an opportunity for FAB members and other RI-based commercial fishermen to address their concerns with the Project and in particular the wind turbine layout. The FAB members and other RI-based commercial fishermen demanded, just as they did at the April 11, 2018 FAB meeting, that Vineyard Wind modify their turbine layout in an east-west orientation with 1 nautical mile spacing between turbines to accommodate long-established fishing patterns. Importantly, Vineyard Wind did not consult with Rhode Island-based fishermen or the FAB in the development of Vineyard Wind's proposed northwest to southeast turbine layout before the COP was filed with BOEM on December 20, 2017 (See more detailed discussion on wind turbine layout in Sections G & H below).

Given the negative responses by the FAB members concerning the proposed wind farm layout, Vineyard Wind indicated at the July 24, 2018 FAB meeting, and confirmed via email later that day, that they were willing to enter into an agreement to stay the CRMC consistency review period by 2 months to pursue turbine layout alternatives in response to the fishermen's objections. Pursuant to 15 CFR § 930.60(b) the CRMC on July 27, 2018 provided to Vineyard Wind an agreement to stay the CRMC review for a period of 2-months until December 6, 2018. The stay agreement was signed by Vineyard Wind on July 30, 2018. See Appendix 7.

The CRMC relies upon the FAB to advise the agency on issues related to the commercial fishing industry in accordance with Ocean SAMP § 11.8(A)(2) (formerly § 1140.1(ii)). The advice and consultation of the FAB is used by the CRMC to aid in its independent analysis and determination whether there are likely impacts to the RI-based commercial fishing industry (coastal effects) from a proposed project and whether an applicant is meeting the enforceable policies related to commercial fishing matters (see further discussion below).

The CRMC and Vineyard Wind met again on July 31, 2018 to discuss the July 26, 2018 FAB meeting and pertinent federal consistency issues. Vineyard Wind staff, including Erich Stephens, Vineyard Wind Chief Operating Officer, stated that in their opinion achieving a full east-west alignment would be extremely challenging and that achieving 1 nautical mile spacing between all turbines would not be feasible. However, no technical reasons were provided at the meeting as to why realigning the layout with 1 nm spacing would not be possible.

The CRMC and Vineyard Wind met again on October 9, 2018 to further discuss the Project layout to achieve an east-west orientation with 1 nm spacing between turbines necessary to accommodate existing Rhode Island-based commercial fishing operations. At the meeting Vineyard Wind stated that for future phases only it would install turbines in an east-west alignment, but it would not change the planned layout for the currently proposed Project other than to eliminate 12 turbine positions in the southern portion of the WDA for a total of 94 wind turbines. Again, no technical justification was provided at the meeting as to why realigning the layout with 1 nm spacing would not be possible.

On November 9, 2018 Vineyard Wind filed with the CRMC additional information regarding Vineyard Wind's inability to accommodate the fishing industry's request that wind turbines be aligned in rows in an east-west direction with 1 nm separation distances between turbine rows. Vineyard Wind continued to steadfastly maintain its position that it would not realign the Project in an east-west orientation; rather it would reduce the number of turbines to approximately 84 using a larger 9.5MW generator, but no more than 100 turbines within the WDA. Vineyard Wind committed to install any future phases within its lease area with turbines aligned in an east-west orientation with 1nm separation distance between rows to accommodate existing commercial fishing operations.

On November 19, 2018 the CRMC convened a meeting of the Fishermen's Advisory Board to review and discuss Vineyard Wind's November 9, 2018 filing with the CRMC. The CRMC's primary objective of this meeting was for the FAB to provide a recommendation as to whether any of Vineyard Wind's three proposed large turbine alternative layouts would better accommodate the Rhode Island-based commercial fishing fleet's historic and current operations within the Vineyard Wind WDA, as opposed to the 106 wind turbine layout as presented in Vineyard Wind's COP. After much discussion, the FAB noted that the three new alternatives only reduce the overall number of turbines and area of construction, but the alternatives did not realign the turbines in an east-west orientation or provide for a minimum spacing of 1 nm between turbines has been continually requested by the commercial fishing industry. The FAB stated that despite the three new large turbine alternatives the Project was unacceptable and would cause adverse impact as a result of the orientation of turbine rows with spacing less than 1

nm between all turbine locations. The end result would be an exclusion zone by default with limited, if any, fishing within approximately 90 square miles of Vineyard Wind's lease area under all but ideal weather conditions due to navigation and fishing operation safety concerns. The FAB voted unanimously to object to the three proposed large (9.5MW) turbine alternatives as they did not provide east-west alignment of wind turbines with a minimum 1 nm separation distances between all turbines.

Following the November 19, 2018 FAB meeting, Vineyard Wind submitted a request for a stay agreement with the CRMC on November 21, 2019 to allow additional time for Vineyard Wind to develop a mitigation plan with Rhode Island commercial fishermen. See Appendix 18. The CRMC at a public meeting on November 27, 2018 granted Vineyard Wind's request and directed Vineyard Wind to work with the FAB in developing and negotiating a mitigation plan. Accordingly, the CRMC and Vineyard Wind mutually agreed to stay the CRMC consistency review period and executed a second stay agreement on November 29, 2018 that required a CRMC consistency decision by January 28, 2019.

The CRMC convened a meeting of the Fishermen's Advisory Board on January 3, 2019 so the FAB could provide an update on the status of mitigation negotiations with Vineyard Wind for compensation to the fishing industry for expected losses resulting from the Project. The FAB revealed that Vineyard Wind had yet to approach FAB members with a mitigation/compensation proposal for their review and approval on behalf of the commercial fishing industry. When the CRMC approved a request by Vineyard Wind at the Council's November 27, 2018 meeting to enter into a stay agreement to provide more time for Vineyard Wind to pursue compensation for fishermen, the CRMC conditioned its approval requiring Vineyard Wind to work directly with the fishermen and provide weekly progress reports. Despite the Council's requirement, Vineyard Wind had not engaged FAB members for the five (5) weeks following the Council's decision leading up to the January 3, 2019 FAB meeting. The FAB made clear that it was displeased with Vineyard Wind for not engaging the FAB in compensation discussions and not having a compensation proposal to review at this meeting. The FAB further stated that it would be considering and taking action to approve or reject any compensation proposals at its next meeting scheduled for January 15, 2019. This would allow the FAB to make a recommendation

to the CRMC in preparation for the Council's scheduled January 22, 2019 meeting where the Council would evaluate and decide on a compensation proposal in accordance with enforceable policy § 11.10.1(C) as necessary to provide a timely consistency decision due on or before January 28, 2019.

When the FAB met again on January 15, 2019, Vineyard Wind had not yet engaged the FAB in discussion or negotiations and had not yet submitted a compensation package to the FAB for their consideration. However, Vineyard Wind CEO Lars Pedersen offered to present their compensation package to the FBA in a private meeting later that evening rather than during the ongoing public meeting. After further discussion during the FAB meeting, Vineyard agreed to provide the compensation package the next day (January 16) via email to the CRMC and the FAB.

Just prior to the January 15, 2019, FAB meeting the CRMC and Vineyard Wind executed a third agreement to stay the CRMC consistency review with a decision date extended to February 1, 2019 to allow more time for Vineyard Wind to engage and enter into mitigation negotiations with the FAB and the CRMC to meet the enforceable policy requirements of § 11.10.1(H). The next meeting of the FAB was scheduled for January 28, 2019. Additionally, a special meeting of the Council was scheduled for January 29, 2019 to consider a recommendation from the FAB on a compensation package and a decision in the Vineyard Wind federal consistency matter.

On January 24, 2019, Vineyard Wind submitted a letter to CRMC requesting that the CRMC consistency review period be extended from February 1 until February 19, 2019 to provide additional time for mitigation negotiations with the FAB. Accordingly, the CRMC and Vineyard Wind executed a fourth stay agreement on January 25, 2019 that extended the CRMC federal consistency review period with a CRMC consistency decision due by February 19, 2019.

Vineyard Wind subsequently filed with the CRMC on January 31, 2019 supplemental materials consisting of a total of 277 pages of new information. This included a new navigational risk supplementary analysis (105 pages) dated January 23, 2019 and modifications to Vineyard

Wind's economic analysis regarding impacts to fisheries authored by Dr. King-dated January 2019. Vineyard Wind's letter further indicated they were ready to proceed with a decision before the CRMC as scheduled for February 12, 2019 despite the fact no mitigation negotiation meetings had yet taken place between Vineyard Wind, CRMC and the FAB.

Mitigation negotiation meetings between Vineyard Wind, CRMC and the FAB eventually took place over several days between February 7 and February 14, 2019. These meetings resulted in a side agreement dated February 8, 2019, which specified productive compensation and mitigation discussions must occur within a set schedule included in the agreement. See Appendix 7 This agreement led to the CRMC and Vineyard Wind executing a fifth stay agreement on February 11, 2019 that extended the CRMC federal consistency review period and a CRMC consistency decision due by March 1, 2019.

A public meeting of the CRMC's FAB was held on Saturday, February 23, 2019 where the FAB voted unanimously to recommend to the CRMC that Vineyard Wind's mitigation proposal as described in the Vineyard Wind Fisheries Mitigation Proposal Term Sheet, dated Final February 15, 2019 is acceptable for purposes of federal consistency.

At a public meeting held on February 26, 2019 the Council voted to accept the Vineyard Wind Fisheries Mitigation Proposal and the CRMC staff recommendation that the project was consistent with the enforceable policies. CRMC staff were directed to issue a federal consistency concurrence for the Vineyard Wind project.

Table 1. Vineyard Wind project chronology of events starting with COP filing to BOEM

Date	Event	Comments
12/19/2017	COP filed by Vineyard Wind with BOEM	
2/19/2018	FAB meeting	General discussion of federal consistency and project status of the Vineyard Wind and adjacent projects
03/06/2018	Vineyard Wind letter to CRMC	Commitment to consult with RI fishermen and provide CRMC a voluntary consistency certification
03/20/2018	COP interagency meeting, Boston	Project introductory meeting

03/21/2018	BOEM cooperating interagency conference call	Project introductory and process meeting
04/03/2018	Federal consistency workshop with David Kaiser/NOAA OCM at URI Alton Jones campus	Attended by wind energy developer representatives including Geri Edens for Vineyard Wind
04/06/2018	Federal consistency certification filed by Vineyard Wind electronically to CRMC	No WTG layout was provided in the consistency certification. CRMC obtains a WTG layout from the COP on BOEM's website for public notice.
04/11/2018	CRMC Fishermen's Advisory Board (FAB) meeting	Vineyard Wind shows WTG layout for the first time. FAB indicates an east-west grid layout with 1 nm spacing is necessary to support continued fishing within the WDA (more important than transiting the WDA).
04/16/2018	Vineyard Wind Notice to Mariners and Fishermen	Geotechnical survey beginning on or about April 16 2018 – estimated duration 4 months. Location: Vineyard Wind lease area and export cable route between lease area and Cape Cod
04/19/2018	BOEM Scoping Meeting for Vineyard Wind COP, Kingston RI	FAB met with BOEM staff, including James Bennett, and delivered alternative east-west layout with 1 nm spacing for Vineyard Wind project
04/24/2018	BOEM Webinar	Review of lease activities and Vineyard Wind COP/lease
04/26/2018	MA Division of Marine Fisheries Notice to Fishermen	Geotechnical Surveys in the Vineyard Wind lease area and between the lease area and Cape Cod began on April 16, 2018
05/20/2018	BOEM cooperating interagency conference call	Primarily a process and schedule discussion
06/13/2018	Vineyard Wind / CRMC meeting at CRMC offices	June 13 CRMC memo provided to Vineyard Wind containing Ocean SAMP enforceable policy requirements. WTG layout redesign discussed.
06/25/18	BOEM conference call with RI state officials	Vineyard Wind COP discussion with RI
07/02/2018	CRMC issues 3-month letter required by 15 CFR § 930.78(a) to Vineyard Wind and BOEM	Describes Ocean SAMP enforceable policies and provides an alternative WTG layout with transit lanes to minimize adverse impacts to RI-based commercial fishermen.
07/16/2018	Vineyard Wind provides response to CRMC 3-month letter	Vineyard Wind disputes information in CRMC 3-month letter particularly coordination with FAB. Questions other Ocean SAMP requirements.

07/24/2018	Vineyard Wind/CRMC Meeting at CRMC Offices	Discussion of 3-month letter, CRMC proposed alternative WTG layout and pre-FAB meeting discussion
07/25/18	Vineyard Wind files revised COP with CRMC	COP dated July 23, 2018 and includes some confidential information
07/26/2018	Joint meeting of CRMC Fishermen's Advisory Board (FAB) and Habitat Advisory Board (HAB) specifically to review and discuss Vineyard Wind project	RI commercial fishermen detail need for E-W WTG orientation with 1 nm spacing to support continued fishing and discuss additional environmental/fisheries impact concerns such as pile driving noise. FAB indicates failure to go with E-W orientation a "deal breaker". Erich Stephens indicates Vineyard Wind open to considering E-W orientation.
07/30/2018	Vineyard Wind & CRMC execute 1st stay agreement	Agreement stays CRMC review period for 2 months with CRMC decision due by December 6, 2018
08/02/2018	BOEM cooperating interagency conference call	Discussion includes CRMC proposed E-W preferred alternative and confirmation that neighboring wind farm proposals (Bay State Wind and Deepwater Wind South Fork) will be oriented E-W to accommodate fishermen.
08/09/2018	Letter to BOEM from CRMC Executive Director Fugate	Recommends a preferred alternative consisting of an E-W orientation for all turbines and ESPs, 1 nm spacing and a 2 nm transit corridor. The letter was a follow-up to the August 2, 2018 interagency conference call.
08/09/2018	Vineyard Wind / CRMC meeting at CRMC offices	Discussion of VW efforts to eliminate 12 WTGs, and relocate others. Confirmation that future phase will be E-W. Provide compensation to fishermen for impacted area not E-W. VW met with FAB members and FAB response was all E-W or nothing. VW states full scale redesign/reorientation E-W not feasible. VW notes BOEM departure request, scheduling, FDR/FIR issues.
08/22/2018	BOEM cooperating interagency conference call	Discussion of DEIS alternatives, "hybrid" alternatives; "mix & match" alternative; alternative to include E-W orientation with 1 nm spacing.
10/03/2018	Commercial Fisheries Center of Rhode Island files affidavit with CRMC and other parties	Affidavit provides basis and agreement for E-W orientation with 1 nm spacing.

10/15/2018	BOEM cooperating interagency conference call	Additional G&G work requirements discussed for E-W orientation with 1 nm spacing and 2019 deadline for federal investment tax credit. CRMC suggests phasing the project to move forward with turbines where G&G work has been completed in close proximity to E-W alignment.
10/12/2018	RI Marine Fisheries Council files recommendation letter with CRMC	RIMFC vote to support E-W alignment with 1 nm spacing for all wind farms in southern NE waters.
10/24/2018	RI Dept. of Environmental Mgmt. issues commercial fisheries report addendum	Addendum shows increase of commercial fishing harvest value from wind energy areas based on improved analysis methodology.
10/25/2018	BOEM interagency meeting/conference call	Discussion of WTG array layout; CRMC proposed E-W layout with 1 nm spacing alternative for salvaged turbines with phasing based on available G&G; project viability and obligations; considerations of array layout changes (G&G), departures; timelines; fisheries compensation, etc.
11/01/2018	RI state agencies/RI Governor's Office/BOEM/Vineyard Wind meeting at RI Dept. of Administration	Discussion of BOEM EIS process, east-west alternative, potential phasing of Vineyard Wind project
11/5/2018	Vineyard Wind issues notice for Fisheries Monitoring Plan scoping workshops	Workshops to identify needs for wind farm pre- and post-construction fishery assessments. Vineyard Wind has yet to provide a required pre-construction fisheries monitoring plan to the CRMC.
11/09/2018	Vineyard Wind provides letter proposing large turbine alternatives and files COP revisions dated 10/22/18 with the CRMC	VW proposes 3 alternative layouts using a larger capacity (9.5MW) turbine and reducing number of turbines to 84. Additionally proposes to withdraw the COP appendix III-R alternative and replace with the 3 large turbine alternatives. VW asserts modifying layout to achieve complete E-W orientation with 1 nm spacing is not a viable alternative. VW discloses executed PPA's totaling 800 MW are on file with the MA DPU for review and approval. VW discloses turbine and cable specific G&G data and required analysis filed with BOEM on October 22, 2018.

11/13/2018	CRMC semi-monthly meeting	Vineyard Wind requests stay agreement. Council denies request
11/19/2018	CRMC FAB meeting	FAB votes to reject Vineyard Wind large-turbine alternatives because layout is not E-W and turbine spacing less than 1 nm.
11/27/2018	CRMC semi-monthly meeting	Vineyard Wind requests stay agreement. Council approves request with conditions to expeditiously work directly with fishermen and to provide weekly progress reports to CRMC.
11/29/2018	Vineyard Wind & CRMC execute 2nd amended stay agreement	Agreement stays CRMC review period with CRMC decision due by January 28, 2019.
01/03/2019	CRMC FAB meeting	Discussion on progress of compensation proposal by Vineyard Wind. FAB members voiced concern and confirmed that Vineyard Wind has yet to have discussions with FAB members and provide a compensation proposal for FAB review and approval. Note that VW has had since November 27 Council meeting to work with fishermen.
1/15/19	Vineyard Wind & CRMC execute 3rd amended stay agreement	CRMC and Vineyard Wind enter into stay agreement specifically to allow time for Vineyard Wind to present a compensation package and negotiate with the FAB. Agreement stays CRMC review period with CRMC decision due by February 1, 2019.
01/15/2019	CRMC FAB meeting	Vineyard Wind refuses to present compensation package at FAB meeting, wants to meet in private with FAB and CRMC. Vineyard Wind delivers compensation package electronically to the FAB and CRMC on 1/16/19
1/25/19	Vineyard Wind & CRMC execute 4th amended stay agreement	CRMC and Vineyard Wind enter into stay agreement to allow time for Vineyard Wind to present a compensation package and negotiate with the FAB. Agreement stays CRMC review period with CRMC decision due by February 19, 2019.
1/31/19	Vineyard Wind filing with CRMC	Vineyard Wind files a letter with supplemental materials (277 pages) requesting that the CRMC proceed with the scheduled February 12, 2019 Council

		meeting for a final decision on the consistency certification and COP.
02/07/19	Meeting between CRMC, FAB and Vineyard Wind	Discussion of Vineyard Wind's mitigation/compensation package proposal.
02/08/19	Meeting between CRMC, FAB and Vineyard Wind	Mitigation/compensation negotiations begin in earnest. CRMC, FAB and Vineyard Wind execute side agreement for engaging in productive compensation and mitigation discussions with a schedule.
02/11/19	Vineyard Wind & CRMC execute 5th amended stay agreement	CRMC and Vineyard Wind enter into stay agreement to allow time for mitigation/compensation negotiations with the FAB. Agreement stays CRMC review period with CRMC decision due by March 1, 2019.
02/11/19	Meeting between CRMC, FAB and Vineyard Wind	Mitigation/compensation negotiations
02/13/19	Meeting between CRMC, FAB and Vineyard Wind	Mitigation/compensation negotiations
02/14/19	Meeting between CRMC, Vineyard Wind and via telephone FAB Chair and attorney	Mitigation/compensation negotiations
02/20/19	Meeting between CRMC staff, CRMC legal counsel and Vineyard Wind legal counsel	Side agreement and concurrence discussions
02/21/19	Meeting between CRMC staff, CRMC legal counsel and Vineyard Wind legal counsel	Side agreement and concurrence discussions
02/23/2019	CRMC FAB meeting	Discussion and action regarding Vineyard Wind compensation proposal and recommendation to CRMC for 2/26/19 Council meeting.
02/26/2019	CRMC semi-monthly meeting	Discussion and action on Mitigation/compensation proposal and consistency determination.

E. Affected Coastal Use – Rhode Island-based Commercial Fishery

NOAA's regulations state "[t]he term 'effect on any coastal use or resource' means any reasonably foreseeable effect on any coastal use or resource resulting from a federal agency activity or federal license or permit activity (including all types of activities subject to the federal consistency requirement under subparts C, D, E, F and I of this part.) Effects are not just environmental effects, but include effects on coastal uses. Effects include both direct effects which result from the activity and occur at the same time and place as the activity, and indirect

(cumulative and secondary) effects which result from the activity and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects are effects resulting from the incremental impact of the federal action when added to other past, present, and reasonably foreseeable actions, regardless of what person(s) undertake(s) such actions." See 15 CFR § 930.11(g).

Pursuant to NOAA's regulations, a federal action is subject to CZMA federal consistency requirements if the action will affect a coastal use or resource. In this matter the affected coastal use is the Rhode Island commercial fishing fleet that harvests fish, mollusks and crustaceans and navigates within the Vineyard Wind WDA. The RI-based commercial fishing fleet targets species using mobile gear (trawl nets) for squid, herring, whiting, mackerel, butter fish, cod, winter flounder and scallops while fixed gear is set for lobster and Jonah crab (traps) using multiple 40-50 trap trawls, and monkfish and cod are harvested using gillnet sets located within the Vineyard Wind WDA.

Additional indirect effects on coastal uses in Rhode Island may include impacts on the commercial/industrial waterfront port facilities of Providence, Quonset/Davisville and Point Judith. Commercial shipping into Narragansett Bay from offshore waters is primarily facilitated by Providence and Quonset/Davisville while Rhode Island-based commercial fishing vessels rely on fishing-related infrastructure located in the ports of Quonset/Davisville, Point Judith, Newport, Block Island, and several other smaller Rhode Island ports.

In fact, the State of Massachusetts Supplemental Draft Environmental Impact Statement Certificate (SDEIR) dated October 12, 2018 indicates that although Vineyard Wind ("the proponent") has signed a letter of intent to use the New Bedford Marine Commerce Terminal for construction staging, the proponent "may stage activities from other port facilities" including, "Providence, Rhode Island" and "Davisville Rhode Island" amongst others. The Massachusetts SDEIR further states "Although an average of 25 vessels will be involved in construction activities on any given day, the SDEIR anticipates an average of 10 daily trips between both the primary and secondary ports and the WDA during construction." And, "[l]arger vessels used to install foundations, ESPs and WTGs in federal waters will likely remain in federal waters and

use port facilities or impact navigation within state waters to make infrequent bunkering trips" See Appendix 11.

F. Value of Commercial Fisheries to Rhode Island

Vineyard Wind's COP significantly underestimates the economic value of commercial fishing species harvested by Rhode Island-based vessels within the WDA. Section 7.6 of the COP, Vol. III characterizes the economic value of commercially harvested species to be uniformly distributed across the MA WEA at $1,000 to $1,200 per km2 with an average value of annual catches from the Vineyard Wind WDA during the period of 2011-2016 estimated to total $348,450. See COP Vol. III at 7-144. Vineyard Wind relied upon two data sources for its estimate of commercial fishing economic value within the WDA; a BOEM study reviewing vessel trip record (VTR)[9] data from 2007-2012 (Kirkpatrick, et al. 2017) and a RI Department of Environmental Management (RIDEM) study reviewing vessel monitoring system (VMS)[10] data from 2011-2016 (Livermore, 2017). A major flaw in the reliance on VTR data is that it is not comprehensive enough to accurately assign catch to the entirety of the area actually fished. For example, a VTR point for a vessel that harvested fish within the WDA may be located outside of the WDA. However, all of that vessel's catch from the WDA will be assigned to that single VTR point that is not located within the WDA. Accordingly, the vessel's catch would be reported for VTR purposes as having been harvested outside of the WDA, thereby underestimating the value of the catch harvested within the WDA.

The RIDEM study (Livermore 2017) uses VMS data specifically for portions of fishing trips that occurred within the Vineyard Wind lease area. Most commercial fishing trips occur across large areas and harvesting activity within the Vineyard Wind lease area may greatly affect

[9] Operators of NOAA Fisheries Greater Atlantic Region permitted commercial fishing vessels are required to submit a vessel trip report (VTR) for every fishing trip regardless of where the fishing occurs or what species are targeted, with the exception of those vessels that possess only a lobster permit. VTRs are required in order to provide information on when and where catch occurred. Operators of all federally permitted vessels must complete a VTR prior to landing.

[10] Vessel Monitoring Systems (VMS) is a general term to describe systems that are used in commercial fishing to allow environmental and fisheries regulatory organizations to track and monitor the activities of fishing vessels.

an entire trip. The RIDEM Spatiotemporal and Economic Analysis of VMS Data-Addendum 1 (Livermore 2018) assesses trip effects for each renewable energy company's lease area within the larger southern New England WEA. This reanalysis method assigns a larger commercial fishing harvest assessment value for each wind energy lease area and more accurately captures potential impacts to commercial harvesting activities. While the new RIDEM study does not including lobster and Jonah crab catches, the revised assessment calculates the average annual landings for all species harvested by RI vessels within the Vineyard Wind lease area during the 2011-2016 study period at $1,408,466. See Section 5.1.3, Livermore 2018. Rhode Island vessels harvested $3,072,607 of seafood from the Vineyard Wind lease area in 2016, which was an annual high during the 2011-2016 study period. Table 3 from the Livermore (2018) study shows that the average annual trip value for the Vineyard Wind lease area for the six study states is $2,820,864, but again does not include lobster or Jonah crab landings. Moreover, Rhode Island vessels harvested 52% ($8,450,798) of the $16,474,726 in total trip annual landings from each of the six states harvested from the Vineyard Wind lease area during the 2011-2016 study period.

The RIDEM revised harvest values are substantially greater than those estimated by the Vineyard Wind COP. Vineyard Wind makes an erroneous assumption of the Kirkpatrick et al. (2017) data, as the COP assumes that because the WDA is only 10.2% of the MA WEA geographic area, then the Vineyard Wind estimate of fishery revenue from the WDA should be reduced accordingly (i.e., 10.2% of the value determined by Kirkpatrick). See COP Vol. III, p. 7-101. However, fisheries biomass is not uniformly distributed either spatially or temporally within the MA WEA or the Vineyard Wind lease area, and thus smaller areas may account for substantial amounts of a particular commercial fish harvest.

Squid

Squid is the largest Rhode Island commercial fishery in volume and value. Although RI-based commercial vessels target both longfin and shortfin squids, the vast majority of squid landings harvested from offshore waters is longfin squid. As determined from Atlantic Coastal Cooperative Statistics Program (ACCSP)[11] data, longfin squid was the top species landed in

[11] Atlantic Coastal Cooperative Statistics Program (ACCSP) is the principal source of marine fishery statistics for the Atlantic coast and provides tools for confidential reporting and real-time access to up-to-date information on species caught and their impact on fisheries and quotas. See: http://www.accsp.org/.

Rhode Island by dollar value ($14,795,851), with shortfin squid coming in as the second highest value ($13,536,617) in 2017. By weight, shortfin squid was the top species in (23,055,000 lbs.), followed by longfin squid (10,701,185 lbs.). Due to the short life history and high inter-annual variability in the species' geographic distributions, Rhode Island's squid fishery fluctuates in value year by year, but has generally grown considerably over the last few years, with 2016 longfin squid catches being the largest in the past ten years. Figure 1 shows the intensity of squid fishing effort within the MA WEA and the Vineyard Wind lease area. As shown on the Northeast Ocean Data portal a large portion of the Vineyard Wind lease area is identified as medium-high to high intensity of fishing effort with a smaller portion shown as very high effort.

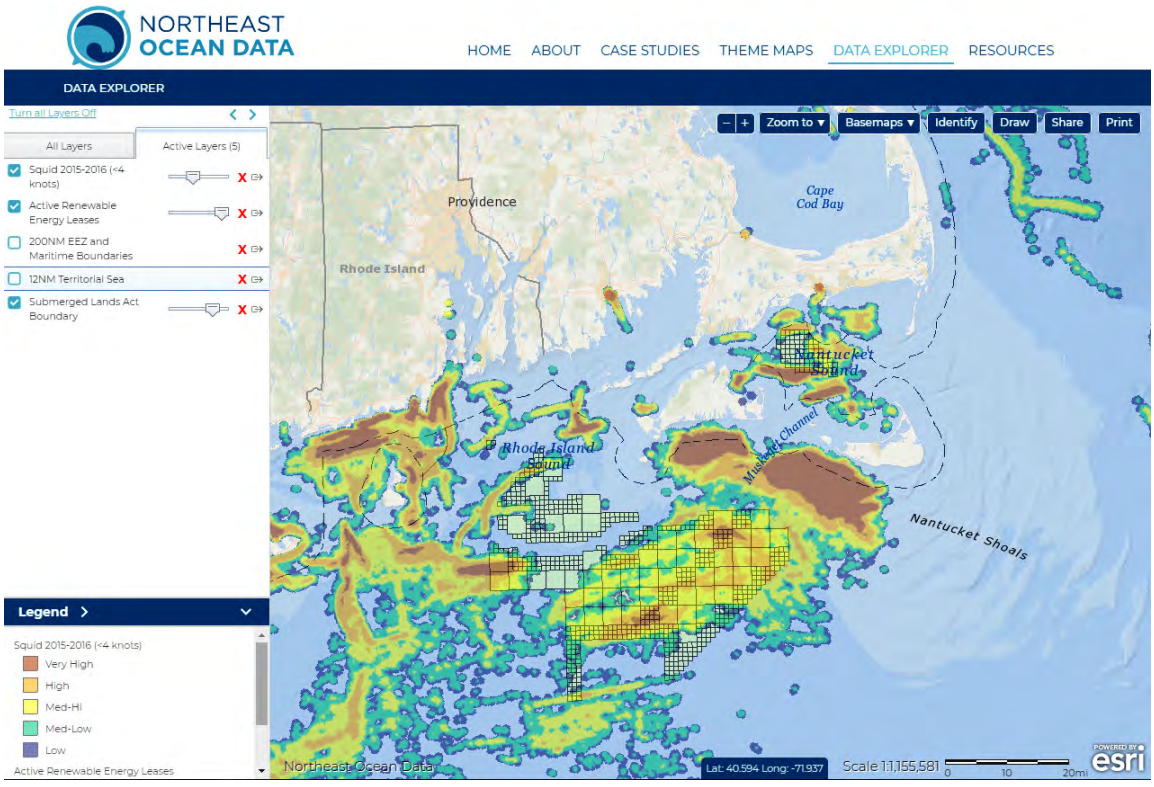

Figure 1: Intensity of commercial squid fishery during 2015-2016 seasons within the MA and RI WEAs and the Vineyard Wind lease area. Source: Northeast Ocean Data portal. https://www.northeastoceandata.org/

The total U.S. Atlantic commercial landings of longfin squid during the years 2011 through 2016 were 166,921,779 pounds, while the commercial landings of longfin squid in

Rhode Island ports during the same period totaled 87,430,234 pounds. Importantly, fifty-two (52) percent of the entire U.S. Atlantic longfin squid harvest was landed and processed in Rhode Island ports representing nearly $100,000,000 of economic activity from this commercial species alone to the state of Rhode Island or more than $16,000,000 annually averaged over this period. Importantly, the value of Rhode Island-based landings for the squid/mackerel/butterfish Fishery Management Plan (FMP) (of which squid accounts for the overwhelming majority of value within this FMP) that are verifiably attributable to the offshore wind energy areas during the period of 2011 through 2016 was $13,549,086. The total value of Rhode Island-based landings for longfin squid from all federal waters during the same period was $98,558,493. Thus, approximately 14% of all longfin squid landings in Rhode Island ports during the period of 2011 through 2016 were harvested from the wind energy areas. Table 15 of the Livermore (2018) study shows a six (6) year value of the squid/mackerel/butterfish FMP of $7,069,283 for an average annual value of $1,178,283 harvested from the Vineyard Wind lease area. This value is for the squid fishery only, but still greatly exceeds the wholly inaccurate Vineyard Wind COP estimated total annual value of all commercial fisheries harvested within the Vineyard Wind lease area at $348,450 during the period of 2011-2016.

Lobster and Jonah Crab

Precise landings and values for American lobster and Jonah crab harvested within the MA WEA, and more specifically the Vineyard Wind WDA, are not available because fixed gear fishermen who exclusively harvest these two species are not covered by VMS data. The current federal and state reporting requirements, along with expansive lobster harvesting effort management areas, are not sufficiently specific to determine the fishing locations and landings for lobster and Jonah crab from within the MA WEA. Nevertheless, the total value of lobster and Jonah crab landings in Rhode Island were $86,165,610 during the period 2011-2016. The annual value of these landings averaged over the same period was $14,360,935 of economic activity for the state of Rhode Island during this period. Rhode Island commercial vessel captains report that there are Rhode Island-based landings for this fixed gear fishery within the MA WEA. However, it is not possible to precisely quantify such landings within the Vineyard Wind WDA under the current federal and state reporting requirements for these two species or without confidential fishing vessel location and harvest data presently unavailable to the CRMC. However, the

Atlantic States Marine Fishery Council's 2015 Interstate Fishery Management Plan for Jonah Crab reports that Massachusetts and Rhode Island fishermen accounted for over 94% of all Jonah crabs commercially harvested in the U.S. during 2014, with MA landing 11.9 million pounds worth $9.3 million and RI landing 4.1 million pounds worth $3.1 million. The Jonah crab harvest occurs predominantly within federal waters. And, between 2012 and 2014, 71.5% of the combined Jonah crab landings from Massachusetts and Rhode Island came from NMFS statistical area 537 (ASMFC 2015), which includes the Vineyard Wind WDA. Thus, RI-based vessels harvested $2,216,500 of Jonah crabs from NMFS statistical area 537 in 2014. The Vineyard Wind COP does not report any landings for lobster or Jonah crab, thus it underestimates the value of the lobster and Jonah crab harvest from within the WDA.

A new economic analysis by the University of Rhode Island titled "The economic impact of Rhode Island's fisheries and seafood sector" (Sproul and Michaud, 2018) estimates the economic impact to all of Rhode Island for its commercial fisheries for 2016. Fisheries landings affect businesses from processors to service and supply providers to professional services and to retail seafood providers. The economic effects should be consistent across all years, but for ease of analysis this report looks at a single year 2016. Sproul provided a summary for determining the economic impact multipliers used for the analysis of the RI commercial fishing industry (Sproul 2018). He examined previous work using economic multipliers and determined that for ex-vessel revenues (i.e., catch sales landed at the dock) the output multiplier was 3.06 and that for each $1M of landed fish 31.14 jobs were created. The recent average annual value of the squid fishery during 2011-2016 from the Vineyard Wind lease area was $1,178,283 (Livermore, 2018). If the proposed wind turbine array prevents mobile gear vessels from fishing within the Vineyard Wind WDA it would potentially eliminate 37 jobs (using Sproul's job creation factor (31.14 jobs/$1M)) and reduce the Rhode Island annual landings economic impact by $3,652,677. And, this economic impact is just for the squid industry. As stated above collecting accurate economic data for some of the other commercial fisheries that occur within the Vineyard Wind lease area is challenging, but negative impact to fishing activity would be expressed throughout the seafood economy of Rhode Island. Moreover, the economic impact is significantly greater than the erroneous $348,450 reported by Vineyard Wind within their COP. Sproul and Michaud

(2108) report that the seafood industry generated $538.33 million of gross sales in 2016 in Rhode Island.

On January 14, 2019 the RIDEM DMF release its report titled "Rhode Island Fishing Value in the Vineyard Wind Construction and Operations Plan Area" that estimated the value of Rhode Island-based landings from the Vineyard Wind WDA over the 30-year life of the project to range from $30,531,599.84 to $35,611,702.85, which on an annual basis ranges from $1,017,720 to $ 1,187,057. See Appendix 19.

On January 15, 2019 Vineyard Wind provided a report to the CRMC and the FAB titled "Economic Exposure of Rhode Island Commercial Fisheries to the Vineyard Wind Project" prepared by Dennis M. King, Ph.D. The King report estimates that the average value of annual landings for Rhode Island-based vessels from the Vineyard Wind WDA is $431,834. See Table 7 of King report in Appendix 21.

A federal study just completed this past December 2018 titled "Fisheries Economics of the United States 2016" that was prepared by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Technical Memorandum NMFS-F/SPO-187) shows the significant value of the commercial fishing industry to the Rhode Island economy. The study reports that there are 2316 commercial harvester jobs in Rhode Island with $16,929,000 in sales, $48,839,000 in income generated and $76,197,000 in value added (contribution made to the gross domestic product) economic impact for the state. The total economic impact of the seafood industry in Rhode Island resulting from commercial harvesters, seafood processors and dealers, seafood wholesalers and distributors and retail sales without imports is 5193 jobs, $332,575,000 in sales, $120,271,000 in income and $168, 541,000 in value added. This is a grand total of $621,387,000 of economic impact from the commercial seafood industry for the state of Rhode Island (NOAA 2018). See: https://www.fisheries.noaa.gov/resource/document/fisheries-economics-united-states-report-2016. Needless to say, the Rhode Island-based commercial fishing industry is a very important segment contributing to the State's economy and overall community wellbeing.

G. Wind Farm Turbine Layout

As proposed in Vineyard Wind's COP, the proposed wind farm would consist of up to 106 (see Footnote 5) wind turbine generators arranged in a grid layout oriented in a northwest-southeast direction as shown in Figure 1, below. If 8 MW turbines are used, up to 106 WTGs will be installed; if 10 MW turbines are used, up to 88 WTGs will be installed. The average spacing between turbines is 1.6 km (0.86 nm). See Section 3.1.1.1 COP Vol. I at 3-5.

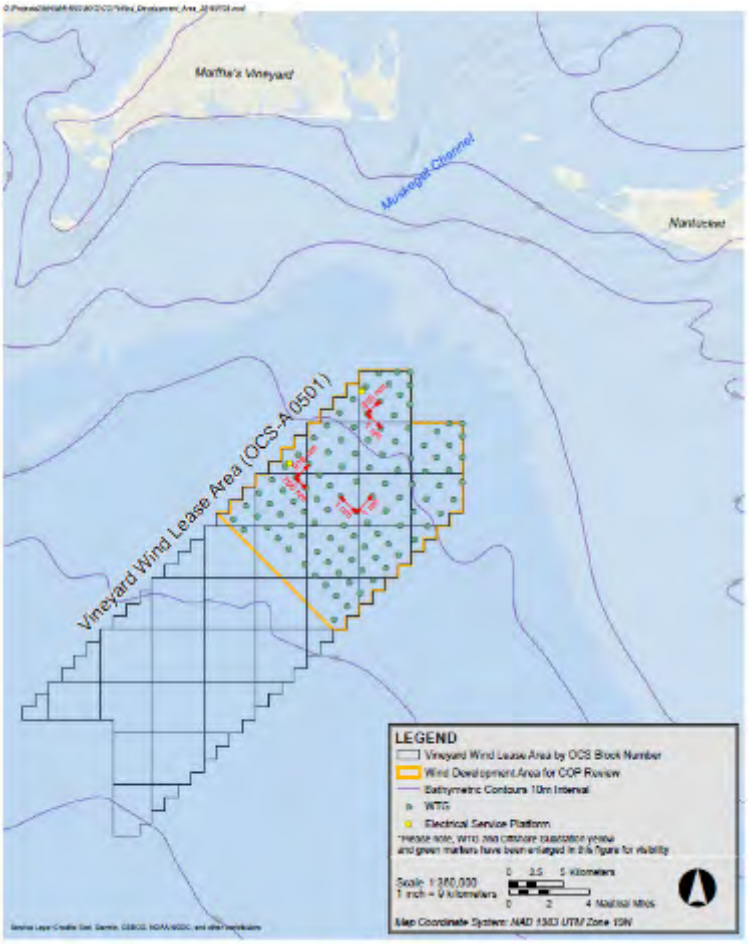

Figure 2: Vineyard Wind Lease Area and Wind Development Area with WTG layout. Source: Vineyard Wind COP Vol. 1, Fig. 3.1-2a.

Vineyard Wind's COP indicates the WTG layout was developed in 2017 following the completion of preliminary geophysical and geotechnical field work conducted within the WDA and export cable routes during the fall of 2016 and summer of 2017. However, Vineyard Wind was informed directly by commercial fishermen and provided proprietary commercial vessel tow

track data by The Town Dock (RI-based squid harvesting and processing company) in August 2017 that showed Rhode Island-based squid vessels towed primarily in an east-west direction within the Vineyard Wind lease area. Therefore, Vineyard Wind should have been aware in the summer of 2017, while it was conducting preliminary geotechnical work to establish the wind farm layout, that commercial fishing vessels were towing in an east-west direction within the lease area.

Vineyard wind states within its COP that "Vineyard Wind has completed two seasons of offshore field programs to identify, map, and document the geological, environmental, and biological characteristics of their Wind Development Area and Offshore Export Cable Corridor in state and federal waters south of Cape Cod and the islands. This document (Volume II-A and II-B) and associated data and charts present the findings of these studies and describe the physical conditions that exist on the surface and in the subsurface within the areas investigated. This information has been used to support the wide variety of assessments performed by the Vineyard Wind team to determine the suitability of conditions for positioning, designing, and constructing project components (WTGs, ESPs, cables)." See COP Vol. II-A at E-1. The extent of these field investigations are approximately 1,025 km of geophysical track line data, 20 geotechnical CPTs (cone penetrometer tests), 3 deep bore holes and 4 benthic grab samples.

In Appendix F of the COP, entitled 2017 "Interim Geotechnical Interpretive Report" (Wood Thilsted) provides a geotechnical assessment and engineering property analysis of the data collected during the first two seasons of data gathering. This report has a significant amount of proprietary materials contained within it, so in an abundance of caution the CRMC will only use conclusion statements with references to the location with the presumption that verification or additional data will be obtained by those with access to these data. The description of Figure 8 is CPT classification in accordance with Robertson 2010. The report states that the Robertson 2010 classification scheme provides an indication of the expected engineering behavior of the each unit based on in-situ measurements which are less affected by disturbance than laboratory tests on samples obtained from boreholes. The report states that "Figure 8 shows that the soils investigated on the site are all competent and suitable to support WTG foundations. Clays, clean sands and gravels are present along with some silty soils. It is noted that the capacity of the cones

may have limited the results in the sands and gravels and in fact the maximum capacity of the sands or gravels is higher than that recorded." See Appendix F of the COP.

The geological and geotechnical surveys conducted during the fall of 2016 and summer of 2017 were determined by Vineyard Wind to be sufficient to develop a wind farm layout and consistent enough for BOEM to accept a departure request from the requirements of boreholes at each location until after the COP was filed with BOEM in December 2017. Again, Vineyard Wind was made aware in the summer of 2017, while it was conducting the preliminary geotechnical surveys to establish the wind farm layout, that Rhode Island-based commercial fishing vessels were towing primarily in an east-west direction within the lease area. Accordingly, it seems reasonable that adjustments in the project layout could have been accomplished by Vineyard Wind in the spring of 2018 to achieve an east-west layout with 1 nm spacing as requested early in April 2018 by RI commercial fishermen and again by the CRMC in its July 2, 2018 three-month letter to Vineyard Wind.

Additional geotechnical work began in April 2018 with an estimated duration of 4 months based on the Notice to Mariners and Fishermen issued on April 26, 2018 (Appendix 3). The CRMC believes the geotechnical work referenced in the April 26, 2018 notice may have occurred at individual wind turbine generator locations since geotechnical information for individual WTG's is not available in Vineyard Wind's COP. However, Vineyard Wind indicated in several meetings with CRMC including the meeting of July 31, 2018 that geotechnical work had been **completed** for individual WTG locations. In making this claim Vineyard Wind provided no information, source or time frame for this geotechnical work, but stated during the July 31, 2018 meeting that this work had been completed at a cost of $15-20 million. Vineyard Wind further indicated that the cost of conducting additional geotechnical work prevented their pursuit of alternate WTG locations to develop an east-west orientation with 1 nm spacing proposed by the CRMC on behalf of affected Rhode Island-based commercial fishermen.

Vineyard Wind's draft COP dated July 23, 2018 only indicates that preliminary geotechnical investigations were conducted in November 2016 in the northern half of the site to: "…assist the client in preparing / confirming the layout of the wind farm as well as performing

preliminary design of the foundation system." Specifically, Volume II-B, Appendix N indicates that 20 seabed CPT (cone penetration test) and 3 deep boreholes were advanced as depicted on the location plan within Appendix N. In attempting to locate information to confirm whether individual foundation specific geotechnical data had been obtained, CRMC staff searched BOEM and Vineyard Wind's websites for this information. In conducting this search a Notice to Mariners was located on Vineyard Wind's website, which indicated additional geotechnical work began on April 16, 2018 with an estimated duration of 4 months (See: Notice to Mariners and Fishermen issued on April 26, 2018 contained in Appendix 3).

Importantly, Vineyard Wind had received a departure from BOEM in April 2018 to submit geological and geotechnical ("G&G") data for the turbine locations at a later date in 2018. Therefore, since the final G&G work had not yet been conducted, Vineyard Wind could have modified the turbine layout in an east-west orientation with 1 nm spacing after being alerted by Rhode Island commercial fishermen at the April 11, 2018 FAB meeting when fishermen objected to Vineyard Wind's proposed layout. Furthermore, Vineyard Wind has acknowledged the need for the east-west layout and they have pledged to construct future phases within its lease area in an east-west layout as requested by Rhode Island commercial fishermen.

A discussion of the timeframe concerning the advancement of WTG foundation specific geotechnical data is important to address CRMC's recommended alternative wind farm layout necessary to avoid significant adverse impacts to Rhode Island-based commercial fishermen. In fact, a review of chronological events (see Table 1) reveals that the CRMC and the FAB recommended an alternative east-west layout with 1 nm spacing before Vineyard Wind began conducting site specific individual WTG foundation geotechnical investigations beginning in April 2018. This fact is recently confirmed by Vineyard Wind's November 9, 2018 letter to CRMC which states, "Vineyard Wind submitted its COP to BOEM in December 2017 and on October 22, 2018 submitted the turbine and cable specific G&G Data and required analyses." See Vineyard Wind Nov. 9, 2018 letter to CRMC at 16 in Appendix 14.

To expound upon the chronology provided in Table 1 herein, the first time Vineyard Wind's WTG layout was provided for review by the CRMC and the FAB was at the April 11, 2018 FAB meeting, which was held just five (5) days after Vineyard Wind had filed its federal

consistency certification to the CRMC. At the April 11, 2018 FAB meeting RI-based commercial fishermen immediately objected to Vineyard Wind's WTG layout and made it clear that an east-west orientation with 1 nm spacing between turbines would be necessary to preserve most of the existing fishing activities conducted within Vineyard Wind's lease area. While Vineyard Wind is correct that they have previously attended meetings with the FAB and met with individual fishermen, Vineyard Wind only provided general information at the earlier FAB meetings and did not include a review or discussion of Vineyard Wind's WTG layout. Nevertheless, Town Dock (a RI-based commercial squid harvesting and processing business) provided proprietary information to Vineyard Wind in August 2017 on their squid vessel tracks within the Vineyard Wind lease area showing a predominant east-west trawl pattern.

At the FAB meeting of April 11, 2018 Vineyard Wind presented its WTG layout, and commercial fishermen immediately objected and began making the case that an east-west WTG layout with 1 nm spacing would be necessary to accommodate their continued fishing and navigation within the Vineyard Wind lease area. In fact, the CRMC's Ocean SAMP review process was set up specifically to accommodate this mutual type of review and discussion through the FAB as specific offshore renewable energy project designs and layouts began to develop. It should be clearly understood by all wind farm developers and CRMC's state and federal regulatory partners that commercial fishermen have not and will not disclose their proprietary information, except as necessary to meet fisheries management regulations until there is a specific project requiring mutual disclosures to further needed negotiations between renewable energy developers and commercial fishermen.

With regard to such disclosures, a review of the chronology in Table 1 indicates that RI-based commercial fishermen immediately and throughout the review process initiated by Vineyard Wind's consistency certification filing of April 6, 2018 provided their requested input and adamantly defended their position without waver for an east-west WTG layout with 1 nm spacing. The fishermen provided detailed proprietary information including vessel tracking information, locations of mobile and fixed gear usage, notice of a long time agreement between fixed and mobile gear fisheries competing for space within the WDA and other applicable

business information. And, as required by the CRMC's Ocean SAMP the CRMC utilized this information to support this important industry and Rhode Island coastal use.

The alternative east-west layout with 1 nm spacing issue was brought to the attention of our federal partners, most importantly BOEM, at every opportunity. Yet, throughout the CRMC consistency review process that began on April 6, 2018, Vineyard Wind collected geotechnical data from April through the summer of 2018 for a pre-determined WTG layout that conflicts with existing RI-based commercial fishing practices and results in significant adverse impacts to RI-based commercial fishermen. In fact, Vineyard repeatedly indicated without providing any supporting or confirmatory information that WTG G&G data had been collected at each turbine location at great expense, which in their view negated any ability to achieve an east-west WTG orientation with 1 nm spacing as requested by commercial fishermen to allow the two industries to coexist.

As confirmed by Vineyard Wind's November 9, 2018 filing, the G&G information had not yet been collected, and in fact the survey vessels were leaving port to begin collecting this highly specific information after the FAB informed Vineyard of the need for the east-west WTG orientation with 1 nm spacing. Furthermore, Vineyard had not secured a Power Purchase Agreement until July 31, 2018[12]. And, it is the CRMC's understanding that Vineyard Wind has yet to obtain the State of Massachusetts Department of Utilities (DPU) approval of their two separate 400 MW contracts as required by Massachusetts's State Law. It is noteworthy that neither of these facts were disclosed by Vineyard Wind until the November 9, 2018 filing with the CRMC. Rather, Vineyard Wind has claimed at all prior meetings with the CRMC since April 2018 that contract obligations, the cost of geotechnical data already obtained as well as federal investment tax credit deadlines and their ability to secure financing prevented the modification to the Project to achieve an east-west WTG orientation with 1 nm spacing necessary to meet the needs of RI based commercial fishermen and to mitigate for significant adverse impacts.

[12] See State of Massachusetts Supplemental Draft Environmental Impact Statement Certification dated October 12, 2018, Appendix L11

In considering the chronology of events, the CRMC must consider the policies of the Ocean SAMP, which require that in the case of project related impacts to natural resources or coastal uses, the applicant must first and foremost *avoid* impacts before mitigation can be considered. This principle of avoidance first then mitigation is consistent with most other State and Federal environmental review regulations and practices. It is not acceptable either by the policies of the Ocean SAMP or other environmental regulatory practices, including the National Environmental Policy Act EIS process, whereby proposed activities are "set in stone" upon filing with an agency without the ability to consider alternatives that avoid impacts. Additionally, it is not acceptable practice to propose mitigation and compensation without first *avoiding* and *minimizing* the impacts. In this regard, RI based fishermen are simply seeking the ability to continue their long established practices of participating in a controlled and properly managed harvest of ocean resources and maximizing sustainable yields, while minimizing the cost of doing business and minimizing safety risks. The RI proposed alternative layout of an east-west alignment with 1 nm spacing is a compromise position on behalf of the RI commercial fishing industry that will allow both the offshore renewable energy and commercial fishing industries to coexist. The CRMC is obligated through the Ocean SAMP and through its federal consistency review responsibility to support the RI based commercial fishing industry, which has been and will continue to be of particular and high importance to the State of Rhode Island, the State's economy and community wellbeing.

Vineyard Wind's COP states that "In consultation with local fishermen and the USCG, corridors in a northwest/southeast and northeast/southwest direction have been maintained." See Section 3.1.1.1 COP Vol. I, p. 3-5. Importantly, however, there were no discussions of the Project layout with the CRMC Fishermen's Advisory Board prior to the filing of Vineyard Wind's COP with BOEM on December 20, 2017. Rhode Island commercial fishermen met with BOEM on April 19, 2018 to express their concern that Vineyard Wind's WTG layout does not achieve an east-west orientation as necessary to protect most of their fishing activities in the area. Erich Stephens, Vineyard Wind's Chief Development Officer, indicated at the July 26, 2018 FAB meeting that the northwest-southeast wind farm layout was developed primarily based on input from the New Bedford-based scallop fishermen. These New Bedford based scallop vessels, however, only transit through the Vineyard Wind lease area and do not harvest scallops within

the Vineyard Wind lease area. Thus, the WTG layout was based primarily on the input from Massachusetts-based commercial fishermen who only transit through the area rather than input from Rhode Island-based commercial fishermen who actually fish within the Vineyard Wind lease area.

For no apparent reason Vineyard Wind committed itself to the WTG site layout proposed in the COP without prior consultation with affected Rhode Island-based commercial fishermen represented by the CRMC's Fishermen's Advisory Board as required by Rhode Island's enforceable policies. To the extent that Vineyard Wind professes hardship in having to align the WTGs in an east-west orientation with 1 nm spacing to accommodate most of the existing Rhode Island commercial fishing operations, the hardship is purely of Vineyard Wind's own making.

As noted above in Section D above, extensive discussions regarding WTG layout have continued between the CRMC, Rhode Island-based commercial fishermen and Vineyard Wind since the April 11, 2018 FAB meeting. During this period two other wind developers that have secured BOEM leases, Deepwater Wind (OCS-A 0486 and 0487) and Bay State Wind (OCS-A 0500), have been listening to the Rhode Island-based fishermen concerns and have responded by committing to an east-west orientation for their proposed wind farm project layouts. This commitment serves to address the concerns of the Rhode Island commercial fishing industry by accommodating existing, well established commercial fishing practices and by supporting safe navigation throughout the entire southern New England wind energy area. The CRMC included a proposed alternative east-west orientation of the Vineyard Wind Project, as shown in Figure 3 below and prepared on behalf of the Commercial Fisheries Center of Rhode Island (CFCRI), within the CRMC's three-month consistency review status letter issued to Vineyard Wind on July 2, 2018. See Appendix 5. Additionally the CRMC's provided the proposed alternative to BOEM in an August 8, 2018 letter regarding alternatives for the DEIS and in an email from CRMC Executive Director Grover Fugate to BOEM on September 27, 2018 (see Appendix 8). These alternative design and layout measures for a wind farm are:

1. East-West orientation of all wind turbines and electric service platforms;

2. A minimum spacing of one (1) nautical mile between all wind turbines and electric service platforms with all horizontal and vertical lanes between turbines having a minimum of 1 nm spacing; and
3. A two (2) nautical mile wide navigational transit corridor with location to be determined by the U.S. Coast Guard for consistency with other offshore wind energy projects.

These design elements are supported by a majority of the Rhode Island-based commercial fishermen. And, the Responsible Offshore Development Alliance supports the CRMC proposed alternative to minimize adverse impacts to commercial fishermen. See Appendix 17. Furthermore, BOEM acknowledges the advantages of this alternative, referenced as Alternative D2 within BOEM's DEIS for the Vineyard Wind project, by stating that this proposed alternative would result in an "improvement in access to fishing locations and the ability of vessels to deploy mobile and fixed fishing gear given the east-west orientation and increased spacing between the WTGs". See BEOEM DEIS at 3-189.

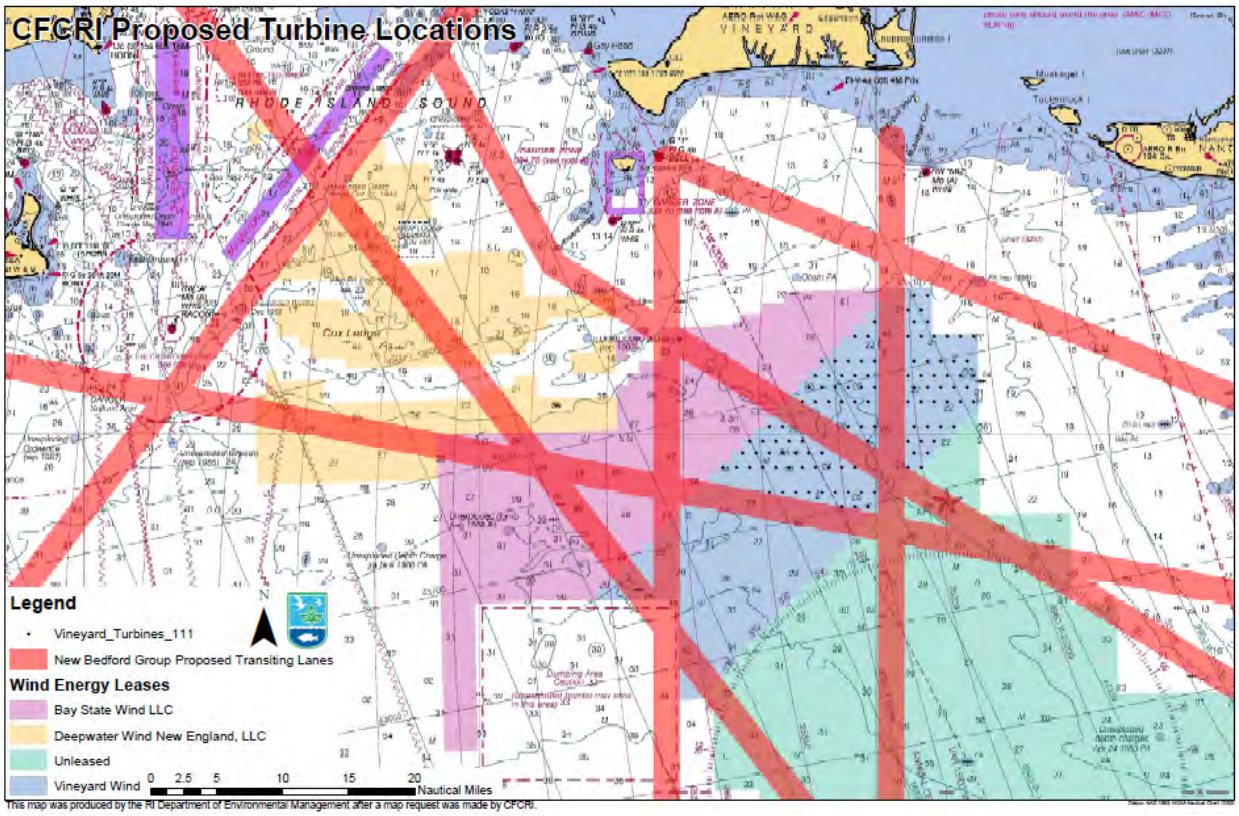

Figure 3: Alternative layout of Vineyard Wind Project (blue-shaded area showing 111 WTGs) showing East-West alignment proposed by the Commercial Fisheries Center of Rhode Island to accommodate existing Rhode Island-based mobile and fixed gear commercial fishing operations. The red shaded lanes are potential 2 nm wide transit corridors. Source: CFCRI and RIDEM (June 14, 2018).

During the October 9, 2018 meeting between CRMC and Vineyard Wind, Vineyard Wind provided a revised proposed layout in an attempt to address the WTG layout and spacing concerns raised by RI-based commercial fishermen. The proposed modification would remove 12 turbine locations (six (6) turbines were already identified by Vineyard Wind as sacrificial) within the southern portion of their WDA leaving 94 WTGs to meet the 800MW need and purpose of the Project. Vineyard Wind also indicated that future phases of development within their lease block could be oriented in an east-west alignment to address commercial fishing concerns and to be consistent with the east-west orientation recently proposed and committed to by other offshore wind energy developers Deepwater Wind and Bay State Wind on adjacent BOEM lease blocks.

CRMC proposed phased approach to developing the Project

Although there is a pending docket with the Massachusetts Department of Public Utilities, Vineyard Wind has not yet secured an approved a contract as required by Massachusetts state law, Section 83C of Chapter 169 of the Acts of 2008, as amended by Chapter 188 of the Acts of 2016. Vineyard Wind has a Power Purchase Agreement ("PPA") with multiple electric distribution companies ("EDCs") in Massachusetts for a combined total of 800MW of offshore wind generation power. The PPA requires that Vineyard Wind deliver the first 400MW (Phase 1) to the electric grid by January 15, 2022 and the second 400MW (Phase 2) by January 15, 2023. See https://macleanenergy.files.wordpress.com/2018/08/doer-83c-filing-letter-dpu-18-76-18-77-18-78august-1-2018.pdf.

Vineyard Wind has repeatedly indicated to the CRMC that they need to meet power contract obligations (timing wise) that Vineyard Wind has not yet secured. And, the geotechnical and geophysical (G&G) work at individual turbine locations was "ongoing" during the July 24 and August 8, 2018 meetings between Vineyard Wind and the CRMC to discuss wind farm layout alternatives rather than "completed" as alleged by Vineyard Wind. In fact, the EDCs only filed their long-term contract with the Massachusetts Department of Public Utilities on July 31, 2018, after the CRMC informed Vineyard Wind in its July 2, 2018 letter that significant wind farm layout changes may be necessary to meet enforceable policies. Yet, Vineyard Wind kept indicating they could not deviate from their schedule due to "contract obligations" and financing issues. As it turns out, Vineyard Wind is concerned about the expiration of the federal investment tax credit ("ITC"), and they have continually indicated that they must start construction before December 31, 2019 in order to be eligible for the 12% ITC on the construction costs. However, in accordance with Internal Revenue Service ("IRS") rules, Vineyard Wind also has the option of meeting the "safe harbor" requirements of the IRS rules by purchasing equipment constituting at least 5% of the qualifying cost of a project by December 31, 2019 and take delivery of the equipment shortly thereafter. See Vineyard Wind 01/14/2019 letter to Massachusetts Department of Energy Resources (Appendix 20).

The CRMC had suggested to both BOEM and Vineyard Wind during the November 1, 2018 meeting in Providence, RI that a phased approach to developing the Project could be

possible in an effort to realign the Project in east-west rows with 1 nm spacing by installing a portion of wind turbine in their present location using the geotechnical data already collected by Vineyard Wind. The phased approach would aid in keeping Vineyard Wind on schedule to begin construction in late 2019. Figure 7 below shows the analysis of so-called salvaged turbines using current COP locations that would allow Vineyard Wind to proceed with construction of 25 or more turbines that meet the CRMC preferred alternative described above following BOEM's approval of the COP. Vineyard Wind would then simultaneously install these salvaged turbines and pursue any geotechnical and geophysical studies necessary for the remainder of the needed turbines to meet the 800MW objective.

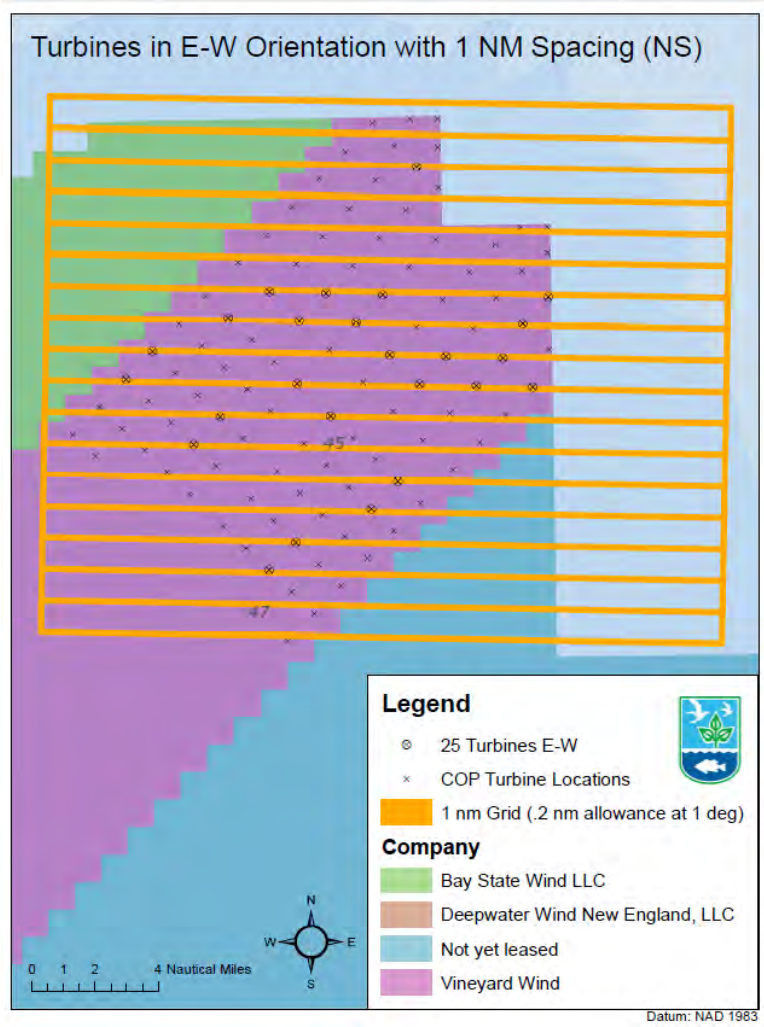

Figure 7. Salvaged turbine locations. Graphic provided by RIDEM (10/26/18)

H. Importance of East-West Turbine Layout with 1 Nautical Mile Spacing to Minimize Adverse Impacts to Rhode Island-based Commercial Fishermen

The Rhode Island-based commercial fisheries that operate off the southern New England coast and throughout the WEA are of two categories, mobile gear and fixed gear. Mobile gear fishing vessels deploy gear (trawl net) that is towed behind the vessel, and the bottom trawl net is typically 1,000 feet behind the boat when being towed. The net is spread open by trawl doors (otter boards), heavy wood and/or steel devices weighing 1,500 to 2,000 pounds each that drag along the sea bottom to keep the net open to the optimal operating configuration. The trawl doors maintain the width of the gear up to 300 feet, and the net is closed at its far end where the fish are captured for hauling onto the vessel at the end of a trawl. Fixed gear fisheries utilize gillnets or traps on the sea bottom, which are marked by buoys on the sea surface. Current fixed gear configurations may be up to 1.25 nautical miles in length.

Certain commercially harvested species must be fished by working a seam on the bottom that is based on depth, bait/prey, bottom temperature, and bottom composition. Historically, this operational method has been conducted by fishing along depth contours, which generally run east-west within the RI and MA WEAs with a transition to NW-SE in a portion of the MA WEA. The mobile gear trawl track lines follow the squid as they move south through the season into the Vineyard Wind lease area and into deeper water.

The squid fishing fleet that operates south of Martha's Vineyard and Nantucket is comprised of vessels from several states including 30 to 40 Rhode Island-based vessels. Multiple vessels often tow side by side or in opposing directions, and also may reverse course to repeat a successful tow back over itself in the opposite direction. Vessel captains concentrate on fish marks on the sounder to tow over and maximize their harvest while avoiding other vessels. They rely on their existing chart plotter tracks and the established common pattern of east-west towing to miss obstructions and fixed gear.

A complicating factor for mobile gear fishermen is the existence of numerous "hangs" (snags on bottom) that can damage the net and put tremendous loads on the tow lines. Snagged fishing gear can result in trawl doors slamming into the side of a vessel, or parting of a tow

cable, or both, creating great risk of serious or fatal injury to crew on deck. Vessel captains rely on existing and past vessel chart plotter tracks that are in an east-west direction to locate and avoid hangs by navigating around them.

Fixed gear fishermen set gill nets or lines of traps for lobster and Jonah crab. The gill nets or trap lines range in length from 0.5 nm to 1.25 nm. Traps are harvested by the vessel hauling them up one trap at a time as the vessel travels along the trap line. The traps are hauled, emptied and reset, dropping back to the sea bottom as the fishing vessel moves from one line of traps to the next.

Fixed and mobile gear fisheries are inherently in conflict when they fish the same waters. If a mobile gear vessel trawls across a trap line its net will snag and be fouled by the traps, and the traps will be lost or destroyed. The traps can have the same effect as "hangs," risking equipment damage and crew injury.

For the last couple decades mobile and fixed gear commercial fishing vessels have fished the offshore waters including the WEA using a practice and protocol that accommodates both gear types. Fixed gear vessels set their trap lines along the same east-west corridors that are trawled by mobile gear fishermen. As explained in the Commercial Fisheries Center of Rhode Island affidavit and rationale for an east-west layout for wind energy areas (see Appendix 9), Rhode Island-based commercial fishing vessels have been towing mobile gear and setting fixed gear using Loran C coordinates[13] that are in an east-west direction. Fixed gear operations set gear on the 0 and 5 lines (i.e., 43900, 43905, 43910, etc.) and mobile gear vessels tow their gear between these numbers to avoid snagging any fixed gear. With the phasing out of Loran C navigation systems the commercial fishing industry has relied upon Wind Plot, which is a commercial fishing software program that converts Loran C coordinates to latitude and longitude coordinates on GPS chart plotter navigation systems. Figure 4 is a graphic depicting multiple squid fishing vessel tracks, which shows that the predominant direction of vessel trawls within the MA WEA is in an east-west direction.

[13] Loran C radio navigational signal systems in the U.S. were shut down in 2010.

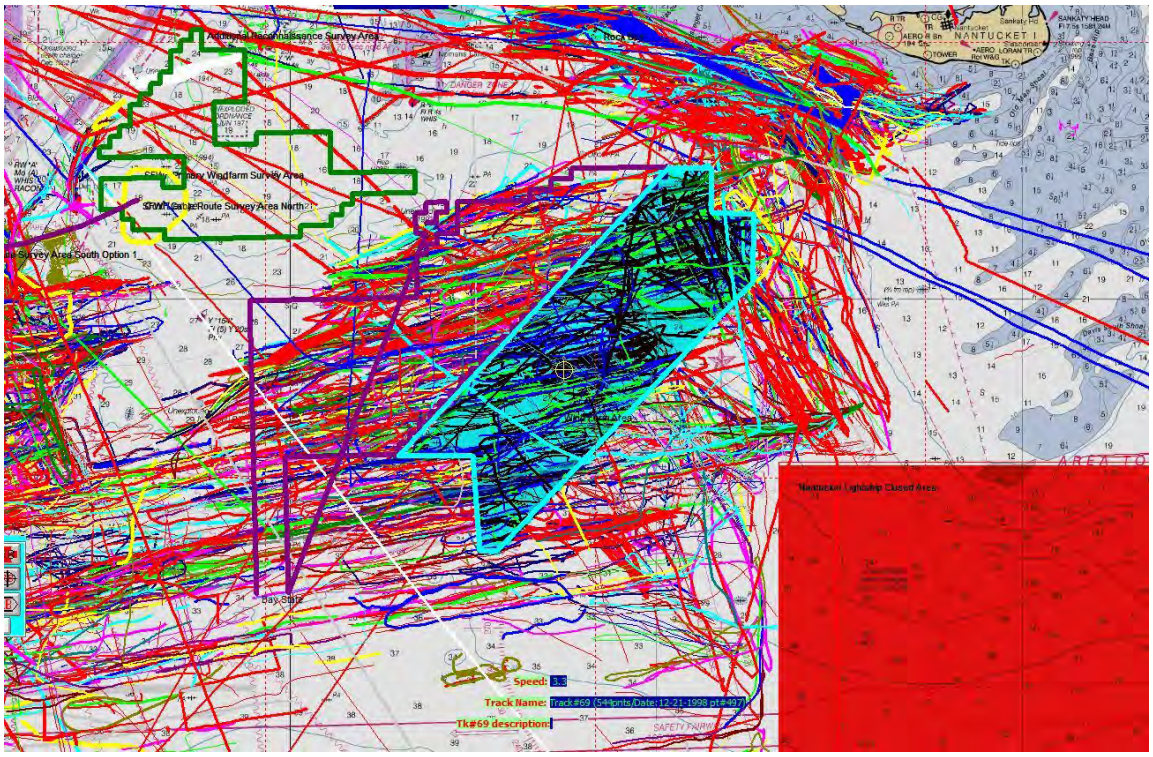

Figure 4. Rhode Island-based commercial squid fishing vessel towing tracks showing a predominantly east-west track lines within the MA WEA and the Vineyard Wind WDA (BOEM Lease Block OCS-A 0501) represented by the light blue outlined and shaded rectangular area. Graphic provided by The Town Dock, Narragansett, RI (04/26/2018).

Using the Loran C 0s and 5s coordinates provides for mobile gear trawling lanes of approximately 0.5 nm wide with the fixed gear creating the northern and southern lane boundaries. Loran C lines were slightly curved, thus the distance between coordinate lines is not constant and often are greater than 0.5 nm. A typical mobile gear fishing trawl begins southeast of the Galilee port, and heads east along the selected Loran C line. A trawl will proceed east for up to 15 nautical miles, through the WEA, at vessel speed of approximately 3.5 knots. The length and breadth of the net, and the effect of wind, current, and tides greatly restrict vessel maneuverability. Fishing vessel captains work carefully to coordinate their movement with other vessels fishing in the same area. Safe navigation, especially in inclement weather and at night, is a full-time challenge.

Lanes of 0.5 nm width are workable in the present environment in which there are no fixed obstructions in the waters. The presence of wind turbine foundations would significantly

restrict navigability, and requires a greater separation between fixed gear trap lines. The minimum lane width needed in an environment of up to 100 WTGs is 1.0 nm. The depiction in Figure 5 below graphically represents the compromise alternative wind turbine and row spacing layout to accommodate existing commercial fishing practices.

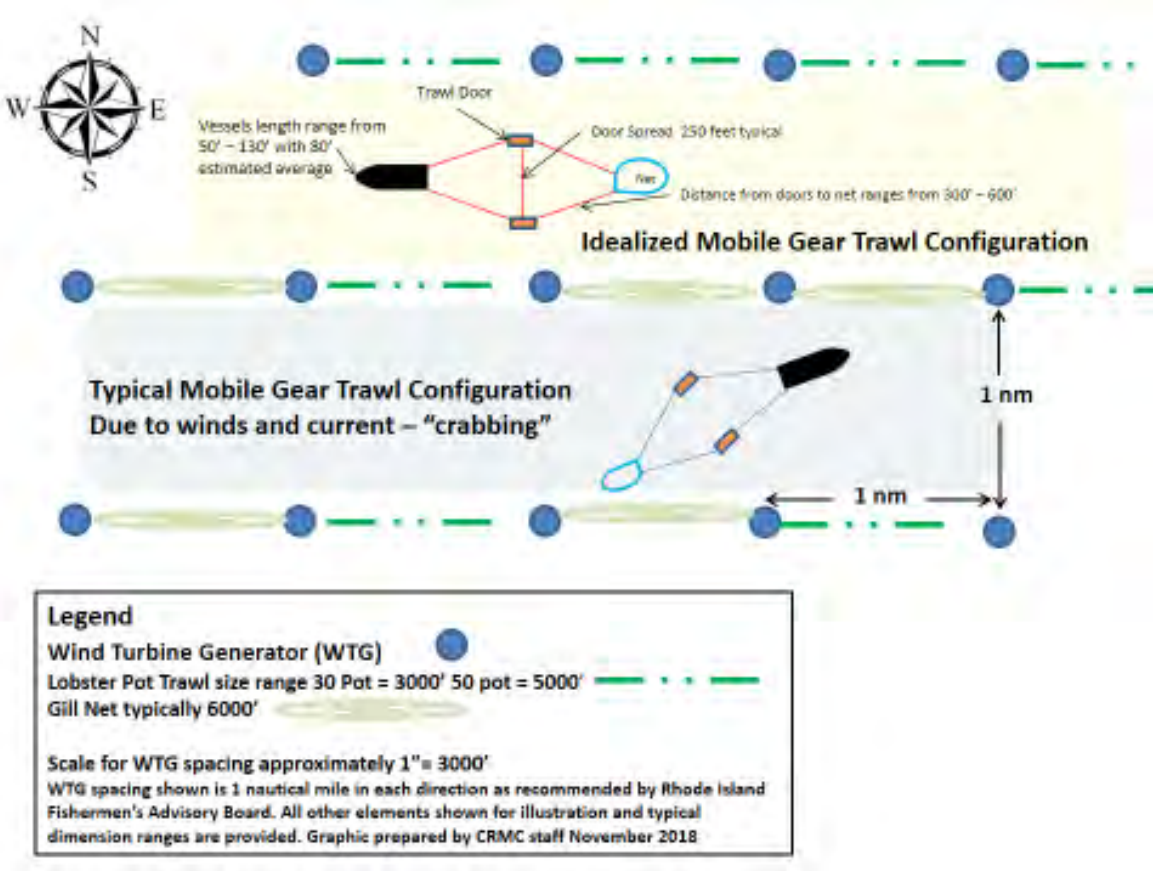

Figure 5. Depiction of WDA commercial fishing operations in idealized or fair weather conditions (top) versus adverse storm conditions or strong wind and tide (bottom). Graphic prepared by CRMC staff.

While it is far from ideal in their view, Rhode Island commercial fishermen proposed that Vineyard Wind adopt a modification of its WTG layout with an east-west orientation with 1 nm spacing that the fishermen believe they could work with to avoid having the entire Vineyard Wind WDA, and perhaps all of the MA WEA if the proposed Vineyard Wind project establishes precedent, becoming an exclusion zone for most commercial fishing operations. The RI-proposed alternative is an acceptable compromise layout for the WTGs to be located in a grid

oriented east-west with a minimum spacing of 1.0 nm between WTGs and rows of wind turbines. This would permit the fixed gear fishermen to place their gill nets and traps on east-west lines in between the WTGs foundations, leaving 1.0 nm wide lanes for mobile gear fishing vessels to trawl. The importance of 1.0 nm spacing between turbines, besides navigational safety and fishing access, is to provide a consistent spacing for fixed gear modifications necessary to work between the turbine foundations. BOEM acknowledges within their DEIS for the Vineyard Wind project that the CRMC proposed alternative, known as Alternative D2, would result in an "improvement in access to fishing locations and the ability of vessels to deploy mobile and fixed fishing gear given the east-west orientation and increased spacing between the WTGs". See BOEM DEIS at 3-189. In addition, the Rhode Island Marine Fisheries Council filed recommendation letter dated October 12, 2018 with CRMC in support of an east-west alignment with 1 nm spacing for all wind farms in southern NE waters. See Appendix 10.

Vineyard Wind is unique in its refusal accommodate commercial fishermen and modify its current project layout to allow coexistence with existing historic marine activities. Following outreach and communications with Rhode Island-based commercial fishermen, Deepwater Wind and Bay State Wind (both companies are now operating as Ørsted U.S. Offshore Wind[14]) have committed to developing their proposed wind farms in an east-west layout to accommodate the current commercial fishing practices within the wind energy area of southern New England. Deepwater Wind filed its COP for the South Fork Wind Farm ("SFWF") with BOEM on June 29, 2018 and. The SFWF project was assigned docket BOEM-2018-0010 and BOEM issued a Notice of Intent on November 19, 2018 to prepare an Environmental Impact Statement for the review of a COP that would allow Deepwater Wind to construct and operate up to 15 turbines within BOEM Lease Area OCS-A 0486. As noted in Figure 6 below the SFWF WTGs will be spaced at least 0.8 miles apart and in an approximate east-west/north-south grid layout, to maintain navigability for fishing vessels and existing commercial fishing activity. See SFWF COP Section 4.6.5.3 at 4-370. Deepwater Wind filed a consistency certification with the CRMC on October 22, 2018 and the SFWF project is currently under CRMC review.

[14] On October 8, 2018 Ørsted announced that it had entered into an agreement with the D.E. Shaw Group to acquire a 100% equity interest in Rhode Island-based Deepwater Wind.

Bay State Wind announced on August 1, 2018 that it was redesigning its Phase 1 project for approximately 110 WTGs located within BOEM Lease Area OCS-A 0500 to be oriented in an east-west grid pattern to address commercial fishing industry needs and allow the two industries to coexist. Bay State Wind's proposed layout is shown in Figure 7 below and will be included within its COP, which Bay State Wind plans to file with BOEM in 2019. The Bay State Wind project abuts the western border of the Vineyard Wind WDA.

Notwithstanding any proposed east-west alternative wind farm layout modifications, the Rhode Island-based commercial fishermen will still have to adapt their operational aspects and modify historic fishing practices and fixed gear to be able to continue harvesting fish and crustaceans within the proposed wind farms (i.e., Vineyard Wind and all other wind energy developers in southern New England offshore waters). The E-W turbine grid layout with 1 nm spacing does not replicate and preserve historic practices, but rather it represents a **compromise** by Rhode Island-based commercial fishermen to allow continued fishing by both fixed and mobile gear fishermen within a wind farm along with the development of the nascent offshore wind industry in a manner that both industries can coexist.

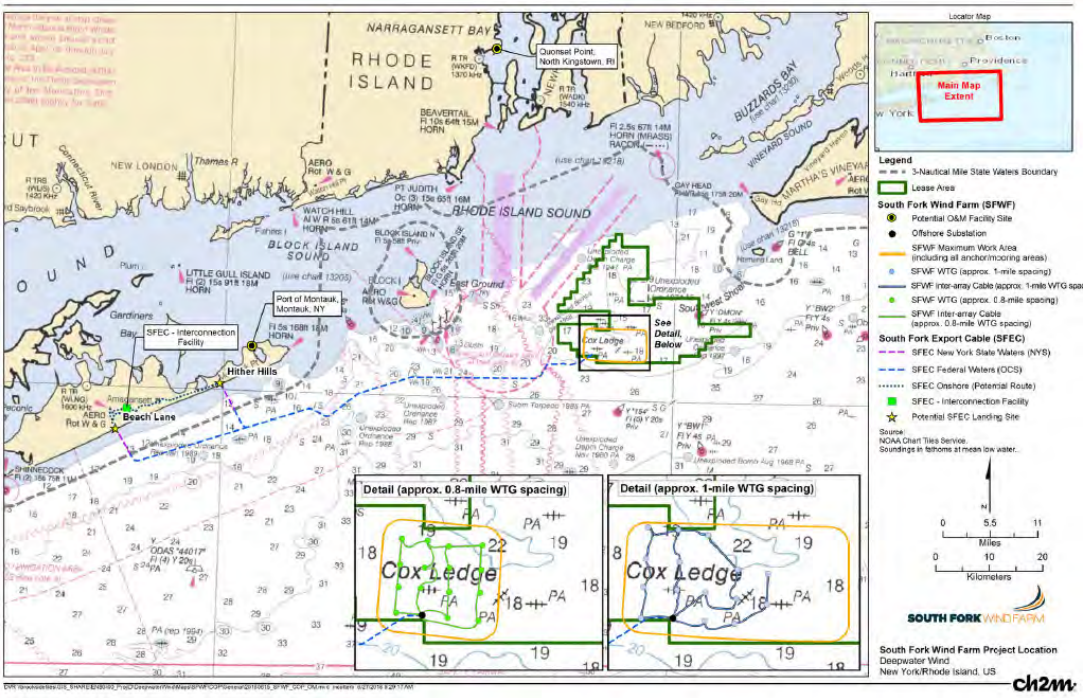

Figure 6. Deepwater Wind SFWF depicting 2 layout options using an east-west WTG layout. Source: Deepwater Wind SFWF COP, Section 1 at 1-25.

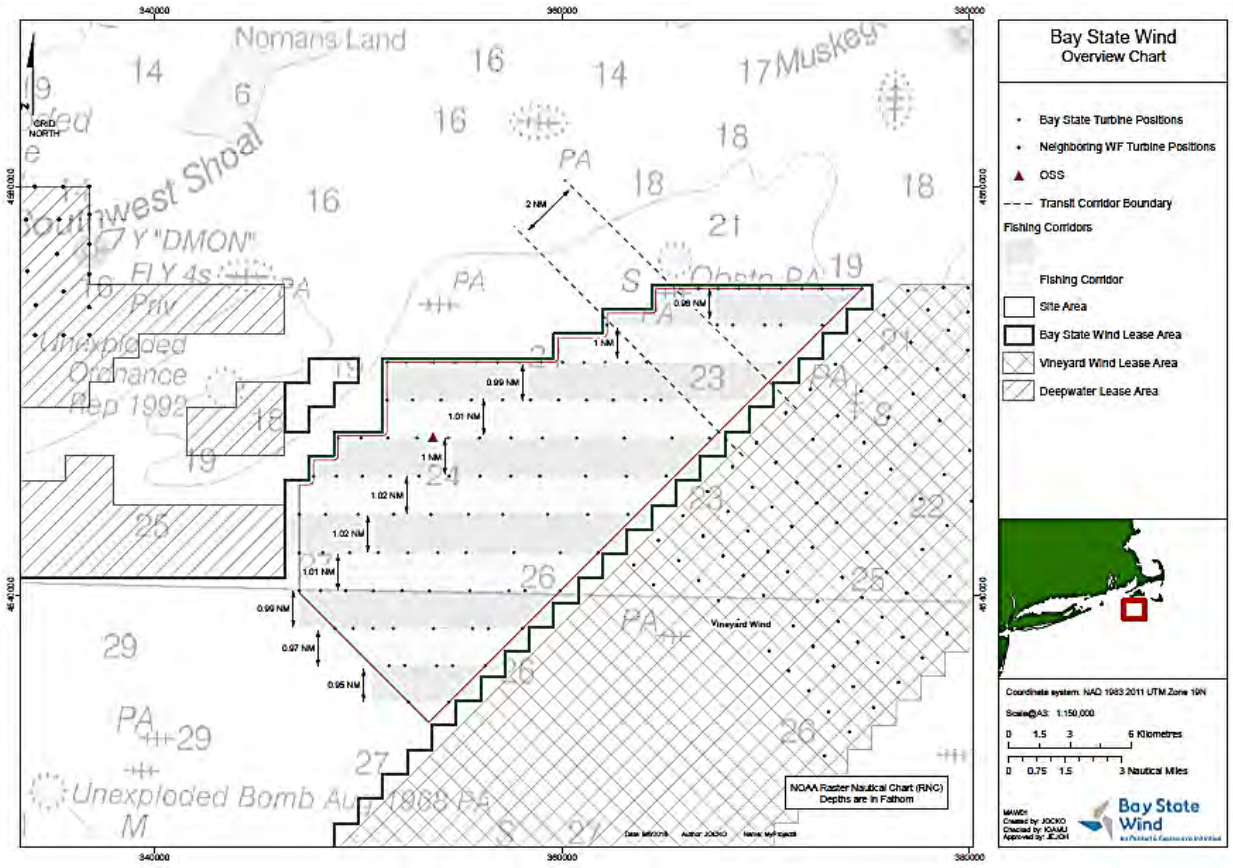

Figure 7. Proposed Bay State Wind project layout with East-West orientation of WTG rows with average spacing of 1 nm wide rows. Note that Vineyard Wind's WTG layout results in obstructions to mariners traversing west to east (and vice versa) into the Vineyard Wind turbine array. Source: Bay State Wind

With strategic and thoughtful planning and with engagement of the Rhode Island-based commercial fishing community, and by showing proposed WTG layouts to commercial fishermen before expending significant effort on geotechnical and geophysical studies, it is certainly possible that the offshore wind industry can design and develop renewable wind energy projects that minimize impacts and accommodate most commercial fishing operation needs to allow both industries to coexist. It is extremely unfortunate that Vineyard Wind failed to show a proposed layout of their 800 MW project to the Rhode Island-based commercial fishing community until 4 months after Vineyard Wind filed its COP with BOEM. Vineyard Wind further failed in its obligation to engage Rhode Island-based commercial fishermen in a discussion of project layout that accommodates commercial fishing operations within the Vineyard Wind WDA until after Vineyard Wind filed its COP.

As a result of this analysis CRMC staff find that offshore wind farms should be developed in a grid pattern with east-west orientation of rows and 1 nm spacing between all turbines and turbine rows as depicted in Figure 5 above, and as described in Alternatives D1 and D2 of BOEM's DEIS, in order to avoid significant adverse impacts to Rhode Island commercial fishing operations and be consistent the CRMC's enforceable polices.

I. Review of State Enforceable Policies

Enforceable policies are defined within the federal regulations as "State policies which are legally binding through constitutional provisions, laws, regulations, land use plans, ordinances, or judicial or administrative decisions, by which a State exerts control over private and public land and water uses and natural resources in the coastal zone." See 15 CFR § 930.11(h). The regulation further describes that an enforceable policy "shall contain standards of sufficient specificity to guide public and private uses." *Ibid*. The CRMC's enforceable policies for purposes of offshore development as approved by NOAA Office of Coastal Management are contained within Chapter 11 of the CRMC's Ocean SAMP (650-RICR-20-05-11). Proposed activities subject to federal consistency review for federal licenses or permits must be fully consistent with enforceable policies of the approved state management program. See 15 CFR §§ 930.57(a) and 930.76(c).

As part of it consistency certification filed with the CRMC on April 6, 2018, Vineyard Wind included Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island, which was a general review of some, but not all, Rhode Island enforceable policies applicable to the Project. The CRMC noted in its June 13, 2018 memo and the July 2, 2018 three-month letter to Vineyard Wind that it was necessary to provide clear and convincing evidence to demonstrate how the proposed Project will be consistent with Rhode Island coastal management program enforceable policies.

On November 9, 2018 Vineyard Wind provided to the CRMC a revised COP dated October 22, 2018 that included an updated consistency statement for the Vineyard Wind project within Appendix III-P. The CRMC has reviewed Vineyard Wind's responses within the Addendum to Table 3-1 CZMA consistency certification Rhode Island enforceable policies, and

we have included a CRMC response within the table indicating whether a Vineyard Wind response was accurate in regard to consistency with specific enforceable polices. See Appendix 24.

1. Applicable State coastal management program enforceable policies of the CRMC's Ocean Special Area Management Plan (650-RICR-20-05-11)

§ 11.10.1(C) (formerly § 1160.1.3)

Offshore developments shall not have a significant adverse impact on the natural resources or existing human uses of the Rhode Island coastal zone, as described in the Ocean SAMP. In making the evaluation of the effect on human uses, the Council will determine, for example, if there is an overall net benefit to the Rhode Island marine economic sector from the development of the project or if there is an overall net loss. Where the Council determines that impacts on the natural resources or human uses of the Rhode Island coastal zone through the pre-construction, construction, operation, or decommissioning phases of a project constitute significant adverse effects not previously evaluated, the Council shall, through its permitting and enforcement authorities in state waters and through any subsequent CZMA federal consistency reviews, ***require that the applicant modify the proposal to avoid and/or mitigate the impacts or the Council shall deny the proposal****.* (Emphasis added.)

Findings:

Vineyard Wind has steadfastly adhered to their original project layout with wind turbines oriented northwest-southeast and average spacing between turbines of 0.86 nm. As Vineyard Wind described at the July 26, 2018 FAB meeting, their wind farm layout was developed based primarily on consultation with New Bedford scallop fishermen who do not even harvest scallops in Vineyard Wind's lease area. Despite recent attempts by Vineyard Wind to redesign the project layout by using a larger 9.5MW turbine design, thus reducing the overall number of needed turbines from 100 to 84 to achieve the designed 800 MW output, the remaining proposed turbines are still oriented northwest-southeast and the spacing between turbines is still less than 1 nm. Rhode Island commercial fishermen developed a compromise alternative project layout of east-west orientation with minimum 1 nm spacing between turbines and turbine rows that would

allow continued harvesting by most commercial fishing operations, with modifications and adjustments to fishing gear, within the Vineyard Wind lease area. The alternative wind farm layout as presented by the CRMC in its July 2, 2018 3-month letter to Vineyard Wind (see Appendix 5) could allow most Rhode Island-based commercial fishing vessels, with modifications to gear and operations, and the offshore wind industry to coexist.

Vineyard Wind in its November 9, 2018 filing with the CRMC states that "the Project will not have significant adverse or long-term impacts on Rhode Island fishermen." See Vineyard Wind November 9, 2018 letter to CRMC at 7 (Appendix 14). Vineyard Wind claims that due to the cumulative and positive impact of five factors that there will be no significant adverse or long-term impacts. Each of Vineyard Wind's five factors are listed below with CRMC's rebuttal:

1. Adoption of the largest commercially available turbine reduces the area of the WDA where turbines cannot be aligned east-west by approximately 22 to 24% depending upon the option chosen, and represents approximately 6% of the total MA/RI areas designated for wind development;

CRMC: While the percentages Vineyard Wind reports for reduced area may be correct, the fact of the matter is that there will still be 84 or more wind turbines occupying approximately 90 square miles located within an important commercial fishing area that will disrupt and in some cases exclude commercial fishing operations for the 30-year life of the project. Therefore, without mitigation the project will have long-term (more than two seasons) significant adverse impacts on the RI-based commercial fishing fleet that has historically operated within the Vineyard Wind lease area.

2. Regardless of row orientation, fishermen may still fish in any area where the turbines are located;

CRMC: Row orientation in an east-west direction with a minimum 1 nm spacing is critical to minimize impacts and to allow the continued operation, with adjustments and modifications to gear, of Rhode Island-based commercial fishing vessels within the WDA. While some mobile gear vessels may be able to work within Vineyard Wind's proposed turbine array, it will exclude most fixed gear fishermen and many other mobile

gear vessels averse to risk resulting from working within such an array, due to operational and navigation safety issues. Turbine row orientation as proposed by Vineyard Wind in a northwest-southeast direction will contradict the east-west orientation for turbine layouts now proposed by other wind developers on adjacent lease areas. Vineyard Wind itself has acknowledged the need for an east-west orientation of rows, which is an admission against interest. In other words, Vineyard Wind concedes the need of Rhode Island-based commercial fishermen for an east-west layout with 1 nm spacing to minimize adverse impacts on commercial fishermen. Further, Vineyard Wind has affirmed that it will orient all future turbine installations within its lease in an east-west layout pursuant to Vineyard Wind's November 9, 2018 letter to CRMC at 5 (Appendix 14) and Vineyard Wind's October 29, 2018 filing with the State of Rhode Island in response to a renewable energy Request For Proposal (See: https://ricleanenergyrfp.files.wordpress.com/2018/11/vineyard-wind-vineyard-wind-rhode-island-11-14-18.zip). However, despite this admission Vineyard Wind will not modify the Project layout in a manner that minimizes adverse impacts and comports with their promise to commercial fishermen for future phase layouts.

3. Adoption of the Consensus Corridor Plan, which is supported by Rhode Island fishermen, will provide fishing vessels safe and efficient means to transit through the WEAs, thereby reducing the amount of time at sea and any associated costs;

CRMC: Actually, not all Rhode Island fishermen are supportive of the so-called "consensus corridor plan," especially the squid harvesting/processor operations that have requested a 4 nm transit corridor through the wind energy areas. Moreover, it appears that Vineyard Wind supports the current transit plan because none of the proposed transit corridors impact any of the currently proposed turbines, regardless of turbine size, within the Vineyard Wind WDA.

4. Vineyard Wind's commitment to compensatory mitigation during the operation of the project, the details of which will [be] developed in consultation with fishermen;

CRMC: Vineyard Wind provided a mitigation package to the CRMC and its Fisheries Advisory Board on January 16, 2019, which was seven (7) weeks after Vineyard Wind was directed by the Council on November 27, 2018 to negotiate with the FAB and

provide weekly progress reports. Within that seven weeks Vineyard Wind did not consult with the FAB, nor was there any mitigation negotiations with the FAB. Vineyard Wind did not provide any proposed mitigation despite the FAB meetings of January 3 and 15, 2019. Based on Vineyard Wind's January 16, 2019 proposal, it appears that Vineyard Wind does not fully understand the magnitude of the necessary mitigation/compensation to Rhode Island-based fishermen for the operational life of the Project. Nevertheless, Vineyard Wind provided a final revised proposal to the CRMC and the FAB on February 15, 2019, and the FAB voted on February 23, 2019 to accept the mitigation proposal.

5. Offshore construction activities will only occupy a specific area for limited period of times, and therefore will not preclude fishing activities in and around the area for long periods of time. Any residual impacts to fishermen will be mitigated through a construction period compensatory mitigation plan.

CRMC: Based on Vineyard Wind's November 9, 2018 filing with CRMC using the large 9.5MW turbine alternative the construction activities will occupy a specific area of between 89.6 to 94.2 square miles. See Appendix 14. Vineyard Wind calculates within their COP that construction activities will occur over 18-24 months, barring unforeseen construction delays due to adverse weather and other circumstances. However, some FAB members and other fishing vessels captains have stated emphatically at FAB meetings that the Vineyard Wind project will result in the exclusion of some vessels from the Project area for the 30 year life of the project. Some Rhode Island fishing vessels captains will not accept the navigational hazards and safety risks to vessels, crew or equipment posed by Vineyard Wind's inadequate layout and spacing between turbines within the WDA. While an east-west orientation of turbines with 1 nm spacing between turbine rows will help to minimize some adverse impacts, many commercial fishing operations will be excluded from the WDA for the 30-year life of the Project. Thus, some commercial fishing operations will be excluded from the Project area for more than two seasons resulting in a significant adverse impact to Rhode Island coastal uses.

Therefore, Vineyard Wind's five assertions above are incorrect, and without mitigation the proposed activity will have significant adverse, long-term impacts on Rhode Island commercial fishermen. As detailed herein, Vineyard Wind has created its own hardship by

failing to consult with and show a proposed wind turbine layout to the CRMC and the FAB before filing its COP with BOEM and before the CRMC's 6-month CZMA review period began on April 6, 2018. Vineyard Wind was obligated to show its proposed project with mitigation measures and consult with the CRMC and the FAB prior to commencement of the CRMC's 6-month review period on April 6, 2018 as required by enforceable policy § 11.10.1(E). Had Vineyard Wind consulted with the CRMC and the Fishermen's Advisory Board regarding the Project layout prior to filing their COP with BOEM on December 20, 2017, Vineyard Wind could have designed the Project with an east-west layout and the appropriate minimum 1 nautical mile spacing between turbines and turbine rows (in accordance with the CRMC-proposed alternative) to minimize the long-term adverse impacts to Rhode Island-based commercial fishing operations within the Project area.

BOEM acknowledges that "[f]isheries that use bottom trawls and dredge may find it challenging to deploy gear, maneuver, and fish in the WDA or along the OECC where cable protection measures have been deployed. Protections placed over cables or around foundations of WTGs or ESPs may catch or entangle fishing gear. Fishermen have expressed specific concerns about fishing vessels operating trawl gear that may not be able to safely deploy gear and operate in the WDA, given the size of the gear, the spacing between the WTGs, and the space required to safely navigate especially with other vessels present. Trawl and dredge vessels require a relatively large space between turbines to maneuver their gear, as the gear does not directly follow the vessel, fishermen have commented that a 1-nautical mile spacing between WTGs may not be enough to safely operate." See BOEM DEIS at 3-184. And further, BOEM "expects the risk of damage or loss of deployed gear as a result of the operations and maintenance would have a moderate effect on mobile gear commercial fisheries." *Ibid*. BOEM defines the "moderate" impact level as "impacts on the affected activity or community are unavoidable" and "the affected activity or community would have to adjust somewhat to account for disruption due to impacts of the project." *Id*. at 3-1.

The squid fishery is the most valuable fishery resource within the Vineyard Wind WDA, a fact determined by RIDEM DMF in their assessments of the value of commercial fishing harvest in the area. See Appendices 12 and 20. BOEM acknowledges that "some fisheries—like

the squid trawl fishery—may not be able to safely operate and harvest the resource in the WDA using status-quo fishing techniques. In this situation, a large portion of annual income for vessels may be inaccessible during operations, resulting in major impacts on individual vessel owners for a given year." *Id*. at 3-184. BOEM defines the "major" impact level as "impacts on the affected activity or community are unavoidable" and "the affected activity or community would experience unavoidable disruption to a degree beyond what is normally acceptable."

The evidence suggests that the proposed Vineyard Wind Project covering approximately 90 square miles will result in an exclusion area for many commercial fishing vessels for the expected 30-year life of the project. In addition, testimony from CRMC Fishermen's Advisory Board members and other commercial fishermen insist most commercial fishing vessels will not be able to fish within the proposed project area due to significant navigational and operational safety risks, especially at night and during inclement weather conditions. Furthermore, BOEM acknowledges within it DEIS for the Vineyard Wind project that "[e]ven if fishing within a wind energy facility is technically feasible, vessel operators may nonetheless perceive they are not able to safely fish there, resulting in de facto exclusion areas. Indeed, Fishermen have voiced their reluctance to enter wind facilities, particularly during low-visibility weather events." *Ibid*.

Not only will there be short-term exclusion areas surrounding turbine and submarine cable installation operations, there will very likely be long-term impacts resulting from the exclusion zone effect for many Rhode Island fishing vessels during the 30-year life operational life span of the Project. Additionally, those excluded commercial fishing vessels that will be displaced by the construction and operation of the Project will be forced into other offshore areas, and thus concentrating fish harvesting effort in more concentrated areas that will cause further economic diminishment for a larger portion of the Rhode Island commercial fishing fleet.

According to available harvest data analyzed by the RIDEM Division of Marine Fisheries, the average value for landings of species harvested by RI vessels, not including lobster or Jonah crab, within the Vineyard Wind lease area during the 2011-2016 study period was calculated at $1,408,466 annually. See Livermore (2018). More recently, the RIDEM DMF release its report titled "Rhode Island Fishing Value in the Vineyard Wind Construction and

Operations Plan Area" that estimated the value of Rhode Island-based landings from the Vineyard Wind WDA over the 30-year life of the project to range from $30,531,599.84 to $35,611,702.85, which on an annual basis ranges from $1,017,720 to $ 1,187,057. See RIDEM DMF 2019, Appendix 19.

Given the facts and testimony of Rhode Island commercial fishermen, The CRMC has determined that there will likely be a significant reduction in landings by Rhode Island-based vessels from within the Vineyard Wind lease area if the proposed Project is constructed as proposed due to both short- and long-term adverse impacts. BOEM has acknowledged that there will be "major impacts to individual vessel owners" in some situations where a large proportion of fishing vessels' annual income may not be achievable during the 30-year project life and if unmitigated, "the impacts would be moderate to major." See BOEM DEIS at 3-184. BOEM anticipates, however, that mitigation measures "could reduce impacts to minor to moderate depending on the level and efficacy of the mitigation provided. *Ibid*. Nevertheless, there will be an overall net loss to the marine economy of the State of Rhode Island due to losses of harvesting from within the Vineyard wind Project area and the adverse impacts associated with shore-side seafood processors and other sectors of the marine economy that rely on fish harvesting from that area. Thus, the proposed Vineyard Wind project will have significant adverse effects on Rhode Island coastal uses.

Despite Vineyard Wind selecting a larger 9.5MW turbine generator and reducing the number of turbines from approximately 100 to 84, the Project layout of northwest-southeast and less than 1 nm spacing between turbines covering 90 square miles will result in a significant adverse impact to Rhode Island-based commercial fishing operations. The CRMC's enforceable policy § 11.10.1(C) requires that "**the applicant modify the proposal to avoid and/or mitigate the impacts**." The CRMC finds that Vineyard Wind has not ***modified*** the proposed Project as required by the enforceable policy to avoid significant adverse impacts described above. Therefore, Vineyard Wind must ***mitigate*** for the adverse impacts that will result from the construction and operational phases of the Project in order to be consistent with the CRMC's enforceable policy.

Vineyard Wind submitted a "Vineyard Wind Fisheries Mitigation Proposal" to the FAB and the CRMC on January 16, 2019. See Appendix 22. As a result of extensive mitigation negotiations conducted between the CRMC, the CRMC's Fishermen's Advisory Board ("FAB") and Vineyard Wind from February 7, 2019 through February 15, 2019, including Vineyard Wind's revised mitigation proposal dated Final February 15, 2019, the CRMC and Vineyard Wind reached agreement in which Vineyard Wind will provide mitigation to offset significant adverse impacts to the Rhode Island-based commercial fishing industry from the construction and operation of the proposed wind farm. A portion of the Vineyard Wind mitigation proposal would appear to satisfy BOEM's requirement for a "disruption payment for fishing industry during construction" as described within Appendix D of the BOEM DEIS.

Therefore as a result of the executed agreement between the CRMC and Vineyard Wind in which Vineyard Wind will provide mitigation in the form of monetary compensation to offset adverse impacts to the Rhode Island-based commercial fishing industry from the construction and operation of the proposed wind farm, the Project is now consistent with § 11.10.1(C).

§ 11.10.1(F) (formerly § 1160.1.6)

The Council shall prohibit any other uses or activities that would result in significant long-term negative impacts to Rhode Island's commercial or recreational fisheries. Long-term impacts are defined as those that affect more than one or two seasons.

Findings:

In accordance with § 11.8(A)(2) the CRMC engaged commercial fishermen in the decision-making process via the Fishermen's Advisory Board meeting of July 26, 2018 specifically to review the proposed Vineyard Wind Project and to obtain their views on the potential adverse impacts of the proposed project on commercial and recreational fishermen, fisheries activities, and on issues including, but not limited to, the evaluation and planning of project locations, arrangements, alternatives and measures to mitigate the potential impacts of the project.

As detailed during the July 26, 2018 FAB meeting, FAB members explicitly communicated to the Vineyard Wind project team why Vineyard Wind's proposed northwest to southeast orientation of the up to 106 wind turbine generators (WTG) layout will cause irreparable long-term harm to the Rhode Island based commercial fishing industry. Members of the FAB and other commercial fishermen attendees comprehensively detailed the necessity of having an east-west WTG layout with 1 nm spacing between turbines to accommodate existing trawling (mobile) and fixed gear fishing operations and practices. Mobile gear vessels have been trawling in an east-west orientation within the wind energy area (WEA) for decades following depth contours (and associated water temperature contours) in pursuit primarily of squid, which are found in abundance within the WEA especially during May, June and July. Fixed gear fishermen deploying lobster and crab pots or gillnets also lay their gear in an east-west orientation with separation between E-W lines approximately 0.5 nautical mile or greater apart to avoid conflicts such as entanglement and gear loss with the mobile gear vessels. However, with the installation of wind turbines in the area it will necessitate the spacing between turbine foundation rows of a minimum full 1 nautical mile to allow sufficient separation and space to allow mobile gear vessels to operate with conflict with fixed gear.

FAB members explained in detail why the Vineyard Wind proposed northwest to southeast WTG grid orientation and spacing less than 1 nautical mile between WTG (average spacing between turbines is 0.86 nm) will force mobile gear fishermen towing into the Vineyard Wind Project to deviate from the established east-west mobile towing lines, which can be especially problematic at night while following historic/established chart plotter lines. Add in stormy weather conditions and multiple vessels trying to tow mobile gear among turbine towers and fixed gear is a combination of risky situations for commercial fishing vessels. Towing through the Vineyard Wind northwest-southeast turbine layout will increase the likelihood of vessel collisions and gear entanglement, and will force fixed gear fishermen to relocate pots and gillnets causing further gear conflict due to gear repositioning, entanglement and conflicts with other established fixed gear fishermen utilizing nearby areas.

Although towing between the CRMC proposed alternative east-west WTG layout with 1 nautical mile spacing will still be challenging for mobile gear fishermen, the result of towing

amongst the Vineyard Wind turbine layout (northwest-southeast) with spacing between turbines less than 1 nm (average (0.86 nm) will result in unnecessary and avoidable challenges making such work very dangerous and unsafe for the Rhode Island-based mobile gear fishing industry. Town Dock, a Narragansett squid harvesting operator and processor, has stated "[a]s the lay out stands now mobile gear will not be able to coexist with the lobster and gillnet fisheries." See Town Dock 11/14/18 letter to CRMC at 1, Appendix 15. Some mobile gear vessel operators have stated that they will refuse to fish amongst the proposed turbines due to legitimate navigational and safety concerns of a randomized array with less than 1 nm spacing, and thus, the installation of the proposed turbine array will result in an exclusion zone for some commercial mobile gear fishing vessels for the life of the Project (i.e., 30 years). Seafreeze Ltd. stated that "[o]ur vessels will be permanently impacted by Vineyard Wind's proposed plan" and "[o]ur vessels will not be able to operate and maneuver in a wind array with turbines spaced 1 nautical mile apart, regardless of the layout." See 11/19/18 letter to CRMC at 1, Appendix 16. Additionally, those mobile gear vessels that are excluded and displaced from the WDA will impact commercial fishing vessels operating in adjacent areas by concentrating additional vessels into other areas with more harvesting pressure on fishery stocks.

The Rhode Island commercial fishing community has strongly objected to Vineyard Wind's proposed wind turbine layout in a northwest to southeast orientation with spacing between turbines less than 1 nautical mile, as it will result in unnecessary and avoidable impacts, gear conflicts and navigational safety issues as detailed above. The Project as proposed will have an operational life of up to 30 years. See COP Vol. I at 1-13. Additionally, the COP states that "[a]s is typical of utility-grade generation and transmission infrastructure, the Project's equipment is expected to have a physical life expectancy of up to 30 years. Id. at 4-47. Consequently, as a direct result of the Vineyard Wind northwest-southeast proposed WTG layout with average spacing between turbines less than 1 nautical mile (0.86 nm), the Project will have a significant long-term, more than one or two seasons, adverse impact on Rhode Island coastal uses, specifically the RI-based commercial fishing industry.

As discussed above and in the Findings for enforceable policy § 11.10.1(C), absent mitigation, there will be significant adverse, long-term effects to Rhode Island-based commercial

fishing operations that have historically fished within the Vineyard Wind lease area and shoreside processing and sales operations that rely upon fish harvested from that area. BOEM acknowledges within its DEIS that there may be "moderate to major long-term impacts on target populations or locations, loss or damage of gear" as a result of the proposed Project. See BOEM DEIS at ES-8. Further, BOEM indicates that commercial fisheries may be subject to irretrievable impacts, which are defined as "the use or consumption or a resource that is neither renewable nor recoverable for use by future generations. In other words, the resource cannot be replaced, recovered, or reversed and results in the loss of production or use of natural or human resources." *Id*. at 6-1. Not only will there be short-term disruptions to fishing operations resulting from construction of the Project over 18-24 months, assuming no delays from adverse weather, insufficient port facilities, etc., but there will be long-term negative impacts for the 30-year life of the Project.

Enforceable policy § 11.10.1(F) requires the Council to prohibit uses or activities that will negatively impact Rhode Island's commercial fishing industry more than one or two seasons. The CRMC has considered all the facts herein and has concluded that since the Project will have a life expectancy of up to 30 years there will be long-term negative impacts to Rhode Island's commercial fishing industry. Accordingly, Vineyard Wind must provide mitigation to offset the significant long-term negative impacts to the affected Rhode Island's commercial fisheries from the Project as required by enforceable policies §§ 11.10.1(C), 11.10.1(G) and 11.10.1(H). As noted above, Vineyard Wind will provide mitigation in the form of monetary compensation to offset adverse impacts to the Rhode Island-based commercial fishing industry from the construction and operation of the proposed wind farm, the Project is now consistent with § 11.10.1(F).

§ 11.10.1(G) (formerly § 1160.1.7)

The Council shall require that the potential adverse impacts of offshore developments and other uses on commercial or recreational fisheries be evaluated, considered, and mitigated as described in § 11.10.1(H) of this Part.

Findings:

Section 7.6.3.4 of the COP (Vol. III), which describes avoidance, minimization, and mitigation measures, asserts that the WEA siting process was thorough and that BOEM had excluded areas of high fisheries value to reduce fishing conflicts. The COP also asserts that the WTG layout was designed to minimize fishing industry concerns, and that potential conflict with the mobile gear squid fishermen and fixed gear lobster/Jonah crab fishermen is acknowledged. However, Vineyard Wind designed the WTG layout specifically to address concerns of the New Bedford based scallop fleet that only transits through the WDA. The wind farm layout was not designed with input from Rhode Island-based commercial fishermen. Other than a reduction in the number of needed WTGs from 100 to 84 to meet the Project need to generate 800MW, there have been no other meaningful avoidance measures incorporated by Vineyard Wind into the Project design in consideration of the Rhode Island-based fisheries harvesting that occurs within the Vineyard Wind lease area.

Rhode Island fishermen have objected to the proposed WTG layout and have provided Vineyard Wind with an alternate layout that would reduce adverse impacts with the commercial fishing operations existing within the WDA. Despite Vineyard Wind's efforts to modify the Project by reducing the number of WTGs using a larger 9.5MW turbine, and the lease area necessary to generate 800MW, Vineyard Wind has not avoided significant adverse impacts to the Rhode Island-based commercial fishing industry. Therefore, meaningful mitigation measures are required in accordance with enforceable policy § 11.10.1(H). And, as noted previously, Vineyard Wind will provide mitigation in the form of monetary compensation to offset adverse impacts to the Rhode Island-based commercial fishing industry from the construction and operation of the proposed wind farm. Thus, the Project is now consistent with § 11.10.1(G).

§ 11.10.1(H) (formerly § 1160.1.8)

For the purposes of fisheries policies and standards as summarized in Ocean SAMP Chapter 5, Commercial and Recreational Fisheries, §§ 5.3.1 and 5.3.2 of this Subchapter, mitigation is defined as a process to make whole those fisheries user groups that are adversely affected by proposals to be undertaken, or undertaken projects, in the Ocean SAMP area. Mitigation measures shall be consistent with the purposes of duly adopted fisheries management plans, programs, strategies and regulations of the agencies and regulatory bodies with

jurisdiction over fisheries in the Ocean SAMP area, including but not limited to those set forth above in § 11.9.4(B) of this Part. Mitigation shall not be designed or implemented in a manner that substantially diminishes the effectiveness of duly adopted fisheries management programs. Mitigation measures may include, but are not limited to, compensation, effort reduction, habitat preservation, restoration and construction, marketing, and infrastructure improvements. Where there are potential impacts associated with proposed projects, the need for mitigation shall be presumed. Negotiation of mitigation agreements shall be a necessary condition of any approval or permit of a project by the Council. Mitigation shall be negotiated between the Council staff, the FAB, the project developer, and approved by the Council. The reasonable costs associated with the negotiation, which may include data collection and analysis, technical and financial analysis, and legal costs, shall be borne by the applicant. The applicant shall establish and maintain either an escrow account to cover said costs of this negotiation or such other mechanism as set forth in the permit or approval condition pertaining to mitigation. This policy shall apply to all large-scale offshore developments, underwater cables, and other projects as determined by the Council.

Findings:

Vineyard Wind has not meaningfully modified the proposed project to avoid significant adverse impacts to commercial fishing vessels as a result of construction and operation of the proposed wind farm. Thus, Vineyard Wind is required to mitigate the impacts, which may include compensation to make whole those fisheries user groups that are adversely affected by the project in accordance with this enforceable policy. Vineyard Wind finally delivered a Fisheries Mitigation Proposal to the CRMC and the FAB on January 16, 2019, following two FAB meetings on January 3 and 15 where the FAB was expecting a proposal from Vineyard Wind. Following FAB review of the Vineyard Wind proposal, mitigation discussions between the CRMC, Vineyard Wind and the FAB were held over several days from February 7 through February 15, 2019.

Vineyard Wind provided a revised Fisheries Mitigation Proposal dated Final February 15, 2019 to the FAB and the CRMC. The FAB held a public meeting on February 23, 2019 and voted to accept the proposal. The Council held a public hearing on February 26, 2019 and voted

to accept the FAB's recommendation that the Vineyard Wind mitigation proposal was acceptable. Vineyard Wind will provide mitigation in the form of monetary compensation to offset adverse impacts to the Rhode Island-based commercial fishing industry from the construction and operation of the proposed wind farm. Thus, the Project is now consistent with § 11.10.1(H).

§ 11.10.5(C)(2)(f)(1) and **§ 11.10.9(C)(1) and (2)** (formerly §§ 1160.5.3(ii) and 1160.9.3, respectively)

The enforceable policy § 11.10.5(C)(2)(f)(1) requires that an applicant's COP shall provide necessary data and information including, among other items, a fish and fisheries survey. The results from the fish and fisheries survey with supporting data must describe the results of:

(i) A biological assessment of commercially and recreationally targeted species. This assessment shall assess the relative abundance, distribution, and different life stages of these species at all four seasons of the year. This assessment shall comprise a series of surveys, employing survey equipment and methods that are appropriate for sampling finfish, shellfish, and crustacean species at the project's proposed location. This assessment may include evaluation of survey data collected through an existing survey program, if data are available for the proposed site.

(ii) An assessment of commercial and recreational fisheries effort, landings, and landings value. Assessment shall focus on the proposed project area and alternatives across all four seasons of the year must. Assessment may use existing fisheries monitoring data but shall be supplemented by interviews with commercial and recreational fishermen.

(iii) For more information on these assessments see § 11.10.9(C) of this Part.

The enforceable policies §§ 11.10.9(C)(1) and (2) provide further information for the required biological and fisheries landing assessments that must be included within the applicant's COP, and read in part as follows:

1. *A biological assessment of commercially and recreationally targeted species shall be required within the project area for all offshore developments. This assessment shall assess the relative abundance, distribution, and different life stages of these species at*

all four seasons of the year. This assessment shall comprise a series of surveys, employing survey equipment and methods that are appropriate for sampling finfish, shellfish, and crustacean species at the project's proposed location. Such an assessment shall be performed at least four times: pre-construction (to assess baseline conditions); during construction; and at two different intervals during operation (i.e. one (1) year after construction and then post-construction). At each time this assessment must capture all four seasons of the year. This assessment may include evaluation of survey data collected through an existing survey program, if data are available for the proposed site.

2. *An assessment of commercial and recreational fisheries effort, landings, and landings value shall be required for all proposed offshore developments. Assessment shall focus on the proposed project area and alternatives. This assessment shall evaluate commercial and recreational fishing effort, landings, and landings value at three different stages: preconstruction (to assess baseline conditions); during construction; and during operation. At each stage, all four seasons of the year must be evaluated. Assessment may use existing fisheries monitoring data but shall be supplemented by interviews with commercial and recreational fishermen. Assessment shall address whether fishing effort, landings, and landings value has changed in comparison to baseline conditions.*

Findings:

A biological assessment of commercially targeted species that covers all four seasons of the year for pre-construction (to assess baseline conditions), during construction; and at two different intervals during operation are requirements pursuant to §§ 11.10.5(C)(2)(f)(1) and 11.10.9(C)(1) and (2). Establishing the baseline assessment of commercially targeted species for all four seasons of the year during the pre-construction phase is a critical necessity to assess any potential impacts on fisheries resources from construction activities and operation of the Project within Vineyard Wind's wind development area. In order to meet the enforceable policies of the Ocean SAMP, the applicant would have to provide a biological assessment of commercially targeted species covering all four seasons, which necessitates a minimum of one full year of monitoring <u>before</u> any construction activity can take place within the WDA.

Construction of the 800 MW Project will be continuous and Vineyard Wind expects to start construction in late 2019. See COP Vol. III at 2-2. Vineyard Wind expects to begin construction in offshore waters starting in May 2020 with the installation of scour protection at each of the wind turbine locations within the Vineyard Wind lease area followed by the installation of wind turbine foundations starting in July 2020. See COP Vol. I, Table 4.1-1a. To date, Vineyard Wind has only provided limited assessment data collected through existing survey programs. For example, one of the most sought after commercial species within the WDA is longfin squid, which is harvested by Rhode Island-based commercial fishermen, including commercial fishermen based in other states, primarily during June, July and August within the Project location (WDA). The applicant's COP relied upon the Massachusetts Division of Marine Fisheries (MDMF) squid assessments that sampled both squid and squid egg mops in Massachusetts state waters as part of spring and fall bottom trawls during 2007-2017. See COP Vol. III at 6-130. However, as shown in Figures 6.6-8 and 6.6-9 of COP Vol. III the sampling data is only collected in Massachusetts state waters out to 3-miles offshore and not federal offshore waters where Vineyard Wind's lease is located. The MDMF surveys that Vineyard Wind relies upon does not provide any assessment of squid and squid egg mops within the Vineyard Wind WDA and only account for 2 seasons (spring and fall), not the four (4) seasons required by §§ 11.10.9(C)(1) and (2).

Moreover, Vineyard Wind states in its COP that "Vineyard Wind is developing a framework for a pre- and post-construction fisheries monitoring program to measure the Project's effect on fisheries resources. Vineyard Wind is working with the Massachusetts School for Marine Science and Technology (SMAST) and local stakeholders to inform that effort and design the study. The duration of monitoring will be determined as part of the initial effort to determine the scope of the study, but it is anticipated to include the pre-construction period and at least one year of post-construction monitoring." See COP Vol. III at 6-143.

As part of the Massachusetts Division of Marine Fisheries April 30, 2018 comments to BOEM regarding the NOI to prepare an EIS for the Vineyard Wind project, MDMF Director David Pierce stated "[t]he distribution of demersal longfin squid eggs ("mops") was not addressed in the Construction and Operations Plan. More information regarding the distribution

and temporal persistence of longfin squid mops and their vulnerability to project activities is needed in the EIS." See MDMF 04/30/18 letter at 5 available on the BOEM website: https://www.regulations.gov/docket?D=BOEM-2018-0015.

Vineyard Wind did not provide a pre-construction biological assessment for commercial species harvested within the Project area that covers all four seasons of the year as part of its April 6, 2018 consistency certification filing with the CRMC. The applicant's COP indicates that Vineyard Wind is developing a framework for a pre- and post-construction fisheries monitoring program to measure the Project's effect on fisheries resources. See COP Vol. III, p. 6-143. Thus, by Vineyard Wind's own admission, the COP does not provide the data and information required by the enforceable policies. The CRMC identified this omission in a meeting with Vineyard Wind on June 13, 2019 and again in the CRMC's July 2, 2019 three-month letter to Vineyard Wind. See Appendix 5. Vineyard Wind issued a notice on November 5, 2018 seeking input from commercial fishermen on the development of a pre- and post-construction assessment of fisheries, ecological conditions, social and economic aspects of fisheries in and around the Vineyard Wind offshore wind lease area (see Appendix 13). CRMC and RIDEM DMF staff attended a meeting organized by Vineyard Wind at the UMASS School for Marine Science and Technology (SMAST) on December 18, 2018 for stakeholders to discuss a potential fisheries monitoring and assessment protocol and projects.

Finally, on February 18, 2019 Vineyard Wind filed with the CRMC details for a pre- and post-construction commercial fisheries biological assessment monitoring program summary to measure the Project's potential effects on fisheries resources (the monitoring plan). See Appendix 26. The monitoring plan contains a description of proposed sampling methodology for a finfish and squid trawl survey, a ventless trap survey for lobster and Jonah crab, a plankton survey and an optical survey of benthic invertebrates and habitat. Vineyard Wind indicated within its filing that they are in the process of obtaining federal agency (NMFS and BOEM) comments and approval of the monitoring plan.

CRMC staff have reviewed the monitoring plan and have concluded that it meets the minimum required elements of the enforceable polices in that Vineyard Wind will conduct

appropriate sampling four times: pre-construction to assess baseline conditions; during construction; and at two different intervals during operation (i.e. one (1) year after construction and then post-construction). Each of these four assessment periods will capture all four seasons of the year. Therefore, with the filing of the Vineyard Wind monitoring plan with the CRMC on February 18, 2019, the Project is now consistent with the State coastal program enforceable policies of §§ 11.10.5(C)(2)(f)(1) and 11.10.9(C)(1) and (2).

In addition, CRMC staff have reviewed all other applicable enforceable polices of the Ocean SAMP not identified above and have determined that the Vineyard Wind project is consistent with those enforceable policies. See Appendix 24.

References

Kirkpatrick, et al. 2017. Socio-Economic Impact of Outer Continental Shelf Wind Energy Development on Fisheries in the U.S. Atlantic. Volume I (https://www.boem.gov/ESPIS/5/5580.pdf)

Livermore 2017 and 2018. Spatiotemporal and Economic Analysis of Vessel Monitoring System Data within Wind Energy Areas in the Greater North Atlantic; and Addendum I (http://www.dem.ri.gov/programs/bnatres/fishwild/pdf/RIDEM_VMS_Report_2017.pdf)

Commonwealth of Massachusetts SDEIR Certificate (2018) (https://eeaonline.eea.state.ma.us/EEA/emepa/mepacerts/2018/sc/eir/15787%20sdeir%20Vineyard%20Wind%20Connector.pdf)

Vineyard Wind Response to Rhode Island Request for Proposal for Long-Term Contract for Renewable Energy (10/29/18) accessed from (https://ricleanenergyrfp.com/public-versions-of-bids/)

Sproul, T., and Michaud, C. 2018. The economic impact of Rhode Island's fisheries and seafood sector. 15 p. Accessed at: www.riepr.org .

Appendices

1. Vineyard Wind letter to CRMC (3/6/18)
2. Vineyard Wind Consistency Certification (4/6/18)
3. MADMF-Vineyard Wind Notice to Mariners (4/26/18)
4. CRMC Public Notice (5/22/18)
5. CRMC 3-month letter with CFCRI East-West WTG layout (7/2/18)
6. Vineyard Wind Response to CRMC 3-month letter (7/16/18) (Contains FAB meeting presentations of 7/24/17 and 4/11/18)
7. CRMC-Vineyard Wind Stay Agreements (all 5)
8. CRMC letter to BOEM re: East-West wind turbine layout (8/9/18)
9. CFCRI E-W Affidavit (10/3/18)
10. RIMFC Recommendation for E-W turbine layout with 1 nm spacing (10/12/18)
11. MA EOEEA Supplemental Draft Environmental Impact report (10/12/18)
12. RIDEM DMF commercial fishing report addendum (10/24/18)
13. Vineyard Wind Fisheries Monitoring Plan meeting invitation (11/4/18)
14. Vineyard Wind submission to CRMC regarding East-West Layout and Proposed Alternatives (11/9/18)
15. Town Dock letter to CRMC re: Vineyard Wind 11/9/18 proposed alternatives (11/14/18)
16. Seafreeze letter to CRMC re: Vineyard Wind 11/9/18 proposed alternatives (11/16/18)
17. RODA letter to CRMC re: Vineyard Wind 11/9/18 proposed alternatives (11/16/18)
18. Vineyard Wind letter to CRMC re: request for stay (11/21/18)
19. RIDEM DMF 1/14/19 “Rhode Island Fishing Value in the Vineyard Wind Construction and Operations Plan Area” January 14, 2019
20. Vineyard Wind 01/14/2019 letter to Massachusetts Department of Energy Resources
21. Vineyard Wind 1/15/19 “Economic Exposure of Rhode Island Commercial Fisheries to the Vineyard Wind Project” (November 30, 2018, updated January 2019)
22. Vineyard Wind 1/16/19 “Vineyard Wind Fisheries Mitigation Proposal to the FAB”
23. Stay Agreement between Massachusetts CZM and Vineyard Wind; executed 10/4/18
24. CRMC Enforceable Policy Response to Addendum Table 3-1
25. CRMC and Vineyard Wind executed trust agreement (2/21/19)
26. Vineyard Wind Commercial Fisheries Biological Assessment and Monitory Plan Summary (2/18/19)

Appendix 1. Vineyard Wind letter to CRMC (3/6/18)

OCS-A 0501 MASS USA

VINEYARD WIND

6 March 2018

Grover Fugate, Executive Director
Coastal Resources Management Council
Stedman Government Center, Suite 3
4808 Tower Hill Road
Wakefield, RI 02879-1900

Dear Mr. Fugate,

I am writing to confirm Vineyard Wind's commitment to continue to actively consult with the Rhode Island Coastal Resources Management Council (CRMC), fishermen out of Rhode Island, and other Rhode Island stakeholders during the permitting, development and operations of the Vineyard Wind project. Furthermore, I want to assure you that Vineyard Wind will follow through on our commitment to voluntarily provide CRMC with a consistency certification, and project information for CRMC's review, and to do so in a timely manner such that CRMC can have ample opportunity to file its own consistency request should we fail to do so ourselves. We will be providing BOEM a copy of this letter and communicating with them regarding their schedule, so that you will have comfort that we will be submitting a voluntary consistency certification in ample time.

As you know, Vineyard Wind's outreach to the fishermen of Rhode Island began in 2010, at which time the company was named OffshoreMW. Vineyard Wind was the first offshore wind project developer to engage a Fisheries Representative, also in 2010, well before this practice was described in BOEM's guidelines. This outreach has continued since then, at a pace appropriate for the project's stage of development, with an increasing number of meetings with fishermen over the last year. We have met with members of the CRMC's Fisheries Advisory Board (FAB) on an individual basis, and presented to the FAB itself in July, 2017. And we have had an on-going effort to identify Fisheries Representatives who would represent Rhode Island fishermen to the project. We will continue all of these consultations and efforts into the future, both on a near-term and long-term basis, as the project continues through the permitting, development, and operational phases.

We also appreciate the opportunities we've had to meet with yourself and other CRMC staff to discuss our proposed offshore wind project. We are now also actively recruiting a full-time Fisheries Liaison and have reached out to Rhode Island agencies and academic institutions to identify candidates from Rhode Island; any suggestions you may have would of course be appreciated as well.

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VINEYARDWIND.COM

We also communicate regularly with the Department of Environmental Management (DEM), Marine Fisheries, on several issues, including their assessment of fishing activity in our lease area and their experience on the Block Island construction and operation. DEM also provided to us extensive comments on our fisheries communication plan, most of which we incorporated.

Rhode Island fishermen probably have the most direct experience with the only existing offshore wind turbine in the US, the Block Island Wind Farm. Given this, we are giving careful consideration to RI fishermen's reports with regard to their experience related to this project, and we are in regular communications with Deepwater Wind, in order to garner lessons learned and benefit from issues arising from that project, and which may also apply in our project area.

In short, we have been for many years, and will continue to be for even more years to come, actively undertaking consultations with CRMC, FAB, DEM, individual fishermen and fishing organizations based in RI, and other RI stakeholders. Our plan and firm intent is to continue active outreach to any fishermen potentially impacted by the project throughout the project's permitting, development, and operations phases.

With this in mind, we would very much appreciate the opportunity to participate in the next FAB meeting, on March 19th, in order to update the FAB on the project, answer any questions, and personally confirm to the FAB our intentions with regard to CRMC's consistency certification. Also, prior to this meeting we could provide CRMC and FAB members an updated version of our fisheries communications plan, and we would appreciate receiving any comments to this plan.

Meanwhile, in keeping with our commitment to work closely with CRMC and RI fishermen, I want to reiterate and once again confirm to you that because Vineyard Wind will voluntarily provide CRMC with a consistency certification, CRMC will not need to seek NOAA approval to review the project as an unlisted activity under 15 C.F.R. § 930.54.

Thank you for your interest in our proposed project, and we look forward to working with you and your team in furthering this important industry and harnessing the region's offshore wind resource.

Sincerely,

Erich Stephens
Chief Development Officer

Appendix 2. Vineyard Wind Consistency Certification (4/6/18)

Vineyard Wind

Coastal Zone Management Act, Consistency Certification (15 CFR 930.57)

Vineyard Wind LLC (Vineyard Wind) has prepared this Consistency Certification to demonstrate that its proposed development within Bureau of Ocean Energy Management (BOEM) Lease Area OCS-A 0501 (Figure 1) is consistent to the maximum extent practicable with the provisions identified as enforceable by the Coastal Management Programs (CMPs) of the Commonwealth of Massachusetts and State of Rhode Island. As described herein, the proposed activity complies with the enforceable policies of the Massachusetts and Rhode Island approved management programs and will be conducted in a manner consistent with such programs. This document is provided pursuant to the requirements of 15 CFR 930.57 of the Coastal Zone Management Act (CZMA) Federal Consistency regulations.

Section 307(c) (1) of the CZMA, as amended, requires that each federal agency activity within or outside the coastal zone affecting any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of federally-approved state management programs.

The Commonwealth of Massachusetts and State of Rhode Island share common coastal management issues and have similar enforceable policies as identified by their respective CMPs. Due to the proximity of the Vineyard Wind Lease Area to both states (Figure 1), and their shared impacts on environmental and socioeconomic resources and uses, Vineyard Wind has prepared a single consistency certification for the Project.

1. BACKGROUND

Vineyard Wind is proposing an ~800 megawatt (MW) wind energy project within BOEM Lease Area OCS-A 0501, consisting of offshore Wind Turbine Generators (WTGs) (each placed on a foundation support structure), Electrical Service Platforms (ESPs), an onshore substation, offshore and onshore cabling, and onshore operations & maintenance facilities (these facilities will hereafter be referred to as the Project). The location of the Lease Area is depicted on Figure 1. As is described later in this document, the ~800 MW Project will be located in the northern portion of the over 675 square kilometers (km^2) (166,886 acre) Lease Area (referred to as the Wind Development Area or WDA).

The Project is fully described in the Construction and Operations Plan (COP) filed with BOEM on December 19, 2017 and is summarized below.

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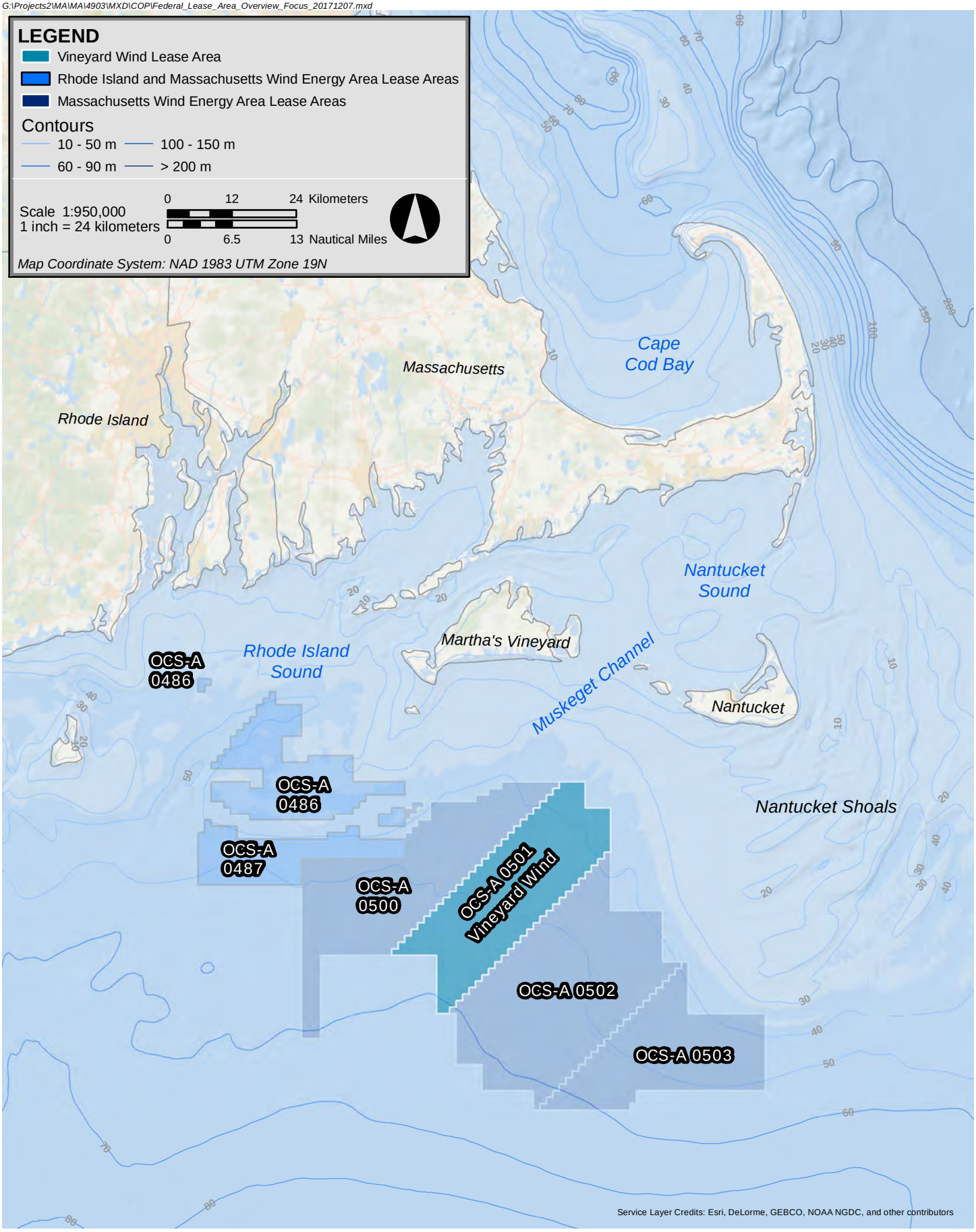


Vineyard Wind Project

VINEYARD WIND

Figure 1

RI and MA Lease Areas Overview

2 DESCRIPTION OF PROPOSED PROJECT

The Project consists of up to 106 offshore WTGs arranged in a grid-like pattern located in the Atlantic Ocean south of Martha's Vineyard. The Project also includes up to four ESPs, inter-array cables connecting the WTGs to the ESPs, inter-link cables between ESPs, and up to three offshore export cables. Each WTG will independently generate approximately 8 to 10 MW of electricity and will interconnect with the ESPs via the inter-array submarine cable

system. The offshore export cable transmission system connects the ESPs to a landfall location in either Barnstable or Yarmouth. It is approximately 227 kilometers (141 miles) in length, assuming that three export cables are used. After the offshore export cables are brought to shore at one of three potential landfall sites, the physical connection between the offshore export cables and the onshore export cables will be made in an underground concrete vault(s). The onshore export cable route, located principally in established right-of-ways, will connect the underground vault at the landfall site to a new onshore substation located within the Independence Park commercial/industrial area in Barnstable. The Project will then connect to the New England transmission system at Eversource's Barnstable Switching Station or the West Barnstable Switching Station.

The Lease Area is within the Massachusetts Wind Energy Area identified by BOEM, following a public process and environmental review, as suitable for wind energy development. The proposed ~800 MW Project is located within the northern portion of the Lease Area, referred to as the WDA. The WDA is 306 km^2 (75,614 acres). At its nearest point, the Lease Area is just over 23 kilometers (14 miles) from the southeast corner of Martha's Vineyard and a similar distance to Nantucket.

The Project has significant environmental benefits. The electricity generated by the WTGs, which do not emit air pollutants, will displace electricity generated by higher-polluting fossil fuel-powered plants and significantly reduce emissions from the ISO New England power grid over the lifespan of the Project. Based on air emissions data for New England power generation facilities from EPA's Emissions & Generation Resource Integrated Database (eGRID), the Project is expected to reduce CO_2 emissions from the ISO NE system by approximately 1,680,000 tons per year (tpy). In addition, NO_x and SOx emissions across the New England grid are expected to be reduced by approximately 1,080 tpy and 880 tpy, respectively. Furthermore, the Project is likely to benefit marine mammals and other marine life. These benefits include reduction in greenhouse gasses that induce climate change which in turn potentially impacts species' ranges and access to prey as prey species' shift or decline. In addition to these important environmental benefits, the Project is expected to bring significant employment and other economic benefits to the south coast of Massachusetts and the region. Finally, the Project should be an important foundational step in creating a thriving, utility scale, domestic offshore wind industry.

2.1 Design Envelope/Phasing

The Project is being developed and permitted using an "Envelope" concept. The evolution of offshore wind technology and installation techniques often outpaces the speed of permitting processes. The Envelope concept allows for optimized projects once permitting is complete while ensuring a comprehensive review of the project by regulators and stakeholders, as BOEM recognized in its National Offshore Wind Strategy. The flexibility provided in the Envelope is important because it precludes the need for numerous permit modifications as infrastructure or construction techniques evolve after permits are granted but before construction commences. The parameters of the Envelope are presented in Table 2-1, with the maximum design scenario for environmental analysis. Vineyard Wind is not proposing to develop its lease in phases at this time. The Project may be constructed in stages consisting of ~200MW, ~400MW, and ~800MW with up to 5 years between increments.

Table 2-1 Vineyard Wind Project Envelope with Maximum Design Scenario

CAPACITY	Maximum	
Wind Farm Capacity	~800 megawatt ("MW")	
WIND TURBINE GENERATORS	**Smallest Turbine**	**Largest Turbine**
Turbine Size	8 MW	10 MW
Total Height[1]	191 meters ("m") (627 feet ["ft"])	212 m (696 ft)
Number of Positions (up to)[2]	~8 MW WTGs 106	~10 MW WTGs 88
FOUNDATIONS		
Foundation Envelope	Combination of at least 400 MW monopiles and up to 400 MW jackets: -100% monopiles or -Up to 50% jackets, remainder monopiles	
Foundation Type	Jackets (Pin Piles)	Monopiles
Number of Piles/Foundation	3-4	1
Maximum Area of Scour Protection at each Foundation	up to 1800 square meters ("m^2") (19,375 square feet ["ft^2"])	up to 2100 m^2 (22,600 ft^2)
Maximum Number of Foundations Installed per Day (24 hours)	2 (up to 8 pin piles)	2

Table 2-1 Vineyard Wind Project Envelope with Maximum Design Scenario (Continued)

ELECTRICAL SERVICE PLATFORMS		
ESP Type	Light-weight ESP	Conventional ESP
Number of ESPs	**4**	2
Foundation Types for Conventional or Light-weight ESP	Monopiles	Jackets
Number of Piles/Foundation	1	3-4
Maximum Area of Scour Protection at each Foundation	up to 2100 m^2 (22,600 ft^2)	up to 2500 m^2 (26,900 ft^2)
Maximum Height above Mean Low Water ("MLLW")	65.5 m (215 ft)	**66.5 m (218 ft)**
INTER-ARRAY CABLES		
Inter-array Cable Voltage	66 kilovolts ("kV")	
Maximum Length of Inter-array Cables	**275 kilometers ("km") (171 miles ["mi"])**	
EXPORT AND INTER-LINK CABLES		
Export and Inter-link Cable Voltage	220 kV	
Maximum Length of Inter-link Cable[3]	**15 km (9.3 mi)**	
Maximum Number of Export Cables	3	
Maximum Length of Export Cables (for three export cables)	**227 km (141 mi)**	

Notes:

Maximum Design Scenario indicated by double lined box and bold text.

1. Turbine output not necessarily proportionately linked to size, so smallest turbine size may not be an eight MW turbine.
2. Additional positions included account for spare positions as well as added capacity to account for electrical losses.

2.2 Construction and Installation

2.2.1 Offshore Activities and Facilities

The Project's offshore elements include the wind turbine generators (WTGs) and their foundations, the electric service platforms (ESPs) and their foundations, scour protection for all foundations, the inter-array cables, the inter-link cable that connects the ESPs, and the offshore export cables. The WTGs, the ESPs, the inter-array cables, the inter-link cable, and portions of the offshore export cables are located in federal waters. The balance of the export cable run is located in Massachusetts waters.

2.2.1.1 Wind Turbine Generators

The Project will install ~8 MW to ~10 MW WTGs. If 8 MW turbines are used, up to 106 WTGs will be installed; if 10 MW turbines are used, up to 88 WTGs will be installed. The site layout for up to 106 turbines is shown on Figure 3.1-2 of Volume I of the COP.

The WTGs are arranged in a grid-like pattern. Spacing between WTGs will vary from approximately 1,400 m to over 1,850 m (0.76 to 1.0 nautical miles) with a one-nautical mile wide corridor (1,850 m) running from northwest to southeast and northeast to southwest within the grid design.

The WTGs consists of two main components, the rotor nacelle assembly (RNA) and the Tower. The nacelle houses the energy-generating components of the turbine, including the gear box, generator, controller, low- and high-speed shafts, and brake. A pitch and yaw system will allow the wind turbine to optimize its performance by positioning the direction of the rotor and the angle of the blades. The brake, pitch, and yaw systems may be controlled using hydraulics. The RNA is mounted on the steel tower which is mounted on a foundation and/or transition piece via a bolted connection. The WTGs will have three-bladed rotors manufactured from fiberglass and carbon, which are connected to a steel hub.

The WTGs will be no lighter than RAL 9010 Pure White and no darker than RAL 7035 Light Grey in color to reduce their visibility against the horizon. In accordance with FAA requirements and/or BOEM guidelines, two synchronized Federal Aviation Administration (FAA) "L-864" aviation red flashing obstruction lights will be installed on each WTG nacelle. Depending upon commercial availability and regulatory approval, the Project will use either an Aircraft Detection Lighting System (ADLS) that is activated automatically by approaching aircraft or a system that automatically adjusts lighting intensity to accommodate visibility conditions to reduce potential impacts. If the use of ADLS is not feasible, reduced lighting for the interior will be reviewed and discussed with BOEM and the FAA. Marine navigation lighting will consist of two yellow flashing lights at each turbine and lights on the corners of ESPs approximately 20 - 23 m above MLLW. In accordance with International Association of Lighthouse Authorities (IALA) guidance, each WTG foundation will be painted with high visibility yellow paint from the water line to an approximate height of at least 15m (50 ft). Automatic Identification System (AIS) transponders and sound signals (on selected WTGs) are included in the Project design to enhance marine navigation safety.

The WTG parameters are provided in the table below and are shown on Figure 3.1-1 of Volume I of the COP.

Table 2-2 WTG Parameters

WTG Parameter	Envelope
Tip height	191-212 m (627-696 ft) MLLW*
Hub height	109-121 m (358-397 ft) MLLW
Rotor diameter	164-180 m (538-591 ft) MLLW
Platform level and expected Interface level towards foundations	19-23 m (62-75 feet) MLLW
Tip clearance	27-31 m (89-102 ft) MLLW

Note: MLLW is mean lower low water, which is the average height of the lowest tide recorded at a tide station each day during the recording period. Elevations relative to mean higher high water are approximately 1 m (3 ft) lower than those relative to MLLW.

The WTGs will be installed with either a jack-up or a dynamic positioning (DP) vessel. The tower will first be erected followed by the nacelle and finally the hub, inclusive of the blades. Alternatively, the nacelle and hub could be installed in a single operation followed by the installation of individual blades. The WTG installation phase represents the most intense period of vessel traffic in the offshore site with wind turbine foundations, inter-array cables and wind turbines being installed in parallel; however, this is a relatively short time period compared to the life of the Project.

2.2.1.2 WTG Foundations

The WTG foundations will either be all monopiles or a combination of monopiles and jackets. Jackets are expected to be used in deeper water locations. Scour protection will be used to protect the foundations from scour development, which is the removal of the sediments near structures (such as the foundation) by hydrodynamic forces. Scour protection consists of the placement of stone or rock material that can withstand the increase seabed drag that is created by the presence of the foundation.

The monopile is a single, hollow cylinder fabricated from steel that is secured in the seabed. The diameter of the monopiles will range from 7.5 to 10.3 meters (25 to 34 feet) and will be driven into the seabed approximately 20 to 45 meters (66 to 148 feet) depending upon seabed conditions and water depths (see Figure 3.1-3 of Volume I of the COP). Each monopile will typically be topped by a transition piece (see Figures 3.1-3 and 3.1-4 of Volume I of the COP), although in some cases an extended monopile may be used (no transition piece; Figure 3.1-5 of Volume I of the COP). The transition piece provides a level surface for the WTG tower above it and contains secondary structures, such as tower flange for mounting the WTG, boat landing, internal and external platform, and various electrical equipment needed during installation and operation.

The Jacket design concept consists of 3-4 piles, a large lattice jacket structure and a transition piece (TP), see Figures 3.1-6 through 3.1-8 of Volume I of the COP. The jacket will also contain secondary structures, such as boat landings and cable tubes. The piles for the jacket foundation will range from 1.5 to 3 meters (5 to 10 feet) and will be driven into the seabed approximately 30 to 60 meters (98 to 197 feet), depending on seabed conditions and water depths.

The monopiles (or jackets) are expected to be installed by a single heavy lift or jack-up vessel. Anchored vessels will not be used as primary construction and installation vessels within the WDA. Any anchoring that does occur within the WDA will occur within the Area of Potential Effect (APE) defined in Volume II-C of the COP. Pile driving will begin with a "soft-start" to ensure that the monopile remains vertical and allow marine life to move away before the pile driving intensity is increased. The intensity (hammer energy level) will be gradually increased based on the resistance that is experienced from the sediments. Typical pile driving for a monopile is expected to take less than approximately three hours to achieve the target penetration depth (driving a pile for a jacket is expected to take significantly less time). It is anticipated that a maximum of two monopiles or two complete jackets could be driven into the seabed per day. No drilling is anticipated, but it could be required if a large boulder is encountered.

2.2.1.3 Electrical Service Platforms (ESPs)

The ESP(s) will serve as the common interconnection point for the WTGs within the array. Each WTG will interconnect with the ESP via a 66kV submarine cable system. These cable systems will interconnect with circuit breakers and transformers located on the ESP to increase the voltage level and transmit wind-generated power through the offshore export cable systems to the final connection point to the New England Transmission System.

For each 400 MW, either one conventional ESP (with two transformers), or two light-weight ESPs (with one transformer on each) that are bridged together at one location may be used. Like the WTGs, the ESPs will be secured to the seabed with either a monopile or jacket foundation and will also have scour protection. The foundations for the ESPs will be installed in the same manner as the WTG foundations. The ESP will have a maximum height above MLLW of approximately 65.5 meters to 66.5 meters (215 to 218 feet) depending upon the foundation used. The approximate size and design of topside components of conventional ESPs are depicted in Figures 3.1-10 through 3.1-13 of Volume I of the COP). Each ESP will be inter-linked with a inter-link cable the same 220 kV cable as used for the export cable. Figure 3.1-14 of Volume I provides representaive pictures of ESPs installed in Europe.

2.2.1.4 Inter-array Cables

The WTG's will be connected to the ESPs via 66kV inter-array cables. The expected cable type is a three-core alternating current ("AC") cable, which will also be the type of cable used for export cables, described in Section 2.2.1.5.

The inter-array cables will connect radial "strings" of 6 to 10 WTGs to the ESPs. The inter-array cable system will be designed and optimized for the Project during the final design and will consider cable design and capacity, ground conditions, Project operating conditions, installation conditions, and potential cultural resources. Therefore, the Envelope for the inter-array cables includes any potential layout within the WDA. One potential layout is provided as Figure 3.1-18 of Volume I of the COP, for illustrative purposes. As shown in Figure 3.1-18, the farthest WTG will have one outgoing connection and each subsequent WTG will have both an incoming and outgoing cable. The maximum anticipated length of the inter-array cables for an ~800 MW Project is approximately 275 km (170.8 miles). The inter-array cables are anticipated to be installed up to 1.5 to 2.5 meters (4.9 to 8.2 feet) below the seafloor, likely by jet plow embedment, after the cables are placed on the seafloor.

2.2.1.5 Offshore Export Cables

Up to three offshore export cables will connect the ESPs to the bulk power grid. Each offshore export cable, as well as the inter-link cables that connect the ESPs together, will be comprised of a three-core 220 kV AC cable for power transmission and one fiber optic cable for communication and temperature measurement, which serves to monitor the high-voltage system. The three-cores of the cable consist of three copper or alumimum conductors which will each be encapsulated by cross-linked polyethylene (XLPE) insulation and waterproof sheathing will prevent the infiltration of water.

Each of the export cables will be installed below the seafloor. In certain locations, sand waves are present, and since part of the sand waves may be mobile over time, the upper portions of the sand waves may need to be dredged so that the cable laying equipment can achieve the proper burial depth below the sand waves and into the stable sea bottom. Where required, dredging will occur within a 20 m (66 foot) wide dredged corridor by various techniques depending upon site conditions. Dredge volumes are dependent on the final route and cable installation method: a cable installation method that can achieve a burial depth of 2.5 m will require less dredging; a cable installation method that can achieve a burial depth of 1.5 m will require more dredging. The average dredge depth is 0.5 meters and may range up to 4.5 meters in localized areas. The maximum length of export cables (assuming three cables) is 227 kilometers (141 miles).

The majority of the export and inter-link cable is expected to be installed using simultaneous lay and bury via jet plowing. However, other methods may be needed in areas of coarser or more consolidated sediment, rocky bottom, or other difficult conditions in order to ensure a proper burial depth. While anchored vessels are not expected to be the primary vessels used for cable installation, some anchored vessels may be needed along portions of the cable route. It is expected that there will be some areas where it will be difficult to achieve the proper burial depth. In those areas the cable will be protected by techniques such as placing rocks on top of the cable or placing prefabricated flexible concrete coverings on top of the cable (referred to as concrete mattresses).

2.2.2 Onshore Activities and Facilities

2.2.2.1 Export Corridors

Two potential export cable corridors are being considered that would connect the ESPs to landfall locations in either Barnstable or Yarmouth: (1) the Western Corridor passes through Muskeget Channel, turn west, and makes landfall at the Covell's Beach parking lot in the Town of Barnstable, New Hampshire Ave/Lewis Bay in the Town of Yarmouth, or a location on Great Island in the Town of Yarmouth, and (2) the Eastern Corridor passes through Muskeget Channel, turn east, and then makes landfall at either New Hampshire Avenue or Great Island. See Figure 3.1-15 of Volume I of the COP.

The New Hampshire Avenue landing site is located inside Lewis Bay where a road dead-ends just west of Englewood Beach at a low concrete bulkhead. A paved parking area is located approximately 300 feet north of the dead-end where construction staging operations could occur. The Great Island cable landing site is located on private property on a barrier beach (Great Island) that separates Lewis Bay from Nantucket Sound. The use of the Great Island landing site avoids the need to route submarine cables through the entrance to Lewis Bay. The Covell's Beach landing site is located on Craigville Beach Road near the paved parking lot entrance to a public beach that is owned and managed by the Town of Barnstable.

In all three cases, the ocean to land transition could be made using Horizontal Directional Drilling (HDD). The HDD rig would be setup in a parking lot or other previously disturbed area; the drill would be advanced seaward. However, the Lewis Bay/New Hampshire Ave landing area may be suitable for a direct lay approach. This landing area is unique in that the shoreline area has been entirely altered with manmade structures (road, sea wall, riprap, etc.). Moreover, there is no eelgrass or other sensitive habitat in the shallow water immediately offshore from the end of New Hampshire Ave.

Upon making landfall, the transmission line would follow one of two potential routes to connect the underground vault at the landfall site to the new onshore substation (Figure 2.2-1 of Volume I of the COP). For both routes, the onshore cables will be located entirely underground, primarily beneath public road right-of-ways with some shorter stretches in existing electric or railroad ROWs. The underground onshore cable routes are approximately 9 to 10 km (5.4 to 6.0 miles) in length.

The physical connection between the offshore export cables and the onshore export cables at the landfall site will be made in an underground concrete vault(s). From the surface, the only visible components of the cable system are the manhole covers. Inside the vault(s), each three-core submarine cable will be separated and spliced into three separate single-core cables and placed within a single duct bank. The duct bank is constructed using heavy wall PVC pipes encased in concrete. The duct bank installation is done with conventional construction equipment (e.g., hydraulic excavator, loader, dump trucks, flatbed trucks to deliver PVC pipe, crew vehicles, cement delivery trucks, paving equipment). Once the duct

bank is in place, the cables are pulled into place via underground splice vaults and associated manholes, which are placed every 457 to 607 m (1,500 to 2,000 ft) or more along the duct bank.

2.2.2.2 Onshore Substation

The onshore substation site will be constructed on the eastern portion of a previously developed site, adjacent to an existing substation, within the Independence Park commercial/industrial area in Barnstable. The buried duct bank will enter the substation site by way of an access road that provides access to the electric transmission corridor from Mary Dunn Road. The substation will house up to four 220 kV /115 kV "step-down" transformers, switchgear, and other necessary equipment. The Project will connect to the bulk power grid via available positions at Eversource's Barnstable Switching Station, located just to the north of the substation site, though Vineyard Wind is also including the option to connect at the West Barnstable Switching Station. If a connection is made at West Barnstable, the Project substation would include step-up transformers (220 kV to 345 kV).

2.2.2.3 Port Facilities

Vineyard Wind has signed a letter of intent to the use the New Bedford Marine Commerce Terminal facility to support Project construction; the terminal is owned by the Massachusetts Clean Energy Center. The 26-acre New Bedford facility, located on the City's extensive industrial waterfront, was purposely built to support offshore wind energy projects. The terminal is just upstream of the Army Corps of Engineers hurricane barrier and has ready access to interstate highways.

The New Bedford facility is expected to be used to offload shipments of components, prepare them for installation, and then load components onto jack-up barges or other suitable vessels for delivery to the lease area for installation[1]. Some component fabrication and fitup may take place in New Bedford or other nearby ports as well.

Given the scale of the Project and the possibility that one or more other offshore wind projects may also use portions of the 26-acre New Bedford facility in parallel with Vineyard Wind, it is possible that Vineyard Wind may stage certain activities from other Massachusetts or North Atlantic commercial seaports. (At this juncture, the Project is also planning to potentially use a port facility in nearby Rhode Island to offload, store and stage the turbine blades for delivery to the offshore construction area as needed.) Consequently, one or more of the ports listed in Table 2-3 may be used during construction of the Project.

[1] Monopiles may not be loaded onto vessels for transport but may instead be pulled by tugs while floating in the water.

Each port facility being considered for the Project is located within an industrial waterfront area and was selected for further evaluation, in part, based on the port's existing infrastructure and capacity to host construction and installation activities. Table 2-3 describes the types of improvements that may be required at each port prior to the Project's use of the port. It is important to note that these improvements will be made irrespective of Vineyard Wind's Project and that Vineyard Wind will not direct or implement any improvements that may be made. Rather, Vineyard Wind will consider whether the ports are suitable for Vineyard Wind's needs if and when any necessary upgrades are made by the owner/lessor.

Table 2-3 Possible Ports Used During Construction

Port	Types of Improvements That May Be Required (To Be Completed by Port Owner/Operator Prior to Use by Vineyard Wind)
Massachusetts Ports	
New Bedford Marine Commerce Terminal	N/A. The New Bedford Terminal was specifically developed to accommodate offshore wind development.
Other areas in New Bedford Port	Onshore infrastructure improvements and local quay reinforcement.
Brayton Point	Land and quay structure improvements and maintenance dredging if used.
Montaup	Land and quay structure improvements; potential removal of some existing onshore infrastructure; and maintenance dredging if used.
Rhode Island Ports	
Providence	Minor land and quay structure improvements and minor dredging.
Quonset Point	Minor land and quay structure improvements and minor dredging.
Connecticut Ports	
New London	Land and onshore infrastructure improvements.
Bridgeport	Onshore infrastructure improvements; local quay reinforcement; and dredging.

2.3 Operations and Maintenance

2.3.1 Offshore Activities and Facilities

The WTGs are designed to operate without attendance by any operators. Continuous monitoring is conducted using a supervisory control and data acquisition (SCADA) system from a remote location. Examples of parameters that are monitored include temperature limits, vibration limits, current limits, voltage, smoke detectors, etc. The WTG also includes

self-protection systems that will be activated if the WTG is operated outside its specifications or the SCADA system fails. These self-protection systems may curtail or halt production or disconnect from the grid.

Weather conditions will also be monitored. The forecasts will cover key parameters covering both meteorological (wind, temperature, visibility, warnings (e.g. lightning), as well as oceanographic parameters (wave conditions). In addition, it is likely that a small weather station (wind, temperature sensors) will be installed on the ESP, as such operations personnel will have an indication of real time conditions offshore which can be used to support the planning and execution of work.

Routine inspection and maintenance activities will be performed for all offshore facilities and may include such things as multi-beam echosounder inspections, side scan sonar inspections, depth of burial inspections, and other geophysical surveys.

2.3.2 Onshore Activities and Facilities

In support of Project operations and the necessary maintenance activities, operations and maintenance facilities (O&M Facilities) will be developed that include offices, a control room, training space for technicians and engineers, shop space, and warehouse space for parts and tools. These functions will be co-located, if feasible.

The O&M Facilities will also include pier space for crew transport vessels (CTV) and other larger support vessels. CTVs are purposely built to support offshore wind energy projects; they are typically about 23 m (75 ft) in length and are set up to safely and quickly transport personnel, parts and equipment. It is expected that approximately 1-2 CTV trips will occur daily during the operation period.

The CTVs are typically used in conjunction with helicopters. Helicopters can be used when rough weather limits or precludes the use of CTVs as well as for fast response visual inspections and repair activities, as needed. The helicopter(s) used to support O&M operations would ideally be based at a general aviation airport in reasonable proximity to the O&M Facilities.

Vineyard Wind is in the early stages of evaluating possible locations for the O&M center; possible locations include Martha's Vineyard or New Bedford. Improvements to the selected site may be needed to accommodate Vineyard Wind's needs, such as improvements to existing marine infrastructure (e.g., dock space for CTVs, access, etc.) and to structures (office and warehouse space). The O&M facilities are expected to be located within an existing working harbor. It is expected that Vineyard Wind would lease the site and any needed improvements would be coordinated with lessor.

2.4 Decommissioning

2.4.1 Offshore Activities and Facilities

As currently envisioned, the decommissioning process is essentially the reverse of the installation process. Decommissioning of the Project is broken down into the following steps:

- Retirement in place or removal of offshore cable system (e.g., 66 kV inter-array and 220 kV offshore export cables).
- Dismantling and removal of WTGs.
- Cutting and removal of monopile foundations (and/or jackets) and possible removal of scour protection.
- Removal of ESPs.
- Possible removal of onshore export cables.

The offshore export cables could be retired in place or removed, subject to discussions with the appropriate regulatory agencies on the preferred approach to minimize environmental impacts. If removal is required, the first step of the decommissioning process would involve disconnecting the inter-array 66 kV cables from the WTGs. Next, the inter-array cables would be extracted from their embedded position in the seabed. If protective mattresses or rocks were used to cover portions of the cables, they are expected to be removed prior to recovering the cable.

Prior to dismantling the WTGs, they would be properly drained of all lubricating fluids, according to the established operations and maintenance procedures and the OSRP. Removed fluids would be brought to a port area for proper disposal and / or recycling. Next, the WTGs would be deconstructed (down to the transition piece) in a manner closely resembling the installation process. It is anticipated that almost all of the WTG will be recyclable, with the potential exception of fiberglass components.

After removing the WTGs, the steel transition pieces and foundation components would be decommissioned. Sediments inside the foundations may be removed and temporarily stored on a barge to allow access for cutting. The foundation and transition piece assembly is expected to be cut below the seabed using one or a combination of: underwater acetylene cutting torches, mechanical cutting, or a high-pressure water jet. The portion of the foundation below the cut will likely remain in place. The cut piece(s) would then be lifted out of the water and placed on a barge for transport to an appropriate port area for recycling. Sediments that were previously removed from the inner space of the foundation would be replaced after the foundation is removed. To minimize sediment disturbance and turbidity, a vacuum pump and diver or ROV-assisted hoses would likely be used.

Subject to consultation with the fishing community, appropriate marine fisheries agencies and BOEM approval of the decommissioning plan, the stone scour protection pads could be left in place. Given the very uniform sandy bottom conditions, the stone scour pads could provide useful habitat diversity and will likely have been in place for at least two decades. If removed, the stone would likely be excavated with a clamshell dredge, placed on a barge, and returned to shore for reuse or disposal at an onshore location.

The process of disassembling the ESPs and their foundations will closely resemble the process used to dismantle the WTGs and their foundations.

The decommissioning of the offshore facilities would require the involvement of an onshore recycling facility with the ability to handle the large quantities of steel and other materials from the Project. There are such facilities currently in operation in New England. Currently, the fiberglass in the rotor blades has no commercial scrap value. Consequently, it is anticipated that the fiberglass from the blades would be cut into manageable pieces and then disposed of at an approved onshore solid waste facility.

2.4.2 Onshore Activities and Facilities

Decommissioning of onshore facilities would be coordinated closely with the host town to ensure that decommissioning activities meet the host town's needs and have the fewest environmental impacts. Subject to those future discussions, it is envisioned that the onshore cables, the concrete encased duct bank itself, and vaults would be left in place for future reuse as would elements of the onshore substation and grid connections. If onshore cable removal is determined to be the preferred approach, removal of cables from the duct bank would be done using truck mounted winches, cable reels and cable reel transport trucks.

3. STATE ENFORCEABLE POLICIES

As part of this consistency certification, Vineyard Wind has evaluated and documented in the following table (Table 3-1) policies identified by Massachusetts and Rhode Island as enforceable, applicable offshore and coastal resources or uses, and CZMA "reasonably foreseeable coastal effects" that might be expected for activities conducted under the proposed action. While reviewing and making these certifications on the policies the states have identified as enforceable in this consistency certification, Vineyard Wind has considered the common enforceable policies identified by each of the two states as enforceable in their CMP as listed in Table 3-1.

4. CONSISTENCY CERTIFICATION

Vineyard Wind has evaluated all applicable enforceable policies of Massachusetts and Rhode Island and the potential activities resulting from the Project. This consistency certification has examined whether the proposed action described in Sections 1 and 2 is consistent to the maximum extent practicable with the policies and provisions identified as enforceable by the

CMPs of Massachusetts and Rhode Island (see Table 3-1). Based on the preceding information and analyses, and the incorporated-by-reference COP, Vineyard Wind has certified the Project will be consistent to the maximum extent practicable with the policies that Massachusetts and Rhode Island have identified as enforceable.

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Coastal Hazards	Coastal Hazards Policies #1 - 4 (MA) Massachusetts Wetland Protection Act (M.G.L. c.131,§40) (MA) Massachusetts General Law Chapter 91 (MA) RI SAMP Section 1160.2.3 Areas of Particular Concern (RI) RI SAMP Section 1160.3 - 4 Prohibitions and Areas Designated for Preservation and Other Areas (RI)	See Section 6.4 of Volume I of the Construction and Operations Plan (COP) for additional information on impacts to coastal habitats and coastal wetland habitats and ecosystems. Potential impacts to coastal wetlands associated with the Vineyard Wind Project (the "Project") may occur where the offshore export cables make landfall; however, through careful route selection and proper use of construction techniques, the Project is designed to avoid potential wetlands impacts to the maximum extent practicable. • **Construction Techniques/Coastal Beach Resource Area:** At the Landfall Site at New Hampshire Avenue in Yarmouth, Vineyard Wind prefers an open-trench technique but is also considering the use of horizontal directional drilling (HDD). Open-trench construction would be completed in a shorter period of time, thus minimizing the duration of construction within Lewis Bay and the neighborhood along New Hampshire Avenue. The only coastal landform the open-trench technique would affect would be a small degraded coastal beach that is bordered on each side by existing bulkheads, and a manmade concrete seawall that backs the coastal beach; this impact would be approximately 1,500 square feet. At the Great Island or Covell's Beach Landfall Sites, the transition from offshore to onshore cable would be installed via HDD to avoid impacts to the most sensitive resource areas along and near the shoreline. • **Coastal Dune Resource Areas:** If the New Hampshire Avenue or Covell's Beach Landfall Sites are used, there will be no impacts to Coastal Dune, as defined in 310 CMR 10.28. If the Great Island Landfall Site is used, there will be some temporary impacts to Coastal Dune on a Barrier Beach, with approximately 4,050 square meters ("m^2") (one acre) of previously-disturbed dune used for the HDD setup, and approximately 610 m^2 (0.15 acres) of Coastal Dune affected along the north side of Great Island Road for installation of the underground duct bank. Disturbed areas will be restored to pre-construction conditions upon completion of construction.

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Coastal Hazards (continued)		• **Additional Wetland Resource Areas:** The Project will require some work within additional wetland resource areas, principally Land Subject to Coastal Storm Flowage ("LSCSF"). No above-ground structures or changes to topography are proposed within LSCSF, and the Project will have no effect on flood velocities or floodplain storage capacity, and therefore no permanent impact to LSCSF is anticipated. Project activities along the Offshore Export Cable Corridors in Land Under the Ocean (as defined in 310 CMR 10.25) will not alter bathymetry in a way that would result in any significant changes to hydrodynamics. Impacts to coastal wetlands and habitats could occur from an accidental spill, including inadvertent releases during refueling of vessels, spills potentially resulting from routine maintenance activities required for operations of the Project, spills due to vessel collisions or allisions, and more significant spills that could result from a catastrophic event occurring at or in proximity to the Project. Vessel fuel spills are not expected, and if one occurred, it is likely to be small. According to the USCG, between 2000 and 2011, the average oil spill size for vessels other than tank ships and tank barges in all US waters was 466 liters (123 gallons) (USCG, 2012). Because a diesel fuel or similar fuel spill of this size is expected to dissipate rapidly then evaporate and biodegrade within a few days, impacts to any affected resources would be short-term and localized to the vicinity of the spill. Likewise, the potential for spills will be further minimized as a result of the fact that vessels will be expected to comply with USCG regulations at 33 C.F.R. § 151 relating to the prevention and control of oil spills. Additionally, the Oil Spill Response Plan ("OSRP Plan"), included in Appendix 1-A, will provide for rapid spill response, clean-up, and other measures that should also help to minimize any potential impact to affected resources as it relates to spills and accidental releases that might occur, including spills resulted from catastrophic events. In addition to spills from vessels, impacts to coastal wetlands and habitats could potentially result from the unlikely event of an accidental release of fuel, lubricating oil, or hydraulic oil from construction equipment operating in or adjacent to the Landfall Site. Refueling and lubrication of stationary equipment will be conducted in a manner that protects coastal habitats from accidental spills. A Construction Spill Prevention Control and Countermeasures Plan will be prepared in accordance with all applicable federal, state,

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Coastal Hazards (continued)		and local requirements. This Plan will identify all measures that will be implemented to prevent spills and the best management practices that that will be in place to contain spills that may occur. As described in Section 3.2.5 of Volume I of the COP, existing ports and staging areas in Massachusetts, as well as one or more ports in Rhode Island, Connecticut, or elsewhere along the North Atlantic coastline, would support Project construction. Vineyard Wind will use ports that are suitable for the Project's needs and will not direct or implement any improvements that may be made; therefore, no impacts to natural coastal landforms will occur as result of the Project. Vineyard Wind is in the early stages of evaluating possible locations for operations & maintenance facilities; possible locations include existing working harbors in Martha's Vineyard or New Bedford. Improvements to the finally selected site may be needed to accommodate Vineyard Wind's needs, such as improvements to existing marine infrastructure (e.g., dock space for CTVs, access, etc.) and to structures (office and warehouse space). The Project will not interfere with water circulation or sediment transport processes, alter bottom topography, increase erosion, or impact littoral drift volumes, as defined in the MA CMP's Coastal Hazards Policy #2. No state or federally-funded public works projects, as defined in the MA CMP's Coastal Hazards Policy #3, will occur as a result of the proposed action. Consistent with the RI Ocean Special Area Management Plan (SAMP) Section 1160.3, no Project components will be constructed within Areas Designated for Preservation. Likewise, no Project components will be constructed within "Other Areas" listed in RI SAMP Section 1160.4. If Quonset or Providence Port are utilized, vessels traveling between one of these ports and the Wind Development Area (WDA) may transit within "Areas of high intensity commercial ship traffic in state waters" identified within Section 1160.4. The Navigational Risk Assessment included as Volume III-I of the COP indicates that Project-related vessel traffic (3-4 vessels daily) will only cause a moderate increase in existing traffic (about 25 vessels daily) within the Traffic Separation Scheme approaches to and from ports in Rhode Island, Massachusetts, and Connecticut. Potential impacts will be minimized by the establishment of a vessel traffic management plan to align scheduling of construction activities with port operations.

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Energy	Energy Policy #1-2 (MA)	The Project, which involves large-scale offshore wind energy generation and the transmission of that energy to shore, is by nature a coastally-dependent energy facility. An analysis of potential locations for wind energy development was previously conduced by BOEM when designating the Massachusetts Wind Energy Area (MA WEA), in which the Project is located. The Project is consistent with the intent of Energy Policy #2 to encourage "the use of alternative sources such as solar and wind power in order to assist in meeting the energy needs of the Commonwealth." In accordance with the mandate provided by the 2016 energy legislation, the Project will provide the Commonwealth of Massachusetts with ~800 megawatts ("MW") of clean, renewable wind energy.
Habitat	Habitat Policy #1 – 2 (MA) RI SAMP Section 1160.3 Prohibitions and Areas Designated for Preservation (RI)	The Project is designed to avoid impacts to coastal habitats and wetland resource areas to the maximum extent practicable and to minimize and mitigate unavoidable impacts in accordance with applicable federal, state, and local regulations. By complying with performance standards identified in the Massachusetts WPA, the Project will serve the protected interests identified in the statute. Wetlands impacts associated with the Onshore Export Cable Corridors are as follows: • The Covell's Beach Landfall Site and the Western Onshore Export Cable Route includes areas of LSCSF. Coastal beach and coastal dune are near the Landfall Site but would not be affected by the Project; construction impacts would be limited to paved surfaces (public roadway and a paved parking lot). • The New Hampshire Avenue Landfall Site and the Eastern Onshore Export Cable Route includes areas of Coastal Beach LSCSF. The coastal beach at the New Hampshire Avenue Landfall Site is directly seaward of a concrete bulkhead at the end of New Hampshire Avenue, and is bordered by two existing bulkheads on adjacent properties. The beach is relatively narrow, with a width of approximately 50 feet at low tide. At high tide, the beach is confined to a small rectangular area surrounded on three sides by bulkheads and riprap. Installation of the export cable by open trenching would require the temporary installation of cofferdams and would temporarily alter approximately 1,500 square feet of coastal beach.

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Habitat (continued)		• The Great Island Landfall Site and the Eastern Onshore Export Cable Route includes areas of LSCSF and coastal dune; the coastal dune is located on a barrier beach If the Great Island Landfall Site is used, approximately 4,050 m2 (one acre) of coastal dune will be impacted by HDD operations north of Great Island Road. The area of the dune that will be affected by HDD staging and operations has been previously disturbed, having once served as a dredge spoil disposal site. Approximately 610 m2 (0.15 acres) of Coastal Dune will also be temporarily affected during construction of the duct bank directly adjacent to Great Island Road. As noted previously, all disturbed areas will be restored to pre-construction conditions. No above-ground structures or changes to topography are proposed within LSCSF. The Project will have no effect on flood velocities or floodplain storage capacity, and therefore no permanent impacts to LSCSF or BLSF are anticipated for any Onshore Export Cable Route. For the New Hampshire Avenue Landfall Site, an area of eelgrass is mapped from a 2015 Massachusetts Department of Environmental Protection survey west of the entrance to Lewis Bay, but this mapped eelgrass can be avoided. At the Great Island Landfall Site, a wider swath of eelgrass beds is mapped just offshore in the 2015 Massachusetts Ocean Management Plan, and it is possible that HDD would not avoid all impacts to these eelgrass beds, though it would minimize potential impacts, and the Project would take steps necessary to ensure compliance with the Massachusetts WPA. No eelgrass habitat has been mapped offshore from the Landfall Site at Covell's Beach. The Offshore Export Cable Corridors are located entirely within Land Under the Ocean. The Export Cable Corridors have been evaluated according to numerous factors, including technical feasibility and environmental considerations, such as the presence of hard bottom habitat, mapped shellfish suitability areas, and the amount of dredging required. The corridors cross some areas of mapped hard bottom and shellfish suitability areas. The Project has sought to avoid impacts to these areas to the greatest extent feasible and will include post-construction benthic monitoring to evaluate impacts and recovery.

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Habitat (continued)		No impact to Areas Designated for Preservation within the RI SAMP, which are afforded additional protection than Areas of Particular Concern, are anticipated as a result of the Project. No impacts to Critical Habitat under the Endangered Species Act and no mining and extraction of minerals, including sand and gravel, from tidal waters and salt ponds would occur as a result of the Project. As described in Section 4.2.3.3.2 of Volume I of the COP, some dredging may be required within the Offshore Export Cable Corridor prior to cable laying due to the presence of sand waves. Dredged material is expected to be side-cast. While not anticipated, if any disposal of dredged material in the ocean, as defined in and subjected to regulations of RI Coastal Resources Management Plan (CRMP) Section 300.9, is proposed, it will be conducted in accordance with the U.S. EPA and U.S. Army Corps of Engineers' manual, *Evaluation of Dredged Material Proposed for Ocean Disposal*. The Project does not include the disposal of dredged material in the following Areas of Particular Concern: historic shipwrecks and archaeological or historic sites; offshore dive sites; navigation, military, and infrastructure areas; and moraines. The Project also does not include underwater cables within Areas Designated for Preservation, although underwater cables are exempt from the existing prohibition of any Large-Scale Offshore Development, mining and extraction of minerals, or other development that has been found to be in conflict with the intent and purpose of an Area Designated for Preservation within the Ocean SAMP. Indirect impacts have the potential to occur from a hypothetical fuel spill; however, as discussed above, should an incidental diesel fuel or oil spill occur as a result of the Project, the impacts on coastal habitats are expected to be negligible.
Ocean Resources	Ocean Resources Policies #1-3 (MA)	As described in Section 7.9.1.4 of Volume III of the COP, the Project does not include and will not adversely affect any state-regulated aquaculture, marine mineral resource extraction, or offshore sand and gravel extraction as described in CMP's Ocean Resources Policies #1, #2, and #3, respectively.

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Ports and Harbors	Ports and Harbors Policy #1 – 4 (MA) RI SAMP Section 1160.2 (1) and (2) Areas of Particular Concern (RI)	As described in Section 3.2.5 of Volume I of the COP, existing ports and staging areas in Massachusetts, as well as one or more ports in Rhode Island, Connecticut, or elsewhere along the North Atlantic coastline, would support Project construction. Within Massachusetts, Vineyard Wind has signed a letter of intent to the use the New Bedford Marine Commerce Terminal ("New Bedford Terminal"), owned by the Massachusetts Clean Energy Center ("MassCEC"), to support Project construction. The 26-acre New Bedford Terminal is located on the City's extensive industrial waterfront, within a Designated Port Area (DPA), and was purpose built to support offshore wind energy projects. However, given the scale of the Project and the possibility that one or more other offshore wind projects may be using portions of the New Bedford Terminal at the same time, Vineyard Wind may need to stage certain activities from other ports located in Massachusetts, Rhode Island, Connecticut, or elsewhere along the North Atlantic coastline. Potential ports that may be used for the Project are listed in Table 3.2-1 of Volume I of the COP. Vineyard Wind will use ports that are suitable for the Project's needs and will not direct or implement any improvements that may be made; therefore, no impacts to ports and surrounding area will occur as result of Project construction. Vineyard Wind is in the early stages of evaluating possible locations for operations & maintenance facilities; possible locations include existing working harbors in Martha's Vineyard or New Bedford. Improvements to the finally selected site may be needed to accommodate Vineyard Wind's needs, such as improvements to existing marine infrastructure (e.g., dock space for CTVs, access, etc.) and to structures (office and warehouse space). Section 7.7 of Volume III of the COP describes impacts of the Project on land use and coastal infrastructure. Overall, construction and installation impacts are anticipated to be temporary. Installation of duct bank beneath paved roadways will require only minimal disturbance to the adjacent road shoulder and is expected to be completed without significant alteration to any land or infrastructure. Land uses are not anticipated to be impacted or altered upon completion of the construction and installation phase. The number of vessels transiting to New Bedford and other ports under consideration will increase as a result of the Project; potential impacts to navigation are discussed in detail in Appendix III-I of the COP.

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Protected Areas	Protected Areas Policy #1 – 3 (MA) RI SAMP Section 1160.2 Areas of Particular Concern (RI) RI SAMP 1160.3 Prohibitions and Areas Designated for Preservation (RI)	Vineyard Wind is conducting ongoing assessments of historical and archaeological resources within areas potentially affected by the Project. On behalf of Vineyard Wind, Public Archaeology Laboratory ("PAL") completed an archaeological due diligence review of potential Onshore Export Cable Routes as well as the archaeological permit application that are included as Appendix III-G of Volume III of the COP. The desktop archaeological due diligence review was conducted to provide information about known archaeological sites within one-half mile of the potential routes, provide a sensitivity assessment for archaeological resources with the Project Area, and make recommendations regarding the need for consultation with the Massachusetts Historical Commission ("MHC") and additional cultural resource management investigations. For onshore areas, it is anticipated that none of the identified buildings or structures will be altered by proposed underground line construction for either onshore route under consideration. A reconnaissance level archaeological survey is presently underway with an approved archaeological permit from the MHC. The survey will be completed in cooperation with local historical commissions and Tribal Historic Preservation Offices. Potential effects, if any, to archaeological resources will be addressed with the Massachusetts Historical Commission through Section 106 of the National Historic Preservation Act ("NHPA"), 4 U.S.C. 300101 et seq., and the State Register Review processes. No previously-identified archaeological resources are located within the Offshore Export Cable Corridors. A permit was received to conduct a marine archaeological survey from the Massachusetts Board of Underwater Archaeological Resources, and preliminary surveys were completed in August 2017. As described in Section 7.3 of Volume III and Appendix II-C of the COP, the surveys did not identify any shipwrecks or aircraft debris along the Offshore Export Cable Corridors, though one shipwreck was identified in the WDA. More detailed marine geophysical and geotechnical surveys are scheduled for Spring/Summer 2018. If potentially significant marine archaeological resources are ultimately identified, the Proponent will consider alternatives to avoid, minimize, and/or mitigate potential impacts to those resources in compliance with Section 106 of the NHPA and State Register Review, as applicable.

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Protected Areas (continued)		An evaluation of the Project's visual impacts to historic resources is provided within Appendix III-H.b. of the COP. (An assessment of the Project's general visual impacts is provided within Appendix III-H.a. of the COP and is summarized below under Public Access.) For the onshore substation, no adverse visual effects are anticipated as a result of modifying the substation or constructing an adjacent station (if needed). For offshore Project components, Areas of Potential Effect (APE) were defined using field surveys to identify locations with the potential to view the WDA. As detailed in Appendix III-H.b. of the COP, limited historic properties on Martha's Vineyard, the southwestern coast of Nantucket and their minor outlying islands may have changes in their viewsheds as a result of the Project. However, it is not the viewshed of the property that is being affected, but rather the viewshed from the property, which in some cases is not as significant. Additionally, distance and weather conditions render the WDA not visible during many times of the year. No effect to historic properties on Cape Cod or Cuttyhunk Island is anticipated due to extreme distance from the WDA. The Project is not located within or near, and will not impact, any Areas of Critical Environmental Concern ("ACECs") or state designated scenic rivers, as described in CMP's Protected Areas Policies #1 and #2, respectively. RI SAMP Section 1160.2 includes a prohibition on Large-scale, Small-scale, or other offshore development, or any portion of a proposed project within Areas of Potential Concern (APCs). Consistent with this provision, the Project is not located within any APC, including: • Historic shipwrecks, archaeological or historical sites and their buffers • Offshore dive sites within the Ocean SAMP area • Glacial moraines • Navigation, Military, and Infrastructure area including: designated shipping lanes, precautionary areas, recommended vessel routes, ferry routes, dredge disposal sites, military testing areas, unexploded ordnance, pilot boarding areas, anchorages, and a coastal buffer of 1 km

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Protected Areas (continued)		• Areas of high fishing activity as identified during the pre-application process by the Fishermen's Advisory Board • Several heavily-used recreational boating and sailboat racing areas • Naval Fleet Submarine Transit Lanes During construction, Project-related vessels may transit through some of the above APC areas. The Navigational Risk Assessment included as Volume III-I of the COP indicates that Project-related vessel traffic (3-4 vessels daily) will only cause a moderate increase in existing traffic (about 25 vessels daily) within the Traffic Separation Scheme approaches to and from ports in Rhode Island, Massachusetts, and Connecticut. Construction vessels would follow routes similar to regular commercial traffic to port sites in Rhode Island. It is assumed that deep draft construction vessels or those loaded with large components would navigate to the northern traffic separation zone when traveling to a Rhode Island port. Potential impacts will be minimized by the establishment of a vessel traffic management plan to align scheduling of construction activities with port operations. Vineyard Wind will continue to engage with the local pilots to coordinate approaches to the ports so as to minimize risk to navigation when entering the port area, as needed. Furthermore, Vineyard Wind's Marine Coordinator will keep track of all planned vessel deployment and will assist with vessel traffic coordination at Rhode Island ports. The Marine Coordinator will ensure ongoing coordination between the USCG, vessels employed for construction, and other relevant parties such as commercial operators (e.g. ferry, tourist, and commercial fishing vessel operators). The WDA is not located within the RI Recreational boating areas designated as Areas of Particular Concern in state waters. As noted in the preceding paragraph, Project-related vessels may transit through part of this area during construction to access a Rhode Island port. In advance of marine events and sailing regattas, Vineyard Wind will work with the event organizers to promote safe navigation and minimize any conflicts. An assessment of the Project's impacts to fish and a description of use of the Project Area by commercial and for hire recreational fishermen are provided in Sections 6.6 and 7.6 of Volume III of the COP, respectively. In general, impacts to finfish and invertebrate species

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Protected Areas (continued)		are expected to be short-term and localized during the construction and installation of the Project. The low total fish biomass and high species richness in the Project Area makes this location ideal for wind energy as it reduces impacts to individual organisms and targets an area which will likely be able to recover following any potential Project-related disturbances. In addition, the Massachusetts Wind Energy Area (MA WEA), in which Vineyard Wind's Lease Area is located, was selected by BOEM to exclude most sensitive fish and invertebrate habitat. As described in detail in Section 7.6 of Volume III of the COP, Vineyard Wind's extensive outreach and conversations with over 100 fishery stakeholders has aided in identifying commercial fishing effort in the WDA. Based on that outreach, the following fisheries could be most affected during construction and installation phase of the Project: • Static gear fisheries (gill nets, traps/pots) • Ground fish/Bottom trawl mobile gear (squid/Fluke/Atlantic Mackerel) • Atlantic Surfclam/Ocean Quahog dredge fishery Many factors, both environmental and regulatory, contribute to productive commercial fishing areas, and as a result, the locations of commercial fishing, and to a lesser extent for-hire recreational fishing activities, are variable. Based on the most recent Vessel Monitoring Systems (VMS) data available, commercial fishing vessel density, a qualitative measure of fishing effort, suggests that vessels targeting groundfish, monkfish, scallop, and ocean quahogs in the WDA are generally Medium-Low to Medium-High. The squid fishery appears to be the most active in the WDA. Vineyard Wind will continue to meet with fishermen to solicit additional information on fishing effort in the WDA, and to ensure that the most accurate and relevant information regarding each of the fisheries in the Project Region is incorporated into the Project's operations plans. Based on the analysis by Kirkpatrick et al. (2017) of commercial fishing activity within the MA WEA, commercial fishing revenue generated from within the MA WEA constitutes small percentages of each fishery's total revenue. As a percentage of revenue, gillnet and bottom trawl vessels, and vessels targeting species from the Small Mesh Multispecies,

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Protected Areas (continued)		skate, Monkfish, Surfclam/Ocean Quahog appear most active in the MA WEA. As a percentage of revenue, individual species most harvested from the MA WEA include Silver Hake, Ocean Quahog, skates, and Monkfish. Commercial fishing and for-hire recreational activities also occur along the Offshore Export Cable Corridor (OECC), particularly to the west and east of Muskeget Channel's southerly approach. Commercial shellfishing is also active in and around Lewis Bay, including areas proximate to the three Landfall Sites under consideration. Overall, impacts to fisheries resources during construction are anticipated to be short-term and localized. Pelagic species will be able to avoid construction areas and are not expected to be substantially impacted by construction and installation. Impacts to mobile pelagic fish and invertebrate species include localized and short-term avoidance behavior. These impacts can be minimized or offset through mitigation consisting of a "soft-start" pile driving regime and efficient construction practices. Direct mortality may occur to immobile benthic organisms that are in the direct path of construction processes. Mortality of immobile pelagic egg and larval life stages in the construction area (WDA and OECC) may occur through water withdrawals of the construction vessels. Although eggs and larvae may be entrained and will not survive, loss of many adult fish and population level impacts are not expected as most of these species produce millions of eggs each year and already have low adult survival rates. In addition, mortality of pelagic eggs due to increased suspended sediments is not likely as only low concentration sediment plumes are expected and resettlement will occur quickly (less than five hours in the water column). Burial and mortality of some demersal eggs and sessile organisms is also expected during cable installation in the WDA and OECC, where deposition is greater than one millimeter. However, mortal deposition levels are only expected in small, localized areas in the direct vicinity of the cable routes. Burrowing mollusks in the area, such as quahogs, will likely be able to avoid construction and burial and are only expected to be slightly impacted and exhibit short-term avoidance of the area. Overall, although sessile benthic organisms and demersal species and life stages will incur the brunt of

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Protected Areas (continued)		construction impacts, because the impacted area is only a small portion of the available habitat in the area, population level impacts are highly unlikely. Impacts to finfish and invertebrate species are expected to be short-term and localized during the construction and installation of the Project. Impacts to commercial fishing activities due to installation of the offshore cable system may result in temporary disruptions to access of shellfishing areas along the Offshore Export Cable Corridor (OECC). Construction and installation may also cause direct impacts to shellfish in proximity to the cable installation. It is expected that physical habitat will recover from the disturbance and communities begin to repopulate within a few months of construction and installation activities concluding (Dernie et al., 2003; Van Dalfsen & Essink, 2001). Vineyard Wind has designed the site layout using a grid pattern and, in consultation with local fishermen and the US Coast Guard, 1 nautical mile wide transit corridors in a northwest/southeast and northeast/southwest direction have been maintained. Vineyard Wind will not restrict fishing or transit in the Project area, except for temporary safety zones during construction or maintenance. Any such restrictions would be included in Notices to Mariners (NTMs) distributed by Vineyard Wind and the US Coast Guard. Commercial fishing impacts will be further mitigated by ongoing communication via the Fisheries Communication Plan (provided in Attachment III-E of Volume III of the COP) and the use of Fisheries Liaisons and Fisheries Representatives. In addition, Vineyard Wind is developing a framework for a pre- and post-construction fisheries monitoring program to measure the Project's effect on fisheries resources. Vineyard Wind is working with the Massachusetts School for Marine Science and Technology (SMAST) and local stakeholders to inform that effort and design the study. During operations and maintenance, noise generated from the operation of wind farms is anticipated to be minimal and only localized avoidance behaviors are expected; acclimation to the noise over time may occur. The addition of EMF from submarine cables will likely not have an impact on elasmobranchs or other electro-sensitive fish species, as cables will be buried in the substrate or covered with rock or concrete mattresses. The introduction of hard structure habitat through the addition of foundations and associated

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Protected Areas (continued)		scour protection for the wind turbine generators and electrical service platforms will add a complexity to the area that did not exist before and will likely attract species that prefer structured habitat. The WDA is located in water depths greater than 20 meters (65.6 ft) and therefore is not located in a sea duck foraging habitat Area Designated for Preservation (RI Ocean SAMP 1160.3 1(i)). In addition, areas of high sea duck occurrence were removed from the MA Call Area during BOEM's Area Identification process and were likewise excluded from leasing consideration. See Section 6.2 of Volume III of the COP for additional information on birds. No impacts to public recreation areas in MA and RI are anticipated as a result of the Project. As described in Section 1.5.3 of Volume I of the COP, activities at the Landfall Site where transmission will transition from offshore to onshore will not be performed during the months of June through September unless authorized by the host town. Likewise, Vineyard Wind will not conduct activities along the onshore transmission route within public roadway layouts from Memorial Day through Labor Day unless authorized by the host town; such work could extend through June 15 subject to consent from the local Department of Public Works (DPW). Vineyard Wind will consult with the towns regarding the construction schedule. These summer limitations on certain onshore construction activities are shown on the detailed construction schedules included as Figures 4.1-1 and 4.1-2 in Volume I of the COP. Vineyard Wind does not anticipate any new coastal development as a result of the Project and will only use coastal sites for HDD Landfall Sites. Potential impacts to wetlands or other coastal habitats are discussed above in the "Coastal Hazards" section.

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Public Access	Public Access Policy #1 (MA) RI SAMP 1160.2 Areas of Particular Concern (RI)	The Project is not anticipated to adversely impact public use and enjoyment of the water's edge. • The Project does not involve development of coastal sites, and will only use coastal sites for HDD Landfall Sites. As described above under Protected Areas and in Section 1.5.3 of Volume I of the COP, activities at the Landfall Site where transmission will transition from offshore to onshore will not be performed during the months of June through September unless authorized by the host town. • As discussed above under Ports and Harbors and as described in Section 3.2.5 of Volume I of the COP, existing ports and staging areas in Massachusetts, as well as one or more ports in Rhode Island, Connecticut, or elsewhere along the North Atlantic coastline, would support Project construction. Vineyard Wind will use ports that are suitable for the Project's needs and will not direct or implement any improvements that may be made; therefore, no impacts to ports and surrounding area will occur as result of Project construction. Vineyard Wind is in the early stages of evaluating possible locations for operations & maintenance facilities; possible locations include existing working harbors in Martha's Vineyard or New Bedford. Improvements to the finally selected site may be needed to accommodate Vineyard Wind's needs, such as improvements to existing marine infrastructure (e.g., dock space for CTVs, access, etc.) and to structures (office and warehouse space). • An assessment of the Project's visual impacts is provided within Appendix III-H.a. of the COP. The distance of the WDA from the nearest coastal vantage point – greater than 23 km (14 mi) - serves to minimize Project visibility from sensitive visual resources. The Project would result in minimal change to landscape conditions for viewers along the Martha's Vineyard and Nantucket coastline. Viewers on the islands will have limited visibility of the Wind Turbine Generators (WTGs) when weather conditions allow. However, at distances greater than 23 km (14 mi) and viewed within the context of the ocean that includes the vast expanse of water, extended beach views and dunes, as well as the sights and

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Public Access (continued)		• sounds of breaking surf and wind, the Project would likely be considered visually subordinate to the wider landscape. The Project will be virtually undetectable from Cape Cod. • An assessment of the Project's visual impacts to historic resources is provided within Appendix III-H.b. of the COP and is summarized above under Protected Resources. Overall, as discussed in Section 7.5 of Volume III of the COP, the Project is not anticipated to have a significant or long-term adverse impact on recreational resources.
Water Quality	Water Quality Policy #1 (MA) (Point Source) Water Quality Policy #2 (MA) (Nonpoint Source) Water Quality Policy #3 (MA) (Groundwater Discharges) Section 401 of the Clean Water Act (33 U.S.C. 1251 et seq.) (MA, RI)	The routine activities associated with the proposed action which would impact coastal and marine water quality include structure installation and removal and vessel discharges (including bilge and ballast water and sanitary waste). Additional information on water quality and impacts to coastal and marine water quality can be found in Section 5.2 of Volume III of the COP. Cable burial operations will occur both in the WDA for the inter-array cables connecting the WTGs to the Electrical Service Platforms (ESPs) and the OECCs for the cables carrying power from the ESPs to landfall. The modeling analyses conducted for the Project indicate that, for both the inter-array cables and the OECCs, mobilized sediment is not transported far by the currents in most cases and settles rapidly. Sediment plumes greater than 10 mg/L typically persist at any given point for less than six hours, and in no case for more than 12 hours. The plume is confined to the bottom three meters (9.8 ft) of the water column, which is usually only a fraction of the water column, and maximum deposition is typically less than five millimeters (0.2 in). Pile driving will be utilized to install the WTG and ESP foundations within the WDA. The potential impacts to water quality via sediment resuspension from repeated hammer blows to the pile would be local to the pile outer diameter and are not anticipated to cause any significant sediment resuspension. HDD may be used, as described in Section 4.2.3.8 of Volume I of the COP, to avoid impacts of standard cable burial techniques in the nearshore region. These activities will only occur in the OECCs. HDD operations may involve temporary removal of sediments from within a partial cofferdam. After cable connection activities are completed, the sediment will be replaced. It is possible that potential, limited sediment releases could occur during the refilling operation but impacts would be localized and short-term.

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Water Quality (continued)		Installation of the rocks or stones for scour protection will occur at each WTG and ESP foundation. The area of scour protection will be limited to 2100 square meters ("m^2") (0.52 acres) at each WTG and 2500 m^2 (0.62 acres) at each ESP. Placement of the rock may yield a temporary increase in suspended sediments due to resuspension of bottom sediments as the rock is placed; however, such impacts are anticipated to be a short-term and temporary due to the predominately sandy composition of the upper sediments in the WDA. Dredging along portions of the OECC may result in temporary increased suspended solids in the water due to sediment remobilization. The amount of remobilization will be based upon the advance rate or speed of the equipment and the fraction of the sediment volume mobilized into the water column. It is anticipated that best management practices will be employed to limit sediment resuspension and dispersion during dredging. Additionally, the proposed side-casting is advantageous over other available disposal methods in that it will limit the generation of suspended sediments. Water quality related to suspended sediments from dredging and other construction activities, as appropriate, will be monitored. Details of the monitoring effort will be developed with the appropriate state and federal agencies (Massachusetts Department of Environmental Protection 401 Regulatory Program and the US Army Corps of Engineers) during other permitting processes. The monitoring is anticipated to consist of using a hand-held or similar turbidity sensor deployed from a small vessel to collect turbidity readings from multiple depths within the water column. If determined to be appropriate, collection of water samples for subsequent analysis for total suspended solids (TSS) could be made from the vessel to quantify the sediment concentration in the plume. Background levels outside of the plume for turbidity (and TSS, if appropriate) could also be acquired. Limited water withdrawals during construction may include water for cable installation (if jet plowing is used) and bilge/ballast water. These modest and temporary water withdrawals are not anticipated to have any meaningful impact on water quality. Vessels may discharge some liquid wastes to marine waters in both the WDA and OECCs. These discharges include domestic water, uncontaminated bilge water, treated deck drainage and sumps, uncontaminated ballast water, and uncontaminated fresh or seawater from vessel air conditioning. Bilge water discharges may occur in nearshore and offshore waters provided that

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Water Quality (continued)		the effluent is processed by an approved oily water separator and the oil content is less than 15 parts per million. In navigable waters of the United States, vessels may not discharge any effluent that contains oil that causes a sheen on the surface of the water or an emulsion beneath the water, which is a violation of 40 CFR 110. Bilge water that cannot be discharged in compliance with these standards must be retained onboard the vessel for subsequent discharge at an approved port reception facility per 33 CFR 151.10(f). Ballast water is used to maintain stability of the vessel and may be pumped from coastal or marine waters. Generally, the ballast water is pumped into and out of separate compartments and is not usually contaminated with oil; however, the same discharge criteria for bilge water apply to ballast water (33 CFR 151.10). Ballast water also may be subject to the USCG's Ballast Water Management Program to prevent the spread of aquatic nuisance species. Accordingly, these discharges will not pose a water quality impact. BOEM (2014) determined the following related to potential water quality impacts from routine vessel discharges: "[I]n the WEA, coastal and oceanic circulation and the large volume of water would disperse, dilute, and biodegrade vessel discharges relatively quickly, and the water quality impact would be minor." Other waste generation such as sewage, solid waste or chemicals, solvents, oils and, greases from equipment, vessels or facilities will be stored and properly disposed of on land or incinerated offshore and will not generate an impact. The Project will require all vessels to comply with regulatory requirements related to the prevention and control of discharges and the prevention and control of accidental spills. Spills could occur during refueling, fluid exchange, or as the result of an allision or collision. Oil and other types utilized by the Project are presented in Table 4.2-3 of Volume I of the COP and in Appendix I-A. Vessel fuel spills are not expected, and if one occurred, it is likely to be small. According to the USCG, between 2000 and 2011, the average oil spill size for vessels other than tank ships and tank barges in all US waters was 466 liters (123 gallons) (USCG, 2012). Because a diesel fuel or similar fuel spill of this size is expected to dissipate rapidly and evaporate within days, impacts to any affected resources would be short-term and localized to the vicinity of the spill. The Project has also developed a draft Oil Spill Response Plan, which is included in Appendix I-A of the COP, which will provide for rapid spill response, clean-up, and other measures that should also help to minimize any potential impact to affected resources as it relates to spills and accidental releases that might occur, including spills resulted from catastrophic events.

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Water Quality (continued)		The USEPA National Pollutant Discharge Elimination System (NPDES) storm water effluent limitation guidelines control storm water discharges from support facilities such as ports and harbors. The Project is not anticipated to increase runoff or onshore discharge into harbors, waterways, coastal areas, or the ocean environment. The Project does not proposed any subsurface waste discharges
Historical Properties	Protected Areas Policy #3 (MA) Rhode Island Historical Preservation Act and Antiquities Act (RI) RI SAMP Section 1160.1.12-17 Overall Regulatory Standards (RI) RI SAMP Section 1160.2.3(i) Areas of Particular Concern (RI)	A Marine Archaeology Assessment and a Visual Impact Assessment (including visual impacts to historic resources) have been conducted for the Project. These assessments are included as Appendices II-C, III-H.a and III-H.b of the COP, respectively. As described above under Protected Areas, on behalf of Vineyard Wind, Public Archaeology Laboratory ("PAL") completed an archaeological due diligence review of potential Onshore Export Cable Routes as well as the archaeological permit application that are included as Appendix III-G of Volume III of the COP. The desktop archaeological due diligence review was conducted to provide information about known archaeological sites within one-half mile of the potential routes, provide a sensitivity assessment for archaeological resources with the Project Area, and make recommendations regarding the need for consultation with the Massachusetts Historical Commission ("MHC") and additional cultural resource management investigations. For onshore areas, it is anticipated that none of the identified buildings or structures will be altered by proposed underground line construction for either onshore route under consideration. A reconnaissance level archaeological survey is presently underway with an approved archaeological permit from the MHC. The survey will be completed in cooperation with local historical commissions and Tribal Historic Preservation Offices. Potential effects, if any, to archaeological resources will be addressed with the Massachusetts Historical Commission through Section 106 of the National Historic Preservation Act ("NHPA"), 4 U.S.C. 300101 et seq., and the State Register Review processes. No previously-identified archaeological resources are located within the Offshore Export Cable Corridors. A permit was received to conduct a marine archaeological survey from the Massachusetts Board of Underwater Archaeological Resources, and preliminary surveys were completed in August 2017. As described in Section 7.3 of Volume III and Appendix II-C of the COP, the surveys did not identify any shipwrecks or aircraft debris along the Offshore Export Cable Corridors, though one shipwreck was identified in the Wind Development Area (WDA).

Table 3-1 Applicable Enforceable Policies for the Coastal Management Programs for Massachusetts and Rhode Island (Continued)

CATEGORY	ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES	REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)
Historical Properties (continued)		More detailed marine geophysical and geotechnical surveys are scheduled for Spring/Summer 2018. If potentially significant marine archaeological resources are ultimately identified, the Proponent will consider alternatives to avoid, minimize, and/or mitigate potential impacts to those resources in compliance with Section 106 of the NHPA and State Register Review, as applicable. An assessment of the Project's visual impacts, including visual impacts to historic resources, is provided within Appendices III-H.a. and III-H.b. of the COP. For the onshore substation, no adverse visual effects are anticipated as a result of modifying the substation or constructing an adjacent station (if needed). For offshore Project components, Areas of Potential Effect (APE) were defined using field surveys to identify locations with the potential to view the WDA. As detailed in Appendix III-H.b. of the COP, limited historic properties on Martha's Vineyard, the southwestern coast of Nantucket and their minor outlying islands may have changes in their viewsheds as a result of the Project. However, it is not the viewshed of the property that is being affected, but rather the viewshed from the property, which in some cases is not as significant. Additionally, distance and weather conditions render the WDA not visible during many times of the year. No effect to properties on Cape Cod or Cuttyhunk Island is anticipated due to extreme distance from the WDA.
Growth Management	Growth Management Policy #1 (MA)	This Project is proposed in response to the Commonwealth's 2016 *An Act to Promote Energy Diversity* and is located within the Massachusetts WEA. The WEA location was carefully selected by BOEM through a process that involved significant public input. The WDA is located approximately 23 km (14 miles) south of Martha's Vineyard and Nantucket in federal waters. A Visual Impacts Assessment for the wind turbines has been prepared and is included in Appendices III-H.a and III-H.b. The offshore cable and its Landfall Site will not be visible, and therefore will not alter local community character. Additionally, the Project's proposed onshore substation is located adjacent to the existing Barnstable Switching Station, so will be compatible with existing land uses.

References

BOEM. (2014). *Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore Massachusetts Revised Environmental Assessment*. U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. OCS EIS/EIA BOEM 2014-603.

Dernie, K. M., Kaiser, M. J., & Warwick, R. M. (2003). Recovery rates of benthic communities following physical disturbance. *Journal of Animal Ecology*, 72 (6), 1043-1056.

Kirkpatrick, J.A., Benjamin, S., DePiper, G.D., Murphy, T., Steinback, S., & Demarest, C. (2017). *Socio-Economic Impact of Outer Continental Shelf Wind Energy Development on Fisheries in the U.S. Atlantic, Vol. I – Report Narrative.* U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Atlantic OCS Region. Washington, D.C. OCS Study BOEM 2017-012.

U.S. Coast Guard (USCG). 2012. Pollution Incidents In and Around U.S. Waters, A Spill/Release Compendium: 1969-2011: U.S. Coast Guard Marine Information for Safety and Law Enforcement (MISLE) System.

Van Dalfsen, J. A., & Essink, K. (2001). Benthic community response to sand dredging and shoreface nourishment in Dutch coastal waters. *Senckenbergiana marit*, 31(2), 329-32.

Appendix 3. MADMF-Vineyard Wind Notice to Mariners (4/26/18)

Commonwealth of Massachusetts

Division of Marine Fisheries

251 Causeway Street, Suite 400
Boston, Massachusetts 02114
(617) 626-1520
fax (617) 626-1509

David E. Pierce, PhD.
Director

Charles D. Baker
Governor
Karyn E. Polito
Lieutenant Governor
Matthew A. Beaton
Secretary
Ronald S. Amidon
Commissioner
Mary-Lee King
Deputy Commissioner

April 26, 2018
MarineFisheries Advisory

Notice to Fishermen: Vineyard Wind Geotechnical Survey

Geotechnical surveys will take place in the Vineyard Wind Lease Area and between the Lease Area and Cape Cod, including Muskeget Channel and Nantucket Sound. The surveys began on April 16th and will last up to 4 months. Please see the Notice to Fishermen for more information.

Fishermen may contact Jim Kendall at 508-287-2010 for more information and a map of the area.

OCS-A 0501 MASS USA

VINEYARD WIND

NOTICE TO MARINERS AND FISHERMEN

Please call Jim Kendall for the latest information: 508-287-2010

Geotechnical Survey Beginning on or about April 16, 2018 – estimated duration 4 months

Vessel: M/V Horizon Geobay
LOA: 285 feet
Flag: Panama
Mobile: +44(0)7551328817
Tel VSAT: +85231521336
Tel Inmarsat: +870773236478
Email: master.geobay@horizon-geosciences.com
Standing by on VHF Channel 16

Vessel: R/V Dina Polaris
LOA: 324 feet
Flag: Norway
GSM Captain: +47 47970226
V-Sat Captain: +47 51229011
V-Sat Bridge: +47 51229010
Iridium: +88 1677744768
Email: bridge@dinapolaris.mmred.no
Standing by on VHF Channel 16

Geotechnical surveys will take place in the Vineyard Wind Lease Area and between the Lease Area and Cape Cod, including Muskeget Channel and Nantucket Sound. Please see reverse side for chart of survey area. Please check in with the contact below for the latest information.

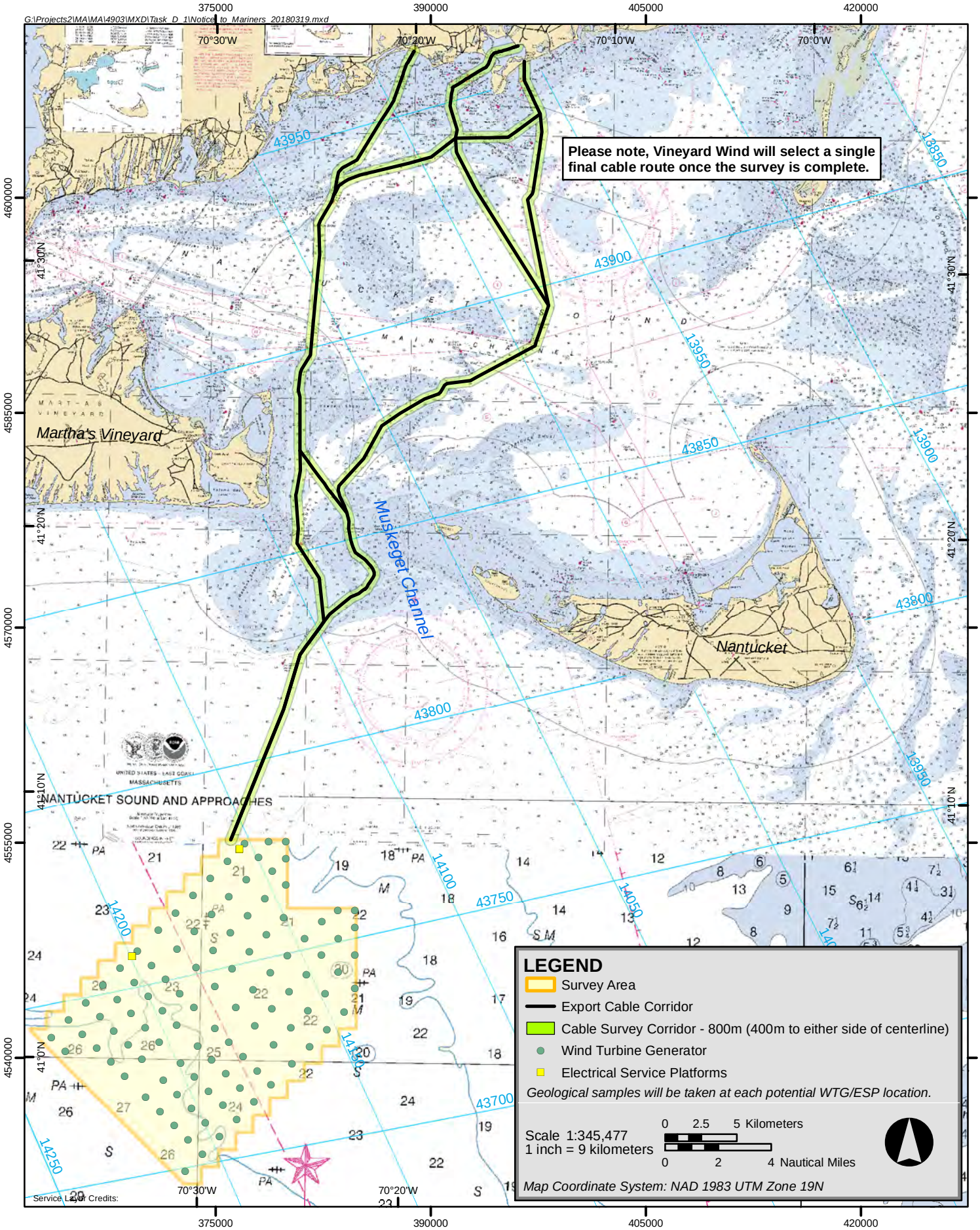
Collecting data and working with the local fisheries, Vineyard Wind is committed to communicating and working with the local fishermen in the region during all stages of development of the proposed offshore wind farm. Information gathered will be used to further design the wind farm and refine the location for the cable route from the wind farm to shore.

In advance of and during survey operations, we seek contact with fishermen who are or may be working in the survey area. Please see reverse side for chart of survey area.

Please contact Jim Kendall, Fishery Representative, for latest information.
Cell: 508-287-2010 • Office: 508-997-0013 • Email: nbsc@comcast.net

OCS-A 0501 MASS USA

VineyardWind.com • info@vineyardwind.com • @vineyardwindMA • 508-717-8964
700 Pleasant Street, Suite 510 • New Bedford, MA 02740



Vineyard Wind Project

VINEYARD WIND

Notice to Mariners - 2018

Appendix 4. CRMC Public Notice (5/22/18)

STATE OF RHODE ISLAND
COASTAL RESOURCES MANAGEMENT COUNCIL

Oliver Stedman Government Center Suite 3
4808 Tower Hill Road
Wakefield, RI 02879-1900

PUBLIC NOTICE

The Coastal Resources Management Council ("CRMC") is in receipt of a federal consistency certification filed electronically by Vineyard Wind LLC (Vineyard Wind) on April 6, 2018 for proposed construction of an approximately 800 megawatt (MW) wind energy project located in offshore waters south of Martha's Vineyard, MA within BOEM Lease Area OCS-A 0501 (See attached figures). The project will consist of up to 106 offshore wind turbine generators (WTGs) (each placed on a foundation support structure) arranged in a grid-like pattern, electrical service platforms (ESP), an onshore substation, offshore and onshore cabling, and onshore operations & maintenance facilities (these facilities will hereafter be referred to as the Project). The Project also includes up to four (4) ESPs, inter-array cables connecting the WTGs to the ESPs, inter-link cables between ESPs, and up to three (3) offshore export cables. Each WTG will independently generate approximately 8 to 10 MW of electricity and will interconnect with the ESPs via the inter-array submarine cable system. The offshore export cable transmission system connects the ESPs to a landfall location in either Barnstable or Yarmouth, MA. The Project may be constructed in stages consisting of ~200 MW, ~400 MW, and ~800 MW with up to 5 years between increments.

Vineyard Wind has filed its Construction and Operations Plan (COP) with the Bureau of Ocean Energy Management (BOEM) for a federal license to construct and operate the proposed Project. BOEM issued a Notice of Intent to prepare an Environmental Impact Statement for the proposed Project on March 30, 2018. Additionally, on May 10, 2018 BOEM approved Vineyard Wind's Site Assessment Plan (SAP) for Lease OCS-A 0501. The SAP approval allows for the installation of up to two Fugro SEAWATCH Wind LiDAR metocean buoys. Vineyard Wind's federal COP and SAP along with other project information is available on the BOEM website at: https://www.boem.gov/Vineyard-Wind/.

Pursuant to 15 C.F.R. Part 930 Subpart D (Consistency for Activities Requiring a Federal License or Permit) the CRMC as the State's authorized coastal zone management agency must make a determination as to whether the proposed project is consistent with the enforceable policies of the State's federally approved coastal program, in particular the CRMC's Ocean Special Area Management Plan. The CRMC's six-month review period in this matter will end on October 6, 2018 in accordance with 15 C.F.R. § 930.60. Vineyard Wind's consistency certification and supporting information have been assigned CRMC file number **2018-04-055** and can be reviewed at the CRMC office during regular office hours (Monday-Friday 8:30 am to 4:00 pm). In addition, a downloadable PDF file copy of Vineyard Wind's consistency certification is posted on the CRMC website at www.crmc.ri.gov.

The CRMC is providing public notice on Vineyard Wind's consistency certification in accordance with 15 C.F.R. § 930.61. All interested parties are invited to submit written comments concerning the proposed Project on or before **June 25, 2018**. Comments should be specifically directed to the issue as to whether the proposed Project is consistent with the enforceable policies and standards of the Rhode Island Coastal Resources Management Program.

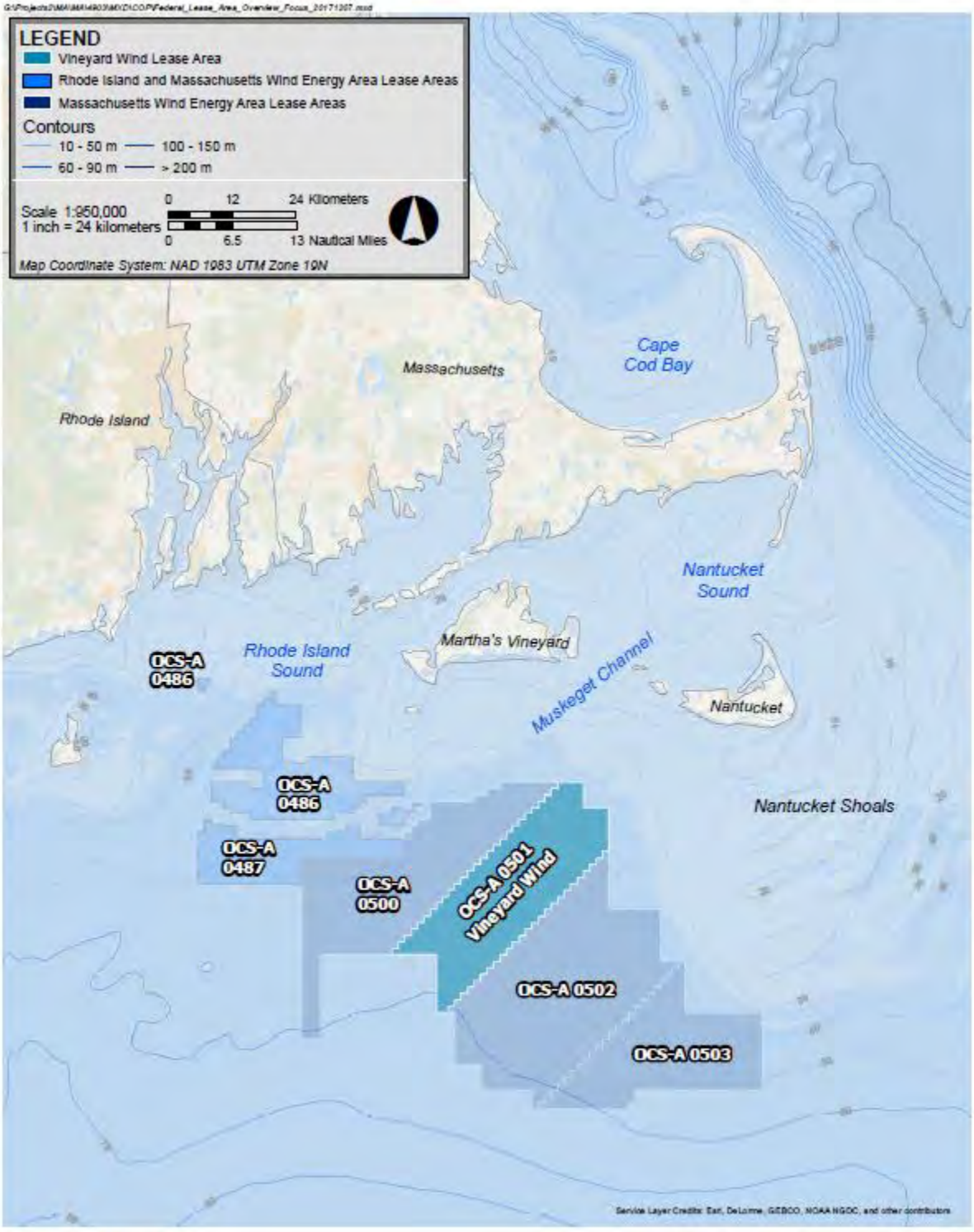
The CRMC will hold a public hearing in this matter on **September 25, 2018 at 6:00 p.m.** in Conference Room A at the Department of Administration, One Capitol Hill, Providence, RI.

Mailing Address for Public Comment Submissions:
Coastal Resources Management Council
Stedman Government Center
4808 Tower Hill Road
Wakefield, RI 02879.
ATTN: Grover J. Fugate, CRMC Executive Director.

Comments may also be electronically filed with the CRMC at: cstaff1@crmc.ri.gov

Signed this 25th day of May 2018.

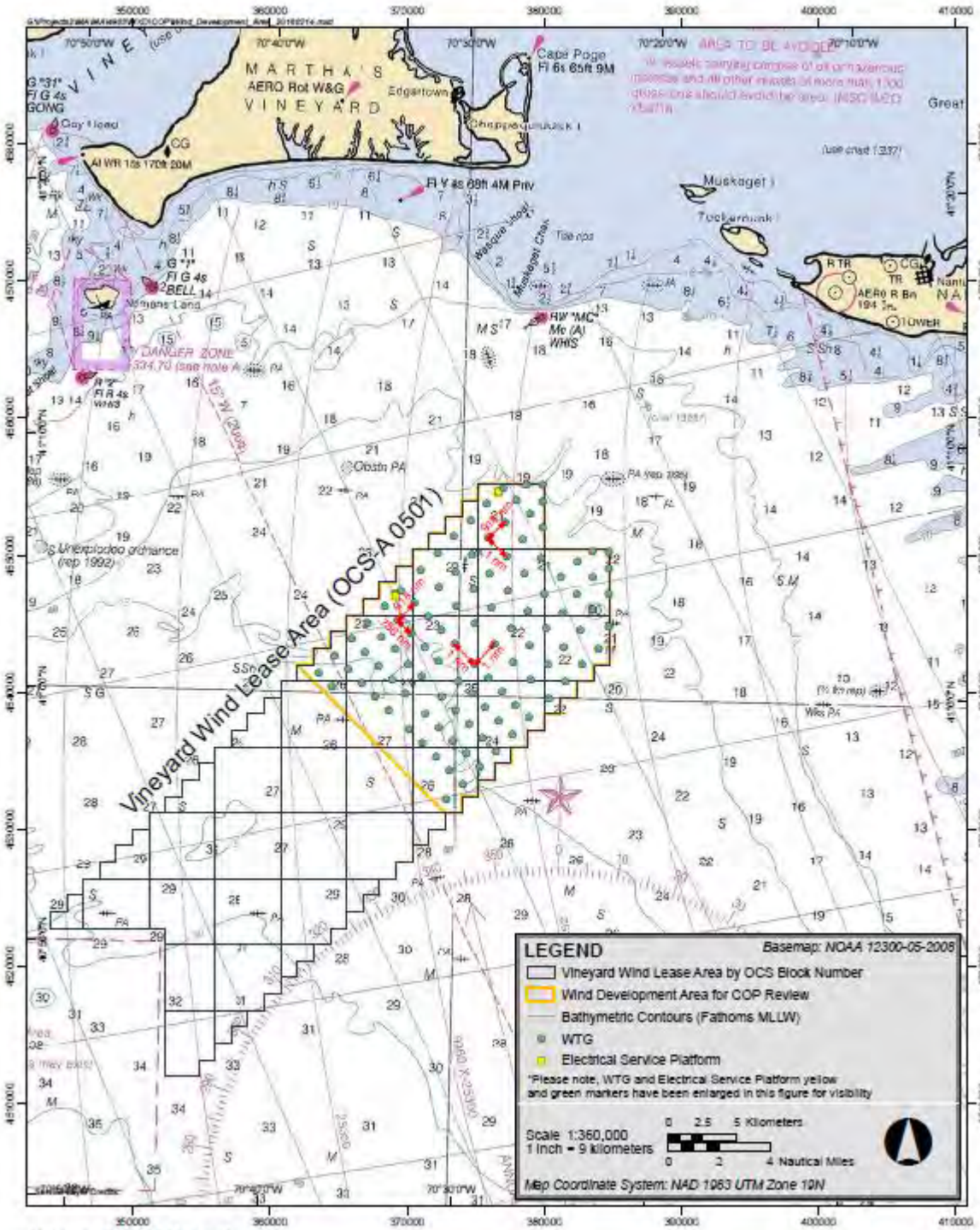
Grover J. Fugate, Executive Director
Coastal Resources Management Council



Vineyard Wind Project

VINEYARD WIND

Figure 1
RI and MA Lease Areas Overview

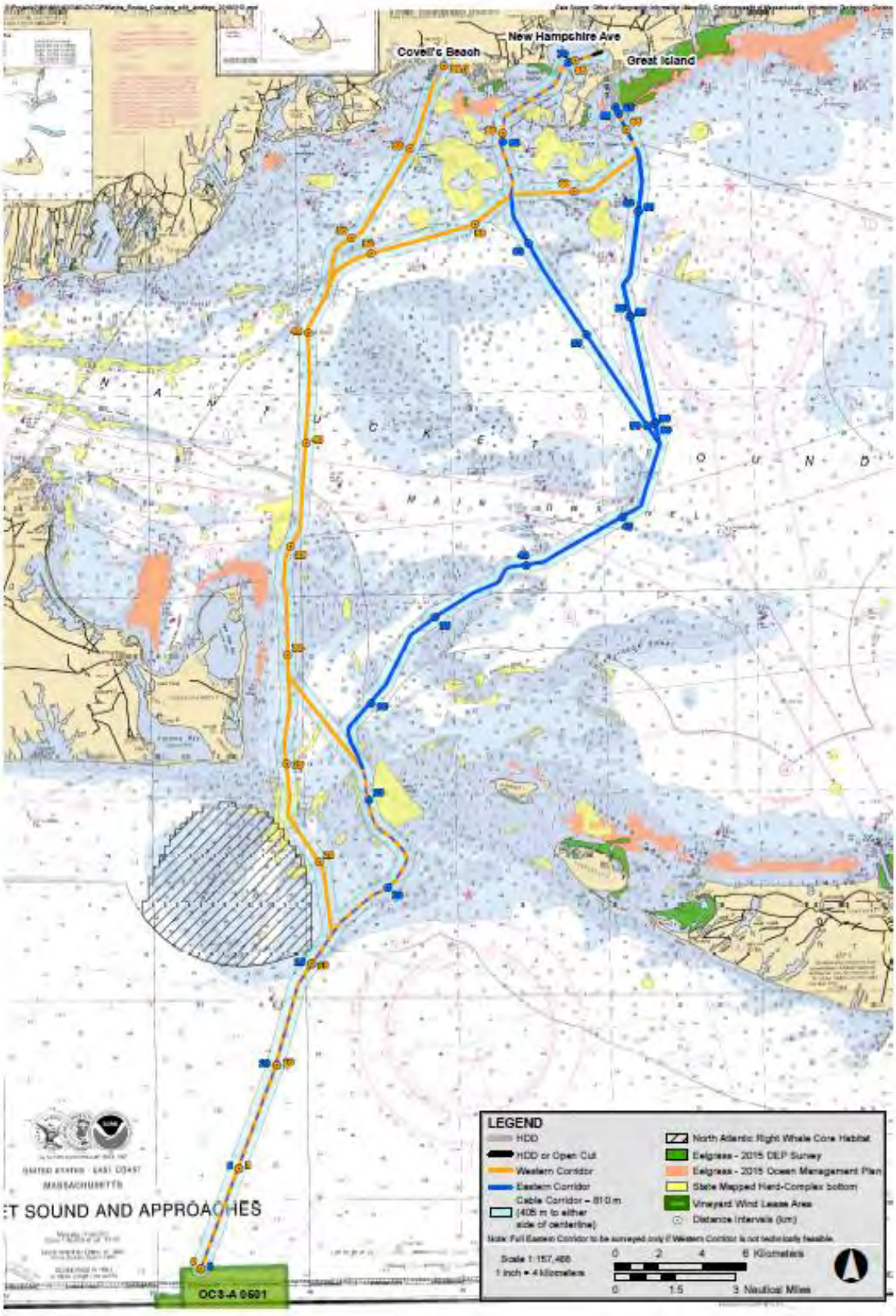


Vineyard Wind Project

VINEYARD WIND

Figure 3.1-2b

Wind Development Area for COP Review



Vineyard Wind Project

VINEYARD WIND

Figure 3.1-15a
Export Cable Corridors

Appendix 5. CRMC 3-month letter with CFCRI East-West WTG layout (7/2/18)

State of Rhode Island and Providence Plantations
Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, RI 02879-1900

(401) 783-3370
Fax (401) 783-2069

July 2, 2018

Mr. Erich Stephens
Chief Executive Officer
Vineyard Wind, LLC
700 Pleasant Street, Suite 510
New Bedford, MA 02740

Re: CRMC review status of federal consistency certification for proposed Vineyard Wind 800MW offshore wind project

CRMC File No.: 2018-04-055

Dear Mr. Stephens,

On April 6, 2018 Vineyard Wind, LLC filed with the Rhode Island Coastal Resources Management Council (CRMC) a federal consistency certification[1] for the proposed construction of an 800MW wind energy project ("Project") consisting of up to 106 wind turbine generators (WTGs) to be located in offshore waters south of Martha's Vineyard, MA, within Bureau of Ocean Energy Management (BOEM) Lease Area OCS-A 0501, which is part of the Massachusetts wind energy area (MA WEA). The Project has been assigned federal docket # BOEM-2011-0049 and Vineyard Wind has filed its Construction and Operation Plan (COP) with BOEM. We note that the Vineyard Wind COP was filed with the Massachusetts Environmental Policy Act Office, as indicated in the MA Office of Coastal Zone Management May 15, 2018 letter to BOEM, yet the COP was not filed with the Rhode Island Coastal Resources Management Council, despite reasonably foreseeable effects on RI coastal resources and uses and CRMC's request for the COP to be filed directly with the agency. Furthermore, the Project's technical information of Volume II (site geology and environmental conditions and geological results relevant to siting and design, among other sections) and its Appendices are completely redacted from the COP available from the BOEM website, which is the version the CRMC has had to rely upon for its federal consistency review.

The proposed Project is subject to CRMC review authority pursuant to the federal Coastal Zone Management Act (CZMA), 16 USC § 1456 and the CZMA's implementing regulations at 15 CFR Part 930 Subpart D – Consistency for Activities Requiring a Federal License or Permit and

[1] Vineyard Wind states in its April 6, 2018 filing that its proposed offshore renewable energy project is "consistent to the maximum extent practicable" with the enforceable policies of Rhode Island's coastal management program. See Vineyard Wind Consistency Certification at 1. However, 15 CFR §§ 930.57(a) and 930.76(c) require that projects are fully consistent with approved state management programs.

Subpart E - Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities. The Project meets the definition of a "large-scale offshore development"[2] as specified in § 1160.1.1 of the CRMC's Ocean Special Area Management Plan (SAMP).

As you know, CRMC staff met with the Vineyard Wind project team on June 13 at the CRMC office to discuss the Project in general, and specifically Vineyard Wind's April 6 consistency certification filing with the CRMC. At that meeting I provided you and the team a memorandum outlining in very general terms the information that Vineyard Wind needs to provide to the CRMC to supplement its consistency certification filing. The CRMC could not fully determine from the consistency certification or the COP what the coastal effects could be from the Project. Thus, the CRMC needs the supplemental information to make a consistency determination by October 6, 2018.

The purpose of this letter is to provide a status update on the CRMC's consistency review of the Project in accordance with 15 CFR § 930.78(a). Therefore, this letter details in terms of what necessary information is required by specific enforceable policies of the Coastal Resources Management Plan, specifically § 1160 of the CRMC's Ocean Special Area Management Plan (SAMP) for the Council to make a consistency certification determination. Additionally, we are providing an alternative wind turbine layout for the Project that does not reduce the overall number of proposed turbines, and that would lessen the effects on RI-based commercial fisheries (coastal uses) that are described in detail in the following sections.

The CRMC issued a public notice for the project on May 25, 2018 that indicated public comments could be filed with the CRMC until June 25, 2018. Comments were provided by the RI Commercial Fisheries Center on June 13, 20018 and by a RI commercial fisherman received on June 20, 2018 concerning commercial fisheries issues. Additionally, combined comments were received on June 25, 2018 filed by the Conservation Law Foundation, the Natural Resources Defense Council, the National Wildlife Federation and Save The Bay.

In anticipation of additional time necessary for the CRMC to obtain and review supplemental materials that Vineyard Wind would need to file, the CRMC on April 13, 2018 provided to Vineyard Wind a draft stay agreement consistent with 15 CFR§ 930.60(b) to stay the CRMC review for a period of 6-months. However, Vineyard Wind informed the CRMC on May 6, 2018 that it declined to enter into a stay agreement at that time. Consequently, the CRMC has scheduled a September 25, 2018 public hearing for this matter in order for the CRMC to meet its six-month consistency review period deadline specified at 15 C.F.R §§ 930.60 and 930.78(b), which in this case is October 6, 2018, to issue a concurrence or objection to Vineyard Wind's federal consistency certification.

A. Supplemental information required to address Rhode Island's enforceable policies

The regulatory standards contained within § 1160 of the CRMC's Ocean Special Area Management Plan are the enforceable policies for purposes of the CZMA federal consistency

[2] The Vineyard Wind project consists of offshore wind facilities consisting of 5 or more turbines within 2 km of each other, or 18MW power generation as defined in Ocean SAMP § 1160.1(1)(i)(a).

provisions. Ocean SAMP Section 1160[3] in addition to other applicable federally approved Rhode Island Coastal Resources Management Program (CRMP) enforceable policies are the basis for a CRMC CZMA federal consistency certification concurrence or objection.

Section 1160.1.3: *Offshore Developments shall not have a significant adverse impact on the natural resources or existing human uses of the Rhode Island coastal zone[4], as described in the Ocean SAMP. In making the evaluation of the effect on human uses, the Council will determine, for example, if there is an overall net benefit to the Rhode Island marine economic sector from the development of the project or if there is an overall net loss. Where the Council determines that impacts on the natural resources or human uses of the Rhode Island coastal zone through the pre-construction, construction, operation, or decommissioning phases of a project constitute significant adverse effects not previously evaluated, the Council shall, through its permitting and enforcement authorities in state waters and through any subsequent CZMA federal consistency reviews, require that the applicant modify the proposal to avoid and/or mitigate the impacts or the Council shall deny the proposal.*

The Council to date has not been provided with detailed information by Vineyard Wind on the construction and operations phases that would allow it to make the determination that this Project will not impact the natural resources or human uses by reasonably foreseeable effects to those uses. In fact, given the information the Council is in possession of as of the date of this letter, we would conclude that there will be long-term and in some cases permanent losses and impacts to the resources and uses detailed within the state's enforceable policies. The Council will offer a WTG layout alternative that the Council believes will make the Project more consistent with specific enforceable policies in the Rhode Island Coastal Resources Management Program (CRMP). In other portions of this letter, we outline the information the Council will need from Vineyard Wind to reach the conclusion on consistency with remaining enforceable policies of the CRMP.

In addition to the reviews conducted by CRMC staff and cooperating agencies, the CRMC relies upon pre-application meetings between applicants and the Fisherman's Advisory Board (FAB) (see § 1160.1.5) as well as the Habitat Advisory Board (HAB) (see discussion below regarding § 1160.1.11) to identify and determine whether there are any reasonably foreseeable effects to Rhode Island coastal resources and uses and economic consequences. Although representatives of Vineyard Wind have attended two FAB meetings (see more detailed discussion below) in the last year, those initial meetings did not constitute a pre-application meeting as required in Ocean SAMP § 1160.1.5, because no detailed information was presented to the FAB for discussion. Vineyard Wind simply presented a general Project description. Further, Vineyard Wind has not had any meetings to date with the HAB as required by Ocean SAMP § 1160.1.11.

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[3] Pursuant to R.I Gen. Laws § 42-35-5(b) the Ocean Special Area Management Plan has now been codified into the new uniform Rhode Island Code of Regulations, effective June 11, 2018. Chapter 11 of the Ocean SAMP is now codified as 650-RICR-20-05-11 and former Ocean SAMP Section 1160 is now referenced as § 11.10 therein.

[4] The test of reasonably foreseeable effects on coastal resources or uses applies to activities within a state's coastal zone (including listed activities within a GLD), to unlisted activities outside of the state coastal zone, or where an applicant voluntarily files a consistency certification with a state. Regardless, once a consistency certification is filed by an applicant, they are bound by the federal regulations under 15 CFR Part 930.

Pre-application meetings between the applicant the CRMC and the FAB and HAB are required pursuant to Ocean SAMP §§ 1160.1.5 and 1160.1.11. Accordingly, Vineyard Wind must work in partnership with the CRMC to organize and schedule pre-application meetings between the FAB and the HAB to provide information that is not available in either the consistency certification or the COP so that the CRMC can determine what the coastal effects may be from the Project.

Section 1160.1.4 *"Any assent holder of an approved Offshore Development shall:*

> *i. Design the project and conduct all activities in a manner that ensures safety and shall not cause undue harm or damage to natural resources, including their physical, chemical, and biological components to the extent practicable; and take measures to prevent unauthorized discharge of pollutants including marine trash and debris into the offshore environment.*

During the installation process Vineyard Wind proposes to grout the connections between all monopiles and the transition pieces (these may also be bolted). Vineyard Wind also proposes to grout all piles within the jacket foundation pile sleeves once they are driven to target depth. See Section 4.2.3.4 of the Vineyard Wind COP, Vol. 1. During the installation of the jacket foundations of the Deepwater Wind project off Block Island grout management became an issue with the in-water discharge of grout used to fix the piles within jacket foundation sleeves. Corrective action immediately followed the illicit discharge, but spills and a discharge occurred even with implementation of a grout management plan and worker training. As part of the Deepwater Wind project there were only 5 WTGs. As part of this Project there may as many as 106 WTGs, which will require a significantly larger volume of grouting material than the Deepwater Wind project (Approximately 8.8 cubic yards of grout was required for each connection or 35.2 cubic yards per jacket.). Specific to this issue is the need for a grout management plan (which was prepared for the Deepwater Wind project) that is required as listed in Table 11-4 (see items (8) and (9) therein) of Ocean SAMP § 1160.5.3.ii (Attached as Appendix A)).

Therefore, Vineyard Wind must file a grout management plan, as the CRMC was unable to determine from Vineyard Wind's COP whether the Project is consistent with the enforceable policy of Ocean SAMP § 1160.1.4.

Section 1160.1.5: *Any Large-Scale Offshore Development, as defined in section 1160.1.1, shall require a meeting between the Fisherman's Advisory Board (FAB), the applicant, and the Council staff to discuss potential fishery-related impacts, such as, but not limited to, project location, construction schedules, alternative locations, project minimization and identification of high fishing activity or habitat edges. For any state permit process for a Large-Scale Offshore Development this meeting shall occur prior to submission of the state permit application. The Council cannot require a pre-application meeting for federal permit applications, but the Council strongly encourages applicants for any Large-Scale Offshore Development, as defined in Section 1160.1.1, in federal waters to meet with the FAB and the Council staff prior to the submission of a federal application, lease, license, or authorization. However, for federal permit applicants, a meeting with the FAB shall be necessary data and information required for federal consistency reviews for purposes of starting the CZMA 6-month review period for federal license*

or permit activities under 15 CFR part 930, subpart D, and OCS Plans under 15 CFR part 930, subpart E, pursuant to 15 CFR § 930.58(a)(2). Any necessary data and information shall be provided before the 6-month CZMA review period begins for a proposed project. (Emphasis added).

Vineyard Wind states in its consistency certification that the Project is not located within any Area of Particular Concern (APC) as identified in the CRMC Ocean SAMP (see Ocean SAMP § 1160.2), including glacial moraines and areas of high fishing activity as identified during the pre-application process by the Fishermen's Advisory Board. See Table 3-1 Vineyard Wind's consistency certification at 25 and 26. Vineyard Wind representatives attended a FAB meeting on July 24, 2017 in which only an overview of the proposed Project was presented to the FAB. Additionally, Vineyard Wind representatives attended a FAB meeting on April 11, 2018 in which they presented an update of the proposed Project, but Vineyard Wind project staff did not engage with FAB members in discussion of areas of high fishing activity or the likely effects of the Project to RI-based commercial fishing resources or uses, nor did Vineyard Wind discuss its proposed WTG layout or provide any data to the FAB or the CRMC. Furthermore, there was no discussion between Vineyard Wind and the FAB regarding construction schedules, alternative locations, project minimization, identification of high fishing activity or habitat edges, as required by Ocean SAMP § 1160.1.5, which are necessary for the Council's consideration of coastal effects. Accordingly, Vineyard Wind has not had a pre-application meeting with the FAB to discuss the proposed WTG layout or identify areas of high fishing activity within the Project area.

Thus, the CRMC concludes that a meeting between the FAB, Vineyard Wind, and CRMC staff is required because of the enforceable policy (Ocean SAMP § 1160.2) that includes a prohibition on large-scale offshore development located within areas of high fishing activity that would be identified by the FAB. In the absence of an appropriate FAB meeting as required by Ocean SAMP § 1160.1.5, the CRMC has to conclude that Vineyard Wind has not demonstrated that this enforceable policy has been met.

Section 1160.1.6: *The Council shall prohibit any other uses or activities that would result in significant long-term negative impacts to Rhode Island's commercial or recreational fisheries. Long-term impacts are defined as those that affect more than one or two seasons.*

Section 1160.1.7: *The Council shall require that the potential adverse impacts of Offshore Developments and other uses on commercial or recreational fisheries be evaluated, considered, and mitigated as described in section 1160.1.9.*

The Project has been designed for permitting purposes using an "envelope" concept, as described in Vineyard Wind's consistency certification. Further, Vineyard Wind describes the Project may be constructed in stages with up to five years between increments. See Vineyard Wind's consistency certification at 4. In review of Vineyard Wind's Draft COP the time frame for construction of the 800 MW array is shown as beginning on February 1, 2021 and completion on June 2, 2022. See Table 4.1-2 in Draft COP Volume I. This contradicts the information presented in Vineyard Wind's consistency certification. Nevertheless, the COP construction schedule is very aggressive to complete the installation of up to 106 wind turbines and does not consider

weather delays and the possibility of construction interruption during spring months when endangered whales are migrating and feeding within the Project area. Additionally, there are no mooring plans provided for the support vessels during Project installation activities. This is necessary to determine not only benthic impacts, which effect fish production and hence lead to a loss in the fisheries, but reasonably foreseeable effects to RI-based commercial and recreational fishing vessels and recreational vessels in the area.

The Vineyard Wind COP anticipates up to three offshore export cables within a cable corridor approximately 0.5 mile wide. The maximum length per cable is just over 75 km (47 mi), which gives a total maximum length of export cables, assuming three cables, of 227 km (141 mi). The maximum length of the inter-array cables for the 800 MW Project is approximately 275 km (171 mi). See COP Vol. 1 at 3-26 and 3-30. Vineyard Wind expects the majority of the cables to be installed using simultaneous lay and bury via jet-plowing methods. The target burial depth for cables is 1.5 – 2.5 m (5-8 feet). However, Vineyard Wind expects that approximately 10% of the cables may not achieve the proper burial depth and will require cable protection. See COP Vol. 1 at 4-19. Cable protection may consist of rock placement or concrete mattresses. See COP Vol. 1 at 3-29. Accordingly, there is the potential for more than 21 linear miles of cable protection that may need to be installed within the inter-array, inter-link and export cables that would become permanent, long-term bottom obstructions that could snag commercial fishing trawl nets. Anecdotal evidence suggests that this may be an issue with the existing Block Island windfarm export cable where cable protection was installed in sections where insufficient cable burial depth occurred.

As shown in Figures 1 and 2 below, there is significant RI-based commercial squid fishing activity in and around the Project location. The RI Department of Environmental Marine Fisheries Division has calculated the value of commercial squid landings in RI at $25, 865,178 per year averaged over the last three seasons (2015-2017), and RI-based vessels harvest a significant portion of those landing in and around the Project area. Vineyard Wind acknowledges that there is an active squid fishery within the Project area. See Vineyard Wind's consistency certification at 27. Based on Vineyard Wind's construction timetable and the resulting permanent wind turbine array (as currently proposed) and cable protection there will very likely be significant disruption over more than 2 seasons and will result in a permanent loss. The current wind turbine array, once constructed will also result in significant long-term negative economic impacts to Rhode Island's commercial fisheries because of the presently proposed wind turbine array and cable protection will result in permanent obstructions that will constrain or prevent the flexibility required by RI-based commercial mobile fishing gear operations. Therefore, because of long-term Project construction and operations it is highly likely that the Project will result in significant long-term negative effects to Rhode Island's commercial fisheries. To obviate a prohibition of the Project by the Council, Vineyard Wind must demonstrate that its Project will not negatively affect Rhode Island commercial fisheries more than one or two seasons. The proposed alternative wind turbine array shown in Figure 3 below would satisfactorily mitigate coastal effects on RI-based commercial mobile fishing gear operation flexibility.

It is recommended that Vineyard Wind modify its proposed wind turbine generator layout and adopt the proposed alternative presented herein (Figure 3), and consider mitigation for

the impact of cable protection to demonstrate that the Project is consistent with enforceable policies §§ 1160.1.6 and 1160.1.7.

Section 1160.1.9: *The Council recognizes that moraine edges, as illustrated in Figures 11.3 and 11.4, are important to commercial and recreational fishermen. In addition to these mapped areas, the FAB may identify other edge areas that are important to fisheries within a proposed project location. The Council shall consider the potential adverse impacts of future activities or projects on these areas to Rhode Island's commercial and recreational fisheries. Where it is determined that there is a significant adverse impact, the Council will modify or deny activities that would impact these areas. In addition, the Council will require assent holders for Offshore Developments to employ micro-siting techniques in order to minimize the potential impacts of such projects on these edge areas.*

Glacial moraines of the coble and boulder nature represent areas of high biodiversity and important fish habitat. Impacts to these areas could result in long-term or permeant impacts to fish populations dependent on these habitat types and thus impact the Rhode Island fishery in the area.

As noted above, Vineyard asserts that the Project is not located on any glacial moraines (identified as Areas of Particular Concern in Ocean SAMP Section 1160.2.3.iii). See Table 3-1 in Vineyard Wind's consistency certification at 25. Vineyard Wind, however, has not provided the CRMC with any sufficient area-wide data (e.g., side-scan sonar, multi-beam sonar, detailed bathymetry or other geophysical data) to verify Vineyard Wind's assertion. Additionally, Vineyard Wind has not provided data and information necessary to engage in a dialogue on this issue in a pre-application meeting with the FAB (as noted above) in which the FAB could identify other habitat edge areas that are important to fisheries within the proposed Project location.

Absent any information to identify and verify whether or not glacial moraines are located within the Project area, the CRMC cannot concur with Vineyard Wind's assertion that the Project is not located on any glacial moraines, and thus the CRMC could modify or deny the Project based on the available information at hand.

Section ll60.1.10: *The finfish, shellfish, and crustacean species that are targeted by commercial and recreational fishermen rely on appropriate habitat at all stages of their life cycles. While all fish habitat is important, spawning and nursery areas are especially important in providing shelter for these species during the most vulnerable stages of their life cycles. The Council shall protect sensitive habitat areas where they have been identified through the Site Assessment Plan or Construction and Operation Plan review processes for Offshore Developments as described in section 1160.5.3(i).*

The appropriate FAB meeting to identify these areas has yet to occur nor has there been any mapping provided to the Council showing the presence or absence of these areas to allow the Council to make a determination on this enforceable policy. In the absence of an appropriate FAB meeting the Council must proceed with the currently available information and would have to assume the Project would have negative coastal effects.

Section 1160.1.11: *Any Large-Scale Offshore Development, as defined in Chapter 11 in section 1160.1.1, shall require a meeting between the HAB, the applicant, and the Council staff to discuss potential marine resource and habitat-related issues such as, but not limited to, impacts to marine resource and habitats during construction and operation, project location, construction schedules, alternative locations, project minimization, measures to mitigate the potential impacts of proposed projects on habitats and marine resources, and the identification of important marine resource and habitat areas. For any state permit process for a Large-Scale Offshore Development, this meeting shall occur prior to submission of the state permit application. The Council cannot require a pre-application meeting for federal permit applications, but the Council strongly encourages applicants for any Large-Scale Offshore Development, as defined in Section 1160.1.1, in federal waters to meet with the HAB and the Council staff prior to the submission of a federal application, lease, license, or authorization. However, for federal permit applicants, a meeting with the HAB shall be necessary data and information required for federal consistency reviews for purposes of starting the CZMA 6-month review period for federal license or permit activities under 15 CFR part 930, subpart D, and OCS Plans under 15 CFR part 930, subpart E, pursuant to 15 CFR § 930.58 (a)(2). Any necessary data and information shall be provided before the 6-month CZMA review period begins for a proposed project.*

There have been no meetings with Vineyard Wind and the Council staff or the HAB to discuss "potential marine resource and habitat-related issues such as, but not limited to, impacts to marine resource and habitats during construction and operation, project location, construction schedules, alternative locations, project minimization, measures to mitigate the potential impacts of proposed projects on habitats and marine resources, and the identification of important marine resource and habitat areas" as required by § 1160.1.11

A pre-application meeting between the applicant, the CRMC and the HAB is required pursuant to Ocean SAMP § 1160.1.11.. In the absence of any conclusive evidence, Vineyard Wind has not demonstrated that the Project is consistent with this enforceable policy.

Section 1160.1.12: *The potential impacts of a proposed project on cultural and historic resources will be evaluated in accordance with the National Historic Preservation Act and Antiquities Act, and the Rhode Island Historical Preservation Act and Antiquities Act as applicable. Depending on the project and the lead federal agency, the projects that may impact marine historical or archaeological resources identified through the joint agency review process shall require a Marine Archaeology Assessment that documents actual or potential impacts the completed project will have on submerged cultural and historic resources.*

Section 1160.1.13: *Guidelines for Marine Archaeology Assessment in the Ocean SAMP Area can be obtained through the RIHPHC in their document, "Performance Standards and Guidelines for Archaeological Projects: Standards for Archaeological Survey" (RIHPHC 2007), or the lead federal agency responsible for reviewing the proposed development.*

Section 1160.1.14: *The potential non-physical impacts of a proposed project on cultural and historic resources shall be evaluated in accordance with 36 CFR 800.5, Assessment of Adverse*

Effects, (v) Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features. Depending on the project and the lead federal agency, the Ocean SAMP Interagency Working Group may require that a project undergo a Visual Impact Assessment that evaluates the visual impact a completed project will have on onshore cultural and historic resources.

To date there is no data or information in Vineyard Wind's filing or the Council's record that would show there have been any meetings with the Rhode Island State Historic Preservation Office or the Tribal Historic Preservation office that would show these enforceable polices have been met. The Council will need to see any data, mapping, minutes of meetings with the RI Historic Preservation and Heritage Commission and/or the Tribal historic preservation offices that may have occurred and what the nature of any resolution that was reached regarding those resources.

Section 1160.2.2: *All Large-scale, Small-scale, or other offshore development, or any portion of a proposed project, shall be presumptively excluded from APCs. This exclusion is rebuttable if the applicant can demonstrate by clear and convincing evidence that there are no practicable alternatives that are less damaging in areas outside of the APC, or that the proposed project will not result in a significant alteration to the values and resources of the APC. When evaluating a project proposal, the Council shall not consider cost as a factor when determining whether practicable alternatives exist. Applicants which successfully demonstrate that the presumptive exclusion does not apply to a proposed project because there are no practicable alternatives that are less damaging in areas outside of the APC must also demonstrate that all feasible efforts have been made to avoid damage to APC resources and values and that there will be no significant alteration of the APC resources or values. Applicants successfully demonstrating that the presumptive exclusion does not apply because the proposed project will not result in a significant alteration to the values and resources of the APC must also demonstrate that all feasible efforts have been made to avoid damage to the APC resources and values. The Council may require a successful applicant to provide a mitigation plan that protects the ecosystem. The Council will permit underwater cables, only in certain categories of Areas of Particular Concern, as determined by the Council in coordination with the Joint Agency Working Group. The maps listed below in section 1160.2.3 depicting Areas of Particular Concern may be superseded by more detailed, site-specific maps created with finer resolution data.*

Areas of Particular Concern (APCs) through the Ocean SAMP process have the goal of protecting areas that have high conservation value, cultural and historic value, or human use value from Large-Scale Offshore Development. Additional Areas of Particular Concern may be identified by the Council in the future as new datasets are made available. Areas of Particular Concern may be elevated to Areas Designated for Preservation in the future if future studies show that Areas of Particular Concern cannot risk even low levels of Large-Scale Offshore Development within these areas.

Areas of high fishing activity (§§ 1160.2.1.vi and 1160.2.3.v) and glacial moraines (§ 1160.2.3.iii), among other features listed in § 1160.2, are considered Areas of Particular Concern. In accordance with Ocean SAMP § 1160.2.2 all large-scale offshore development, or any portion of a proposed project, shall be presumptively excluded from APCs unless the

applicant can demonstrate by clear and convincing evidence that there are no practicable alternatives that are less damaging in areas outside of the APC or that the proposed project will not result in a significant alteration to the values and resources of the APC. As noted previously, Vineyard has provided no data or mapping to show the APCs are being avoided. In regard to the areas of high fishing activity, Vineyard Wind acknowledges that there is an active squid fishery within the Project area. See Vineyard Wind's consistency certification at 27. Additionally, the East Farm Commercial Fisheries Center of Rhode Island has filed comments with the CRMC indicating that the Project area has significant RI-based commercial fishing activity, primarily for squid and whiting. Furthermore, the information shown in Figures 1 and 2 (attached) illustrate areas of high fishing activity within the Project area.

Therefore, in order for Vineyard Wind to demonstrate that its Project is not located within an APC it must provide evidence required under Ocean SAMP § 1160.1.5 (data, mapping and a meeting with the FAB) as detailed above. Alternatively, if it is concluded that the Project is located within an APC, then Vineyard Wind would have to demonstrate that the Project will not result in significant alteration to the values (coastal uses) and resources of the APC, which could include an alternative layout as may be required under the provisions of § 1160.2.2 or mitigation (where there are potential impacts associated with proposed projects, the need for mitigation shall be presumed), as described in § 1160.1.8.

Section 1160.2.3: *Areas of particular concern that have been identified in the Ocean SAMP area in state waters also include glacial moraines, historic shipwrecks, archeological or historical sites and their buffers as described in Chapter 4, Cultural and Historic Resources and Offshore dive sites. The moraines have been referred to previously and are important habitat areas for a diversity of fish and other marine plants and animals because of their relative structural permanence and structural complexity. Glacial moraines create a unique bottom topography that allows for habitat diversity and complexity, which allows for species diversity in these areas and creates environments that exhibit some of the highest biodiversity within the entire Ocean area. The Council also recognizes that because glacial moraines contain valuable habitats for fish and other marine life, they are also important to commercial and recreational fishermen. Accordingly, the Council has designated glacial moraines as Areas of Particular Concern.*

Other APC's include historic shipwrecks, archeological or historical sites and their buffers. These sites are important as resources and uses within the area that important for the states cultural identity and are valuable recreational assets which are important to sustaining Rhode Island's recreation and tourism economy.

Navigation, Military, and Infrastructure areas including: designated shipping lanes, precautionary areas, recommended vessel routes, ferry routes, dredge disposal sites, military testing areas, unexploded ordnance, pilot boarding areas, anchorages, are designated as Areas of Particular Concern. The Council recognizes the importance of these areas to marine transportation, navigation and other activities in the region including to Rhode Island coastal resources and uses. Areas of high fishing activity as identified during the pre-application process by the Fishermen's Advisory Board, as defined in section 1160.1.6, may be designated by the Council as Areas of Particular Concern. The Council recognizes that organized recreational boating and sailboat

racing activities are concentrated in these particular areas, which are therefore important to sustaining Rhode Island's recreation and tourism economy.

Wind development that is found to be a hazard to commercial navigation shall avoid areas of high intensity commercial marine traffic. Avoidance shall be the primary goal of these areas. Areas of High Intensity Commercial Marine Traffic are defined as having 50 or more vessel counts within a 1 km by 1 km. See Ocean SAMP § 1160.4

No data or mapping has been provided to the CRMC to demonstrate these APCs are not being encroached on or impacted. The Council requires mapping and data within the Project development envelope that shows these areas have been mapped and avoided.

Section 1160.5.3 specifies that a construction and operation plan, as detailed in Tables 11.4, 11.5 and 11.6, is required by the CRMC. See Ocean SAMP § 1160.5.3.ii. Each of these tables is attached in Appendix A because the specified and detailed information in each table is necessary for the CRMC to conduct its consistency review and determine any coastal effects from the Project.

The following three sections (1160. 7, 1160.8 and 1160.9) are enforceable policies of the Ocean SAMP.

Section 1160.7 Pre-Construction Standards

4. *The Council shall consult with the U.S. Coast Guard, the U.S. Navy, marine pilots, the Fishermen's Advisory Board as defined in section 1160.1.6, fishermen's organizations, and recreational boating organizations when scheduling offshore marine construction or dredging activities. Where it is determined that there is a significant conflict with season-limited commercial or recreational fishing activities, recreational boating activities or scheduled events, or other navigation uses, the Council shall modify or deny activities to minimize conflict with these uses.*

5. *The Council shall require the assent holder[5] to provide for communication with commercial and recreational fishermen, mariners, and recreational boaters regarding offshore marine construction or dredging activities. Communication shall be facilitated through a project website and shall complement standard U.S. Coast Guard procedures such as Notices to Mariners for notifying mariners of obstructions to navigation.*

6. *For all Large-Scale Offshore Developments, underwater cables, and other development projects as determined by the Council, the assent holder shall designate and fund a third-party fisheries liaison. The fisheries liaison must be knowledgeable about fisheries and shall facilitate direct communication between commercial and recreational fishermen and the project developer. Commercial and recreational fishermen shall have regular contact with and direct access to the fisheries liaison throughout all stages of an offshore development (pre-construction; construction; operation; and decommissioning).*

[5] Pursuant to state law applicants are required to obtain both an assent and a lease and are under the same obligations for purposes of federal consistency.

7. *Where possible, Offshore Developments should be designed in a configuration to minimize adverse impacts on other user groups, which include but are not limited to: recreational boaters and fishermen, commercial fishermen, commercial ship operators, or other vessel operators in the project area. Configurations which may minimize adverse impacts on vessel traffic include, but are not limited to, the incorporation of a traffic lane through a development to facilitate safe and direct navigation through, rather than around, an Offshore Development*

9. *The facility shall be designed in a manner that minimizes adverse impacts to navigation. As part of its application package, the project applicant shall submit a navigation risk assessment under the U.S. Coast Guard's Navigation and Vessel Inspection Circular 02-07, "Guidance on the Coast Guard's Roles and Responsibilities for Offshore Renewable Energy Installations."*

10. *Applications for projects proposed to be sited in state waters pursuant to the Ocean SAMP shall not have a significant impact on marine transportation, navigation, and existing infrastructure. Where the Council, in consultation with the U.S. Coast Guard, the U.S. Navy, NOAA, the U.S. Bureau of Ocean Energy Management, Regulation and Enforcement, the U.S. Army Corps of Engineers, marine pilots, the R.I. Port Safety and Security Forums, or other entities, as applicable, determines that such an impact on marine transportation, navigation, and existing infrastructure is unacceptable, the Council shall require that the applicant modify the proposal or the Council shall deny the proposal. For the purposes of Marine Transportation Policies and Standards as summarized in Chapter 7, sections 770.1-770.2, impacts will be evaluated according to the same criteria used by the U.S. Coast Guard, as follows; these criteria shall not be construed to apply to any other Ocean SAMP chapters or policies:*

    i. *Negligible: No measurable impacts.*
    ii. *Minor: Adverse impacts to the affected activity could be avoided with proper mitigation; or impacts would not disrupt the normal or routine functions of the affected activity or community; or once the impacting agent is eliminated, the affected activity would return to a condition with no measurable effects from the proposed action without any mitigation.*
    iii. *Moderate: Impacts to the affected activity are unavoidable; and proper mitigation would reduce impacts substantially during the life of the proposed action; or the affected activity would have to adjust somewhat to account for disruptions due to impacts of the proposed action; or once the impacting agent is eliminated, the affected activity would return to a condition with no measurable effects from the proposed action if proper remedial action is taken.*
    iv. *Major: Impacts to the affected activity are unavoidable; proper mitigation would reduce impacts somewhat during the life of the proposed action; the affected activity would experience unavoidable disruptions to a degree beyond what is normally acceptable; and once the impacting agent is eliminated, the affected activity may retain measurable effects of the proposed action indefinitely, even if remedial action is taken.*

11. Prior to construction, the Applicant shall provide a letter from the U.S. Coast Guard showing it meets all applicable U.S. Coast Guard standards.

The proposed Project envelope approach requires that the maximum anticipated impacts be evaluated. Impacts tori coastal resources and uses vary by foundation type. Without knowing the type of foundation and cable protection by location, the Council cannot determine if the enforceable policies have been met. The likely use of RI ports as listed in Table 3.2-1 of the COP, Vol. 1 by Project construction vessels will have a reasonably foreseeable effect on RI coastal uses such as recreational boating, scheduled events and other navigational uses including ferry service in southern New England waters. There are up to 106 foundations, transition sections, nacels and turbine blades proposed to be installed within a 53 day window two (2) foundations installed per day) See Table 3.1-1, COP Vol. 1. This level of supply chain storage, preparatory work and intense shipping to keep the proposed maximum construction schedule is an enormous logistical feat that will require intense shipping effort along with shoreside impacts many weeks and months ahead.

This proposed level of intense construction activity has clearly foreseeable navigational effects to other coastal uses in Rhode Island. It is plainly clear that the 26 acre site in New Bedford harbor is not sufficient for this proposed Project schedule. We base this opinion on Rhode Island's experience with the logistical requirements for the five (5) WTG Block Island project. Vineyard Wind's declaratory statements indicate there will be no impacts to RI enforceable policies in this regard, yet no data or analysis has been provided. The consistency certification states that the Project could take up to five (5) years. Vineyard Wind's consistency certification and the Vineyard Wind COP[6], do not address these reasonably foreseeable coastal effects. There are no details of RI port use, vessels to be used, vessel routes, detailed construction timetable, foundation type by location, cable matting locations, and other construction details to allow the Council to conduct its analysis of coastal effects. This information will need to be provided in order for the CRMC to determine consistency with the enforceable policies listed in Ocean SAMP § 1160.7.

Section 1160.8 Standards for Construction Activities

1. *The Assent Holder shall use the best available technology and techniques to minimize impacts to the natural resources and existing human uses in the project area.*

2. *The Council shall require the use of an environmental inspector to monitor construction activities. The environmental inspector shall be a private, third-party entity that is hired by the Assent Holder, but is approved and reports to the Council. The environmental inspector shall possess all appropriate qualifications as determined by the Council. This inspector service may be part of the CVA requirements.*
3. *Installation techniques for all construction activities should be chosen to minimize sediment disturbance. Jet plowing and horizontal directional drilling in nearshore areas shall be required in the installation of underwater transmission cables. Other*

[6] A Navigational Risk Assessment (Appendix III-I) is shown in the List of Appendices in COP Vol. II, but it is redacted from the COP available to the CRMC from the BOEM website.

technologies may be used provided the applicant can demonstrate they are as effective, or more effective, than these techniques in minimizing sediment disturbance.

4. *All construction activities shall comply with the policies and standards outlined in the Rhode Island Coastal Resources Management Program (RICRMP), as well as the regulations of other relevant state and federal agencies.*

5. *The applicant shall conduct all activities on the applicant's permit under this part in a manner that conforms with the applicant's responsibilities in section 1160.1.5, and using:*
    i. *Trained personnel; and*
    ii. *Technologies, precautions, and techniques that shall not cause undue harm or damage to natural resources, including their physical, atmospheric, chemical and biological components.*

6. *The Assent Holder shall be required to use the best available technology and techniques to mitigate any associated adverse impacts of offshore renewable energy development.*
    i. *As required, the applicant shall submit to the Council:*
        a. *Measures designed to avoid or minimize adverse effects and any potential incidental take of endangered or threatened species as well as all marine mammals;*
        b. *Measures designed to avoid likely adverse modification or destruction of designated critical habitat of such endangered or threatened species; and*
        c. *The applicant's agreement to monitor for the incidental take of the species and adverse effects on the critical habitat, and provide the results of the monitoring to the Council as required; and*

7. *If the Assent Holder, the Assent Holder's subcontractors, or any agent acting on the Assent Holder's behalf discovers a potential archaeological resource while conducting construction activities, or any other activity related to the Assent Holder's project, the applicant shall:*
    i. *Immediately halt all seafloor disturbing activities within the area of the discovery;*
    ii. *Notify the Council of the discovery within 24 hours; and*
    iii. *Keep the location of the discovery confidential and not take any action that may adversely affect the archaeological resource until the Council has made an evaluation and instructed the applicant on how to proceed.*
        a. *The Council may require the Assent Holder to conduct additional investigations to determine if the resource is eligible for listing in the National Register of Historic Places under 36 CFR 60.4. The Council shall do this if:*
            1. *The site has been impacted by the Assent Holder's project activities; or*
            2. *Impacts to the site or to the area of potential effect cannot be avoided.*

b. *If the Council incurs costs in protecting the resource, under section 110(g) of the NHPA, the Council may charge the applicant reasonable costs for carrying out preservation responsibilities.*

8. *Post construction, the Assent Holder shall provide a side scan sonar survey of the entire construction site to verify that there is no post construction debris left at the project site. These side-scan sonar survey results shall be filed with the Council within 90 days of the end of the construction period. The results of this side-scan survey shall be verified by a third-party reviewer, who shall be hired by the Assent Holder but who is pre-approved by and reports to the Council.*

9. *All pile-driving or drilling activities shall comply with any mandatory best management practices established by the Council in coordination with the Joint Agency Working Group and which are incorporated into the RICRMP.*

10. *The Council may require the Assent Holder to hire a CVA to perform periodic inspections of the structure(s) during the life of those structure(s). The CVA shall work for and be responsible to the council.*

Section 1160.9 Monitoring Requirements

1. *The Council in coordination with the Joint Agency Working Group, as described in Section 1160.1.4, shall determine requirements for monitoring prior to, during, and post construction. Specific monitoring requirements shall be determined on a project-by-project basis and may include but are not limited to the monitoring of:*
    - *i. Coastal processes and physical oceanography*
    - *ii. Underwater noise*
    - *iii. Benthic ecology*
    - *iv. Avian species*
    - *v. Marine mammals*
    - *vi. Sea turtles*
    - *vii. Fish and fish habitat*
    - *viii. Commercial and recreational fishing*
    - *ix. Recreation and tourism*
    - *x. Marine transportation, navigation and existing infrastructure*
    - *xi. Cultural and historic resources*

2. *The Council shall require where appropriate that project developers perform systematic observations of recreational boating intensity at the project area at least three times: pre-construction; during construction; and post-construction. Observations may be made while conducting other field work or aerial surveys and may include either visual surveys or analysis of aerial photography or video photography. The Council shall require where appropriate that observations capture both weekdays and weekends and reflect high-activity periods including the July 4th holiday weekend and the week in June when Block Island Race Week takes place. The quantitative results of such observations, including raw boat counts and average number of vessels per day, will be provided to the Council.*

3. *The items listed below shall be required for all Offshore Developments:*
    i. *A biological assessment of commercially and recreationally targeted species shall be required within the project area for all Offshore Developments. This assessment shall assess the relative abundance, distribution, and different life stages of these species at all four seasons of the year. This assessment shall comprise a series of surveys, employing survey equipment and methods that are appropriate for sampling finfish, shellfish, and crustacean species at the project's proposed location. Such an assessment shall be performed at least four times: pre-construction (to assess baseline conditions); during construction; and at two different intervals during operation (i.e. 1 year after construction and then post-construction). At each time this assessment must capture all four seasons of the year. This assessment may include evaluation of survey data collected through an existing survey program, if data are available for the proposed site. The Council will not require this assessment for proposed projects within the Renewable Energy Zone that are proposed within 2 years of the adoption of the Ocean SAMP.*
    ii. *An assessment of commercial and recreational fisheries effort, landings, and landings value shall be required for all proposed Offshore Developments. Assessment shall focus on the proposed project area and alternatives. This assessment shall evaluate commercial and recreational fishing effort, landings, and landings value at three different stages: pre-construction (to assess baseline conditions); during construction; and during operation. At each stage, all four seasons of the year must be evaluated. Assessment may use existing fisheries monitoring data but shall be supplemented by interviews with commercial and recreational fishermen. Assessment shall address whether fishing effort, landings, and landings value has changed in comparison to baseline conditions. The Council will not require this assessment for proposed projects within the Renewable Energy Zone that are proposed within 2 years of the adoption of the Ocean SAMP.*

4. *The Council in coordination with the Joint Agency Working Group may also require facility and infrastructure monitoring requirements, that may include but are not limited to:*
    i. *Post construction monitoring including regular visual inspection of inner array cables and the primary export cable to ensure proper burial, foundation and substructure inspection.*

B. Alternative Project WTG layout

In order to minimize the coastal effects to RI commercial fishing interests, and absent the missing or redacted information in Vineyard Wind's COP for the CRMC to further evaluate the effects described herein, an alternative wind turbine generator layout is provided below in **Figure 3** that minimizes negative effects to RI-based commercial fishing activity within the Project area. Importantly, it does not change the number of Vineyard Wind's proposed WTGs within the northern half of BOEM Lease Area OCS-A 0501, rather it spaces the WTGs in a

manner to achieve three East-West corridors to accommodate the flexibility and needs of the RI-based commercial fishing interests. It further provides for a minimum separation distance of 1 NM between WTGs to minimize coastal effects and accommodate RI-based mobile and fixed gear fishing activities that are documented within the Project area.

C. Conclusion

Pursuant to the enforceable policies of the Ocean SAMP § 1160, offshore developments shall not have a significant adverse impact on the natural resources or existing human uses of the Rhode Island coastal zone. Where the CRMC determines that there are significant adverse effects on Rhode Island coastal resources or uses, it can require that the applicant modify the proposal to avoid and/or mitigate the impacts or the CRMC shall deny the proposal. See Ocean SAMP § 1160.1.3. Vineyard Wind's COP has missing or redacted information that does not allow for the CRMC to properly evaluate coastal effects to the RI-based fishery., Vineyard Wind's proposed WTG layout does not allow the current RI-based fishery to operate with the same level of viability. Therefore, the Project as presently proposed will have negative and detrimental effects on coastal resources and uses, specifically RI-based commercial fishing interests. CRMC staff analysis and discussion with the FAB conclude that the proposed design layout and spacing for a maximum of 106 WTGs in the northerner end of the Project area would make trawling for squid impossible. Moreover, all large-scale offshore development, including the proposed Project are presumptively excluded from being located within Areas of Particular Concern (APC) in accordance with Ocean SAMP § 1160.2.2. No evidence has been presented to the Council that would demonstrate Vineyard Wind has avoided APCs. In addition, because the Project has been proposed in an area of high RI-based commercial fishing activity, the enforceable policy of Ocean SAMP § 1160.2.2 prohibits large-scale offshore development located within areas of high fishing activity.

The proposed alternative wind turbine layout as shown in Figure 3 (attached) would lessen some of the adverse effects to RI-based commercial fisheries activities in the area. Should Vineyard Wind adopt this alternative turbine array layout and propose it in an amended consistency certification filing, along with the requested additional information the CRMC could find that the amended consistency certification filing is more consistent with the enforceable policies of the CRMP. However, Vineyard Wind may be required to provide other mitigation measures to address adverse effects from the Project that are not addressed by an alternative WTG layout plan. Mitigation measures may include, but are not limited to, compensation, effort reduction, habitat preservation, restoration and construction, marketing, and infrastructure improvements as part of the enforceable policy in Ocean SAMP § 1160.1.8.

If Vineyard Wind does not provide the information requested herein, the CRMC may object to Vineyard Wind's consistency certification as provided in 15 CFR § 930.63(c). It is requested that Vineyard Wind provide the information specified herein to the CRMC by July 15, 2018 to provide CRMC staff sufficient time to review the adequacy of the information and to prepare a staff report in advance of the scheduled September 25, 2018 Council meeting on the Project. A final decision on the Vineyard Wind consistency certification will be determined at the September 25 Council meeting to meet the federal regulatory deadline of October 6, 2018 for the CRMC to issue its concurrence or objection pursuant to 15 CFR §§ 930.62, 930.63 and 930.78. Should Vineyard Wind require additional time to prepare and file the requested information, the

CRMC would entertain a mutually agreeable stay agreement, as previously offered by the CRMC on April 13, 2018, and as provided for under 15 CFR § 930.60(b) to afford sufficient time for review and consideration by the CRMC to issue a determination on Vineyard Wind's consistency certification filing.

The CRMC will file a copy of this consistency review status with the Acting Director of the Bureau of Ocean Energy Management as required pursuant to 15 CFR §§ 930.62(b) and 930.78.

Please contact me at 401-783-3370 or email gfugate@crmc.ri.gov should you have any questions.

Sincerely,

Grover J. Fugate, Executive Director
Coastal Resources Management Council

cc Walter Cruickshank, Ph.D., Acting Director
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

Brian Krevor
Office of Renewable Energy Programs, Environmental Review Branch
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Silver Spring, MD 20910

RI Congressional delegation

Honorable Gina Raimondo
Office of the Governor
82 Smith Street
Providence, RI 02903

Jennifer R. Cervenka, CRMC Chair
CRMC Council members
Anthony DeSisto, Esq., CRMC legal counsel
Jeffrey Willis, CRMC Deputy Director
James Boyd, CRMC Coastal Policy Analyst

Attachments:

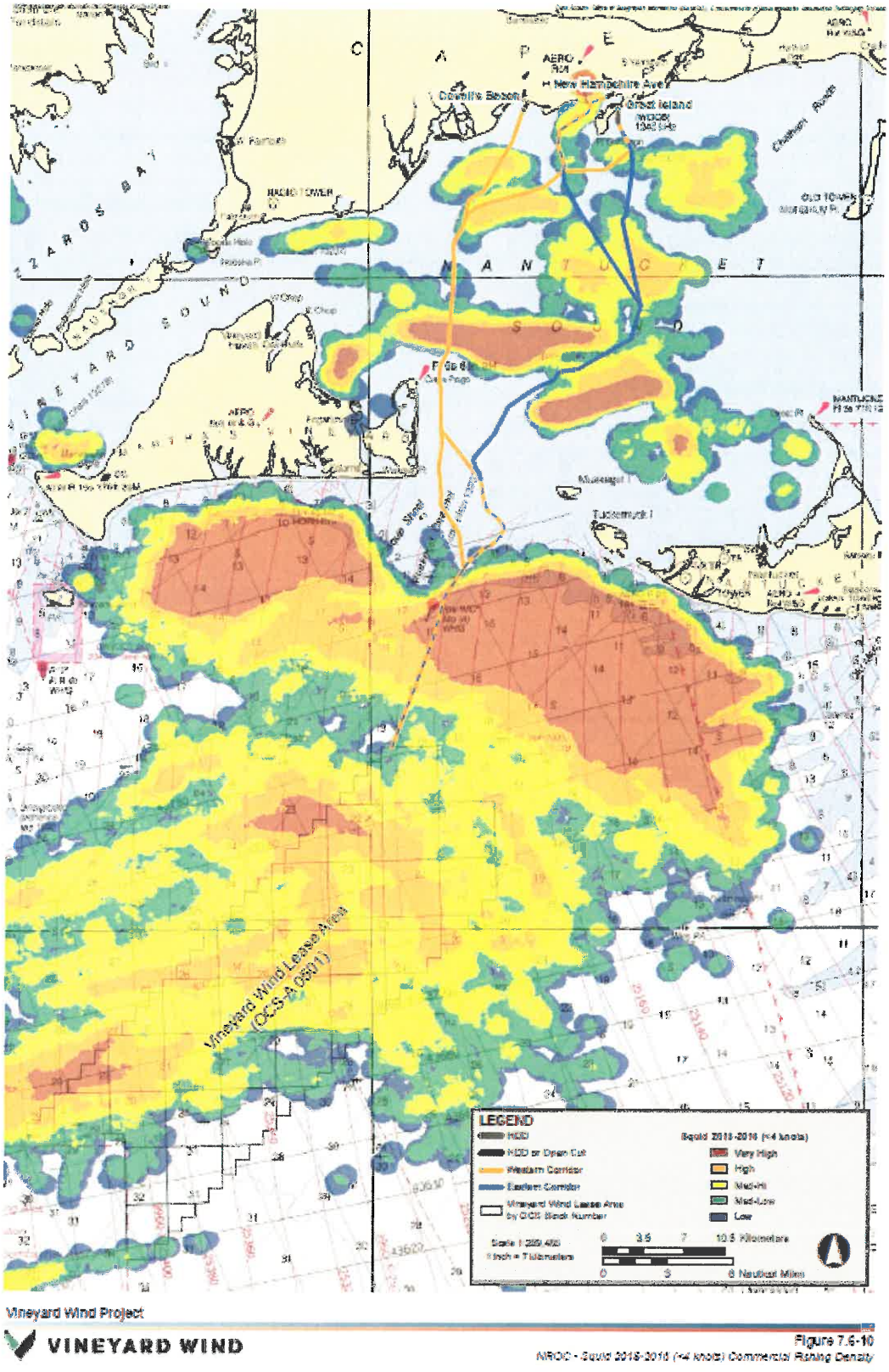

Figure 1: Vessel Monitoring System-recorded commercial squid fishing activity within BOEM Lease Blocks south of Martha's Vineyard during 2015-2016 showing Med-Hi to Very High density of fishing activity within and around the Vineyard Wind Project area. Data source: Northeast Regional Ocean Council.Graphic: Vineyard Wind COP Vol. III Figure 7.6-10 (March 15, 2018)

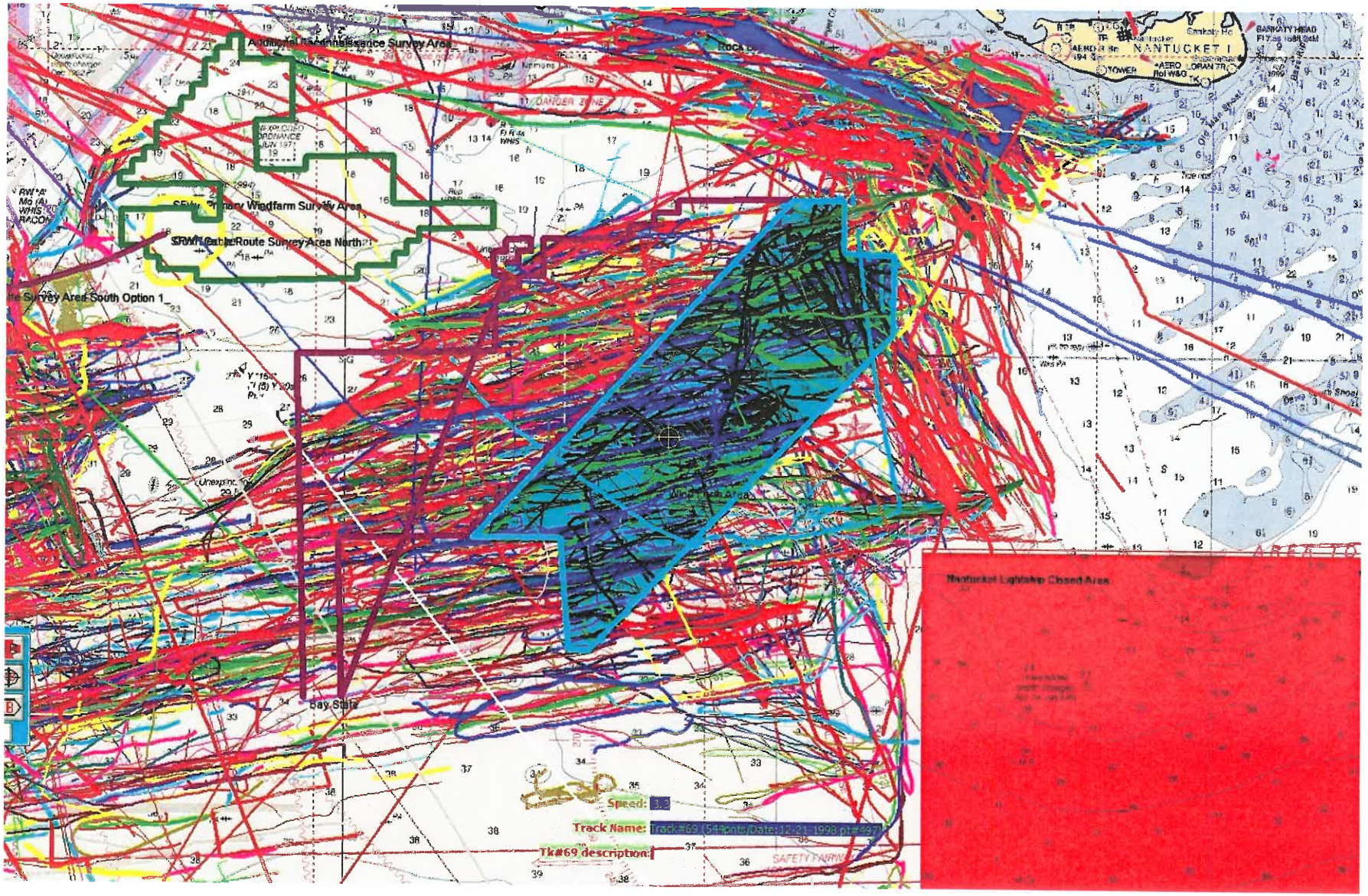

Figure 2: Rhode Island-based commercial squid fishing vessel towing tracks within BOEM Lease Block OCS-A 0501. The colored lines represent the mobile gear towing tracks for five (5) RI vessels during the squid run (June, July and August) for the period of 2011 through 2017. The Vineyard Wind project is located within the upper (northern) end of BOEM Lease Block OCS-A 0501 represented by the lightblue outlined and shaded rectangular area. Data provided by The Town Dock, Narragansett, RI (04/26/2018).

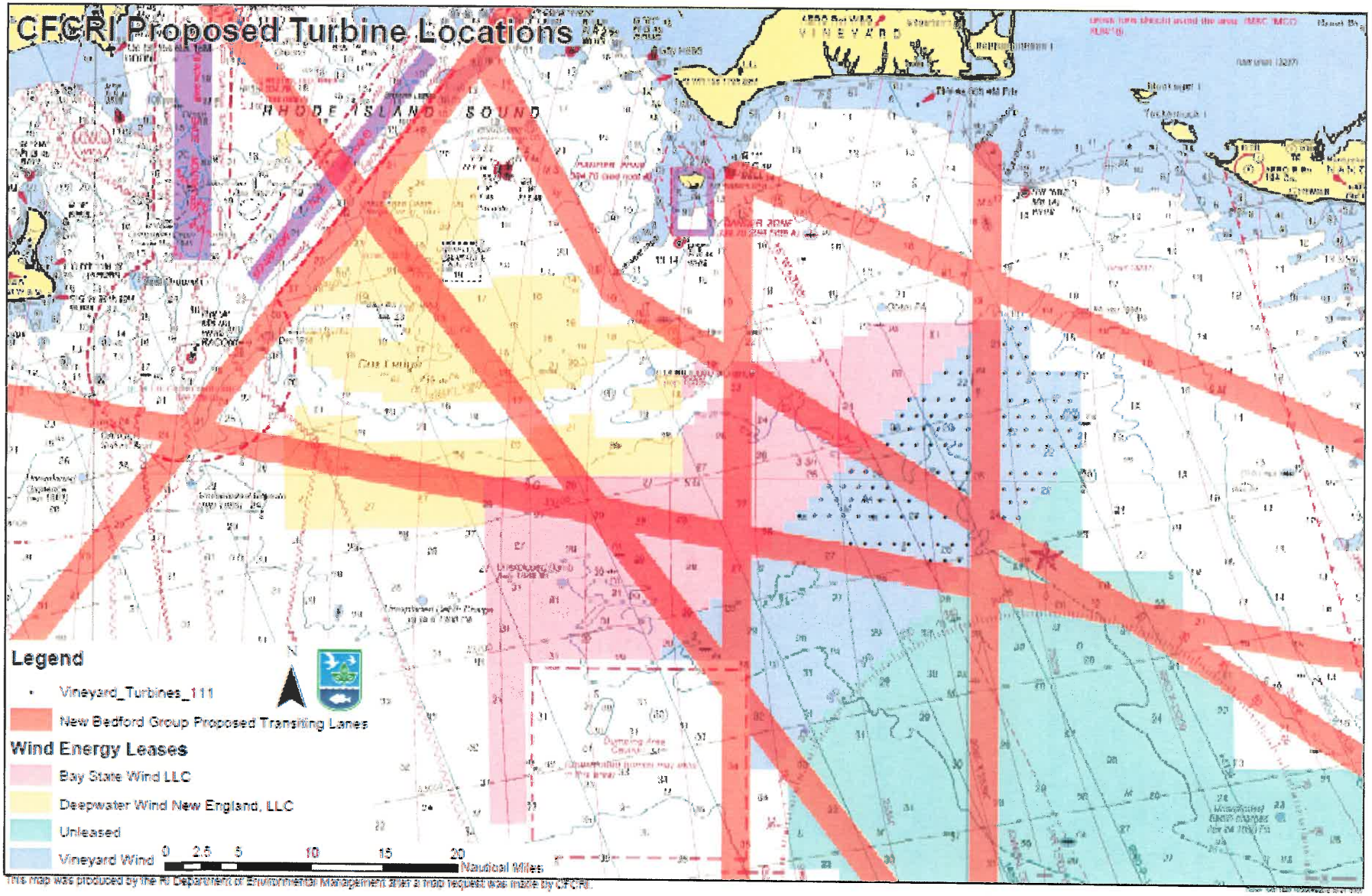

Figure 3: Alternative Vineyard Wind 800MW project layout for wind turbine generators within BOEM Lease Block OCS-A 0501 showing the transit lanes proposed by the New Bedford Group (shaded red), including the most easterly transit lane (running north to south into Muskegat Channel) and the three east-west lanes within the turbine layout proposed by the Commercial Fisheries Center of Rhode Island to accommodate Rhode Island-based commercial fishing vessel mobile gear activity.

Appendix A: Tables 11.4, 11.5 and 11.6

Table 11.4: Contents of the Construction and Operations Plan

Project information:	**Including:**
(1.) Contact information	The name, address, e-mail address, and phone number of an authorized representative.
(2.) Designation of operator, if applicable.	
(3.) The construction and operation concept	A discussion of the objectives, description of the proposed activities, tentative schedule from start to completion, and plans for phased development.
(4.) A location.	The surface location and water depth for all proposed and existing structures, facilities, and appurtenances located both offshore and onshore, including all anchor/mooring data.
(5.) General structural and project design, fabrication, and installation.	Information for each type of structure associated with the project and, unless the Council provides otherwise, how the applicant shall use a CVA to review and verify each stage of the project.
(6.) All cables and pipelines, including cables on project easements.	Location, design and installation methods, testing, maintenance, repair, safety devices, exterior corrosion protection, inspections, and decommissioning. The applicant shall prior to construction also include location of all cable crossings and appropriate clearance from the owners of existing cables.
(7.) A description of the deployment activities.	Safety, prevention, and environmental protection features or measures that the applicant shall use.
(8.) A list of solid and liquid wastes generated.	Disposal methods and locations.
(9.) A list of chemical products used (if stored volume exceeds Environmental Protection Agency (EPA) Reportable Quantities).	A list of chemical products used; the volume stored on location; their treatment, discharge, or disposal methods used; and the name and location of the onshore waste receiving, treatment, and/or disposal facility. A description of how these products would be brought onsite, the number of transfers that may take place, and the quantity that shall be transferred each time.
(10.) Decommissioning and site clearance procedures.	A discussion of general concepts and methodologies.
(11.) A list of all Federal, State, and local authorizations, approvals, or permits that are required to conduct the proposed activities, including commercial operations.	A list of all Federal, State, and local authorizations, approvals, or permits that are required to conduct the proposed activities, including commercial operations. In addition, a statement indicating whether the applicant has applied for or obtained such authorizations, approvals, or permits.
(12.) The applicant's proposed measures for avoiding, minimizing, reducing, eliminating, and monitoring environmental impacts.	A description of the measures the applicant shall take to avoid or minimize adverse effects and any potential incidental take before conducting activities on the project site, and how the applicant shall minimize environmental impacts from proposed activities, including a description of the measures.
(13.) Information the applicant incorporates by reference.	A list of the documents referenced and the actual document if requested.
(14.) A list of agencies and persons with whom the applicant has communicated, or with whom the applicant shall communicate, regarding potential impacts associated with the proposed	Contact information, issues discussed and the actual document if requested

activities.	
(15.) Reference.	Contact information.
(16.) Financial assurance.	Statements attesting that the activities and facilities proposed in the applicant's COP are or shall be covered by an appropriate bond or security, as required by section 1160.7.2.
(17.) CVA nominations	CVA nominations for reports required.
(18.) Construction schedule.	A reasonable schedule of construction activity showing significant milestones leading to the commencement of commercial operations.
(19.) Air quality information.	Information required for the Clean Air Act (42 U.S.C. 7409) and implementing regulations.
(20.) Other information.	Additional information as required by the Council.

Table 11.5: Necessary data and information to be provided in the Construction and Operations Plan.

Information:	**Report contents:**	**Including:**
(1.) Shallow hazards.	The results of the shallow hazards survey with supporting data, if required.	Information sufficient to determine the presence of the following features and their likely effects on the proposed facility, including: (i) Shallow faults; (ii) Gas seeps or shallow gas; (iii) Slump blocks or slump sediments; (iv) Hydrates; or (v) Ice scour of seabed sediments.
(2.) Geological survey relevant to the siting and design of the facility.	The results of the geological survey with supporting data.	Assessment of: (i) Seismic activity at the proposed site; (ii) Fault zones; (iii) The possibility and effects of seabed subsidence; and (iv) The extent and geometry of faulting attenuation effects of geologic conditions near the site.
(3.) Biological survey.	The results of the biological survey with supporting data.	A description of the results of biological surveys used to determine the presence of live bottoms, hard bottoms, and topographic features, and surveys of other marine resources such as fish populations (including migratory populations) not targeted by commercial or recreational fishing, marine mammals, sea turtles, and sea birds.
(4.) Fish and fisheries survey.	The results from the fish and fisheries survey with supporting data.	A report that describes the results of: (i) A biological assessment of commercially and recreationally targeted species. This assessment shall assess the relative abundance, distribution, and different life stages of these species at all four seasons of the year. This assessment shall comprise a series of surveys, employing survey equipment and methods that are appropriate for sampling finfish,

		shellfish, and crustacean species at the project's proposed location. This assessment may include evaluation of survey data collected through an existing survey program, if data are available for the proposed site. (ii) An assessment of commercial and recreational fisheries effort, landings, and landings value. Assessment shall focus on the proposed project area and alternatives across all four seasons of the year must. Assessment may use existing fisheries monitoring data but shall be supplemented by interviews with commercial and recreational fishermen. (iii) For more information on these assessments see Section 1160.9.3.

Table 11.6: Resources, conditions and activities that shall be described in the Construction and Operations Plan.

Type of Information:	**Including:**
(1.) Hazard information and sea level rise.	Meteorology, oceanography, sediment transport, geology, and shallow geological or manmade hazards. Provide an analysis of historic and project (medium and high) rates of sea level rise and shall at minimum assess the risks for each alternative on public safety and environmental impacts resulting from the project (see Chapter 3, section 350.2 for more information).
(2.) Water quality and circulation.	Turbidity and total suspended solids from construction. Modeling of circulation and stratification to ensure that water flow patterns and velocities are not altered in ways that would lead to major ecosystem change.
(3.) Biological resources.	Benthic communities, marine mammals, sea turtles, coastal and marine birds, fish and shellfish not targeted by commercial or recreational fishing, plankton, seagrasses, and plant life.
(4.) Threatened or endangered species.	As defined by the ESA (16 U.S.C. 1531 *et seq.*)
(5.) Sensitive biological resources or habitats.	Essential fish habitat, refuges, preserves, Areas of Particular Concern, sanctuaries, rookeries, hard bottom habitat, barrier islands, beaches, dunes, and wetlands.
(6.) Fisheries resources and uses	Commercially and recreationally targeted species, recreational and commercial fishing (including fishing seasons, location, and type), commercial and recreational fishing activities, effort, landings, and landings value.
(6.) Archaeological resources.	As required by the NHPA (16 U.S.C. 470 *et seq.*), as amended.
(7.) Social and economic resources.	As determined by the Council in coordination with the Joint Agency Working Group.
(8.) Coastal and marine uses.	Military activities, vessel traffic, and energy and non-energy mineral exploration or development.

COASTAL RESOURCES MANAGEMENT COUNCIL

Oliver Stedman Government Center
4808 Tower Hill Road; Suite 116
Wakefield, RI 02879
401-783-3370

Vineyard Wind Meeting Memo – June 13, 2018

This memo has been prepared by the CRMC for the meeting scheduled for June 13 between the CRMC and Vineyard Wind to assist Vineyard Wind in its federal consistency certification filing with the CRMC. The CRMC issued a public notice for the proposed project on May 25, 2018 that provides a 30-day public comment period (until June 25, 2018). The CRMC has assigned this matter file number 2018-04-055.

The information filed by Vineyard Wind on April 6, 2018 with the CRMC consists of a 37 page joint consistency certification for both Massachusetts and Rhode Island that summarizes what Vineyard Wind determined to be similar enforceable policies and shared impacts for the two state coastal zone management programs. The material provided is a summary and does not contain a reference to the RI Coastal Resources Management Program (RICRMP) except in a very general manner. Importantly, the certification filing does not provide any clear and convincing evidence to demonstrate how the proposed project will meet the RICRMP enforceable policies. While Table 3-1 lists some applicable Ocean SAMP enforceable policies and includes a general statement that there will be no reasonably foreseeable coastal effects, Vineyard Wind has not provided any specific details to justify its conclusion. Absent the specific details as outlined in the table below, the CRMC is presently unable to concur with Vineyard Wind's assertion of no coastal effects.

The information provided in the joint consistency certification without the specific benefit and citation of supporting information makes it difficult to determine if the Vineyard Wind project is consistent[1] with all of the enforceable policies outlined in the RICRMP and Ocean SAMP Chapter 11 Section 1160. It would be in the applicant's best interest to provide the information detailed below to clearly indicate where each of the enforceable policies contained in the RICRMP are addressed in the material submitted or provide supplemental information as needed. The CRMC will be using this filing, and any supplemental material filed in a timely manner, to make its determination of consistency. If the filing is not clear or does not provide sufficient information to allow the CRMC to clearly make that determination, then the CRMC will have to base its opinion on the material provided to date. The enforceable polices of Massachusetts and Rhode Island are sufficiently distinct such that a joint bi-state consistency certification may not be the best way for Vineyard Wind to demonstrate that its proposal is consistent with enforceable policies of the RICRMP.

[1] Vineyard Wind asserts in its April 6, 2018 filing that its proposed offshore renewable energy project is "consistent to the maximum extent practicable" with the enforceable policies of Rhode Island's coastal management program. See Vineyard Wind Consistency Certification at 1. However, 15 C.F.R. Part 930 Subpart D – Consistency for Activities Requiring a Federal License or Permit requires that such projects are fully consistent with approved management programs.

One example of the unclear nature of the summary submitted is from page 4 which states that Vineyard Wind is utilizing the "envelop" concept which attempts to detail the maximum coastal impacts for the proposed project. The submitted information, however, falls short of addressing the maximum impacts for the numerous references to potential ports for staging and construction within Rhode Island waters. There are no details as to the size, scope, location, vessel traffic or time of year for these direct coastal impacts. The envelop concept requires that maximum impacts be the basis for the impact analysis. Accordingly, the applicant is requested to include these elements as part of the clarifying information.

The table below is a general summary of the RICRMP enforceable policies which require specific call outs in the applicant's data submitted or supplemental information that would benefit the CRMC's review. These are general headings and are a guide to the applicant to supplement their review if they choose. Again, the CRMC will base its review on the material provided at this time. In addition, the CRMC will issue a 3-month status letter for the Vineyard Wind project on or before July 6, 2018 in accordance with 15 C.F.R. § 930.62.

The site assessment or technology testing concept.	A discussion of the objectives; description of the proposed activities, including the technology to be used; and proposed schedule from start to completion.
General structural and project design, fabrication, and installation.	Information for each type of facility associated with the applicant's project. Foundation type for each location, design criteria, construction schedules, vessel types for each location, ports of call and support. Any environmental windows that may be employed.
Deployment activities.	A description of the safety, prevention, and environmental protection features or measures that the applicant will use.
The applicant's proposed measures for avoiding, minimizing, reducing, eliminating, and monitoring environmental impacts.	A description of the measures the applicant shall take to avoid or minimize adverse effects and any potential incidental take, before the applicant conducts activities on the project site, and how the applicant shall mitigate environmental impacts from proposed activities, including a description of the measures to be used.
Reference information.	Any document or published sources that the applicant cites as part of the plan.
Decommissioning and site clearance procedures.	A discussion of methodologies.
Air quality information.	Information required for the Clean Air Act (42 U.S.C. 7409) and implementing regulations
A listing of all Federal, State, and local authorizations or approvals required to conduct site assessment activities on the project site.	A statement indicating whether such authorization or approval has been applied for or obtained, including the status of those authorizations, validity dates, and appeals pending.
Geotechnical.	Reports from the geotechnical survey with supporting data. Original side scan, multi beam, and sub bottom data on hard drive should be provided.
Archaeological	The results from the archaeological survey with supporting data, if required.

resources.	Including any meeting with state historic preservation offices with notes from those meeting as well as tribal historic preservation offices.
Geological survey.	The results from the geological survey with supporting data. The results of any sediment testing program with supporting data, the various field and laboratory tests employed, and the applicability of these methods as they pertain to the quality of the samples, the type of sediment, and the anticipated design application. The applicant shall explain how the engineering properties of each sediment stratum affect the design of the facility. In the explanation, the applicant shall describe the uncertainties inherent in the overall testing program, and the reliability and applicability of each method.
Biological survey.	The results from the biological survey with supporting data. Benthic habitat mapping done to the NOAA standard at a scale sufficient to reach conclusions for each tower location.
Fish and Fisheries Survey	The results from the fish and fisheries survey with supporting data for all four seasons including target species done by the applicant as well as effort, landings and value for the fishery in the area.
Hazard information.	Meteorology, oceanography, sediment transport, geology, and shallow geological or manmade hazards.
Water quality.	Turbidity and total suspended solids from construction.
Biological resources.	Surveys done by the applicant on benthic communities, marine mammals, sea turtles, coastal and marine birds, fish and shellfish (not targeted by commercial or recreational fishing), plankton, seagrasses, and plant life.
Threatened or endangered species.	As required by the Endangered Species Act (ESA) of 1973 (16. U.S.C. 1531 *et seq.*).
Sensitive biological resources or habitats.	Essential fish habitat, refuges, preserves, Areas of Particular Concern meeting the definition contained in the Ocean Special Area Management Plan as well as, Areas Designated for Preservation, sanctuaries, rookeries, hard bottom habitat, and calving grounds
Archaeological and visual resources.	As required by the National Historic Preservation Act and Antiquities Act (16 U.S.C. 470 *et seq.*), as amended, the Rhode Island Historical Preservation Act and Antiquities Act and Sections 220 and 330 of the RICRMP, as applicable. See above for resources.
Social and economic resources.	Employment, existing offshore and coastal infrastructure (including major sources of supplies, services, energy, and water), land use, subsistence resources and harvest practices, recreation, minority and lower income groups, and view shed.
Coastal and marine uses.	Mapped locations of military activities, vessel traffic, and energy and non-energy mineral exploration or development along with impact analysis and mitigation if required.
All cables and pipelines, including cables on project easements.	Location, design and installation methods, testing, maintenance, repair, safety devices, exterior corrosion protection, inspections, and decommissioning. The applicant shall prior to construction also include location of all cable crossings and appropriate clearance from the owners of existing cables.
A list of solid and liquid wastes generated.	Disposal methods and locations.
A list of chemical products used (if stored volume exceeds Environmental Protection Agency (EPA) Reportable Quantities).	A list of chemical products used; the volume stored on location; their treatment, discharge, or disposal methods used; and the name and location of the onshore waste receiving, treatment, and/or disposal facility. A description of how these products would be brought onsite, the number of transfers that may take place, and the quantity that shall be transferred each time.

The applicant's proposed measures for avoiding, minimizing, reducing, eliminating, and monitoring environmental impacts.	A description of the measures the applicant shall take to avoid or minimize adverse effects and any potential incidental take before conducting activities on the project site, and how the applicant shall minimize environmental impacts from proposed activities, including a description of the measures.
Construction schedule.	A reasonable schedule of construction activity showing significant milestones leading to the commencement of commercial operations.
	The project proponent shall demonstrate consistency with all federal and state agency requirements, which may include but are not limited to the requirements of the following agencies: the Rhode Island Coastal Resources Management Council, U.S. Department of the Interior Bureau of Ocean Energy Management, Regulation and Enforcement, Army Corps of Engineers, National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, and the U.S. Environmental Protection Agency.
	The project proponent shall avoid and minimize conflict with season limited commercial or recreational fishing activities, recreational boating activities or scheduled events, or other navigation uses.
	The project proponent shall designate and fund a third party fisheries liaison. The fisheries liaison must be knowledgeable about fisheries and shall facilitate direct communication between commercial and recreational fishermen and the project developer. Commercial and recreational fishermen shall have regular contact with and direct access to the fisheries liaison throughout all stages of an offshore development (pre-construction; construction; operation; and decommissioning). The applicant should be prepared to demonstrate how this will be met.
	Where possible, Offshore Developments should be designed in a configuration to minimize adverse impacts on other user groups, which include but are not limited to: recreational boaters and fishermen, commercial fishermen, commercial ship operators, or other vessel operators in the project area. Configurations which may minimize adverse impacts on vessel traffic include, but are not limited to, the incorporation of a traffic lane through a development to facilitate safe and direct navigation through, rather than around, an Offshore Development. The applicant shall demonstrate how the field has been designed to meet these concerns. Where possible, mooring mechanisms shall be installed to allow safe public use of the areas surrounding the installed turbine or other structure
	An environmental inspector shall be employed to monitor construction activities. The environmental inspector shall be a private, third-party entity that is hired by project proponent. The environmental inspector shall possess appropriate qualifications. The applicant should be prepared to demonstrate how this will be met.
	The facility shall be designed in a manner that minimizes adverse impacts to navigation. As part of its application package, the project applicant shall submit a navigation risk assessment under the U.S. Coast Guard's Navigation and Vessel Inspection Circular 02- 07, "Guidance on the Coast Guard's Roles and Responsibilities for Offshore Renewable Energy Installations." Prior to construction, the project proponent shall provide a letter from the U.S. Coast Guard showing it meets all applicable U.S. Coast Guard standards
	The project proponent shall use the best available technology and techniques to minimize impacts to the natural resources and existing human uses in the project area

	Installation techniques for all construction activities should be chosen to minimize sediment disturbance
	The project proponent shall conduct all activities in a manner that shall not cause undue harm or damage to natural resources, including their physical, atmospheric, chemical and biological components
	The project proponent shall be required to use the best available technology and techniques to mitigate any associated adverse impacts of offshore renewable energy development
	The project proponent shall describe measures designed to avoid or minimize adverse effects and any potential incidental take of endangered or threatened species as well as all marine mammals
	The project proponent shall describe measures designed to avoid likely adverse modification or destruction of designated critical habitat of such endangered or threatened species
	The project proponent shall describe an agreement to monitor for the incidental take of the species and adverse effects on the critical habitat, and provide the results of this monitoring
	Post construction, the project proponent shall provide a side scan sonar survey of the entire construction site to verify that there is no post construction debris left at the project site. These side-scan sonar survey results shall be completed within 90 days of the end of the construction period. The results of this side-scan survey shall be verified by a third-party reviewer
	All pile-driving or drilling activities shall comply with any mandatory best management practices. The applicant will provide any information of agreements with non-governmental organizations to demonstrated use of environmental window for construction operations.
	The applicant should provide the council with a monitoring plan that will address the biological assessment of commercially and recreationally targeted species shall be required within the project area. This assessment shall assess the relative abundance, distribution, and different life stages of these species at all four seasons of the year. This assessment shall comprise a series of surveys, employing survey equipment and methods that are appropriate for sampling finfish, shellfish, and crustacean species at the project's proposed location. Such an assessment shall be performed at least four times: pre-construction (to assess baseline conditions); during construction; and at two different intervals during operation (i.e. 1 year after construction and then post-construction). At each time this assessment must capture all four seasons of the year. This assessment may include evaluation of survey data collected through an existing survey program, if data are available for the proposed site. The applicant's written guarantee of this assessment would be part of the consistency certification.
	An assessment of commercial and recreational fisheries effort, landings, and landings value shall be required. The assessment shall focus on the proposed project area and alternatives. This assessment shall evaluate commercial and recreational fishing effort, landings, and landings value at three different stages: preconstruction (to assess baseline conditions); during construction; and during operation. At each stage, all four seasons of the year must be evaluated. Assessment may use existing fisheries monitoring data but shall be supplemented by interviews with commercial and recreational fishermen. The assessment shall address whether fishing effort, landings, and landings value has changed in comparison to baseline conditions.

The following monitoring considerations shall be incorporated into a monitoring plan for the project	i. Coastal processes and physical oceanography ii. Underwater noise iii. Benthic ecology iv. Avian species v. Marine mammals vi. Sea turtles vii. Fish and fish habitat viii. Commercial and recreational fishing ix. Recreation and tourism x. Marine transportation, navigation and existing infrastructure xi. Cultural and historic resources

Appendix 6. Vineyard Wind Response to CRMC 3-month letter (7/16/18)
(Contains FAB meeting presentations of 7/24/17 and 4/11/18)

OCS-A 0501 MASS USA

VINEYARD WIND

VIA Electronic Mail and FedEx

July 16, 2018

Grover J. Fugate
Executive Director
Rhode Island Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, RI 02879-1900

Re: Vineyard Wind – CRMC File No. 2018-04-055

Dear Mr. Fugate:

We have reviewed your July 2, 2018 letter providing the Coastal Resources Management Council's ("CRMC") review status of the Vineyard Wind Project ("Project") and provide herein a response to the issues you raise in order to further facilitate your review.[1] As discussed below, most of the issues you have raised are addressed in Vineyard Wind's currently available Construction and Operations Plan ("COP") submitted to the Bureau of Ocean Energy Management ("BOEM") on March 15, 2018. In addition, Vineyard Wind is preparing to submit to BOEM an updated version of the COP that responds to comments received from BOEM, federal and state agencies, and stakeholders, including Rhode Island fishermen. We will file this revised submission with CRMC on or before July 23.

To facilitate your review, we request to meet with CRMC to walk through relevant portions of the COP, discuss CRMC's information needs, and the review process going forward. As we have now scheduled a fourth meeting between Vineyard Wind and the FAB/HAB on July 26, 2018, a meeting with CRMC before that date would be particularly helpful. We are available to meet the morning of July 23, the afternoon of the 24th (after 2 pm), anytime on July 25th, or the morning of July 26th. Please let us know what day and time works best for CRMC.

[1] CRMC requested a response to its letter by July 15, 2018. However, July 15th falls on a Sunday. Therefore, this response is provided on the next business day.

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VINEYARDWIND.COM

I. Construction and Operations Plan (COP)

As a preliminary matter, we want to clarify that pursuant to BOEM regulations governing the Project, our consistency certification is governed principally by Subpart E of the Coastal Zone Management Act Federal Consistency Regulations, 15 C.F.R. § 930.76. *See* 33 C.F.R. §627(a)(9) (providing that Subpart E applies if a COP is submitted after lease issuance). Thus, the COP is the principal source of information regarding potential coastal effects. With respect to necessary data and information pursuant to §930.58, the information requirements set forth in the Rhode Island Ocean Special Area Management Plan ("Ocean SAMP") §1160.5 are identical to BOEM's COP requirements. Therefore, it follows that the enforceable policies found in §1160 of the Ocean SAMP, which are applicable to federal consistency, are addressed by the information included in the COP. Nevertheless, to the extent that additional information is required and obtainable, we will certainly strive to satisfy your requests.

With respect to filing the COP with CRMC, our consistency certification provided an easily accessible link to the COP.[2] We were not informed that our submission was in anyway incomplete.[3] Volume II of the COP was not provided to CRMC because it contains confidential and proprietary information. We will provide CRMC with access to Volume 2 if CRMC can provide assurances that the information will be protected against public disclosure. 15 C.F.R. § 930.58(c).

As noted above, Vineyard Wind is preparing to submit to BOEM a revised version of the COP, which we will provide to CRMC, including the confidential and proprietary information upon receiving CRMC's assurances that it will be protected against public disclosure. Please let us know as soon as possible if the confidential information needs to be marked in any particular way to ensure nondisclosure.

At the June 13, 2018 meeting with CRMC, CRMC provided Vineyard Wind with a compilation of Tables 11.4, 11.5, and 11.6 found in §1160.5 and indicated that it would be in Vineyard Wind's best interest to demonstrate where in the information submitted the enforceable policies are addressed. As Tables 11.4, 11.5, and 11.6 from the Ocean SAMP are identical to BOEM's regulations for a COP submission (30 CFR §585.105(a), 621 (a-g), 626(a) and (b), 627(a)), COP Volume I, Table 1.6-1 cross references the listed Table requirements with the relevant sections of the COP. Thus, Table 1.6-1 should facilitate CRMC's review of the submitted information.

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2 Pursuant to 15 C.F.R. § 930.76(b) "[t]he Secretary of the Interior or designee shall furnish the State agency with a copy of the information submitted under paragraph (a) of this section [i.e., the COP] (excluding confidential and proprietary information)."

3 CRMC did not notify Vineyard Wind that, pursuant to 15 C.F.R.§ 930.60(a)(1), it had failed to submit necessary data and information required for CRMC to begin its 6-month review of the Project. Thus, the 6-month review period began on April 6, 2018.

II. Requested Supplemental Information Related to Identified Enforceable Policies

In its letter CRMC lists the enforceable policies and provides comments with respect to deficiencies and/or information CRMC believes is needed to complete the review. We assume that the policies not referenced in the letter are either not relevant to federal consistency or Vineyard Wind has addressed them satisfactorily. The issues raised by CRMC are discussed below in the order of the enforceable policy cited in CRMC's letter.

> **Section 1160.1.3**: *Offshore Developments shall not have a significant adverse impact on the natural resources or existing human uses of the Rhode Island coastal zone, as described in the Ocean SAMP. Where the Council determines that impacts on the natural resources or human uses of the Rhode Island coastal zone through the pre-construction, construction, operation, or decommissioning phases of a project constitute significant adverse effects not previously evaluated, the Council shall, through its permitting and enforcement authorities in state waters and through any subsequent CZMA federal consistency reviews, require that the applicant modify the proposal to avoid and/or mitigate the impacts or the Council shall deny the proposal.*

(a) Detailed information on the construction and operations phases of the project

CRMC states that the Council has not been provided with detailed information on the construction and operations phases of the Project. It is unclear what additional detailed information CRMC is requesting. In accordance with both BOEM regulations and Ocean SAMP Tables 11.4 - .6, COP Volume I provides detailed technical information on the construction and operations phases on the project. Volume III identifies the impact producing factors during construction, operations, and decommissioning activities and analyzes potential impacts to multiple resources. If CRMC can provide a more precise description of the information it seeks beyond what is included in the COP, we could provide a response.

CRMC has previously informed Vineyard Wind that its' principal concerns are with respect to fisheries and commercial and recreational fishing. The sections of the COP most relevant to these issues include Volume 3, section 6.5 (benthic resources), 6.6 (finfish and invertebrates), section 6.7 (marine mammals), section 6.8 (sea turtles), Appendix III-F (Essential Fish Habitat), and section 7.6 (commercial and recreational fishing). We address CRMC's proposed alternative layout in Section III below.

(b) Meetings with the FAB and HAB

Enforceable policies §§ 1160.1.5 and 1160.1.11 provide that the Council cannot require "pre-application meetings" for federal permit applications, but encourages applicants to meet with the FAB, the HAB, and the Council staff prior to the submission of a federal application. A meeting with the FAB and HAB is considered necessary data and information prior to the 6-month CZMA review period, but the policies do not outline what is required to be discussed in a federal consistency meeting as it does for a "pre-application" meeting.

To date, we have attended three meetings with the FAB, one of which was a combined FAB/HAB meeting. Consistent with §§ 1160.1.5 and .11, two of those meetings were held prior to CRMC's 6-month review period. For the past three months, we have sought additional meetings with the FAB, but we were unable to secure a commitment to meet. We have also met individually with individual members, including:

- Katie Almeida (FAB) - August 31, 2017 and March 5, 2018;
- Lanny Dellinger (FAB) - March 5, 2018 and July 9, 2018;
- Rick Bellavance (FAB) - April 11, 2018;
- Fred Mattera (FAB) - February 19, 2018 and July 9, 2018;
- Nicole Lengyel (RI DEM-FAB) - September 6, 2017;
- Donald Fox (FAB) - August 31, 2017, March 5, 2018, and June 1, 2018;
- Greg Mataronas (FAB) – July 9, 2018;
- Brian Thibeault (FAB) – July 9, 2018; and
- Mike Marchetti (FAB) – July 9, 2018.

In addition, we have met or spoken with Julia Livermore, Rhode Island Department of Environmental Management's ("RI DEM") FAB representative, numerous times beginning in September, 2017 to discuss the Project, ongoing survey work, lessons learned from the Block Island project, and RI DEM's study of fishing activity. RI DEM also regularly receives fishermen and mariner notices for distribution from Vineyard Wind's fisheries liaison. In addition, RI DEM reviewed and provided comments to Vineyard Wind on its Fisheries Communication Plan that is included in the COP.

Further, we have met with CRMC staff both before and after filing our consistency certification. We also began meeting with Rhode Island fishermen in 2011, while in the early planning stages of the Project to gather information regarding fishing activities in the Project area, which we took into consideration in designing the Project.

July 24, 2017 FAB/HAB Meeting: Vineyard Wind first met with the FAB/HAB on July 24, 2017, at which time we presented an overview of the Project and discussed ongoing activities to address numerous issues, including planned fisheries studies. *See* Attachment A. At this meeting, Vineyard Wind heard from numerous attendees regarding areas fished, spacing between the turbines, and needed fishery studies. While CRMC organized, scheduled, and actively participated in this meeting, we were not provided with any direction on additional information and/or meetings necessary to satisfy the federal consistency review. Following the meeting Vineyard Wind continued outreach to individual FAB members to seek additional input on the Project.

February 19, 2018: Vineyard Wind attended a second FAB meeting on February 19, 2018, where the agenda included a discussion of federal consistency and project status of the Vineyard Wind and adjacent projects. CRMC largely discussed both projects with the FAB. Vineyard Wind was available to answer questions or concerns about the Project.

April 11, 2018: A third meeting with the FAB was held on April 11, 2018 where Vineyard Wind updated the FAB on the Project.[4] *See* Attachment B. Importantly, Vineyard Wind highlighted that it had held over 100 meetings with fishermen and fishing organizations, including the FAB and HAB, which informed the proposed project layout and discussed planned pre and post-construction fisheries studies.[5] Vineyard Wind also made clear to the FAB that it wanted to work collaboratively on an ongoing basis to address issues such as gear loss and establishing a damage reporting clearinghouse. The FAB raised a number of issues for consideration including transit lanes, layout of the Project, and the effects of turbidity on fish larvae, all of which are addressed in the COP. At the meeting, CRMC directed Vineyard Wind to work directly with FAB chair Lanny Dellinger and other FAB members to further discuss the issues. We were told that the FAB had as many as 18 members, but that it was likely that 6 to 8 members would be available to attend follow-up meetings. On April 13, 2018, Vineyard Wind reached out to Mr. Dellinger to set up the follow-up meetings. While Mr. Dellinger agreed to check with members to find a time to meet, Vineyard Wind

[4] Prior to the April 2018 FAB meeting, Vineyard Wind contacted all members of the FAB individually informing them that Vineyard Wind had submitted its COP and would like the "opportunity to sit down with you to continue our dialogue, give you an update on our project and hear your feedback." While a few members of the FAB responded, only one member was available to meet (Rick Bellavance).

[5] A list of the fishermen and fishing organizations with whom Vineyard Wind has met can be provided upon request.

never received confirmation of a meeting time despite, numerous follow-up inquiries, even as recently as July 9, 2018.[6] On July 12, 2018, CRMC notified Vineyard Wind that its planned FAB meeting with Deepwater Wind scheduled on July 26, 2018 had to be rescheduled and asked if Vineyard Wind would like to use that time slot to meet with the FAB. We gladly accepted the invitation.

While we look forward to meeting again with the FAB/HAB on July 26, we believe we have satisfied the requirement to meet with the FAB and HAB as part of the federal consistency review (as opposed to the requirement to have a "pre-application" meeting). Sections 1160.1.5 and .11 provide that a meeting with the FAB and HAB is considered necessary data and information *prior to the 6-month CZMA review period* for purposes of starting the review, which CRMC initiated on April 6, 2018. Vineyard Wind was never notified pursuant to 15 C.F.R.§ 930.60(a)(1) that it had failed to satisfy this pre-requisite information need.

It is also unclear to us what information will be provided at the July 26 FAB/HAB meeting that is not available in the COP or that we have not otherwise received from and discussed with numerous individual Rhode Island fishermen, including FAB members, fishing organizations, and state and federal agencies. Indeed, on July 9, 2018, Vineyard Wind met with the Rhode Island Commercial Fisheries Center, which represents numerous Rhode Island fishermen and fishing organizations, including members of the FAB, to specifically discuss fishing activities within the Project area, how the layout of the Project may potentially affect those activities, and potential ways to mitigate concerns.[7] A central focus of the meeting was a discussion of the alternative layout provided by CRMC in Figure 3, which we address further in Section III below.

Section 1160.1.4: "*Any assent holder of an approved Offshore Development shall:*

i. Design the project and conduct all activities in a manner that ensures safety and shall not cause undue harm or damage to natural resources, including their physical, chemical, and biological components to the extent practicable; and take measures to prevent unauthorized discharge of pollutants including marine trash and debris into the offshore environment.

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6 Vineyard Wind reached out to Mr. Dellinger via text, his preferred method of communication, on April 13, April 18, April 23, May 2, May 30, June 20, and June 27, 2018. On July 12, 2018, Mr. Dellinger contacted Vineyard Wind to inform us that additional meetings with the FAB should be scheduled through the CRMC staff.

7 Meeting attendees included Fred Mattera, Tricia Jedele, Lanny Dellinger, Greg Materonas, Todd Sutton, Brian Thibeau, Mike Marchetti, Vineyard Wind representatives, and Deepwater Wind representatives.

Based on its experience with the Deepwater Wind project, CMRC requests that Vineyard Wind submit a grout management plan in accordance with the requirements of Table 11-4 (items (8) and (9)) of the §1160.5 (Application Requirements). Table 11-4, item 8 requires a list of solid wastes and liquid wastes generated, including disposal methods and locations; item 9 requires a list of chemicals used, including the volume stored on location, their treatment, discharge or disposal methods used, and the name and location of the onshore waste receiving, treatment, and/or disposal facility. These requirements are identical to BOEM's requirements that this information be included in the COP (*see* 33 C.F.R. § 585.626(b)(9) and (10)). The information can be found in COP Volume I, sections 4.2.5 and 4.2.6. In particular, Table 4.2-3 contains information specific to grout use.

We further note that neither the enforceable policies nor the federal regulations state that a separate "grout management plan" is required. Rather, pursuant to BOEM's regulations, Vineyard Wind has developed a draft Safety Management Systems Plan ("SMS"), which includes an Environmental Management Plan. *See* COP Vol. I, Appendix B. The final Environmental Management Plan will be completed before construction begins and will contain detailed plans for ensuring compliance with all environmental laws and regulations.

Under the SMS, the Environmental Coordinator will report to the Project Director and will ensure that all local, state and federal permit requirements and laws relating to environmental protection and reporting are followed. The Environmental Coordinator will monitor contractors' compliance with Project-specific environmental requirements and shall be responsible for verifying compliance with environmental protection programs and protocols for environmental incident response. In addition, all equipment suppliers and construction firms are being evaluated to ensure compliance with regulatory and Project requirements. The evaluation includes a comprehensive gap analysis review of the equipment supplier and/or construction firm's SMS and Environmental Management System to ensure that work can performed in compliance with regulatory requirements. This evaluation includes ensuring that contractors have compliant oil spill response plans, hazardous waste plans, and waste management plans in place.

We also note that it is not certain that Vineyard Wind will use grout at all. As CRMC correctly notes, the connections could also be bolted together, which, at this time, may be the more likely approach. To the extent that grout is used for connecting monopiles to transition pieces, the grouting activity takes place in a contained area. Thus, potential discharges to water are unlikely. Nevertheless, if grout is used,

Vineyard Wind will, as part of its environmental management program, ensure that the grouting contractor has appropriate plans in place to prevent illicit discharges of grout and to respond appropriately should accidental releases occur.

Section 1160.1.5: *Any Large-Scale Offshore Development, as defined in section 1160.1.1, shall require a meeting between the Fisherman's Advisory Board (FAB), the applicant, and the Council staff to discuss potential fishery-related impacts, such as, but not limited to, project location, construction schedules, alternative locations, project minimization and identification of high fishing activity or habitat edges. For any state permit process for a Large-Scale Offshore Development this meeting shall occur prior to submission of the state permit application. The Council cannot require a pre-application meeting for federal permit applications, but the Council strongly encourages applicants for any Large-Scale Offshore Development, as defined in Section 1160.1.1, in federal waters to meet with the FAB and the Council staff prior to the submission of a federal application, lease, license, or authorization. However, for federal permit applicants, a meeting with the FAB shall be necessary data and information required for federal consistency reviews for purposes of starting the CZMA 6-month review period for federal license or permit activities under 15 C.F.R. part 930, subpart D, and OCS Plans under 15 C.F.R. part 930, subpart E, pursuant to 15 C.F.R. § 930.58(a)(2). Any necessary data and information shall be provided before the 6-month CZMA review period begins for a proposed project.*

With respect to a "required" meeting with the FAB and CRMC, we refer to the response provided under §1160.1.3. As noted, Vineyard Wind has, for several months tried to secure a meeting with FAB members pursuant to CRMC's direction at the April 11, 2018 meeting. Thus, we appreciate CRMC placing Vineyard Wind on the already scheduled FAB agenda on July 26.

Section 1160.1.6: *The Council shall prohibit any other uses or activities that would result in significant long-term negative impacts to Rhode Island's commercial or recreational fisheries. Long-term impacts are defined as those that affect more than one or two seasons.*

Section 1160.1.7: *The Council shall require that the potential adverse impacts of Offshore Developments and other uses on commercial or recreational fisheries be evaluated, considered, and mitigated as described in section 1160.1.9.*

(a) Project Schedule

CRMC states that there is a contradiction between the description of the Project schedule in the consistency certification and the draft COP. CRMC also observes that the construction schedule is "very

aggressive" and that it does not consider weather delays and the possibility of construction interruption during spring months when endangered whales are migrating and feeding within the Project area.

As you are aware, Vineyard Wind was the successful bidder in response to Massachusetts Section 83C Offshore Wind Energy Generation request for proposals, being awarded distribution contracts for 800 MW of power. The parties are in the final stages of contract negotiations. As a result, Vineyard Wind's Project schedule has been modified to accommodate construction of an 800 MW project beginning in late 2019, with offshore construction commencing in May 2020. The revised construction schedule can be found in COP Volume 1, Figure 4.1-1.

The schedule takes into consideration weather delays, as well as provides that no pile driving will be conducted from January through April when endangered whales may migrate through the Project area. Vineyard Wind is working closely with BOEM, and the expert agency, the NOAA Fisheries Service (NOAA Fisheries), on the identification and analysis of potential impacts to marine mammals during Project construction, as well as potential mitigation measures. In addition, Vineyard Wind is meeting with renowned North American Right Whale scientists to inform strategies for monitoring and mitigating potential impacts. As noted, Vineyard Wind has already committed to not drive piles from January through April. In addition, based on analysis and consultation with BOEM and NOAA Fisheries, it was determined that an average of 12 dB is a reasonable and achievable noise reduction, which Vineyard Wind is committed to achieving. Other commitments include not beginning pile driving at night, not driving piles concurrently, and only installing a maximum of two foundations per day. Moreover, Vineyard Wind has established a $3 million "Whales and Wind Fund" to fund development and demonstration of innovative methods and technologies to enhance protections for marine mammals as the U.S. offshore wind industry continues to grow. All of these commitments equally mitigate potential impacts to fisheries important to commercial fishing. Further, extensive acoustic modeling has been conducted and a supplement to the marine mammal section of the COP will be submitted to BOEM in August. We will provide CRMC with a copy of the supplement as well. In addition, Vineyard Wind will be submitting an Incidental Harassment Authorization (IHA) to NOAA Fisheries in the coming months. As you know, Vineyard Wind cannot commence offshore construction before NOAA Fisheries issues an IHA.

Having considered weather delays and measures needed to protect marine mammals, the construction schedule is based on the extensive

experience members of the Vineyard Wind team have constructing offshore wind projects in Europe. COP Volume I, section 1.6 details the many projects team members have constructed or are in the process of constructing. The schedule presented in the COP is consistent with schedules followed for these projects. In addition, as part of the Massachusetts section 83C bid process, Vineyard Wind's construction schedule was reviewed by experts and was found to be workable for achieving Project commitments. For these reasons, we disagree with CRMC's observation that the construction schedule is "very aggressive."

(b) Cable Burial

CRMC states that there is the potential that more than 21 linear miles of cable protection will be installed thereby creating permanent, long-term bottom obstructions that could snag commercial fishing trawl nets. The revised COP does conservatively estimate that up to 10% of the total length of the offshore export cable system could require protection measures. However, Vineyard Wind will minimize the need for cable protection to the greatest extent feasible through careful site assessment and thoughtful selection of the most appropriate cable installation tool to achieve sufficient burial. Therefore, the 10% represents a worst case estimate. For the inter-link cable and inter-array cables within the Wind Development Area ("WDA"), this worst case estimate represents only 0.089% of the total area of the WDA. It is also important to understand that the majority of the WDA is comprised of homogeneous fine sand and silt-sized sediments. Therefore, it is expected that cable protection would only be necessary where difficult soils, such as boulders or rock formations are encountered and burial depth cannot be achieved. Areas with cable protection will be made known to area fishermen so the areas can be avoided.

(c) Mooring Plans

CRMC states that "mooring plans" for support vessels are necessary for CRMC to determine reasonably foreseeable effects to Rhode Island-based commercial and recreational fishing vessels. The COP explains that within the WDA, anchored vessels will not be used as primary construction and installation vessels. Thus, any anchoring that may occur in the WDA will likely be limited and sporadic. And, as discussed in the COP, there are no sensitive seafloor habitats within the WDA that could be impacted by anchoring. The COP also explains that anchoring along the export cable route may occur through Muskeget Channel or in the shallower waters of Lewis Bay near the New Hampshire Avenue Landfall Site, though anchoring could occur at any point along the offshore export cable route. If used,

anchored vessels will avoid sensitive seafloor habitats to the greatest extent practicable. Importantly, based on our analysis and the information received from our extensive outreach to fishermen, we are not aware that any Rhode Island fishermen who fish within Muskeget Channel or in Lewis Bay near the New Hampshire Avenue Landfall Site. Therefore, even if anchoring does occur, Rhode Island fishermen would not likely be affected. Moreover, at the June 13 meeting, CRMC informed us that it was not concerned about coastal effects potentially related to activities in Nantucket Sound.

Given the uncertain and sporadic nature of potential anchoring activities, it is impossible to quantify anchor use and anchor sweep at this time. Thus, it is impossible to develop a mooring plan as CRMC requests. We can, however, confirm that any anchoring that does take place will be within areas surveyed. And, we refer CRMC to COP Volume III, sections 6.5, 6.6. and 7.6 for a comprehensive discussion of potential impacts to benthic resources, fish, and commercial and recreational fishing. These sections address the potential impacts of the maximum design scenario for the Project and thus present a worst-case analysis. Any potential impacts from anchoring activities are within the scope of this worst-case analysis.

Section 1160.1.9: *The Council recognizes that moraine edges, as illustrated in Figures 11.3 and 11.4, are important to commercial and recreational fishermen. In addition to these mapped areas, the FAB may identify other edge areas that are important to fisheries within a proposed project location. The Council shall consider the potential adverse impacts of future activities or projects on these areas to Rhode Island's commercial and recreational fisheries. Where it is determined that there is a significant adverse impact, the Council will modify or deny activities that would impact these areas. In addition, the Council will require assent holders for Offshore Developments to employ micro-siting techniques in order to minimize the potential impacts of such projects on these edge areas.*

CRMC is requesting side-scan sonar, multi-beam sonar, detailed bathymetry information and other geophysical data to confirm our representation that there are no glacial moraines in the Project area. COP Volume II confirms there are no glacial moraines within the Project area. The survey information and data requested is confidential information. However, as noted above, Vineyard Wind will provide CRMC with COP Volume II upon receiving assurances that the information will be protected from public disclosure.

Further, as also noted above, Vineyard Wind has met numerous times with individual fishermen and fishing organizations, including the FAB and FAB members to discuss fishing activities in and around the Project area. FAB members have not made us aware of edge areas that

are important to commercial fishing within the Project area. In addition, COP section 6.5 contains a detailed description of benthic habitats within the Project area, section 6.6 contains an extension discussion of fish and invertebrates within the Project area, Essential Fish Habitats are discussed in Appendix III-F, and section 7.6 discusses commercial fisheries and recreational fishing within the Project area. Together, these sections provide a comprehensive analysis of fisheries resources important to commercial and recreational fishing.

Section 1160.1.10: *The finfish, shellfish, and crustacean species that are targeted by commercial and recreational fishermen rely on appropriate habitat at all stages of their life cycles. While all fish habitat is important, spawning and nursery areas are especially important in providing shelter for these species during the most vulnerable stages of their life cycles. The Council shall protect sensitive habitat areas where they have been identified through the Site Assessment Plan or Construction and Operation Plan review processes for Offshore Developments as described in section 160.5.3 (i).*

Section 1160.1.10 states that the Council will protect sensitive habitats "where they have been identified through the Site Assessment plan or Construction and Operation Plan review processes." There is no mention that a FAB meeting is required to identify sensitive habitats. COP Volume III, section 6.5 contains a detailed description of benthic habitats within the Project area, section 6.6 contains an extensive discussion of fish and invertebrates within the Project area, and Essential Fish Habitats are discussed in Appendix III-F. These sections specifically address fish habitats within the Project area and the life histories of fishes found in the area, including species targeted by commercial and recreational fishermen. Thus, we do not understand CRMC's statement that information has not been provided to the Council to demonstrate the presence or absence of these habitat areas that would allow the Council to make a determination on this enforceable policy. Rather, it appears that CRMC is taking the position that only a meeting with the FAB can satisfy this policy, which is not what the policy, on its face, requires. Nevertheless, we would be pleased to discuss the information contained in the COP with the FAB/HAB on July 26.

Section 1160.1.11: *Any Large-Scale Offshore Development, as defined in Chapter 11 in section 1160.1.1, shall require a meeting between the HAB, the applicant, and the Council staff to discuss potential marine resource and habitat-related issues such as, but not limited to, impacts to marine resource and habitats during construction and operation, project location, construction schedules, alternative locations, project minimization, measures to mitigate the potential impacts of proposed projects on habitats and marine resources, and the identification of important marine resource and habitat areas. For*

any state permit *process for a Large-Scale Offshore Development, this meeting shall occur prior to submission of the state permit application. The Council cannot require a pre-application meeting for federal permit applications, but the Council strongly encourages applicants for any Large-Scale Offshore Development, as defined in Section 1160.1.1, in federal waters to meet with the HAB and the Council staff prior to the submission of a federal application, lease, license, or authorization. However, for federal permit applicants, a meeting with the HAB shall be necessary data and information required for federal consistency reviews for purposes of starting the CZMA 6-month review period for federal license or permit activities under 15 C.F.R. part 930, subpart D, and OCS Plans under 15 C.F.R. part 930, subpart E, pursuant to 15 C.F.R. § 930.58 (a)(2). Any necessary data and information shall be provided before the 6-month CZMA review period begins for a proposed project.*

CRMC states that there have been no meetings with Vineyard Wind and the HAB to discuss "potential marine resource and habitat-related issues such as, but not limited to, impacts to marine resource and habitats during construction and operation, project location, construction schedules, alternative locations, project minimization, measures to mitigate the potential impacts of proposed projects on habitats and marine resources, and the identification of important marine resource and habitat areas" and therefore a "pre-application" meeting is required between Vineyard Wind, CRMC, and the HAB to satisfy this policy. However, the policy also makes clear that CRMC cannot require a "pre-application" where federal permits are sought.

As discussed under policy 1160.1.3, Vineyard Wind met with the FAB/HAB on July 24, 2017, at which time it presented an overview of the Project and discussed ongoing activities to address numerous issues, including planned fisheries studies. *See* Attachment A. At this meeting, Vineyard Wind heard from numerous attendees regarding areas fished, spacing between the turbines, and needed fishery studies. While CRMC organized, scheduled, and actively participated in this meeting, we were not provided with any direction on additional information and/or meetings necessary to satisfy the federal consistency review.

Moreover, the COP includes detailed information on the potential impacts to marine resource and habitats during construction and operation, project location, construction schedules, project minimization, measures to mitigate the potential impacts of proposed projects on habitats and marine resources, and the identification of important marine resource and habitat areas. *See* Volume 1, section 2.0 (project location); section 4.1 (construction schedule); Volume 3, section 6.5 (benthic resources), 6.6 (finfish and invertebrates), section 6.7 (marine mammals), section 6.8 (sea turtles), and Appendix III-F

(Essential Fish Habitat). CRMC has not indicated how this information is insufficient evidence to demonstrate the potential impacts of the Project on marine resources and habitats. Thus, it is difficult for us to understand CRMC's conclusion that we have not demonstrated that the Project is consistent with this enforceable policy. Nevertheless, we would be pleased to discuss the information contained in the COP with the FAB/HAB on July 26.

Section 1160.1.12: *The potential impacts of a proposed project on cultural and historic resources will be evaluated in accordance with the National Historic Preservation Act and Antiquities Act, and the Rhode Island Historical Preservation Act and Antiquities Act as applicable. Depending on the project and the lead federal agency, the projects that may impact marine historical or archaeological resources identified through the joint agency review process shall require a Marine Archaeology Assessment that documents actual or potential impacts the completed project will have on submerged cultural and historic resources.*

Section 1160.1.13: *Guidelines for Marine Archaeology Assessment in the Ocean SAMP Area can be obtained through the RIHPHC in their document, "Performance Standards and Guidelines for Archaeological Projects: Standards for Archaeological Survey" (RIHPHC 2007), or the lead federal agency responsible for reviewing the proposed development.*

Section 1160.1.14: *The potential non-physical impacts of a proposed project on cultural and historic resources shall be evaluated in accordance with 36 CFR 800.5, Assessment of Adverse Effects, (v) Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features. Depending on the project and the lead federal agency, the Ocean SAMP Interagency Working Group may require that a project undergo a Visual Impact Assessment that evaluates the visual impact a completed project will have on onshore cultural and historic resources.*

None of the enforceable policies cited require meetings with the Rhode Island State Historic Preservation Office ("RI SHPO") or the Tribal Historic Preservation office to show that the enforceable policies have been satisfied. Enforceable policies §§ 1160.1.12 and .13 require a marine archeological assessment prepared in accordance with the federal agency responsible for reviewing the Project, in this case BOEM. Vineyard Wind retained Gray & Pape of Providence, Rhode Island, to conduct a marine archeological assessment for the WDA and export cable route. The assessment was conducted in accordance with BOEM regulations and guidance, and included archival and document research and field investigations. COP Volume III, section 7.3 provides an overview of the assessment and the full report is provided in COP Volume II, Appendix C. As the assessment contains confidential archeological information, it will be provided to CRMC

upon receiving assurances that it will not be publicly disclosed. The report satisfies the requirements of enforceable policies §§ 1160.1.12 and .13.

Enforceable policy § 1160.1.14 requires that potential non-physical impacts of a project on cultural and historic resources to be evaluated in accordance with 36 C.F.R. 800.5(2)(v) (introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features). COP section 7.3 and 7.4 discuss cultural, historic and archeological resources and COP Volume III, Appendix H.b contains a visual impact assessment. We note, however, there are no areas along the Rhode Island coast from which the Project is visible. This is because the Project is more than 41 miles from the nearest point on the Rhode Island coast with the most direct line of sight towards the Project. The maximum distance any of the Project's turbines could be visible due to the curvature of the earth and horizon line is 35.3 miles. Moreover, most of the Project is shielded from the Rhode Island coast by an intervening land mass, i.e., Martha's Vineyard. Thus, Rhode Island is not within the Area of Potential Effects (APE) for visual effects. It is therefore unclear that a meeting with the RI SHPO would be productive or useful to the RI SHPO or CRMC.

We also note that BOEM has initiated its Section 106 process under the National Historic Preservation Act, to which we understand CRMC and the Narragansett Historic Preservation Office have been invited to participate as consulting parties.[8] At its first section 106 webinar held on June 26, 2018, BOEM presented the Project APE. *See* Attachment C.

We further note that our lease with BOEM requires us to consult with the Narragansett Tribe at least 45 days prior to commencing survey activities. We have therefore invited the Tribe to meet with Vineyard Wind on at least four occasions to not only discuss our survey plans, but also any matters related to the Project generally. The Tribe has also been invited to view the collection and analysis of offshore sample cores. Vineyard Wind also provided the Tribe with electronic copies of the sections of the COP related to cultural issues. Moreover, in addition to the Tribe's participation in the section 106 process, BOEM has a separate obligation to hold government-to-government consultations with the Tribe to discuss the Project.

[8] Our understanding is that BOEM invited all participants in the Joint Rhode Island/Massachusetts Wind Energy Task Force to participate in the section 106 process. It is unclear to us whether the RI SHPO was a participant in the Task Force or has otherwise been invited to participate in the Section 106 process.

Section 1160.2.2: *All Large-scale, Small-scale, or other offshore development, or any portion of a proposed project, shall be presumptively excluded from APCs. This exclusion is rebuttable if the applicant can demonstrate by clear and convincing evidence that there are no practicable alternatives that are less damaging in areas outside of the APC, or that the proposed project will not result in a significant alteration to the values and resources of the APC. When evaluating a project proposal, the Council shall not consider cost as a factor when determining whether practicable alternatives exist. Applicants which successfully demonstrate that the presumptive exclusion does not apply to a proposed project because there are no practicable alternatives that are less damaging in areas outside of the APC must also demonstrate that all feasible efforts have been made to avoid damage to APC resources and values and that there will be no significant alteration of the APC resources or values. Applicants successfully demonstrating that the presumptive exclusion does not apply because the proposed project will not result in a significant alteration to the values and resources of the APC must also demonstrate that all feasible efforts have been made to avoid damage to the APC resources and values. The Council may require a successful applicant to provide a mitigation plan that protects the ecosystem. The Council will permit underwater cables, only in certain categories of Areas of Particular Concern, as determined by the Council in coordination with the Joint Agency Working Group. The maps listed below in section 1160.2.3 depicting Areas of Particular Concern may be superseded by more detailed, site-specific maps created with finer resolution data.*

> As discussed above, there are no glacial moraines or other habitat features within the Project area considered an area of particular concern (APC) in the Ocean SAMP. Fishing activity within the Project area is discussed in Section III below in conjunction with the proposed alternative layout for the Project.

Section 1160.2.3: *Areas of particular concern that have been identified in the Ocean SAMP area in state waters also include glacial moraines, historic shipwrecks, archeological or historical sites and their buffers as described in Chapter 4, Cultural and Historic Resources, and Offshore dive sites. The moraines have been referred to previously and important habitat areas for a diversity of fish and other marine plants and animals because of their relative structural permanence and structural complexity. Glacial moraines create a unique bottom topography that allows for habitat diversity and complexity, which allows for species diversity in these areas and creates environments that exhibit some of the highest biodiversity within the entire Ocean SAMP area. The Council also recognizes that because glacial moraines contain valuable habitats for fish and other marine life, they are also important to commercial and recreational fishermen. Accordingly, the Council shall designate glacial moraines as Areas of Particular Concern.*

CRMC states that Vineyard Wind has not provided information to demonstrate that other APCs are not being encroached on or impacted including, historic shipwrecks, archeological or historical sites, designated shipping lanes, precautionary areas, recommended vessel routes, ferry routes, dredge disposal sites, military testing areas, unexploded ordinance, pilot boarding areas, anchorages, racing activities, and high intensity commercial marine traffic. However, as discussed under enforceable policies §§ 1160.1.12 and .13, COP Volume III, section 7.3 provides an overview of the marine archeological assessment and the full report is provided in COP Appendix II-C. The assessment includes identification of historic shipwrecks, archeological or historical sites.

COP Appendix III-I contains a comprehensive Navigational Risk Assessment that was developed in consultation with the Coast Guard and incorporates comments received by both BOEM and the Coast Guard.[9] The Navigational Risk Assessment addresses shipping lanes, precautionary areas, recommended vessel routes, ferry routes, dredge disposal sites, military testing areas, unexploded ordinance, pilot boarding areas, anchorages, racing activities, and high intensity commercial marine traffic.

With the extensive analyses contained in COP Appendices II-C and III-I, it is unclear to us why CRMC believes that no data or mapping has been provided to demonstrate that these APCs are not being encroached on or impacted. If there is information in the COP regarding these issues that is unclear or needs further explanation, Vineyard Wind would be pleased to provide additional information.

Section 1160.7 Pre-Construction Standards: **subsections 4, 5, 6, 7, 9, 10, 11**

CRMC states that Vineyard Wind has not provided details regarding Rhode Island port use, vessels to be used, vessel routes, a detailed construction timetable, foundation type by location, cable matting locations, and other construction details to allow the Council to conduct its analysis of coastal effects. First, with respect to foundation type by location, BOEM's policies specifically allow for an envelope approach to provide the flexibility needed to take advantage of technological advances that evolve after permits are granted but before construction commences. The envelope also precludes the need for numerous permit modifications as infrastructure or construction techniques are refined. For environmental permitting, including

[9] CRMC states that the Navigational Risk Assessment was redacted in the COP available to CRMC from the BOEM website. However, only a few small sections of the Navigational Risk Assessment were redacted because it references confidential information contained in COP Volume II.

coastal zone consistency, the maximum design scenario is considered worst-case for assessing potential environmental impacts. The COP analyzes the potential environmental impacts of the maximum design scenario by resource. Thus, for example, the potential impacts of installing 106 turbines are analyzed when the maximum possible are 100 and the likely number will be less than 100. Moreover, the differences between monopile and jacket foundations are clearly explained in the COP as they relate to potential impacts. We therefore find it difficult to understand why the Council cannot examine the worst-case scenario to determine if the enforceable policies have been met, as every other state and federal agency are doing in their review of the Project. We are also perplexed to understand which enforceable policies require information regarding foundation type by precise location, especially where a worst-case analysis has been provided.

Second, a detailed construction schedule is provided in COP Volume I, Figure 4.1-1. We note that the schedule has been modified to account for the construction of an 800 MW project. Offshore construction activities will be complete within two years and therefore will not disrupt fishing activities over more than two seasons.

Third, it is impossible to provide CRMC with exact cable matting locations because, as the COP explains, cable protection will only be used if the multiple cable laying tools available are unable to reach the targeted burial depth. Thus, the need for and location of cable protection will be determined as the cable is installed. For this reason, the COP assumes worst case that up to 10% of the total length of the offshore export cable system could require protection measures. However, as noted above, because the WDA is comprised of homogeneous fine sand and silt-sized sediments, it is expected that cable protection would only be necessary where difficult soils such as boulders or rock formations are encountered and cannot be avoided. Areas with cable protection will be made known to area fishermen so the areas can be avoided.

Finally, with respect to Rhode Island port use and navigation, the COP explains that the Project may use a port facility in Rhode Island to offload, store, and stage the turbine blades for delivery to the offshore WDA, as needed and furthers identifies that either the Port of Providence or the Quonset Point port may be used, both of which are existing industrial ports. COP Volume I, section 4.2.3.7 explains that feeder barges would transport components, *i.e*. blades, from the port to the installation vessel. Table 4.2-1 in COP Volume I specifically describes the vessels that will be used to transport the blades from Europe to the port and from the port to the WDA. For your convenience, the relevant lines from the table are provided below.

As Table 4.2-1 demonstrates, approximately 3 to 5 vessels would transport the blades from Europe to the Rhode Island port, where the blades would be stored until needed. Two feeder vessels would be used to transport the blades from the Rhode Island port to the WDA for installation.[10] Worst case, it is estimated that up to approximately 100 roundtrips would be needed to transport the blades for installation on 100 WTGs (*i.e.*, each roundtrip carrying one full blade set for a WTG). *See* Attachment C of Appendix III-B.[11] As shown on the construction schedule, WTG installation is expected to begin in Spring 2021 and will take approximately 8 months to complete. Thus, there would be approximately 2 round trips per day out of the Rhode Island port. The types of vessels and the level of vessel activity associated with the Project is consistent with the Rhode Island ports' current industrial usage and does not represent a significant increase in traffic.

Role	Vessel Type	#	Approx. Size		Displacement		Approximate Vessel Speed		Type of Propeller System	Approximate Fuel Capacity	Marine Sanitation Device	Crew Size	Vessel Examples
			Width	Length	Gross Tonnage	Deadweight	Operational Speed	Max Transit Speed					
WTG Installation													
Blade Transport	Heavy Cargo Vessel	3-5	~15 m (49 ft)	~130 m (427 ft)	6,300 t (6,945 US tons)	8,000 t (8,818 US tons)	14 kn	14 kn	Blade propeller system / blade thrusters	~455,000 L (120,200 gal)	IMO compliant	15-18	BBC Bergen
Feeding WTG Component from Harbor to WDA	Jack-up Vessels[12]/ Feeder Barges	2-4	6-50 m (20 - 164 ft)	35 - 100 m (115 - 328 ft)	4,000 t (4,409 US tons)	2,000-8,000 t (2,205-8,818 US tons)	0 - 10 kn	14 kn	Blade propeller system / blade thrusters	215,000 - 280,000 L (56,800 - 73,970 gal)	IMO compliant	15-80	Liftboat Jill Liftboat Robert Multratug PSV's or barges

In addition, the Navigational Risk Assessment (COP Volume III, Appendix I) provides a detailed analysis of all vessel activity during construction, including an analysis of reasonably foreseeable effects on recreational boating, scheduled events, and other navigational uses including ferry service. The assessment considers potential impacts during the most intense period of construction where as many as 45 vessels per day may be transiting in the WDA from multiple ports. As explained in the assessment, a Marine Coordinator will manage all construction vessel logistics and act as a liaison with the USCG, port

[10] The other two feeder vessels identified in the Table would operate from a different port.

[11] The number of vessels trips for all vessel activity have been conservatively estimated for purposes of calculating air emissions, which is required to obtain an OCS Air Permit under the Clean Air Act.

[12] Jacking-up in ports may occur.

authorities, state and local law enforcement, marine patrol, and commercial operator(s) during construction. As specified in the Draft Safety Management System (COP Volume I Appendix I-B), the Marine Coordinator will keep track of all planned vessel deployment, and will assist with vessel traffic coordination at the Port of New Bedford or the secondary ports as needed. Furthermore, a vessel traffic management plan will be established to align scheduling of construction activities with port operations.

Section 1160.7.4: This enforceable policy states that "the Council will consult with the U.S. Coast Guard, the U.S. Navy, marine pilots, the FAB, fishermen's organizations, and recreational boating organizations when scheduling offshore marine construction or dredging activities" and may "modify or deny activities" to minimize significant conflicts with season-limited commercial or recreational fishing activities, recreational boating activities or scheduled events, or other navigation uses. We understand how this enforceable policy applies within state waters where the Council has a direct role in authorizing offshore marine construction. However, it is unclear to us how the enforceable policy is applied for federal consistency. If CRMC interprets this policy for federal consistency to mean that the Project cannot significantly conflict with season-limited commercial or recreational fishing activities, recreational boating activities or scheduled events, or other navigation uses, the Navigational Risk Assessment provides a detailed assessment of the potential impacts of the Project on these uses. *See* COP Volume III, Appendix I.

Section 1160.7.5: Enforceable policy 1160.7.5 requires the assent holder to provide for communication with commercial and recreational boaters regarding offshore marine construction. COP Volume III, Appendix E contains a Fisheries Communication Plan. In addition, for the survey work that has been conducted, Vineyard Wind has communicated its planned activities to fishermen and has issued Notices to Mariners posted on its website and through other appropriate means, including directly to Rhode Island fishermen. The current notice, as well as all past notices, can be found on our website at https://www.vineyardwind.com/fisheries.

Section 1160.7.6: This enforceable policy requires the assent holder to designate and fund a third-party fisheries liaison. Vineyard Wind's Fisheries Communication Plan (COP Volume I, Appendix E) explains that Vineyard Wind's fisheries communication is conducted through several roles including Fisheries Liaisons (FLs) and Fisheries Representatives (FR). The FR is intended to represent a particular fishery industry, organization, gear type, port or region, or sector(s) to the project, communicating concerns, issues and other input for the life

of the project, from development and pre-construction through decommissioning. Typically, the FR is an active fisherman, or group representing active fishermen, within the region, fishery, or sector they represent. The FL facilitates the work of the FRs by serving as a knowledgeable point of contact to which the FRs can efficiently and effectively communicate. The FL also serves to communicate on behalf of the Project to the fisheries sectors directly, and with the FRs. The FL communicates across fishery communities and regions in order to educate and disseminate vital information regarding the project to fishermen, and receive input back to the project. The FL works to validate fisheries information through cross-referencing among data sources.

Vineyard Wind has had a FR in place since 2010 and a FL in place since 2016. Currently, Crista Bank is the Vineyard Wind FL. Ms. Bank is a researcher who has been working with fishermen along the New England coast, including fishermen from Rhode Island, for more than 12 years. Nate Mayo, Vineyard Wind, serves as the FL specifically for scallopers and shellfish farmers in Lewis Bay. Their contact information is posted on Vineyard Wind's website.

Section 1160.7.9: This enforceable policy requires the submission of a navigational risk assessment. As noted, COP Volume III, Appendix I contains the Navigational Risk Assessment that was developed in coordination with the U.S. Coast Guard. The revised COP, includes revisions to the navigational risk assessment to address comments received from BOEM, the Coast Guard, and fishermen.

Section 1160.7.10: This enforceable policy appears to apply only to "applications for projects proposed to be sited in state waters pursuant to the Ocean SAMP" and requires that a project not have a significant impact on marine transportation, navigation, and existing infrastructure. To the extent CRMC maintains this policy is an enforceable policy for federal consistency purposes, the Navigational Risk Assessment demonstrates that the Project will not have a significant impact on marine transportation, navigation, and existing infrastructure. *See* COP Volume I, Appendix E.

Section 1160.8 Standards for Construction Activities and Section 1160.9 Monitoring Requirements

CRMC lists the enforceable policies applicable to construction activities and monitoring but does not indicate how the information that has been provided in the COP does not demonstrate consistency with these policies. The policies parallel BOEM's requirements and are addressed throughout the COP. For a summary of potential impacts and avoidance, minimization, and mitigation measures that are

discussed throughout the COP, as well as Best Management Practices to be employed, we refer CRMC to Tables 4.2-1 and 4.2-2 in COP Volume III.

III. Proposed Alternative Project Layout

CRMC states Vineyard Wind's proposed WTG layout does not allow the current Rhode Island-based fishery to operate with the same level of viability, concluding that the layout and spacing for a maximum 106 WTGs in the northern end of the Project area would make trawling for squid impossible. CRMC further concludes that the Project is in an APC of "high fishing activity" and therefore is presumptively excluded unless it can be shown that there are no practicable alternatives that are less damaging in areas outside the APC, or that the Project will not result in a significant alteration to the values and resources of the APC. §1160.2.2. We respond to each of these points below, but note that the revised COP contains supplemental information on fisheries and commercial and recreational fishing that address these issues in detail, which we will provide to CRMC on or before July 23.

Fishing Activity in the Project Area

As a threshold matter, it is important to point out that BOEM's identification of the wind energy area where Vineyard Wind's lease is located involved a multi-year stakeholder engagement process through meetings of the Massachusetts Renewable Energy Task Force, consultations with federal, state, and local agencies, and potentially affected Tribes, as well as extensive input from the public and potentially affected stakeholders. CRMC and the State of Rhode Island were actively involved in this process. The process resulted in BOEM excluding areas that if developed, would likely cause substantial conflict with commercial and recreational fishing activities. Thus, the Project area was determined to be an area where there would not be a substantial conflict with commercial and recreational fishing activities.

CRMC's conclusion that the Project area is an area of "high fishing activity" appears to be based upon (1) the 3-year average (2015-2017) of commercial squid landings in Rhode Island ($25.8 million) and the assumption that "Rhode Island-based vessels harvest a significant portion of those landings in and around the Project area," (2) a VMS "heat map" showing commercial squid fishing activity within BOEM lease blocks south of Martha's Vineyard (Figure 1), and (3) a Figure of reported commercial squid vessel towing tracks. While Vineyard Wind acknowledges in the COP that there is commercial fishing activity in the Project area, for the following reasons, we do not believe that it is correctly characterized as an APC of "high fishing activity."

First, the best available data does not support a finding that a "significant portion" of the commercial squid landings in Rhode Island are harvested from within the Project area. In response to fishermen concerns that the economic values of the fisheries in the BOEM wind energy areas were underestimated, and that the data used to describe fishing activity in the area were inadequate, the Rhode Island Department of

Environmental Management, Division of Marine Fisheries, conducted a comprehensive analysis of VMS, VTR, and landings data for the years 2011 through 2016 to provide more accurate fishing location and density information. (Livermore, 2017). The combined data were segregated by fishery (species, gear, state and port landings) and mapped as a raster of fishing density by year. In addition to providing more robust locational information through the incorporation of the VMS dataset, the study was able to scale the landings based on the density of fishing activity within the MA WEA during a given year, thereby providing a unique estimate of fishery revenue within specific geographic areas of the MA WEA, including the Vineyard Wind Lease Area.

Based on the Rhode Island DEM study and the other available data, our initial conservative estimate of squid landings from the Vineyard Wind Project area attributable to Rhode Island-based vessels, is less than 2% of the total value of the fishery. It is therefore difficult to understand how CRMC can conclude that a "significant portion" of the landings are harvested from the Project area. As the Rhode Island DEM study demonstrates, the majority of squid, mackerel, butterfish activity occurs outside the Project area mostly in the areas just south of Nantucket and Martha's Vineyard and to the north of the Project area. A more extensive discussion of fisheries values is discussed in Volume III, section 7.6 of the revised COP.

With respect to Figure 1 of CRMC's letter, the "heat map" demonstrates that the highest levels of fishing activity are outside of the Project area, consistent with the Rhode Island DEM findings that the majority of squid, mackerel, butterfish activity occurs just south of Nantucket and Martha's Vineyard and north of the Project area. Numerous additional maps and graphics depicting fishing activity in and around the Project area are presented in the revised COP Volume III, section 7.6. Collectively they demonstrate that the Project area is not an area of "high fishing activity" within the meaning of the Ocean SAMP.

Finally, CMRC provides in Figure 3 of its letter reported vessels tracks from five Rhode Island vessels during the squid run (June, July, and August) for the period 2011 through 2017 to demonstrate the level of fishing activity in the Project area. We note, however, that the Figure references track names from 1998, which calls into question quality control of the underlying data or possible errors in mapping the underlying data. Further, the tracks presented in the Figure are represented using wide line dimensions, causing lines to frequently obscure and overlap other lines and thus, making it difficult to accurately assess the level of activity actually presented. The Figure also does not distinguish between vessels that are fishing versus transiting through the area. Moreover, we have received multiple communications about this figure, many of which provide contradictory views of the data upon which it is based and what the figure is actually presenting.

Because the figure is in portable document format (PDF) it cannot be manipulated to examine important details in the data and because there is a great deal of confusion about what the figure actually represents, it is impossible to meaningfully consider

the proposed alternative or understand the data upon which it is based. The Figure indicates that the "data" were provided by The Town Dock, but it is unclear whether CRMC generated the Figure from data provided by The Town Dock or if The Town Dock provided the Figure. In any event, 15 C.F.R. § 930.58(b) provides that,

> at the request of the applicant, interested parties who have access to information and data required by this section may provide the State agency with all or part of the material required. Furthermore, upon request by the applicant, the State agency shall provide assistance for developing the assessment and findings required by this section.

Pursuant to this section, Vineyard Wind requests that CRMC either provide Vineyard Wind with the underlying data upon which the Figure is based or assist Vineyard Wind in obtaining the data from The Town Dock so that the proposed alternative can be meaningfully discussed with CRMC and other stakeholders. It would be most helpful if the data could be provided as soon as possible to facilitate discussions with CRMC and the FAB the week of July 23.

Alternative Project Layout

CRMC attached as Figure 3 an alternative layout for the Project showing transit lanes proposed by the New Bedford Group and a proposed alternative a turbine layout proposed by the Commercial Fisheries Center of Rhode Island ("CFCRI"). As we understand CRMC's position, the Project once constructed will result in significant long-term negative economic impacts to Rhode Island's commercial fisheries because the wind turbine array and cable protection will prevent or constrain the flexibility required by Rhode Island-based commercial fishing gear operations. CRMC states that the alternative layout would satisfactorily mitigate the coastal effects on Rhode Island-based commercial mobile gear operation flexibility. Thus, while CFCRI may have developed the alternative, CRMC is adopting it as an alternative that would permit the Project to be conducted in a manner consistent with the enforceable policies of the management program.

As noted above, on July 9, 2018, Vineyard Wind met with CFCRI where the proposed alternative presented in Figure 3 was discussed. We note that CFCRI has further modified its proposed alternative by reducing the number of turbines from 106 to 90. Thus, it is now unclear which alternative CRMC is adopting.

Based on the Figure's lack of specificity, it is difficult to understand the details of the alternative layout, such as GPS coordinates of the WTG locations, separation distances, etc. or the rationale for proposing drastic changes to the Project. Moreover, neither CRMC nor CFCRI has made clear why our proposed layout does not work. Vineyard Wind asked CFCRI to address a number of questions, some of which were discussed at the meeting and others CFCRI stated it would provide a follow-up response. *See* Attachment D. We pose the same questions to CRMC, as CRMC is

embracing the alternative for federal consistency purposes. Accordingly, we are still in the information gathering stage. With more detailed information, we can better assess whether any modifications to the Project design could be made to address all or some of the Rhode Island-based commercial mobile gear fishing concerns.

It is, however, important to understand that the proposed Project layout is a result of input from numerous stakeholders, including the Coast Guard and fishermen who use or transit the Project area. The original layout was designed to optimize energy development, which requires that the WTGs be scattered and closer together, not aligned in a grid pattern with large separation distances. Vineyard Wind heard and understood the need for transit corridors and separation distances that allow the area to be fished. We also considered the available data on vessel activity in the area, most of which shows that fishing activity takes place north of the Project area. We also worked closely with the Coast Guard to establish the separation distances, transit corridors, and the orientation of the grid. Thus, the Project layout was designed to address many competing interests, including competing fishing interests. Of particular concern was the potential impact of the Project on the scallop fishery out of New Bedford, which according to NOAA data, has an annual average value of over $281 million. The orientation of the transit corridor through the Project was specifically designed in consultation with the scallop industry to allow passage through the Project to fishing areas, and the wide distances between the turbines allows for mobile and fixed gear fishing within the Project area.

Our objective is to work collaboratively with CRMC and Rhode Island commercial fishing interests to facilitate compatible use of the Project area. To this end, we ask that CRMC to assist us in finding workable solutions to meeting the needs of Rhode Island fishermen while maintaining our ability to fulfill the purpose of the Project in a reasonable and cost effective manner, as well as ensure continued compatible use of the area with a broad range of stakeholders in Rhode Island, Massachusetts, and elsewhere.

We look forward to meeting with CRMC the week of July 23 to discuss these issues further.

Sincerely,

Erich Stephens
Chief Development Officer

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Attachment A

OCS-A 0501 MASS USA

VINEYARD WIND

Presentation to:

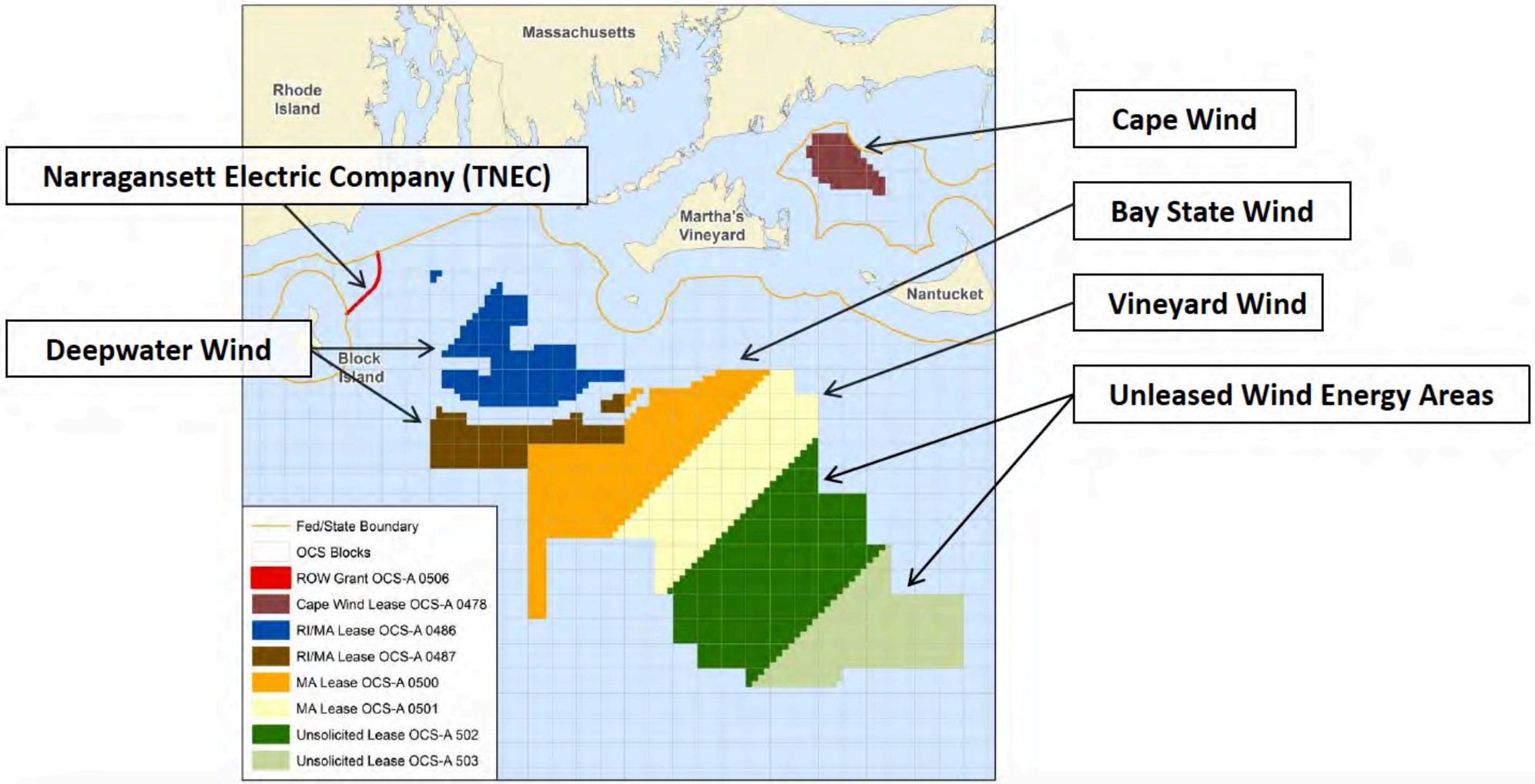
Rhode Island Habitat & Fisheries Working Groups

July 24, 2017

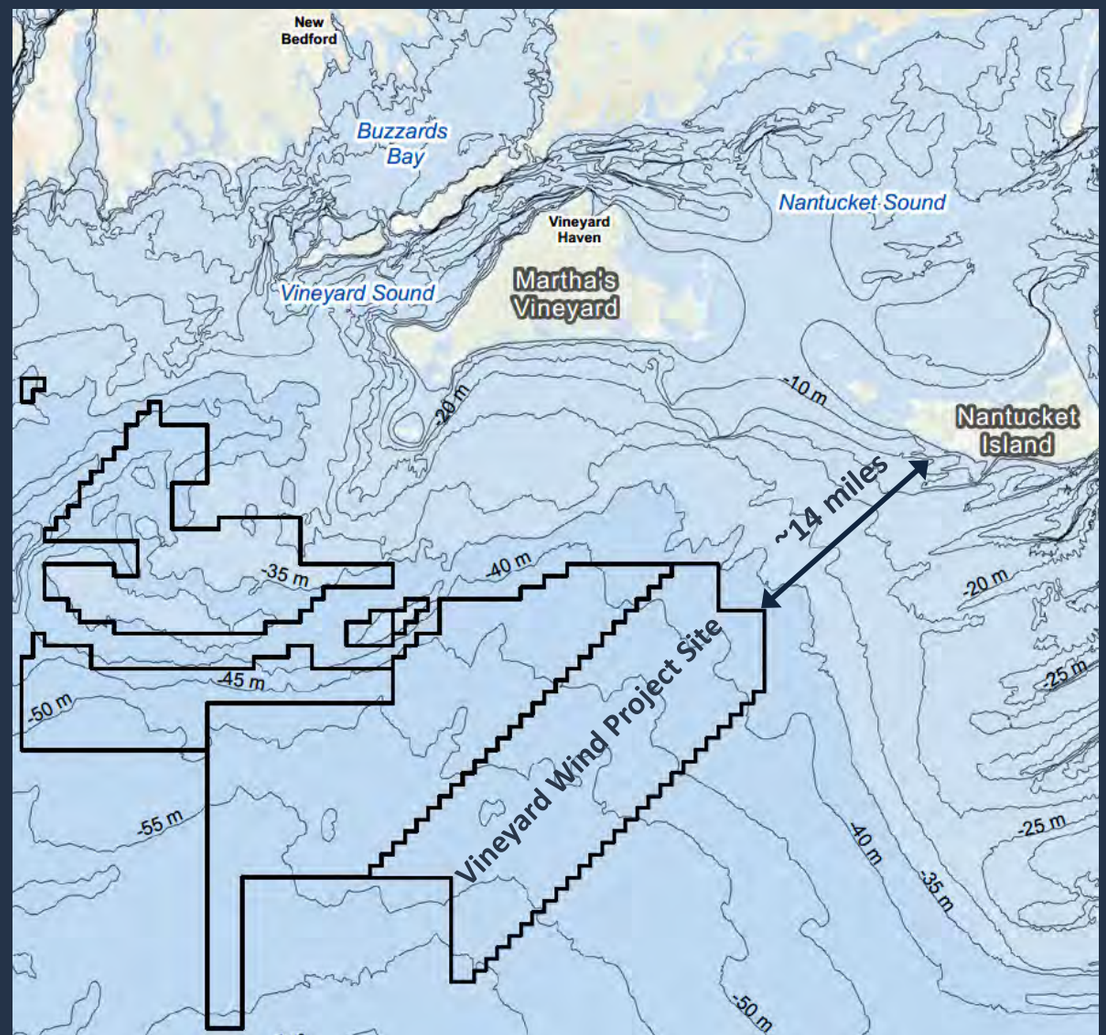
AGENDA

- Introduction
- Overview of Vineyard Wind
- Project status
- Stakeholder Outreach
- Project Mitigation

LEASE AREAS IN SURROUNDING FEDERAL WATERS



LEASE AREA OCS-A-501



- Acquired in 2015 through US Department of Interior competitive lease auction
- As good as any offshore site in the world:
  - High wind speeds
  - Solid seafloor conditions
  - Multiple grid connection options
- Project sizing / buildout will be shaped by Massachusetts procurement process

EXPERIENCED TEAM, STRONG FINANCIAL BACKING

CIP
COPENHAGEN INFRASTRUCTURE PARTNERS

- Long-term, clean energy infrastructure focus
  - Invests on behalf of 21 institutional investors
  - Some of largest Scandinavian pension funds
- Early engagement / buy and hold
- Today manages over € 5 billion
- Specialized team to deliver offshore wind (“COP”):
  - Veja Mate, 402 MW, Germany
  - Beatrice, 588 MW, UK
  - Individuals on team have had key roles on :
    - More than 15 offshore wind projects in Europe
    - 10 of the 15 largest projects to date
    - As early as world´s 2nd offshore wind farm, built in 1995

AVANGRID RENEWABLES

- One of US’s largest wind owner / operators
- 6 GW of wind in 22 states
- Part of Iberdrola group:
  - World largest renewables asset base
  - 14,000 megawatts renewable energy
  - 12 countries
- Substantial offshore wind experience (Scottish Power):
  - West of Duddon Sands: UK, 389 MW, 2014 COD
  - Wikinger: Germany, 350 MW, 2017 COD
  - East Anglia One: UK, 714 MW, 2020 COD
  - St. Brieuc: France, 496 MW

VINEYARD WIND

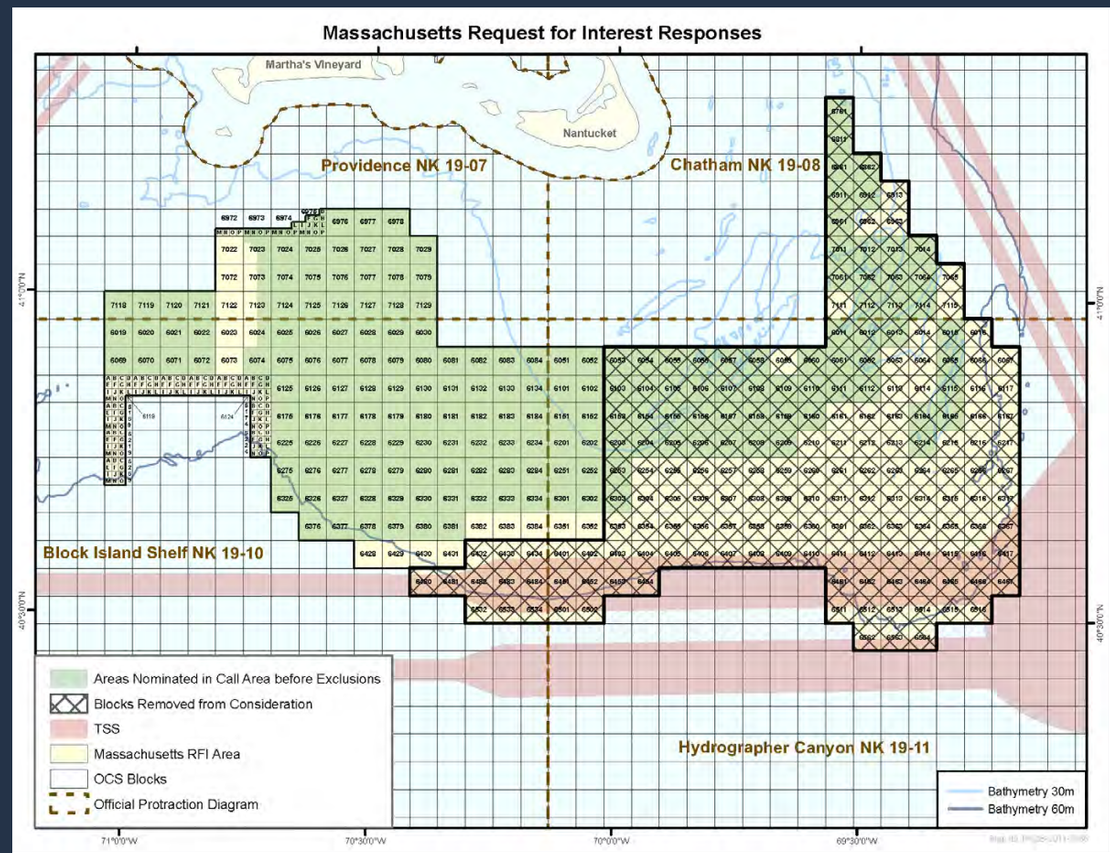
LOCAL COMMUNITY PARTNER

- First and only developer in the US to execute a Community Benefit Agreement with a local, non-profit partner
- Provides meaningful local participation in project
  - 1400 members: 10% of island's utility meters
  - Seasonal, year-round, and small business members
- Closely involved in day-to-day development activities
- Provides guidance regarding important local issues
- Identifies opportunities to benefit local community

PROJECT SITE IDENTIFIED THROUGH 7+ YEAR PROCESS

- 2009-Present: Project outreach to RI and MA fisheries and communities
  - Site ID process prior to “smart from Start”
  - Vineyard Power Partnership
- 2010-2015: Task Force process
  - MA Task Force includes RI stakeholders
  - Multiple stakeholder meetings
  - Working groups
- 2011: Request for Interest (RFI)
- 2012: Call for Information (CFI)
- 2012: Environmental Assessment (EA)
- 2014: Proposed Sale Notice (PSN)
- 2015: Final Sales Notice, Auction, and Lease issuance
- 2015-Present: Massachusetts Task Force, on-going project consultations

MASSACHUSETTS RFI AREA - 2010



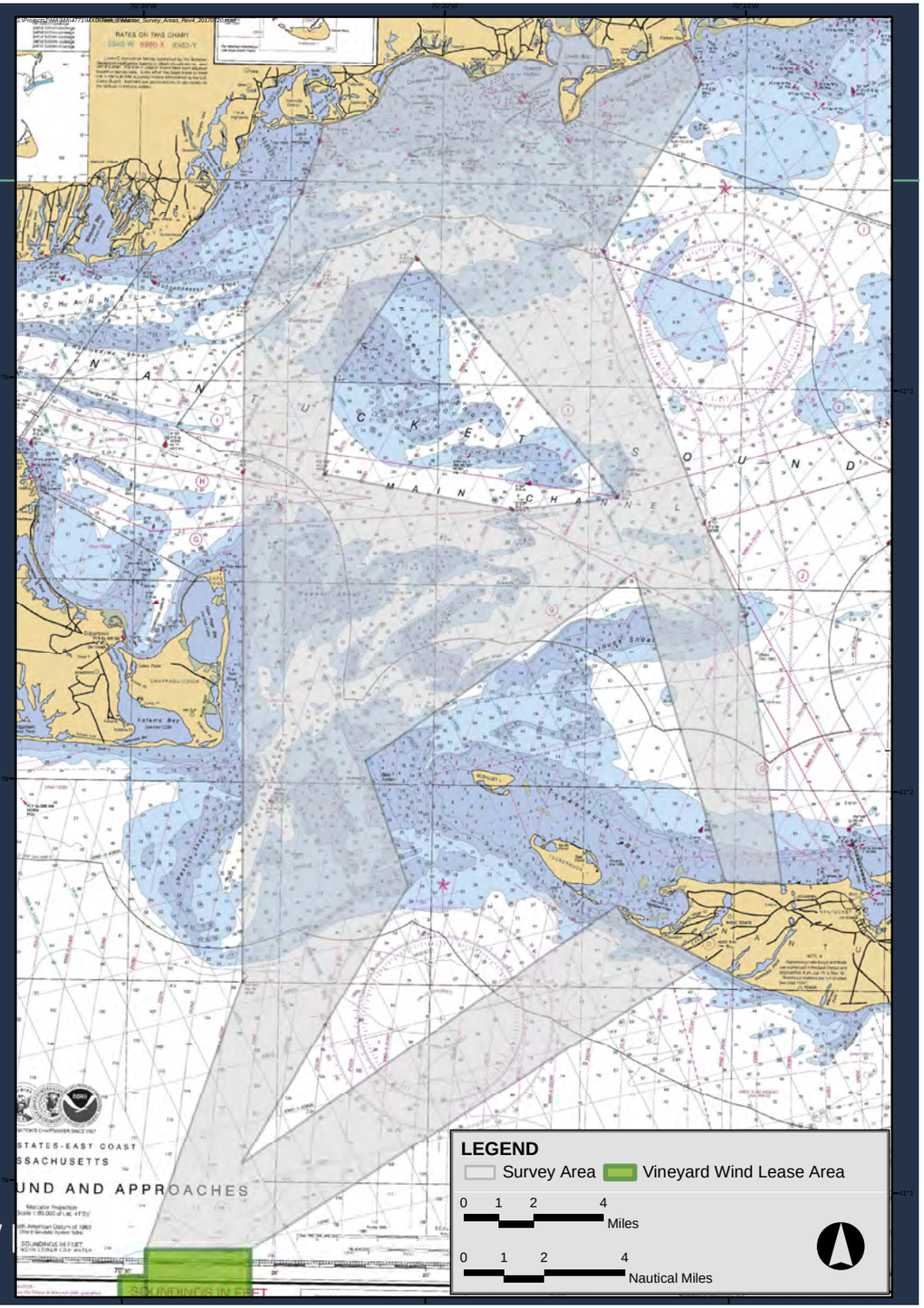
VINEYARD WIND

PROJECT STATUS

- Fall 2016: Geological surveys in lease area conducted in
- Winter 2016: SAP Submitted
- Winter 2016-Present: Export cable route planning
- August 2017: Export cable survey

EXPORT CABLE ROUTE STUDY

- "Optimize" cable route from lease area to grid connection point
  - Environmental
  - Fisheries and other users
  - Cost and reliability
  - Upland and offshore
- Survey to study:
  - Water depth
  - Bottom topography
  - Sensitive habitat (SAV/hard bottom)
  - Historical / archaeological
  - Sub-bottom profiling
  - Others
- Desktop/Stakeholder research
  - Anchoring activity
  - Fishing and other vessel activity
  - Previous survey work
  - Existing cables



ON-GOING OUTREACH TO FISHERIES

- Fisheries Representative (on-going)
- Flyers and advertisements (showing LORAN lines)
- Thumb drives for chart plotters
- Scheduled and ad hoc meetings
- Real time response during surveys
- Consultations on all aspects of project design:
  - Turbine lay-out
  - Cable routes
  - Ports and harbors
  - Safety, navigation, and communications
  - Fishing gear and practices
  - Fisheries studies
  - Etc.

VINEYARD WIND

VINEYARD WIND

As of July 21, 2017

Notice to Mariners & Fishermen

Please call Jim Kendall for the latest information: 508-287-2010

Geophysical Survey
Beginning on or about: July 28
Estimated duration: up to 3 weeks

Vessel: R/V Henry Hudson
LOA 45 Feet
Flag: USA
Cell Phone: +1 201 995 7185
Vessel Email: jbailey@alpineocean.com
Standing by on VHF channel 16

Geotechnical Survey
Beginning on or about: August 1
Estimated duration: up to 3 weeks

Vessel: R/V Shearwater
LOA 110 feet
Flag: USA
Bridge VSAT Phone: +1 201 297 6015
Vessel Email: wporter@alpineocean.com
Standing by on VHF channel 16

In July and August, geophysical & geotechnical surveys will take place between the Vineyard Wind lease area and Cape Cod including Muskeget Channel and Nantucket Sound. The survey will cover a much larger area than needed for the cables, so as to identify best cable locations. Please see reverse side for chart of expected survey area. Survey may vary in the field. Please check in with the contact below for latest information.

Both vessels may be towing geophysical equipment up to 300' astern, and generally following long survey track lines on the same bearing. The R/V Henry Hudson may be operating an ROV. The R/V Shearwater may be conducting shallow coring or collecting sediment samples while maintaining station.

Collecting data and working with the local fisheries
Vineyard Wind is committed to communicating and working with the local fishermen in the region across all fishery sectors and during all stages of development of the proposed offshore wind farm. Information gathered will be used to design the wind farm and select the location for the cable route from the project area to shore.

In advance of and during survey operations, we seek contact with fishermen who are or may be working in the survey area (see reverse side). Please contact:

Vineyard Wind Contact	Company	Role	Phone	Email
Jim Kendall	New Bedford Seafood Consulting	Fishery Representative	cell: 508-287-2010 office: 508-997-0013	nbsc@comcast.net

For general inquiries please contact Vineyard Wind
Phone: 508-717-8964
Email: info@vineyardwind.com
www.vineyardwind.com

OTHER STAKEHOLDER OUTREACH

- Environmental NGOs
  - Ongoing updates and consultations
  - Compliance with NGO proposed approach to surveys
  - Active engagement at industry level (e.g. via American Wind Energy Association)
- Tribal consultation underway
- Municipal outreach underway

PROJECT MITIGATION TO DATE (Among Others)

Marine Mammals & Sea Turtles

- Protected species observers
- Exclusion zones / equipment shut-downs
  - 500m for North Atlantic Right Whale
  - 200m for all species
- Passive acoustic monitoring
- Night vision binoculars
- Vessel speed restrictions

Historic Concerns

- Oversight from a Qualified Marine Archaeologist
- Review of geophysical data prior to bottom disturbing activity
- Ongoing and planned consultations

NEXT STEPS

- Export Cable Route: Survey and planning
- Massachusetts RFP for projects
- Finalize Project Envelope
- Federal Permitting
- State Permitting
- Design fisheries study (BACI)
- On-going: Input from stakeholders

CONTACT INFORMATION

Vineyard Wind

- info@vineyardwind.com
- www.vineyardwind.com

Fisheries Representative: Jim Kendall

- 508-287-2010
- nbsc@comcast.net

Community Partner: Vineyard Power

- Erik Peckar: Erik@vineyardpower.com
- www.vineyardpower.com

Attachment B

OCS-A 0501 MASS USA

VINEYARD WIND

Rhode Island Fishery Advisory Board (FAB)

4/11/2018

Where are we in the process?

Public input opportunities (purple)

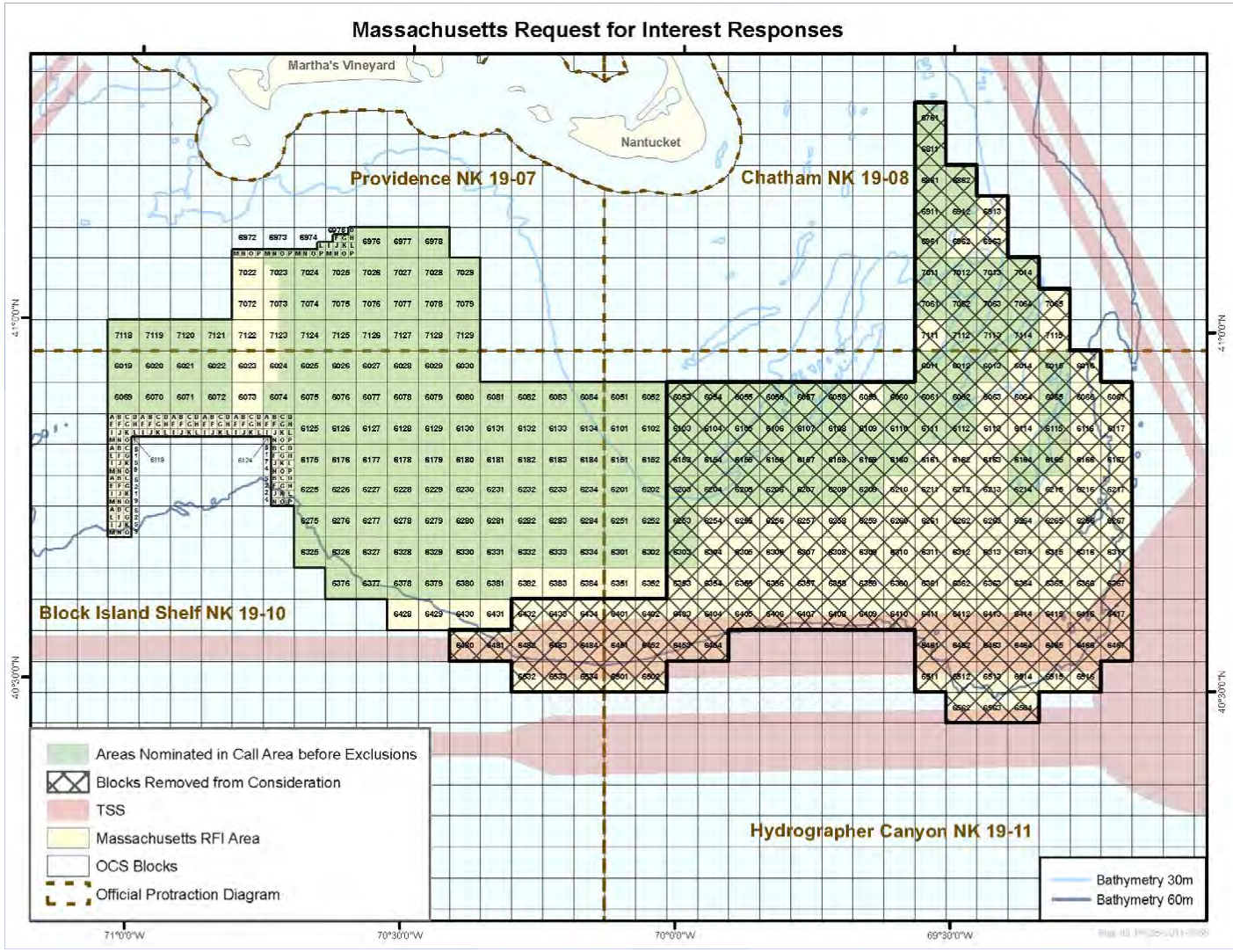
	Federal Permitting	State Permitting
December 2017	Draft COP submitted • Ongoing updates to COP until deemed sufficient • Available for review before finalizing	ENF (MEPA) & EFSB Applications
January/February 2018		• MEPA hearing and scoping for Environmental Impact Report (DEIR). • MEPA Certificate released
April 2018	EIS Scoping Meetings and written comment	EFSB Hearing and written comment DEIR Submitted
May - August		DEIR Review and FEIR production EFSB ongoing review
August/September	DEIS Released by BOEM	

Vineyard Wind: Local stakeholder and community focused since 2009

- First offshore wind developer to enter into a community partnership: Vineyard Power Coop
  - Non-profit serving 10% of Martha's Vineyard's customers
- Letters of Support from all towns of Martha's Vineyard and Nantucket, and Mashpee Wampanoag
- First US offshore wind developer to engage a fisheries' representative (2010)
- Local staff with extensive U.S. offshore wind experience
  - Based in New Bedford
  - Offices in Vineyard Haven and Boston

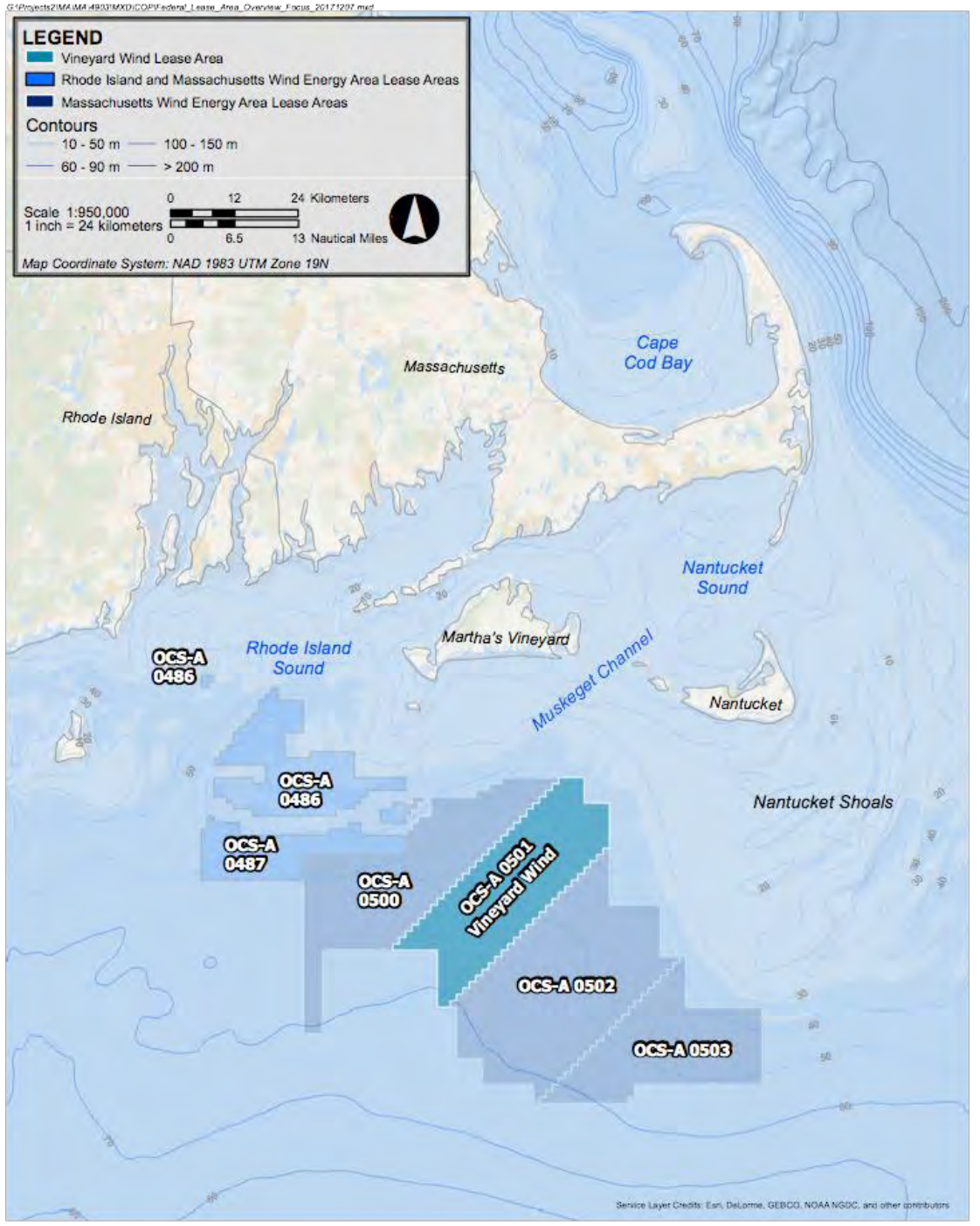
Turbine Site Identified by Multi-Year Stakeholder Process

- BOEM – Federal Process
  - 2010 BOEM Task Force
    - Local government representatives
    - Multiple stakeholder meetings
    - Habitat and fisheries working groups
  - 2011: Request for Interest
  - 2012: Environmental Assessment & Call for Information
  - 2014: Lease Sale Notices
  - 2015: Auction and Lease issuance
  - 2015 – Present: Task Force & Working Groups on-going guidance and consultation
- Massachusetts Policy
  - Energy Diversity Act of 2016
    - Utilities procure total of 1600MW of offshore wind



Project Context and Background

- Vineyard Wind Lease area OCS-A 0501
- ~261 square miles
- Northern tip of Lease Area is ~35 miles offshore from Cape Cod, and ~14 miles south of Martha's Vineyard and Nantucket
- Study and analysis began as soon as lease acquired in 2015
  - Building on earlier consultations by project and Vineyard Power
  - Offshore geological and ecological surveys in 2016 and 2017 Additional surveys underway spring and summer 2018



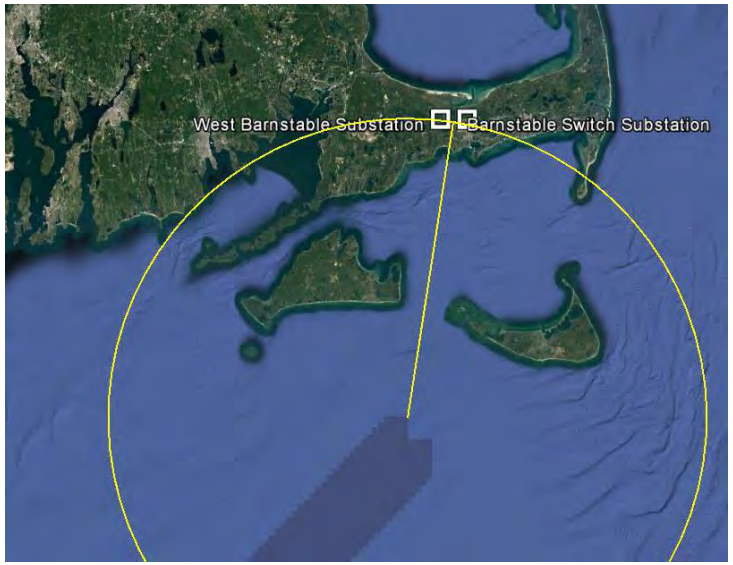
Outreach Ongoing

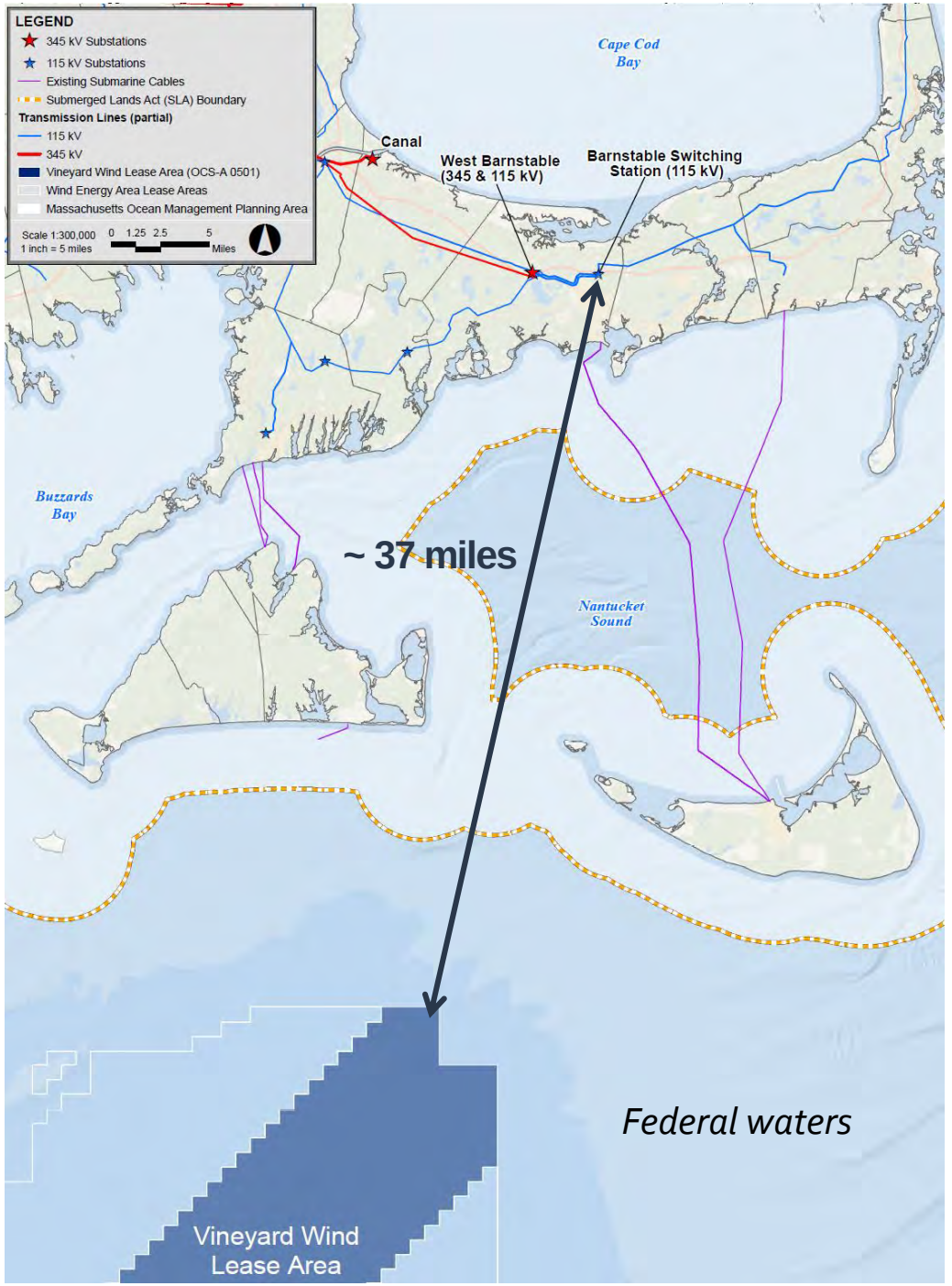
Includes over 100 meetings with fishermen and fishing organizations to date

- Alliance to Protect Nantucket Sound
- Association to Preserve Cape Cod;
- Cape and Islands Self-Reliance;
- Cape and Vineyard Electrical Cooperative;
- Cape Cod Fishermen's Alliance;
- Cape Light Compact;
- Climate Action Business Association;
- Coalition for Social Justice;
- Conservation Law Foundation;
- Coonamessett Farm Foundation;
- Eastern Fisheries;
- Environment Massachusetts;
- Environmental Business Council of New England;
- Environmental League of Massachusetts;
- Hercules SLR;
- Long Island Commercial Fishing Association;
- Martha's Vineyard Fishermen Preservation Trust;
- Massachusetts Audubon Society;
- Massachusetts Clean Energy Center;
- Massachusetts Fisheries Institute;
- Massachusetts Fisheries Working Group;
- Massachusetts Fishermen's Partnership and Support Services;
- Massachusetts Habitat Working Group;
- Massachusetts Lobstermen's Association;
- Nantucket Rotary Club;
- National Academies of Sciences, Offshore Renewable Energy Development and Fisheries Conference;
- National Wildlife Federation;
- Natural Resources Defense Council;
- New Bedford Harbor Development Commission;
- New England Aquarium;
- New England Energy and Commerce Association;
- New England Fishery Management Council
- Northeast Fisheries Sciences Center;
- Northeast Fishery Management Council;
- Northeast Fishery Sector Managers X, XI, XIII, VII, VIII;
- Port of New Bedford;
- Recreational Fishing Alliance;
- Rhode Island Fishermen's Advisory Board;
- Rhode Island Habitat Advisory Board;
- Scallop Industry Advisors Meeting;
- Sierra Club;
- Stoveboat - Saving Seafood;
- The Nature Conservancy;
- Town Dock;
- University of Massachusetts (various campuses); and
- Woods Hole Oceanographic Institute.

Nearest suitable existing substations are in Barnstable

- Minimizes amount of cable installed
- No changes to existing transmission system will be required
- Connection location enhances grid reliability by providing power at edge of grid system



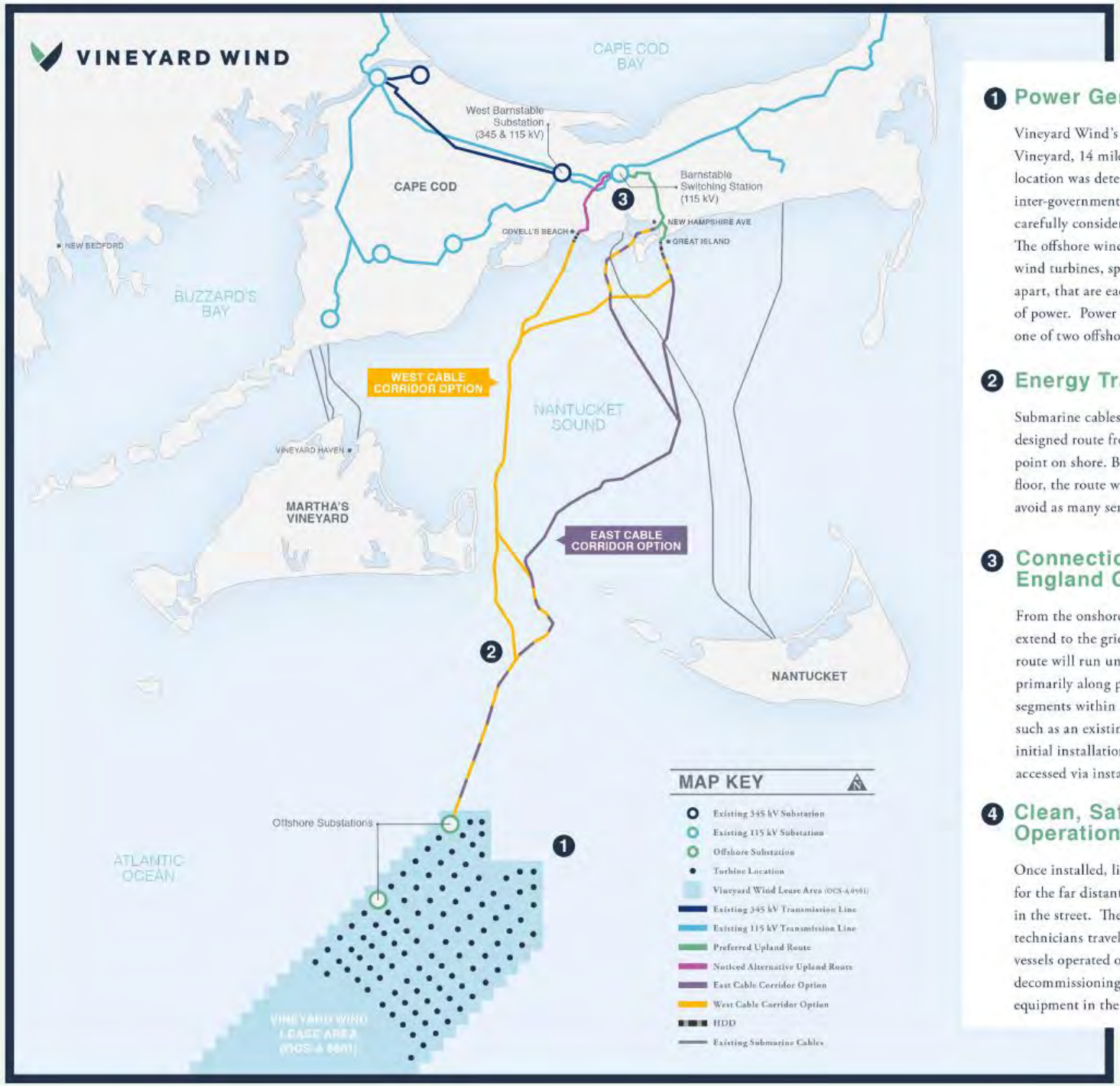


VINEYARD WIND

Construction and Operations Plan Project Envelope

Layout and Project Size	Foundation	WTGs
• ~800MW project • Up to 106 WTG positions • Continuous construction from 2021 to 2024 or 2 ~400MW stages with up to 5 years in-between construction periods	• 800MW of monopiles or 400MW of piles and up to 400MW of jackets • Pile driving hammer • Scour protection on all positions • Installation with a jack-up vessel or vessel on dynamic positioning (DP) with feeder barges	• 8 – 10MW WTG • Rotor size of 164-180 m (538-591 ft) • Hub height of 109-121 m (358-397 ft) • Installation with a jack-up vessel or vessel on dynamic positioning (DP) with feeder barges

Inter-array cables	Export Cables	Electrical Service Platform (ESP)
• 66kV cables • Example layout identified, not finalized • Maximum total cable lengths indicated • Installation techniques include jet plow, mechanical plow & mechanical trenching. • Installation with a vessel on dynamic positioning (DP) • Pre-lay grapnel run	• Up to three 220kV export cables • Two corridors identified with variants • Max total cable lengths indicated • Installation techniques include jet plow, mechanical plow & mechanical trenching. Dredging in some locations to achieve burial depth • Installation with a vessel on dynamic positioning (DP) and some use of an anchored vessel • Use of mattresses or rock protection on areas of minimal cable burial • Pre-lay grapnel run	• Four light-weight ESPs or two conventional ESPs • Each ESP installed on one monopile or a single jacket foundation • Scour protection on all positions • Installation using foundation and turbine installation vessels or specialized crane vessel



1 Power Generation

Vineyard Wind's turbine area is south of Martha's Vineyard, 14 miles from the nearest shore. The location was determined through a multi-year, inter-governmental and stakeholder process, which carefully considered scientific data and public input. The offshore wind project will consist of an array of wind turbines, spaced at least eight-tenths of a mile apart, that are each capable of generating over 8MW of power. Power from the turbines is collected by one of two offshore substations.

2 Energy Transmission

Submarine cables will be installed along a carefully designed route from the turbine site to a landing point on shore. Buried up to six feet below the sea floor, the route was designed after field studies to avoid as many sensitive areas as possible.

3 Connection to the New England Grid

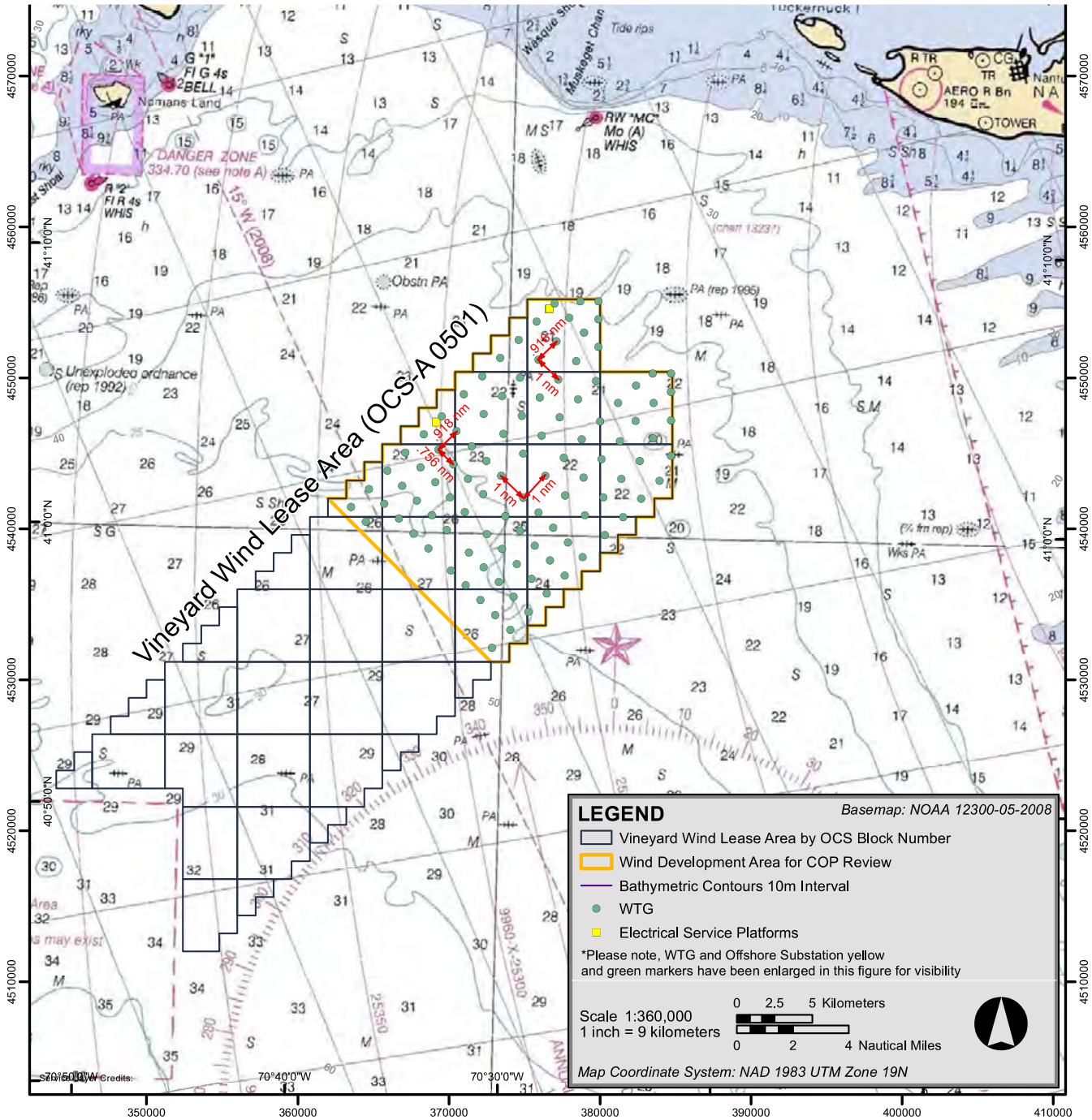
From the onshore cable landing site, the route will extend to the grid connection point inland. The route will run underground its entire length, primarily along public roads, but will include segments within other previously disturbed corridors such as an existing utility right-of-way. After the initial installation, all maintenance work will be accessed via installed manholes.

4 Clean, Safe, Sustainable Operations

Once installed, little of the project will be visible but for the far distant turbines and some manhole covers in the street. The turbines will be serviced by technicians travelling to the project site on small vessels operated out of Vineyard Haven. A decommissioning fund ensures safe removal of equipment in the future.

VINEYAI

Turbine layout responsive to input from fishermen

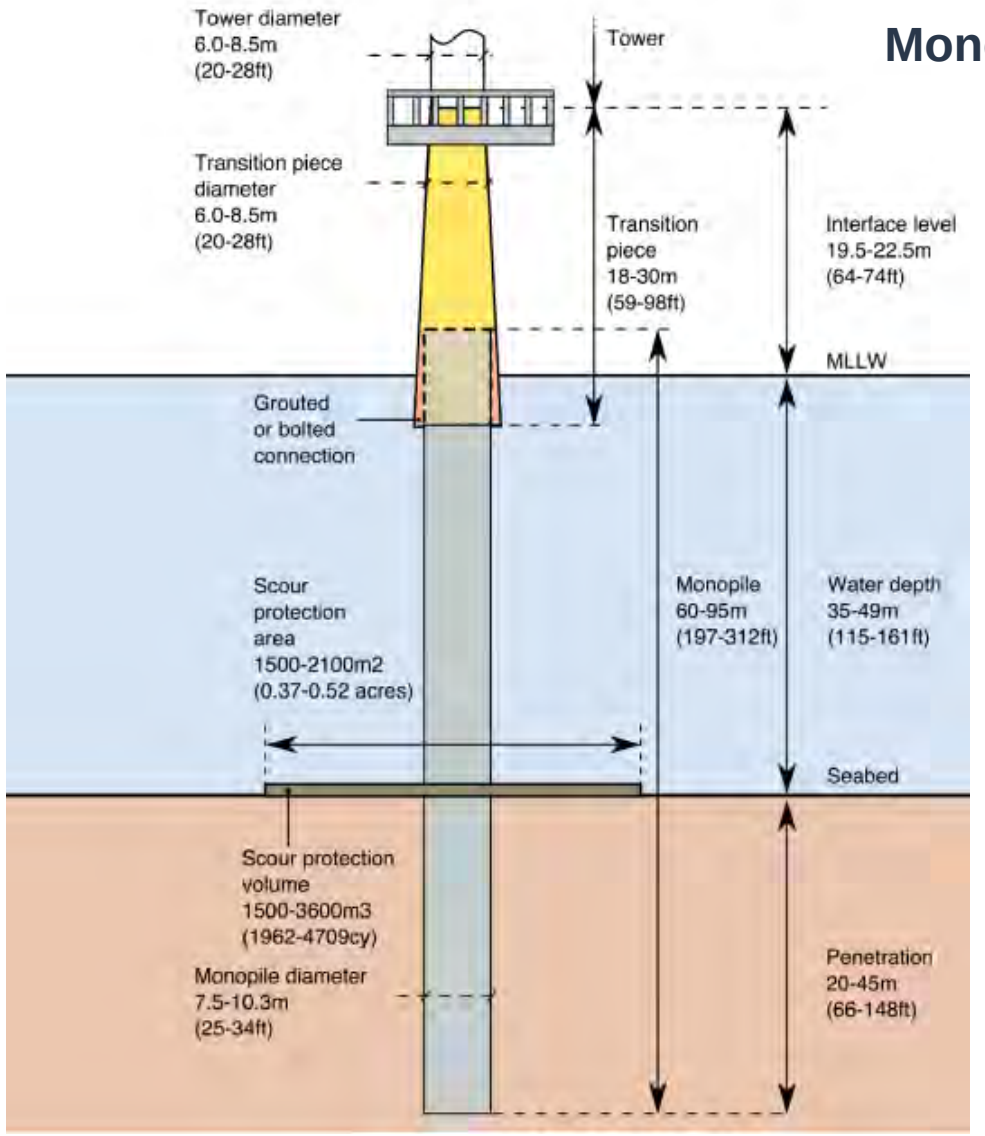


Vineyard Wind Project

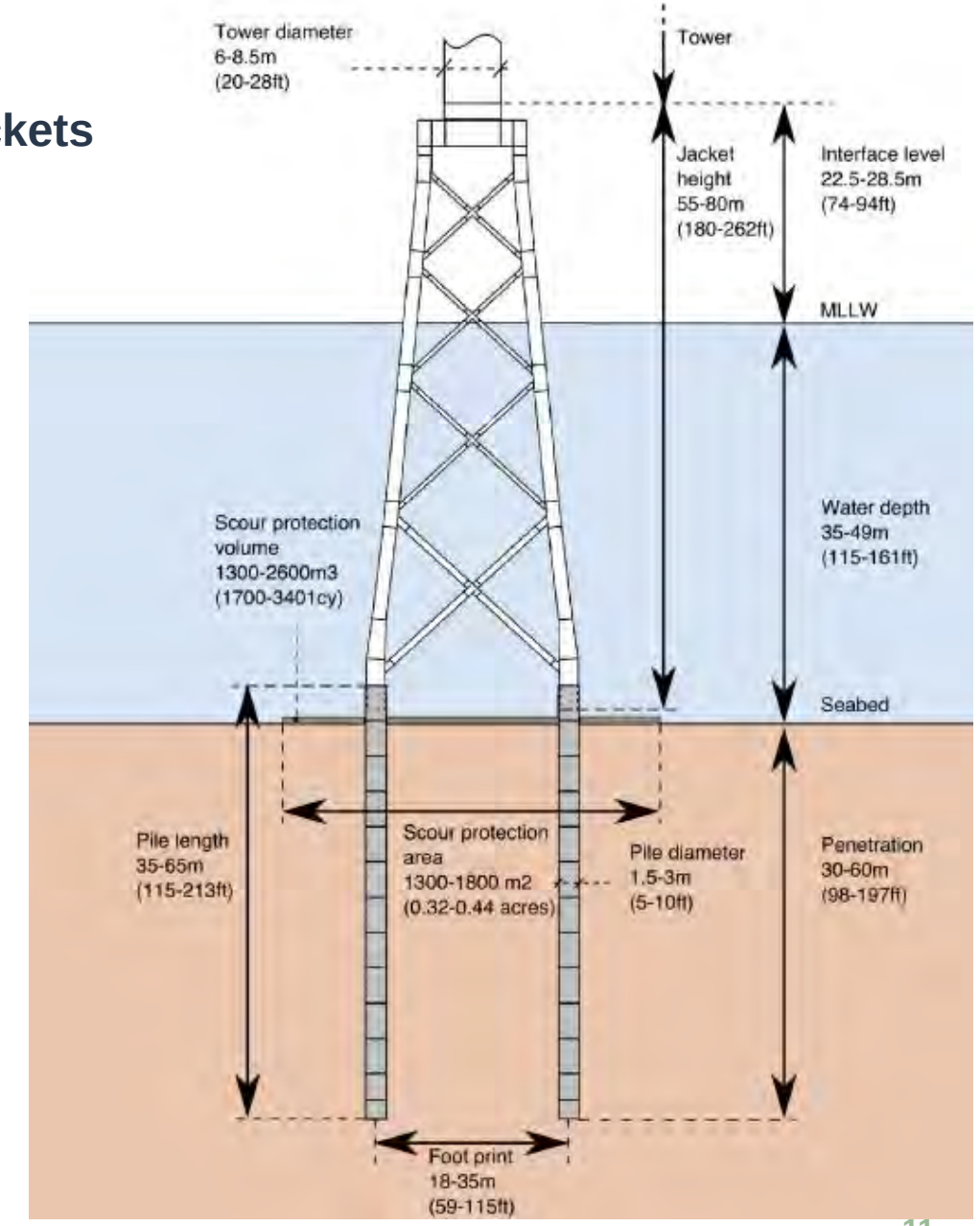
VINEYARD WIND

Foundations

Monopiles



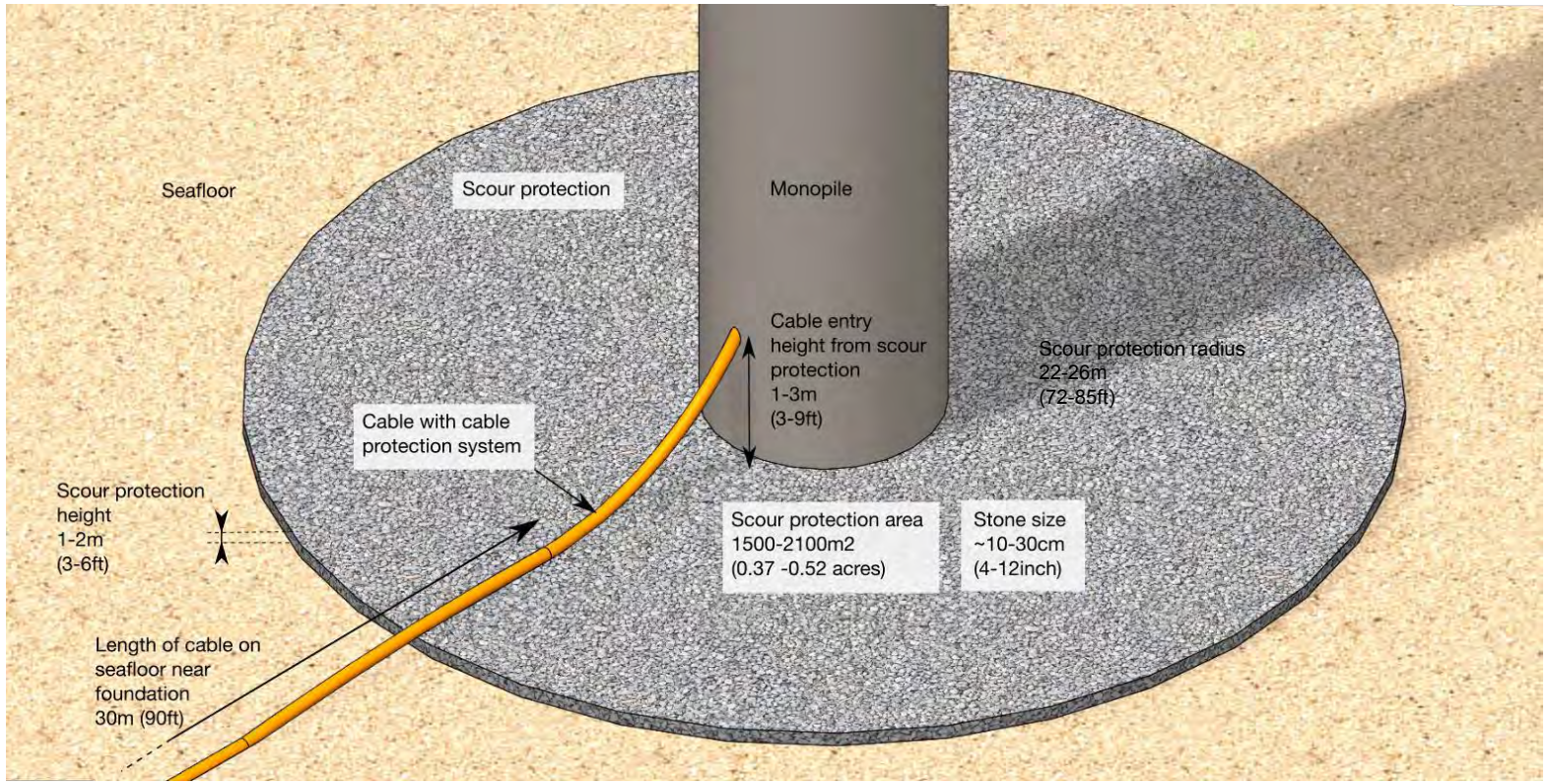
Jackets



Scour Protection

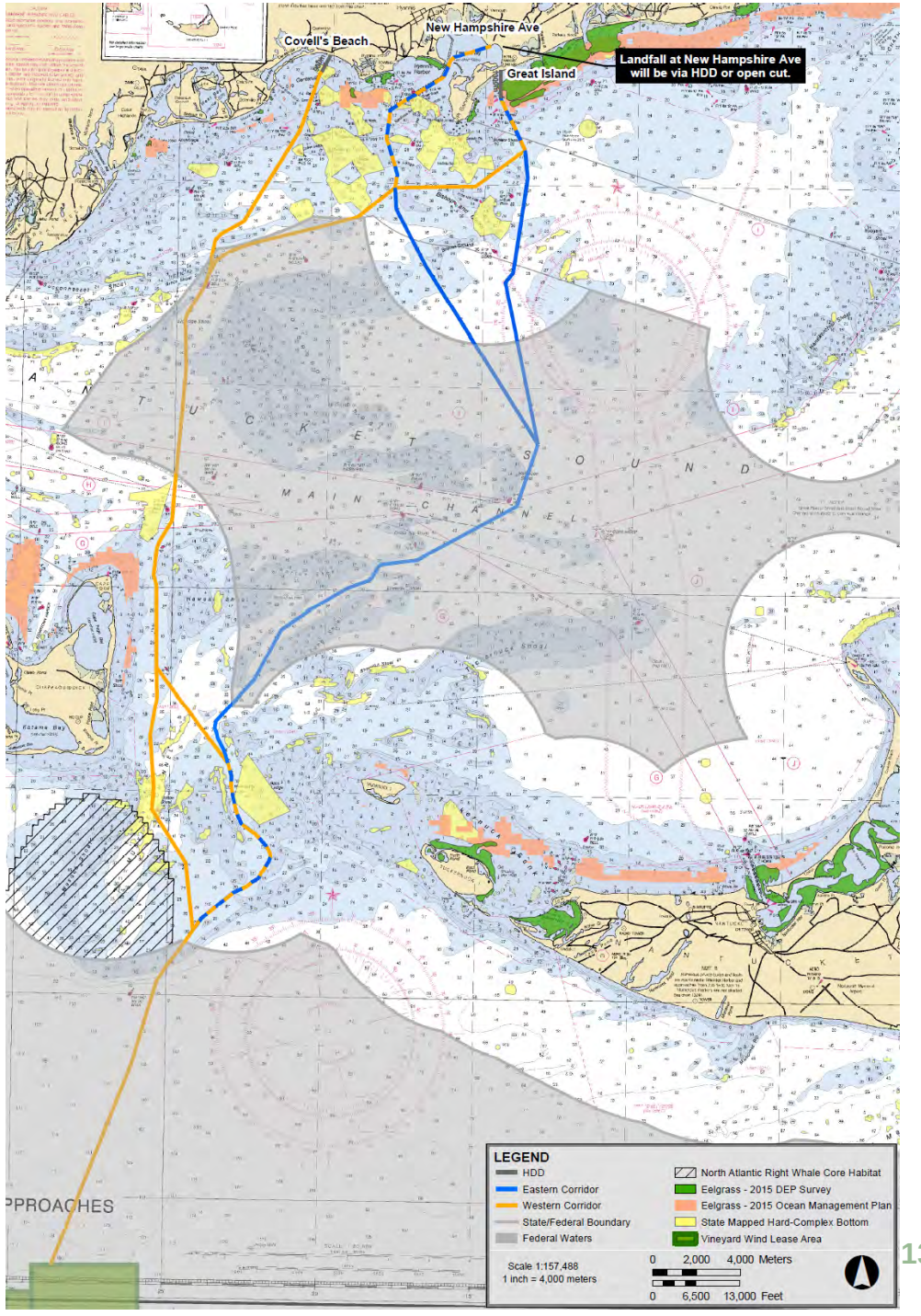
Scour

- Stone placed around foundation
  - Sized between 4-12 inches
  - 3-6 feet high
- Protects the foundation from the removal of sediments near the bas
- Dimensions
  - 138ft - 170ft diameter



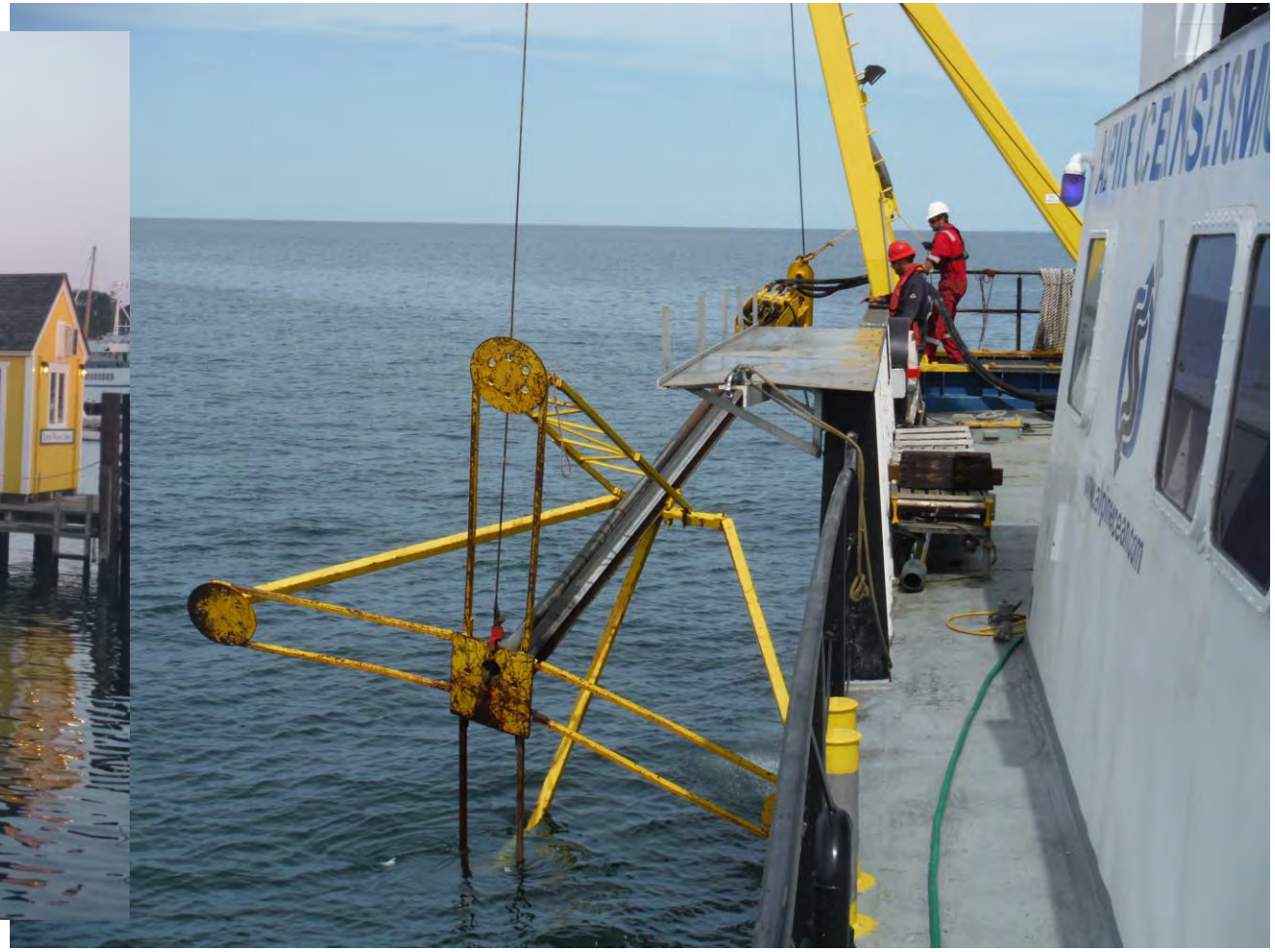
Proposed Offshore Cable Corridors

- 2 possible corridors: Western & Eastern (only one will be used)
  - Two options through Muskeget Channel
  - August/September 2017 surveys, more in 2018
- Routing
  - Considerations include water depth, bathymetry, SSU areas, etc.
  - Federal and state waters (Land Under the Ocean)
  - Avoidance of mapped eelgrass habitat and core habitat for whales
  - Minimization of impacts to hard/complex bottom areas
- Installation via jet-plow, plow, or mechanical trenching
  - Target burial depth = 5 to 8 feet (1.5 to 2.5 m)
  - 6-foot-wide swath affected by trenching
  - Where sand waves are present, dredging will be used to achieve target burial depth
- Extensive outreach with local and regional fishermen and their representatives



Site Data

Extensive data is available on the site that has been collected by Vineyard Wind and others



VINEYARD WIND

Benthic Data

Sampling and video available from:

- SMAST
- Coonamessett Farm Foundation
- NEFSC
- Vineyard Wind
- Cape Wind

Side Scan Sonar & Bathymetry data throughout WDA and cable routes

From COP:

- Impact area: 0.4% of Wind Development Area
- Data used to describe benthic resources (grab and image) in the Offshore Project Area came from a robust dataset and previous studies conducted within or near the Project Area between 2012-2017
- Data allowed for the characterization of abundance, diversity, community composition, and percent cover of benthic macrofauna and macroflora, both within the Project Area and surrounding area.
- Seafloor conditions within the WDA are very homogenous, dominated by fine sand and silt-sized sediments that become finer in deeper water.
- Overall, the simulations show that sediment is not transported far from the route and resettles rapidly due to the high proportion of coarse sand throughout the route.

Proposed Mitigation:

- Siting of cables with sensitive habitat avoided as much as possible
- Utilize widely-spaced WTGs, so that the foundations (and associated scour protection) for the WTGs, along with the ESPs, inter-link cables, and inter-array cables, only occupy a minimal portion of the WDA, leaving a huge portion of the WDA undisturbed
- Conduct post-construction monitoring to document habitat disturbance and recovery.
- Where feasible and considered safe, use mid-line buoys on anchor lines to minimize impacts from anchor line sweep.

Fisheries (biologic) Data

Data resources:

- Northeast Fisheries Science Center multispecies bottom trawl surveys
- Massachusetts Department of Marine Fisheries Trawl surveys
- School of Marine Science and Technology (SMAST) Survey of the WDA
- Southern New England Industry-Based Yellowtail Flounder Survey
- Northeast Area Monitoring and Assessment Program

From COP:

- Total biomass of fish is low across the Project Area, while species richness is relatively high. High species richness has been linked to increased ecosystem resilience or the ability of an ecosystem to recover from disturbance
- Many of the fish species found off the Massachusetts coast are important due to their value as commercial and/or recreational fisheries.
- Wind Development Area: Sediment dispersion modeling indicates that deposition of 0.2 mm or greater is centered around the cable trench and no deposition over five millimeters occurs.
- Cable Routes: The simulations show that sediment is not transported far from the route and resettles rapidly due to the high proportion of coarse sand throughout the route.
- The low total fish biomass and high species richness in the Project Area makes this location ideal for wind energy as it reduces impacts to individual organisms and targets an area which will likely be able to recover following any potential Project-related disturbances.

Proposed Mitigation:

- To mitigate the potential impacts of injury to fish from pile driving, the Project will apply a soft-start procedure to the pile driving process, which delivers initial pile drives at a lower intensity, allowing fish to move out of the activity area before the full-power pile driving begins.
- Impacts to benthic organisms may be minimized through the use of mid-line buoys, if feasible and safe, and installation equipment that minimizes installation impacts, such as a jet plow. In nearshore areas where sensitive resources are located, horizontal directional drilling may be used to minimize impacts.
- Vineyard Wind is developing a framework for a pre- and post-construction fisheries monitoring program to measure the Project's effect on fisheries resources. Vineyard Wind is working with the Massachusetts School for Marine Science and Technology (SMAST) and local stakeholders to inform that effort and design the study.

Fisheries (socio) Data

Data resources:

- Northeast Fisheries Science Center multispecies bottom trawl surveys
- Massachusetts Department of Marine Fisheries Trawl surveys
- VMS Trip & Dealer Reports (2011 – 2016)
- Vessel Trip Reports (2011-2016)
- NE Fisheries Observer Program Database
- RI-SAMP
- MA Ocean Management Plan

From COP:

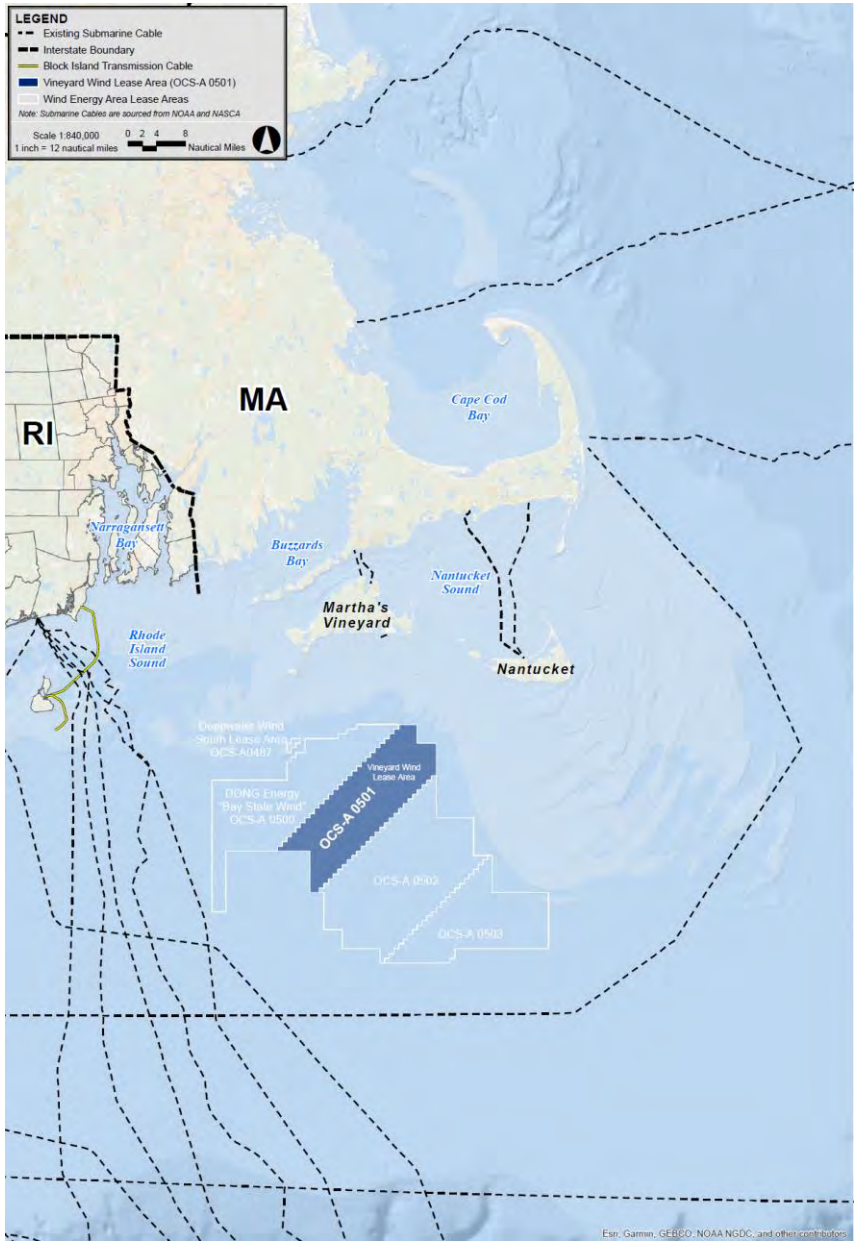
- Commercial fishing revenue generated from within the MA WEA constitutes small percentages of each fishery's total revenue
- Silver Hake was the most abundant landing of the small mesh species sourced from the MA WEA based on percentage of revenue.
- The annual average revenue of over $212 million for Lobster harvested between 2007 and 2012, approximately $300,000 per year was harvested from the MA WEA.
- Squid vessels are active throughout the WDA and along portions of the offshore export cable corridor through Nantucket Sound.
- Vessels targeting Monkfish are trawling portions of the WDA, though vessel density increases to the north of the WDA, in the areas on either side of Muskeget Channel.

Proposed Mitigation:

- Siting of cables with sensitive habitat avoided as much as possible
- Burial of cables to address EMF concerns
- Conduct post-construction monitoring to document habitat disturbance and recovery.
- Grid pattern and transit corridors in wind turbine layout
- Utilizing suspended sediment minimizing installation techniques for cable installation

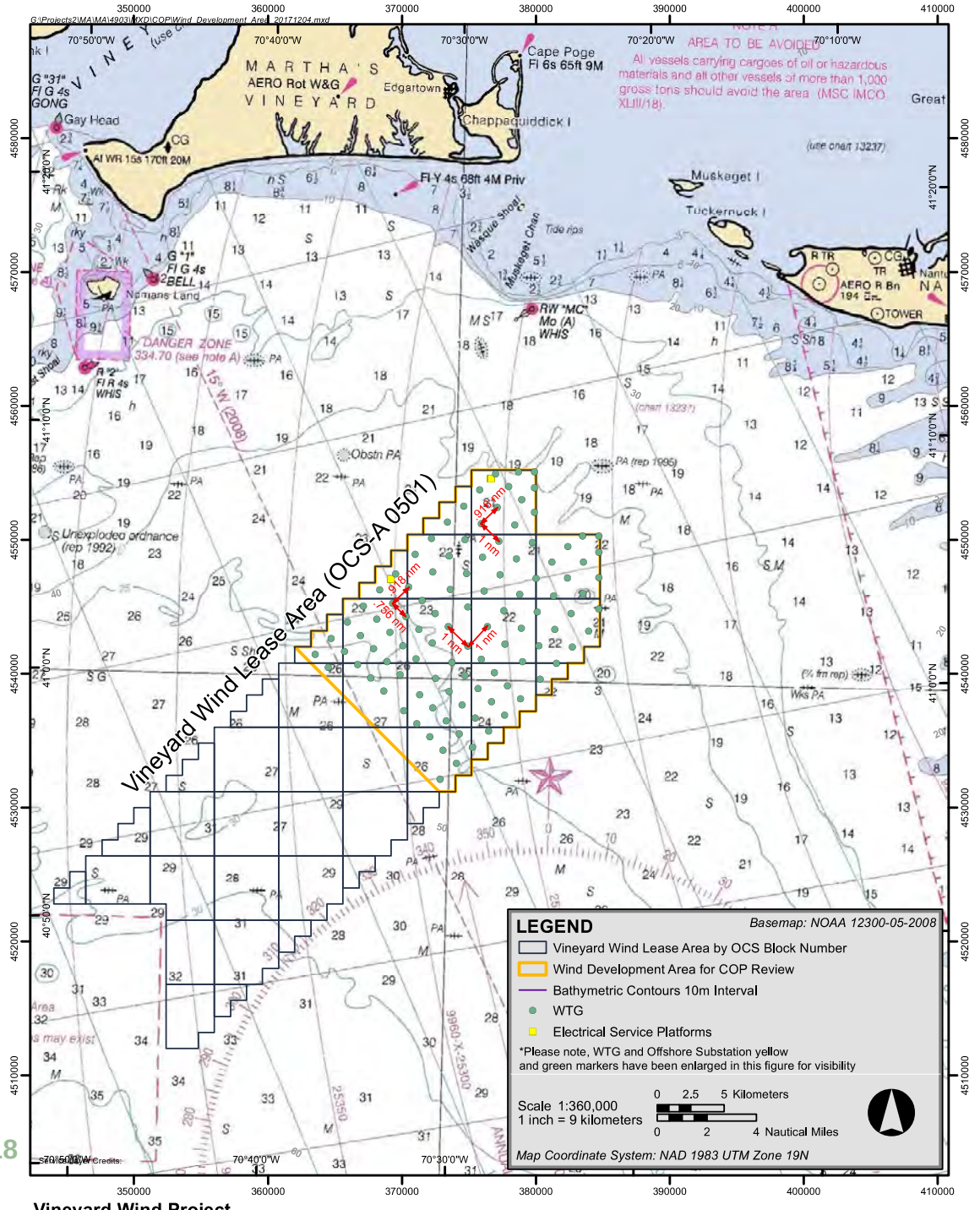
Existing Submarine Cables

- 2 Nantucket power cables
  - each ~28 miles long
- 3 power cables to Martha's Vineyard
- Cable to Block Island from RI
  - ~20 miles
- 2 cables between New Haven and Long Island
  - Crosses Long Island Sound
  - ~25 mi, ~15 years ago
- Sayreville NJ to Long Island
  - 50 miles of submarine cable
  - 15 mile underground on Long Island
- Many communications cables
  - Decades old in many cases



Active Consultation and Response

- Layout
  - Grid pattern, transit corridors – in consultation with fishermen
  - Up to 1nm apart
- Active and ‘live’ fisheries communication plan reviewed by regulators, fishermen and fishing organizations
  - Fishery Liaison and Fishery Representatives
- Electronic chart thumb drives
- Feedback under review
  - Turbine locations along 20 fathom contour line
  - Consider larger rock size for scour protection (rip rap)
    - Potential lobster habitat
  - N/S & E/W corridor



VINEYARD WIND

April 2018

On-going Engagement with Fishing Community

- **Most important**: On-going participation in working groups and individual/small group meetings

- Agreement with SMAST for pre- and post-construction fishery studies
  - SMAST will consult with fishing industry, regulators and academia - on what should be studied
  - Data will be publicly available

- Fishery Liaison (FL) and Fishery Representatives (FR)
  - Actively seeking permanent FL
  - Looking to expand FR network

Thoughts on mutually beneficial topics

Gear loss / damage reporting clearing-house

- Efficient for fishermen
  - Advocate and follow-up
- Effective for project
  - Confident project will be responsive
- Fair to everyone
  - Third party referee
  - Uniform treatment

Third-party VMS data analysis (from source)

- Efficient for fishermen and project
- Ensure confidentiality
- High confidence in results for everyone

Contact Details

Erik Peckar - erik@vineyardpower.com

508-693-3002

Jim Kendall – nbsc@comcast.net

508-287-2010

Fisheries@vineyardwind.com

For the latest project information please visit

www.vineyardwind.com

Attachment C

Vineyard Wind Construction and Operations Plan

National Historic Preservation Act Update and Consultation

BUREAU OF OCEAN ENERGY MANAGEMENT

JUNE 26, 2018

WEBINAR

National Historic Preservation Act Section 106 Consultation

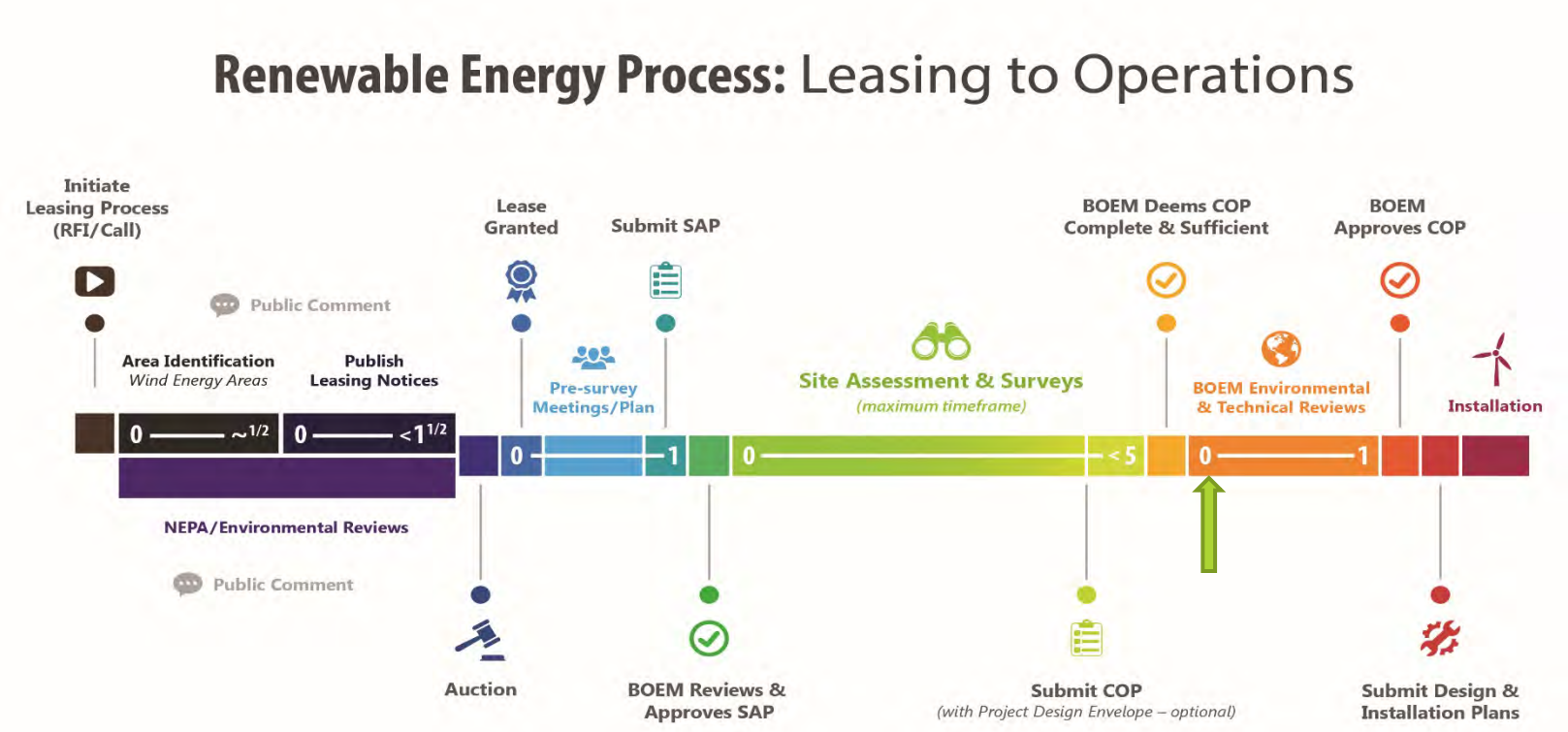
- Seeks to accommodate historic preservation concerns though consultation with parties with a interest in possible effects;

- Goal of consolation is to identify historic properties potentially affected by a undertaking, assess effects, and seek ways of avoid, minimize any adverse effects on historic properties

Main Objectives

- **Reach Consensus on key Section 106 concepts:**
- Definition of the Undertaking;
- Areas of Potential Effects (APEs); and
  - Visual, terrestrial, and marine
- Good Faith Effort to Identify Historic Properties.

Leasing and Development Process



Environmental Review and Approval Process for COP

~1 ½ to 2 YEARS

Submitted

- Completeness and sufficiency review

Scoping

- Publish Notice of Intent (NOI) in *Federal Register (March 30, 2018)*
- 30-day public comment period
- Hold public meetings (April 2018)
- Receive input on issues and alternatives

Draft Environmental Impact Statement

- Prepare with cooperating agencies
- Publish Notice of Availability in *Federal Register (Fall 2018)*
- 45-day public comment period
- Hold public hearings (Fall 2018)

Final Environmental Impact Statement

- Address public comments with cooperating agencies
- Publish Notice of Availability in *Federal Register (Spring 2019)*

12 MONTHS

Record of Decision

- "**One Federal Decision"** (Summer 2019 or later)
- Minimum 30-day wait period

What **is** a Construction and Operations Plan (COP)?

- Submitted by lessee for BOEM's review and approval
- Describes all the lessee's planned facilities and activities, onshore and offshore
- Contains information to assist BOEM in complying with relevant laws, including NHPA

Where can the COP be found?

- BOEM's website for this undertaking, including the COP and project updates:

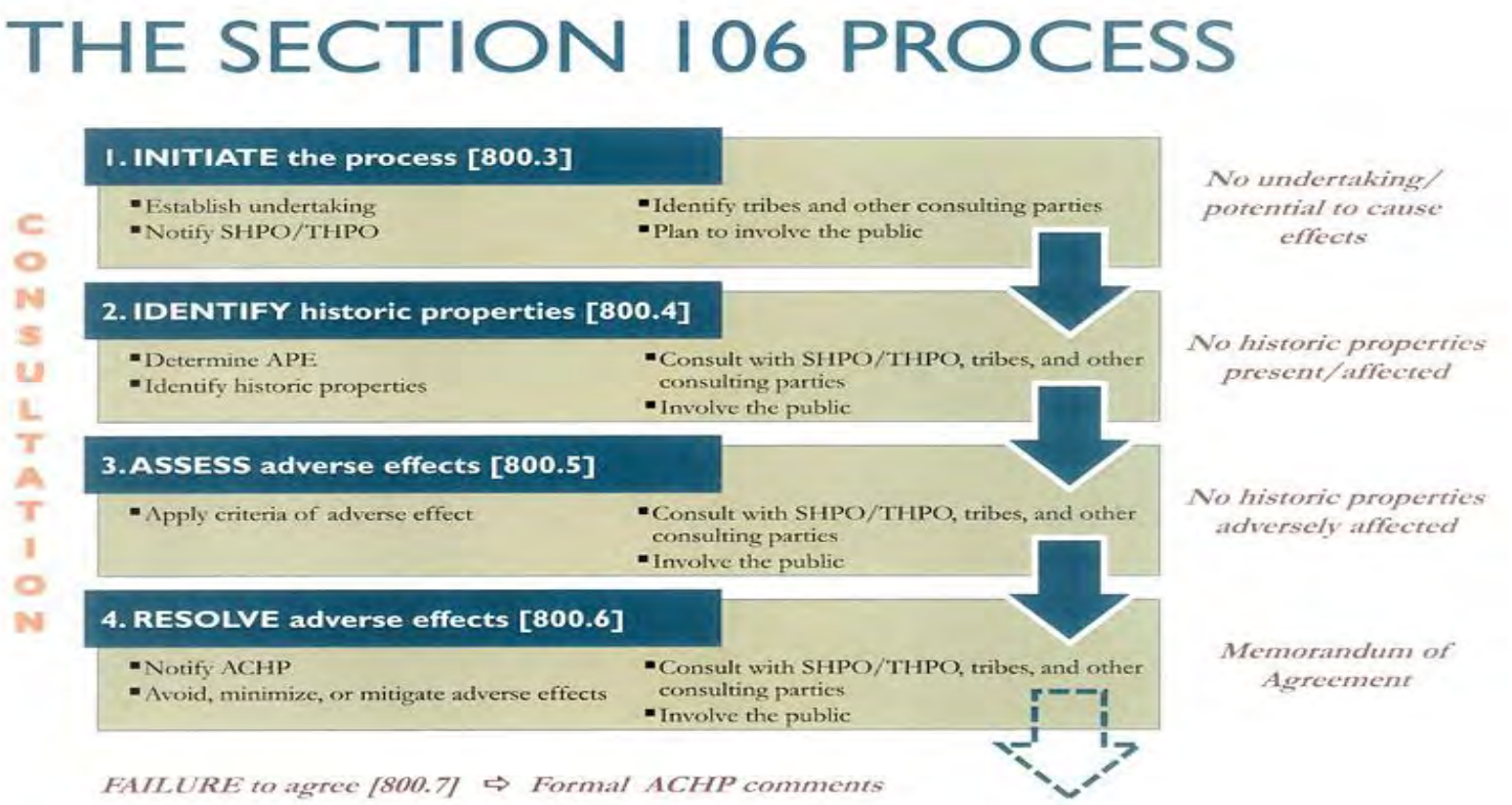
  https://www.boem.gov/Vineyard-Wind/

- BOEM's Renewable Energy website: **https://www.boem.gov/Renewable-Energy/**

Vineyard Wind COP

- Vineyard Wind submitted their Construction and Operations Plan (COP) on **December 20, 2017**
- Currently undergoing a sufficiency review by BOEM
- BOEM can disapprove, approve, or approve with conditions:
  - After preparation of an environmental impact statement (EIS)
  - Documented by a Record of Decision (ROD)

Overview in Four Steps



Previous 106 Consultation for the Massachusetts Wind Energy Area

- Programmatic agreements for leasing, and Section 106 compliance with site activity plans (SAPs) for all leases, including the MA WEA (May 2012)
- Consultation with New England tribes with update on New England Offshore Wind (May 2017)
- Documented and distributed finding for Section 106 for Vineyard Wind's SAP (October 2017)
- On BOEM website: https://www.boem.gov/North-Atlantic-Wind-Energy-Areas/

Consulting Parties

Federal and Applicant

- Applicant
- Federally-recognized tribes
- Other federal agencies

State

- State Historic Preservation Officers

Local

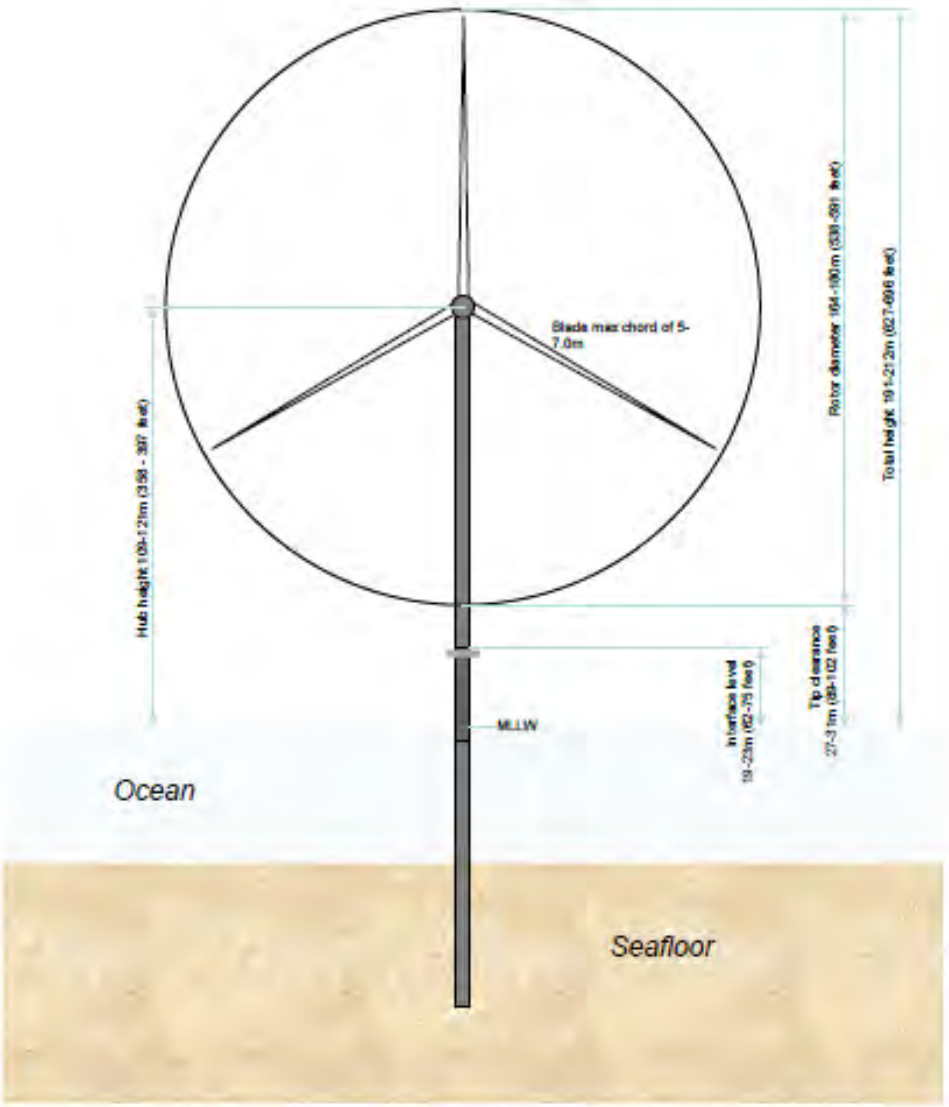
- Local governments and Communities
- Other interested persons and organizations, including historical societies and museums

BOEM's Definition of the Undertaking

- *'The undertaking includes the activities described in the Construction and Operations Plan (COP) for the construction, operation, and decommissioning of the proposed Vineyard Wind Offshore Wind Energy Project.'*

The Undertaking

- Installation of up to 106 wind turbine generators; inter-array cables; and up to 4 electrical service platforms within the lease area;
- Installation of offshore export cables connecting the project to shore at either Barnstable or Yarmouth;
- Installation of an onshore cable connecting to the power grid at the Barnstable Switching Station;
- Onshore and offshore staging or construction areas; and
- Operations and maintenance activities at Vineyard Haven and New Bedford.


Blade max chord of 5-7.0m
Hub height 103-121m (338 - 397 feet)
Rotor diameter 164-180m (538-591 feet)
Total height 191-212m (627-696 feet)
Tip clearance 27-31m (89-102 feet)
Interface level 19-23m (62-75 feet)
MLLW
Ocean
Seafloor


VM05S

Proposed Facilities and Activities

Layout and Project Size	Foundation	WTGs
• ~800MW project • Up to 106 WTG positions • Construction may occur in ~200 MW, ~400 MW, and ~800 MW increments • Construction begins late 2019 • The first ~400 MW could be constructed by the end of 2021 • Construction of the remaining 400 MW may occur concurrently or after a gap of up to five years	• 800MW of monopiles or 400MW of piles and up to 400MW of jackets • Pile driving hammer • Scour protection on all positions • Installation with a jack-up vessel or vessel on dynamic positioning (DP) with feeder barges	• 8 – 10MW WTG • Rotor size of 164-180 m (538-591 ft) • Hub height of 109-121 m (358-397 ft) • Installation with a jack-up vessel or vessel on dynamic positioning (DP) with feeder barges

Inter-array cables	Offhore Export Cables	Electrical Service Platform (ESP)
• 66kV cables beneath the seafloor • Example layout identified, not finalized • Maximum total cable lengths indicated • Installation techniques include jet plow, mechanical plow & mechanical trenching. • Installation with a vessel on dynamic positioning (DP) • Pre-lay grapnel run	• Up to three 220kV export cables beneath the seafloor • Two corridors identified with variants • Max total cable lengths indicated • Installation techniques include jet plow, mechanical plow & mechanical trenching. Dredging in some locations to achieve burial depth • Installation with a vessel on dynamic positioning (DP) and some use of an anchored vessel • Use of mattresses or rock protection on areas of minimal cable burial • Pre-lay grapnel run	• Four light-weight ESPs or two conventional ESPs • Each ESP installed on one monopile or a single jacket foundation • Scour protection on all positions • Installation using foundation and turbine installation vessels or specialized crane vessel

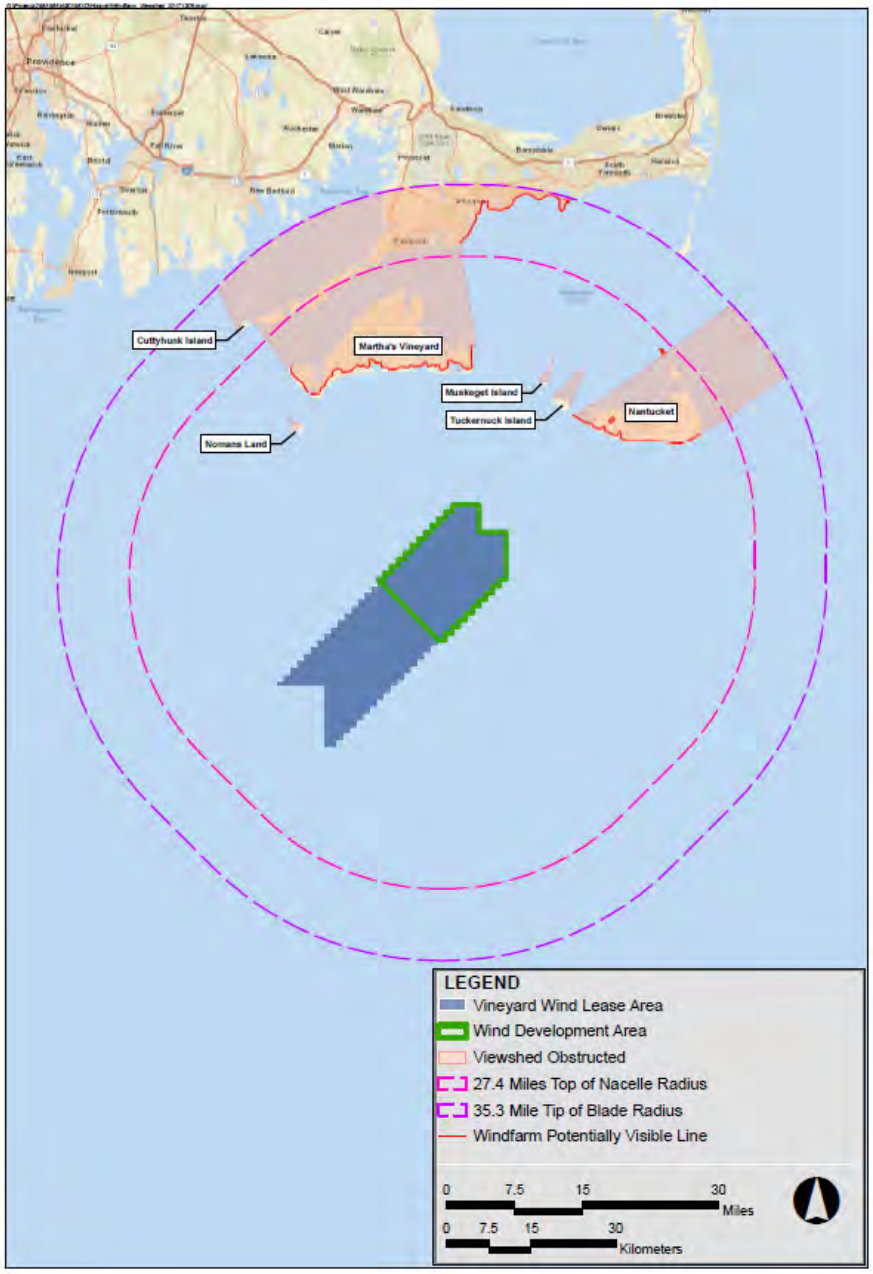
Area(s) of Potential Effect (APE)

- The **depth and breadth of the seabed** potentially impacted by any bottom-disturbing activities;
- The **depth and breadth of terrestrial areas** potentially impacted by any ground disturbing activities;
- The **viewshed** from which renewable energy structures, whether located offshore or onshore, would be visible; and
- Any temporary or permanent **construction or staging areas**, both onshore and offshore.

Visual Impact Analysis (VIA) For Historic Resources

- **APE:** *Locations where the proposed Wind development area is visible.*
- Visibility shaped by topography, vegetation, geography, weather, and, ultimately, curvature of the earth.
- Done by GIS analysis and computer simulation.


LEGEND
Airports
Vineyard Wind Lease Area
Wind Energy Area - Leased Area
Scale 1:600,000
1 inch = 15 kilometers
0 5 15 Kilometers
0 5 10 Miles
Map Coordinate System: NAD 1983 StatePlane Massachusetts Meters
Cape Cod Bay
Cape Cod
Bishop and Clerks
Nantucket Sound
Vineyard Sound
Martha's Vineyard
Airport
Rhode Island Sound
Muskeget Channel
29.8km (18.5 miles)
23.2km (14.4 miles)
23.7km (14.7 miles)
31.4km (19.5 miles)
Nantucket Island
Airport
Deepwater Wind
Bay State Wind
Vineyard Wind
49.8km (26.9 nm)
16.1km (8.7 nm)

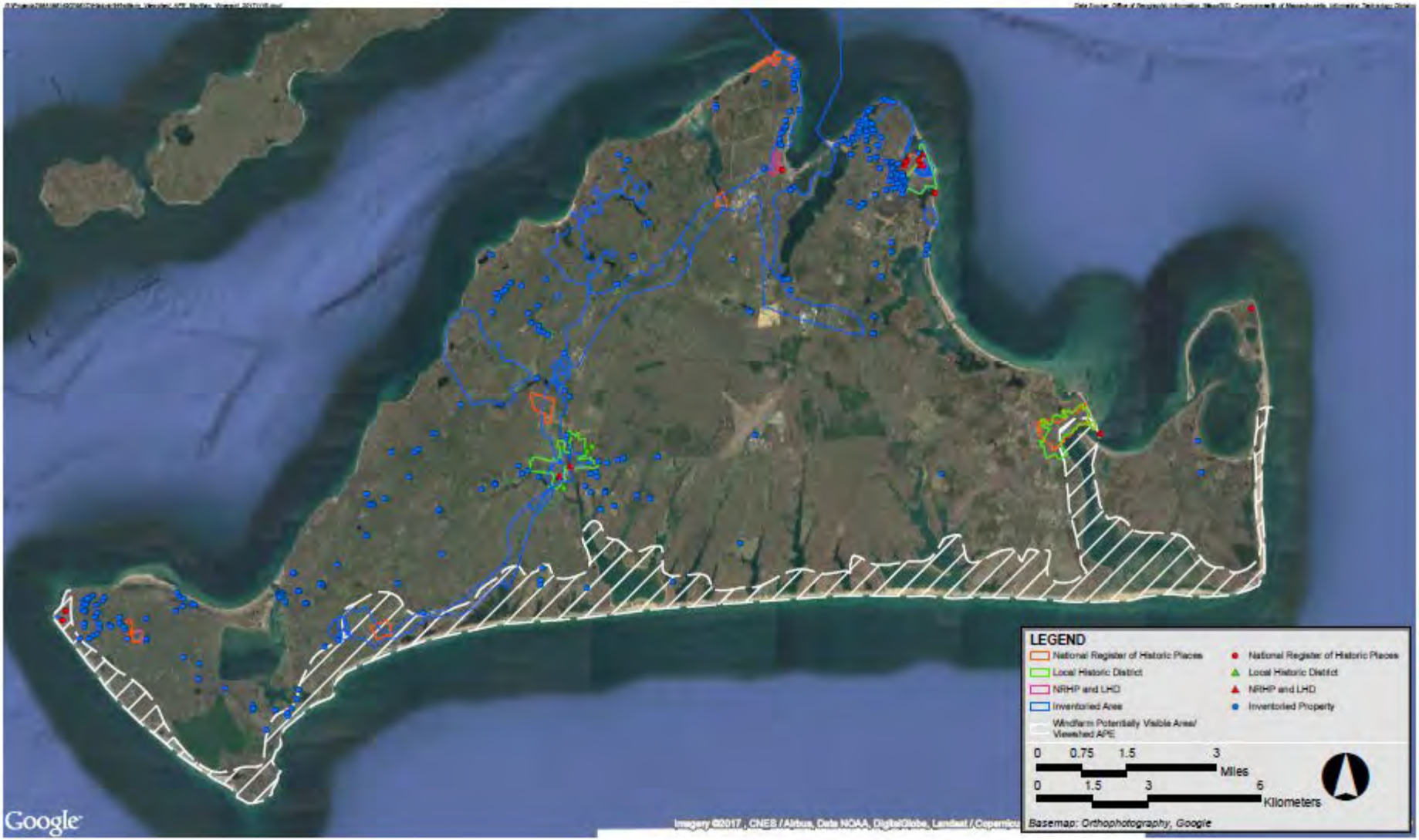

Cuttyhunk Island
Martha's Vineyard
Muskeget Island
Tuckernuck Island
Nantucket
Nomans Land
LEGEND
Vineyard Wind Lease Area
Wind Development Area
Viewshed Obstructed
27.4 Miles Top of Nacelle Radius
35.3 Mile Tip of Blade Radius
Windfarm Potentially Visible Line
0 7.5 15 30
Miles
0 7.5 15 30
Kilometers

Visual Impact Assessment: Current Status

- COP has a completed Visual Impact Assessment (VIA) included in Vol 3;
- Still simulations in the COP; video simulations of day and night are on BOEM's project website;
- COP Includes a inventory of historic buildings and districts.

Identification of Historic Properties for VIA

- National Register of Historic Places (Includes National Historic Landmarks)
- Local Historic Districts;
- Inventoried Areas (recorded as potentially historic, but not formally evaluated;
- **Others?**



Vineyard Wind Project

VINEYARD WIND

Figure 3-3a
Windfarm Viewshed APE Martha's Vineyard

Figure 3-3b

Windfarm Viewshed APE Martha's Vineyard

Figure 3-3c
Windfarm Viewshed APE Martha's Vineyard

Vineyard Wind Project

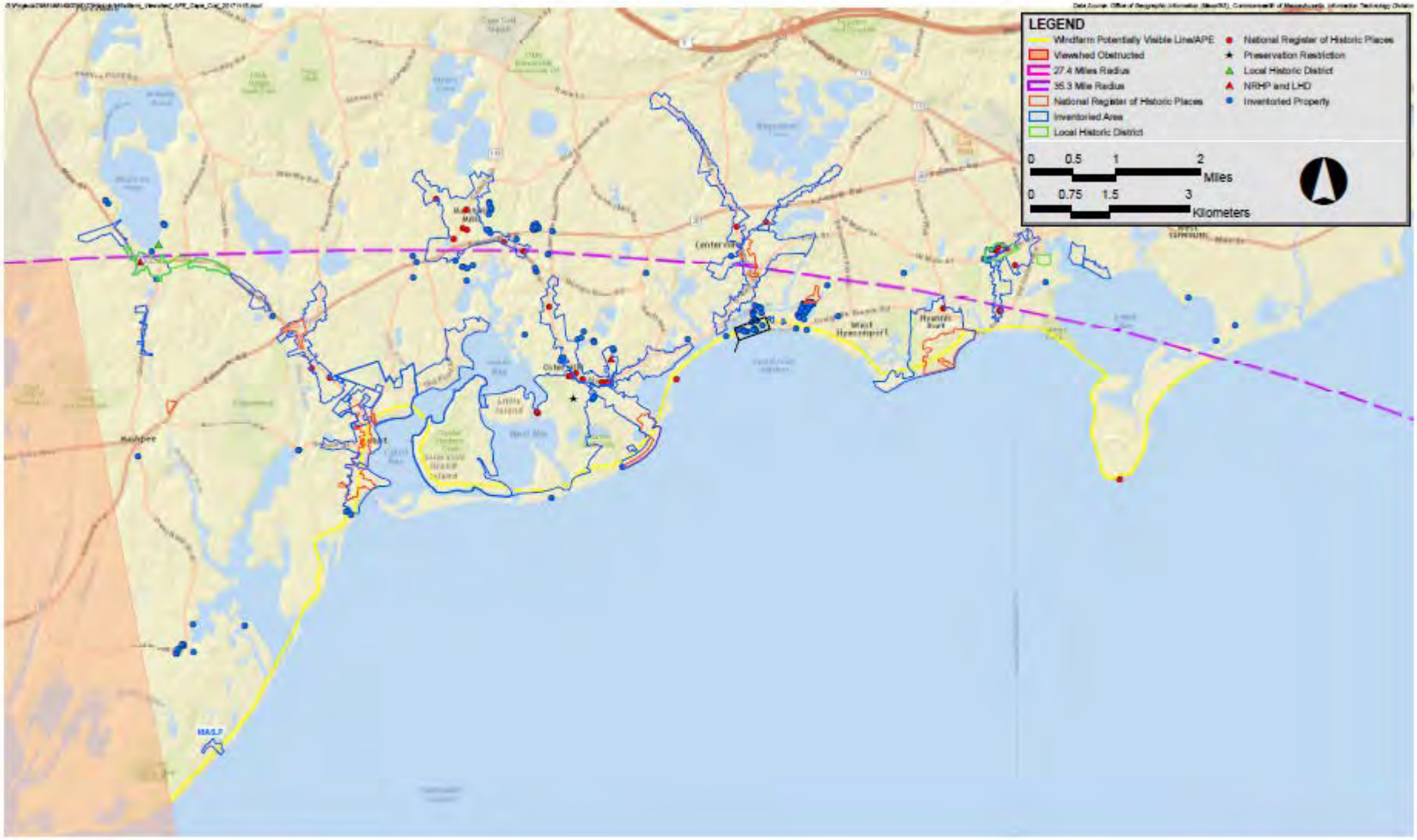
VINEYARD WIND

Figure 3-6

Vineyard Wind Project

VINEYARD WIND

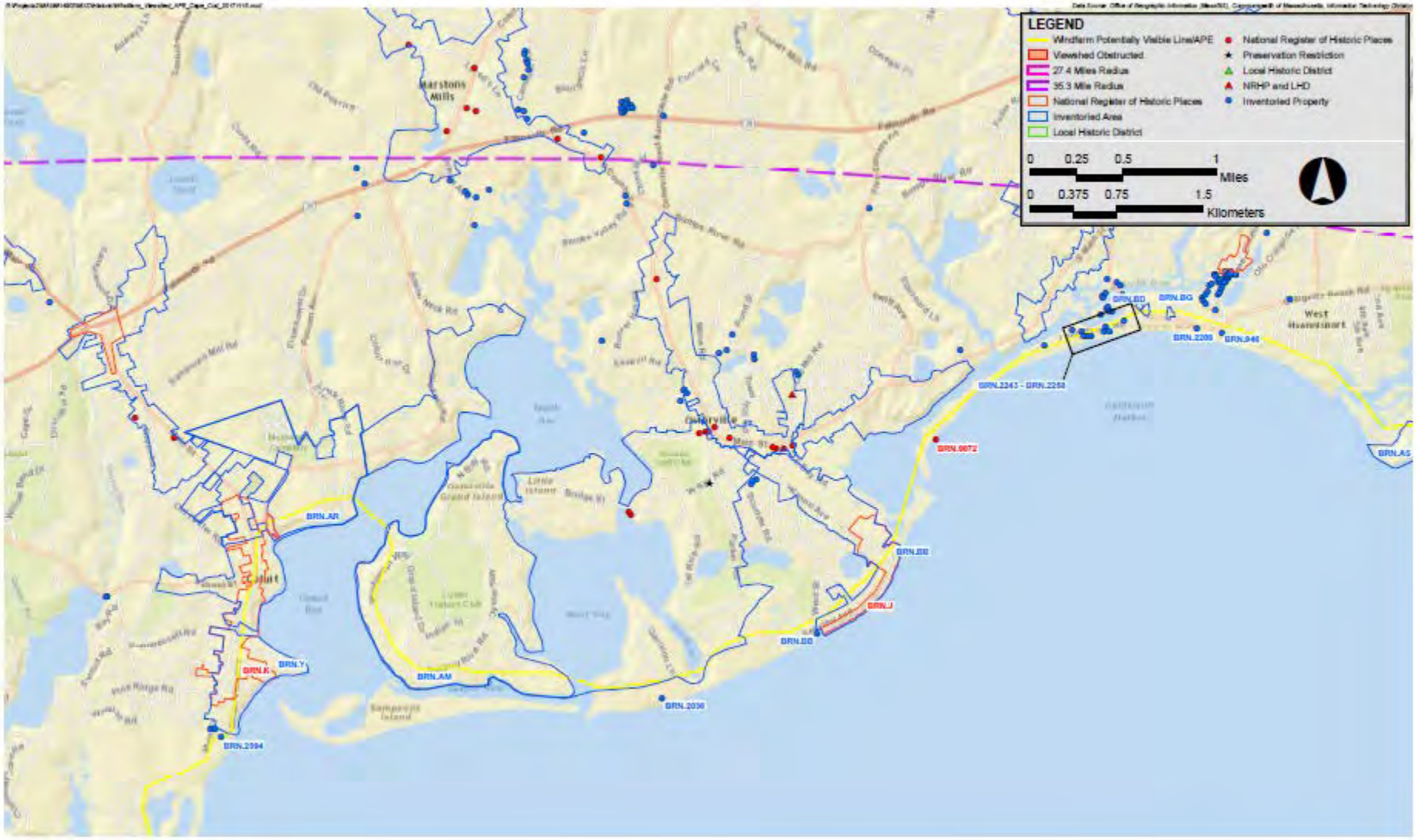
Figure 5-1
Windfarm Viewshed APE Cuttyhunk Island



Vineyard Wind Project

VINEYARD WIND

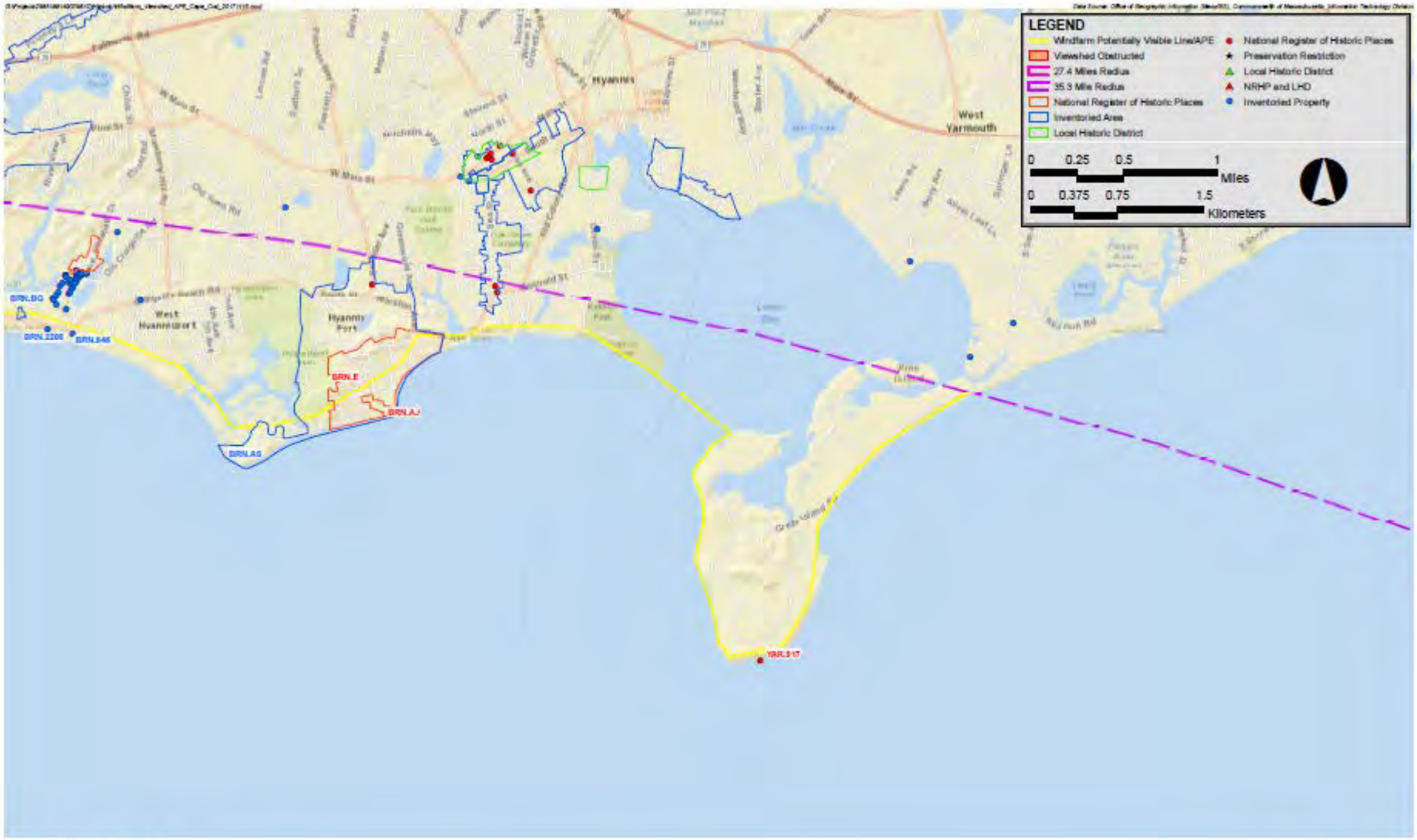
Figure 3-7a
Windfarm Viewshed APE Cape Cod



Vineyard Wind Project

VINEYARD WIND

Figure 3-7b
Windfarm Viewshed APE Cape Cod



Vineyard Wind Project

VINEYARD WIND

Figure 3-7c

VIA Summary

- BOEM has determined the viewshed APE.
- BOEM believes a good faith effort has been made to identify historic properties within the viewshed APE.
- Are there properties that have not been identified or that BOEM should consider?
- The project will be visible from historic properties within the APE. Next step is for BOEM to apply the criteria of adverse effects to these properties.

Onshore APE

- **APE:** *The depth and breadth of terrestrial areas potentially impacted by ground disturbing activities.*
- Cable Routes on Shore.
- Electrical Substations and equipment, materials staging.
- Harbor Alterations or Improvements.

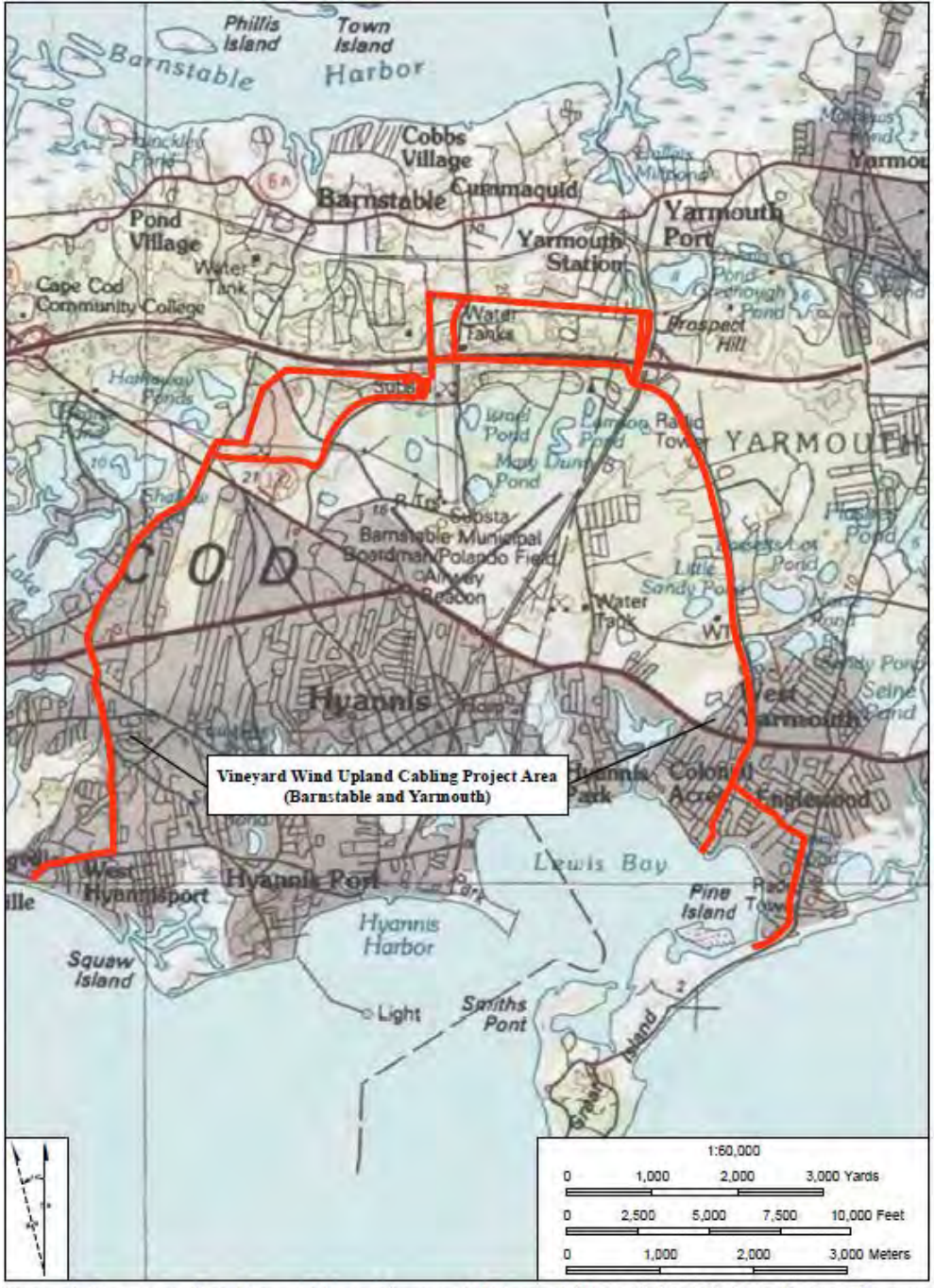


Figure 1. Location of the Barnstable and Yarmouth Vineyard Wind Upland Cabling Project Area on the New Bedford USGS topograpic map, 1:100,000 scale series.

Identification of Historic Properties within Onshore APE

- Located in area occupied for centuries; one of most historic landscapes in American history.
- 'Due Diligence Study' in COP
- Field Strategy: identify high, low probability areas, ground survey.
- Report Due: September, 2018

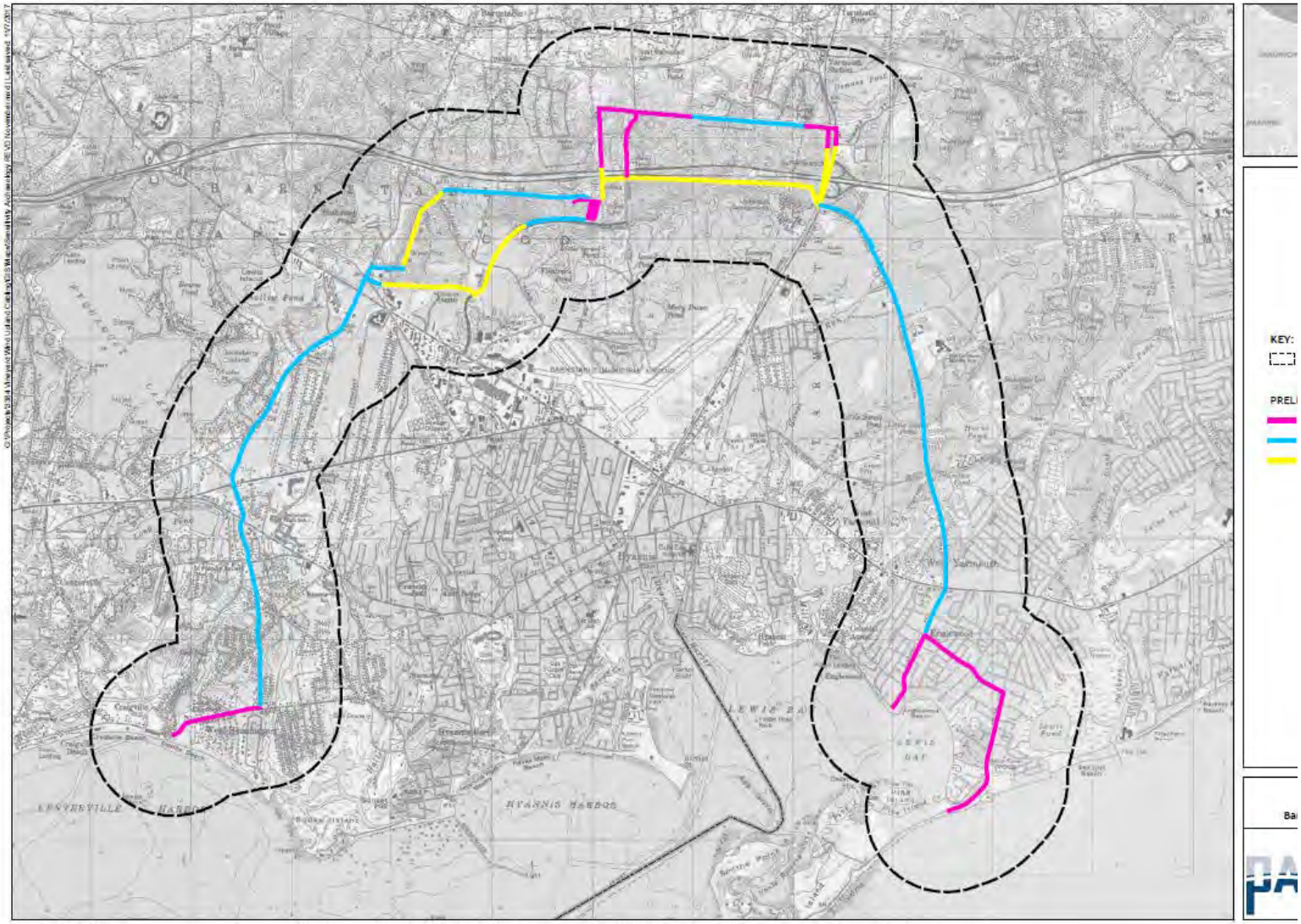
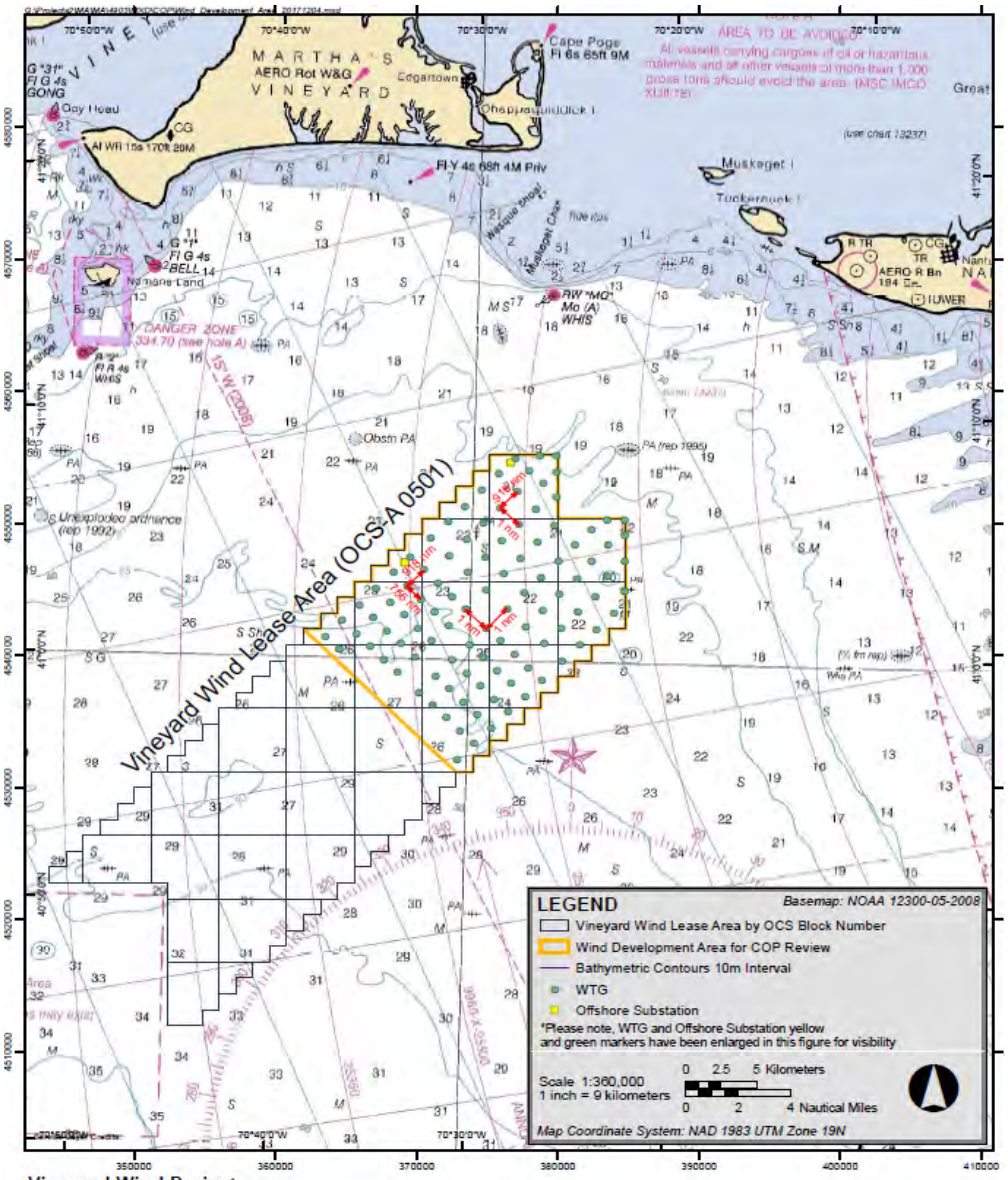


Figure 3. Preliminary sensitivity assessment of the Vineyard Wind Upland Cabling Project on the USGS Hyannis and Dennis topographic quads, 7.5 minute series.

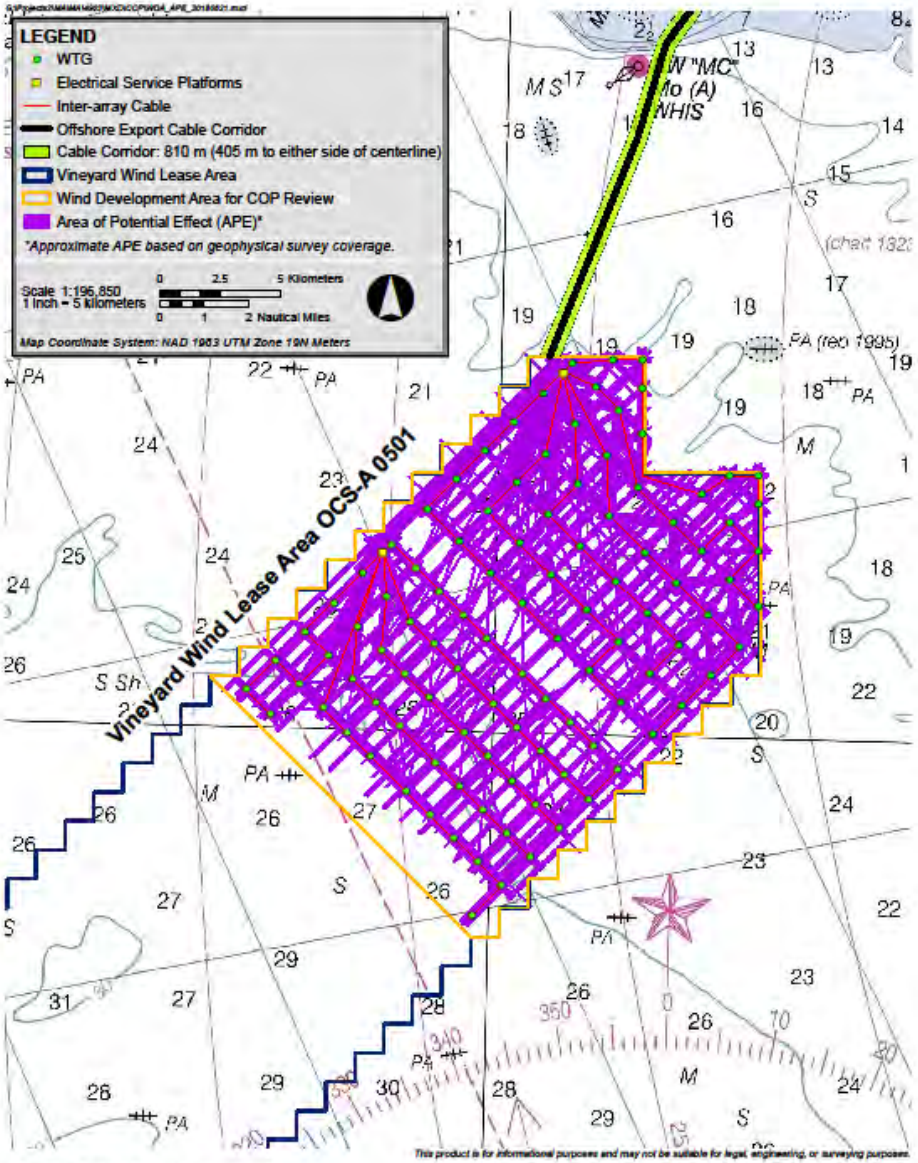
Offshore APE

- **APE :** *Depth and breath of seabed impacted by any bottom disturbing activities*
  - Includes Wind turbines, interarray cables, offshore export cable.

- **Identification of Historic Properties:**
  - Ongoing remote sensing survey.
  - Good faith effort identified through BOEM guidelines.
  - Report: Late September, early October 2018.


Vineyard Wind Lease Area (OCS-A 0501)
LEGEND
Basemap: NOAA 12300-05-2008
Vineyard Wind Lease Area by OCS Block Number
Wind Development Area for COP Review
Bathymetric Contours 10m Interval
WTG
Offshore Substation
*Please note, WTG and Offshore Substation yellow and green markers have been enlarged in this figure for visibility
Scale 1:360,000
1 inch = 9 kilometers
0 2.5 5 Kilometers
0 2 4 Nautical Miles
Map Coordinate System: NAD 1983 UTM Zone 19N
MARTHA'S VINEYARD
Cape Poge Fl 6s 65ft 9M
Edgartown
Oak Bluffs
Muskeget I
Tuckernuck I
Nomans Land
DANGER ZONE
AREA TO BE AVOIDED
Vineyard Wind Project
VINEYARD WIND
Figure 1-2

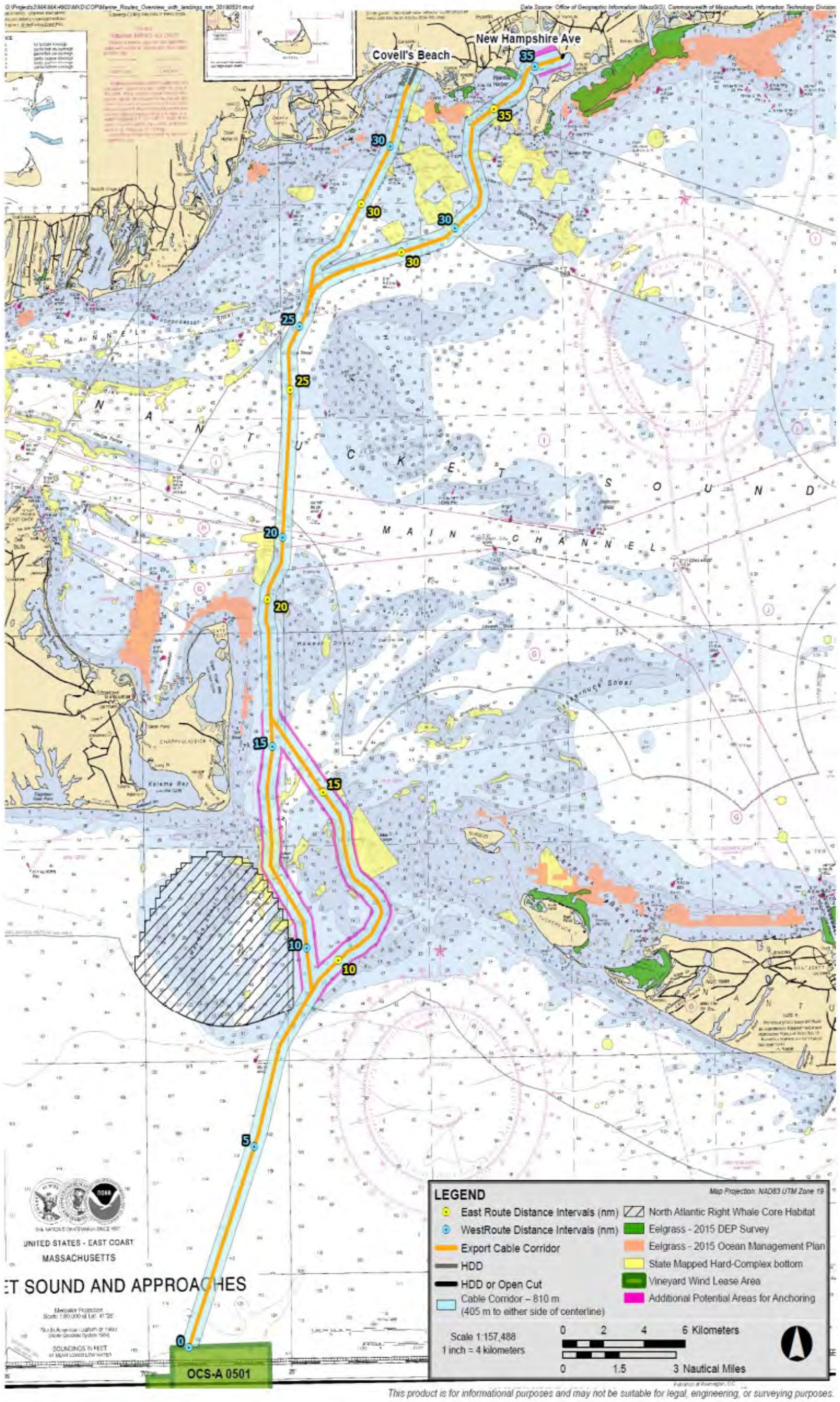
APE: Cal



Vineyard Wind Project

VINEYARD WIND

Figure 3
WDA Area of Potential Effect



New Hampshire Ave
Covell's Beach
N A N T U C K E T S O U N D
M A I N C H A N N E L
UNITED STATES - EAST COAST
MASSACHUSETTS
ET SOUND AND APPROACHES
OCS-A 0501
LEGEND
Map Projection: NAD83 UTM Zone 19
East Route Distance Intervals (nm)
WestRoute Distance Intervals (nm)
Export Cable Corridor
HDD
HDD or Open Cut
Cable Corridor – 810 m
(405 m to either side of centerline)
North Atlantic Right Whale Core Habitat
Eelgrass - 2015 DEP Survey
Eelgrass - 2015 Ocean Management Plan
State Mapped Hard-Complex bottom
Vineyard Wind Lease Area
Additional Potential Areas for Anchoring
Scale 1:157,488
1 inch = 4 kilometers
0 2 4 6 Kilometers
0 1.5 3 Nautical Miles
This product is for informational purposes and may not be suitable for legal, engineering, or surveying purposes.

Staging Areas APE

- **APE :** *Any temporary or permanent construction or staging areas, both onshore and offshore.*
- Operations and maintenance activities at Vineyard Haven and New Bedford.

Vineyard Wind Project

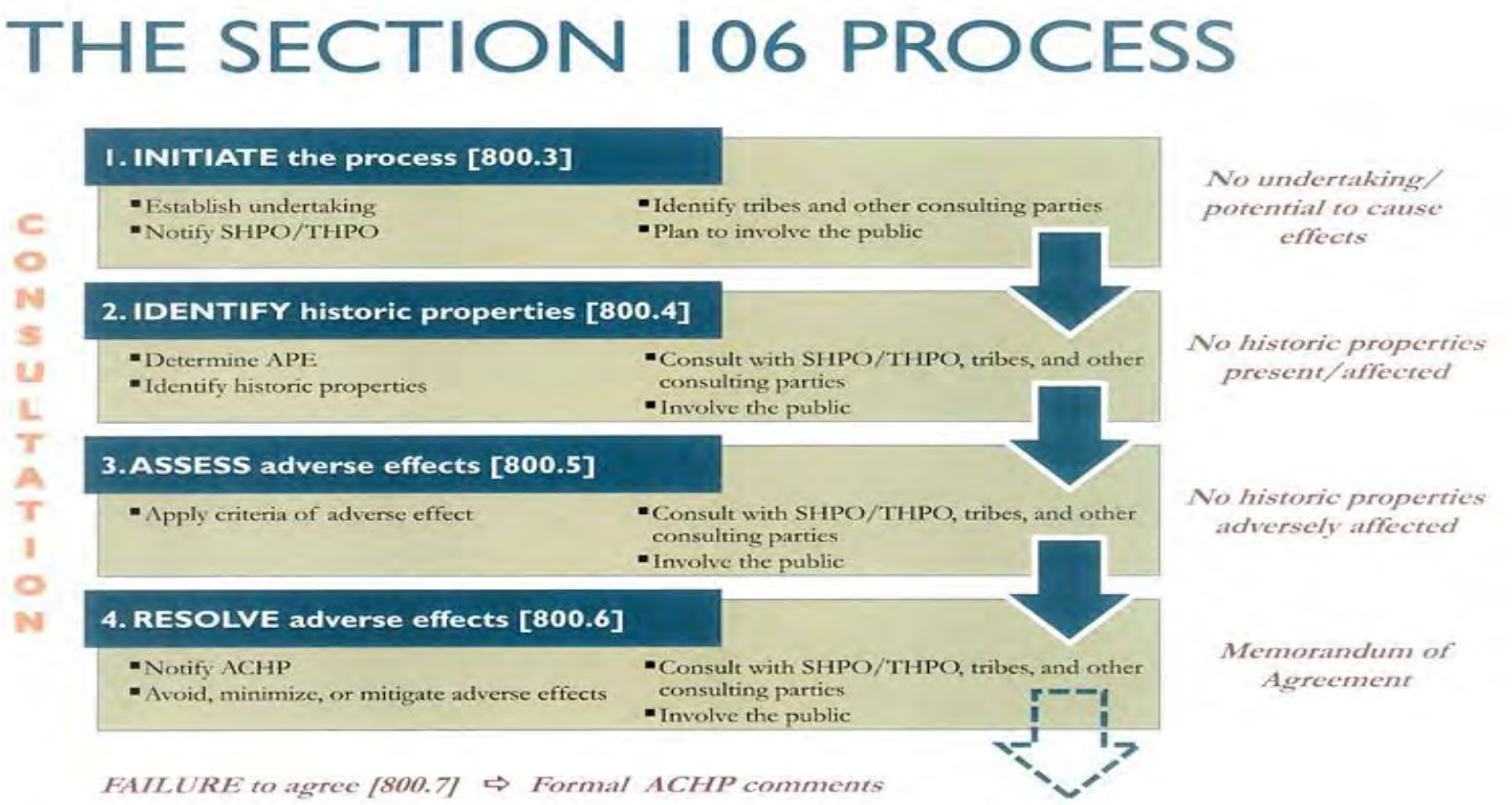
VINEYARD WIND

Figure 4
Vineyard Haven O&M Area of Potential Effect

Next Steps

- BOEM will review all historic property identification reports: VIA/viewshed assessment to historic properties, terrestrial archaeological survey report , and marine archaeological survey report.
- Possible webinar for terrestrial and marine archaeological surveys, Fall 2018?
- Additional questions/comment?

Overview in Four Steps



Questions?

For more information on the Vineyard Wind project, visit:
www.boem.gov/Vineyard-Wind

Richard Warner
Cultural Resource Specialist
Richard.Warner@boem.gov
703-787-1085

Attachment D

Questions for discussion with the Commercial Fisheries Center of Rhode Island

July 9, 2018

East Farm Campus

1) We are hearing from numerous groups with varying interests, which makes it difficult for us to engage in meaningful discussions without knowing whether all relevant interests are duly represented. Thus, it would be helpful for us to better understand the associations, individual fishermen or groups represented by the Commercial Fisheries Center of Rhode Island. Are there are other groups or individual fishermen that CFCRI does not represent that fish in or around our project area that should be included in our discussions?

2) We have been directed to work with the RI Fisheries Advisory Board. However, it is unclear to us how CFCRI's membership overlaps, if at all, with the FAB and/or how CFCRI and the FAB work together on issues of mutual concern. Any insight you could provide would be very helpful.

3) We have received the attached proposed alternative layout for the project, which we understand was developed by CFCRI. In order for us to meaningfully evaluate the proposed alternative, we need additional information, including:

a) the layout presented using GPS coordinates or a GIS readable form;

b) the data that was used to inform the proposed turbine layout;

c) the fishing interests the alternative layout is intended to address and whether other fishing interests may be impacted;

d) the rationale for what appears to be an east/west grid layout and why a northwest to southeast layout is not workable

e) the distance between turbines in each of the directions, and the rationale for the recommended separation distance

f) the specific purpose of the wider east/west lanes within the turbine layout and how the specific locations and widths were determined

g) the specific purpose of the north/south lanes within the turbine layout and the basis for determining their specific locations and widths

h) the specific purpose of the northwest to southeast lane within the turbine layout and the basis for determining its specific location and width

4) As we have to consider many competing issues, it would be helpful for us to understand which elements of the proposed alternative layout you believe are the most important to achieve

5) In your comments to BOEM, you were critical of the data we presented in our COP. We would appreciate your input on data sources we might look to, including:

a) whether the various “heat maps” available through the ocean portal accurately represent the efforts and activities of the various fisheries you represent? If not, why not? And if not, what data sources should we also look to?

b) whether the RI DEM study is a reliable source of landings data and of fisheries value from the various lease areas? If not, why not? And if not, what would other data sources that can answer these questions would the Center consider to be reliable?

c) if the RI DEM study separated the squid fishery relative VMS data from the mackerel and butterfish fisheries, would that accurately depict the characterization of the longfin squid fishery?

d) what is the best source of data to capture landings and revenue data from the lobster fishery in the lease areas?

6) We would appreciate any guidance you can offer on how developers can better communicate with industry?

Thank you very much and we look forward to a productive meeting.

Appendix 7. CRMC-Vineyard Wind Stay Agreements (all 5)

State of Rhode Island and Providence Plantations
Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, RI 02879-1900

(401) 783-3370
Fax (401) 783-2069

July 31, 2018

Walter Cruickshank, Ph.D., Acting Director
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

James Bennett, Renewable Energy Program Manager
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

Re: Vineyard Wind, LLC; Docket No. BOEM-2011-0049
CRMC File 2018-04-055

Dear Messrs. Cruikshank and Bennett:

Pursuant to 15 CFR § 930.54(f), Vineyard Wind, LLC filed a federal consistency certification with the Rhode Island Coastal Resources Management Council (CRMC) on April 6, 2018 for the proposed construction and operation of an 800 megawatt wind energy project consisting of up to 106 offshore wind turbine generators to be located in offshore waters south of Martha's Vineyard, MA within BOEM Lease Area OCS-A 0501. The proposed project is subject to CRMC review authority pursuant to the federal Coastal Zone Management Act (CZMA), 16 USC § 1456, and the CZMA's implementing regulations at 15 CFR Part 930 Subpart D – Consistency for Activities Requiring a Federal License or Permit and Subpart E - Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities.

The CRMC and Vineyard Wind, LLC have mutually agreed to stay the CRMC six month federal consistency review period in accordance 15 CFR § 930.60(b). Accordingly, the CRMC decision date for the Vineyard Wind, LLC matter is now December 6, 2018.

The purpose of this letter is to notify the Bureau of Ocean Energy Management (BOEM) of this agreement as required under 15 CFR § 930.60(b), and a copy of the stay agreement is attached herewith. Further, the CRMC requests BOEM not to issue a license or permit to Vineyard Wind, LLC until the requirements of 15 CFR Part 930, Subparts D and E have been satisfied. The CRMC will notify BOEM when it issues a final decision in this matter.

Please contact me at 401-783-3370 or email gfugate@crmc.ri.gov should you have any questions.

Sincerely,

Grover J. Fugate, Executive Director
Coastal Resources Management Council

/lat

cc: Mr. Erich Stephens
Chief Executive Officer
Vineyard Wind, LLC
700 Pleasant Street, Suite 510
New Bedford, MA 02740

David Kaiser, Senior Policy Analyst
Stewardship Division
Office for Coastal Management
National Oceanic and Atmospheric Administration
Coastal Response Research Center, University of New Hampshire
246 Gregg Hall, 35 Colovos Road
Durham, NH 03824-3534

Allison Castellan, Coastal Management Specialist
Office for Coastal Management N/OCM6
National Oceanic and Atmospheric Administration, SSMC4
Silver Spring, MD 20910

Jennifer Cervenka, CRMC Chair
CRMC Members
Anthony DeSisto, Esq., CRMC Legal Counsel
Jeffrey Willis, CRMC Deputy Director
James Boyd, Coastal Policy Analyst

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

COASTAL RESOURCES MANAGEMENT COUNCIL
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, R.I. 02879-1900

(401) 783-3370
FAX: (401) 783-3767

AMENDED AGREEMENT TO STAY SIX MONTH REVIEW PERIOD

Between

Rhode Island Coastal Resources Management Council

And

Vineyard Wind, LLC

The Rhode Island Coastal Resources Management Council, hereinafter referred to as the "CRMC," and the Vineyard Wind, LCC, hereinafter referred to as "Vineyard Wind," hereby agree as follows.

Pursuant to 15 CFR § 930.54(f), Vineyard Wind filed a federal consistency certification with the CRMC on April 6, 2018 for the proposed construction and operation of an 800 megawatt wind energy project consisting of up to 106 offshore wind turbine generators to be located in offshore waters south of Martha's Vineyard, MA within BOEM Lease Area OCS-A 0501. The proposed project is subject to CRMC review authority pursuant to the federal Coastal Zone Management Act (CZMA), 16 USC §§ 1451-1464, and the CZMA's implementing regulations at 15 CFR Part 930 Subpart D – Consistency for Activities Requiring a Federal License or Permit and Subpart E - Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities.

Pursuant to 15 CFR § 930.60(b) the CRMC and Vineyard Wind have mutually agreed to the following dates and to stay the CRMC six-month review period as specified herein.

- Date the CRMC 6-month review period commenced: April 6, 2018
- Date the 6-month period was to end: October 6, 2018
- Date during the 6-month review period that the stay begins: August 6, 2018
- Date that the stay ends: October 6, 2018
- Date the CRMC decision is due: December 6, 2018

The CRMC will issue its consistency determination on or before December 6, 2018 unless Vineyard Wind and CRMC mutually agree in writing to another later date.

These agreements made and entered by:

Grover J. Fugate
Executive Director, CRMC

7/27/18
Date

Erich Stephens
Chief Development Officer, Vineyard Wind, LLC

30 Jul 18
Date

State of Rhode Island and Providence Plantations
Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, RI 02879-1900

(401) 783-3370
Fax (401) 783-2069

November 29, 2018

Walter Cruickshank, Ph.D., Acting Director
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

James Bennett, Renewable Energy Program Manager
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

Re: Vineyard Wind, LLC; Docket No. BOEM–2018–0015
CRMC File 2018-04-055

Dear Messrs. Cruikshank and Bennett:

Pursuant to 15 CFR § 930.54(f), Vineyard Wind, LLC filed a federal consistency certification with the Rhode Island Coastal Resources Management Council (CRMC) on April 6, 2018 for the proposed construction and operation of an 800 megawatt wind energy project consisting of up to 106 offshore wind turbine generators to be located in offshore waters south of Martha's Vineyard, MA within BOEM Lease Area OCS-A 0501. The proposed project is subject to CRMC review authority pursuant to the federal Coastal Zone Management Act (CZMA), 16 USC § 1456, and the CZMA's implementing regulations at 15 CFR Part 930 Subpart D – Consistency for Activities Requiring a Federal License or Permit and Subpart E - Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities.

The CRMC and Vineyard Wind, LLC on July 30, 2018 mutually agreed to stay the CRMC six month federal consistency review period in accordance 15 CFR § 930.60(b), and the CRMC decision date for the Vineyard Wind, LLC matter was extended until December 6, 2018. The CRMC and Vineyard Wind have now mutually agreed to further stay the CRMC six month federal consistency review period with a CRMC decision date in this matter now due no later than January 28, 2019 in accordance with the attached stay agreement that was executed on November 29, 2018.

The purpose of this letter is to notify the Bureau of Ocean Energy Management (BOEM) of this agreement as required under 15 CFR § 930.60(b). The CRMC requests BOEM not to issue a license or permit to Vineyard Wind, LLC until the requirements of 15 CFR Part 930, Subparts D and E have been satisfied. The CRMC will notify BOEM when it issues a final decision in this matter.

Please contact me at 401-783-3370 or email gfugate@crmc.ri.gov should you have any questions.

Sincerely,

Grover J. Fugate, Executive Director
Coastal Resources Management Council

/lat

cc Lars Pedersen, CEO, Vineyard Wind, LLC
David Kaiser. NOAA
Allison Castellan, NOAA
Jennifer Cervenka, CRMC Chair
CRMC Members
Anthony DeSisto, Esq., CRMC Legal Counsel

State of Rhode Island and Providence Plantations
Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, RI 02879-1900

(401) 783-3370
Fax (401) 783-2069

AMENDED AGREEMENT TO STAY SIX MONTH REVIEW PERIOD

Between

Rhode Island Coastal Resources Management Council

And

Vineyard Wind, LLC

The Rhode Island Coastal Resources Management Council, hereinafter referred to as the "CRMC," and the Vineyard Wind, LCC, hereinafter referred to as "Vineyard Wind," hereby agree as follows.

Pursuant to 15 CFR § 930.54(f), Vineyard Wind filed a federal consistency certification with the CRMC on April 6, 2018 for the proposed construction and operation of an 800 megawatt wind energy project consisting of up to 106 offshore wind turbine generators to be located in offshore waters south of Martha's Vineyard, MA within BOEM Lease Area OCS-A 0501. The proposed project is subject to CRMC review authority pursuant to the federal Coastal Zone Management Act (CZMA), 16 USC § 1456(c)(3)(A) and the CZMA's implementing regulations at 15 CFR Part 930 Subpart D – Consistency for Activities Requiring a Federal License or Permit and Subpart E - Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities.

Pursuant to 15 CFR § 930.60(b) the CRMC and Vineyard Wind entered into an agreement on July 30, 2018 to stay the CRMC six-month review period for two months with a CRMC decision due on December 6, 2018. The CRMC and Vineyard Wind now mutually agree to the following dates to further stay the CRMC six-month review period as specified herein.

- Date the CRMC 6-month review period commenced: April 6, 2018
- Date the 6-month review period was to end: December 6, 2018
- Date during the 6-month review period that the stay begins: November 30, 2018

- Date that the amended stay ends: January 22, 2019
- Date the CRMC decision is due: January 28, 2019

The CRMC will issue its consistency determination on or before **January 28, 2019** unless Vineyard Wind and CRMC mutually agree in writing to another later date.

These agreements made and entered by:

Grover J. Fugate
Executive Director, CRMC

11/29/2018
Date

11/28/2018
Date

Lars Pedersen
Chief Executive Officer, Vineyard Wind, LLC

cc: BOEM
NOAA OCM
CRMC Council members

State of Rhode Island and Providence Plantations
Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, RI 02879-1900

(401) 783-3370
Fax (401) 783-2069

January 16, 2019

Walter Cruickshank, Ph.D., Acting Director
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

James Bennett, Renewable Energy Program Manager
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

Re: Vineyard Wind, LLC; Docket No. BOEM–2018–0015
CRMC File 2018-04-055

Dear Messrs. Cruikshank and Bennett,

Pursuant to 15 CFR § 930.54(f), Vineyard Wind, LLC filed a federal consistency certification with the Rhode Island Coastal Resources Management Council (CRMC) on April 6, 2018 for the proposed construction and operation of an 800 megawatt wind energy project consisting of up to 106 offshore wind turbine generators to be located in offshore waters south of Martha's Vineyard, MA within BOEM Lease Area OCS-A 0501. The proposed project is subject to CRMC review authority pursuant to the federal Coastal Zone Management Act (CZMA), 16 USC § 1456, and the CZMA's implementing regulations at 15 CFR Part 930 Subpart D – Consistency for Activities Requiring a Federal License or Permit and Subpart E - Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities.

The CRMC and Vineyard Wind, LLC on November 29, 2018 mutually agreed to stay the CRMC six-month federal consistency review period in accordance 15 CFR § 930.60(b), and the CRMC decision date for the Vineyard Wind, LLC matter was extended until January 28, 2019 to allow Vineyard Wind time to prepare a mitigation package and negotiate with the CRMC's Fishermen's Advisory Board (FAB) in order to meet the requirements of the CRMC's enforceable policies.

Vineyard Wind has not yet engaged the FAB in mitigation negotiations as of the date of this letter, despite having met with the FAB on January 3 and 15, 2019. Therefore, the CRMC and Vineyard Wind have mutually agreed to further stay the CRMC six-month federal consistency review period to provide Vineyard Wind additional time to negotiate with the FAB. Pursuant to the attached stay agreement executed on January 15, 2019 the CRMC consistency determination decision date in this matter is now due no later than February 1, 2019. Vineyard Wind has indicated that they are willing to enter into a further stay agreement provided negotiations proceed in sincerity and if a mitigation agreement with the FAB appears to be attainable.

The purpose of this letter is to notify the Bureau of Ocean Energy Management (BOEM) of this agreement as required under 15 CFR § 930.60(b). The CRMC requests BOEM not to issue a license or permit to Vineyard Wind, LLC until the requirements of 15 CFR Part 930, Subparts D and E have been satisfied. The CRMC will notify BOEM when it issues a final decision in this matter.

Please contact me at 401-783-3370 or email gfugate@crmc.ri.gov should you have any questions.

Sincerely,

Grover J. Fugate, Executive Director
Coastal Resources Management Council

/lat

cc Lars Pedersen, CEO, Vineyard Wind, LLC
David Kaiser. NOAA
Allison Castellan, NOAA
Jennifer Cervenka, CRMC Chair
CRMC Members
Anthony DeSisto, Esq., CRMC Legal Counsel

State of Rhode Island and Providence Plantations
Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 116
Wakefield, RI 02879-1900

(401) 783-3370
Fax (401) 783-3767

AMENDED AGREEMENT TO STAY SIX MONTH REVIEW PERIOD

Between

Rhode Island Coastal Resources Management Council

And

Vineyard Wind, LLC

The Rhode Island Coastal Resources Management Council, hereinafter referred to as the "CRMC," and Vineyard Wind, LLC, hereinafter referred to as "Vineyard Wind," hereby agree as follows.

Pursuant to 15 CFR § 930.54(f), Vineyard Wind filed a federal consistency certification with the CRMC on April 6, 2018 for the proposed construction and operation of an 800 megawatt wind energy project consisting of up to 106 offshore wind turbine generators to be located in offshore waters south of Martha's Vineyard, MA within BOEM Lease Area OCS-A 0501. The proposed project is subject to CRMC review authority pursuant to the federal Coastal Zone Management Act (CZMA), 16 USC § 1456(c)(3)(A) and the CZMA's implementing regulations at 15 CFR Part 930 Subpart D – Consistency for Activities Requiring a Federal License or Permit and Subpart E - Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities.

Pursuant to 15 CFR § 930.60(b) the CRMC and Vineyard Wind entered into an agreement on November 29, 2018 to stay the CRMC six-month review period with a CRMC decision due on January 28, 2019. The CRMC and Vineyard Wind now mutually agree to the following dates to further stay the CRMC six-month review period as specified herein.

- Date the CRMC 6-month review period commenced: April 6, 2018
- Date the 6-month review period was to end: January 28, 2019
- Date during the 6-month review period that the stay begins: January 15, 2019
- Date that the stay ends: January 29, 2019
- Date the 6-month review period ends and the CRMC decision is due: February 1, 2019

The CRMC will issue its consistency determination on or before **February 1, 2019** unless Vineyard Wind and CRMC mutually agree in writing to another later date.

These agreements made and entered by:

Grover J. Fugate
Executive Director, CRMC

Date 1/15/19

Lars T. Pedersen
Chief Executive Officer, Vineyard Wind, LLC

1/14/2019
Date

cc: BOEM
NOAA OCM
CRMC Council members

State of Rhode Island and Providence Plantations
Coastal Resources Management Council
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January 25, 2019

Walter Cruickshank, Ph.D., Acting Director
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

James Bennett, Renewable Energy Program Manager
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

Re: Vineyard Wind, LLC; Docket No. BOEM–2018–0015
CRMC File 2018-04-055

Dear Messrs. Cruikshank and Bennett,

Pursuant to 15 CFR § 930.54(f), Vineyard Wind, LLC filed a federal consistency certification with the Rhode Island Coastal Resources Management Council (CRMC) on April 6, 2018 for the proposed construction and operation of an 800 megawatt wind energy project consisting of up to 106 offshore wind turbine generators to be located in offshore waters south of Martha's Vineyard, MA within BOEM Lease Area OCS-A 0501. The proposed project is subject to CRMC review authority pursuant to the federal Coastal Zone Management Act (CZMA), 16 USC § 1456, and the CZMA's implementing regulations at 15 CFR Part 930 Subpart D – Consistency for Activities Requiring a Federal License or Permit and Subpart E - Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities.

The CRMC and Vineyard Wind, LLC on January 24, 2019 mutually agreed to stay the CRMC six-month federal consistency review period in accordance 15 CFR § 930.60(b), and the CRMC decision date for the Vineyard Wind, LLC matter is now extended until February 19, 2019 to allow Vineyard Wind time to negotiate a mitigation package with the CRMC's Fishermen's Advisory Board (FAB) in order to meet the requirements of the CRMC's enforceable policies.

Based on the attached letter, dated January 24, 2019 from Vineyard Wind CEO Lars Pedersen, the CRMC and Vineyard Wind have mutually agreed to further stay the CRMC six-month federal consistency review period to provide Vineyard Wind additional time to negotiate with the FAB. Pursuant to the attached stay agreement executed today, January 25, 2019, the CRMC consistency determination decision date in this matter is now due no later than February 19, 2019. Vineyard Wind has indicated that they are willing to enter into a further stay agreement provided negotiations proceed in sincerity and if a mitigation agreement with the FAB appears to be attainable.

The purpose of this letter is to notify the Bureau of Ocean Energy Management (BOEM) of this agreement as required under 15 CFR § 930.60(b). The CRMC requests BOEM not to issue a license or permit to Vineyard Wind, LLC until the requirements of 15 CFR Part 930, Subparts D and E have been satisfied. The CRMC will notify BOEM when it issues a final decision in this matter.

Please contact me at 401-783-3370 or email gfugate@crmc.ri.gov should you have any questions.

Sincerely,

Grover J. Fugate, Executive Director
Coastal Resources Management Council

/lat

cc Lars Pedersen, CEO, Vineyard Wind, LLC
David Kaiser, NOAA
Allison Castellan, NOAA
Jennifer Cervenka, CRMC Chair
CRMC Members
Anthony DeSisto, Esq., CRMC Legal Counsel

State of Rhode Island and Providence Plantations
Coastal Resources Management Council
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AMENDED AGREEMENT TO STAY SIX MONTH REVIEW PERIOD

Between

Rhode Island Coastal Resources Management Council

And

Vineyard Wind, LLC

The Rhode Island Coastal Resources Management Council, hereinafter referred to as the "CRMC," and Vineyard Wind, LLC, hereinafter referred to as "Vineyard Wind," hereby agree as follows.

Pursuant to 15 CFR § 930.54(f), Vineyard Wind filed a federal consistency certification with the CRMC on April 6, 2018 for the proposed construction and operation of an 800 megawatt wind energy project consisting of up to 106 offshore wind turbine generators to be located in offshore waters south of Martha's Vineyard, MA within BOEM Lease Area OCS-A 0501. The proposed project is subject to CRMC review authority pursuant to the federal Coastal Zone Management Act (CZMA), 16 USC § 1456(c)(3)(A) and the CZMA's implementing regulations at 15 CFR Part 930 Subpart D – Consistency for Activities Requiring a Federal License or Permit and Subpart E - Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities.

Pursuant to 15 CFR § 930.60(b) the CRMC and Vineyard Wind entered into an agreement on January 15, 2019 to stay the CRMC six-month review period with a CRMC decision due on February 1, 2019. The CRMC and Vineyard Wind now mutually agree to the following dates to further stay the CRMC six-month review period as specified herein.

- Date the CRMC 6-month review period commenced: April 6, 2018
- Date the 6-month review period was to end: February 1, 2019
- Date during the 6-month review period that the stay begins: January 25, 2019
- Date that the stay ends: February 13, 2019
- Date the 6-month review period ends and the CRMC decision is due: February 19, 2019

The CRMC will issue its consistency determination on or before **February 19, 2019** unless Vineyard Wind and CRMC mutually agree in writing to another later date.

These agreements made and entered by:

Jennifer R. Cervenka
Chair, CRMC

1/25/19
Date

Lars T. Pedersen
Chief Executive Officer, Vineyard Wind, LLC

1/24/2019
Date

cc: BOEM
NOAA OCM
CRMC Council members

OCS-A 0501 MASS USA

VINEYARD WIND

VIA Electronic Mail

January 24, 2019

Jeffrey Willis
Deputy Director
Rhode Island Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, RI 02879-1900

Re: Vineyard Wind – CRMC File No. 2018-04-055

Dear Mr. Willis:

As you are aware, pursuant to the Ocean SAMP Vineyard Wind has submitted a mitigation proposal to CRMC and the FAB and has established an escrow account to cover the reasonable costs associated with negotiations concerning the proposal. I met today with FAB Chair Lanny Dellinger to discuss the process to engage with the FAB going forward. We mutually agreed to the following:

1. the FAB, Vineyard Wind, and CRMC staff are committed to engaging in meaningful negotiations regarding the mitigation proposal;
2. meaningful negotiations cannot be completed before the FAB meeting on January 28, 2019 and the Council meeting on January 29, 2019 and therefore these meetings should be cancelled;
3. negotiations can be completed within two weeks and therefore the Council should reschedule its consistency decision for the Vineyard Wind project to February 12, 2019; and
4. a schedule for negotiations will be established beginning the week of January 28, 2019 and concluding no later than Feb. 11, 2019.

For these reasons, Vineyard Wind requests that the Council's consistency review period that is currently scheduled to end on February 1, 2019, be extended to February 19, 2019. If this meets with your approval, as you have done with the previous stays, please forward to me an Amended Agreement to Stay the Six Month Review Period to memorialize the extended stay.

700 Pleasant Street, Suite 510, New Bedford, MA 02740
TEL 508.717.8964 EMAIL info@vineyardwind.com
VINEYARDWIND.COM

Thank you for your consideration of this request. Please feel free to contact me if you need any additional information.

Sincerely,

Lars Pedersen
Chief Executive Officer

Cc: L Dellinger

State of Rhode Island and Providence Plantations
Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
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February 12, 2019

Walter Cruickshank, Ph.D., Acting Director
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

James Bennett, Renewable Energy Program Manager
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

Re: Vineyard Wind, LLC; Docket No. BOEM–2018–0015
CRMC File 2018-04-055

Dear Messrs. Cruikshank and Bennett,

Pursuant to 15 CFR § 930.54(f), Vineyard Wind, LLC filed a federal consistency certification with the Rhode Island Coastal Resources Management Council (CRMC) on April 6, 2018 for the proposed construction and operation of an 800 megawatt wind energy project consisting of up to 106 offshore wind turbine generators to be located in offshore waters south of Martha's Vineyard, MA within BOEM Lease Area OCS-A 0501. The proposed project is subject to CRMC review authority pursuant to the federal Coastal Zone Management Act (CZMA), 16 USC § 1456, and the CZMA's implementing regulations at 15 CFR Part 930 Subpart D – Consistency for Activities Requiring a Federal License or Permit and Subpart E - Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities.

Based on the "Agreement" executed on February 8, 2019, and attached to the stay agreement herein, the CRMC and Vineyard Wind, LLC on February 11, 2019 mutually agreed to stay the CRMC six-month federal consistency review period in accordance 15 CFR § 930.60(b), to further mitigation discussions between Vineyard Wind, the CRMC and the CRMC's Fishermen's Advisory Board (FAB) in order to meet the requirements of the CRMC's enforceable policies.

Pursuant to the attached stay agreement executed yesterday, February 11, 2019, the CRMC consistency determination decision date in this matter is now due no later than March 1, 2019. The purpose of this letter is to notify the Bureau of Ocean Energy Management (BOEM) of this agreement as required under 15 CFR § 930.60(b). The CRMC requests BOEM not to issue a license or permit to Vineyard Wind, LLC until the requirements of 15 CFR Part 930, Subparts D and E have been satisfied. The CRMC will notify BOEM when it issues a final decision in this matter.

Please contact me at 401-783-3370 or email gfugate@crmc.ri.gov should you have any questions.

Sincerely,

Grover J. Fugate, Executive Director
Coastal Resources Management Council

/lat

cc Lars Pedersen, CEO, Vineyard Wind, LLC
David Kaiser. NOAA
Allison Castellan, NOAA
Jennifer Cervenka, CRMC Chair
CRMC Members
Anthony DeSisto, Esq., CRMC Legal Counsel

State of Rhode Island and Providence Plantations
Coastal Resources Management Council (401) 783-3370
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Wakefield, RI 02879-1900

AMENDED AGREEMENT TO STAY SIX MONTH REVIEW PERIOD

Between

Rhode Island Coastal Resources Management Council

And

Vineyard Wind, LLC

The Rhode Island Coastal Resources Management Council, hereinafter referred to as the "CRMC," and Vineyard Wind, LLC, hereinafter referred to as "Vineyard Wind," hereby agree as follows.

Pursuant to 15 CFR § 930.54(f), Vineyard Wind filed a federal consistency certification with the CRMC on April 6, 2018 for the proposed construction and operation of an 800 megawatt wind energy project consisting of up to 106 offshore wind turbine generators to be located in offshore waters south of Martha's Vineyard, MA within BOEM Lease Area OCS-A 0501. The proposed project is subject to CRMC review authority pursuant to the federal Coastal Zone Management Act (CZMA), 16 USC § 1456(c)(3)(A) and the CZMA's implementing regulations at 15 CFR Part 930 Subpart D – Consistency for Activities Requiring a Federal License or Permit and Subpart E - Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities.

Pursuant to 15 CFR § 930.60(b) the CRMC and Vineyard Wind entered into a fourth (4^{th}) agreement on January 25, 2019 to stay the CRMC six-month review period with a CRMC decision due on February 19, 2019. To accommodate the time necessary for mitigation discussions, pursuant to the "Agreement" attached hereto and incorporated herein, and executed on February 8, 2019, the CRMC and Vineyard Wind now mutually agree to the following dates to further stay the CRMC six-month review period as specified herein.

- Date the CRMC 6-month review period commenced: April 6, 2018
- Date the 6-month review period was to end: February 19, 2019
- Date during the 6-month review period that the stay begins: February 11, 2019
- Date that the stay ends: February 21, 2019

- Date the 6-month review period ends and
  the CRMC decision is due: March 1, 2019

The CRMC will issue its consistency determination on or before **March 1, 2019** unless Vineyard Wind and CRMC mutually agree in writing to another later date.

These agreements made and entered by:

Grover J. Fugate
Executive Director, CRMC

2/11/19
Date

Lars T. Pedersen
Chief Executive Officer, Vineyard Wind, LLC

2-11-2019
Date

cc: BOEM
NOAA OCM
CRMC Council members

AGREEMENT

This Agreement between Vineyard Wind, LLC ("Vineyard"), the Coastal Resources Management Council staff ("CRMC"), and the Fisheries Advisory Board ("FAB") (collectively the "Parties") is made this 8th day of February 2019.

WHEREAS, the Parties have engaged in productive discussions regarding Vineyard's proposed compensatory mitigation;

WHEREAS, Vineyard is willing to agree to extend CRMC's review period for evaluating its consistency certification to allow the Council to vote on February 26, 2019 and for the CRMC staff to notify the federal agencies of the Council's vote by March 1, 2019; and

WHEREAS, the Parties want to continue and conclude discussions regarding Vineyard's mitigation proposal within a time frame that allows the Council to vote on Vineyard's federal consistency certification on February 26, 2019;

NOW THEREFORE, the Parties agree as follows:

1. The Parties will meet on Monday February 11, 2019 and thereafter through February 14, as necessary to discuss Vineyard's mitigation agreement.
2. Following conclusions of discussions on February 14, 2019, the FAB will discuss the outcome of the Parties discussions with its constituents.
3. The FAB will inform Vineyard and CRMC of its recommendation regarding Vineyard's mitigation proposal on or before February 25, 2019.
4. The Parties agree that this schedule has provided adequate time for the FAB to consider and make a recommendation on Vineyard's mitigation proposal.
5. The FAB and Vineyard agree that they will not raise any argument to the Council that the time allowed for discussions was adequate or inadequate.

Vineyard Wind

Fisheries Advisory Board
Tricia K. Jedele, Esq. 2/8/19
on behalf of the FAB

CRMC Staff

Appendix 8. CRMC letter to BOEM re: East-West wind turbine layout (8/9/18)

State of Rhode Island and Providence Plantations
Coastal Resources Management Council
Oliver H. Stedman Government Center
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August 9, 2018

Michelle Morin
Chief, Environmental Branch for Renewable Energy
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

Brian Krevor
Environmental Protection Specialist
Office of Renewable Energy Programs
Bureau of Ocean Energy Management
45600 Woodland Road
Sterling, Virginia 20166

Re: CRMC preferred Alternative for Vineyard Wind EIS

Dear Ms. Morin and Mr. Krevor,

The CRMC offers the following preferred alternative as a follow up to the cooperating interagency conference call of August 2, 2018 to discuss the BOEM draft list of potential alternatives for the proposed Vineyard Wind 800MW windfarm project. We are providing these comments within 10 days of the conference call in accordance with the Memorandum of Understanding Implementing One Federal Decision under Executive Order 13807.

As you know, the Rhode Island-based commercial fishing industry has been advocating for an East-West orientation of Vineyard Wind's wind turbine grid layout to accommodate existing, well-established commercial fishing mobile and fixed gear operations within the wind development area (WDA) and other wind energy area leases. The currently proposed orientation of the Vineyard Wind grid layout is in a Northwest-Southeast direction, which was designed absent any consultation with the Rhode Island commercial fishing industry that conducts fishing activities within the WDA. In fact, the present orientation was based solely on accommodating transit by the New Bedford-based scallop fleet through the WDA. Importantly, Bay State Wind announced last week (August 1) that the grid layout for their proposed wind farm will be oriented in an East-West direction. It was carefully redesigned specifically to accommodate the concerns expressed by the Rhode Island commercial fishing industry. The CRMC has also received confirmation from Deepwater Wind that the grid layout for their South Fork and Revolution Wind projects will also be oriented East-West for regional windfarm continuity and to address issues that have been raised concerning navigation safety and commercial fishing interests.

Therefore, it is preferable that the Vineyard Wind turbine grid layout also be oriented in an East-West direction. It is only logical that turbine grid layouts within the regional wind energy area should all be oriented East-West for a predictable pattern that facilitates navigational safety and existing commercial fishing operations. The CRMC preferred alternative as discussed during the cooperating interagency conference call is Alternative T (not yet included within the BOEM draft) which would provide the following elements:

1. East to West orientation of all wind turbines and electric service platforms;
2. 1 nautical mile spacing between all wind turbines and electric service platforms; and
3. 2 nautical mile wide navigational transit corridor (location to be determined by the U.S.C.G.)

The CRMC believes it is critically important that the Vineyard Wind grid layout be designed in accordance with CRMC's alternative described above to minimize navigational safety issues and accommodate existing and well-established Rhode Island-based commercial fishing operations within the WDA and other wind energy area leases. Thank you for your consideration. Please contact me at 401-783-3370 or email gfugate@crmc.ri.gov should you have any questions.

Sincerely,

Grover J. Fugate, Executive Director
Coastal Resources Management Council

/lat

cc Jennifer Cervenka, CRMC Chair
CRMC Members
Anthony DeSisto, Esq., CRMC Legal Counsel
Jeffrey Willis, CRMC Deputy Director
James Boyd, Coastal Policy Analyst

From:	Grover Fugate
To:	"Krevor, Brian"
Cc:	"Dan Goulet"; "Dave Reis"; "David Beutel"; "De Sisto, Tony"; "Jeff Willis"; "Jen Cervenka"; "Jim Boyd"; "Laura Dwyer"; "R. Daniel Prentiss"
Date:	Thursday, September 27, 2018 2:38:05 PM

Brian,

I am not sure if our staff made it clear but we believe there should be an alternative that is a combination of Alternatives D1 (2 nm navigation corridor), D2 (1 nm turbine foundation spacing) and D3 (East-West turbine layout). This is the only alternative that is sufficient to mitigate impacts to RI-based commercial fisheries operations (RI coastal uses within the MA WEA).

Grover Fugate
Executive Director
Coastal Resources Management Council
Oliver Stedman Government Center
4808 Tower Hill Road
Wakefield, Rhode Island 02879
(401)783-3370

Appendix 9. CFCRI E-W Affidavit (10/3/18)

Commercial Fisheries Center of Rhode Island

P.O. Box 5161, Wakefield, RI 02880
Tel: (401) 874-4568 Web: www.cfcri.org
Email: fredmattera@cfcri.org shayerooney@cfcri.org

October 3, 2018

Bureau of Ocean Energy Management

Chief of Office of Renewable Energy

Dear James Bennett,

As a leadership and motivated professional for the Commercial Fisheries Center of RI (CFCRI) representing the RI Fishing Community I am delighted to provide an Affidavit Rationale for Commercial Fishing Industries required East & West Turbine Layout for Wind Energy Areas for RI and Mass. including BOEM OCS Lease Sites A-0486, A-0487, A-500, A-501. I am a retired Commercial Fisherman of 40 years, USCG Certified Marine Safety Instructor, past member for 9 years of the Commercial Fishing Safety Advisory Committee (CFSAC, Homeland Security appointed), Director with Global and Domestic Marine Insurer's and President of Fisheries Associations and Foundations nurturing a wealth of Maritime knowledge and Associates.

The CFCRI can guarantee results through the application of our communication and reputation of working with the RI Fishing Community. We posses expertise in identifying innovative and effective strategies and an aptitude for optimizing productivity and motivating colleagues. This Affidavit was produced through keen decision-making and collaboration with all Fishing Community partners. CFCRI welcomes the opportunity to discuss further the East & West Turbine Layout proposal.

Cordially,

Frederick J Mattera, Executive Director

Commercial Fisheries Center of RI

Proudly Representing:

Ocean State Fishermen's Association, RI Commercial Fisherman's Association, RI Lobstermen 's Association, RI Shellfishermen 's Association, Eastern New England Scallop Association, RI Monkfishermen 's Association, Point Judith Fishermen Memorial Foundation, Commercial Fisheries Research Foundation, RI Party & Charter Boat Association, Pt. Judith Scholarship Foundation

Cc: Walter Cruickshank - Director/BOEM
James Bennett - Chief/BOEM
Brian Hooker - BOEM
Brian Krevor - BOEM
Ed LaBlanc - USCG
Gov. Gina Raimondo - RI Governor
Rosemary Powers - Governor's Deputy Chief of Staff
Carol Grant - RIOER
Grover Fugate - RICRMC
David Beutel - RICRMC
Janet Coit - RIDEM
Julia Livermore - RIDEM
Jason MaNamee - RIDEM
Bruce Carlisle - MACZM
Bill White - MACEC
David Pierce - MADMF
Kathryn Ford - MADMF
Eric Stephens - Vineyard Wind
Deep Water Wind - Aileen Kinney
Bay State Wind - Laura Morse
Jack Reed - RI Sen.
Sheldon Whitehouse - RI Sen.
Jim Langevin - RI Congress
David Cicilline - RI Congress

Commercial Fisheries Center of Rhode Island

P.O. Box 5161, Wakefield, RI 02880
Tel: (401) 874-4568 Web: www.cfcri.org
Email: fredmattera@cfcri.org shayerooney@cfcri.org

AFFIDAVIT RATIONALE FOR COMMERCIAL FISHING INDUSTRIES REQUIRED EAST & WEST TURBINE LAYOUT FOR WIND ENERGY AREAS FOR RHODE ISLAND AND MASSACHUSETTS INCLUDING BUREAU OF OCEAN ENERGY MANAGEMENT OCS LEASE SITES A-0486, A-0487, A-0500, A-0501

September 23, 2018

I, Frederick Mattera am the Executive director of the Commercial Fisheries Center of Rhode Island. The CFCRI represents the RI commercial fishing industry through its membership of mobile and fixed gear associations. The leaders of the membership associations have worked with me to develop this document. Their affiliations and signatures are included with this document. We swear and affirm:

1. We represent each of the fixed and mobile gear fishing associations within the CFCRI.
2. Since 1996 to present, the mobile gear tow patterns have been East to West on these fishing grounds. Induced by a Gentlemen's Agreement between fixed gear (lobster, gillnet) and mobile gear (scallopers, trawlers, clammers) fishermen to avoid gear conflicts. This was initiated around 1996, after a mobile gear fisherman hauling his net aboard, with an offshore lobster vessel standing by and witnessing and photographing the mobile gear fisherman with lobster pots in his net. A Lawsuit (*CEH Inc. vs F/V Seafarer ON 675048, CN 95-1462)* followed with compelling evidence finding the mobile gear fisherman guilty and imposing a substantial cost of $100,000.00. This set a precedent, encouraging the dialogue that lead to the Gentlemen's Agreement that still exist today. Gentlemen's Agreement: Using Loran "C" as a benchmark, fixed gear fishermen would set their gear on the "0's" and "5's" line (i.e. 43900, 43905, 43910, 43915, etc.) and mobile gear fishermen would tow their gear between the "0's" and "5's" (i.e. between the 43901 -43904 line) which are in an E & W direction. As Loran "C" is totally phased out the fishing industry will convert to latitudes which tracks in an E & W pattern.

3. There are numerous Hangs (wrecks, rocks, planes, debris that will damage or lose gear) on the Ocean seabed. We use existing and or past Tracks on our Plotters, that follow an E & W direction to avoid known Hangs. It is important to recognize that when a new Captain or Mate is making a tow on these grounds, that they can use the existing E & W tracks to navigate around the marked Hangs to avoid gear damage.
4. Certain species that mobile gear fishermen target; winter flounder, (*Pseudopleuronectes americanus)* & yellowtail flounder *(Limanda ferruginea*) on these OSW sites are fished on a seam. The seam may be a depth, contour or a bearing line, catching 1000 lbs./hour or more. Move an eighth of a mile N or S and the catch is reduced to 100 lbs./hour. These contours, depths and lines follow an E & W pattern, with the flounders congregating due to feed and generally bottom temperature which is aligned to their metabolism.
5. The traditional Squid fishery of Longfin squid (*Loligo pealeii)* south of Martha's Vineyard and Nantucket may generate as many as 30 – 40 or more fishing vessels on the fishing grounds. By late August through to the end of October, the Squid will begin to migrate to the Southwest, directly onto the Vineyard Wind lease site BOEM OCS A-0501 within the turbine array as currently proposed. Mobile gear fishermen will continue to work in the wind energy areas towing mobile gear even with one nautical mile (NM) spacing, will be extremely difficult and dangerous, especially if fishermen must operate around randomly spaced Turbines. One NM spacing and an E & W layout will allow fishing vessels to pass or tow side by side to avoid hangs, turbines, scour protection, cable protection, and fixed gear in a safe manner. This will allow fishing vessels to haul part of their gear up and turn, allow vessels to stop and haul back their gear, vessels to turn to pass over fish marks on their fish sounder and fishing vessels to maneuver by each other towing in opposing directions. When fish congregate in *open grounds* and 12 – 20 vessels are towing in opposing directions in a 2 – 3-mile-wide span the task is daunting, now add 2 – 3 rows of Turbines placed randomly amid these vessels towing, without 1NM spacing and E & W Turbine layout mobile gear fishing will be perilous. Fishing in tight quarters will cause fishermen to snag each other's gear, almost unavoidable in windy conditions, untangling a vessels gear is treacherous; a 1500 – 2000lb door can slam across the back deck in a split second due to the opposing strain, 5/8" to 1" wire cable becomes bow tight and parts from the strain possibly causing major injury, maiming and a fatality

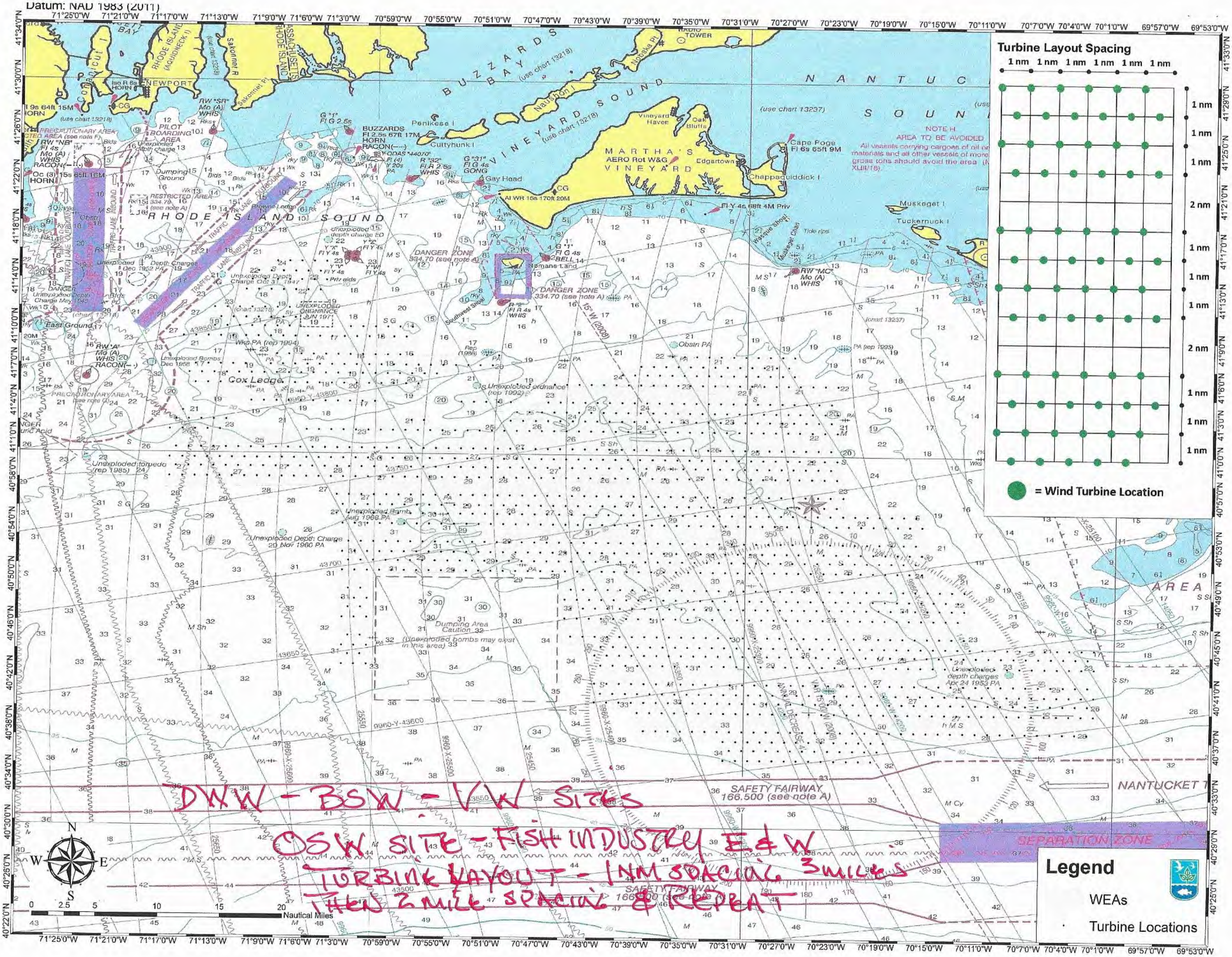
to a crewman. Also creating gear and vessel damage and loss fishing time, triggers further economic hardship. This must be prevented at all cost, by initiating 1NM spacing and an E & W turbine layout pattern.

6. Without the proposed logical 1 NM spacing and E & W turbine layout pattern mobile and fixed gear fishermen will experience excessive vessel and gear damage as well as major injuries and fatalities that may provoke Insurance Underwriters to initiate an exclusion in their policies from fishing in Wind Turbine Areas.
7. As expressed, the absolute need for a 1NM N & S spacing for the mobile gear fishermen on the Latitude bearing will provide an E & W Turbine layout pattern. It is also critical that there is a 1NM E & W spacing to provide fixed gear (lobster, crab, gillnets) with the necessary spacing for safe operations for lobster and crab pot fishermen. Lobster and crab pot fishermen, that fish these grounds encounter a 4-5-hour steam to the grounds, allowing less time to haul their traps. So, to expedite their hauling time, they are now setting 1-1.25NM trawls which will force them to fish in and around the turbines, exposing them to snagging on the scour protection, cable protection, and or turbine itself, as well as exposing the trawl to mobile gear interaction. Gillnetters are setting a string of 25 nets (each 300') equal to 1.25NM for the same reasons. Without this consideration, fixed gear fishermen will be exposed to the dangers of hauling fixed gear around the turbine from wind, tide, other gear and mobile gear, a potential disaster.

The proprietary 24 thousand and more tracks exhibited by 21 mobile gear fishing vessels from Block Island to Nantucket on their Chart Plotters demonstrate the mobile gear tow patterns. These 21 vessels represent less than 20% of the vessels that traditionally fish these grounds. Please keep in mind that Fishermen erase 80% - 90% of their tracks on their Chart Plotters or you wouldn't be able to view the chart and the Hangs. This reveals substantial amount of towing on these specific fishing grounds. Tow track screen photos attached.

Tracks Options Adjustments Window Backup Help
57.74Nm
HORN
Present
40°58.682'N
70°49.952'W
Halt/NONE
No Track Name
2.0°t
Speed
0.0Kts
MARTHA'S VINEYARD
AERO PA
Rot W & G
NANTUCKET
Fl 5s 71ft 12M
SANKATY HEAD
NANTUCKET
Sankaty Hd
Rot W & G LORAN
AERO
Old Man Shoal
(use chart 13237)
WINDFARM
BLOCK I
AERO
Rot W&G
Unexploded Ordnance Rep 1988
1°17.907'N
1°40.488'W
2.7Nm
96.7°
Delete Tk
Go To
Dpth
PP
00:02:80
UnErased (109pnts/Date:02-20-2012 ptl136)
SAFETY FAIRWAY
166.500 (see note A)
Unexploded Depth Charges
NANTUCKET TO AM
SEPARATION ZONE

Datum: NAD 1983 (2011)



WE EACH AFFIRM THAT THE ABOVE STATEMENTS ARE TRUE AND CORRECT TO THE BEST OF OUR INFORMATION, KNOWLEDGE AND BELIEF.

Commercial Fisheries Center of RI;
RI Commercial Fishermen's Association — Christopher Brown, President

RI Lobstermen's Association — Greg Mataronas, President

Eastern NE Scallop Association — Michael Marchetti, President

Ocean State Fishermen's Association — Todd Sutton, President

RI Party & Charter Boat Association — Rick Bellavance, President

Town Dock Commercial Fishing Fleet — Donald Fox, Fleet Manager

Newport Fishermen's Association — David Spencer, President

I SWEAR THAT THE ABOVE FOREGOING REPRESENTATIONS ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF. I HAVE WITNESSED EACH SIGNATURE OF ASSOCIATION LEADERS.

Date 10/4/18 CFCRI Frederick J. Mattera

I, the undersigned Notary Public, do hereby affirm that Frederick J. Mattera personally appeared before me on (10/4/2018), and signed the above affidavit as his free and voluntary act and deed.

Date 10-4-2018

Lisa A. Turner

OFFICIAL SEAL
LISA A. TURNER
NOTARY PUBLIC - RHODE ISLAND
My Commission Expires 03-11-2019

Appendix 10. RIMFC Recommendation for E-W turbine layout with 1 nm spacing (10/12/18)

Rhode Island Marine Fisheries Council

3 Fort Wetherill Road Jamestown, Rhode Island 02835
(401) 423-1920 Fax: (401) 423-1925

October 12, 2018

Grover Fugate, Executive Director
RI Coastal Resources Management Council
Stedman Government Center
Wakefield, RI 02879

Janet Coit, Director
RI Department of Environmental Management
235 Promenade Street
Providence, RI 02908

Dear Executive Director Fugate and Director Coit:

At the August 30, 2018 meeting of the Rhode Island Marine Fisheries Council, the Council received presentations on the nature and status of the offshore wind energy projects proposed for federal waters off southern New England by two developers, Deepwater Wind and Vineyard Wind. Following the presentations, members of the Council, as well as members of the public, posed questions and offered perspectives. Attached is a summary of that meeting.

At the next meeting of the Council, held on October 1, 2018, the Council discussed key issues raised at the August 30 meeting, with particular focus on potential impacts to marine fisheries. On the heels of that discussion, the Council unanimously adopted a recommendation which, in accordance with the Council's statutory authority, is offered in the form of advice to the CRMC and DEM. The Council requests that this advice be used for the purpose of developing comments on various aspects of offshore wind energy project proposals, undertaking federal consistency determinations, and exercising any other roles and responsibilities applicable to such projects and their impacts on Rhode Island's marine fisheries interests.

The recommendation adopted by the Council is as follows:

Recommend to the Director of DEM and CRMC that all wind power leases off southern New England be required to have turbines set in an east-west pattern with 1 nm of spacing to minimize the negative impacts on historical fishing activities, and further require that all structures are removed after the lease termination to restore fishing access to the entire area.

Thank you for your willingness to consider and to the extent possible act on this advice from the Council.

Sincerely,

Robert Ballou
Chair

cc: Members, RI Marine Fisheries Council

Rhode Island Marine Fisheries Council

3 Fort Wetherill Road Jamestown, Rhode Island 02835
(401) 423-1920 Fax: (401) 423-1925

MEETING SUMMARY
August 30, 2018

Chairperson: *B. Ballou (DEM)*
RIMFC members present: *D. Monti, J. Grant, A. Dangelo, T. Barao, C. Rein, J. Jarvis*
Division: *J. McNamee, S. Olszewski, J. Livermore, J. Lake, P. Duhamel*
Public: Approximately 7-8 persons in attendance

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Public: Approximately 7-8 persons in attendance

1. **Approval of the Agenda:** The Chair, B. Ballou, noted that the meeting is meant to be informational only, with no formal recommendations votes or recommendations being sought at this time. He then inquired as to any modifications to the agenda or objections to adopting the agenda as modified; hearing none, the agenda was approved by consent.

2. **Presentation from Deepwater Wind regarding federal offshore wind development:** Eileen Kenny, Senior VP of Development, and John O'Keefe, Manager of Operations and Maintenance and Marine Affairs, were present from Deepwater Wind, with Mr. O'Keefe providing a powerpoint presentation. Following the presentation, the floor was opened to questions and comments from the Council and the public.

    - B. Ballou inquired as to the number of turbines proposed for the Southfork project; Mr. O'Keefe replied that although the exact number has yet to be finalized, it is anticipated that the South Fork project will include 15 turbines, and the Revolution project will include about 50 turbines.
    - A. Dangelo stated that he has been involved in the rod and reel research survey for the Southfork project, and that the area is very good for cod fishing. He expressed concern that his involvement was during the winter, when the fish weren't there. He asked if the survey would be continued throughout the year, given that the fishing is known to be better in the fall and spring. Mr. O'Keefe stated that the survey he participated in is a cod spawning survey; it is a constant-level survey, and not meant

to be part of the more comprehensive surveys that will be conducted for the 2-year pre-construction phase. Mr. O'Keefe stated that Mr. D'Angelo's recommendation -- for year-round rod and reel surveys -- is the kind of input needed to help determine the collaborative research needed beginning in 2019.

- D. Monti stated that the RI Party and Charter Boat Assoc. and the RI Saltwater Anglers Assoc. also have concerns about the rod and reel surveys, in that more surveys should be conducted. He asked how these groups could participate in developing the research plan and the types of surveys needed. Mr. O'Keefe stated that he could set up meetings to determine what type of information is needed, and that the process of determining the details of the research plan is beginning now, so there is time to provide such input.
- J. Jarvis stated that he is aware of concern from fishermen due to the newness of offshore wind in this area, and that there hasn't been a lot of time for environmental impacts studies. He is concerned about what happens to invertebrates, squid and other forage species from the turbine vibrations, as many fishermen's livelihood rely on this area. Mr. O'Keefe stated that he is very sensitive to such matters. He offered that the Block Island windfarm has provided a great deal of information about impacts. He said it is difficult to use data from European windfarms due to variability of sites and age of technology used with older windfarms common in Europe. He stated that newer turbines will have more megawatts, use longer blades, and have greater distances between turbines, and that shorter distances between turbines is known to be a problem.
- J. Grant asked about the life expectancy of the turbines, and their fate operations were to cease in the future. Mr. O'Keefe stated that the foundations are expected to last 50 years, the turbines 20-25 years. He also stated that a bond would be in place to cover the costs of decommissioning.
- M. Rice asked about the lessons learned from the BI windfarm, namely, if there is any evidence of impacts. Mr. O'Keefe replied that there have been no negative impacts to date, based on 6 years of study.
- D. Monti asked about cumulative impacts from several windfarms together; and if studies would be developed to look at cumulative impacts as each new project begins operations. He emphasized that lessons should be learned along the way. Mr. O'Keefe stated that several studies are occurring, and that they are being conducted by many other entities besides DWW. Ms. Kenny offered that the RODEO program provided real time observations during construction, looking a variety of things including visual and acoustic impacts, scour testing, and sediment modelling. She stated that there is a great deal of information and data publicly available.
- D. Fox, Town Dock asked about the release date for the COP for the project. Mr. O'Keefe said that it is expected to be released for 30-day public comment in late September/early October 2018.
- J. McNamee referenced the regional science collaboration initiative that is aimed at coordinating scientific work on multiple projects throughout the region, and asked whether DWW plans to use the same monitoring designs as used for the BI project; or is DWW open to new ideas? He also asked whether state agencies would have an opportunity to review the scientific designs of any new studies that would be occurring in the wind energy areas, as was provided for the BI project. Mr. O'Keefe

responded that the designs of the scientific studies will build upon those utilized for the BI project, but will be tailored to meet new needs and priorities; the study designs will be vetted both publicly and through existing connections with state agencies as this approach proved successful during the Block Island project.

- A. MacKown, Northwest Atlantic Marine Alliance, asked whether the technology will affect the size of the transmission cables. Mr. O'Keefe responded that the size of the cable will not be affected by the turbine technology.
- B. Ballou sought confirmation that the proposed layout for the South Fork project is a N-S/E-W square grid, with 1-mile spacing. Mr. O'Keefe replied in the affirmative, and that the layout is based on input from fishermen based on ability to navigate and fish between turbines.
- J. Grant asked about fishing prohibitions in the lease area, to which Mr. O'Keefe replied that there are none, and that DWW has no authority to place restrictions.

3. **Presentation from Vineyard Wind regarding federal offshore wind development:** Christa Banks, Fisheries Liaison, was present from Vineyard Wind, joined by Erich Stephens. Ms. Banks provided a powerpoint presentation. Following the presentation, the floor was opened to questions and comments from the Council and the public.

    - B. Ballou asked staff from CRMC to brief the Council on the status of the federal consistency determinations for both projects. J. Boyd from CRMC offered the following with respect to Vineyard Wind: application filed in April 2018, triggering 180-day window for review and determination; additional 2 months granted; thus, deadline is now December 6, 2018; hearing scheduled for November 27. The application was not required, because the project proposal is outside the OSAMP Area; VW submitted voluntarily. With regard to DWW: the COP was just filed; because the project is within the OSAMP Area, a federal consistency determination is required; the application for that is expected to be filed this fall, triggering a 180-day review period, during which a public hearing will be held.
    - D. Monti expressed concern that the proposed spacing between the turbines is not even. Ms. Banks acknowledged the desirability of even spacing and a squared grid pattern, at least for some ocean users such as fishermen; but also noted that the area is subject to heavy vessel traffic, e.g., by scallopers, to/from port and their offshore fishing grounds, so accommodating their interest's conflicts with the interests of others.
    - D. Monti also asked about the status of the research plan. Ms. Banks responded that the plan is currently being formulated via SMAST-hosted workshops. The goal is to establish and adopt regionally consistent research protocols. She also noted that BOEM has a number of ongoing research projects, including some that are assessing EMF effects. D. Monti expressed concern that he saw no input from recreational fishermen in developing the research plan or a specific protocol regarding what studies are needed; and that an industry standard regarding types of studies needed is necessary for all windfarm development proposals. E. Stephens from VW noted that the workshops are aimed at starting the planning process and that input from recreational fishermen will be part of the process. he also noted that a video trawl survey is being currently underway.

- J. Grant expressed concern that the E-W pattern, which is essential to enable traditional fishing activities (namely, trawling) to continue in the area, is not yet firmly decided. E. Stephens offered assurance that the matter is being addressed, i.e., that Vineyard Wind is actively pursuing this configuration.
- M. Rice emphasized the importance of assessing cumulative effects through a robust protocol. In response, it was noted that regional studies will facilitate cumulative impact analyses.
- D. Fox expressed concern that the proposed layout will eliminate commercial fishing in the area; that a grid pattern is essential. He stated that federal regulations require full removal of all wind farm components upon decommissioning, but this commitment is not adequately set forth in the Vineyard Wind COP. In response, it was noted that sufficient funds will provided via bond to cover full removal costs, however, it won't be clear, until decommissioning, whether it would be more environmentally sound to leave some components (e.g., cables) in place; the goal is, and will be, to minimize environmental impacts upon decommissioning. Mr. Fox expressed concern that components left behind at decommissioning will make the area unusable for fishing.
- A. MacKown noted that while there is no industry standard regarding turbine spacing, now is the time to establish such a standard. A grid pattern is essential to safe navigation. She suggested use of AIS transiting data to inform the process. Response was that a grid pattern has been proposed, which is based on transiting data, but that the resulting configuration does not align with other fishing-related needs.
- D. Fox stated that fishing in an E-W direction has been a fishing industry for years, but that the wind farms don't seem to understand this.
- D. Monti offered that the BI wind farm development has been very favorable for recreational fishing interests. Moreover, further renewable energy development will assist in reducing impacts of climate change.

Next Steps: B. Ballou asked if the Council wished to further consider the issues raised during the presentations, and potentially formulate recommendations to the CRMC and/or DEM, at a subsequent meeting. The Council unanimously supported moving forward in that way.

Meeting adjournment: Upon conclusion of deliberating all agenda items, *B. Ballou* inquired as to any objection to adjourning the meeting; hearing none, the meeting was adjourned by consent at approximately 8:15pm.

Appendix 11. MA EOEEA Supplemental Draft Environmental Impact report (10/12/18)

The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Charles D. Baker
GOVERNOR

Karyn E. Polito
LIEUTENANT GOVERNOR

Matthew A. Beaton
SECRETARY

Tel: (617) 626-1000
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http://www.mass.gov/eea

October 12, 2018

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT REPORT

PROJECT NAME	: Vineyard Wind Connector
PROJECT MUNICIPALITY	: Barnstable, Yarmouth, State/Federal Waters
PROJECT WATERSHED	: Cape & Islands
EEA NUMBER	: 15787
PROJECT PROPONENT	: Vineyard Wind
DATE NOTICED IN MONITOR	: September 5, 2018

Pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G. L. c. 30, ss. 61-62I) and Section 11.08 of the MEPA regulations (301 CMR 11.00), I have reviewed the Supplemental Draft Environmental Impact Report (SDEIR) and hereby determine that it **adequately and properly complies** with MEPA and its implementing regulations. The Proponent may file the Final Environmental Impact Report (FEIR) in accordance with the Scope provided in this Certificate.

The Vineyard Wind project is proposed in response to the clean energy mandate of Chapter 188 of the Acts of 2016 (An Act to Promote Energy Diversity) and associated Request for Proposals (RFP). The RFP was issued by energy distribution companies, in coordination with the Massachusetts Department of Energy Resources (DOER), to solicit long-term contracts to satisfy the policy directives encompassed within Section 83C of the Act and to assist the Commonwealth with meeting its Global Warming Solution Act (GWSA) goals. Subsequent to the filing of the Draft Environmental Impact Report (DEIR), Vineyard Wind was selected to advance to contract negotiations for 800 megawatts (MW) of wind energy. The Proponent filed executed Power Purchase Agreements (PPAs) with the Massachusetts Department of Public Utilities (DPU) on July 31, 2018.

Subsequent to the filing of the SDEIR, the Proponent indicated its decision to select the offshore cable route to Covell's Beach in Barnstable (previously identified Noticed Alternative) as its Preferred Route based on the execution of a Host Community Agreement (HCA) with the Town of Barnstable (October 3, 2018).[1] The offshore cable route to New Hampshire Avenue in Yarmouth (previously identified as the Preferred Route) is now identified as the Noticed Alternative route.

Project Description

The purpose of the Vineyard Wind project is to generate and distribute Offshore Wind Energy Generation[2] to Massachusetts in accordance with An Act to Promote Energy Diversity (the Act). The Act was promulgated as part of a strategy to meet the Commonwealth's Greenhouse Gas (GHG) reduction and energy goals. The project proposes to construct an offshore wind project located in the federally designated Wind Energy Area (WEA) which is under the jurisdiction of the Bureau of Ocean Energy Management (BOEM). The WEA is located in federal waters to the south of Martha's Vineyard. Vineyard Wind will deliver 800 MW of energy to the New England energy grid via submarine export cables that will make landfall in Massachusetts. The SDEIR indicates that the Vineyard Wind project would offset carbon dioxide (CO_2) emissions by approximately 1,680,000 tons per year (tpy).

For the purpose of MEPA review, the portion of Vineyard Wind subject to state jurisdiction is referred to as the Vineyard Wind Connector and the "Project". Major elements of Vineyard Wind include a wind turbine array including wind turbine generators (WTGs), offshore electrical service platforms (ESPs), offshore submarine transmission cables, onshore underground transmission cables, and an onshore substation. The SDEIR indicates that two offshore export cables will be installed in a 2,660-foot wide installation corridor to distribute the energy to the New England bulk power grid (a reduction from the three export cables proposed in the DEIR). The Project includes offshore transmission cables in state waters, onshore cables and a substation. The SDEIR describes the elimination of one of the two offshore cable corridors previously presented (Eastern Offshore Export Cable Corridor (Eastern cable corridor)). The Proponent will advance the Western Offshore Export Cable Corridor (Western cable corridor) which will make landfall at one of two potential sites in Massachusetts. The Western cable corridor includes variations that extend through Muskeget Channel to the west and the east. Approximately 20.9 to 23.3 miles of the transmission lines will be located in state waters depending on the selected route through Muskeget Channel and landfall site. Covell's Beach in Barnstable has been selected as the Preferred Route based on support from the Town of Barnstable, shorter cable length and associated reduction in impacts, and avoidance of crossing the existing National Grid Cape Cod to Nantucket Cable.

Each 10-inch diameter offshore export cable will be comprised of a three-core 220 kilovolt (kV) alternating current (AC) cable for power transmission bundled with a fiber optic cable. The cables are proposed to be buried approximately five to eight feet below the seafloor and laid with a combination of jet-plowing (through flat, soft sediments), jetting (through small sand waves), suction dredging (through large sand waves), and mechanical trenching (through compacted sand/gravel/cobble). Boulders will be

[1] Email to Purvi Patel, MEPA from Rachel Pachter, Vineyard Wind, on October 5, 2018.
[2] Chapter 188 of the Acts of 2016 defines Offshore Wind Energy Generation as offshore electric generating resources derived from wind that: (1) are Class I renewable energy generating sources, as defined in section 11F of Chapter 25A of the General Laws; (2) have a commercial operations date on or after January 1, 2018, that has been verified by DOER; and (3) operate in a designated WEA for which an initial federal lease was issued on a competitive basis after January 1, 2012.

relocated (except within dense areas which will be avoided) from the cable route and placed in another location within the construction corridor. Where burial is not possible due to subsurface conditions, it will be laid on the ocean floor and covered by rock or concrete mattresses. Within the transition zone between Nantucket Sound and land, Horizontal Directional Drilling (HDD) or open trenching will be used to install the cable.

The Preferred Route (5.4 miles long) for the onshore cable is located exclusively within Barnstable; the Noticed Alternative (6 miles long) extends from Yarmouth to Barnstable. The substation is proposed adjacent to the Eversource 115 kV Switching Station in Barnstable. The identification of Covell's Beach as the Preferred Route does not affect the on-shore variants of each route.

The SDEIR indicates that Vineyard Wind will include two 400-MW offshore cables (reduced from three offshore cables proposed in the DEIR). The Proponent plans to construct the full 800 MW sequentially (in a single phase), rather than being separated into two 400-MW phases (as previously described as a possibility in the DEIR). The two cables will be separated by approximately 330 feet within the 2,660-foot wide installation corridor.

Installation of each offshore cable from the Wind Development Area (WDA) to the landfall site will require approximately 24 days for simultaneous lay and bury (16 days for lay, six days for splice, two days for landfall connection) and approximately 37 days for the less weather-sensitive free lay and post lay burial technique (11 days for lay, six days for splice, 18 days for burial, two days for landfall connection). Preparatory or advance activities such as a grapnel run (to provide clearance for installation) and dredging of sand waves will occur two to four weeks prior to cable installation. The cable laying vessel and its guard vessels will follow a pre-identified route at a speed of less than one knot and will maintain a "moving" safety exclusion zone in consultation with U.S. Coast Guard (USCG) (approximately 0.6-mile radius).

The SDEIR indicates that the following changes to the project will reduce environmental impacts compared to those identified in the DEIR:

- Installation of 800 MW in a single phase, rather than two phases (400 MW each);
- Elimination of the Eastern cable corridor alternative;
- Elimination of one of the three offshore export cables and associated reduction in number of onshore cables (from nine to six);
- Reduction in the size of the duct bank to accommodate eight conduits instead of 12;
- Identification of rock placement as the preferred cable protection approach;
- Identification of a shorter HDD route at a more oblique angle to completely avoid areas of hard/complex bottom and eelgrass near Covell's Beach;
- Selection of Variant 1 (Attucks Lane and Independence Drive – entirely within existing roadway layouts) as the Preferred Route to the substation; and
- Advancement in substation design and redesign of the stormwater management system to accommodate additional containment volumes.

Project Area

The cable routes through Nantucket Sound include sections within the area of federal waters in the center of the sound. A portion of the cable route within state waters lies within the Cape and Islands Ocean Sanctuary (CIOS) and the Massachusetts Ocean Management Plan (OMP) planning area. The Western cable corridor to the preferred landing site passes through 20.9 miles and 22.6 miles of state waters using the western route and eastern route through Muskeget Channel, respectively. The Noticed Alternative would extend through 21.4 miles and 23.3 miles of state waters using the western route and eastern route through Muskeget Channel, respectively.

The substation is proposed within a 6.35-acre site that is zoned for industrial use. It is located on Independence Drive within the Independence Park commercial/industrial area. The majority of the site is wooded and includes some limited parking areas and a small building. The site is bordered to the north by the Barnstable Switching Station, to the west by the former Cape Cod Times building, to the south by Independence Drive, and to the east by a 150- to 200-foot wide electric transmission corridor. The surrounding area has been zoned, permitted and developed or is proposed to be developed with residential, commercial, and recreational uses. A residential neighborhood is located approximately 2,000 feet from the site. Onshore transmission lines are proposed primarily within paved roadways and other existing rights of way (ROW) in Yarmouth and Barnstable.

According to the Massachusetts Natural Heritage and Endangered Species Program (NHESP), portions of the project area are mapped as Priority and Estimated Habitat for rare species including Roseate Tern (*Sterna dougallii*)[3], Common Tern (*Sterna hirundo*), Least Tern (*Sternula antillarum*), Water-willow Borer Moth (*Papaipema sulphurata*), Scarlet Bluet (*Enallagma pictum*), and Piping Plover (*Charadrius melodus*).[4] North Atlantic Right Whale (*Eubalaena glacialis*), Humpback Whale (*Megaptera novaeangliae*), marine birds such as Long-tailed Duck , Northern Gannet, Razorbill, Wilson's Storm Petrel, fulmars, loons, scoters, and shearwaters, and Loggerhead (*Caretta caretta*) and Leatherback (*Dermochelys coriacea*) sea turtles have been observed throughout Nantucket Sound.

The Massachusetts Division of Marine Fisheries (DMF) indicates that the cable routes will pass through areas of commercial and recreational fishing and habitat for a variety of invertebrate and finfish species, including channeled whelk (*Busycotypus canaliculatus*), knobbed whelk (*Busycon carica*), longfin squid (*Doryteuthis pealeii*), summer flounder (*Paralichthys dentatus*), windowpane flounder (*Scophthalmus aquosus*), scup (*Stenotomus chrysops*), surf clam (*Spisula solidissima*), sea scallop (*Argopecten irradians*), quahog (*Mercenaria mercenaria*), horseshoe crabs (*Limulus polyphemus*), and blue mussel (*Mytilus edulis*). Blue mussel and kelp (*Saccharina latissima*) aquaculture operations are also located within Horseshoe Shoals (a subtidal area of Nantucket Sound).

Lewis Bay supports a variety of marine resources including winter flounder (*Pseudopleuronectes americanus*), horseshoe crabs, and shellfish. Sections of the Lewis Bay shoreline are mapped soft shell clam (*Mya arenaria*), American oyster (*Crassostrea virginica*), and quahog habitat. Oyster aquaculture grants are present along the eastern shoreline. Most of Lewis Bay is identified as bay scallop habitat and it supports a seasonal bay scallop fishery. Covell's Beach is mapped as a horseshoe crab nesting beach and waters offshore of the beach are mapped as surf clam habitat. Waters offshore of portions of

[3] Species also federally protected pursuant to the U.S. Endangered Species Act (ESA, 50 CFR 17.11).
[4] Ibid.

Covell's Beach and the entrance channel to Lewis Bay contain mapped eelgrass (*Zostera marina*) habitat. The 2018 marine surveys located an area of eelgrass offshore from Covell's Beach around Spindle Rock in Centerville Harbor.

The Massachusetts Board of Underwater Archaeological Resources (BUAR) has identified Nantucket Sound as an area of high sensitivity that is rich in submerged ancient Native American cultural resources and shipwrecks. A number of properties included in the Massachusetts Historical Commission (MHC) Inventory of Historic and Archaeological Assets of the Commonwealth (Inventory) and State and National Registers are located along the onshore segment of the transmission route. Both the Preferred Route and Noticed Alternative extend through and are adjacent to archaeological sites.

In addition, portions of the project area include land held in accordance with Article 97 of the Amendments of the Constitution of the Commonwealth (Article 97) and land permanently protected through a conservation restriction (CR).

Environmental Impacts and Mitigation

Potential environmental impacts[5] of the project in Massachusetts include alteration of up to 8.3 acres of land, creation of up to 0.6 acres of impervious area, and alteration to wetland resource areas. Based on information in the SDEIR regarding the Preferred Alternative, the project will impact Land Under the Ocean (LUO), of which up to nine acres will be Land Containing Shellfish (LCS) based on DMF shellfish suitability maps, associated with installation of the submarine cable, dredging of sand waves, sediment dispersion and installation of the cofferdam at the end of the alternate landfall site. Installation of the land-based section of the transmission line for the Noticed Alternative will alter approximately 19,350 square feet (sf) of Land Subject to Coastal Storm Flowage (LSCSF) and 5,600 sf of Riverfront Area (RFA) and open-cut trenching at the alternate landfall site will alter approximately 1,500 sf of Coastal Beach. Installation of the land-based section of the transmission line for the Preferred Alternative will alter approximately 7,500 sf of LSCSF. The project will include up to approximately 104,000 cubic yards (cy) of dredging of sand waves within state waters and 164,000 cubic meters (m^3) total from the WDA based on the Western cable corridor (west through Muskeget Channel).

The submarine cable will be installed using jetting, jet-plow, or mechanical trenching to minimize the area of dredging and direct seafloor impact. HDD will be used for the transition to landfall to avoid impacts to coastal wetland resource areas along the Preferred Route (Covell's Beach). Open trench and HDD have been considered for the Noticed Alternative. Areas of Coastal Beach, RFA, and LSCSF impacted during construction will be restored. The project will be required to comply with management standards in the OMP to minimize impacts to marine resources. Best management practices (BMPs) will be employed during the construction period. The substation will include full containment for any components containing dielectric fluids including transformers and capacitor banks.

The project will offset 1.68 million tpy of GHG emissions and improve the resiliency of energy infrastructure.

[5] Certain impacts identified in the SDEIR are associated with the Vineyard Wind Connector only, while others are associated with elements of the project under state and federal jurisdiction.

Permits and Jurisdiction

The Project is subject to a Mandatory EIR because it requires Agency Action and it will alter ten or more acres of other wetlands (LUO) pursuant to 301 CMR 11.03(3)(a)(1)(b) of the MEPA regulations. The project also exceeds ENF thresholds at 301 CMR 11.03(3)(b)(3) for dredging of 10,000 or more cubic yards (cy) of material and at 301 CMR 11.03(7)(b)(4) for construction of electric transmission lines with a capacity of 69 or more kV that are over one mile in length. The Project may exceed the ENF threshold at 301 CMR 11.03(2)(b)(2) for disturbance of greater than two acres of designated priority habitat that results in a take of a state-listed rare species. Depending on the on-shore transmission route selected, the Project may also exceed ENF thresholds at 301 CMR 11.03(1)(b)(3) for conversion of land held for natural resources purposes in accordance with Article 97 to any purpose not in accordance with Article 97; and 301 CMR 11.03(1)(b)(5) for release of an interest in land held for conservation purposes.

The Project will require a Section 401 Water Quality Certification (WQC), a Chapter 91 (c. 91) License, and Approval of Easement pursuant to 310 CMR 22.00 from the Massachusetts Department of Environmental Protection (MassDEP); review under the Massachusetts Endangered Species Act (MESA) by NHESP; review under the OMP and Ocean Sanctuaries Act; a Non-Vehicular Access Permit, Road Crossing Permits, and a Rail Division Use and Occupancy License from the Massachusetts Department of Transportation (MassDOT); and Approval under MGL Chapter 164 Sections 69J and 72, and Chapter 40A Section 3 Zoning Exemption from the Energy Facility Siting Board (EFSB) and DPU. The Project also requires a Federal Consistency review by the Massachusetts Office of Coastal Zone Management (CZM). The Project is subject to the MEPA GHG Emissions Policy and Protocol (the Policy). It may require authorization from the State Legislature in accordance with Article 97.

Consistent with the request for proposals issued pursuant to Section 83 of Chapter 169 of the Acts of 2008 (An Act Relative to Green Communities), as amended by Chapter 188 of the Acts of 2016, the distribution companies must submit any long-term contract proposed to the DPU for review and approval.

The Project will require Orders of Conditions from Conservation Commissions in Edgartown, Yarmouth, and Barnstable, and potentially, Nantucket and Mashpee (or in the case of an appeal, Superseding Orders of Conditions from MassDEP).

Vineyard Wind and elements of the Vineyard Wind Connector require approvals from BOEM[6]; an Individual Permit from the U.S. Army Corps of Engineers (ACOE) under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act (RHA); review from the U.S. National Marine Fisheries Service (NMFS), USCG, and Federal Aviation Administration (FAA); consultation with and Field Investigation Permits from MHC in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 and M.G.L. Chapter 9, Sections 26-27C; a Special Use Permit from BUAR; Development of Regional Impact (DRI) review from the Cape Cod Commission (CCC) and

[6] During its review, BOEM must comply with its obligations under the National Environmental Policy Act (NEPA), the NHPA, the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the Migratory Bird Treaty Act (MBTA), the Clean Air Act (CAA), and the Endangered Species Act (ESA). BOEM will coordinate/consult with other Federal agencies including NMFS, United States Fish and Wildlife Service (USFW), EPA, and USGC). BOEM will also coordinate with the State pursuant to the Coastal Zone Management Act (CZMA).

Martha's Vineyard Commission (MVC); and a National Pollutant Discharge Elimination System (NPDES) Construction General Permit and Outer Continental Shelf Air Permit from the U.S. Environmental Protection Agency (EPA).

Because the Proponent is not seeking Financial Assistance, MEPA jurisdiction extends to those aspects of the Project that are within the subject matter of required or potentially required Agency Actions that are likely, directly or indirectly, to cause Damage to the Environment. The subject matter of the EFSB/DPU approvals and the c. 91 License are sufficiently broad such that jurisdiction is functionally equivalent to full scope jurisdiction and extends to all aspects of the Project that are likely, directly or indirectly, to cause Damage to the Environment.

Review of the SDEIR

The SDEIR provides an updated description of baseline environmental conditions informed by surveys and impacts associated with proposed Project elements within State jurisdiction. It describes several methodologies for installation of offshore export cables. Baseline conditions for Project elements located in federal waters are available in the Construction and Operations Plan (COP) found on the BOEM website. The SDEIR provides a general project schedule. It describes applicable time-of-year (TOY) restrictions, some of which conflict for various resources, and indicates that consultation with state and federal agencies regarding construction scheduling and potential TOY restrictions for offshore elements is ongoing.

The SDEIR identifies the Proponent's extensive consultation with federal, state and local agencies and officials and to stakeholders and the public. Comments from MassDEP, DMF and CZM indicate that the SDEIR is generally responsive to the Scope. It describes changes to the project since the filing of the DEIR and provides additional information to support the alternatives analysis.

The SDEIR contains additional data and analyses, including preliminary results from the 2018 marine surveys as well as an updated and expanded sediment dispersion modeling study that includes cable installation activities and dredging of sand waves. These surveys provide data to delineate site conditions, evaluate impacts associated with cable routes and support micro-siting of cables within the corridor; provide information regarding sensitive environmental resources for avoidance, minimization and/or mitigation of impacts; and inform the proposed cable design, burial techniques and cable protection.

The 2018 marine survey includes data collection along multiple lines within the 2,660-foot wide installation corridor, including the two options through Muskeget Channel (west and east) and the Preferred Route and Noticed Alternative landfall sites. Based on the results of the survey, the Proponent has eliminated the Eastern cable corridor. The Proponent determined that it would impact a larger proportion of complex bottom which would require additional dredging of sand waves. The survey data will supplement the OMP-mapped "special, sensitive or unique resources" (SSU).

The SDEIR indicates that the Western cable corridor was selected as the preferred route for the offshore export cable based on marine surveys which confirm that it is technically feasible and that it will avoid and minimize potential impacts compared to the Eastern cable corridor.

The SDEIR includes updated site plans and graphics (Attachment A); new plans reflecting marine surveys and OMP-mapped resources (Attachment C); and engineering plans (landfall and onshore duct bank) for the Preferred Route and the Noticed Alternative (Attachments I and H, respectively). The SDEIR includes an updated list of State, federal and local permitting and review requirements and provides an update on the status of each of these pending actions. It includes an assessment of the Project's consistency with the OMP, c. 91 regulations (310 CMR 9.00) and 401 WQC regulations (314 CMR 9.00).

The SDEIR provides draft Section 61 Findings and describes measures to mitigate environmental impacts. The SDEIR includes a draft Benthic Habitat Monitoring Plan (Attachment D) that will guide post-construction monitoring to document habitat disturbance and recovery. The Proponent indicates it will consult with NHESP, DMF, research and other organizations, and interested stakeholders to identify parameters that will be monitored, methodology and frequency of monitoring, development of monitoring reports and distribution of monitoring reports.

Federal Consistency

CZM review will extend to the entire Vineyard Wind project. The SDEIR includes the Federal Consistency Statement submitted to CZM (Attachment O). The SDEIR was required to provide context and information regarding cumulative impacts of the entire project to support meaningful review and, in particular, to support Federal Consistency Review by CZM. As previously mentioned, the SDEIR includes a brief description of the activities proposed in federal waters and references the COP for additional information on elements outside State jurisdiction. The SDEIR focuses on impacts within State jurisdiction and provides an impact analysis for LUO associated with certain activities within federal waters such as dredging.

Ocean Management Plan

The project is subject to review under the Massachusetts OMP.[7] The OMP identifies and maps important ecological resources that are key components of the State's estuarine and marine ecosystems - defined as SSUs - and identifies key areas of water-dependent uses including commercial and recreational fishing and navigation. It contains siting and management standards applicable to specific ocean-based activities to protect SSU resources and water-dependent uses. For cable projects, the OMP identifies the applicable SSUs as core habitat areas for the North Atlantic Right Whale, Fin Whale and Humpback Whale, areas of hard/complex seafloor, intertidal flats, and eelgrass. SSU resources potentially impacted by the Project are primarily areas of hard/complex seafloor. Eelgrass and North Atlantic Right Whale core habitat will be avoided. OMP maps also depict areas of Sea duck core habitat, Concentrated Recreational Fishing, Concentrated Commerce Traffic, Concentrated Commercial Fishing Traffic and Concentrated Recreational Boating.

The siting standards of the OMP and its implementing regulations (301 CMR 28.00) presume that a project alternative located outside mapped SSU resources is a less environmentally damaging practicable alternative (LEDPA) than a project located within a mapped SSU resource. The OMP management standards require a demonstration that new, site-specific information provides more accurate delineation of the resource areas, that no other LEDPA exists, that the project has undertaken

[7] The OMP was developed pursuant to the Oceans Act (Chapter 114 of the Acts of 2008) in 2009 and was updated in 2015.

all practicable measures to avoid damage to SSU resources, that there will be no significant alteration of SSU resource values or interests, and that the public benefits of the project outweigh the public detriments posed by impacts to SSU resources. The SDEIR provides additional analysis to supplement information in the DEIR. It provides a discussion of the Project's consistency with the management standards of the OMP by identifying the project purpose and constraints, reviewing alternatives that would avoid SSUs, providing sufficient details of existing and proposed conditions along the proposed cable route, documenting environmental impacts of the project and mitigation measures, and addressing its public benefits.

Available data and recent surveys are used to demonstrate that cable route alternatives generally avoid sensitive resources identified in the OMP and minimize potential impacts to those resources. The SDEIR includes revised maps that update benthic conditions and identify the extent of hard/complex seafloor and eelgrass along the cable route in higher resolution than mapped in the OMP. The SDEIR separately delineates hard bottom and complex seafloor (sand waves). The 2018 survey data was used to establish boundaries of hard/complex bottom habitat areas and eelgrass to determine impacts to SSUs and to provide a comparison to post-construction conditions. The proposed cable route will be sited to avoid hard seafloor to the maximum extent practicable; however, the SDEIR indicates that the amount of hard bottom (areas of cobble and biogenic habitat) that cannot be avoided and may be impacted during the cable laying process is not fully known. New areas of eelgrass uncovered around Spindle Rock will be avoided by realigning the cable corridor at an angle at it approaches the Covell's Beach land site.

The OMP includes mapped areas of commercial and recreational fishing and navigation in Nantucket Sound that could be affected by the project. Proponents must avoid, minimize, and mitigate impacts to areas of concentrations of water dependent uses identified in the OMP pursuant to 301 CMR 28.04(3). The SDEIR evaluates potential conflicts to navigation as vessels transit between ports and the offshore wind lease area and evaluate establishment of transit corridors to provide safe passage. The SDEIR provides additional information to describe how cable installation could affect fishing, including restrictions on navigation, on fishing and on the placement of fixed or mobile fishing gear.

The SDEIR describes measures to minimize impacts to recreational/commercial fishing activities and navigation including employing a Marine Coordinator during the construction and installation phase to manage all construction vessel logistics; liaise with USCG, port authorities, and others; and coordinate with fisherman and other mariners in advance of cable laying (by providing notices to mariners to minimize conflicts between construction and recreational/commercial vessels); maintaining a 1,640-foot safety zone around all construction activities; establishing a vessel traffic management plan; and coordinating with local pilots during construction. The SDEIR includes an updated Fisheries Communications Plan (FCP) (Attachment G) for alerting mariners of the location and timing of activities in Nantucket Sound. The Proponent will prioritize burying cables to a sufficient depth within the seabed to avoid and minimize the use of cable protection measures which could impact fishing activities post-construction. The Proponent is developing a framework for a pre- and post-construction fisheries monitoring program to measure the Project's effect on fisheries resources in consultation with the University of Massachusetts Dartmouth School for Marine Science and Technology (SMAST) and local stakeholders. The duration of monitoring will be determined as part of the initial effort to determine the scope of the study, but it is anticipated to include the pre-construction period and at least one year of post-construction monitoring.

The Proponent will continue to actively consult with DMF, the Massachusetts Lobstermen's Association (MLA), New England Fisheries Management Council (NEFMC), and a number of other fisheries groups and individuals to consider design and construction measures to minimize interference with fishing activity and impacts to fish habitat.

The Oceans Act established an Ocean Development Mitigation Fee to be assessed for offshore development projects. The purpose of the fee is to compensate the Commonwealth for impacts to ocean resources and the broad public interests and rights in the lands, waters and resources of the OMP areas. If the Project is permitted, the fee must be deposited in the Oceans and Waterways Trust. The fee will be established through MEPA review. The guidance and fee structure contained in the OMP, the information and analysis contained in the SDEIR and FEIR and consultation with agencies will inform the determination of the fee.

The SDEIR proposes a fee based on the project's footprint and taking into consideration public benefits and the $15 million Offshore Wind Accelerator Program. The Proponent asserts that the Project should be classified within the Class II category and proposes a fee of $240,000 based on 27 acres of permanent cover on the seafloor associated with cable protection along the two export cables.

Based on the full extent of impacts identified in the SDEIR, the Project would be more appropriately classified as a Class III category. These impacts include: direct cable laying and dredging area, dredged disposal area, sediment deposition area, and impacts to biota and habitat, and permanent hard cover. The SDEIR estimates that impacts associated with cable installation in state waters could temporarily alter up to 94 acres of seafloor; permanently alter 27 acres of seafloor (hard cable protection); fluidize up to 138,000 m^3 of sediment resulting in up to 200 acres covered in over 1 millimeter (mm) of sediment; and dredge 104,000 m^3 of sand waves. As noted by CZM, it is possible that some of these impacts may be underestimated. In addition, project changes and/or provision of additional data and analysis in the FEIR could result in reductions in identified impacts. The Proponent should engage in further discussions with the MEPA Office and CZM to estimate the Ocean Development Mitigation Fee for the FEIR.

The SDEIR provides additional information regarding the $15 million Offshore Wind Accelerator Program and its three major components: $10 million Offshore Wind Energy Industry Accelerator Fund; $2 million WindWard Workforce program; and $3 million for the Innovations for Marine Mammal Protection program.

Alternatives Analysis

The DEIR included an alternatives analysis for offshore and onshore routing, landfall sites, substation sites, and construction methodology and identified criteria employed to evaluate alternatives. The proposed reduction in the number of cables from three to two will avoid and minimize environmental impacts. The SDEIR indicates that the Proponent considered sequential and simultaneous installation of the two export cables. The Proponent selected sequential installation because simultaneous installation would require two separate vessels which would increase expenses and create logistical challenges.

The SDEIR asserts that the complex nature of the project necessitates that interrelated elements (offshore route, landfall site, onshore route, substation site, and interconnection location) must be independently feasible and also work as a unified system to meet the project purpose. The Proponent has indicated its interest in retaining flexibility to advance the project through a "permitting envelope" approach. The SDEIR outlines the importance of providing flexibility in maintaining: a 2,660-foot wide installation corridor; eastern and western route options through Muskeget Channel; two landfall sites; two options for transitioning from offshore to onshore cables at New Hampshire Avenue; comparable onshore routing variants; possible cable installation techniques; and options for cable burial and cable protection.

The MEPA Regulations include provisions to support flexibility of review and changes to projects over time, including the ability to advance more than one alternative to permitting. This provision requires that the environmental impacts of alternatives have been adequately reviewed and that the alternatives are similar in terms of environmental impact. Specifically, the regulations at 301 CMR 11.10 (1) indicate that "*The selection by the Proponent or the imposition as a condition or restriction in a Permit or other relevant review document allowing or approving an Agency Action of any alternative that similarly avoids, minimizes or mitigates potential environmental impacts shall not constitute a change in the Project, provided that the alternative was previously reviewed in an EIR.*"

The Proponent identifies the Preferred Alternative and alternatives that the Proponent will continue to evaluate. The SDEIR advances analysis of a single offshore submarine transmission route (Western cable corridor and associated western and eastern routes through Muskeget Channel) including two landfall sites, and two onshore transmission routes (Preferred Route and Noticed Alternative) including onshore variants. The SDEIR indicates that the Eastern cable corridor was eliminated because of its slightly longer length and comparable environmental characteristics (although it exhibited larger sand waves). The SDEIR describes and compares the offshore routing from the WDA to the landfall sites (along both routes through Muskeget Channel). The SDEIR describes how selection of the Preferred Route and Noticed Alternative avoid or minimize impacts to resources and uses.

In considering alternative geographic routes, the Proponent delineated a Study Area that included all of southeastern Massachusetts and eastern Rhode Island. The SDEIR provides additional analysis of the West Barnstable, Brayton Point and Pine Street Substations to justify selection of the Barnstable Switching Station as the preferred interconnection point.

The project includes high-voltage alternating current (HVAC) technology based on its flexibility, reliability and reduced costs. The Proponent indicates that HVAC technology will support expansion of transmission cables and substation capacity and avoids costs associated with converter stations necessary at both cable termini. The maximum cable length from the federal lease area to the interconnection point could not exceed 62 miles without requiring an expensive mid-way reactor station.

The SDEIR maintains that both offshore routes are feasible, avoid core habitat mapped for whales, avoid mapped eelgrass habitat, and minimize impacts to mapped SSU areas. It asserts that the routes have generally equivalent impacts.

Offshore installation of the two cables for the majority of the route is anticipated to use simultaneous lay-and-bury via jet plow. The SDEIR indicates that other methods may be required in areas of hard bottom or other challenging conditions and provides information regarding cable

installation methods. Target burial depth will be approximately five to eight feet below stable seabed. Jet-plowing, plowing, and/or mechanical trenching will create a trench that is up to 3.3 feet wide. Where subsurface conditions prevent burial of the cable it will be placed on the seafloor and covered with protective material. The SDEIR describes potential impacts from offshore cable installation associated with the 3.3-foot-wide trench (direct), 6.6-foot-wide corridor for the cable installation tool which will move along the seafloor on skids or tracks (temporary), sediment dispersion and deposition, dredging through sand waves, anchoring, and cable protection. The SDEIR does not identify where certain installation methods will be used. The SDEIR claims that the selected installation method will not involve significant sidecasting of sediment.

HDD is proposed at the Covell's Beach landfall site to avoid impacts to sensitive resources and recreation. Open trench installation is proposed at the New Hampshire Avenue landfall site; however, the SDEIR includes analysis of both methodologies and compares impacts. HDD is proposed at Covell's Beach to avoid impacts to the rare species habitat, nearshore area, tidal zone, beach, and coastal dunes. Open-trench is identified as the preferred method for the Noticed Alternative because cable burial depth would be three to five times greater using HDD and deeper burial depths cause a cable to operate at a higher temperature (open trench would result in a better cable rating); shorter construction timeline; and lower costs. The SDEIR outlines a contingency plan describing measures that will be undertaken to minimize and contain turbidity, sedimentation and release of drilling slurry during the drilling or trenching process.

Wetlands and Water Quality

Vineyard Wind includes work within wetland resource areas and activities that trigger Federal, State and local wetland permitting jurisdiction, each with its own performance standards and regulations. The Conservation Commissions of Yarmouth, Barnstable, and Edgartown and potentially Nantucket and Mashpee will review the project to determine its consistency with the Wetlands Protection Act (WPA), the Wetlands Regulations (310 CMR 10.00), and associated performance standards, including the stormwater management standards (SMS). MassDEP will also review the Project to determine its consistency with the 401 WQC (314 CMR 9.00) and c. 91 regulations (310 CMR 9.00). Finally, ACOE review will determine its consistency with Section 404 of the Federal CWA and Section 10 of the RHA.

The SDEIR describes impacts to onshore and offshore resource areas in Massachusetts including certain impacts within federal waters (discussion of seafloor impacts and dredging).[8] The SDEIR describes the methodology and assumptions for quantifying impacts from cable installation on LUO.

Maximum area of seafloor (LUO) impacts associated with installation of two cables are updated and summarized in the following table (Tables 1-4 and 1-5 of the SDEIR summarize individual impacts to LUO from cable installation along each cable route).

[8] Certain impacts were disaggregated into those under MEPA jurisdiction and those under federal jurisdiction.

Project Activity	State Waters	Total (State and Federal Waters)
Trench impact zone (acres)*	19	35
Disturbance zone from tool skids/tracks (acres)**	37	70
Length of sand wave dredging (miles)	2.2	3.8
Volume of sand wave dredging (nearest 1,000 m^3)	104,000	164,000
Volume of sediment fluidized in trench (nearest 1,000 m^3)	138,000	259,000
Dredging of sand waves (acres)***	39	68
Sediment deposition greater than 1 mm from dredging operations (acres)	200	329
Sediment deposition greater than 20 mm from dredging operations (acres)	22	36
Anchoring (acres)****	3.7	6.9
Cable Protection*****	27	27

* based on 3.3-foot-wide trench (the DEIR indicated a 6-foot wide trench)
** based on a 6.6-foot-wide disturbance zone (the DEIR indicated a 20-foot wide trench)
***65-foot-wide centered on cable less the 6.6-foot wide jet plow and 3.3-foot wide trench impacts
**** Estimate based on half the length of the longest offshore corridor route
***** Up to 3.7 miles includes federal waters in Nantucket Sound

The SDEIR indicates that the Proponent will maintain both options through Muskeget Channel to provide flexibility in design and installation. The SDEIR compares both routes through Muskeget Channel to each of the landfall sites.

The majority of the export cable is expected to be installed using simultaneous lay and bury via jet plowing (fluidizing the sediment within the trench and allowing the cable to sink under its own weight to the appropriate depth or be placed at depth by the tool) or other typical techniques such as mechanical plowing and mechanical trenching. Dredging techniques will have differing impacts on seafloor disturbance and sedimentation. Comments from CZM concur that simultaneous cable laying and burial in soft sediments (as opposed to trenching and laying the cable at a later time) is the preferred method for minimizing impacts. Depending on which cable installation tool is selected, trench disturbance is expected to be up to approximately 3.3 feet wide. The tool is expected to move along the seafloor on skids or tracks which will slide over the surface of the seafloor (along an area 3.3 to 6.6 feet wide) and may disturb benthic habitat. While the Proponent will prioritize the least environmentally impactful cable installation alternatives practicable for each segment of cable installation, the SDEIR indicates that the exact methods and equipment for dredging sand waves and offshore cable installation will be developed through the contractor evaluation and selection process. Assessment of measures to avoid and minimize certain resource areas is ongoing based on consultation with resource agencies, final processing and analyzing of survey data, and refinements to cable laying methods.

Dynamic positioning vessels will be used for cable installation. Shallow water and strong currents may preclude its use in some areas, particularly within Muskeget Channel and potentially within Lewis Bay. Where it is precluded, anchoring will be necessary. Anchoring impacts would be associated with disturbance of the substrate resulting in localized mortality of infauna and anchor sweeps across the seafloor. Anchored vessels must avoid eelgrass and will avoid other SSU habitats to the greatest extent practicable. The SDEIR indicates that mid-line anchor buoys, where feasible and

safe, will be used. With the exception of Muskeget Channel and Lewis Bay (up to 3,300 feet), anchoring will be contained within the installation corridor.

The SDEIR estimates that cable burial may not be achievable for up to 3.7 miles of the corridor (including at the crossing of the existing Nantucket cable required if the New Hampshire Avenue landing site were used). The Proponent indicates that it will reattempt burial before armoring. Hand-jetting may be used in very limited instances. Where armoring cannot be avoided, the SDEIR describes alternative cable protection methods including rock placement along relatively larger areas, concrete mattresses within limited areas, and protective cable shells (Uraduct/half-shell or similar). The SDEIR does not propose specific mitigation measures to offset conversion of benthic habitat.

The SDEIR was required to use field data and hydrodynamic modeling to characterize the wave dynamics, currents, and sediment transport along the proposed cable route, particularly in areas of sand waves, to better understand whether the proposed depth of burial is sufficient to avoid the potential use of armoring. After the initial survey, the Proponent will survey the cable's burial depth annually for the first three years after construction, every three years for the next 12 years, and every five years beyond that. Sections of cable that are inadequately buried will be buried again using a secondary burial tool.

The SDEIR estimates discontinuous sand wave dredging along up to 2.2 miles with a corresponding volume of dredging up to 104,000 m^3 in state waters. Where dredging is required to remove the upper portions of the sand waves above the stable seabed, the Proponent is considering the use of jetting and trailing suction hopper dredge (TSHD). Jetting uses a pressurized stream of water to push sand to the side and is distinct from jet-plowing, which is the preferred approach for cable burial. TSHD involves using suction to remove material from the seafloor, depositing in the vessel hopper, releasing dredged material within the surveyed installation corridor in a comparable area characterized by sand waves, and laying the cable at a later time. The SDEIR does not identify locations for deposition nor does it quantify associated impacts to the benthic environment. Dredged corridors through sand waves would be approximately 65 feet wide at the bottom with 1:4 side slopes.

The SDEIR includes a revised sediment dispersion modeling study of offshore cable installation activities (Attachment F) and provides a discussion of the results. Two approaches were modeled: TSHD Pre Dredge and Limited TSHD Pre Dredge including Jetting. Modeling of sand wave dredging using TSHD indicated that total suspended solids (TSS) concentrations above 10 milligrams per liter (mg/L) extended up to 10 miles from the cable trench centerline. TSS concentrations greater than 1,000 mg/l is predicted up to three miles away during hopper overflow and dumping. Modeling indicates greater impacts are associated with TSHD than jetting or jet-plowing. The SDEIR asserts that increased turbidity and possible siltation during cable installation will be minor and of short duration and acknowledges that resettlement of sediment may cause mortality of benthic fauna particularly sessile and attached organisms proximate to the route. In addition, dredging of sand waves will directly impact organisms within and adjacent to the dredge footprint.

The two offshore export cables would transition to up to six onshore transmission cables. The Preferred Route and Noticed Alternative include variants for the underground duct bank routes to the substation. Routes are generally similar in length and both routes and variants are considered viable.

The Proponent will locate synchronous condensers within the existing building (the former Cape Cod Times building) just west of the substation site to reduce potential visual and noise impacts and

avoid construction of a separate enclosure. The substation will be equipped with full containment (110 percent) for any components containing dielectric fluids plus an incremental volume sufficient to account for a simultaneous 100-year, 24-hour rainfall event (9 inches of rain). The substation stormwater design has been updated to reflect this change and includes a revised Stormwater Management Report (Attachment N). The onshore segment of the Project is proposed within or proximate to the Zone I and Zone II of public water supplies, which are considered Critical Areas. The stormwater management design at the substation site will meet or exceed the Massachusetts Stormwater Policy recommendations for this Project, and will comply with the MassDEP Stormwater Standard 6 for Critical Areas. The site design will also comply with Barnstable source water protection ordinances, bylaws, and regulations.

Waterways

The submarine cable will be located within flowed tidelands of Nantucket Sound and Lewis Bay and will be subject to licensing under c. 91 and the Waterways Regulations. The SDEIR discusses the Project's consistency with the applicable c. 91 regulations. The SDEIR provides additional information to evaluate the impacts of dredging.

As a facility generating electricity from wind power which requires an EIR pursuant to 310 CMR 9.12(2)(e), MassDEP shall find the project to be water-dependent based on a comprehensive alternatives analysis demonstrating that the facility requires direct access to or location in tidal waters and cannot reasonably be located or operated away from tidal waters. For projects subject to an EIR, the alternatives analysis must be provided during MEPA review so that I may make a finding regarding water-dependency. The SDEIR includes information intended to document that the project is a water-dependent facility in accordance with the Waterways Regulations (310 CMR 9.00) and describes why the project cannot be reasonably located away from tidal waters.

The SDEIR addresses potential impacts of armoring of the cable on commercial fishing operations. The analysis of the Noticed Alternative identifies how crossing of the NSTAR Yarmouth to Nantucket Cable would be addressed and describes how cable installation would be designed and installed to avoid, minimize and mitigate constraints on municipal projects including potential dredging use of helical anchors within Lewis Bay.

The SDEIR assesses the impacts of the installation, operations and maintenance of the cables on commercial and recreational fishing and navigation. It identifies how potential impacts will be avoided and minimized. It indicates that the planned burial depth of the offshore cables will allow continued use of mobile fishing gear. The SDEIR indicates the Proponent will select and design protection to minimize impacts to fishing and other gear and to avoid impacts to navigation.

Rare Species, Wildlife, and Marine Resources

The cable routes extend through diverse marine environments within the Outer Continental Shelf, Nantucket Sound, and the CIOS. As noted by the NHESP, CZM, and DMF, the area includes habitat and prey species important for rare species, including several state- and federally-listed terns (Roseate, Common, and Least), Piping Plover, as well as shellfish and finfish species that are important to the commercial and recreational fishing industries. The critically endangered North Atlantic Right Whales transit through this area and have been observed in areas outside of the Core Habitat SSU. The

SDEIR describes the size of vessels, the frequency and time of year of trips, and speed restrictions that will be observed. The SDEIR describes measures to avoid and minimize impacts to whales, turtles, and seabirds during construction. The Proponent will use acoustic monitoring during construction to protect whales and other marine species. Passive acoustic monitoring (PAM) will be used during pile driving activities within federal waters.

Comments from the Conservation Law Foundation (CLF), Natural Resources Defense Council (NRDC), National Wildlife Federation (NWF), Mass Audubon, and Sierra Club note that North Atlantic Right Whales have been observed in areas outside of the SSU in State and federal waters and recommend additional mitigation to avoid, minimize and mitigate impacts to whales.

The SDEIR identifies measures to avoid eelgrass and horseshoe crab spawning off of Covell's Beach. The landfall location at Covell's Beach intersects mapped habitat for Piping Plover. Based on recommendation from NHESP, the SDEIR commits to begin HDD in advance of April 1 or after August 31 to minimize noise impacts to this species during the breeding season. Discussions with resource agencies to determine appropriate TOY restrictions for construction to avoid impacts to Piping Plovers (work prohibited from April 1 – August 31), bay scallops, whelks, squid eggs, and diving/plunging birds are ongoing. The Proponent indicates that installation of export cables may be sequenced to begin in the nearshore in one year ending with burial of the partial cable segments followed by splicing and laying of the remaining cable lengths in the offshore portion in the following year. The SDEIR identifies an ideal weather window for cable installation from April through September. For simultaneous lay and burial, cables would be installed in May and June, with shoreward work completed in April. For free lay and burial, cables would be installed in late March and late May, with shoreward work completed in April.

The SDEIR includes an updated draft of the Benthic Habitat Monitoring Plan, which incorporates the sand lance, and is intended to document habitat and benthic community disturbance and recovery associated with project construction and installation within areas of the WDA and in the selected offshore cable corridor. The Proponent will continue consultation with NHESP on the specifics of this plan with respect to the Sand Lance. The benthic survey is proposed to begin in 2019 or 2020. The plan will focus on seafloor habitat and benthic community to measure potential impacts and the recovery of these resources comparable to controls outside the areas of construction activity. The plan outlines the schedule for conducting pre-construction (baseline) and post-construction surveys; parameters that will be monitored; employing a benthic ecologist; content of monitoring reports; site locations and survey/sampling configurations; and monitoring methodologies.

The SDEIR includes a revised Electric and Magnetic Field (EMF) assessment (Attachment J). Magnetic field (MF) modeling for both the offshore and onshore cables was performed for 800 MW of output. MF impacts were modeled at the seafloor at two burial depths (one and two meters). Results indicate that the highest modeled MFs for the submarine cross sections would occur directly above the 400 MW cable at the one-meter burial depth. Modeled MFs fall rapidly with lateral distance from the buried cable and results suggest MF associated with buried, subsea cables is very low and would not interfere with the navigational sense of marine organisms. The SDEIR concludes that the electrical energy from cables will not be detected by marine organisms.

Fisheries Resources

The SDEIR addresses comments from DMF and CZM regarding potential impacts to fisheries and other marine resources and measures to avoid, minimize, and mitigate these impacts along the length of the cable corridor and within the project area. Consideration of TOY restrictions is ongoing in consultation with resource agencies.

The SDEIR characterizes fish and fisheries resources in the Project area and their value. Commercial fishing resources include maps of fishing activity based on Vessel Monitoring System (VMS), Vessel Trip Reports (VTRs), and landings databases maintained by the Northeast Regional Ocean Council (NROC) and the Mid-Atlantic Council on the Ocean (MARCO). The SDEIR includes a discussion of the potential impacts of the cable installation process, and an estimate of predicted recovery time for affected resources. The SDEIR includes revised sediment dispersion modeling for jet-plowing using two soil deposition thresholds: a deposition thickness of 1 mm (sensitivity threshold for demersal eggs based on findings related to Winter Flounder and a deposition thickness of 20 mm (sensitivity threshold for shellfish). Modeling results indicate that the predicted extent of sediment deposition that might impact Winter Flounder eggs (deposition greater than 1 mm) is limited to within 330 feet of the cable trench and dissipated within four to six hours following disturbance. Recolonization and recovery to pre-construction levels is expected given the similarity of nearby habitat and species.

Traffic and Transportation

The Project requires a Non-Vehicular Access Permit, Road Crossing Permits, and a Rail Division Use and Occupancy License from MassDOT. All onshore export cables will be buried within concrete duct banks, primarily within paved public roadway layouts with some shorter stretches in existing utility transmission ROW, a MassDOT-owned railroad ROW, and potentially along the bike path corridor proposed by MassDOT (Variant 3). The majority of these roads are maintained by the Towns of Yarmouth or Barnstable; the Preferred Route, Variant 1 (Independence Drive), is located exclusively within Barnstable and almost entirely within roadway ROWs.

Traffic impacts are limited to the construction period. The Proponent will continue to work closely with the municipalities and MassDOT to develop Traffic Management Plans (TMPs) to evaluate construction-related traffic impacts, maintain safe and efficient access for all modes of travel in the vicinity of the ROW, and propose mitigation including night work, signage, and similar measures. The SDEIR provides an outline of the revised draft TMP and describes potential construction sequencing and traffic impacts. The TMPs will be submitted for review and approval by the municipalities. The TMPs will be adapted and revised to address unanticipated changes in construction prior to implementation of construction changes. The Proponent will provide funding to municipalities to hire a construction monitor to evaluate compliance with TMPs and coordinate with municipalities and residents regarding concerns during construction. The TMPs will serve as Temporary Traffic Control Plans (TTCP) consistent with Federal Highway Administration (FHWA) and MassDOT guidelines.

Cultural Resources

Both offshore and onshore components of the Project are located in areas with significant cultural resources associated with ancient and historic period Native American activities and colonial

settlement. The project area includes a high density of shipwrecks and may include submerged ancient Native American cultural resources. The Project route contains numerous historic and archaeological resources which are either listed in the State and/or National Register of Historic Places, Inventory, or within local historic districts. The Project will require review from MHC pursuant to the Programmatic Agreement with BOEM as part of Section 106 of the NHPA. BUAR issued a Special Use Permit on September 28, 2017 for a marine archaeological reconnaissance survey in Barnstable, Martha's Vineyard, Nantucket, and Yarmouth. Activities allowed under this permit include archaeological reconnaissance and remote sensing, video documentation, benthic grab sample collection, and vibracore sampling in the permit area. MHC issued an archaeological permit to conduct a terrestrial archaeological reconnaissance survey for the onshore segment of the project.

The marine surveys were developed with BUAR, CZM and DMF to address data collection, including systematic sub-bottom coring and collection of geophysical data. The Proponent will provide upland and marine survey results to BUAR, MHC, CZM, and DMF. The SDEIR provides an update on consultations with MHC. The Proponent will coordinate directly with MHC regarding the need for additional field surveys and, to the extent necessary, will develop impact avoidance and mitigation plans. Potential impacts to archaeological resources will be addressed with MHC through Section 106 and the State Register Review processes.

The Proponent submitted a hardcopy of the draft COP to MHC and will provide an updated version of the COP after BOEM completes its sufficiency review, which includes draft archaeological reports for the terrestrial and marine aspects of the Project. The Proponent also submitted a draft terrestrial archaeological reconnaissance report MHC for its review. The COP will provide additional information about the scope of the wind array in federal waters and Areas of Potential Effect (APE) as determined by BOEM through its review under Section 106. The SDEIR indicates that cables and substation will not result in an adverse visual impact to historic properties and that construction and operation will not affect any historic buildings or structures.

The SDEIR indicates that the survey identified limited areas of archaeological sensitivity. The Proponent will avoid, minimize and/or mitigate impacts to archaeological resources during the final route selection. The SDEIR outlines the steps taken to limit adverse effects to submerged cultural resources in an inadvertent find protocol developed in accordance with BUAR's *Policy Guidance for the Discovery of Unanticipated Archaeological Resources*.

Port Facilities

The Proponent has signed a letter of intent with the Massachusetts Clean Energy Center (MassCEC) to use the New Bedford Marine Commerce Terminal for construction staging. The 26-acre facility is located on the New Bedford's industrial waterfront and was built to support offshore wind energy projects. The terminal is located within the ACOE hurricane barrier, has access to interstate highways and is located within a Designated Port Authority (DPA). The facility will be used to offload, prepare, and load components onto barges/vessels for delivery to the wind turbine array area for installation. It may also be used to fabricate and fit up components.

The Proponent may stage activities from other port facilities in the North Atlantic including Brayton Point and/or Montaup in Somerset; Providence, Rhode Island; Davisville, Rhode Island; and/or

New London and Bridgeport in Connecticut. The Proponent will use port facilities in Vineyard Haven and the New Bedford Marine Commerce Terminal during the operations and maintenance phase. The SDEIR indicates environmental review and permitting of port improvements will be addressed by the owners of those facilities.

The SDEIR describes potential conflicts with project-related vessels transiting to the WDA and other vessels along the route will be avoided and minimized. During the construction and installation phase, the Marine Coordinator will manage all construction vessel logistics between staging ports and the WDA, keep informed of all planned vessel deployment and liaise with the USCG, port authorities, state and local law enforcement, marine patrol, and port operators. Larger vessels used to install foundations, ESPs, and WTGs in federal waters will likely remain within federal waters and use port facilities or impact navigation within state waters to make infrequent bunkering trips. Vessels making round-trips from port facilities in Massachusetts are primarily smaller crew transport vessels (CTVs), tugboats, and jack-up vessels. Although an average of 25 vessels will be involved in construction activities on any given day, the SDEIR anticipates an average of 10 daily trips between both the primary and secondary ports and the WDA during construction.

Decommissioning

Decommissioning activities are anticipated to require federal, state, regional, and local permitting. The Proponent is required to "remove or decommission all facilities, projects, cables, pipelines, and obstructions and clear the seafloor of all obstructions created by activities on the leased area, including any project easements(s) within two years following lease termination, whether by expiration, cancellation, contraction, or relinquishment, in accordance with any approved Site Assessment Plan (SAP), COP or approved Decommissioning Application and applicable regulations in 30 CFR Part 585." The SDEIR indicates that these regulations extend to the full project, onshore and offshore, and in state and federal waters. The decommissioning application must be submitted to BOEM for its review and approval prior to decommissioning. It will include an analysis of resources, conditions, and activities that could be impacted by or could impact the decommissioning activities, a schedule, plans for disposal/reuse of removed facilities, and measures to protect archaeological and sensitive biological features and avoid discharge of pollutants. In addition, the Proponent will be required to set aside decommissioning funds (bond or other guaranteed financial assurance) in an amount determined by BOEM based on anticipated decommissioning costs pursuant to 30 CFR 585.516.

Decommissioning of the Project includes retirement in place or removal of offshore export cables, potential removal of onshore export cables and potential removal of substation equipment. Equipment and vessels used during decommissioning will likely be similar to those used during construction and installation. The Project's equipment is expected to have a life expectancy of up to 30 years and decommissioning would begin no earlier than 2052. The SDEIR does not identify potential environmental impacts associated with each decommissioning alternative. The Proponent asserts that it is challenging to quantify impacts associated with decommissioning at this time because experience in the European offshore wind industry and technological advances in methods and equipment may result in increased efficiencies and reduced environmental impacts associated with decommissioning.

The SDEIR addresses potential conflicts for future uses such as sewer or water mains within streets where splice vaults, conduits, and duct banks are left in place. The SDEIR indicates that the

Proponent has worked with town officials to assess potential onshore cable routes, which included identification of existing and planned underground municipal infrastructure. The Proponent commits to working with the Town of Yarmouth to ensure that the onshore duct bank will not conflict with potential sewer installation.

Conclusion

Based on a review of the SDEIR, the Scope included in the Certificate on the DEIR, consultation with State Agencies and review of comment letters, I have determined that the SDEIR is responsive to the Scope. Significant changes to the project identified in the SDEIR and during MEPA review will reduce environmental impacts compared to the DEIR. The Proponent should prepare the FEIR consistent with the Scope outlined below.

SCOPE

General

The FEIR should follow Section 11.07 of the MEPA regulations for outline and content, as modified by this Scope. Additional recommendations provided in this Certificate may result in a modified design that enhances the ability to avoid, minimize, or mitigate Damage to the Environment. The FEIR should discuss steps the Proponent has taken to further reduce the impacts of the project since the filing of the SDEIR, or, if certain measures are infeasible, the FEIR should discuss why these measures will not be adopted.

The FEIR should clearly identify the selection of the Covell's Beach landing site as the Preferred Route and identify its commitment to design and permit the project accordingly while continuing to include the New Hampshire Avenue landing site as the Noticed Alternative. The FEIR should address how and under what circumstances a subsequent change in routing would be disclosed to regulators and the public.

Project Description and Permitting

The FEIR should describe any changes to the project since the filing of the SDEIR. It should include updated site plans for existing and proposed conditions. Conceptual plans should be provided at a legible scale and clearly identify all: major project components; impervious areas; ownership of parcels including easement areas; stormwater, and utility infrastructure; and the location of wetland resource areas. The FEIR should include a list of required Permits, Financial Assistance, or other State approvals and provide an update on status. The FEIR should note that the project will require a Letter of Authorization and/or Scientific Permit from DMF for surveys and for the pre-lay grapnel run. The FEIR should provide an update on the federal and local review and permitting processes.

The FEIR should clarify whether the area of Covell's Beach affected by the project is protected by Article 97. If it is determined that it is Article 97 land, the FEIR must include an evaluation of

consistency with the Executive Office of Energy and Environmental Affairs (EEA) Article 97 Land Disposition Policy (Article 97 Policy).

The FEIR should provide information regarding the project schedule and construction sequencing for both onshore and offshore project elements.

Ocean Management Plan

The FEIR should include additional information to demonstrate that the selected route and cable laying method(s) will minimize impacts to hard/complex bottom. The FEIR should clearly delineate and describe the extent and area of hard bottom that cannot be avoided and must be excavated or covered to successfully bury the cables. The FEIR should include additional images obtained and habitat classification analysis conducted based on field surveys and investigations for areas where identified hard bottom and biogenic habitats are within or proximate to the cable footprint. It should provide updates and identification of specific areas of proposed construction activity (dredging, cable laying, vessel anchoring, dredged material deposition or disposal, cable burial), and provision of more detailed anchoring plans.

The FEIR should address the Project's consistency with the siting and management standards of the OMP for the routes through Muskeget Channel and landing at Covell's Beach. The FEIR should clearly demonstrate how the public benefits of the project outweigh the public detriments to SSU resources.

Comments from CZM and DMF emphasize the importance of selecting methods and equipment for cable installation that maximize avoidance and minimization of impacts to SSU resources. To the extent possible, installation methods, such as jet plowing and remotely operated seabed tractors that achieve burial with minimal seabed disturbance (including footprint, width of trench, and sidecast and suspension of sediments) should be used. The FEIR should include a commitment to develop an inspection and maintenance plan to assess coverage of the pipeline post-installation and, if problematic areas are identified, to identify measures to reestablish adequate burial or provide protection.

The Proponent and resource agencies have been consulting regarding the multiple and overlapping TOY restrictions which could severely limit, if not preclude, the installation window for the cable. The consultation and prioritization of TOY restrictions and other mitigating measures that will provide a sufficient window for cable installation will continue. The FEIR should include a framework for balancing construction needs and TOY restrictions.

DMF has established a standard protocol for communicating the location and timing of survey activities to fixed gear fishermen which includes using various media sources to alert members of the MLA to the location and start time of a survey, to provide daily updates on activities, to answer inquiries from fishermen, and identifies how to return intercepted gear. The Proponent should work with DMF and the fixed gear community to adopt a similar program to minimize impacts to this commercial fishery during construction.

Wetlands and Waterway

The FEIR should demonstrate that the Project will avoid, minimize or mitigate wetland resource area impacts to the maximum extent practicable. It should outline a comprehensive wetland mitigation program designed to meet ACOE, MassDEP, and local bylaw requirements and performance standards. This mitigation program should include monitoring, construction period measures, and restoration. The FEIR should address comments from CZM, DMF and others regarding identification of impacts to the seafloor and benthic habitat and appropriate mitigation. The FEIR should provide updated information regarding potential impacts to LCS, LUO, Coastal Bank, Coastal Beach and RFA for each cable route. The Proponent has indicated that it will provide all interpreted and raw field data (photos, videos, bathymetry, sidescan, biological and sediment grab samples) from the 2018 marine survey to State Agencies including CZM, MassDEP, DMF and NHESP.

The SDEIR indicates that the Proponent is refining the cable alignment within the installation corridor to avoid and minimize impacts to hard bottom and complex bottom. The FEIR should describe the refined cable alignment within the installation corridor and provide additional information regarding the extent of cable that cannot avoid these areas. To the extent possible based on project design and available data, the FEIR should identify where certain installation methods will be used.

The FEIR should specifically address comments from CZM and DMF regarding offshore cable installation. Estimates of length of hard/complex seafloor disturbed, volume of sand waves to be dredged and volume of fluidized sediment from jet-plowing should be updated using the most recent field data on sediment types, depths and the location and extent of hard/complex seafloor. The lengths, areas and volumes of disturbed seafloor should be recalculated taking into consideration guidance provided by CZM.

Comments from CZM suggest the analysis in the SDEIR may underestimate the potential volumetric impacts associated with dredging of sand waves. The FEIR should clarify the assumptions and assess the height and extent of areas of sand waves, based on marine survey data, to provide updated estimates of the volumetric impacts. The FEIR should assess resources within each proposed disposal area to ensure that impacts to sensitive benthic habitat or fisheries resources will be avoided during these activities. As recommended by CZM, the FEIR should identify potential dredge disposal locations that minimize impacts to benthic resources and to establish areas where dumping will be avoided using recent survey data. Suitable locations should avoid mapped biogenic habitats and identify areas with similar characteristics as the sites from which the material is dredged. The FEIR should clearly depict areas to be dredged and dredge disposal areas in maps with supporting field data. CZM comments indicate that the Proponent should validate areas mapped as biogenic structures and cobble or cobble mixes. The FEIR should incorporate the complete results from the 2018 marine surveys and present the data in a usable format. To the extent practicable, the FEIR should include references/links to the raw field data.

CZM comments note that results from the sediment dispersion modeling appear to integrate the sediment plume impacts over the total period of dredging activity and do not provide information for any given day. The FEIR should include model results for a representative day (potentially with an hourly breakdown) to better understand potential impacts associated with sedimentation and visibility for diving birds. The Proponent should use the 2018 survey data to avoid or minimize laying cable in

large sand waves (to avoid and minimize use of TSHD) and maximize the use of fluidization and jetting (using simultaneous cable lay and burial techniques) to minimize direct impacts to habitat and biota on the seafloor and indirect sedimentation on these resources. The Proponent should commit to verifying modeled results during the installation process and work with CZM and other resource agencies regarding the details of this monitoring program.

Comments from CZM and DMF emphasize that adequate burial of the cable should be maximized and armoring should be avoided to the extent possible. If burial depth is insufficient, the Proponent should employ efforts to rebury the cable to the appropriate depth or, if that is not feasible, cover the cable with sand bags and gravel/cobble cover to mimic adjacent seafloor conditions.

Fisheries Resources

The location and configuration of the WTGs in federal waters will impact resources and uses of State waters. Significant marine vessel navigational activity occurs across the offshore wind lease areas. The SDEIR indicates that the Proponent, in consultation with the Marine Coordinator and Fisheries Liaison, is evaluating the use of consistent transit lanes for construction vessels during the installation phase to reduce conflicts and minimize and eliminate loss of fishing gear. The FEIR should include a commitment to the establishment of transit corridors to ensure the safe passage of a high volume of vessels and identify transit lanes through the offshore lease areas in consultation with CZM, DMF, the MA Fisheries Working Group on Offshore Wind, USCG and other stakeholders. Comments from CZM and DMF provide additional guidance on feasible alternatives.

The FEIR should specify what type(s) of information will be provided regarding commercial and for-hire recreational fishing, how it will be collected, and how potential impacts on commercial and recreational fisheries will be evaluated. It should indicate how these fleets, management agencies and the public will be notified regarding adjustments to surveying, construction or operating procedures. The FEIR should describe appropriate compensatory mitigation for gear loss and lost fishing time. The Proponent should confirm it will use high flyer buoys to delineate active and future cable laying areas which has been a successful strategy in other projects.

The FEIR should include a summary of discussions regarding prioritization of TOY restrictions and a framework for construction sequencing. Comments from DMF indicate that cable laying in July and August instead of April and May avoids a more sensitive TOY for a wide array of natural resources that are actively reproducing and settling in the springtime in Nantucket Sound. The FEIR should describe the methods and results of all eelgrass surveys conducted, including at Spindle Rock and Egg Island. The FEIR should identify the basis for use of the 20 mm sediment deposition threshold for analysis of impacts to shellfish.

The Proponent has indicated that the Noticed Alternative will be carried through permitting. The FEIR should provide additional information regarding marine resources in Lewis Bay and measures to avoid impacts, or where avoidance is not possible, to minimize and mitigate impacts. DMF recommends that the Proponent conduct pre- and post-construction shellfish surveys. The FEIR should provide a map of Lewis Bay and the Noticed Alternative route, indicating the spatial extent of features, including mooring areas, shellfish propagation areas, bay scalloping and fishing areas, and aquaculture sites. The FEIR should describe how the cable could be micro-sited to avoid high density shellfish areas and how

TOY provisions (to avoid Winter Flounder and shellfish spawning seasons) could be employed to minimize impacts to resources in Lewis Bay. For the Noticed Alternative, the FEIR should compare impacts of the open trench and HDD alternatives to boat ramp traffic.

Rare Species, Wildlife, and Marine Resources

The Proponent will continue to work with MassDEP, CZM, DMF and the other resource agencies on development of monitoring plans and establishment of a process for determining if established performance standards have been met. The Proponent is working with DMF to incorporate Sand Lance into the plan to the extent feasible. NHESP will continue to evaluate these impacts as they relate to state-listed tern species and will provide comments on the Benthic Habitat Monitoring Plan. The FEIR should provide an update on these consultations and identify refinements to the plan.

A joint comment letter from CLF, Mass Audubon, NRDC, Environmental League of Massachusetts, NWF and the Acadia Center highlight the need for protection of North American Right Whales. These comments note the measures identified in the SDEIR and COP to avoid and minimize impacts to marine mammals in state and federal waters and urge the Proponent to clarify, strengthen and expand these measures in the FEIR. The FEIR should address the feasibility of incorporating the identified measures into the Project. In addition, it should indicate how and whether marine mammal protection identified in the FEIR will be coordinated and/or funded by the $15 million Accelerator Program.

NHESP comments continue to express concerns regarding potential impacts of the WTGs on rare and endangered shorebirds including Roseate Tern, Common Tern, and Least Tern associated with their staging, nesting and foraging habitats. The Proponent recently submitted supplemental information to NHESP documenting the results of a boat-based avian survey (focusing on state and federally-listed species during spring migration) within the WDA which confirmed that terns, including Roseate Terns, use the WDA during spring migration. NHESP anticipates providing additional comments and recommendations on the project through the NEPA process. NHESP identifies concerns that impacts to state- and federally-protected Roseate Tern and other listed avian species associated with the project have not been adequately addressed within either the COP or the SDEIR. The FEIR should include a comprehensive, adaptive strategy for avoiding, minimizing and mitigating potential impacts to listed avian species.

The FEIR should include details regarding how the construction activities, particularly in Muskeget Channel, will be timed, staged, and sequenced to minimize impacts to the high density of diving and plunging birds that use the channel for seasonal foraging, in addition to turtles, whales, other marine mammals, and other species of concern. As noted previously, the FEIR should propose a framework for balancing construction needs and TOY restrictions.

Mitigation and Section 61 Findings

The FEIR should include an updated and revised chapter that summarizes proposed mitigation measures and provides individual draft Section 61 Findings for each State Agency that will issue permits for the Project. The FEIR should contain clear commitments to implement mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and

contain a schedule for implementation. The draft Section 61 Findings provided in the SDEIR are very general and require additional specificity. In addition, they should clearly identify mitigation measures that are limited to a specific route or landing site.

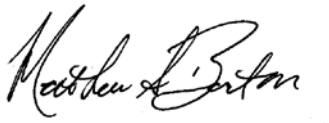
Responses to Comments

The FEIR should contain a copy of this Certificate and a copy of each comment letter received. In order to ensure that the issues raised by commenters are addressed, the FEIR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended, and shall not be construed, to enlarge the scope of the FEIR beyond what has been expressly identified in this certificate. I recommend that the Proponent use either an indexed response to comments format, or a direct narrative response.

Circulation

In accordance with Section 11.16 of the MEPA Regulations, the Proponent should circulate a hard copy of the FEIR to each State Agency and municipal agency from which the Proponent will seek permits or approvals. The Proponent must circulate a copy of the FEIR to all other parties that submitted individual written comments on the ENF, DEIR, and SDEIR.

In accordance with 301 CMR 11.16(5), the Proponent may circulate copies of the FEIR to these other parties in a digital format (e.g., CD-ROM, USB drive) or by directing commenters to a project website address. However, the Proponent should make available a reasonable number of hard copies to accommodate those without convenient access to a computer and distribute these upon request on a first-come, first-served basis. The Proponent should send a letter accompanying the digital copy or identifying the website address of the online version of the FEIR and indicate that hard copies are available upon request, noting relevant comment deadlines, and appropriate addresses for submission of comments. The FEIR submitted to the MEPA office should include a digital copy of the complete document. A copy of the FEIR should be made available for review at the public libraries in Yarmouth, Barnstable, Edgartown, Mashpee and Nantucket.



October 12, 2018
Date

Matthew A. Beaton

Comments received:

09/06/2018 Mark S. Donahue
09/13/2018 Rabbi Elias Lieberman
09/15/2018 Don Mallinson (2nd comments 10/03/2018)
09/16/2018 Sally Mavroides
09/16/2018 Jeffrey K. Kominers

09/17/2018 Nicola J. Blake, PhD
09/19/2018 Elizabeth Rodio
09/19/2018 Thomas Sullivan
09/20/2018 Linda Ziegler
09/20/2018 Wendy K. Northcross, Cape Cod Chamber of Commerce
09/25/2018 Richard Andre, Vineyard Power Cooperative
09/25/2018 Morgan D. Hodgson
09/25/2018 Eric P.
09/25/2018 Christine K. Greeley
09/25/2018 Dorothy Shannon
09/26/2018 Thomas Hodgson
09/26/2018 Ann Rosenkranz
09/26/2018 Anna Edey
09/26/2018 Katherine DiTrapano (2nd comments – 9/28/2018)
09/26/2018 Robert and Linda Genovese (2nd comments – 9/28/2018)
09/26/2018 Robert Monaldo (2nd comments – 9/28/2018)
09/26/2018 Steve and Donna Boulay
09/27/2018 Loren & Sheila Charif
09/28/2018 David R. Bernstein
09/28/2018 Dr. W. J. Overholtz
09/28/2018 Lisa Coedy
09/28/2018 Resolvert Williams
09/30/2018 Michael B. Jacobs, Vineyard Power Cooperative
09/30/2018 Sarah Jane Hughes
09/30/2018 Tom Soldini
09/30/2018 Laura Plunkett
10/01/2018 Massachusetts Board of Underwater Archaeological Resources (BUAR)
10/01/2018 Michael H. Shaw, Patriot Offshore Inc.
10/01/2018 Bruce S. Sostek
10/01/2018 Illegible signature
10/01/2018 Paul and Amy Thompson
10/01/2018 Kenneth & Cynthia Beebe
10/01/2018 Joanna DiTrapano (2nd comments 10/03/2018)
10/01/2018 Jeanne Fox
10/01/2018 Judy Edmunds
10/01/2018 Ronna C. Johnson (2nd comments 10/03/2018)
10/01/2018 Thomas Finelli
10/01/2018 Susan Seiton
10/01/2018 Donald Sostek
10/01/2018 Alan Richard Sostek
10/01/2018 Joan Ramidas
10/01/2018 Cynthia R.
10/01/2018 Chris Egan
10/01/2018 James and Diane Coco
10/01/2018 Robert and Marguerite Anderson
10/01/2018 J. Goldstein

10/01/2018 Maureen A. and John C. Dolan
10/01/2018 Mary M. Conneely
10/01/2018 Thomas and Roberta Burke
10/01/2018 Donna S. Ripley
10/01/2018 Robert M. Ripley
10/01/2018 Maurice and Eileen Cavanaugh
10/01/2018 Sean and Kelly J.
10/01/2018 Eileen Larney
10/01/2018 Paul Loselle
10/02/2018 Mark Kozma
10/02/2018 Karen L. O'Connor, PhD
10/02/2018 Barbara Durkin (2nd comments – 10/02/2018; 3rd, 4th, 5th comments – 10/03/2018)
10/02/2018 Denise K. Cummings
10/02/2018 Ardith Orr and John Griesemer
10/02/2018 Marianne Sforza
10/02/2018 Alexander and Elizabeth Boyle
10/02/2018 William T. Lake
10/03/2018 Association to Preserve Cape Cod (APCC)
10/03/2018 Martha's Vineyard Commission (MVC)
10/03/2018 Nicole Morris-McLaughlin, Marion Institute's Southcoast Energy Challenge
10/03/2018 Tom Durkin
10/03/2018 Maureen Condon
10/03/2018 Jonathan Hartzband
10/03/2018 Sheila B. Place
10/03/2018 Michelle Sgarlat
10/03/2018 Susan Starkey
10/03/2018 Russell and Nancy Twist
10/03/2018 Jan Hively, PD
10/03/2018 Barb Lambdin
10/03/2018 Paul F. Pimentel
10/03/2018 Dr. and Mrs. Gilbert Brinckerhoff
10/03/2018 Laurie Gates
10/03/2018 Dr. David D. Dow
10/03/2018 Kathleen Schatz
10/03/2018 Susan Brita
10/03/2018 Acres of Pines, Inc., Crowell Beach Associates, Inc., Englewood Shores Beach Association, Great Island Associates, Inc., Grist Mill Village Civic Association, Inc., Harborside Estates Beach Association, Hyannis Park Civic Association, Inc., Lewis Bay Neighborhood Association, Inc., Ocean Harbor Estates, Inc., Wimbledon Shores, Inc.
10/03/2018 Cynthia J. Khoury Bolles
10/03/2018 Arthur and Judith Warren (corrected version submitted 10/03/2018)
10/03/2018 Alyssa Greeley
10/03/2018 Denise Rooney
10/03/2018 Martha and John Sawyer
10/03/2018 Jo Daley
10/03/2018 Richard and Linda Loring

10/03/2018 John Nickandros
10/03/2018 Paul and Veronica Cove (2nd comments late – 10/09/2018)
10/03/2018 Mary Khoury
10/03/2018 Monica Kelley
10/03/2018 Janice VanDenton
10/03/2018 John Crowell
10/03/2018 Illegible signature
10/03/2018 Nancy J. Diomandes
10/03/2018 Thomas and Mary Mara
10/03/2018 Kelly Wietecha
10/03/2018 Susan Doliner
10/03/2018 Karen H. Crowell
10/03/2018 Gail Benson
10/03/2018 Mollie Jean Miller
10/03/2018 Charles E. Moran
10/03/2018 Cristopher Wietecha
10/03/2018 Benjamin D. Van Der Aa
10/03/2018 Judith Green
10/04/2018 Cape Cod Commission (CCC)
10/04/2018 John A. Cooke
10/04/2018 Rachel Youngling, Hyannis Park Civic Association
10/04/2018 Edmund J. Janiunas and Michael Dunbar
10/04/2018 Paul and Keri P.
10/04/2018 Annick S. Cooper
10/04/2018 Michael Dunbar
10/04/2018 Jim Reardon
10/04/2018 David Lowe
10/04/2018 Julie Taberman and Richard Horsley
10/04/2018 Jan Kubiac
10/05/2018 Massachusetts Division of Marine Fisheries (DMF)
10/05/2018 Massachusetts Natural Heritage and Endangered Species Program (NHESP)
10/05/2018 State Senator Julian Cyr and State Representative Dylan Fernandes
10/05/2018 Town of Yarmouth
10/05/2018 Conservation Law Foundation, Natural Resources Defense Council, National Wildlife Federation, Mass Audubon, Environmental League of Massachusetts, and Acadia Center
10/05/2018 Fisheries Survival Fund
10/05/2018 The Town Dock
10/05/2018 Responsible Offshore Development Alliance
10/05/2018 Charles Grant Walker
10/05/2018 Gerard Dhooge, Boston & New England Maritime Trades Council
10/05/2018 Susan L. Moran
10/05/2018 Jim Davos
10/05/2018 Chris Powicki
10/05/2018 Andrea and Dave Slote
10/05/2018 Linda Lancaster
10/05/2018 Warren Adams

10/05/2018 Raymond Rose Jr.
10/05/2018 Angela Carbone
10/05/2018 The DeNucci/Asaley/Busa Families
10/05/2018 Vida R. Morris
10/05/2018 Jeff K. Shrago
10/05/2018 John C. Henderson (2nd comments late – 10/09/2018)
10/05/2018 Martin T. Reilly, former State Senator
10/05/2018 Douglas Lawson (attachment could not be opened)
10/07/2018 Lindsay Crouch
10/08/2018 Unknown
10/09/2018 Massachusetts Historical Commission (MHC)
10/09/2018 Massachusetts Department of Environmental Protection (MassDEP)
10/09/2018 Massachusetts Office of Coastal Zone Management (CZM)

MAB/PPP/ppp

Appendix 12. RIDEM DMF commercial fishing report addendum (10/24/18)

Spatiotemporal and Economic Analysis of Vessel Monitoring System Data within Wind Energy Areas in the Greater North Atlantic

Addendum I

Rhode Island Department of Environmental Management
Division of Marine Fisheries

1 TABLE OF CONTENTS

2 LIST OF TABLES

3 PURPOSE OF ADDENDUM

The prior approach takes a fishing density-weighted estimate of fishing value within a WEA and includes only the points within a WEA in the value estimation. This means that only the portion of that trip that overlaps with the WEA is included in the value. An important note about this is that the trips that had been taken previously with a portion of the trip intersecting with the WEA, may now not occur as the WEA may disrupt the fishing activity of the entire trip. See figure below for example.

In this example, the blue shape represents a wind farm and the red line represents a fishing tow line. Only the portion where the line intersects the blue shape is included in the current calculation of the value estimation, while in reality, the full trip may be disrupted and may not occur in the future, depending on the final orientation of the wind farm and the area of the WEA the trip is occurring in. Thus, the VMS estimates provided in the original report should be interpreted as a minimal estimate of the total economic exposure created by each individual WEA.

In the additional approach provided in this addendum, the value of each trip in its entirety is included in the value estimation. Thus, the prior estimates may be interpreted as minimal estimates of economic exposure, and the estimates provided in this addendum may be interpreted as maximal estimates of economic exposure (i.e., if every trip that fished in part within a lease area or WEA was prevented). The true economic exposure is likely between the two.

It should also be noted that the values from each lease area or WEA cannot be combined, as overlapping trips may be included in multiple area values. Thus, adding values of areas may include the same trip multiple times.

4 ADDITIONAL METHODS

Following all steps of the previous methodology, a unique identifier was created in a new column by concatenating the species name, price paid to the dealer, the supplier trip ID, and the WEA in which the point occurred. The weighted point value was not used. The unique function in R was then used to select only rows with a unique value in the unique identifier column. This resulted in a dataframe containing a single row per trip per WEA (e.g., if a vessel fished in three WEAs on a single trip, three rows would result in the final dataset where there is a row for each of the WEAs and each row contains the same information except for the contents of the WEA column). From this point, the total trip value was aggregated annually by summing trip values based on the same parameters as before: by species landed, state landed in, port landed in, and gear used.

5 RESULTS

5.1 EX-VESSEL VALUES BY STATE

5.1.1 Fishing within the Deepwater Wind Lease Area

Over the six-year study period, the majority of landings from the Deepwater Wind area were made in two states: MA and RI (Table 1). Landings in both states exceeded $1 million in all years and totaled to $18,936,280.97 in MA and $13,119,899.98 in RI. The maximum annual values occurred in 2014 for MA ($4,525,862.04) and in 2013 for RI ($2,853,162.54).

5.1.2 Fishing within the Bay State Wind Lease Area

The majority of landings from the Bay State Wind area were made in the same two states: MA and RI. The six-year total was $13,539,321.80 for MA and $11,052,133.96 for RI (Table 2). The largest values occurred in 2015 and 2016 for MA landings and 2013, 2014 and 2016 for RI. All annual values for RI exceed $500,000 and all annual values for MA exceed $900,000.

5.1.3 Fishing within the Vineyard Wind Lease Area

RI and MA landed the majority of seafood from the Vineyard Wind area as well (six-year totals of $8,450,797.53 and $6,301,883.92, respectively; Table 3). Annual highs occurred in 2016 for RI ($3,072,606.73) and 2012 for MA ($1,789,728.95). All RI annual values exceeded $500,000 and all MA values exceeded $250,000. The state of NY also had landings greater than $500,000 in 2016.

5.1.4 Fishing within the Statoil (now Equinor) Lease Area

The highest annual landings coming from the Statoil (now Equinor) lease area went to the states of MA ($75,807,134.50 six-year total), NJ ($69,669,101.67 six-year total), and RI ($10,223,430.33 six-year total; Table 4). Annual highs for MA and NJ occurred in 2011 ($24,057,215.22 and $17,334,723.71, respectively) and in 2014 for RI ($3,314,073.96). All MA and NJ annual values exceeded $4 million and all RI annual values exceeded $500,000.

5.1.5 Fishing within the OCS-A 502 and OCS-A 503 WEAs

The values of landings from the OCS-A 502 WEA were greatest going into RI and MA, with RI values exceeding $500,000 in all years and reaching $1,178,043.18 in 2016 and MA values exceeding $250,000 all years and reaching $832,048.04 in 2012 (Table 5). Six-year totals reached $4,807,871.13 and $3,143,475.76 for RI and MA, respectively. There may be landings from this area in states south of NJ, but landings and VTRs were not obtained for those states as part of this work.

The landings values coming from the OCS-A 503 WEA all went to MA and accumulated to a $1,385,740.92 six-year total (Table 6).

5.2 EX-VESSEL VALUES BY PORT

5.2.1 Fishing within the Deepwater Wind Lease Area

The majority of landings from the Deepwater Wind area were made in two ports: New Bedford, MA ($17,718,903.90 six-year total), Point Judith, RI ($10,921,904.75 six-year total; Table 7). Annual highs occurred in 2013 for New Bedford ($4,245,205.20) and in 2014 in Point Judith ($2,402,309.73).

5.2.2 Fishing within the Bay State Wind Lease Area

Bay State Wind area fishing activity also resulted in landings primarily in New Bedford, MA ($11,848,681.65 six-year total) and Point Judith, RI ($10,072,332.00 six-year total; Table 8). Annual highs occurred in 2016 for both ports: $2,835,889.89 in New Bedford and $2,780,553.47 in Point Judith.

5.2.3 Fishing within the Vineyard Wind Lease Area

Fishing activity in the Bay State Wind area lead to landings mostly in Point Judith, RI ($7,999,559.57 six-year total) and New Bedford, MA ($5,539,352.31 six-year total) as well, with annual highs in 2016 for RI ($2,980,772.46) and 2012 for New Bedford ($1,575,748.70; Table 9).

5.2.4 Fishing within the Statoil (now Equinor) Lease Area

Within the Statoil/Equinor lease area, most fishing activity lead to landings in New Bedford, MA ($73,396,735.21 six-year total); Cape May, NJ ($29,305,818.42 six-year total); Point Pleasant, NJ ($14,566,162.22 six-year total); and Point Judith, RI ($6,794,086.01 six-year total; Table 10). Annual highs occurred in the following years for each port: 2011 for New Bedford ($22,525,.826.93) and Cape May ($9,579,036.94) and 2014 for Point Pleasant ($3,126,366,64) and Point Judith ($1,981,498.84).

5.2.5 Fishing within the OCS-A 502 and OCS-A 503 WEAs

Point Judith, RI ($4,395,287.27 six-year total) and New Bedford, MA ($2,349,058.89 six-year total) were the two ports where the majority of landings resulting from OCS-A 502 WEA fishing were made (Table 11). All Point Judith annual values exceeded $500,000 and 2016 reached $1,053,449.80. New Bedford annual landings reached $638,549.63 in 2012.

Fishing activity in the OCS-A 503 WEA resulted in landings primarily in New Bedford, MA and Chatham, MA. No annual values for either port reached $200,000 (Table 12).

5.3 Ex-vessel Values by Species Landed or Fishery Management Plan

5.3.1 Fishing within the Deepwater Wind Lease Area

The primary species/FMPs with landings coming from the Deepwater Wind area were the Sea Scallop FMP ($16,493,426.25 six-year total); the Northeast Multispecies FMP ($5,163,164.05 six-year total); the Monkfish FMP ($4,015,824.52 six-year total), the Squid, Mackerel, Butterfish FMP ($3,086,874.88 six-year total); and the Summer Flounder, Scup, Black Sea Bass FMP ($3,005,156.17 six-year total; Table 13). The annual high for the Sea Scallop FMP was in 2015 ($4,410,115.23); the high for the Northeast Multispecies FMP was in 2014 ($1,266,334.64); the high for the Monkfish FMP was in 2011 ($925,919.40); the annual high for the Squid, Mackerel, Butterfish FMP was in 2016 ($1,482,887.47); the high for the Summer Flounder, Scup, Black Sea Bass FMP was in 2012 ($751,953.72).

5.3.2 Fishing within the Bay State Wind Lease Area

The same six FMPs made up the majority of the landings from the Bay State Wind area. Six-year totals were as follows: $9,647,939.31 for the Sea Scallop FMP (with a 2015 high of $2,734,723.85); $5,930,212.15 for the Squid, Mackerel, Butterfish FMP (with a 2016 high of $3,444,130.25); $3,345,325.14 for the Summer Flounder, Scup Black Sea Bass FMP (with a 2013 high of $1,162,544.00); $3,132,262.82 for the Monkfish FMP (with a 2011 high of $656,789.99); $2,459,280.18 for the Northeast Multispecies FMP (with a 2014 high of $913,013.41); and $1,797,378.40 for the Northeast Small Mesh Multispecies FMP (with a 2016 high of $526,684.06; Table 14).

5.3.3 Fishing within the Vineyard Wind Lease Area

Four FMPs' fishing activity in the Vineyard Wind area resulted in most of the landings: Six-year totals from the Squid, Mackerel, Butterfish FMP; Sea Scallop FMP; Northeast Small Mesh Multispecies FMP; and Summer Flounder, Scup, Black Sea Bass FMP are $7,069,695.55; $3,492,324.72; $2,684,308.09; and $1,880,168.55, respectively (Table 15). Annual highs for both the Squid, Mackerel, Butterfish FMP ($3,819,617) and the Northeast Multispecies FMP ($823,293.34) occurred in 2016. The annual high for the Sea Scallop FMP was in 2012 ($1,366,019.30); for the Summer Flounder, Scup, Black Sea Bass FMP the high was in 2014 ($439,326.13).

5.3.4 Fishing within the Statoil (now Equinor) Lease Area

Landings from the Statoil/Equinor area were predominantly from Sea Scallop FMP activity. The 6-year total was $150,950,679.27, and the annual high occurred in 2011 with $42,167,898.55 (Table 16). All years exceeded $10 million. The Squid, Mackerel, Butterfish FMP also had notable landings with a six-year total of $9,176,405.23 and an annual high of $2,872,684.87 in 2012. The Northeast Multispecies FMP also reached a six-year total of $1,213,518.90 with an annual high of $639,544.07.

5.3.5 Fishing within the OCS-A 502 and OCS-A 503 WEAs

For the fishing activity in OCS-A 502, four FMPs resulted in the most landings: Squid, Mackerel, Butterfish FMP (six-year total of $3,104,337.85; annual high of $1,004,485.53 in 2016); Northeast Small mesh Multispecies FMP (six-year total of $2,367,988.56; annual high of $521,694.80 in 2016); Sea Scallop FMP (six-year total of $1,597,691.33; annual high of $921,463.03 in 2012); and Summer Flounder, Scup, Black Sea Bass FMP (six-year total of $1,525,594.00; annual high of $341,403.04 in 2013; Table 17).

No FMP or species landings reached $100,000 in a single year, though six-year totals accumulated to $342,559.39 for the Monkfish FMP; $208,177.53 for the Squid, Mackerel, Butterfish FMP; and $191,353.34 for the Northeast Small Mesh Multispecies FMP (Table 18).

5.4 Ex-vessel Values by Gear Used

5.4.1 Fishing within the Deepwater Wind Lease Area

The primary gear types used within the Deepwater Wind area were the scallop dredge ($16,486,655.81 six-year total), the bottom fish otter trawl ($12,036,401.50 six-year total), and the sink gill net ($3,599,103.29 six-year total; Table 19). Annual highs for each were: $4,425,062.36 in 2015 for the scallop dredge, $2,710,991.18 in 2014 for the bottom fish otter trawl, and $771,962.08 in 2011 for the sink gill net.

5.4.2 Fishing within the Bay State Wind Lease Area

The Bay State Wind area had the same primary gears used: bottom fish otter trawl (six-year total of $14,302,137.18 and annual high of $4,361,033.47 in 2016), scallop dredge (six-year total of $9,637,579.64 and annual high of $2,745,530.03 in 2015), and sink gill net (six-year total of $2,191,763.16 and annual high of $498,201.33; Table 20).

5.4.3 Fishing within the Vineyard Wind Lease Area

The Vineyard Wind area had the bottom fish otter trawl and the scallop dredge as the main gears used. The otter trawl had a six-year total of $12,550,647.12 with an annual high in 2016 at $5,036,628.76

(Table 21). The scallop dredge six-year total was $3,211,989.30 and the annual high of $1,365,623.30 occurred in 2012.

5.4.4 Fishing within the Statoil (now Equinor) Lease Area

The majority of landings from the Statoil/Equinor area came from scallop dredge usage. The six-year total was $150,385,960.00 and the annual high occurred in 2011 with $42,051,698.69; all annual values exceeded $10 million (Table 22). The bottom fish otter trawl also resulted in a $10,582,433.17 six-year total and an annual high in 2012 of $2,975,215.21; all annual values exceeded $200,000.

5.4.5 Fishing within the OCS-A 502 and OCS-A 503 WEAs

Landings from fishing in the OCS-A 502 WEA indicate that the primary gears were the bottom fish otter trawl and the scallop dredge. The otter trawl annual high occurred in 2016 with $1,882,054.10 and a six-year total of $7,296,152.16 (Table 23). The scallop dredge annual high was in 2012 at $921,463.03 and the six-year total was $1,597,738.28.

The gears most heavily used in the OCS-A 503 WEA were the bottom fish otter trawl and the sink gill net (Table 24).

6 TABLES

6.1 LANDINGS BY STATE – TOTAL TRIP VALUES

Table 1. Annual landings including total trip values in each study state coming from the Deepwater Wind lease area. NH had no landings from the lease area. (C) = confidential landings and (-) = no landings

State	2011	2012	2013	2014	2015	2016	Non-Confidential Total
CT	$123,870.87	$346,462.08	$303,122.64	$347,255.88	C	$144,590.80	$1,265,302.27
MA	$2,730,261.37	$1,352,236.08	$2,146,834.13	$4,270,928.25	$4,525,862.04	$3,910,159.10	$18,936,280.97
NJ	-	C	C	$27,320.80	$82,957.24	$30,680.60	$140,958.64
NY	$45,321.05	$38,989.19	$200,500.55	$115,217.83	$114,039.45	$199,885.15	$713,953.22
RI	$1,336,225.93	$1,763,327.11	$2,853,162.54	$2,674,480.08	$2,215,043.98	$2,277,660.34	$13,119,899.98

Table 2. Annual landings including total trip values in each study state coming from the Bay State Wind lease area. NH had no landings from the lease area. (C) = confidential landings and (-) = no landings

State	2011	2012	2013	2014	2015	2016	Non-Confidential Total
CT	$75,058.87	$387,604.73	$176,318.00	$89,854.03	-	$285,019.21	$1,013,854.84
MA	$1,167,299.03	$988,208.26	$2,091,373.20	$2,685,094.84	$3,243,343.89	$3,364,002.58	$13,539,321.80
NJ	-	C	C	$82,083.12	C	$71,634.06	$153,717.18
NY	$45,263.35	-	$287,633.76	$131,486.40	$145,264.80	$542,551.50	$1,152,199.81
RI	$896,414.82	$528,342.24	$2,655,633.87	$2,438,919.92	$1,663,043.84	$2,869,779.27	$11,052,133.96

Table 3. Annual landings including total trip values in each study state coming from the Vineyard Wind lease area. NH had no landings from the lease area. (C) = confidential landings and (-) = no landings

State	2011	2012	2013	2014	2015	2016	Non-Confidential Total
CT	$111,918.72	C	$132,648.00	C	-	$233,072.85	$477,639.57
MA	$274,093.43	$1,789,728.95	$1,194,243.92	$796,422.64	$641,739.39	$1,605,655.59	$6,301,883.92
NJ	-	C	-	C	$90,548.22	$87,846.31	$178,394.53
NY	C	C	$296,931.95	C	$253,453.50	$515,623.15	$1,066,008.60
RI	$606,220.87	$789,005.63	$1,429,129.66	$1,226,020.96	$1,327,813.68	$3,072,606.73	$8,450,797.53

Table 4. Annual landings including total trip values in each study state coming from the Statoil (now Equinor) lease area. NH had no landings from the lease area. Please note that the RI landings values will differ from the July 22, 2016 RIDEM report on the RI fishing value of the NY WEA. The methodologies of the addendum and the earlier report are the same, but the 2016 report used the original NY WEA shapefile, while this effort utilized the revised WEA now leased to Equinor (BOEM removed four aliquots). (C) = confidential landings and (-) = no landings

State	2011	2012	2013	2014	2015	2016	Non-Confidential Total
CT	$638,664.50	$1,546,826.79	$732,996.61	$308,793.30	-	C	$3,227,281.20
MA	$24,057,215.22	$13,344,927.85	$6,648,677.02	$20,388,010.02	$6,202,893.09	$5,165,411.30	$75,807,134.50
NJ	$17,334,723.71	$13,860,543.40	$12,050,918.65	$13,536,089.82	$8,320,392.47	$4,566,433.62	$69,669,101.67
NY	$1,450,298.12	$804,593.48	$251,559.30	$409,622.07	$154,651.00	$184,348.50	$3,255,072.47
RI	$1,532,575.04	$1,953,586.38	$2,243,578.19	$3,314,073.96	$561,494.71	$618,122.05	$10,223,430.33

Table 5. Annual landings including total trip values in each study state coming from the OCS-A 502 WEA. NH had no landings from the WEA. (C) = confidential landings and (-) = no landings

State	2011	2012	2013	2014	2015	2016	Non-Confidential Total
CT	C	$282,954.82	$60,482.00	C	-	$54,159.35	$397,596.17
MA	$358,111.03	$832,048.04	$679,205.27	$395,111.66	$283,384.59	$595,615.17	$3,143,475.76
NJ	-	C	-	C	C	C	C
NY	C	C	$443,235.36	C	$269,131.45	$126,216.10	$838,582.91
RI	$647,450.68	$804,203.11	$919,800.53	$586,621.54	$671,752.09	$1,178,043.18	$4,807,871.13

Table 6. Annual landings including total trip values in each study state coming from the OCS-A 503 WEA. NH had no landings from the WEA. (C) = confidential landings and (-) = no landings

State	2011	2012	2013	2014	2015	2016	Non-Confidential Total
CT	-	C	C	-	-	C	C
MA	$198,361.36	$369,185.71	$222,789.30	$274,004.94	$267,136.76	$54,262.85	$1,385,740.92
NY	C	C	C	C	C	-	C
RI	C	C	C	-	-	C	C

6.2 LANDINGS BY PORT – TOTAL TRIP VALUES

Table 7. Annual non-confidential landings including total trip values in each port (within the six study states) coming from the Deepwater Wind lease area. (C) = confidential landings and (-) = no landings

Port	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Atlantic City, NJ	-	C	-	-	-	-	C
Barnegat Light, NJ	-	-	-	-	C	-	C
Barnstable, MA	-	-	-	C	-	-	C
Boston, MA	-	-	-	-	C	C	C
Cape May, NJ	-	-	C	C	-	C	C
Chatham, MA	C	C	$9,265.90	C	C	-	$9,265.90
Chilmark, MA	C	-	-	-	-	-	C
Dartmouth, MA	C	-	-	-	-	-	C
Davisville, RI	-	-	-	-	C	-	C
East Haven, CT	-	-	-	-	-	C	C
Fairhaven, MA	C	-	-	-	C	-	C
Fall River, MA	-	-	-	C	-	C	C
Falmouth, MA	-	C	-	-	-	-	C
Gloucester, MA	C	C	C	C	C	C	C
Greenport, NY	C	-	-	C	-	-	C
Hampton Bays, NY	C	C	C	-	C	C	C
Jamestown, RI	-	-	C	C	C	-	C
Little Compton, RI	$257,095.75	$146,843.45	$145,008.60	C	C	C	$548,947.80
Menemsha, MA	-	-	-	-	C	-	C
Montauk, NY	$32,687.35	$24,338.19	$174,511.55	$94,200.20	$94,162.95	$178,132.65	$598,032.89
Mystic, CT	-	-	-	-	C	C	C
Nantucket, MA	-	-	-	-	C	-	C
New Bedford, MA	$2,637,639.56	$1,221,606.41	$1,992,516.01	$4,106,837.35	$4,245,205.20	$3,515,099.37	$17,718,903.90
New London, CT	C	C	$80,979.35	C	C	C	$80,979.35
New Shoreham, RI	-	-	-	C	-	-	C

Port	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Newport, RI	C	$204,685.52	$425,583.69	C	C	C	$630,269.21
North Kingstown, RI	-	-	-	-	-	C	C
Plymouth, MA	C	-	-	-	-	-	C
Point Judith, RI	$968,865.38	$1,381,278.69	$2,272,575.66	$2,402,309.73	$1,922,545.60	$1,974,329.69	$10,921,904.75
Point Pleasant, NJ	-	-	-	C	$53,735.19	C	$53,735.19
Portsmouth, RI	-	-	-	C	-	-	C
Providence, RI	-	-	C	-	-	-	C
Provincetown Wharf, MA	-	-	-	-	C	C	C
Shinnecock Reservation, NY	-	-	-	-	-	C	C
Stonington, CT	$61,418.75	$260,997.37	$222,143.29	C	-	C	$544,559.41
Tiverton, RI	-	C	C	$18,622.76	C	-	$18,622.76
Westport, MA	$59,714.20	C	$116,987.37	$89,058.40	C	$255,187.32	$520,947.29
Wildwood, NJ	-	-	-	-	-	C	C
Woods Hole, MA	-	C	C	C	-	-	C

Table 8. Annual non-confidential landings including total trip values in each port (within the six study states) coming from the Bay State Wind lease area. (C) = confidential landings and (-) = no landings

Port	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Atlantic City, NJ	-	C	-	-	-	-	C
Barnegat Light, NJ	-	-	-	C	-	-	C
Boston, MA	-	-	-	-	C	$72,398.35	$72,398.35
Cape May, NJ	-	-	-	-	-	C	C
Chatham, MA	C	$53,595.05	$71,143.15	C	C	C	$124,738.20
East Haven, CT	-	-	-	-	-	C	C
Fairhaven, MA	C	-	-	-	C	-	C
Fall River, MA	C	-	-	-	-	-	C
Falmouth, MA	-	C	-	-	-	-	C
Gloucester, MA	C	C	C	-	C	$285,542.69	$285,542.69
Greenport, NY	C	-	-	C	-	-	C
Hampton Bays, NY	-	-	C	-	C	C	C
Harwich Port, MA	-	-	-	C	C	-	C
Little Compton, RI	C	C	C	C	C	C	C
Menemsha, MA	-	-	-	-	C	C	C
Montauk, NY	$40,994.65	-	$261,644.76	$122,699.65	$125,388.30	$422,474.85	$973,202.21
Mystic, CT	-	-	-	-	-	C	C
New Bedford, MA	$903,463.60	$711,464.76	$1,925,866.99	$2,516,011.50	$2,955,984.91	$2,835,889.89	$11,848,681.65
New London, CT	C	C	$176,318.00	C	-	C	$176,318.00
Newport, RI	C	C	$221,813.30	C	C	-	$221,813.30
North Kingstown, RI	C	-	-	C	-	C	C
Point Judith, RI	$599,011.91	$481,832.34	$2,413,597.17	$2,172,444.62	$1,624,892.49	$2,780,553.47	$10,072,332.00
Point Pleasant, NJ	-	-	C	$74,699.62	C	C	$74,699.62
Provincetown Wharf, MA	-	-	-	C	C	-	C
Shinnecock Reservation, NY	-	-	-	-	-	C	C
Stonington, CT	C	C	-	C	-	C	C

Port	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Tiverton, RI	-	-	C	-	C	-	C
Westport, MA	$168,608.87	$108,245.52	$80,231.96	C	C	$157,091.90	$514,178.25
Woods Hole, MA	-	-	C	C	C	-	C

Table 9. Annual non-confidential landings including total trip values in each port (within the six study states) coming from the Vineyard Wind lease area. (C) = confidential landings and (-) = no landings

Port	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Barnegat Light, NJ	-	-	-	-	C	-	C
Belford, NJ	-	-	-	-	-	C	C
Boston, MA	-	-	C	-	C	C	C
Cape May, NJ	-	C	-	C	C	C	C
Chatham, MA	$102,120.19	$144,879.42	$70,968.05	$37,902.22	C	C	$355,869.88
East Haven, CT	-	-	-	-	-	C	C
Gloucester, MA	C	C	-	-	-	C	C
Hampton Bays, NY	-	-	C	-	C	C	C
Harwich Port, MA	-	-	-	-	C	C	C
Little Compton, RI	-	-	-	C	-	C	C
Montauk, NY	C	C	$268,142.95	C	$149,538.50	$401,899.00	$819,580.45
Mystic, CT	-	-	-	-	-	C	C
New Bedford, MA	$110,137.34	$1,575,748.70	$1,112,523.15	$732,842.02	$550,396.53	$1,457,704.57	$5,539,352.31
New London, CT	$55,807.52	C	C	C	-	C	$55,807.52
Newport, RI	-	-	C	-	-	-	C
North Kingstown, RI	C	-	-	-	-	C	C
Point Judith, RI	$480,937.02	$777,024.63	$1,215,988.56	$1,217,023.22	$1,327,813.68	$2,980,772.46	$7,999,559.57
Point Pleasant, NJ	-	-	-	C	C	C	C
Providence, RI	-	-	C	-	-	-	C
Provincetown Wharf, MA	C	-	-	-	C	-	C
Shinnecock Reservation, NY	-	-	-	-	-	C	C
Stonington, CT	C	-	C	-	-	C	C
Wakefield, RI	-	C	-	-	-	-	C
Westport, MA	C	C	C	C	C	C	C
Woods Hole, MA	-	-	-	-	C	-	C

Table 10. Annual non-confidential landings including total trip values in each port (within the six study states) coming from the Statoil (now Equinor) lease area. (C) = confidential landings and (-) = no landings

Port	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Atlantic City, NJ	-	-	-	C	C	-	C
Avalon, NJ	C	C	C	-	-	-	C
Barnegat Light, NJ	C	C	C	C	C	C	C
Barnstable, MA	C	-	-	-	-	-	C
Belford, NJ	C	C	C	C	C	C	C
Belmar, NJ	-	C	-	-	-	-	C
Boston, MA	-	-	-	-	C	-	C
Brielle, NJ	-	C	-	C	-	-	C
Cape May, NJ	$9,579,036.94	$5,578,437.90	$5,081,283.32	$5,399,652.54	$2,762,439.87	$904,967.85	$29,305,818.42
Fairhaven, MA	C	-	C	-	-	C	C
Fall River, MA	-	C	-	-	-	-	C
Freeport, NY	C	-	-	-	-	-	C
Gloucester, MA	-	-	-	-	-	C	C
Hampton Bays, NY	$362,610.45	$103,360.33	$118,106.10	$93,798.37	$26,762.98	-	$704,638.23
Islip, NY	C	-	-	-	-	-	C
Montauk, NY	$809,664.97	$564,480.90	$69,407.20	$156,690.85	$92,846.10	C	$1,693,090.02
New Bedford, MA	$22,525,826.93	$13,330,527.85	$6,445,810.38	$20,388,010.02	$6,187,677.29	$4,518,882.74	$73,396,735.21
New London, CT	C	$1,212,846.89	C	C	-	-	$1,212,846.89
Newport, RI	C	C	C	-	-	-	C
North Kingstown, RI	$0.00	C	C	C	-	-	C
Point Judith, RI	$1,363,878.64	$1,021,764.14	$1,362,466.08	$1,981,498.84	$561,494.71	$502,983.60	$6,794,086.01
Point Lookout, NY	C	$136,752.25	$46,056.00	$149,262.85	C	C	$332,071.10
Point Pleasant, NJ	$2,348,012.05	$2,706,423.66	$2,211,076.49	$3,126,366.65	$2,439,751.90	$1,734,532.47	$14,566,163.22
Sea Isle City, NJ	-	-	-	-	C	-	C
Shinnecock Reservation, NY	C	-	C	C	C	-	C

Port	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Stonington, CT	C	C	C	$294,126.55	-	C	$294,126.55
Wildwood, NJ	C	C	C	C	C	-	C

Table 11. Annual non-confidential landings including total trip values in each port (within the six study states) coming from the OCS-A 502 WEA. (C) = confidential landings and (-) = no landings

Port	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Boston, MA	-	-	C	-	C	-	C
Cape May, NJ	-	C	-	C	-	-	C
Chatham, MA	$144,945.46	$158,191.01	$54,136.85	$58,907.80	$37,213.62	C	$453,394.74
Falmouth, MA	-	C	-	-	-	-	C
Gloucester, MA	-	C	C	-	-	-	C
Hampton Bays, NY	-	-	C	C	C	C	C
Harwich Port, MA	-	-	-	-	C	C	C
Little Compton, RI	-	C	-	-	-	-	C
Montauk, NY	C	C	$435,005.36	C	$144,552.45	$76,525.70	$656,083.51
Mystic, CT	-	-	-	-	-	C	C
New Bedford, MA	$147,728.97	$638,549.63	$546,255.39	$276,345.76	$211,924.53	$528,254.61	$2,349,058.89
New London, CT	-	C	C	C	-	C	C
Newport, RI	-	-	$211,676.25	-	-	-	$211,676.25
North Kingstown, RI	C	-	-	-	-	C	C
Point Judith, RI	$638,752.75	$738,637.81	$706,073.28	$586,621.54	$671,752.09	$1,053,449.80	$4,395,287.27
Point Lookout, NY	-	C	-	-	-	-	C
Point Pleasant, NJ	-	-	-	C	C	C	C
Providence, RI	-	-	C	-	-	-	C
Provincetown Wharf, MA	C	C	-	C	C	-	C
Shinnecock Reservation, NY	-	-	-	-	-	C	C
Stonington, CT	C	C	C	-	-	C	C
Wakefield, RI	-	C	-	-	-	-	C
Westport, MA	C	C	C	C	-	C	C
Woods Hole, MA	-	-	C	-	C	-	C

Table 12. Annual non-confidential landings including total trip values in each port (within the six study states) coming from the OCS-A 503 WEA. (C) = confidential landings and (-) = no landings

Port	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Chatham, MA	$60,880.56	$82,354.34	C	$91,147.31	$53,667.60	$39,080.42	$327,130.23
Fairhaven, MA	-	C	-	-	C	-	C
Hampton Bays, NY	-	-	C	-	-	-	C
Harwich Port, MA	-	-	-	-	-	C	C
Little Compton, RI	-	C	-	-	-	-	C
Montauk, NY	C	C	C	C	C	-	C
Mystic, CT	-	-	-	-	-	C	C
New Bedford, MA	C	$53,176.04	$155,262.27	$143,132.03	$31,681.33	C	$383,251.67
New London, CT	-	C	C	-	-	C	C
Point Judith, RI	C	-	C	-	-	C	C
Stonington, CT	-	C	-	-	-	-	C
Westport, MA	C	-	C	C	-	-	C
Woods Hole, MA	-	-	-	-	C	-	C

6.3 LANDINGS BY SPECIES OR FMP – TOTAL TRIP VALUES

Table 13. Annual non-confidential landings including total trip values by species landed or fishery management plan (within the six study states) coming from the Deepwater Wind lease area. (C) = confidential landings and (-) = no landings

Species or FMP	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Bluefish FMP	$9,096.26	$7,500.31	$4,109.19	$6,227.16	$3,356.58	$3,254.15	$33,543.65
BONITO, ATLANTIC	C	C	C	C	C	-	C
CRAB, ATLANTIC ROCK	C	-	C	-	-	-	C
CUNNER	C	-	$198.55	C	C	-	$198.55
DOGFISH, SMOOTH	C	C	$870.40	C	$1,154.90	$2,126.75	$4,152.05
DOGFISH, SPINY	$16,458.29	$33,322.12	$27,757.90	$28,053.67	$16,114.89	$28,550.91	$150,257.78
DORY, AMERICAN JOHN	C	$736.88	$4,295.64	C	C	C	$5,032.52
EEL, CONGER	C	C	$67.16	C	$22.11	C	$89.27
FLOUNDER, FOURSPOT	-	-	C	-	C	C	C
GROUPERS	C	-	-	-	-	-	C
HAKE, SPOTTED	-	-	-	-	C	C	C
HALIBUT, ATLANTIC	-	C	C	C	-	-	C
Monkfish FMP	$925,919.40	$844,800.19	$739,770.90	$677,262.47	$442,675.36	$385,396.20	$4,015,824.52
Northeast Multispecies FMP	$309,589.16	$621,192.20	$1,207,467.07	$1,266,334.64	$720,703.84	$1,037,877.14	$5,163,164.05
Northeast Red Crab FMP	C	-	-	-	C	-	C
Northeast Small Mesh Multispecies FMP	$127,199.24	$88,680.47	$191,422.34	$284,182.68	$139,364.50	$155,633.84	$986,483.07
RAVEN, SEA	C	-	-	-	-	-	C
ROBINS, SEA	C	C	C	C	C	C	C
Sea Scallop FMP	$2,290,449.90	$1,045,779.61	$1,926,741.61	$3,986,075.76	$4,410,115.23	$2,834,264.14	$16,493,426.25
SHARK, SANDBAR	C	-	-	-	-	-	C
SHARK, THRESHER	-	C	-	-	-	-	C
Skate FMP	$5,104.01	$50,723.22	$47,400.22	$109,629.11	$122,178.77	$69,191.16	$404,226.49

Species or FMP	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Squid Mackerel Butterfish FMP	$176,331.44	$219,009.53	$514,417.90	$403,011.10	$291,217.44	$1,482,887.47	$3,086,874.88
Summer Flounder, Scup, Black Sea Bass FMP	$326,990.60	$497,591.68	$751,953.72	$630,328.72	$411,423.48	$386,867.97	$3,005,156.17
SWORDFISH	-	-	-	-	-	C	C
TAUTOG	C	C	C	-	C	-	C
TILEFISH, BLUELINE	C	-	-	-	-	C	C
TRIGGERFISHES	C	C	-	-	-	-	C
TUNNY, LITTLE	C	-	-	-	-	-	C

Table 14. Annual non-confidential landings including total trip values by species landed or fishery management plan (within the six study states) coming from the Bay State Wind lease area. (C) = confidential landings and (-) = no landings

Species or FMP	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Bluefish FMP	$9,414.43	$11,671.34	$4,039.60	$8,083.33	$3,257.80	$3,963.11	$40,429.61
BONITO, ATLANTIC	-	C	-	C	C	-	C
CROAKER, ATLANTIC	-	-	-	-	-	C	C
CUNNER	-	-	-	-	C	-	C
DOGFISH, SMOOTH	C	-	$1,336.75	$649.20	$2,092.40	$1,312.65	$5,391.00
DOGFISH, SPINY	$3,372.20	$9,855.34	$8,319.46	$3,145.67	$1,200.05	C	$25,892.72
DORY, AMERICAN JOHN	$1,745.40	C	$2,509.95	C	$701.25	$510.25	$5,466.85
EEL, AMERICAN	-	-	C	-	-	-	C
EEL, CONGER	-	C	C	C	C	$64.10	$64.10
FLOUNDER, FOURSPOT	C	-	-	-	$408.40	C	$408.40
HAKE, SPOTTED	-	-	-	-	C	C	C
HALIBUT, ATLANTIC	-	C	C	C	C	-	C
Monkfish FMP	$656,789.99	$520,898.81	$569,630.75	$654,711.06	$439,986.68	$290,245.53	$3,132,262.82
Northeast Multispecies FMP	$267,854.50	$60,192.03	$355,896.31	$913,013.41	$518,281.71	$344,042.22	$2,459,280.18
Northeast Small Mesh Multispecies FMP	$120,358.48	$298,886.67	$337,996.04	$250,859.66	$262,593.49	$526,684.06	$1,797,378.40
ROBINS, SEA	C	C	C	$32.24	C	-	$32.24
Sea Scallop FMP	$548,177.91	$407,719.52	$1,971,271.12	$1,918,225.27	$2,734,723.85	$2,067,821.64	$9,647,939.31
Skate FMP	C	$7,097.90	$14,035.95	$110,000.49	$89,908.69	$51,192.40	$272,235.43
SPOT	-	-	-	C	-	-	C
Squid Mackerel Butterfish FMP	$332,784.68	$257,638.15	$726,141.40	$678,510.82	$491,006.85	$3,444,130.25	$5,930,212.15
Summer Flounder, Scup, Black Sea Bass FMP	$223,684.79	$269,244.12	$1,162,544.00	$879,443.22	$510,239.69	$300,169.32	$3,345,325.14
SWORDFISH	-	-	-	-	-	C	C
TAUTOG	-	-	C	-	-	-	C

Species or FMP	2011	2012	2013	2014	2015	2016	Non-Confidential Total
TILEFISH, BLUELINE	C	-	-	-	-	C	C
TRIGGERFISHES	-	C	-	C	-	-	C
TUNNY, LITTLE	-	-	-	C	-	-	C

Table 15. Annual non-confidential landings including total trip values by species landed or fishery management plan (within the six study states) coming from the Vineyard Wind lease area. (C) = confidential landings and (-) = no landings

Species or FMP	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Bluefish FMP	$7,391.09	$11,694.84	$4,597.93	$5,616.35	$5,871.85	$3,971.91	$39,143.97
BONITO, ATLANTIC	-	-	-	C	C	C	C
CUNNER	-	-	-	-	C	-	C
DOGFISH, SMOOTH	-	C	$1,469.95	C	$2,599.20	$953.25	$5,022.40
DOGFISH, SPINY	$3,466.62	$2,322.37	$1,105.45	C	$615.55	$2,000.70	$9,510.69
DORY, AMERICAN JOHN	C	$1,111.10	C	C	$711.45	C	$1,822.55
EEL, CONGER	-	C	C	-	C	C	C
FLOUNDER, FOURSPOT	-	-	-	-	C	-	C
HAKE, SPOTTED	-	-	-	-	C	C	C
HALIBUT, ATLANTIC	-	C	-	C	-	C	C
Monkfish FMP	$163,872.44	$254,420.09	$199,032.87	$78,337.86	$121,379.28	$107,970.57	$925,013.11
Northeast Multispecies FMP	$47,408.33	$29,590.43	$158,735.93	$304,299.44	$165,788.61	C	$705,822.74
Northeast Small Mesh Multispecies FMP	$283,047.12	$520,938.60	$395,816.77	$275,346.47	$385,865.78	$823,293.35	$2,684,308.09
ROBINS, SEA	-	C	C	C	$22.90	-	$22.90
Sea Scallop FMP	C	$1,366,019.30	$1,084,202.65	$520,058.47	$243,680.65	$278,363.65	$3,492,324.72
Skate FMP	$19,388.98	C	C	$19,483.98	$41,752.00	$31,703.67	$112,328.63
SPOT	-	-	-	C	-	-	C
Squid Mackerel Butterfish FMP	$374,839.40	$629,863.91	$804,561.45	$515,937.56	$924,875.54	$3,819,617.69	$7,069,695.55
Summer Flounder, Scup, Black Sea Bass FMP	$103,969.23	$174,676.61	$369,104.24	$439,326.13	$419,596.03	$373,496.31	$1,880,168.55
SWORDFISH	-	-	-	-	-	C	C
TAUTOG	-	-	C	-	-	-	C
TILEFISH, BLUELINE	-	-	-	-	-	C	C

Table 16. Annual non-confidential landings including total trip values by species landed or fishery management plan (within the six study states) coming from the Statoil (now Equinor) Wind lease area. (C) = confidential landings and (-) = no landings

Species or FMP	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Bluefish FMP	$6,157.22	$5,976.49	$1,710.03	$2,438.93	$306.50	C	$16,589.17
BONITO, ATLANTIC	-	-	-	C	-	-	C
Coastal Migratory Pelagics FMP	C	-	-	-	-	-	C
CROAKER, ATLANTIC	-	-	-	$3,729.80	C	-	$3,729.80
DOGFISH, SMOOTH	$4,376.58	$4,179.62	$1,851.82	$2,747.80	$2,282.86	C	$15,438.68
DOGFISH, SPINY	$940.25	C	-	-	C	-	$940.25
DORY, AMERICAN JOHN	-	-	C	C	C	-	C
EEL, CONGER	-	C	C	-	-	-	C
Monkfish FMP	$108,743.49	$126,096.84	$56,657.51	$93,015.97	$42,884.43	$45,284.39	$472,682.63
Northeast Multispecies FMP	$115,259.88	$306,453.75	$639,544.07	C	C	$152,261.20	$1,213,518.90
Northeast Small Mesh Multispecies FMP	$8,512.27	$4,662.82	$20,624.19	$3,940.46	$1,907.77	C	$39,647.51
ROBINS, SEA	C	-	-	$70.24	C	-	$70.24
Sea Scallop FMP	$42,167,898.55	$28,099,760.78	$19,830,274.12	$35,840,640.59	$14,370,061.11	$10,642,044.12	$150,950,679.27
SHARK, THRESHER	-	-	-	C	-	-	C
Skate FMP	-	C	-	$27.28	$400.11	C	$427.39
Squid Mackerel Butterfish FMP	$2,481,105.59	$2,872,684.87	$1,341,252.36	$1,823,238.80	$656,415.62	$1,707.99	$9,176,405.23
Summer Flounder, Scup, Black Sea Bass FMP	$119,905.41	$89,168.50	$33,624.27	$152,014.35	$140,059.81	$44,463.43	$579,235.77
TAUTOG	-	C	-	-	-	-	C
TILEFISH, BLUELINE	-	-	C	C	C	-	C
TRIGGERFISHES	-	C	-	-	-	C	C
WHELK, CHANNELED	-	-	C	C	C	C	C

Table 17. Annual non-confidential landings including total trip values by species landed or fishery management plan (within the six study states) coming from the OCS-A 502 WEA. (C) = confidential landings and (-) = no landings

Species or FMP	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Bluefish FMP	$2,110.80	$9,139.54	$3,944.45	$3,632.05	$3,519.50	$4,002.22	$26,348.56
BONITO, ATLANTIC	-	-	-	-	C	-	C
DOGFISH, SMOOTH	C	C	$2,637.05	$1,246.70	$2,944.60	C	$6,828.35
DOGFISH, SPINY	$1,988.39	$296.06	$523.79	C	C	C	$2,808.24
DORY, AMERICAN JOHN	C	C	C	C	C	$1,611.25	$1,611.25
EEL, CONGER	-	C	-	C	C	-	C
FLOUNDER, FOURSPOT	C	-	-	-	-	-	C
HAKE, SPOTTED	-	-	-	-	-	C	C
HALIBUT, ATLANTIC	-	-	C	C	-	C	C
Monkfish FMP	$176,341.15	$218,063.04	$109,212.25	$86,295.75	$45,312.18	$40,712.73	$675,937.10
Northeast Multispecies FMP	$31,173.45	-	$11,974.80	$76,860.52	$25,758.46	C	$145,767.23
Northeast Small Mesh Multispecies FMP	$391,551.51	$456,888.01	$407,280.54	$225,892.48	$364,681.22	$521,694.80	$2,367,988.56
ROBINS, SEA	-	C	C	C	C	-	C
Sea Scallop FMP	C	$921,463.03	$521,336.30	$154,892.00	C	-	$1,597,691.33
Skate FMP	$17,345.21	C	C	$23,017.69	$43,279.79	$18,958.40	$102,601.09
Squid Mackerel Butterfish FMP	$358,111.73	$323,266.19	$632,812.91	$246,432.45	$539,229.04	$1,004,485.53	$3,104,337.85
Summer Flounder, Scup, Black Sea Bass FMP	$129,219.35	$215,668.55	$341,403.04	$268,822.74	$232,805.71	$337,674.61	$1,525,594.00
SWORDFISH	C	-	-	-	-	-	C
TAUTOG	-	-	-	C	-	-	C

Table 18. Annual non-confidential landings including total trip values by species landed or fishery management plan (within the six study states) coming from the OCS-A 503 WEA. (C) = confidential landings and (-) = no landings

Species or FMP	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Bluefish FMP	C	$336.20	$256.75	-	C	C	$592.95
DOGFISH, SMOOTH	-	-	-	-	C	-	C
DOGFISH, SPINY	$880.20	-	-	$875.50	C	C	$1,755.70
DORY, AMERICAN JOHN	C	-	C	-	C	C	C
EEL, CONGER	-	-	-	C	-	-	C
HALIBUT, ATLANTIC	-	-	-	C	-	C	C
Monkfish FMP	$71,854.06	$84,610.05	$19,174.55	$84,160.72	$47,005.23	$35,754.78	$342,559.39
Northeast Multispecies FMP	C	-	-	-	C	C	C
Northeast Small Mesh Multispecies FMP	$47,310.45	$70,192.55	$41,831.22	C	$11,936.07	$20,083.05	$191,353.34
Sea Scallop FMP	-	C	C	C	C	-	C
Skate FMP	$6,009.85	C	C	C	$12,891.65	$6,941.04	$25,842.54
Squid Mackerel Butterfish FMP	$79,656.94	$16,132.25	$54,725.74	C	$23,192.55	$34,470.05	$208,177.53
Summer Flounder, Scup, Black Sea Bass FMP	C	$6,845.38	$8,515.44	C	$17,486.43	$13,106.45	$45,953.70

6.4 LANDINGS BY GEAR – TOTAL TRIP VALUES

Table 19. Annual non-confidential landings including total trip values by gear type (within the six study states) coming from the Deepwater Wind lease area (C) = confidential landings and (-) = no landings

Gear	2011	2012	2013	2014	2015	2016	Non-Confidential Total
DREDGE, OCEAN QUAHOG/SURF CLAM	-	C	C	C	C	C	C
DREDGE, SCALLOP	$2,300,460.86	$1,035,225.81	$1,890,170.71	$3,990,717.00	$4,425,062.36	$2,845,019.07	$16,486,655.81
GILL NET, RUNAROUND	C	-	-	-	-	-	C
GILL NET, SINK	$771,962.08	$688,129.27	$664,728.59	$573,772.60	$488,219.53	$412,291.22	$3,599,103.29
LONGLINE, BOTTOM	C	C	-	-	-	-	C
OTTER TRAWL, BOTTOM, FISH	$1,102,956.24	$1,631,460.30	$2,565,418.45	$2,710,991.18	$1,589,841.53	$2,435,733.80	$12,036,401.50
OTTER TRAWL, MIDWATER	-	-	-	C	C	$119,664.00	$119,664.00
PAIR TRAWL, MIDWATER	-	C	$259,430.04	C	C	$562,751.02	$822,181.06
POT, CRAB/LOBSTER	$40,024.34	$91,595.20	$106,420.82	$42,330.71	$388,318.25	$177,449.47	$846,138.79
POT, FISH	-	-	C	-	-	C	C

Table 20. Annual non-confidential landings including total trip values by gear type (within the six study state) coming from the Bay State Wind lease area. (C) = confidential landings and (-) = no landings

Gear	2011	2012	2013	2014	2015	2016	Non-Confidential Total
DREDGE, OCEAN QUAHOG/SURF CLAM	-	C	C	C	C	C	C
DREDGE, SCALLOP	$551,261.41	$396,823.52	$1,954,669.82	$1,916,981.10	$2,745,530.03	$2,072,313.76	$9,637,579.64
GILL NET, SINK	$445,459.89	$498,201.33	$258,402.55	$355,938.35	$376,436.65	$257,324.39	$2,191,763.16
OTTER TRAWL, BOTTOM, FISH	$1,109,379.77	$941,317.73	$2,818,303.53	$3,143,594.76	$1,928,507.92	$4,361,033.47	$14,302,137.18
OTTER TRAWL, BOTTOM, SHRIMP	-	-	-	-	-	C	C
OTTER TRAWL, MIDWATER	C	-	-	-	-	C	C
PAIR TRAWL, MIDWATER	-	-	C	-	-	C	C

Table 21. Annual non-confidential landings including total trip values by gear type (within the six study state) coming from the Vineyard Wind lease area. (C) = confidential landings and (-) = no landings

Gear	2011	2012	2013	2014	2015	2016	Non-Confidential Total
DREDGE, OCEAN QUAHOG/SURF CLAM	-	-	-	-	-	C	C
DREDGE, SCALLOP	C	$1,365,623.30	$1,086,063.25	$516,370.35	$243,932.40	C	$3,211,989.30
GILL NET, SINK	$140,381.19	$235,051.15	$102,823.74	$50,562.12	$108,292.02	$116,691.14	$753,801.36
OTTER TRAWL, BOTTOM, FISH	$849,572.84	$1,397,741.78	$1,711,692.15	$1,593,681.22	$1,961,330.37	$5,036,628.76	$12,550,647.12
OTTER TRAWL, BOTTOM, SHRIMP	-	-	-	-	-	C	C
PAIR TRAWL, MIDWATER	C	-	C	-	-	-	C

Table 22. Annual non-confidential landings including total trip values by gear type (within the six study states) coming from the Statoil (now Equinor) lease area. (C) = confidential landings and (-) = no landings

Gear	2011	2012	2013	2014	2015	2016	Non-Confidential Total
DREDGE, OCEAN QUAHOG/SURF CLAM	-	-	C	C	-	-	C
DREDGE, SCALLOP	$42,051,698.69	$27,868,706.58	$19,866,398.12	$35,745,609.90	$14,365,612.55	$10,487,934.16	$150,385,960.00
GILL NET, SINK	C	C	-	-	C	C	C
OTTER TRAWL, BOTTOM, FISH	$2,703,975.13	$2,975,215.21	$1,815,727.84	$2,050,066.99	$820,165.56	$217,282.44	$10,582,433.17
OTTER TRAWL, BOTTOM, SCALLOP	C	$199,768.95	C	$126,951.81	C	-	$326,720.76
OTTER TRAWL, MIDWATER	-	C	C	-	-	C	C
PAIR TRAWL, MIDWATER	C	$446,751.56	C	C	C	C	$446,751.56
POT, CONCH/WHELK	-	-	C	-	-	-	C
SEINE, DANISH	-	-	-	-	C	-	C

Table 23. Annual non-confidential landings including total trip values by gear type (within the six study state) coming from the OCS-A 502 WEA. (C) = confidential landings and (-) = no landings

Gear	2011	2012	2013	2014	2015	2016	Non-Confidential Total
DREDGE, SCALLOP	C	$921,463.03	$522,186.75	$154,088.50	-	-	$1,597,738.28
GILL NET, SINK	$174,898.66	$205,617.76	$77,568.50	$99,571.90	$70,281.82	$55,306.31	$683,244.95
HARPOON	C	-	-	-	-	-	C
OTTER TRAWL, BOTTOM, FISH	$935,443.60	$1,021,851.23	$1,433,022.85	$835,436.25	$1,188,344.13	$1,882,054.10	$7,296,152.16
PAIR TRAWL, MIDWATER	-	-	C	-	-	-	C

Table 24. Annual non-confidential landings including total trip values by gear type (within the six study states) coming from the OCS-A 503 WEA. (C) = confidential landings and (-) = no landings

Gear	2011	2012	2013	2014	2015	2016	Non-Confidential Total
DREDGE, SCALLOP	-	C	C	C	C	-	C
GILL NET, SINK	$67,117.06	$84,235.74	C	$98,525.61	$58,245.55	$42,113.27	$350,237.23
OTTER TRAWL, BOTTOM, FISH	$146,919.99	$103,138.04	$105,575.10	C	$55,216.43	$68,921.55	$479,771.11
OTTER TRAWL, MIDWATER	-	-	-	-	-	C	C

7 APPENDIX

7.1 SIDE-BY-SIDE RESULTS OF THE WEIGHTED AND TOTAL TRIP VALUE APPROACHES

There are substantial differences between the results of the two approaches. This is primarily due to the inclusion of all points within a fishing trip using the total trip value approach, versus only considering the portion of a trip within the actual WEA in the original analysis. There are limitations to both approaches, as more of a trip may be affected by the presence of a wind farm than just the portion that occurs within that wind energy area, but a portion of the trip may still be able to occur. Therefore, there is uncertainty in how a fishery will respond to a wind farm and that response will likely depend on a variety of factors (e.g., turbine layout, number of turbines).

In an effort to clearly demonstrate the range in values coming from both methods, tables of the fisheries landings with both methods side-by-side are presented below. Only fisheries with larger values were included in these tables, though all values are available in the tables in the original document and earlier in this addendum. As previously stated, the weighted and spatially clipped method (referred to as "Weighted" in the tables below) may be interpreted as the lower bound of economic exposure, while the total trip value method (referred to as "Total" in the tables below) may be considered as the upper bound.

7.1.1 Landings by State – Side-by-Side Weighted and Total Trip Values

Table 25. Annual weighted landings and total trip value landings in each study state coming from the Deepwater Wind lease area. (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

State - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
MA - Weighted	$273,295.14	$299,707.13	$293,928.93	$419,532.08	$921,941.08	$1,091,151.12	$3,299,555.48
MA – Total	$2,730,261.37	$1,352,236.08	$2,146,834.13	$4,270,928.25	$4,525,862.04	$3,910,159.10	$18,936,280.97
RI – Weighted	$314,846.27	$344,832.26	$563,106.73	$743,139.01	$798,139.76	$398,520.43	$3,162,584.46
RI – Total	$1,336,225.93	$1,763,327.11	$2,853,162.54	$2,674,480.08	$2,215,043.98	$2,277,660.34	$13,119,899.98

Table 26. Annual weighted landings and total trip value landings in each study state coming from the Bay State Wind lease area (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

State - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
MA - Weighted	$432,258.46	$266,422.90	$677,701.14	$433,150.82	$406,115.57	$1,189,168.36	$3,404,817.25
MA – Total	$1,167,299.03	$988,208.26	$2,091,373.20	$2,685,094.84	$3,243,343.89	$3,364,002.58	$13,539,321.80
RI – Weighted	$132,863.46	$63,579.49	$623,837.32	$699,244.04	$398,902.05	$1,119,799.41	$3,038,225.75
RI – Total	$896,414.82	$528,342.24	$2,655,633.87	$2,438,919.92	$1,663,043.84	$2,869,779.27	$11,052,133.96

Table 27. Annual weighted landings and total trip value landings in each study state coming from the Vineyard Wind lease area (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

State – Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
MA - Weighted	$112,425.43	$987,431.20	$551,972.38	$199,069.54	$247,676.22	$675,235.18	$2,773,809.95
MA – Total	$274,093.43	$1,789,728.95	$1,194,243.92	$796,422.64	$641,739.39	$1,605,655.59	$6,301,883.92
RI – Weighted	$56,401.42	$53,035.97	$159,040.67	$257,132.80	$245,168.64	$1,142,581.23	$1,913,360.73
RI – Total	$606,220.87	$789,005.63	$1,429,129.66	$1,226,020.96	$1,327,813.68	$3,072,606.73	$8,450,797.53

Table 28. Annual weighted landings and total trip value landings in each study state coming from the Statoil (now Equinor) lease area. Please note that the RI total trip value landings values will differ from the July 22, 2016 RIDEM report on the RI fishing value of the NY WEA. The methodologies of the addendum and the earlier report are the same, but the 2016 report used the original NY WEA shapefile, while this effort utilized the revised WEA now leased to Equinor (BOEM removed four aliquots). (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

State - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
CT - Weighted	$73,581.40	$136,500.78	$57,180.47	$52,479.53	-	$80.39	$319,822.56
CT – Total	$638,664.50	$1,546,826.79	$732,996.61	$308,793.30	-	C	$3,227,281.20
MA – Weighted	$4,057,730.43	$1,373,540.07	$321,090.37	$1,356,719.10	$497,233.96	$286,700.41	$7,893,014.35
MA – Total	$24,057,215.22	$13,344,927.85	$6,648,677.02	$20,388,010.02	$6,202,893.09	$5,165,411.30	$75,807,134.50
NJ – Weighted	$2,711,295.27	$1,734,064.53	$1,034,975.58	$931,913.90	$1,251,437.97	$390,662.79	$8,054,350.04
NJ – Total	$17,334,723.71	$13,860,543.40	$12,050,918.65	$13,536,089.82	$8,320,392.47	$4,566,433.62	$69,669,101.67
NY – Weighted	$362,532.56	$21,046.42	$28,453.27	$119,737.05	$32,478.57	$3,083.03	$567,330.91
NY – Total	$1,450,298.12	$804,593.48	$251,559.30	$409,622.07	$154,651.00	$184,348.50	$3,255,072.47
RI – Weighted	$261,231.12	$103,638.26	$368,075.46	$589,751.75	$28,715.20	$2,158.15	$1,353,569.95
RI – Total	$1,532,575.04	$1,953,586.38	$2,243,578.19	$3,314,073.96	$561,494.71	$618,122.05	$10,223,430.33

7.1.2 Landings by Port – Side-by-Side Weighted and Total Trip Values

Table 29. Annual weighted landings and total trip value landings in each study port coming from the Deepwater Wind lease area. (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

Port - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
New Bedford, MA - Weighted	$262,238.32	$258,034.31	$231,092.90	$357,096.98	$877,566.42	$969,314.59	$2,955,343.52
New Bedford, MA - Total	$2,637,639.56	$1,221,606.41	$1,992,516.01	$4,106,837.35	$4,245,205.20	$3,515,099.37	$17,718,903.90
Point Judith, RI – Weighted	$135,152.73	$165,805.42	$223,148.68	$623,286.25	$598,181.01	$337,650.67	$2,083,224.76
Point Judith, RI – Total	$968,865.38	$1,381,278.69	$2,272,575.66	$2,402,309.73	$1,922,545.60	$1,974,329.69	$10,921,904.75

Table 30. Annual weighted landings and total trip value landings in each study port coming from the Bay State Wind lease area. (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

Port - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
New Bedford, MA - Weighted	$334,861.50	$143,456.23	$624,583.87	$345,847.43	$356,310.97	$866,115.77	$2,671,175.77
New Bedford, MA - Total	$903,463.60	$711,464.76	$1,925,866.99	$2,516,011.50	$2,955,984.91	$2,835,889.89	$11,848,681.65
Point Judith, RI – Weighted	$111,254.28	$40,401.57	$430,646.01	$679,573.55	$392,247.66	$1,076,542.94	$2,730,666.01
Point Judith, RI – Total	$599,011.91	$481,832.34	$2,413,597.17	$2,172,444.62	$1,624,892.49	$2,780,553.47	$10,072,332.00

Table 31. Annual weighted landings and total trip value landings in each study port coming from the Vineyard Wind lease area. (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

Port - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
New Bedford, MA - Weighted	$37,705.15	$884,492.00	$513,661.67	$177,570.24	$215,194.22	$615,985.94	$2,444,609.22
New Bedford, MA - Total	$110,137.34	$1,575,748.70	$1,112,523.15	$732,842.02	$550,396.53	$1,457,704.57	$5,539,352.31
Point Judith, RI – Weighted	$54,172.29	$52,724.30	$150,418.90	$257,070.74	$245,168.64	$1,111,489.95	$1,871,044.82
Point Judith, RI – Total	$480,937.02	$777,024.63	$1,215,988.56	$1,217,023.22	$1,327,813.68	$2,980,772.46	$7,999,559.57

Table 32. Annual weighted landings and total trip value landings in each study port coming from the Statoil (now Equinor) lease area. (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

Port - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Cape May, NJ – Weighted	$1,750,250.16	$791,932.12	$186,877.30	$398,576.69	$408,723.38	$31,715.68	$3,568,075.33
Cape May, NJ – Total	$9,579,036.94	$5,578,437.90	$5,081,283.32	$5,399,652.54	$2,762,439.87	$904,967.85	$29,305,818.42
New Bedford, MA - Weighted	$3,674,879.23	$1,371,324.69	$320,027.76	$1,356,719.10	$497,041.09	$248,166.07	$7,468,157.94
New Bedford, MA - Total	$22,525,826.93	$13,330,527.85	$6,445,810.38	$20,388,010.02	$6,187,677.29	$4,518,882.74	$73,396,735.21
Point Judith, RI – Weighted	$253,016.43	$22,716.38	$248,544.28	$318,928.22	$28,715.20	$2,011.25	$873,931.76
Point Judith, RI – Total	$1,363,878.64	$1,021,764.14	$1,362,466.08	$1,981,498.84	$561,494.71	$502,983.60	$6,794,086.01
Point Pleasant, NJ – Weighted	$472,366.07	$240,904.40	$458,312.55	$329,845.18	$496,932.35	$298,034.95	$2,296,395.50
Point Pleasant, NJ – Total	$2,348,012.05	$2,706,423.66	$2,211,076.49	$3,126,366.65	$2,439,751.90	$1,734,532.47	$14,566,163.22

7.1.3 Landings by Species or FMP – Side-by-Side Weighted and Total Trip Values

Table 33. Annual weighted landings and total trip value landings for each species or fishery management plan coming from the Deepwater Wind lease area. (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

Species/FMP - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Monkfish – Weighted	$321,298.32	$239,799.05	$236,555.53	$193,511.67	$152,545.99	$123,863.90	$1,267,574.46
Monkfish – Total	$925,919.40	$844,800.19	$739,770.90	$677,262.47	$442,675.36	$385,396.20	$4,015,824.52
NE Multispecies - Weighted	$53,035.13	$93,876.42	$189,910.88	$274,121.35	$201,613.35	$188,022.95	$1,000,580.08
NE Multispecies - Total	$309,589.16	$621,192.20	$1,207,467.07	$1,266,334.64	$720,703.84	$1,037,877.14	$5,163,164.05
Sea Scallop – Weighted	$138,251.18	$276,570.66	$286,370.37	$374,632.33	$1,083,888.70	$786,752.88	$2,946,466.12
Sea Scallop – Total	$2,290,449.90	$1,045,779.61	$1,926,741.61	$3,986,075.76	$4,410,115.23	$2,834,264.14	$16,493,426.25
Squid Mackerel Butterfish FMP – Weighted	$4,744.47	$6,440.79	$45,708.28	$65,211.77	$36,526.04	$238,832.79	$397,464.14
Squid Mackerel Butterfish FMP – Total	$176,331.44	$219,009.53	$514,417.90	$403,011.10	$291,217.44	$1,482,887.47	$3,086,874.88
Summer Flounder, Scup, Black Sea Bass FMP – Weighted	$39,499.10	$44,900.47	$120,749.87	$104,692.35	$95,174.20	$79,108.10	$484,124.09
Summer Flounder, Scup, Black Sea Bass FMP – Total	$326,990.60	$497,591.68	$751,953.72	$630,328.72	$411,423.48	$386,867.97	$3,005,156.17

Table 34. Annual weighted landings and total trip value landings for each species or fishery management plan coming from the Bay State Wind lease area. (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

Species/FMP - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
Monkfish – Weighted	$229,048.60	$222,086.17	$131,706.77	$189,995.47	$152,882.29	$120,574.90	$1,046,294.20
Monkfish – Total	$656,789.99	$520,898.81	$569,630.75	$654,711.06	$439,986.68	$290,245.53	$3,132,262.82
NE Multispecies - Weighted	$62,312.83	$13,526.03	$118,795.99	$548,426.99	$287,174.62	$244,375.50	$1,274,611.96
NE Multispecies - Total	$267,854.50	$60,192.03	$355,896.31	$913,013.41	$518,281.71	$344,042.22	$2,459,280.18
Sea Scallop – Weighted	$215,533.91	$24,794.77	$604,396.34	$116,761.02	$221,360.53	$570,567.27	$1,753,413.84
Sea Scallop – Total	$548,177.91	$407,719.52	$1,971,271.12	$1,918,225.27	$2,734,723.85	$2,067,821.64	$9,647,939.31
Squid Mackerel Butterfish FMP – Weighted	$9,146.52	$7,636.56	$178,368.96	$30,494.90	$41,720.44	$1,494,990.24	$1,762,357.62
Squid Mackerel Butterfish FMP – Total	$332,784.68	$257,638.15	$726,141.40	$678,510.82	$491,006.85	$3,444,130.25	$5,930,212.15
Summer Flounder, Scup, Black Sea Bass FMP – Weighted	$31,589.39	$29,318.04	$275,339.95	$262,752.12	$84,752.65	$84,280.35	$768,032.50
Summer Flounder, Scup, Black Sea Bass FMP – Total	$223,684.79	$269,244.12	$1,162,544.00	$879,443.22	$510,239.69	$300,169.32	$3,345,325.14

Table 35. Annual weighted landings and total trip value landings for each species or fishery management plan coming from the Vineyard Wind lease area. (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

Species/FMP - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
NE Small Mesh Multispecies - Weighted	$54,234.24	$61,117.67	$105,568.03	$95,737.31	$144,312.09	$473,309.82	$934,279.16
NE Small Mesh Multispecies - Total	$283,047.12	$520,938.60	$395,816.77	$275,346.47	$385,865.78	$823,293.35	$2,684,308.09
Sea Scallop – Weighted	C	$860,827.35	$486,967.00	$123,920.84	$42,903.90	$3,768.44	$1,518,387.53
Sea Scallop - Total	C	$1,366,019.30	$1,084,202.65	$520,058.47	$243,680.65	$278,363.65	$3,492,324.72
Squid Mackerel Butterfish FMP – Weighted	$19,589.39	$21,041.07	$78,916.33	$74,834.90	$133,944.37	$1,381,315.24	$1,709,641.30
Squid Mackerel Butterfish FMP – Total	$374,839.40	$629,863.91	$804,561.45	$515,937.56	$924,875.54	$3,819,617.69	$7,069,695.55

Table 36. Annual weighted landings and total trip value landings for each species or fishery management plan coming from the Statoil (now Equinor) lease area. (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

Species/FMP - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
NE Multispecies - Weighted	$659.02	$90,114.84	$25,483.60	C	C	$33,077.26	$149,334.72
NE Multispecies - Total	$115,259.88	$306,453.75	$639,544.07	C	C	$152,261.20	$1,213,518.90
Sea Scallop – Weighted	$6,805,054.97	$3,149,266.59	$1,471,671.72	$2,641,411.54	$1,707,500.43	$628,124.80	$16,403,030.05
Sea Scallop – Total	$42,167,898.55	$28,099,760.78	$19,830,274.12	$35,840,640.59	$14,370,061.11	$10,642,044.12	$150,950,679.27
Squid Mackerel Butterfish FMP – Weighted	$619,032.38	$115,326.85	$300,348.77	$370,063.37	$69,641.86	$54.12	$1,474,467.35
Squid Mackerel Butterfish FMP – Total	$2,481,105.59	$2,872,684.87	$1,341,252.36	$1,823,238.80	$656,415.62	$1,707.99	$9,176,405.23

7.1.4 Landings by Gear – Side-by-Side Weighted and Total Trip Values

Table 37. Annual weighted landings and total trip value landings caught by each gear coming from the Deepwater Wind lease area. (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

Gear - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
DREDGE, SCALLOP - Weighted	$141,622.75	$274,007.81	$271,641.80	$374,576.59	$1,087,685.54	$792,707.67	$2,942,242.16
DREDGE, SCALLOP - Total	$2,300,460.86	$1,035,225.81	$1,890,170.71	$3,990,717.00	$4,425,062.36	$2,845,019.07	$16,486,655.81
GILL NET, SINK – Weighted	$349,005.06	$300,934.68	$271,514.48	$229,031.14	$196,435.52	$147,416.20	$1,494,337.08
GILL NET, SINK – Total	$771,962.08	$688,129.27	$664,728.59	$573,772.60	$488,219.53	$412,291.22	$3,599,103.29
OTTER TRAWL, BOTTOM, FISH - Weighted	$109,488.29	$122,999.86	$335,022.52	$566,863.81	$376,647.48	$432,395.06	$1,943,417.02
OTTER TRAWL, BOTTOM, FISH - Total	$1,102,956.24	$1,631,460.30	$2,565,418.45	$2,710,991.18	$1,589,841.53	$2,435,733.80	$12,036,401.50

Table 38. Annual weighted landings and total trip value landings caught by each gear coming from the Bay State Wind lease area. (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

Gear - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
DREDGE, SCALLOP - Weighted	$216,084.09	$21,614.44	$595,947.28	$115,041.91	$220,941.56	$570,600.01	$1,740,229.29
DREDGE, SCALLOP - Total	$551,261.41	$396,823.52	$1,954,669.82	$1,916,981.10	$2,745,530.03	$2,072,313.76	$9,637,579.64
GILL NET, SINK – Weighted	$205,543.55	$228,174.84	$96,138.97	$139,276.23	$160,848.18	$128,020.37	$958,002.14
GILL NET, SINK – Total	$445,459.89	$498,201.33	$258,402.55	$355,938.35	$376,436.65	$257,324.39	$2,191,763.16
OTTER TRAWL, BOTTOM, FISH - Weighted	$152,116.57	$85,719.74	$733,738.82	$1,002,592.16	$486,879.17	$1,716,350.06	$4,177,396.52
OTTER TRAWL, BOTTOM, FISH - Total	$1,109,379.77	$941,317.73	$2,818,303.53	$3,143,594.76	$1,928,507.92	$4,361,033.47	$14,302,137.18

Table 39. Annual weighted landings and total trip value landings caught by each gear coming from the Vineyard Wind lease area. (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

Gear - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
DREDGE, SCALLOP - Weighted	C	$860,813.02	$487,985.38	$123,480.82	$42,929.62	C	$1,515,208.84
DREDGE, SCALLOP - Total	C	$1,365,623.30	$1,086,063.25	$516,370.35	$243,932.40	C	$3,211,989.30
OTTER TRAWL, BOTTOM, FISH - Weighted	$114,166.51	$109,599.42	$226,370.35	$331,493.73	$438,182.18	$1,981,018.41	$3,200,830.60
OTTER TRAWL, BOTTOM, FISH - Total	$849,572.84	$1,397,741.78	$1,711,692.15	$1,593,681.22	$1,961,330.37	$5,036,628.76	$12,550,647.12

Table 40. Annual weighted landings and total trip value landings caught by each gear coming from the Vineyard Wind lease area. (C) = confidential landings and (-) = no landings. White cells correspond to weighted trip values; gray cells correspond to total trip values.

Gear - Method	2011	2012	2013	2014	2015	2016	Non-Confidential Total
DREDGE, SCALLOP - Weighted	$6,773,376.44	$3,107,844.60	$1,476,807.03	$2,572,517.90	$1,700,301.74	$627,537.37	$16,258,385.08
DREDGE, SCALLOP - Total	$42,051,698.69	$27,868,706.58	$19,866,398.12	$35,745,609.90	$14,365,612.55	$10,487,934.16	$150,385,960.00
OTTER TRAWL, BOTTOM, FISH - Weighted	$666,580.55	$138,545.12	$330,454.54	$418,223.93	$96,418.33	$4,002.31	$1,654,224.78
OTTER TRAWL, BOTTOM, FISH - Total	$2,703,975.13	$2,975,215.21	$1,815,727.84	$2,050,066.99	$820,165.56	$217,282.44	$10,582,433.17

7.2 R CODE

7.2.1 Code to Aggregate Total Trip Values

```
options(scipen=999)
require(stringr)
require(rgdal)
require(reshape)
require(formattable)
require(raster)

setwd("C:/Livermore/Federal_Offshore_Energy/Wind/Large_Scale_VMS/Data/Results/TotTripVals")

NYWEA.pts<-
read.csv("C:/Livermore/Federal_Offshore_Energy/Wind/Large_Scale_VMS/Data/Results/NYWEA_Points.csv
")
DWW1.pts<-
read.csv("C:/Livermore/Federal_Offshore_Energy/Wind/Large_Scale_VMS/Data/Results/DWW1_Points.csv"
)
BaySt.pts<-
read.csv("C:/Livermore/Federal_Offshore_Energy/Wind/Large_Scale_VMS/Data/Results/BaySt_Points.csv
")
Vineyard.pts<-
read.csv("C:/Livermore/Federal_Offshore_Energy/Wind/Large_Scale_VMS/Data/Results/Vineyard_Points.
csv")
OCSA502.pts<-
read.csv("C:/Livermore/Federal_Offshore_Energy/Wind/Large_Scale_VMS/Data/Results/OCSA502_Points.c
sv")
OCSA503.pts<-
read.csv("C:/Livermore/Federal_Offshore_Energy/Wind/Large_Scale_VMS/Data/Results/OCSA503_Points.c
sv")

# Add column of WEA name and then do aggregations to a single file
# Aggregations by species caught, gear type, state, port, etc.
NYWEA.pts$WEA<-"NYWEA"
DWW1.pts$WEA<-"DWW1"
BaySt.pts$WEA<-"BaySt"
Vineyard.pts$WEA<-"Vineyard"
OCSA502.pts$WEA<-"OCSA502"
OCSA503.pts$WEA<-"OCSA503"

allDat<-rbind(NYWEA.pts,DWW1.pts,BaySt.pts,Vineyard.pts,OCSA502.pts,OCSA503.pts)

WEAs<-c("NYWEA","DWW1","BaySt","Vineyard","OCSA502","OCSA503")

remove(BaySt.pts,DWW1.pts,NYWEA.pts,Vineyard.pts,OCSA502.pts,OCSA503.pts)

# Clean up (we don't need the proportional values for this analysis)
allDat$X<-NULL
allDat$Prop.Value<-NULL
allDat$Weighted.Value<-NULL

##############################################################################################
# Run all analysis using a unique ID to find the value of all trips that used the
# WEAs, not a proportion.
##############################################################################################

# Create a unique ID to remove all points except one per species per trip
# We need to inclue the landed pounds and dollars because different grades of the
# same species may be landed at the same time from the same trip.

# Aggregate by species
allDat$UniqueID<-paste(allDat$Land.Supplier.Trip.Id,
                       allDat$Land.Common.Name,
                       allDat$Land.Dollars,
                       allDat$WEA,sep="")
allDat2<-allDat[!duplicated(allDat[,c("UniqueID")]),]
remove(allDat)
```

```
allDat.speciesValue<-aggregate(Land.Dollars~Land.Common.Name+Year+WEA,data=allDat2,FUN=sum)
allDat.speciesVessel<-aggregate(PERMIT~Land.Common.Name+Year+WEA,data=allDat2,function(x)
length(unique(x)))
allDat.speciesFisherman<-
aggregate(Land.Fisherman~Land.Common.Name+Year+WEA,data=allDat2,function(x) length(unique(x)))
allDat.speciesDealer<-
aggregate(Land.Dealer.License.Nbr~Land.Common.Name+Year+WEA,data=allDat2,function(x)
length(unique(x)))
allDat.speciesAgg<-
merge(allDat.speciesValue,allDat.speciesVessel,by=c("Land.Common.Name","Year","WEA"))
allDat.speciesAgg<-
merge(allDat.speciesAgg,allDat.speciesFisherman,by=c("Land.Common.Name","Year","WEA"))
allDat.speciesAgg<-
merge(allDat.speciesAgg,allDat.speciesDealer,by=c("Land.Common.Name","Year","WEA"))
colnames(allDat.speciesAgg)<-
c("Land.Species","Land.Year","WEA","Dollar.Value","Num.Vessel","Num.Fishermen","Num.Dealers")

remove(allDat.speciesValue)
remove(allDat.speciesVessel)
remove(allDat.speciesFisherman)
remove(allDat.speciesDealer)

# Aggregate by gear

allDat.gearValue<-aggregate(Land.Dollars~VTR.Gear.name+Year+WEA,data=allDat2,FUN=sum)
allDat.gearVessel<-aggregate(PERMIT~VTR.Gear.name+Year+WEA,data=allDat2,function(x)
length(unique(x)))
allDat.gearFisherman<-aggregate(Land.Fisherman~VTR.Gear.name+Year+WEA,data=allDat2,function(x)
length(unique(x)))
allDat.gearDealer<-
aggregate(Land.Dealer.License.Nbr~VTR.Gear.name+Year+WEA,data=allDat2,function(x)
length(unique(x)))
allDat.gearAgg<-merge(allDat.gearValue,allDat.gearVessel,by=c("VTR.Gear.name","Year","WEA"))
allDat.gearAgg<-merge(allDat.gearAgg,allDat.gearFisherman,by=c("VTR.Gear.name","Year","WEA"))
allDat.gearAgg<-merge(allDat.gearAgg,allDat.gearDealer,by=c("VTR.Gear.name","Year","WEA"))
colnames(allDat.gearAgg)<-
c("VTR.Gear","Land.Year","WEA","Dollar.Value","Num.Vessel","Num.Fishermen","Num.Dealers")

remove(allDat.gearValue)
remove(allDat.gearVessel)
remove(allDat.gearFisherman)
remove(allDat.gearDealer)

# Aggregate data by state

allDat.stateValue<-aggregate(Land.Dollars~Land.State+Year+WEA,data=allDat2,FUN=sum)
allDat.stateVessel<-aggregate(PERMIT~Land.State+Year+WEA,data=allDat2,function(x)
length(unique(x)))
allDat.stateFisherman<-aggregate(Land.Fisherman~Land.State+Year+WEA,data=allDat2,function(x)
length(unique(x)))
allDat.stateDealer<-
aggregate(Land.Dealer.License.Nbr~Land.State+Year+WEA,data=allDat2,function(x) length(unique(x)))
allDat.stateAgg<-merge(allDat.stateValue,allDat.stateVessel,by=c("Land.State","Year","WEA"))
allDat.stateAgg<-merge(allDat.stateAgg,allDat.stateFisherman,by=c("Land.State","Year","WEA"))
allDat.stateAgg<-merge(allDat.stateAgg,allDat.stateDealer,by=c("Land.State","Year","WEA"))
colnames(allDat.stateAgg)<-
c("Land.State","Land.Year","WEA","Dollar.Value","Num.Vessel","Num.Fishermen","Num.Dealers")

remove(allDat.stateValue)
remove(allDat.stateVessel)
remove(allDat.stateFisherman)
remove(allDat.stateDealer)

# Aggregate data by port

allDat.portValue<-aggregate(Land.Dollars~Land.Port+Land.State+Year+WEA,data=allDat2,FUN=sum)
allDat.portVessel<-aggregate(PERMIT~Land.Port+Land.State+Year+WEA,data=allDat2,function(x)
length(unique(x)))
```

```
allDat.portFisherman<-
aggregate(Land.Fisherman~Land.Port+Land.State+Year+WEA,data=allDat2,function(x)
length(unique(x)))
allDat.portDealer<-
aggregate(Land.Dealer.License.Nbr~Land.Port+Land.State+Year+WEA,data=allDat2,function(x)
length(unique(x)))
allDat.portAgg<-
merge(allDat.portValue,allDat.portVessel,by=c("Land.Port","Year","WEA","Land.State"))
allDat.portAgg<-
merge(allDat.portAgg,allDat.portFisherman,by=c("Land.Port","Year","WEA","Land.State"))
allDat.portAgg<-
merge(allDat.portAgg,allDat.portDealer,by=c("Land.Port","Year","WEA","Land.State"))
colnames(allDat.portAgg)<-
c("Land.Port","Land.Year","WEA","Land.State","Dollar.Value","Num.Vessel","Num.Fishermen","Num.Dea
lers")

allDat.portAgg$Land.Port<-paste(allDat.portAgg$Land.Port,", ",allDat.portAgg$Land.State,sep="")

remove(allDat.portValue)
remove(allDat.portVessel)
remove(allDat.portFisherman)
remove(allDat.portDealer)

# Export results
write.csv(allDat.gearAgg,"WEA_Land_by_Gear_TotalTripEst.csv")
write.csv(allDat.portAgg,"WEA_Land_by_Port_TotalTripEst.csv")
write.csv(allDat.stateAgg,"WEA_Land_by_State_TotalTripEst.csv")
write.csv(allDat.speciesAgg,"WEA_Land_by_Species_TotalTripEst.csv")

# Clean up tables again for confidentiality reasons
allDat.speciesAgg$VesConfid<-ifelse(allDat.speciesAgg$Num.Vessel>=3,1,0)
allDat.speciesAgg$FisherConfid<-ifelse(allDat.speciesAgg$Num.Fishermen>=3,1,0)
allDat.speciesAgg$DealerConfid<-ifelse(allDat.speciesAgg$Num.Dealers>=3,1,0)
allDat.speciesAgg$Confid<-ifelse(allDat.speciesAgg$VesConfid+
                                   allDat.speciesAgg$DealerConfid+
                                   allDat.speciesAgg$DealerConfid>=3,"OK","CONFIDENTIAL")
allDat.speciesAgg$Dollar.Value<-
ifelse(allDat.speciesAgg$Confid=="CONFIDENTIAL","C",allDat.speciesAgg$Dollar.Value)
allDat.speciesAgg<-allDat.speciesAgg[,1:4]

allDat.stateAgg$VesConfid<-ifelse(allDat.stateAgg$Num.Vessel>=3,1,0)
allDat.stateAgg$FisherConfid<-ifelse(allDat.stateAgg$Num.Fishermen>=3,1,0)
allDat.stateAgg$DealerConfid<-ifelse(allDat.stateAgg$Num.Dealers>=3,1,0)
allDat.stateAgg$Confid<-ifelse(allDat.stateAgg$VesConfid+
                                 allDat.stateAgg$DealerConfid+
                                 allDat.stateAgg$DealerConfid>=3,"OK","CONFIDENTIAL")
allDat.stateAgg$Dollar.Value<-round(allDat.stateAgg$Dollar.Value,2)
allDat.stateAgg$Dollar.Value<-
ifelse(allDat.stateAgg$Confid=="CONFIDENTIAL","C",allDat.stateAgg$Dollar.Value)
allDat.stateAgg<-allDat.stateAgg[,1:4]

allDat.portAgg$VesConfid<-ifelse(allDat.portAgg$Num.Vessel>=3,1,0)
allDat.portAgg$FisherConfid<-ifelse(allDat.portAgg$Num.Fishermen>=3,1,0)
allDat.portAgg$DealerConfid<-ifelse(allDat.portAgg$Num.Dealers>=3,1,0)
allDat.portAgg$Confid<-ifelse(allDat.portAgg$VesConfid+
                                allDat.portAgg$DealerConfid+
                                allDat.portAgg$DealerConfid>=3,"OK","CONFIDENTIAL")
allDat.portAgg$Dollar.Value<-round(allDat.portAgg$Dollar.Value,2)
allDat.portAgg$Dollar.Value<-
ifelse(allDat.portAgg$Confid=="CONFIDENTIAL","C",allDat.portAgg$Dollar.Value)
allDat.portAgg<-allDat.portAgg[,c(1:3,5)]

allDat.gearAgg$VesConfid<-ifelse(allDat.gearAgg$Num.Vessel>=3,1,0)
allDat.gearAgg$FisherConfid<-ifelse(allDat.gearAgg$Num.Fishermen>=3,1,0)
allDat.gearAgg$DealerConfid<-ifelse(allDat.gearAgg$Num.Dealers>=3,1,0)
allDat.gearAgg$Confid<-ifelse(allDat.gearAgg$VesConfid+
                                allDat.gearAgg$DealerConfid+
                                allDat.gearAgg$DealerConfid>=3,"OK","CONFIDENTIAL")
allDat.gearAgg$Dollar.Value<-round(allDat.gearAgg$Dollar.Value,2)
allDat.gearAgg$Dollar.Value<-
ifelse(allDat.gearAgg$Confid=="CONFIDENTIAL","C",allDat.gearAgg$Dollar.Value)
```

```
allDat.gearAgg<-allDat.gearAgg[,1:4]

# Subset by WEAs to
for (wea in WEAs){

  # By species by year
  weaSubSp<-subset(allDat.speciesAgg,WEA==wea)
  weaSubSp$WEA<-NULL
  weaSubSp<-reshape(weaSubSp,idvar="Land.Species",timevar="Land.Year",direction="wide")
  colnames(weaSubSp)<-substr(colnames(weaSubSp),nchar(colnames(weaSubSp))-
3,nchar(colnames(weaSubSp)))
  weaSubSp<-weaSubSp[,order(names(weaSubSp))]
  weaSubSp<-weaSubSp[,c(7,1,2,3,4,5,6)]
  colnames(weaSubSp)[1]<-"Species or FMP"
  weaSubSp[is.na(weaSubSp)]<-0
  fileName<-paste(wea,"_SpeciesLand_by_Year_TotalTripEst.csv",sep="")
  write.csv(weaSubSp,fileName)

  # By state by year
  weaSubSt<-subset(allDat.stateAgg,WEA==wea)
  weaSubSt$WEA<-NULL
  weaSubSt<-reshape(weaSubSt,idvar="Land.State",timevar="Land.Year",direction="wide")
  colnames(weaSubSt)<-substr(colnames(weaSubSt),nchar(colnames(weaSubSt))-
3,nchar(colnames(weaSubSt)))
  weaSubSt<-weaSubSt[,order(names(weaSubSt))]
  weaSubSt<-weaSubSt[,c(7,1,2,3,4,5,6)]
  colnames(weaSubSt)[1]<-"State"
  weaSubSt[is.na(weaSubSt)]<-0
  fileName<-paste(wea,"_StateLand_by_Year_TotalTripEst.csv",sep="")
  write.csv(weaSubSt,fileName)

  # By port by year
  weaSubPort<-subset(allDat.portAgg,WEA==wea)
  weaSubPort$WEA<-NULL
  weaSubPort<-reshape(weaSubPort,idvar="Land.Port",timevar="Land.Year",direction="wide")
  colnames(weaSubPort)<-substr(colnames(weaSubPort),nchar(colnames(weaSubPort))-
3,nchar(colnames(weaSubPort)))
  weaSubPort<-weaSubPort[,order(names(weaSubPort))]
  weaSubPort<-weaSubPort[,c(7,1,2,3,4,5,6)]
  colnames(weaSubPort)[1]<-"Port"
  weaSubPort[is.na(weaSubPort)]<-0
  fileName<-paste(wea,"_PortLand_by_Year_TotalTripEst.csv",sep="")
  write.csv(weaSubPort,fileName)

  # By gear by year
  weaSubGear<-subset(allDat.gearAgg,WEA==wea)
  weaSubGear$WEA<-NULL
  weaSubGear<-reshape(weaSubGear,idvar="VTR.Gear",timevar="Land.Year",direction="wide")
  colnames(weaSubGear)<-substr(colnames(weaSubGear),nchar(colnames(weaSubGear))-
3,nchar(colnames(weaSubGear)))
  weaSubGear<-weaSubGear[,order(names(weaSubGear))]
  weaSubGear<-weaSubGear[,c(7,1,2,3,4,5,6)]
  colnames(weaSubGear)[1]<-"Gear"
  weaSubGear[is.na(weaSubGear)]<-0
  fileName<-paste(wea,"_GearLand_by_Year_TotalTripEst.csv",sep="")
  write.csv(weaSubGear,fileName)

  remove(weaSubGear,weaSubPort,weaSubSp,weaSubSt)

}

remove(allDat.gearAgg,allDat.portAgg,allDat.speciesAgg,allDat.stateAgg)
```

FISHERIES INPUT TO VINEYARD WIND MONITORING PLAN

The School for Marine Science & Technology (UMass Dartmouth) invites fishermen to a series of workshops to identify what questions and information would be most valuable for pre- and post-construction assessments of fisheries, ecological conditions, social and economic aspects of fisheries in and around the Vineyard Wind offshore wind lease area.

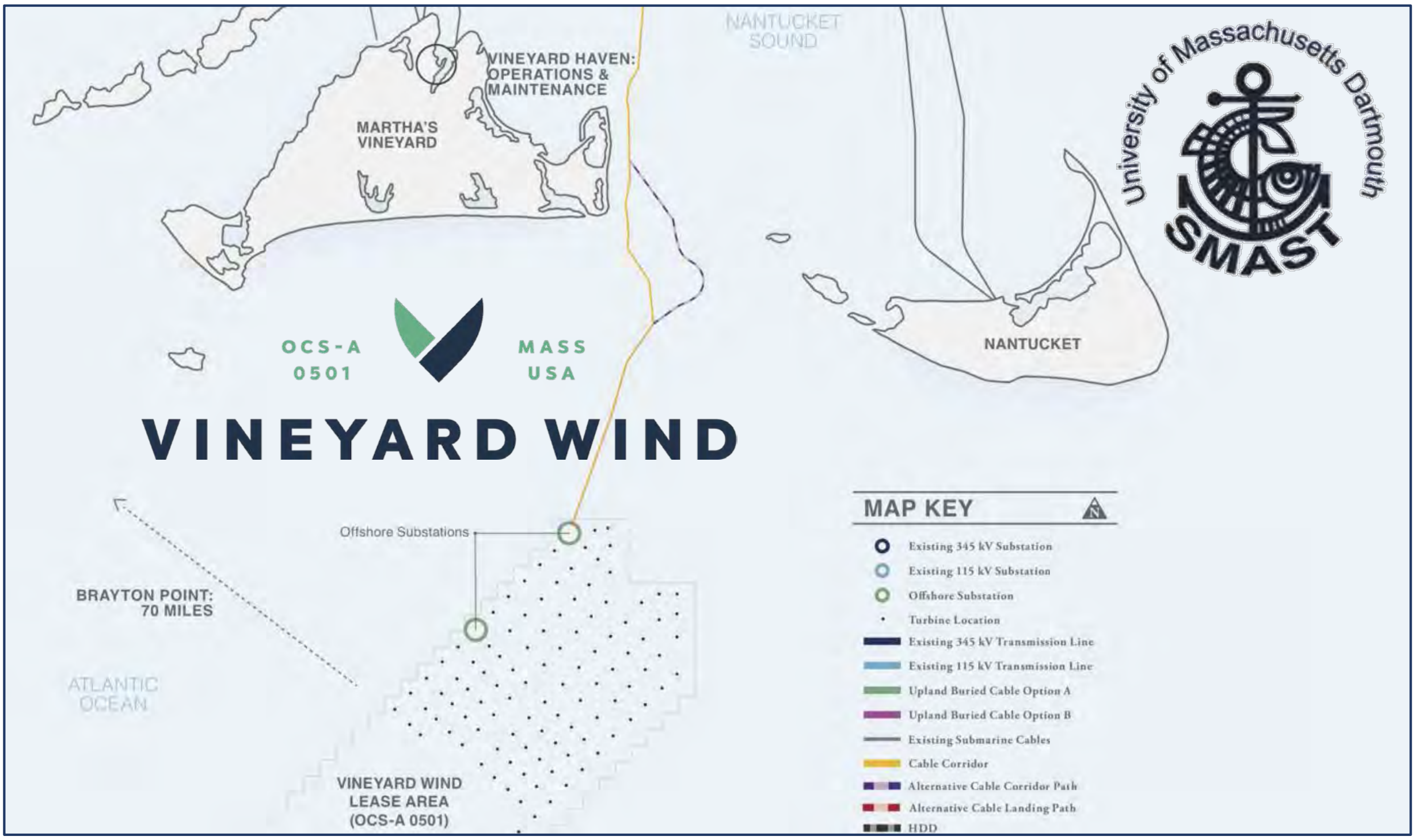
- We invite people involved in any local fisheries.
- Workshops will include a brief description, status and plans of the Vineyard Wind project, results from some initial fishery resource surveys, and discussion to identify priorities for pre- and post-construction monitoring plans.

Workshop Schedules (all workshops are 6-8pm):

- Thursday November 8, School for Marine Science & Technology (836 South Rodney French Boulevard, New Bedford MA)
- Thursday November 15, Commercial Fisheries Center of Rhode Island (East Farm Campus Building 61B URI, Kingston RI)
- Monday November 19, 6-8pm, Chatham Community Center (702 Main Street, Chatham MA)
- Monday December 3, West Tisbury Library (1042 State Rd, West Tisbury MA)

Vineyard Wind recognizes that the time invested in meetings is time taken away from fishing and is offering commercial fishermen $200 to attend workshops.
Contact: Crista Bank (508 525-0421, cbank@vineyardwind.com)

FISHERIES INPUT TO VINEYARD WIND MONITORING PLAN



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Contact: Crista Bank (508 525-0421, cbank@vineyardwind.com)

Appendix 14. Vineyard Wind submission to CRMC regarding East-West Layout and Proposed Alternatives (11/9/18)

VIA Electronic Mail and FedEx

November 9, 2018

Grover J. Fugate
Executive Director
Rhode Island Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, RI 02879-1900

Re: Vineyard Wind – CRMC File No. 2018-04-055

Dear Mr. Fugate:

As we discussed at our October 9, 2018 meeting with you and the Coastal Resources Management Council ("CRMC") staff, and as a follow-up to our November 1, 2018 meeting ("November 1 Meeting")with CRMC, the Governor's Office, BOEM, and others, Vineyard Wind is submitting this letter and the attached information regarding Vineyard Wind's ability to accommodate the fishing industry's request that turbines be aligned in rows going in an east-west direction with 1 nautical mile ("nm") separation distances between turbine rows. We also include herein the alternative layout discussed at the November 1 Meeting and included in our October 22, 2018 Construction and Operation Plan ("COP") submission that reduces the area of the Wind Development Area ("WDA") where turbines cannot be aligned in an east-west direction and which provides east-west fishing lanes along the southern portion of the WDA (the "COP Appendix III-R Alternative" shown in Attachment A).

As we also discussed at the November 1 Meeting, Vineyard Wind has been exploring the possibility of procuring a turbine model with a larger generation capacity (megawatts), which would decrease the number of required turbine locations and thereby further decrease the area of the WDA that cannot be aligned in an east-west direction. We are pleased to inform you that Vineyard Wind has been able to secure a larger turbine than we had previously anticipated, indeed it is the largest turbine commercially available in the world today. Even though use of this new turbine presents additional risk to the project by using a "first-in-series" turbine model, which has not yet received necessary design certifications, Vineyard Wind commits to employ this new turbine in order to avoid and minimize potential impacts to Rhode Island fishermen. We believe this extraordinary commitment, together with our proposed framework for a compensatory mitigation program, undeniably demonstrates that the project is consistent with the Rhode Island Ocean Special Area Management Plan ("Ocean SAMP") and furthers Rhode Island's goals to promote

offshore renewable energy while protecting commercial fisheries from significant adverse impacts.

Our commitment to use the larger turbine reduces the number of turbine locations from 94 to 84 and allows for several turbine layout options to be considered (the "Large Turbine Alternative WDA"). Attachment B provides three proposed layout options for the Large Turbine Alternative WDA. The locations depicted for each option are the planned and intended locations that we fully expect to use barring any unforeseen issues which are beyond our control. We do note, however, that in the unlikely event Vineyard Wind encounters unexpected surface or subsurface issues at a location, a turbine could be moved to an alternate location where required geological data already exists, but would still be located in the project envelope of the COP. Should this be necessary, the new turbine location would be chosen so as to be contiguous with the main turbine array, so as not to disrupt the planned east-west orientation of future turbines.

All of the Large Turbine Alternative WDA options further reduce the size of the WDA where turbines cannot be aligned in an east-west direction from the COP Appendix III-R Alternative. Each option may have certain advantages over others for minimizing potential impacts to commercial fishermen. From a technical perspective, all of the options are feasible for Vineyard Wind. Therefore, we are willing to adopt the option CRMC deems best aligned to address Rhode Island fishermen needs. As the Bureau of Ocean Energy Management's ("BOEM") review process is well underway and its draft environmental impact statement is scheduled to be published for public comment on December 7th, Vineyard Wind intends to withdraw the COP Appendix III-R Alternative as a viable alternative for consideration and instead, propose to BOEM the three Large Turbine Alternative WDA options as viable alternatives and mitigation measures for consideration in its National Environmental Policy Act review and decision on the project.

Table 1 below presents a comparison of each Large Turbine Alternative WDA options to the COP Appendix III-R Alternative, identifying the area of the WDA that cannot be aligned east-west and the percent reduction in the WDA from the originally proposed layout. It also provides a brief description of each option, which are more fully described herein and shown in Attachment B.

Table 1 Comparison of Turbine Layout Options

Turbine Layout Options	Number of Turbine Locations	Not East-West Turbine Area (sq. km)	% Reduction in Non East-West Area Relative to Originally Proposed Layout	Description
Appendix III-R Alternative	94	244	20% (18 sq. nm smaller)	This alternative layout was proposed in the October 22, 2018 COP update Appendix III-R. It provided considerable advantages over other layout options Vineyard Wind considered that require 94 locations to achieve 800 MW. This layout minimizes the area without east-west rows by creating east-west rows on the south edge of the WDA through the elimination of particular locations, resulting in a 20.3% reduction in non-east-west area relative to the originally proposed lay-out. In addition, four turbines would be at seemingly random, isolated locations far to the south of the main turbine area until adopted in a future project layout. This alternative is shown here for comparison purposes. Vineyard Wind is no longer proposing this alternative, as better options are available due to the decision to deploy the largest turbine commercially available.
Large Turbine Alternative WDA Option 1	84	239	22% (19.5 sq. nm smaller)	This option uses the largest turbine commercially available and needs only 84 turbine locations to achieve 800MW. The key advantage of this layout is that it creates 19.5 sq. nm of area for future east-west rows, while also eliminating the three turbine locations furthest to the north. The area to the north of the WDA is a squid "hotspot" and the most heavily transited area by fishing vessels travelling to and from fishing grounds. The main drawback of this option is that, even though it eliminates a considerable area without east-west turbine rows, it is the option with the largest area without east-west turbine rows.
Large Turbine Alternative WDA Option 2	84	232	24% (21.5 sq. nm smaller)	This option uses the largest turbine commercially available and needs only 84 turbine locations to achieve 800MW. The key advantage of this layout is that it has the smallest area without east-west rows. The area without east-west rows is confined to the north, which means that future build out of the remaining lease area to the south will be exclusively comprised of east-west turbine rows.
Large Turbine Alternative WDA Option 3	84	236	23% (20.4 sq. nm smaller)	This option uses the largest turbine commercially available and needs only 84 turbine locations to achieve 800MW. This option is a combination of option 1 and 2. It has the advantage of eliminating the furthest northeast turbine location, i.e. the closest turbine to the squid hotspot that occurs in an arc just south of Martha's Vineyard and Nantucket. This layout has the second smallest area without east-west turbine rows.

While the Large Turbine Alternative WDA options presented in Attachment B minimize by more than 20% the total area that would not be aligned east-west, under all options only about 6% of the entire, combined Rhode Island/Massachusetts and Massachusetts Wind Energy Areas ("WEA") would not have east-west rows as requested by the fishermen as a means to minimize impacts from offshore wind to commercial fishing in the region. Therefore, we believe it is appropriate to now consider other forms of mitigation related specifically to the area that would not have east-west rows. To that end, as you are aware, Vineyard Wind is seeking input from fishermen on what they would like to see in a compensatory mitigation program.

At the October 31, 2018 meeting organized by the Responsible Offshore Development Alliance ("RODA"), a number of ideas were suggested, and many were consistent with what Vineyard Wind has heard from fishermen through our own outreach efforts. Vineyard Wind desires to continue to collect input and feedback from fishermen and fishing organizations, CRMC, and other agencies in order to be able to propose a well-designed mitigation program. To this end, we intend to make an additional submission to CRMC that describes Vineyard Wind's proposed compensatory mitigation program and the economic data upon which it relies. Vineyard Wind has retained an expert fisheries economist to provide an objective evaluation of the best available fisheries economics data.

We ask that this, and our compensatory mitigation proposal, when submitted, be included in the record and, in addition to Vineyard Wind's COP (as updated and filed with BOEM on October 22, 2018 and also being provided today to CRMC via a share file), be considered in CRMC's review of the project for consistency with Rhode Island's enforceable policies set forth in the Ocean SAMP. We also incorporate by reference the information provided in our July 16, 2018 letter responding to CRMC's three-month status review of the project. The factual information we have submitted for your consideration, as well as the measures proposed herein, demonstrate that the project is consistent with Rhode Island's enforceable policies.

Vineyard Wind's Commitments to Rhode Island Fishermen

As we have discussed, realigning the entire project layout in an east-west direction is not a feasible or reasonable alternative because it could not be implemented in a manner that allows Vineyard Wind to achieve the primary purpose of the proposed project, *i.e.*, to deliver 800 MW of power within a specified time and at a competitive price to Massachusetts ratepayers and to advance the interests of Rhode Island, Massachusetts, and the nation in providing new clean sources of energy. Given the technical and legal constraints associated with making any changes to the project at this late stage of the process, Vineyard Wind has spent many months exploring ways to best accommodate Rhode Island fishermen's desire for an east-west turbine row arrangement within the WDA without putting the entire project at risk. In so doing, we are making six important commitments to fishermen in Rhode Island and elsewhere.

Vineyard Wind will:

1. **Utilize the world's largest commercially available turbine, a "first-in-series", which allows 22 turbine locations to be eliminated and significantly reduces the area of the WDA where turbines are not aligned in east-west rows.** Vineyard Wind is proposing several options for how the turbines could be laid out in the Large Turbine Alternative WDA scenario, as shown in Attachment B. Vineyard Wind is willing to adopt any of these options. This decision represents a significant commitment by Vineyard Wind.

2. **Implement a compensatory mitigation program to mitigate potential impacts to commercial fisheries that result from the area of the WDA not being aligned in east-west rows.** The details of the program will be developed with input from fishermen and described in our compensatory mitigation submission. Vineyard Wind anticipates that the program could be comprised of funding that is provided directly to impacted vessels and/or funding that supports community level programs focused on enhancing the safety and profitability of the Rhode Island fishing industry and the well-being of fishermen generally, as fishing will take place among turbines into the future (whether the Vineyard Wind or other projects).[1]

3. **Implement a construction impacts mitigation program that mitigates project impacts to individual fishing vessels resulting from the construction of the project.** Details of this program will also be developed with input from fishermen, but we anticipate this program would likely be structured as funding to vessels that would be expected to be impacted because of their inability to operate in a particular area at a particular time due to project construction activities.

4. **Orient all future turbine installations in the remainder of the lease area in east-west rows and include a 1 nm separation distance between each row.** This measure, in combination with the removal of the 22 locations described above, will result in approximately 64 to 66% of our lease area having an east-west row alignment across the full width of the lease area, depending on which turbine layout option is adopted. Vineyard Wind also commits to work with adjacent lease holders to align rows across lease areas to the greatest extent feasible. In fact, we are already in communication with Bay State Wind to this end. We note that, to the best of our knowledge, no other RI/MA lease holder has yet committed to east-west rows with 1 nm wide separation as we are doing here.

[1] Vineyard Wind recognizes that for projects sited in state waters, the Ocean SAMP requires mitigation measures to be negotiated between the Council staff, the FAB, and the project developer, and then approved by the Council. However, because the project is sited in federal waters, Vineyard Wind's compensatory mitigation program must also address input from stakeholders beyond Rhode Island, a process that began at the October 31, 2018 RODA meeting. We look forward to advancing those initial discussions with CRMC staff and the FAB.

5. **Adopt the 2 nm wide "Consensus Transit Corridor Plan" which has consensus support from Rhode Island fishermen.** This Consensus Corridor Plan (the "Plan") calls for a 2 nm wide corridor running at a northwest-southeast direction through our lease area, located to the south of the WDA as shown in Attachment C. The Plan was supported by most if not all fishermen, including Rhode Island fishermen, in attendance at the Massachusetts Fisheries Working Group meeting on September 20, 2018 ("FWG Meeting"). The Consensus Corridor Plan was also roundly endorsed by Rhode Island fishermen at the October 11, 2018 meeting organized by CRMC ("CRMC Meeting"). Support for the Plan has also been expressed to us by fisheries representatives and individual fishermen. Aside from fishermen, the Coast Guard has indicated its support of the Plan to BOEM; BOEM has posted the plan on its website so as to advise potential bidders in upcoming lease area auctions; and the Plan is also supported by the Massachusetts Coastal Zone Management ("CZM") Office. See Attachment E.

   As documented in the COP, AIS data shows that the large majority of the AIS-equipped vessel navigation in this area is by transiting fishing vessels, most of them travelling in a northwest-southeast direction. While these vessels likely do not have gear deployed while transiting, they are in a real sense "fishing" as many of these fishing vessels are regulated based on the amount of time they spend at sea. As such, the ability to safely and efficiently transit a particular area can be an important factor relative to the effectiveness and profitability of the vessel's fishing trip. The available tracking data therefore also indicates that the Consensus Corridor Plan is supportive of both traditional transiting and fishing patterns in the region.

   Unless a new transit corridor plan is developed that garners the same level of support from fishermen as the current plan, and also allows us to eliminate turbine locations for the purpose of accommodating the east-west row request, Vineyard Wind intends to use the current Consensus Corridor Plan for planning both the current project as well as any future projects.

   In addition to the corridors included in the Plan, Vineyard Wind is supportive of an additional, north-south oriented corridor located to the east of our lease area. This north-south corridor is of particular importance to squid vessels operating out of Rhode Island. While this proposed corridor would not pass through our lease area, Vineyard Wind is supportive of the corridor as a matter of general wind industry policy as a means to further support the traditional use of the area by the Rhode Island fishing fleet.

6. **Contribute to regional fisheries studies by providing funds, available expertise, and scientific resources.** Vineyard Wind has been a strong advocate for federal, state, or regional bodies to establish mechanisms to fund and organize fisheries studies to assess the cumulative impacts of multiple offshore wind projects on the fishing industry in Rhode Island and elsewhere, and to inform future project planning by the offshore wind industry generally.

Vineyard Wind's strong commitment to regional fisheries studies is evidenced by our being unique among the RI/MA lease holders in proposing a specific funding mechanism that would provide for on-going funding of such regional and/or long-term studies. Vineyard Wind continues to stand ready to support these studies once a mechanism to fund, design, and organize them is established.

The Project Will Not Have Significant Adverse or Long-term Impacts on Rhode Island Fishermen

In summary, the Vineyard Wind project will not have significant adverse or long-term impacts on Rhode Island commercial fishermen due to the cumulative, positive impacts of the following factors:

1) Adoption of the largest commercially available turbine reduces the area of the WDA where turbines cannot be aligned east-west by approximately 22 to 24% depending upon the option chosen, and represents approximately 6% of the total MA/RI areas designated for wind development;

2) Regardless of row orientation, fishermen may still fish in any area where the turbines are located;

3) Adoption of the Consensus Corridor Plan, which is supported by Rhode Island fishermen, will provide fishing vessels safe and efficient means to transit through the WEAs, thereby reducing the amount of time at sea and any associated costs;

4) Vineyard Wind's commitment to compensatory mitigation during the operation of the project, the details of which will developed in consultation with fishermen; and

5) Offshore construction activities will only occupy a specific area for limited period of times, and therefore will not preclude fishing activities in and around the area for long periods of time. Any residual impacts to fishermen will be mitigated through a construction period compensatory mitigation plan.

We look forward to CRMC's feedback on the information presented in this filing so that we can address any outstanding issues and enable CRMC to reach a consistency determination.

Sincerely,

Erich Stephens
Chief Development Officer

Attachments

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SUBMISSION TO THE RHODE ISLAND COASTAL RESOURCES MANAGEMENT COUNCIL

November 9, 2018

I. The Primary Purpose of the Project is to Deliver 800 MW of Wind Generation Capacity at a Specified Price and Within a Specified Time

As previously reported to CRMC, Vineyard Wind was the successful bidder in response to the Massachusetts Section 83C Offshore Wind Energy Generation request for proposals, being awarded power purchase agreements totaling 800 MW of wind generation capacity. These long-term contracts with the Massachusetts electric distribution companies (Eversource, National Grid, and Unitil) have been executed and filed with the Massachusetts Department of Public Utilities ("DPU") for review and approval. Now that the contracts have been executed, Vineyard Wind's sole project purpose is to fulfill its obligations under the contracts to deliver 800 MW of power at the prices and within the time period specified in those contracts with the electric distribution companies, which together provide most of Massachusetts with its electrical energy. Once operational, Vineyard Wind's 800 MW project will provide energy equivalent to power more than 15% of the homes in Massachusetts.

On August 1, 2018, the Massachusetts Department of Energy Resources ("DOER") submitted a letter to the DPU urging approval of Vineyard Wind's contracts because of the significant benefits the project would generate (*See* Attachment D). Importantly, DOER found that Vineyard Wind's 800 MW project was superior to other proposals and would result in projected savings to ratepayers of approximately $1.4 billion over the life of the contracts. In addition, the project assists Massachusetts in meeting its Global Warming Solutions Act goals and provides critically needed diversity to Massachusetts', and the region's, energy portfolio. Further, as the largest procurement of offshore wind generation in the U.S., the project creates jobs and spurs economic development.

The project will also benefit Rhode Island. With more than 400 miles of coastline, Rhode Island is particularly vulnerable to the impacts of climate change, which has brought more severe and frequent storms to the region in recent years. The increasing frequency of extreme weather events also poses serious energy and fuel security risks, particularly in light of the region's dependence on natural gas to meet both electricity and heating needs. For these reasons, the Council expressly supports "the policy of increasing offshore renewable energy production in Rhode Island as a means of mitigating the potential effects of global climate change." Ocean SAMP § 1150.2(1). Vineyard Wind's injection of emission free, reliable offshore wind power into the New England grid will enhance the overall reliability of the electricity system, increase resource diversity, and contribute to a more climate resilient energy system.

Some of the key benefits Vineyard Wind's project will deliver to the region's ratepayers include a reduction in greenhouse gas emissions (GHG), lower power prices, and a decrease in demand for natural gas. A 2017 study conducted by Daymark Energy Advisors ("Daymark"), on behalf of Vineyard Wind, shows that our 800 MW project would lead to 588,000 fewer metric tons of carbon emissions annually, $657 million (NPV 2022 dollars) in Locational Marginal Price benefits for New England ratepayers — other than Massachusetts ratepayers— over 20 years, and a reduction in demand for natural gas by the region's electricity sector of about 22.8 million MMBtu per annum.

The fuel security, system reliability, and price suppression attributes of the project undeniably benefit all of New England. These benefits are perhaps best illustrated by how the project would have performed had it been operational during winter storm Grayson in early 2018, the so-called "bomb cyclone". Another analysis conducted by Daymark study shows that during the 4-day storm event, our project would have displaced 61 million kilowatt hours of oil- and natural gas-fired generation, resulting in savings of over $31 million for New England ratepayers and emission reductions totaling 67,485 metric tons of carbon dioxide, which is equivalent to removing 14,358 cars from the road for an entire year. Finally, the project also has the potential to create direct economic benefits in Rhode Island, as Vineyard Wind is seeking the opportunity to use Rhode Island ports for staging some components during project construction.

The Vineyard Wind project is also important to realizing Governor Raimondo's commitment to a clean, affordable and reliable energy future, even if the output of the project will serve Massachusetts. As the first utility-scale offshore wind project in the country, the project is already stimulating significant investment interest in southeastern New England, including in Rhode Island businesses and infrastructure. The Vineyard Wind project is a critically important step towards realizing a viable offshore wind industry in the U.S., southern New England in particular, and therefore also furthers Rhode Island's interest in being a hub of this new industry. Moreover, as multiple news outlets have reported, Vineyard Wind's levelized price of 6.5 cents per kilowatt hour, including environmental attributes, is well below analysts' expectations and sets a new record for U.S. offshore wind.[2] As a result of our project, offshore wind is now competitive with other types of energy generation and assures access to abundant clean energy resources for decades to come. This competitive pricing has shown the way to a U.S. offshore wind industry that is centered in southeastern New England and growing faster and larger than most analysts had predicted. This is yet another reason why the Vineyard Wind project puts Rhode Island in an excellent position for maintaining its leading role in this industry.

[2] By way of comparison, two Maryland projects contracted at approximately 13 cents per kilowatt hour, the Block Island project was priced at 24.2 cents per kilowatt hour, and the Cape Wind project was priced at 18.5 cents per kilowatt hour.

II. Reorienting the Project Layout in a Complete East-West Configuration with One Nautical Mile Spacing Between Turbine Rows is Not a Reasonable Alternative Because It Cannot Achieve the Project Purpose

In assessing alternative designs to Vineyard Wind's proposal, it is critically important to understand that Vineyard Wind's ability to deliver the significant benefits described above, by providing 800 MW of renewable energy at a competitive price, is directly tied to its ability to maintain its qualification for federal investment tax credits ("ITC"). In order to qualify for these tax credits, the value of which are directly passed on to ratepayers, Vineyard Wind must make continuous progress towards completion of the project and adhere to its construction schedule as set forth in COP Volume 1, section 1.5.3; this schedule requires onshore construction to begin in Q4 2019.[3] To achieve this schedule, Vineyard Wind must have all necessary permits in hand by Q3 2019 at the latest in order to finalize construction financing. Investors require certainty to reduce risk and therefore will not invest in or lend to a project unless it is fully permitted.

CRMC should also be aware that the long-term contracts with the Massachusetts electric distribution companies contain certain project milestones that Vineyard Wind must meet, which the project schedule takes into account. These include obtaining the necessary permits, closing financing, acquiring any necessary real property, and meeting the guaranteed commercial operation dates, the earliest of which is January 15, 2022. Thus, Vineyard Wind must permit, finance, construct, connect to the grid, and begin to deliver power in less than 38 months.

BOEM's current permitting schedule calls for a decision on Vineyard Wind's COP by July 2019, which allows Vineyard Wind to obtain all other state and federal permits, close financing, and begin construction in Q4 2019, thereby maintaining qualification for the ITC. In addition, there are many other processes and instruments being put in place to allow Vineyard Wind to start construction in Q4 2019. These include, but are not limited to, procuring component design, supply and installation contractors, securing necessary vessels and port facilities, financing the project, fabricating necessary components under the direction of the CVA, and maintaining qualification for the ISO New England Forward Capacity Market. In short, any delay in BOEM's approval process will have a domino effect and will most likely be fatal to the project.

Understanding these constraints, Vineyard Wind has spent significant time and resources examining the possible re-orientation of the project array in an east-west

[3] Vineyard Wind has already qualified for the ITC at a level that provides for significant savings to ratepayers. However, in order to maintain this qualification, the project must both show "continuous construction", as well as complete the project by a date certain. The IRS provides specific definitions as to "continuous construction". Because of these various requirements, Vineyard Wind must arrange the financing and achieve Financial Close on the project by Q4 2019 in order to give its main contractors a so-called "Notice to Proceed" enabling them to start manufacturing and construction activities needed to finish by the end of 2021.

direction. Our conclusion is that it simply is not possible to do this for both technical and legal reasons, which are further detailed below.

A. Reorienting the Project Array is Not Technically Feasible

Each wind turbine foundation is specifically designed for the subsurface conditions at each planned turbine location using data collected from high resolution geophysical surveys ("HRG Surveys"), *e.g.*, side-scan sonar, bathymetry, magnetometers, and sub-bottom profilers. In addition, bore hole sampling and/or cone penetrometer tests conducted at each turbine location provide critically important information for understanding the soil and subsurface characteristics as well as interpreting the HRG data. Conducting these offshore surveys requires at least three months' lead time for permitting, followed by at least four to five months of the actual offshore field work for the entire WDA, followed by at least another four to five months to analyze the data and report findings. Only then can the foundation design process begin, which takes approximately 10 to 12 months to complete. In order to fabricate and certify the foundations in time for offshore construction to begin as scheduled in summer 2020, foundation designs must be complete by May 2019. Given the schedule constraints described, Vineyard Wind collected all geological data necessary for foundation designs in Spring/Summer 2018, so that data necessary to design and procure the foundations would be available this Fall. And indeed, this design and procurement is now underway.

Any change in turbine locations would require geological data for that specific location before foundation design could begin. Reorienting the project array in an east-west direction with 1 nm spacing between turbines would cause all but approximately 19 turbines to be relocated to areas not previously surveyed and would place turbines in areas outside the WDA. Moreover, a reorientation of the array would require a redesign of the array cable layout, as all cable strings are carefully planned and balanced to have an equal number of WTGs on each string and to minimize the length of cables (to avoid unsuitable locations and reduce cost and losses). The 1 nm spacing between all turbines would also increase the amount of cabling required, raising additional engineering and cost considerations that would have to be addressed. Vineyard Wind would effectively have to start the project design and permitting process over and resurvey the entire project area, even though it has already spent over seven months (in addition to a reconnaissance survey in 2016) and many millions of dollars collecting and analyzing the data to support the current layout.

While the cost of redoing the HRG and geotechnical surveys is significant, the more important factor is the time required to collect and analyze the data. Vineyard Wind began collecting its data to support the current project layout in April 2018 and finalized the analysis of the data for submission to BOEM on October 22, 2018. Thus, not including the regulatory approval times

discussed below, it takes at least eight to 10 months to collect and analyze the data before foundation design could begin, which, as noted, then takes approximately 10 to 12 months to complete. Given that additional surveys could not begin until at least March 2019 due to weather, regulatory, and logistical constraints, foundation designs would not likely be completed before the end of 2020. The lead times necessary for certification and fabrication would most certainly push the start of construction into third quarter of 2021. With an expected construction period of up to 18 months, this delayed start would make it impossible for Vineyard Wind to meet its guaranteed commercial operation date of January 15, 2022. Moreover, Vineyard Wind would lose its qualification for the ITC thereby affecting the entire pricing structure for the project. For these reasons, reorienting the entire project array in an east-west direction with 1 nm spacing between turbines is not technically feasible to achieve the primary or essential purpose of the proposed project, *i.e.*, deliver 800 MW of generation capacity within a specified time at a specified price.

B. Regulatory Requirements Preclude Vineyard Wind from Reorienting the Project Array to a Complete East-West Orientation Within the Time Available

In considering the feasibility of reorienting the project array, Vineyard Wind also carefully considered the regulatory requirements for obtaining COP approval and, as part of this analysis, Vineyard Wind engaged in detailed consultations with BOEM staff (*i.e.,* the individuals who would be responsible for implementing any changes) regarding the impact to the permitting schedule of relocating even a limited number of turbines.

On the October 25, 2018 call with CRMC, BOEM and others, BOEM confirmed to CRMC that modifying the project layout to a complete east-west orientation would cause the project approval process to be delayed for at least one year because Vineyard Wind would have to submit geophysical data relevant to the design and siting of the turbines, as well as geotechnical data regarding the stratigraphic and geoengineering properties of the bottom sediment, which in turn affects the foundations or anchoring systems of any structure permanently or temporarily attached to the seabed (collectively "G&G Data"). 30 C.F.R. §585.626; BOEM COP Guidelines (2016).[4] Vineyard Wind believes the regulatory process would be delayed even longer than the one year estimated by BOEM because of the time it would take for

[4] The Ocean SAMP similarly requires "the results of adequate *in situ* testing, boring, and sampling at each foundation location, to examine all important sediment and rock strata to determine its strength classification, deformation properties, and dynamic characteristics." Table 11.4. Indeed, the Ocean SAMP expressly requires that "a minimum of one boring shall be taken per turbine planned, and the boring shall be taken within 50 feet of the final location of the turbine." *Id.* Thus, CRMC clearly recognizes the importance of G&G Data to the siting and approval wind turbine locations.

Vineyard Wind to collect and analyze the necessary data. Based on our current experience with collecting and analyzing the required G&G Data for the site, it would take eight to 10 months to complete the data collection and analyses, and likely longer because the east-west orientation and 1 nm turbine separation locates approximately 16 to some 18 turbines outside the WDA where no data has been collected or analyzed. Also, as BOEM explained to CRMC, it takes 90 to 120 days to obtain approval to conduct the work. Therefore, assuming Vineyard Wind could begin collecting G&G Data in March 2019, it would be eight to 10 months before Vineyard Wind would be in a position to submit the data to BOEM (i.e., Q4 2019 or Q1 2020), which would likely delay a decision on the COP until late 2020 or early 2021 thereby precluding Vineyard Wind from maintaining its qualification for the ITC and delivering power beginning in January 2022.[5]

C. Obtaining A Conditional COP Approval and Phasing (Segmenting) the Project Is Not a Technically Feasible or Reasonable Alternative

On the October 25, 2018 call with BOEM and others, as well as at the November 1 Meeting, CRMC raised the possibility of BOEM allowing Vineyard Wind to collect the additional G&G Data necessary for a complete east-west layout after a decision on the COP was issued. CRMC suggested that a "phased" approach would allow Vineyard Wind to start construction for turbines where G&G Data exists and, after the additional G&G Data is collected, allow construction to proceed on the remaining turbines. Such a "phased" approach is not technically or legally feasible for three important reasons.

First, BOEM explained that while the regulations allow Vineyard Wind to seek a departure from the data requirements, the amount of data that would have to be deferred is significant and there would be several procedural steps that need to be addressed before a departure could be granted. One such example is the need to reopen the Section 106 Programmatic Agreement regarding G&G work, which would take time and delay the current permitting schedule. Perhaps most importantly, BOEM advised CRMC of legal precedent that precludes BOEM from segmenting its NEPA analysis. The

[5] In November 2017, Vineyard Wind requested a departure from the regulations to allow Vineyard Wind to conduct the turbine and cable specific G&G Data beginning in Spring 2018, after COP submission but in time for BOEM to consider the data for its relevant reviews and consultations before issuing a decision on the COP; BOEM granted this request on January 19, 2018. Vineyard Wind submitted its COP to BOEM in December 2017 and on October 22, 2018 submitted the turbine and cable specific G&G Data and required analyses. Thus, as of October 22, 2018, Vineyard Wind has met the regulatory requirements for data required for COP approval. Vineyard Wind has expended tremendous resources, including tens of millions of dollars, to meet this deadline so that BOEM is in a position to issue a decision on the COP in July 2019. We mention this not because of the expense itself, but to demonstrate the importance of the schedule to the success of the project, and the high priority the company has put on maintaining the schedule in order to deliver a successful project to Massachusetts and the region.

referenced case involved the Cape Wind project where BOEM granted Cape Wind a departure from the regulations that allowed Cape Wind to collect certain geophysical data after lease/COP approval but before construction.[6] That decision was challenged and ultimately appealed to the U.S. Court of Appeals for the District of Columbia, where the court held that BOEM violated NEPA because "[w]ithout adequate geological surveys, the Bureau cannot 'ensure that the seafloor [will be] able to support' wind turbines." *Public Employees for Environmental Responsibility v. Hopper,* 827 F.3d 1077, 1083 (D.C. Cir. 2016). The D.C. Circuit further stated that "NEPA does not allow agencies to slice and dice proposals in this way." *Id.*

Second, Vineyard Wind would not be able to close financing on the project with a conditional approval that deferred such a significant amount of the G&G Data to a future unknown date. Investors require permitting certainty to reduce risk. This is why Vineyard Wind has expended significant resources working with multiple federal and state agencies to ensure that it receives all required permits by Q3 2019. If Vineyard Wind cannot close financing, it will not be able to start construction in Q4 2019 and will lose its qualification for the ITC. As already noted, the loss of the ITC would upset the entire pricing structure for the project.

Finally, for technical and engineering reasons the project could not be constructed as CRMC suggests. For one, the project schedule requires on-going construction of each element of the project, not two distinct phases of construction as would be required by CRMC's suggestion. Such on-going construction is necessary for both commercial reasons, including costs (regarding costs of multiple spread engagement and vessel availability), and schedule and risk management reasons (in order to ensure project is completed on schedule and the fact that on-going construction takes less time total than phased construction). Perhaps most importantly, constructing in phases, as suggested, is not practical for a number of technical reasons such as the need for turbines to have power once they are installed, the need to avoid jacking up vessels in the vicinity of buried cable, the importance of installing foundations before cable, having power available for turbines once installed, and installation of scour protection after installing cable. Breaking the construction into two phases also has the potential to increase environmental and fisheries impacts.

[6] BOEM's review of the Cape Wind project began before the current regulations were promulgated and therefore the EIS was issued at the lease stage and supplemented at later stages. Nevertheless, as CRMC proposes here, G&G Data collection was deferred until after COP approval but before construction, which the court held violated NEPA.

III. Vineyard Wind's Commitments to Rhode Island Fishermen

Even though it is not possible to reorient the entire project in an east west direction, Vineyard Wind takes seriously the fishermen's request to orient the turbine rows in an east-west direction as a means to avoid gear conflicts and mitigate the potential impacts of offshore wind generally (not just our project) on the regional fishing industry. Therefore, Vineyard Wind is making six important commitments to Rhode Island fishermen:

1. Vineyard Wind will utilize the largest commercially available turbine, which decreases the number of required turbine locations and thereby results in less area not aligned in an east-west orientation. Vineyard Wind is willing to adopt any of the Large Turbine Alternative WDA options shown in Attachment B. As this is the first turbine of this size to become commercially available, it presents some risk to the project, but it is a risk Vineyard Wind is willing to assume to minimize potential impacts to Rhode Island fishermen.

2. Vineyard Wind is committed to implementing a compensatory mitigation program that mitigates potential impacts to commercial fisheries as a result of a portion of the WDA not having east-west rows. The details of the program will be developed with input from fishermen and fully described in our compensatory mitigation submission. Vineyard Wind anticipates that the program could be comprised of funding that is provided directly to impacted vessels and/or funding that supports community level programs focused on enhancing the safety and profitability of the Rhode Island fishing industry and the well-being of fishermen generally, as fishing will take place among turbines into the future (whether the Vineyard Wind or other projects).

3. Vineyard Wind will implement a construction impacts mitigation program that mitigates project impacts to individual fishing vessels resulting from the construction of the project. Details of this program will also be developed with input from fishermen, but we anticipate this program would likely be structured as funding to vessels that would be expected to be impacted because of their inability to operate in a particular area at a particular time due to project construction activities.

4. Vineyard Wind will orient turbines in the remainder of the lease area in rows in an east-west direction with 1 nm separation between the rows. Vineyard Wind is also committed to working with adjacent lease holders so that, to the greatest degree practical, turbine rows would line up and continue across lease boundaries. We are already in communication with the leaseholder to the west for this purpose (the lease area to the east is not yet leased, but we will establish communication upon lease award, which is expected in December 2018).

5. Vineyard Wind will adopt the 2 nm wide "Consensus Transit Corridor Plan" that was developed through discussions among fishing stakeholders and state agencies, and presented during the FWG Meeting, and again at the CRMC Meeting; this transit lane is shown in Attachment C. Both federal and state agencies worked to synthesize input from fishing stakeholders to arrive at this layout, which represents a compromise of the various desired transit directions and corridor widths to/from priority areas identified by various fishing sectors and ports.

   From a navigation safety perspective, this corridor provides options for vessels transiting through the adjacent Massachusetts and Rhode Island lease areas while maintaining a single heading. Scallopers, fixed gear, squid, and whiting/scup fishermen from Massachusetts, New York, and Rhode Island ports all agreed this was a workable compromise at the FWG meeting, and representatives of the Rhode Island fishing industry reiterated support for the transit corridor plan at the CRMC Meeting. As stated in a letter from CZM regarding Vineyard Wind's Supplemental Draft Environmental Impact Report dated October 5th, 2018, "CZM believes that the working group consensus alternative is a balanced and feasible option that while perhaps optimal to none, is acceptable from a navigational safety perspective and represents a compromise approach to a very difficult issue." (*See* Attachment E).

   At the FWG Meeting and CRMC Meeting, the U.S. Coast Guard expressed support for these lanes, as did Rhode Island fisheries stakeholders. These meetings resulted in an unprecedented level of agreement among fishermen. For all these reasons, the consensus transit corridor plans that resulted from those discussions will be incorporated into Vineyard Wind's project. Vineyard Wind also supports adopting a north/south transit lane directly to the east of the WDA to allow passage for fisheries travelling between squid and whiting fishing grounds.

   Importantly, because the Consensus Transit Corridor Plan's 2 nm wide transit corridor crosses the lease area to the south of the WDA, and does not pass through the WDA, Vineyard Wind can use eliminated turbine locations for the purpose of minimizing areas without east-west lanes. Vineyard Wind's originally proposed turbine layout was designed to accommodate both fishing within the turbine area as well as fishermen who needed to transit from ports to the northwest of the lease area and pass through the turbine area out to fishing grounds to the southeast. In particular, the turbine rows were oriented so as to allow straight-line navigation in this northwest-southeast direction. The transit lane described above and now incorporated into Vineyard Wind's long-term plans for the lease area is also designed to facilitate transiting navigation in this direction. By adopting this Consensus Transit Corridor Plan transit lane, the turbine rows can therefore be adjusted to better accommodate the request for an east-west row arrangement, while still maintaining a consistent transiting navigation option.

6. Vineyard Wind will contribute to regional fisheries studies by providing funds, available expertise, and scientific resources. Vineyard Wind has been a strong advocate for federal, state, or regional bodies to establish mechanisms to fund and organize these studies to assess the cumulative impacts of multiple offshore wind projects on the fishing industry in Rhode Island and elsewhere and has even proposed a funding model that could be used. Vineyard Wind stands ready to support these study programs once they are established.

IV. Background on Vineyard Wind's Efforts to Avoid and Minimize Potential Impacts to Fishermen

In an effort to accommodate Rhode Island fishermen's request, Vineyard Wind spent many months with its technical team examining possible ways to avoid and minimize potential impacts to Rhode Island fishermen. It is important to understand that while Vineyard Wind's project envelope identifies turbine sizes ranging from 8 to 10 MW, the largest commercially feasible and available turbine has until very recently been an approximate 8.5 MW turbine. Therefore, Vineyard Wind's initial efforts to avoid and minimize potential impacts to fishermen assumed the project would employ an 8.5 MW turbine, which would require 94 locations to realize an 800 MW project.

Given the technical and regulatory constraints discussed above, we first explored the number of turbine locations that could feasibly be relocated to areas where geophysical data has already been collected. At most, we were able to create two 1 nm mile fishing lanes within the array, and possibly a third ½ nm lane. We presented this possible option for turbine layout adjustment to leaders of the Rhode Island fishing industry, and learned from them that this adjustment would not meaningfully address their concerns. In addition, based on further discussions with BOEM staff, we concluded that even moving a limited number of turbine locations at this late stage would introduce considerable schedule risk, and so should not be undertaken unless there was a clear and significant advantage in doing so. Given that this approach would introduce significant risk with limited value to fishermen, it was not pursued further.

We therefore looked for ways to minimize the total area that would not ultimately have a fully east-west turbine row orientation. This led us to focus on the southern portion of the WDA and the interface with the remaining lease area which, as noted, Vineyard Wind will design in an east-west orientation. As shown in Attachment A, by selectively dropping 12 turbine locations (shown in red), Vineyard Wind was able to create three full (and a portion of a fourth) 1 nm wide east-west fishing lanes at the southern portion of the WDA, which limits the total turbine area of the current WDA without east-west lanes, and smoothly integrates with future turbines sited in an east-west direction (shown in blue) in the remaining lease area. The future turbine locations in blue are shown for illustrative purposes only, meant to represent the general arrangement of turbines, and are not necessarily the exact locations where future turbines might be proposed. By creating these three full and a partial fourth, 1 nm east-west fishing lanes the size of the originally proposed WDA where turbines

are not arranged in east-west rows was reduced by approximately 20% or 62 sq. km (18 sq. nm). Furthermore, when future turbines are built to the south, there would be no additional areas without east west rows extending the full width of the lease area, and therefore the total area without east-west rows would be limited to the 62 sq. km.

While we were considering options to modify the WDA within the constraints described, our commercial team was actively engaged with turbine manufacturers to evaluate the commercial feasibility of using a larger turbine. As we discussed at the November 1 Meeting, until this time, a larger turbine was not commercially available for the U.S. market. However, because of Rhode Island's urging to use a larger turbine at the November 1 Meeting, our commercial team redoubled their efforts, engaging in all-night negotiations, to allow us to commit to using a larger turbine. Vineyard Wind's successful procurement of this turbine, and our commitment to use it despite the risks of using a "first-in-series" turbine that has not yet received technical certifications, confirms our dedication to the successful coexistence of the offshore wind industry and commercial fishing interests.

V. Large Turbine Alternative WDA Options

While Vineyard Wind is pleased that it is able to commit to using the largest commercially available turbine for the project, doing so does present some risk to the project as it is the first use of a new turbine model in a new market. In particular, the new turbine will need to be certified for use in the U.S. on a timeline compatible with organizing financing. Nevertheless, Vineyard Wind is willing to accept this risk to avoid and minimize potential impacts to fishermen.

With use of this larger turbine, the project layout requires only 84 locations to produce 800 MW of power. This enables Vineyard Wind to eliminate 22 turbine locations and reduce the area of the WDA where turbines cannot be aligned in an east-west orientation, while allowing for several turbine layout options to be considered. Attachment B provides three proposed layout options for the Large Turbine Alternative WDA. The locations depicted for each option are the planned and intended locations we fully expect to use barring any unforeseen issues that are beyond our control. We do note, however, that in the unlikely event Vineyard Wind encounters unexpected subsurface issues at a location, a turbine could be moved to an alternate location where required geological and geophysical data already exists, but still located in the project envelope of the COP. Should this be necessary, the new turbine location would be chosen so that it is contiguous with the main turbine array, and does not to disrupt the planned east-west orientation of future turbines.

All of the Large Turbine Alternative WDA options have 84 turbine locations, which further reduces the size of the WDA where turbines cannot be aligned in an east-west direction compared to the COP Appendix III-R Alternative. Each option also retains the originally planned 1 nm northwest-southeast transit corridor that further enables transit and/or fishing within the WDA (in addition to the 2 nm wide corridor to the south of the turbine area which is part of the Consensus Corridor Plan). Each option

may have certain advantages over others for minimizing potential impacts to commercial fishermen. From a technical perspective, all of the options are feasible for Vineyard Wind. Therefore, we are willing to adopt the option CRMC deems best aligned to address Rhode Island fishermen needs.

Large Turbine Alternative WDA Option 1: At the November 1 Meeting, Vineyard Wind was expressly asked whether turbines located at the northern portion of the WDA could be moved to allow more space for fishing and transiting activities that occur north of the WDA. Option 1 responds to that request by eliminating the three northernmost turbine locations. As can be seen in Attachment A, under this option the northern most turbines are now approximately 1 nm farther from the area to the north of the WDA which is considered a squid "hotspot" and the most heavily transited area by fishing vessels travelling to and from fishing grounds. This option reduces the area of the WDA where turbines are not aligned east-west by 22%, meaning it is 19.5 sq. nm smaller than the originally proposed WDA. While this reduction in size is significant, it is slightly less than the reduction achieved by options 2 and 3.

Large Turbine Alternative WDA Option 2: This option retains the northernmost turbine locations which allows elimination of 22 turbines from the southern portion of the WDA. This option achieves the greatest reduction in the size of the WDA where turbines are not aligned east-west — a 24% reduction, which means it is 21.5 sq. nm smaller than the originally proposed WDA.

Large Turbine Alternative WDA Option 3: Option 3 is a combination of options 1 and 2 in that it removes the furthest northeastern turbine, which is closest to the squid hotspot that occurs in an arc just south of Martha's Vineyard and Nantucket, and eliminates the remaining 21 turbines from the southern portion of the WDA. It reduces the size of the WDA by 23%, which means it is 20.4 sq. nm smaller than the originally proposed WDA.

To aid evaluation of these options, Attachment F overlays each option on the tow track graphic submitted to the record by the Commercial Fisheries Center of Rhode Island ("CFCRI"), which was reported to represent tow tracks over a 20-year period.[7] In our view, the graphic suggests that over a 20-year period, tows in an east-west direction occur principally in the area to the south and west of the WDA where turbines will be aligned in an east-west direction (indicative locations shown as aqua dots). Fishing occurs in more random directions where turbines cannot be aligned east-west (locations shown as green dots). Indeed, in many respects fishing in this area appears to occur largely in a northwest-southeast direction consistent with the

[7] As CRMC is aware, Vineyard Wind requested that CRMC analyze the track line graphic to obtain a more reliable assessment of actual fishing effort by year and season. RI DEM informed us that based on discussions with CFCRI, it is not possible to analyze the data upon which the graphic is based because the dates attributed to the tracks may not be indicative of actual fishing dates, nor may a single track represent the number of tows performed on a particular track.

layout in that area and with the contours within the WDA. In any case, the graphic demonstrates that the layout options provide a reasonable alternative to accommodate Rhode Island fishermen. In addition, fishermen have indicated that certain species that mobile gear fishermen target are fished along "seams" that may be contours, depths, or bearing lines. Attachment G provides 2016 AIS track line data from 16 individual Rhode Island- based vessels traveling under 4 knots overlaid on Vineyard Wind's most recent bathymetry of the WDA. The Attachment shows that contours and depths, *i.e.*, seams, within the WDA are not aligned in an east-west direction or and that fishing AIS track lines don't strictly occur in an east-west direction

IV. Input from Rhode Island Fishermen

Vineyard Wind has been actively engaging with Rhode Island fishermen as we have explored options for minimizing potential impacts to fishermen. Our Fisheries Representative, Crista Bank, has had numerous communications with Fisheries Advisory Board ("FAB") Chairman Lanny Dellinger, CFCRI Executive Director Fred Mattera, Town Dock representatives Donald Fox and Katie Almeida, and others to keep them informed of how Vineyard Wind was trying to address their concerns and to solicit feedback from them. Ms. Bank has also reached out to fishermen from Massachusetts and other states who may fish in the lease area. The general feedback from Rhode Island fishermen has been that the only acceptable alternative is to completely realign the turbines in an east-west direction with 1 nm between each row. As will be discussed in more detail in our mitigation submission, the best available data does not support a finding that the WDA is an area of high fishing activity or that fishing necessarily occurs in a strictly east-west direction.[8]

Rather, there appears to be concern among fishermen that the Vineyard Wind project is precedent setting and that any compromise with Vineyard Wind will have a domino effect resulting in future projects also not having an east-west layout. As CRMC is aware, at the July 26, 2018 FAB meeting, Vineyard Wind was directly told by FAB members that it was "important that we prevail in this discussion as an industry and that lends itself to the next development so that we prevail in that one as well", that anything less "is not negotiable," and Vineyard Wind "is going to cave on this one."[9] While we understand fishermen's concerns about the impact of offshore wind development on their industry as a whole, CRMC must base its decision making on the facts before it and the merits of Vineyard Wind's proposal.

However, the Vineyard Wind project is not precedent-setting with respect to its layout. Rhode Island fishermen have already received commitments from all current lease holders, including Vineyard Wind, that for all future projects in waters important to Rhode Island fishermen, turbines will be aligned in an east-west

[8] Vineyard Wind notes that the Ocean SAMP principles include basing "all decisions on the best available science."

[9] *See* Transcript of July 26, 2018 Vineyard Wind meeting with the FAB at pages 40 and 94.

direction. Vineyard Wind has further committed to a 1 nm distance in between rows. While Vineyard Wind is not sure if other developers have also committed to 1 nm distance between rows, if they have not so committed Vineyard Wind's commitment for full 1 nm spacing between rows will actually serve as an example for other projects, and would therefore be a desirable precedent for fishermen.

Moreover, in its October 19, 2018 Final Sale Notice for the remaining portions of the Massachusetts Wind Energy Area (ATLW–4A), BOEM includes lease terms that require lessees to "extend any BOEM-approved vessel transit corridors in adjacent lease areas, unless BOEM determines that such corridors are not necessary or can be modified." 83 Fed. Reg. 53,089. In addition, in its supplemental information for bidders, BOEM puts bidders on notice that an additional north-south transit corridor has been identified as an important need for the fishing industry to allow vessels to transit between the squid grounds, fished during the day, and the whiting grounds, fished at night. Furthermore, CRMC has requested that its Geographic Location Description ("GLD") be expanded to include these new lease areas and through the GLD or other authority, CRMC can establish a policy that turbine rows should be aligned in an east-west direction. Thus, any uncertainties that the Vineyard Wind project will set standards for future projects in the area is simply unfounded.

Rather, the area where turbines will not be aligned in an east-west direction accounts for a relatively small area (approximately 6%) of the Massachusetts and Rhode Island/Massachusetts WDAs. Moreover, as discussed above, the evidence presented by fishermen themselves shows that this small area is not where fishermen routinely trawl in an east-west direction. It is also not an area that yields large revenues for the Rhode Island fishermen compared to other areas, which is shown in the data analysis conducted by the Rhode Island Department of Environmental management and by CRMC's submission to the National Oceanographic and Atmospheric Administration requesting to amend its GLD.[10] By providing the Large Turbine Alternative WDA options and committing to a compensatory mitigation program, Vineyard Wind has clearly demonstrated that the project will not have significant long-term impacts on Rhode Island commercial fishermen.

Finally, Vineyard Wind wants to acknowledge for the record that meaningful communications between federal and state agencies, the fishing industry, and the offshore wind industry has not been ideal for all parties involved. There is a need to create a better system that allows fishermen to be better heard on key issues important to them at both local and regional levels so that developers can reliably incorporate concerns early in their planning and design of projects.

The expressed desire for an east-west alignment of turbine rows is a case in point. Throughout BOEM's entire public process on establishing the Massachusetts WEA, including multiple joint taskforce meetings between Rhode Island and Massachusetts

[10] As noted, Vineyard Wind has retained an expert fisheries economist to evaluate the best available data. His expert report will be submitted with Vineyard Wind's compensatory mitigation proposal.

in which CRMC was an active participant, the expressed need to align turbines in an east-west direction was never raised. Nor is there any mention of an east-west agreement between mobile and fixed gear fishermen in the Ocean SAMP. Indeed, the Ocean SAMP discusses that mobile and fixed gear fishermen alternate use of the Cox's ledge area during certain times of the year to avoid gear conflict, not that they fish in any particular direction. Additionally, Vineyard Wind began informal discussions with Rhode Island fishermen in 2011 to obtain information about fishing activity in our lease area, including several meetings with members of the FAB. The need for an east-west alignment was never raised nor were any concerns regarding the turbine layout and gear conflicts. For example, Vineyard Wind presented to the FAB on July 24, 2017, and received many detailed questions and comments regarding the project, but there was no request or mention of an east-west turbine row layout. It was not until after Vineyard Wind submitted its COP that the east-west alignment was raised, which is far too late in the process for Vineyard Wind, or any other developer, to make wholesale changes to a project.

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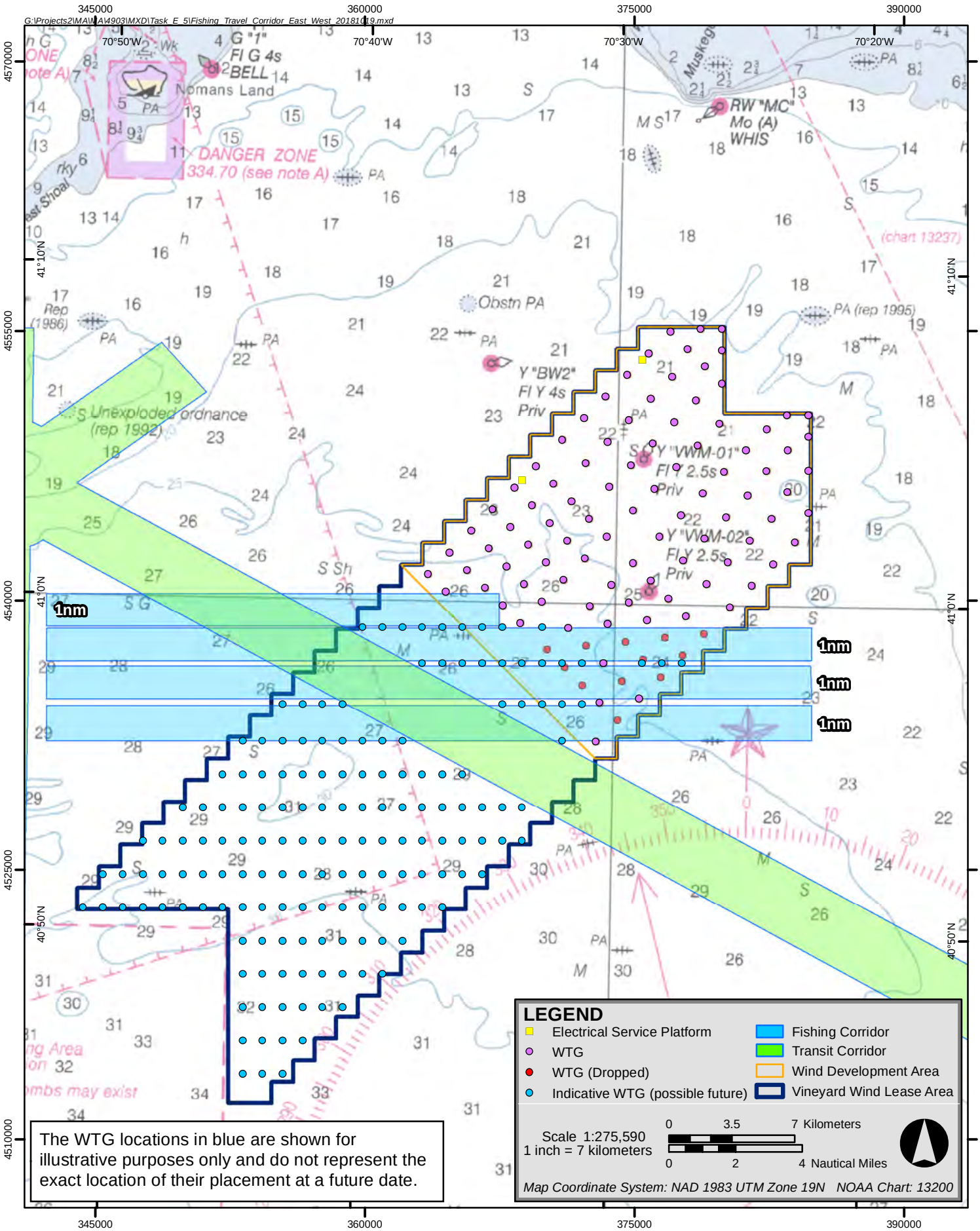
VINEYARD WIND

Attachment A – COP Appendix III-R Alternative



Vineyard Wind Project

VINEYARD WIND

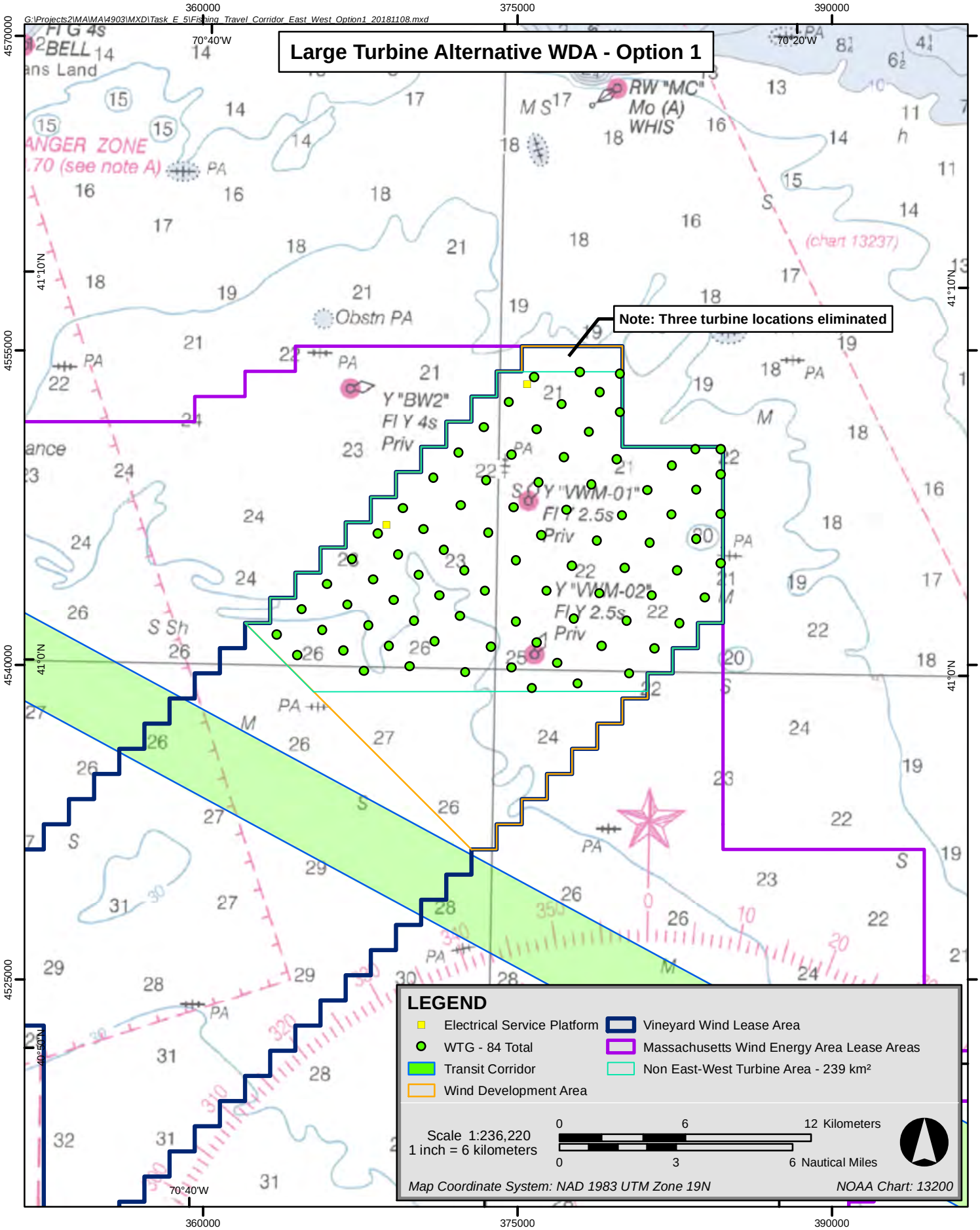
Figure R-1

Alternate Layout

OCS-A 0501 MASS USA

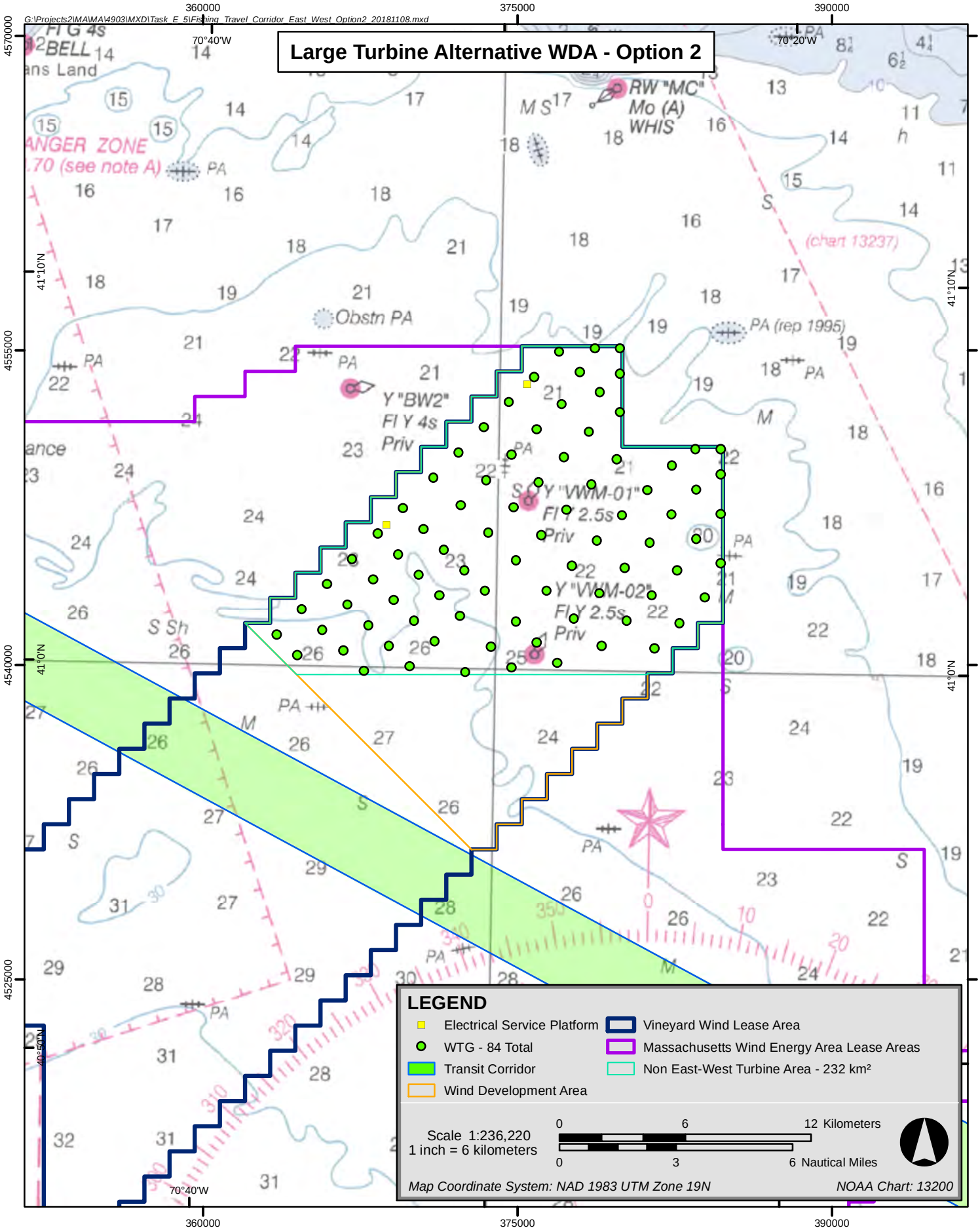
VINEYARD WIND

Attachment B – Large Turbine Alternative WDA Options



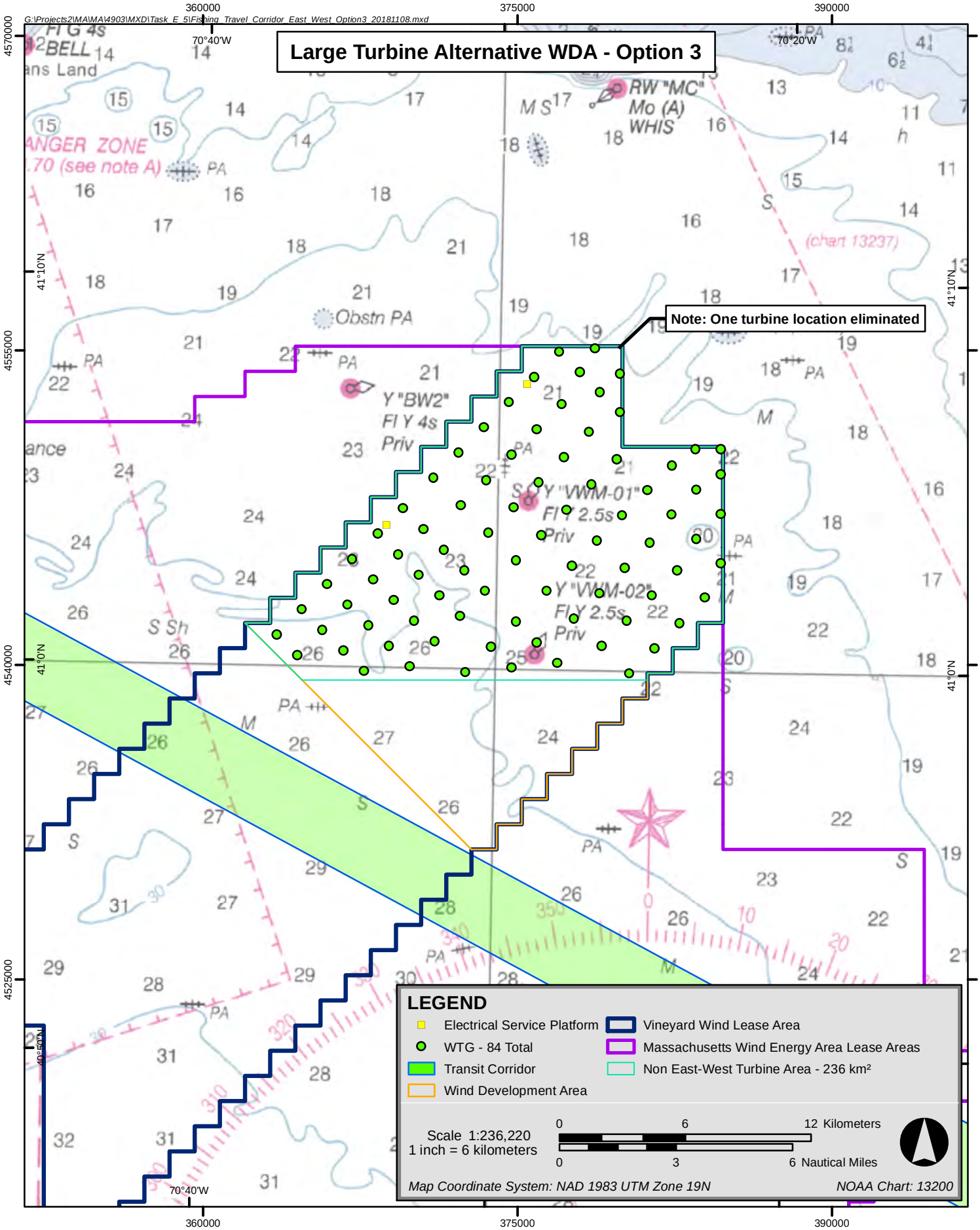
Vineyard Wind Project

VINEYARD WIND



Vineyard Wind Project

VINEYARD WIND



Vineyard Wind Project

VINEYARD WIND

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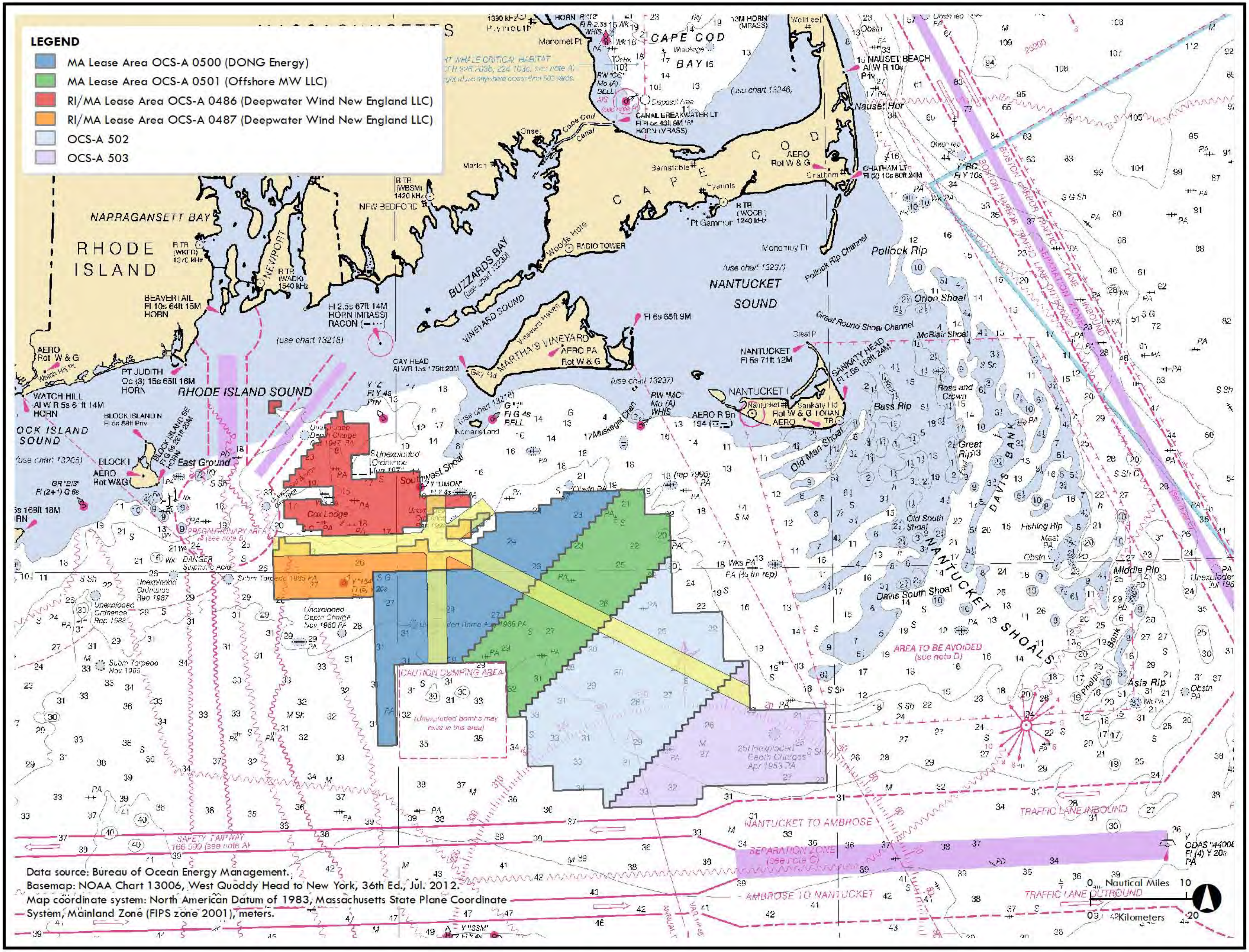
VINEYARD WIND

Attachment C – Consensus Transit Corridor Plan


LEGEND
MA Lease Area OCS-A 0500 (DONG Energy)
MA Lease Area OCS-A 0501 (Offshore MW LLC)
RI/MA Lease Area OCS-A 0486 (Deepwater Wind New England LLC)
RI/MA Lease Area OCS-A 0487 (Deepwater Wind New England LLC)
OCS-A 502
OCS-A 503
RHODE ISLAND
NARRAGANSETT BAY
RHODE ISLAND SOUND
BUZZARDS BAY
VINEYARD SOUND
MARTHA'S VINEYARD
NANTUCKET SOUND
CAPE COD BAY
CAPE COD
NANTUCKET SHOALS
Data source: Bureau of Ocean Energy Management.
Basemap: NOAA Chart 13006, West Quoddy Head to New York, 36th Ed., Jul. 2012.
Map coordinate system: North American Datum of 1983, Massachusetts State Plane Coordinate System, Mainland Zone (FIPS zone 2001), meters.
0 Nautical Miles 10
0 Kilometers 20

OCS-A 0501 MASS USA

VINEYARD WIND

Attachment D – Massachusetts Department of Energy Resources Letter August 1, 2018

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF
ENERGY AND ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENERGY RESOURCES
100 CAMBRIDGE ST., SUITE 1020
BOSTON, MA 02114
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Facsimile: 617-727-0030

Charles D. Baker
Governor

Karyn E. Polito
Lt. Governor

Matthew A. Beaton
Secretary

Judith F. Judson
Commissioner

August 1, 2018

Mark D. Marini, Secretary
Department of Public Utilities
One South Station, 5th Floor
Boston, MA 02110

RE: Petitions for Approval of Proposed Long-Term Contracts for Offshore Wind Energy Pursuant to Section 83C of Chapter 188 of the Acts of 2016, DPU 18-76, 18-77, 18-78.

Dear Secretary Marini:

On July 31, 2018, Fitchburg Gas and Electric Light Company, d/b/a Unitil ("Unitil"), Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid ("National Grid"), and NSTAR Electric Company and Western Massachusetts Electric Company each d/b/a Eversource Energy ("Eversource") (collectively, the "Electric Distribution Companies" or "EDCs"), filed long-term contracts for the Vineyard Wind project for review and approval by the Department of Public Utilities ("Department"), pursuant to Section 83C of Chapter 169 of the Acts of 2008, as amended by Chapter 188 of the Acts of 2016 ("Section 83C"). In accordance with Section 83C, the EDCs issued a Request for Proposals ("RFP") on June 29, 2017 seeking offshore wind energy generation. The outcome of this process was the selection of the Vineyard Wind LLC ("Vineyard Wind") combined 800 megawatts ("MW") of offshore wind generation project (the "800 MW Vineyard Wind Project")[1] and the execution of

[1] The long-term contracts provide for the delivery of an aggregate of 800 MW of Offshore Wind Energy Generation and related RECs which will be delivered in two phases with expected commercial operation dates ("COD") of

cost-effective long-term contracts for the reliable offshore wind generation output and renewable energy certificates ("RECs") of the 800 MW Vineyard Wind Project.

The Vineyard Wind offshore wind generation long-term contracts filed by the EDCs represent over a year's worth of collaboration and consultation among the EDCs, the Department of Energy Resources ("DOER"), and Independent Evaluator ("IE"), and are a significant milestone in the Commonwealth's transition to a clean, diversified energy portfolio. As detailed below, at a total levelized price of 6.5 cents/kilowatt hour ("cents/kWh")(2017 Dollars) for energy and RECs, the Vineyard Wind offshore wind generation long-term contracts provide a highly cost-effective source of clean energy generation for Massachusetts customers.[2] As shown in the EDCs' filings, on average, these contracts are expected to reduce customer's monthly bills, all else being equal, approximately 0.1% to 1.5%.[3] The 800 MW Vineyard Wind Project achieves the requirements and objectives of Section 83C and the Department's regulations, 220 C.M.R. §23.00,[4] including assisting the Commonwealth with meeting its Global Warming Solutions Act goals and supplying the Commonwealth with critical diversity to our energy portfolio through utilizing a technology with relatively high production during winter months. The implementation of this 800 MW Vineyard Wind Project has the potential to support Massachusetts' "first mover" advantage in offshore wind development, providing greater opportunities for development of local supply chain and offshore wind industry jobs in the Commonwealth. This 800 MW Vineyard Wind Project is the largest procurement of offshore wind generation in the US, and will help spur development of local industry and economic development, including the use of the New Bedford Marine Commerce Terminal.

I. Section 83C Solicitation and Selection of Vineyard Wind

On April 28, 2017, pursuant to Section 83C, the EDCs proposed a timetable and method for solicitation of long-term contracts for offshore wind energy to the Department for review and approval. Subsequently, the Department approved the RFP, and the EDCs and DOER, (together the "Evaluation Team"), as monitored by the IE, conducted a highly competitive and robust solicitation for offshore wind generation projects. The RFP targeted 400 MW of generation but allowed proposals from 200 to 800 MW with the ability to select 800 MW if the larger proposal was superior to other proposals and was shown to provide significantly more net benefits to ratepayers. A total of 27 different proposals from three different bidders were received. The proposals ranged in capacity from 200 to 800 MW, contained various configurations of

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January 15, 2022 for the first 400 MW (Phase 1) and January 15, 2023 for the second 400 MW (Phase 2). The long-term contracts each have a term of 20 years from the date of commercial operation.

[2] All dollar figures in this document are the result of using an evaluation of a multi-year net present value analysis as set forth in the RFP and are expressed in 2017 real dollars.

[3] Exhibit JU-8, EDC Initial Filing (DPU 18-76, 18-77, 18-78).

[4] Pursuant to Section 83C, the Department was required to promulgate regulations. The regulations required the long-term contracts for Offshore Wind Energy Generation resources to: 1) provide enhanced electricity reliability; 2) contribute to reducing winter electricity price spikes; 3) be cost effective to Massachusetts electric ratepayers over the term of the contract, taking into consideration potential economic and environmental benefits to the ratepayers; 4) avoid line loss and mitigate transmission costs to the extent possible and ensure that transmission cost overruns, if any, are not borne by ratepayers; 5) adequately demonstrate project viability in a commercially reasonable timeframe; 6) allow offshore wind energy generation resources to be paired with energy storage systems; 7) mitigate any environmental impacts, where possible, and; 8) create and foster employment and economic development in Massachusetts, where feasible.

transmission, and included various pricing options. Per the RFP, the evaluation process was comprised of three evaluation stages, including both a quantitative and qualitative assessment of bids. At the conclusion of the evaluation process, the Evaluation Team ranked the proposals, and the 800 MW Vineyard Wind Project was determined to be the lowest cost and highest ranked proposal.

The EDCs agreed to select one of the projects proposed by Vineyard Wind; however, they disagreed as to which specific project,[5] with National Grid and Unitil favoring Vineyard Wind's 800 MW proposal and Eversource favoring Vineyard Wind's 400 MW proposal. Given that the EDCs failed to agree on whether the 800 MW or 400 MW Vineyard Wind bid should be selected, DOER followed Section 83C to consult with the IE and select the winning bid. DOER selected the 800 MW Vineyard Wind Project after determining, consistent with the RFP, that the 800 MW Vineyard Wind project meets the threshold of being superior to other proposals and is likely to produce significantly more economic benefits to ratepayers compared to the 400 MW project.

DOER found that the 800 MW Vineyard Wind Project was superior in terms of having the lowest total proposal price and highest levelized benefit (at net present value) of all proposals evaluated. Compared to the 400 MW Vineyard Wind proposal, it had significantly higher NPV net benefit to ratepayers. Further, the selection of the 800 MW Vineyard Wind Project is expected to exert downward pressure on future prices for offshore wind. In addition, contracting with 800 MW of offshore wind provides a unique opportunity to maximize the value of the federal investment tax credit ("ITC") as the value of the credit is scheduled to be gradually reduced and will not be available for projects that start construction after December 31, 2019.

II. The 800 MW Vineyard Wind Project Provides Significant Value to Massachusetts Ratepayers

As previously stated, the DOER strongly supports the 800 MW Vineyard Wind Project, and recommends that the Department approve the resulting offshore wind energy generation long-term contracts. The 800 MW Vineyard Wind Project is highly cost-effective procured through a rigorous and highly competitive RFP process that will provide offshore wind energy generation and RECs to the Commonwealth and effectively meets the requirements and objectives of Section 83C. Specifically, the 800 MW Vineyard Wind Project significantly aligns with the Commonwealth's goals of creating a clean, affordable, and resilient energy future for the Commonwealth.

The 800 MW Vineyard Wind Project contributes to the Baker-Polito Administration's goal of creating an affordable energy future. As detailed in the EDCs' filing[6], the 800 MW Vineyard Wind Project will provide the Commonwealth with energy and RECs at a total

[5] Exhibit JU-6, EDC Initial Filing (DPU 18-76, 18-77, 18-78).
[6] *Id.* at Exh. JU-5, *see also* Exh. JU-4.

levelized price of 6.5 cents/kWh 2017 dollars over the term of the long-term contracts.[7] This total price is materially below the levelized projected costs of buying the same amount of wholesale energy and RECs in the market, which is projected to be a total levelized price of 7.9 cents/KWh in 2017 dollars over the 20-year term of contract.[8] Over the life of the contract, the 800 MW Vineyard Wind Project is projected to provide an average 1.4 cents/KWh of direct savings to ratepayers.

In addition to the direct market benefits from these fixed cost contracts described above, the 800 MW Vineyard Wind Project also provides indirect benefits. These indirect benefits include energy market price reductions and lower Renewable Energy Portfolio Standard ("RPS") compliance costs through increased REC supply. Additionally, ratepayers receive the benefit of price certainty through a fixed cost contract. Overall, the total direct and indirect benefits to Massachusetts ratepayers from the long-term contracts with Vineyard Wind are expected to be 3.5 cents/kWh, or $35.29/ megawatt-hours ("MWh") on average over the term of the contract, with total net benefits of approximately $1.4 billion.[9]

Section 83C allowed for proposals to provide options to create and foster employment and economic development in the Commonwealth, where feasible. The 800 MW Vineyard Wind Project includes a $15 million initiative for acceleration of the offshore wind market including: a $10 million offshore wind industry accelerator fund, $2 million for workforce development and $3 million for innovations in protecting marine mammals. Additionally, Vineyard Wind will further establish a Resiliency and Affordability Fund by contributing $1 million each year for 15 years. The Fund will support the construction of battery energy storage and solar projects for the purpose of enhancing resiliency and providing low-income ratepayer benefit in the communities hosting the Vineyard Wind Project.

[7] The price for energy and RECs in the Phase 1 of the long-term contracts begins at $74 per MWh (nominal $), and the price for energy and RECs in the Phase 2 long-term contracts begins at $65 per MWh (nominal $). Each long-term contract has a 20-year term, starting at the COD of the relevant project, and the prices described above escalate by 2.5 percent each year of that term which starts in 2022 and runs until 2043. The 20-year average cost of the two long-term contracts' is $84.23 per MWh in levelized nominal dollar terms. This is equivalent to a levelized net present value price in 2017 dollars of $64.97 per MWh.

[8] Projections of future energy market and REC costs are described in detail in the quantitative evaluation results.

[9] *Id.* at Exh. JU-5, *see also* Exh. JU-4.

III. CONCLUSION

The 800 MW Vineyard Wind Project and the corresponding contracts provide a cost-effective source of reliable offshore wind energy for Massachusetts customers, meet the requirements of Section 83C, and are in the public interest. Accordingly, the DOER respectfully requests that the Department approve the long-term contracts filed by the EDCs.

Respectfully submitted by,

THE MASSACHUSETTS DEPARTMENT OF ENERGY RESOURCES

By its attorneys,

/s/ Robert H. Hoaglund II

Robert H. Hoaglund II, General Counsel
Ben Dobbs, Deputy General Counsel
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617.626.7300

OCS-A 0501 MASS USA

VINEYARD WIND

Attachment E – Massachusetts Coastal Zone Management Letter
October 5, 2018

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
251 Causeway Street, Suite 800, Boston, MA 02114-2136
(617) 626-1200 FAX: (617) 626-1240

MEMORANDUM

TO: Matthew A. Beaton, Secretary, EEA
ATTN: Purvi Patel, MEPA Unit
FROM: Bruce Carlisle, Director, CZM
DATE: October 5, 2018
RE: EEA-15787, Vineyard Wind Connector

The Massachusetts Office of Coastal Zone Management (CZM) has completed its review of the above-referenced Supplemental Draft Environmental Impact Report (SDEIR), noticed in the *Environmental Monitor* dated September 5, 2018. These comments address the responsiveness of the SDEIR with regards to CZM's comments on the Draft Environmental Impact Report (DEIR), respond to new information provided since the SDEIR as part of the ongoing discussions between the proponent and state agencies, and review the proposed project with regards to the siting standards as stated in Ocean Management Plan (OMP) Regulations (301 CMR 28.00) which will provide a framework for the Final Environmental Impact Report (FEIR) review and the Secretary's Certificate on the proposed project. The SDEIR is largely responsive to comments and questions raised in CZM's comment letter on the DEIR. CZM commends Vineyard Wind for their efforts to address agency concerns throughout the MEPA review.

Project Description

Vineyard Wind proposes to install two 10-inch diameter 220 kV AC offshore export cables to connect its wind energy project, located within the federally designated Wind Energy Area off Massachusetts, to the existing electrical grid on Cape Cod. This proposal is part of a larger project that seeks to permit an 800-megawatt (MW) offshore wind farm under the jurisdiction of the Bureau of Ocean Energy Management (BOEM). Major elements of the total project include a wind turbine array, offshore electrical service platforms, offshore electric transmission to shore, onshore underground transmission, and an onshore substation. The SDEIR maintains two alternative offshore export cable corridors (a Western cable corridor and an Eastern cable corridor) which can make landfall at one of two potential sites (New Hampshire Avenue in Yarmouth and Covell's Beach in Barnstable). Each proposed cable construction corridor may be up to 810 meters wide. The Western corridor to the landing site at New Hampshire Avenue passes through 21.4 miles of state waters, while the Eastern corridor to the New Hampshire Avenue landing passes through 23.3 miles of state waters. Selection of the Covell's Beach landing site would result in corridors 20.9 and 22.6 miles long, respectively. Both proposed cable routes through Nantucket Sound include sections within the area of federal waters in the center of the sound. The cables will be buried approximately 1.5 to 2.4 meters below the seafloor and laid with a combination of hydroplowing (through flat, soft sediments), jetting (through small sand waves), suction dredging (through large sand waves), and mechanical dredging (through compacted sand/gravel/cobble). Dense aggregations of boulders will be avoided while solitary boulders will be removed from the cable pathway and placed in another location within the construction corridor.

Project Comments

CZM supports the responsible development of marine renewable energy to help meet state and regional greenhouse gas emission reduction goals as well as other statutory obligations. Vineyard Wind's offshore wind project has been developed through the federal planning and analysis, leasing, site assessment and construction and operations plan processes in which CZM has been an active participant since 2009. Through MEPA, NEPA, and federal consistency reviews CZM seeks to ensure that the project is consistent with state coastal program policies and applicable regulations.

In comments on the DEIR, CZM requested that Vineyard Wind provide clearer depictions of the proposed project relative to existing ocean resources and uses. The maps in Attachment A and the map books provided to CZM are largely highly responsive to this request. Due to project logistics relating to the processing of survey data, ongoing discussions with resource agencies, and still-to-be-confirmed cable laying methods, assessment of the project's avoidance and minimization of impacts to some sensitive resource areas is ongoing.

In the DEIR comments, CZM recommended that the information collected during the 2018 field campaign be used to demonstrate that Vineyard Wind's preferred cable route alternative avoids sensitive resources identified in the Ocean Management Plan (OMP) and, where avoidance is not practicable, minimizes potential impacts to those resources. After review of the information and analysis provided to date, CZM finds that Vineyard Wind has adequately demonstrated avoidance and minimization of potential impacts to core whale habitat areas, eelgrass, and intertidal flats in conformance with the siting standards of the OMP; however, more information is required in the FEIR on how the selected route and cable laying method(s) will minimize impacts to hard/complex seafloor resources. As Vineyard Wind is still processing and analyzing its 2018 field data, CZM looks forward to reviewing this information in the FEIR. This data should confirm the conclusions of Vineyard Wind's alternatives analysis and assessment of impacts. Similarly, CZM understands that the exact methods and equipment for dredging sand waves and installing the submarine cable will not be known until a contractor for such work is selected. Specific points and questions related to the OMP management standards, dredging methods and impacts, time of year restrictions, monitoring plans, and the Ocean Development Mitigation Fee are detailed below and should be addressed in the FEIR.

Massachusetts Ocean Management Plan

The OMP and its implementing regulations at 301 CMR 28.04(2) and (6) describe the management standards that apply to cables in the ocean planning area. The siting standard for activities in the ocean management planning area are presumptively excluded from the special, sensitive or unique (SSU) resource areas delineated on maps contained in the OMP. The presumptive exclusion may be overcome by a clear demonstration that (1) new, site-specific information provides more accurate delineation of the resource areas; or (2) no less environmentally damaging practicable alternative exists; and (3) all practicable measures to avoid damage to SSU resources have been taken and the activity will cause no significant alteration; and (4) the public benefits associated with the activity outweigh the public detriments to the SSU resource. For cable projects, the SSU resources that must be avoided are: hard/complex seafloor, eelgrass, intertidal flats, North Atlantic right whale core habitat, humpback whale core habitat, and fin whale core habitat. In the siting of cable projects for the transmission of offshore wind energy, the OMP management standards clarify that such cables are in presumptive compliance with the siting standards if: 1) investigations and surveys confirm the predominance of soft-bottom seafloor (i.e., the general absence of hard-bottom substrate) within cable corridors such that sufficient burial depths for cables can be reasonably expected, and that the presence of relatively small areas of hard-bottom substrate, such that the cable route cannot be

practicably located outside of these areas, within acceptable limits, is permissible; and 2) time of year controls are in place such that operations and dredging will avoid damage and cause no significant alteration to North Atlantic right whale core habitat, humpback whale core habitat, and fin whale core habitat. As stated above, CZM finds that Vineyard Wind has sufficient protocols in place to avoid impacts to endangered whales. The revised maps provided in the SDEIR show the extent of hard/complex seafloor in higher resolution than depicted in the OMP. Vineyard Wind has further delineated hard seafloor separately from complex seafloor (sand waves) and has made efforts to avoid hard seafloor when siting the proposed cable route. However, at this time, the amount of hard seafloor (areas of cobble and biogenic habitat) that cannot be avoided and may be impacted during the cable laying process are not fully known. CZM recommends that the FEIR clearly delineate and describe the extent and area of hard seafloor that is unavoidable and must be excavated or covered to successfully bury the cables. The FEIR should also present additional images obtained and habitat classification analysis conducted based on Vineyard Wind's field surveys and investigations for areas where identified hard bottom and biogenic habitats are within or proximate to the cable footprint.

The SDEIR provides a summary of impacts for the proposed cable routes (Table 1-4) and identifies that the western route through Muskeget Channel landing at Covell's Beach in Barnstable results in the least amount of impacts to the seafloor. In meeting the siting standards at 301 CMR 28.04(2)(b), it appears that the western route to Covell's Beach may represent the least environmentally damaging practicable alternative; however, further information and analysis to be presented in the FEIR may supersede this. Additionally, to meet the management standards in the OMP, Vineyard Wind should demonstrate, and clearly describe in the FEIR, how the public benefits of the proposed project outweigh the public detriments to SSU resources.

The method and machinery selected for the laying of the transmission cables is important to the avoidance and minimization of SSU resources. The OMP contains language that states that installation methods that achieve burial with minimal seabed disturbance—including footprint, width of trench, and sidecast and suspension of sediments—are strongly preferred. Such methods include jet plowing, remotely operated seabed tractors, and some towed seabed plows. The plan also states that all cable projects will need to have an approved plan for inspection and maintenance to ensure that adequate coverage is maintained. Vineyard Wind has conveyed that it seeks to maximize the use of trench fluidization through soft sediments as the preferred mode of cable laying. CZM agrees that simultaneous cable laying and burial in soft sediments (as opposed to trenching and laying the cable at a later time) is the preferred method for minimizing impacts. In areas of sand waves or other locations where dredging is required, CZM notes that the several dredging techniques presented in the SDEIR have different effects in terms of seafloor disturbance and sedimentation. It is clear from the additional modeling presented in the SDEIR that Trailing Suction Hopper Dredging (TSHD) has greater impacts than jetting or jetplowing. In order to reduce both direct impacts to habitat and biota on the seafloor and indirect sedimentation on these resources per the OMP requirements, Vineyard Wind should use the 2018 survey data to avoid or minimize laying cable in large sand waves (a process that requires TSHD), and maximize the use of fluidization and jetting (processes that allow simultaneous cable laying).

Under the OMP regulations at 301 CMR 28.04(3), proponents must avoid, minimize, and mitigate impacts to areas of concentrations of water dependent uses identified in the plan. Vineyard Wind's proposed steps to minimize impacts to recreational and commercial fishing activities and navigation include employing a Marine Coordinator to manage all construction vessel logistics,

enacting a 500-meter safety zone around all construction activities, and establishing a vessel traffic management plan and coordination with local pilots during construction. CZM encourages Vineyard Wind to provide notices to mariners to keep them apprised of specific construction activities and to minimize conflicts between construction vessels and recreational or commercial vessels in high transit areas, especially Muskeget Channel. In addition, DMF has a standard protocol for communicating the location and timing of survey activities to fixed gear fishermen. The protocol includes using various media sources (letters, texts, postcards, emails, website) to alert members of the Massachusetts Lobstermen's Association to the location and start time of a survey, to provide daily updates on activities, to answer inquiries from fishermen, and details a process for returning intercepted gear. CZM encourages Vineyard Wind to work with DMF and the fixed gear community to adopt a similar program to minimize impacts to this important commercial fishery during construction.

Transit Corridor and Turbine Spacing

While located in federal waters and therefore not under MEPA jurisdiction, the location and configuration of the turbines will have effects on resources and uses of the state's coastal zone. CZM's federal consistency review includes all of the elements of the proposed project in both the coastal zone and in federal waters. In our comments on the DEIR, CZM indicated that data from Vessel Monitoring Systems and Automatic Identification Systems show significant marine vessel navigational activity across the offshore wind lease areas, and that due to the high volume of vessel traffic (fishing and otherwise), the establishment of transit corridors is critically important to the safe passage of vessels. Since June, CZM has been working with the MA Fisheries Working Group on Offshore Wind (comprised of fishing industry representatives, representing various fisheries, gear types and ports) and the U.S. Coast Guard on the issue of identifying transit lanes through the offshore lease areas. Over the course of several meetings with significant discussion and consultation on a number of options and alternatives, general consensus was reached at the September 20th working group meeting on an alternative that provides safe options for vessels transiting through the adjacent wind energy lease areas via 2 nautical mile wide transit lanes to/from priority areas identified by various fishing sectors and ports. This alternative includes east/west and north/south transit lanes and a lane to the southeast ending just south of Nantucket shoals. Additionally, another north/south lane within the currently unleased areas (502 and 503) was discussed, to be revisited after the delineation of lease areas in BOEM's pending Final Sale Notice. We understand that discussions on this topic are still ongoing in other jurisdictions; however, CZM believes that the working group consensus alternative is a balanced and feasible option that while perhaps optimal to none, is acceptable from a navigational safety perspective and represents a compromise approach to a very difficult issue.

Species of Concern

Vineyard Wind has previously presented information on how it plans to mitigate for construction noise disturbance and ship strikes to whales and turtles. In the SDEIR, Vineyard Wind presents a plan for avoiding eelgrass beds and horseshoe crab spawning off Covell's Beach in Barnstable, should that landing alternative be chosen. Discussions to find appropriate TOY for construction to avoid impacts to Piping Plovers, bay scallops, whelks, squid eggs, and diving/plunging birds are ongoing. In meetings with resource agencies, Vineyard Wind has proposed that it may be possible to begin construction of the energy export cables in the nearshore in one year, bury the partial cable segments, and then splice and continue laying the remaining cable lengths in the offshore portion of the project in the following year. The FEIR should include details as to how the construction activities will be timed, staged, and sequenced to minimize impacts to the species of concern mentioned above. CZM acknowledges that the cumulative result of the various TOY restrictions may severely limit, if not preclude, time available for cable installation. Vineyard Wind should continue

discussions with resource agencies to determine the highest priority TOY and identify other mitigating measures (such as clearing the cable route prior to work) that will allow for a sufficient window for cable installation.

Fisheries Resources

In the SDEIR, Vineyard Wind provided new modeling (discussed further in the next section) for jetplowing, that shows the predicted extent of sediment drape that might affect winter flounder eggs (deposition > 1mm) is confined to within about 100 meters of the cable trench. Sediment deposition associated with dredging techniques is greater. As stated above, Vineyard Wind has had discussions with DMF and NMFS regarding the best TOY for construction to avoid impacts to fisheries resources. A summary of these discussions and a possible construction sequencing solution should be provided in the FEIR.

Vineyard Wind presented a third-party analysis of the potential electromagnetic frequency (EMF) energy released by the proposed energy export cables. The results suggest that the AC magnetic fields associated with buried, subsea cables is very low and when acting on a "compass-like magnetic sensing system, would have a time-average force of zero." Thus, the EMF energy from the cable is not expected to interfere with the navigational sense of marine organisms. Vineyard Wind concludes that the electrical energy from its cables will not be detected by marine organisms.

Vineyard Wind should continue to work with DMF and the Town of Yarmouth shellfish program to delineate shellfish resources within the proposed cable corridor in Lewis Bay. Details of how the cable could be sited to avoid high density shellfish areas and how TOY provisions could be employed to minimize impacts to resources in Lewis Bay should be presented in the FEIR.

Cable Installation

The SDEIR includes new modeling of the potential sediment plume and deposition associated with laying the cables. Three methods of cable laying are modeled: 1) "jet plowing" (hydroplowing) where simultaneous fluidizing of the trench and cable laying occurs; 2) "TSHD" where a suction dredge excavates sand waves areas, material is placed in a hopper and then dumped a distance away from the cable trench, and the cable is laid some time later; and 3) "jetting" (mass flow excavation) where jets of water push small sand waves away from the desired trench area and the cable is laid simultaneously. Mechanical trenching, with a tool similar to a chain saw discussed previously by Vineyard Wind for removing packed sand/gravel/cobble areas, was not modeled. During jet plowing, the model results predict that deposition of sediments > 1 mm would be confined to within 100 meters of the cable. However, the modeling work assumes the jetplow trench would be 1 meter wide while published field evidence from the Block Island Wind Farm (BOEM 2017-027) indicates that this method leaves a trench 2 meters wide. CZM requests that Vineyard Wind describe why jetplowing for this proposed project would result in half the trench width than has been documented for a similar offshore export cable.

During TSHD activities, the modeling depicts a plume of sediment with Total Suspended Solids (TSS) > 10 mg/l that is predicted to extend 10 miles from the dredged area while TSS > 1000 mg/l is predicted up to 3 miles away during hopper overflow and dumping. However, the model results shown seem to integrate all of the sediment plume impacts over the entire course of the total days of dredging activity and do not represent what would be present on any given day. CZM recommends that the FEIR include the model results for a representative day, perhaps even with an hourly breakdown, to better understand potential effects on both sedimentation and on visibility for

diving birds. As stated above, CZM recommends that Vineyard Wind minimize TSHD activities and maximize the use of simultaneous cable lay and burial techniques (e.g., jetplowing and jetting) to minimize impacts to the seafloor.

As stated in the DEIR comment letter, CZM recommends that the modeled results be verified during the actual installation process. The SDEIR suggests that this monitoring activity might include a handheld turbidity meter deployed from a small vessel at various depths during dredging. CZM looks forward to working with Vineyard Wind and the resource agencies on the details of this monitoring program.

In previous comments, CZM suggested that Vineyard Wind use its field data and its hydrodynamic model to characterize the wave dynamics, currents, and sediment transport along the proposed cable route, particularly in areas of sand waves, to better understand whether the proposed depth of burial is sufficient to avoid the potential use of armoring. The SDEIR describes a cable burial survey effort initially after construction, every year for the first three years, every three years for the next 12 years, and every five years beyond that. The SDEIR describes that sections of cable that are identified as inadequately buried, will be buried using a secondary burial tool. CZM discourages the use of armoring due to the detrimental impacts which can include increased scouring of the seafloor adjacent to the hard cover, increased substrate providing a vector for invasive species colonization, and impacts to commercial and recreational fishing operations. CZM instead recommends additional efforts to bury the cable to the appropriate depth or covering the cable with sand bags and gravel/cobble cover, as appropriate to mimic adjacent seafloor conditions.

Sand Waves

Vineyard Wind estimates that the linear extent of sand wave dredging would be 1.4 to 2.2 miles (depending upon the corridor and landing point) and the volume of dredging required in sand waves to be 71,000 to 136,000 cubic yards. Vineyard Wind estimates that the dredged corridors through sand waves for both cables will be approximately 65 feet wide at the bottom and with a 4:1 side slope ratio. This suggests that cable corridors within a 10-foot sand wave would be 145 feet wide and within a 15-foot sand wave would be 185 feet wide. CZM's understanding is that the potential dredging estimates were calculated assuming a 65-foot width which, given the above information, would underestimate the volumetric impacts. CZM suggests that for the FEIR Vineyard Wind use field survey data on the height and extent of sand wave areas to provide an updated estimate of the volume of material that will need to be removed from the seafloor to allow for cable laying in sand wave areas.

At this time, Vineyard Wind has not identified the exact areas where dredged material will be deposited other than to state that hopper dredge spoils will be dumped to the east or west of the dredging area within the 810-meter cable corridor. As CZM stated previously, there should be resource assessment information for each proposed disposal area to ensure that sensitive benthic habitat or fisheries resources are not impacted during this aspect of construction. CZM recommends that Vineyard Wind use its survey data (bathymetry, videos, benthic grabs) in the FEIR to identify potential dredge disposal locations that minimize impacts to benthic resources and to establish areas where dumping will be avoided. For example, dredge material should not be placed on areas mapped by Vineyard Wind as biogenic habitats. Potential dredge disposal areas should be similar in sediment texture and structure as the sites from which the material is dredged (e.g., excavated sand waves should be deposited in a nearby sand wave site). CZM recommends that areas to be dredged and dredge disposal areas be clearly defined in maps, with supporting field data to confirm the mapped units. The

FEIR should include all interpreted and raw field data (photos, videos, bathymetry, sidescan, biological and sediment grab samples) and these data should be used to inform this process. In particular, CZM would like to see validation for areas mapped as biogenic structures and cobble or cobble mixes.

Monitoring Plan(s)

CZM's previous comments asked for information on monitoring plans related to:

- Real-time cable installation effects (turbidity, sediment drape, physical disturbance) so that actual effects can be compared to anticipated effects;
- Construction impacts to biogenic habitats, benthic infauna, and/or fisheries resources;
- Recovery times of various resources;
- Demonstration of the as-built cable condition to verify the appropriate depth of cable burial;
- Demonstration that the cable remains adequately buried over the long-term.

While Vineyard Wind has outlined a monitoring effort to address each of these subjects in the SDEIR, the details regarding specific methods, times of year, frequency, and locations are still to be determined. CZM looks forward to working with Vineyard Wind and the other resource agencies on the details of these monitoring plans and establishing a process for determining if established performance standards have been met.

Ocean Development Mitigation Fee

Pursuant to the OMP and its regulations, the project is subject to an Ocean Development Mitigation Fee. In the SDEIR, pursuant to the fee structure contained in the OMP, Vineyard Wind identified the proposed project as a Class II ocean development activity category and proposed $240,000 mitigation for a predicted 27 acres of permanent hard cover in state waters to protect the energy export cables. CZM's position is that mitigation for the Vineyard Wind project should be based upon the full extent of the impact of the project including: direct cable laying and dredging area, dredged disposal area, sediment deposition area, and impacts to biota and habitat, as well as permanent hard cover. Based upon Vineyard Wind's estimates of area impacted by cable installation in state waters (Table 1-4), up to 94 acres of seafloor could be disturbed temporarily; 27 acres of seafloor could be permanently covered with hard cable protection; 166,000 cubic yards of sediment could be fluidized resulting in 200 acres covered in over 1 mm of sediment; and 136,000 cubic yards of sand waves could be dredged. As stated above, some of these impacts may be underestimated. The extent of the anticipated impacts would place the project in the Class III ocean development activity category (i.e., footprint greater than 20 acres). CZM looks forwards to further discussion with Vineyard Wind and the Secretary's office on the Ocean Development Mitigation Fee for the FEIR.

Federal Consistency

The proposed project is subject to CZM federal consistency review. For further information on this process, please contact, Robert Boeri, Project Review Coordinator, at 617-626-1050 or visit the CZM web site at www.state.ma.us/czm/fcr.htm.

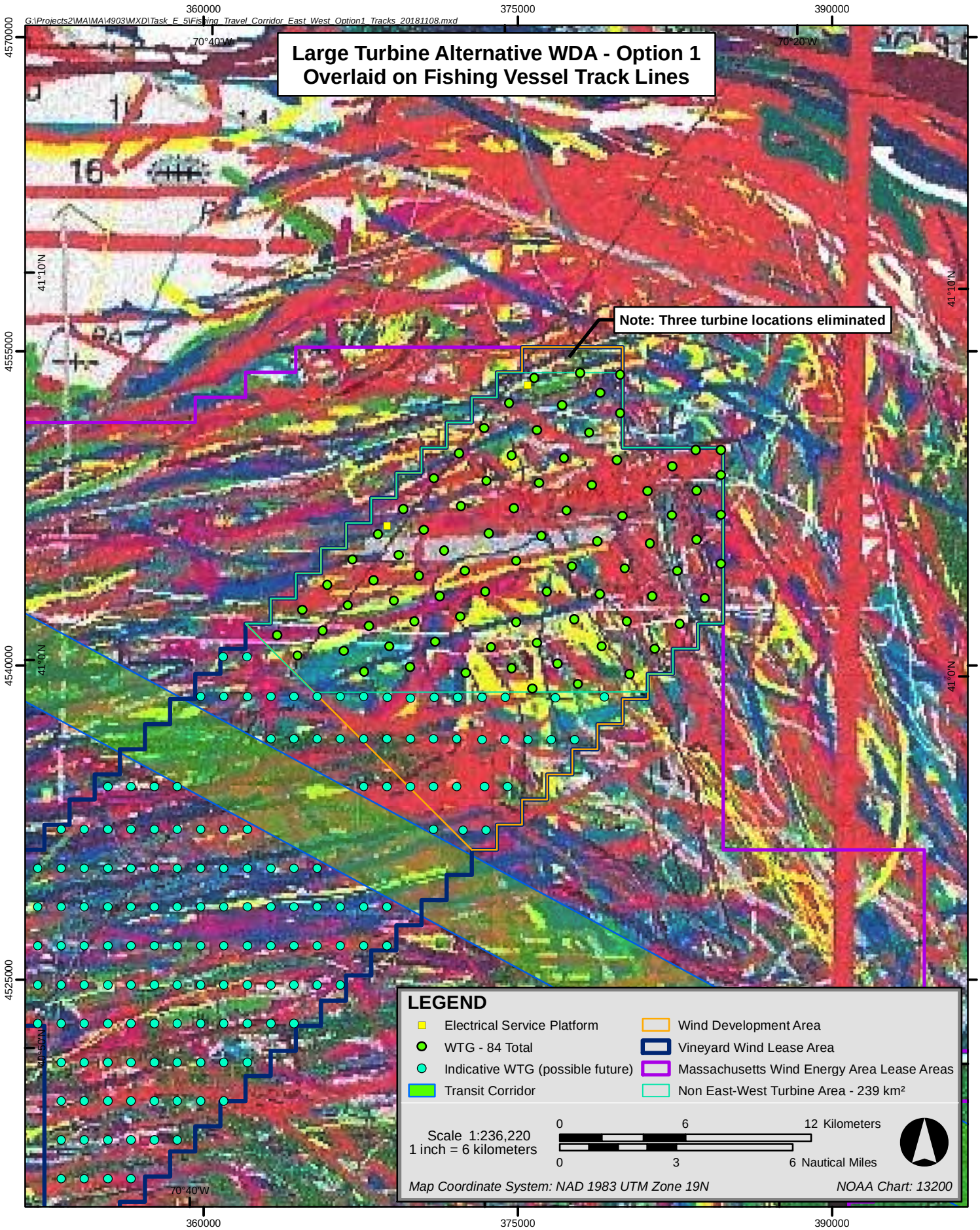
BKC/rlb/tc/sm

cc: Yarmouth Conservation Commission
Barnstable Conservation Commission
Holly Carlson Johnston, Epsilon Associates, Inc.
Rachel Pachter, Vineyard Wind
Conrad Caia, Yarmouth Shellfish Constable
Dan Horn, Barnstable Shellfish Constable
Christopher Boelke, Sue Tuxbury & Alison Verkade, NMFS
Ed Reiner, EPA
Derek Standish, David Wong, DEP
Kathryn Ford, John Logan, Eileen Feeney, DMF

OCS-A 0501 MASS USA

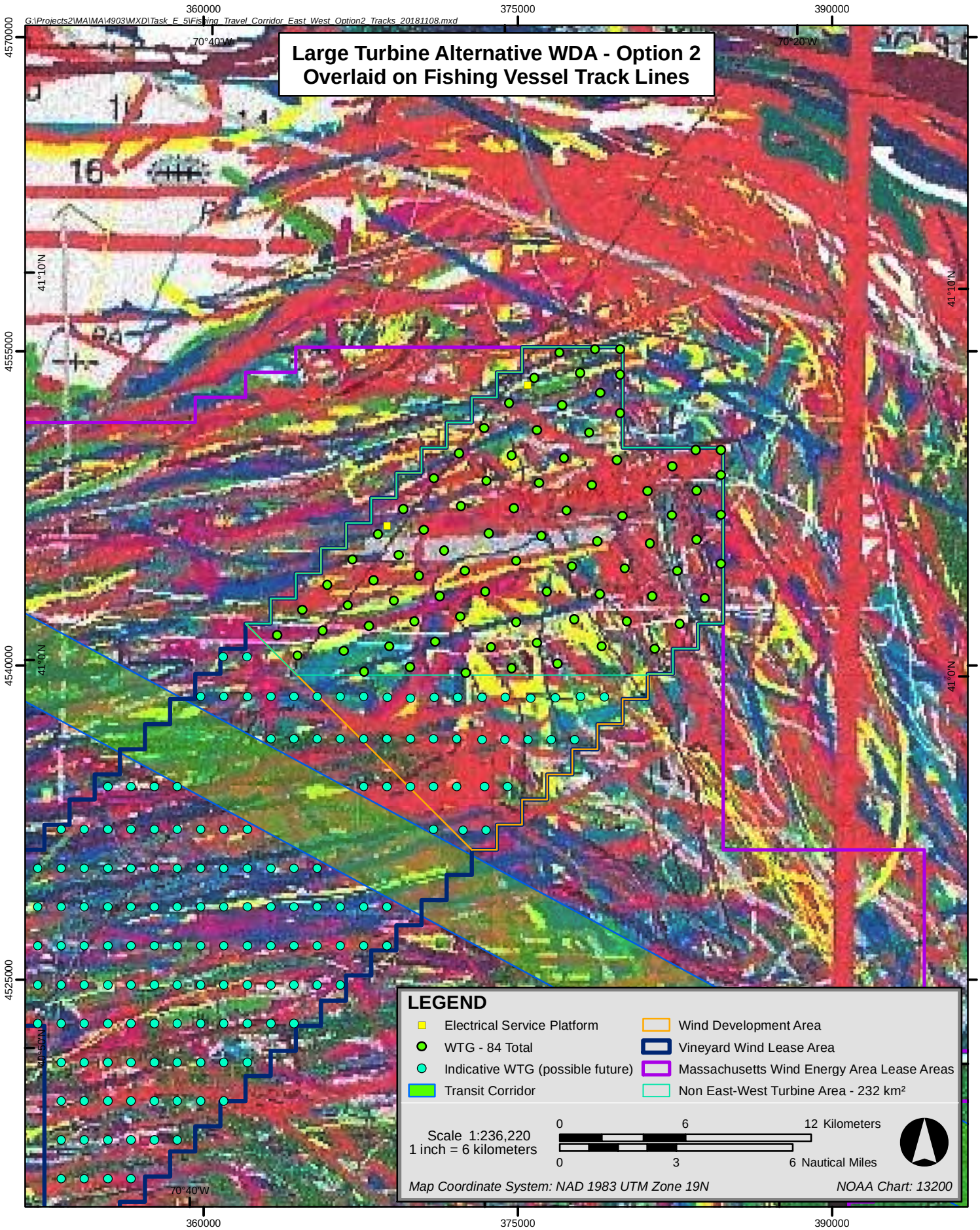
VINEYARD WIND

Attachment F – Large Turbine Alternative WDA Options Overlain on Tow Track Graphic



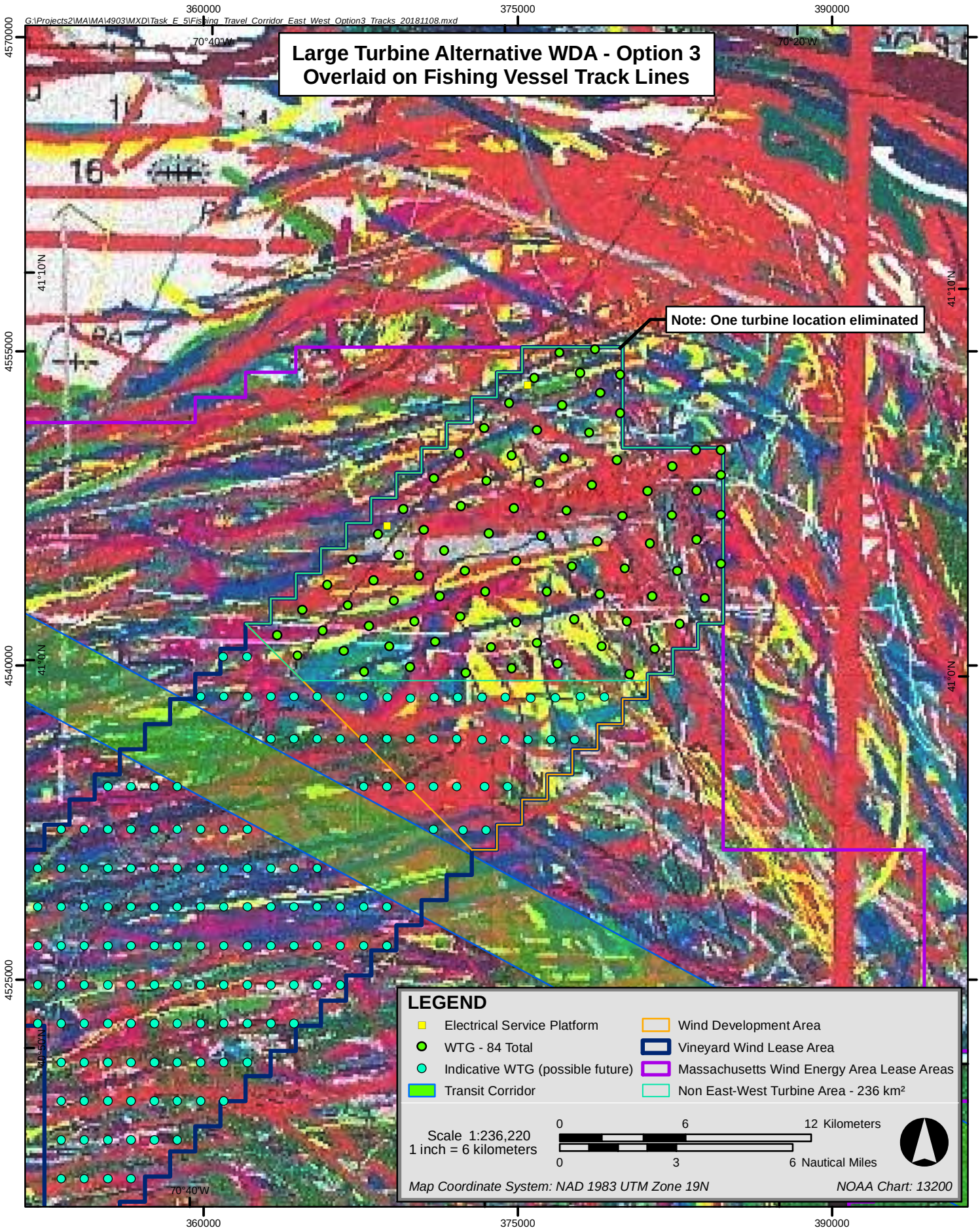
Vineyard Wind Project

VINEYARD WIND



Vineyard Wind Project

VINEYARD WIND



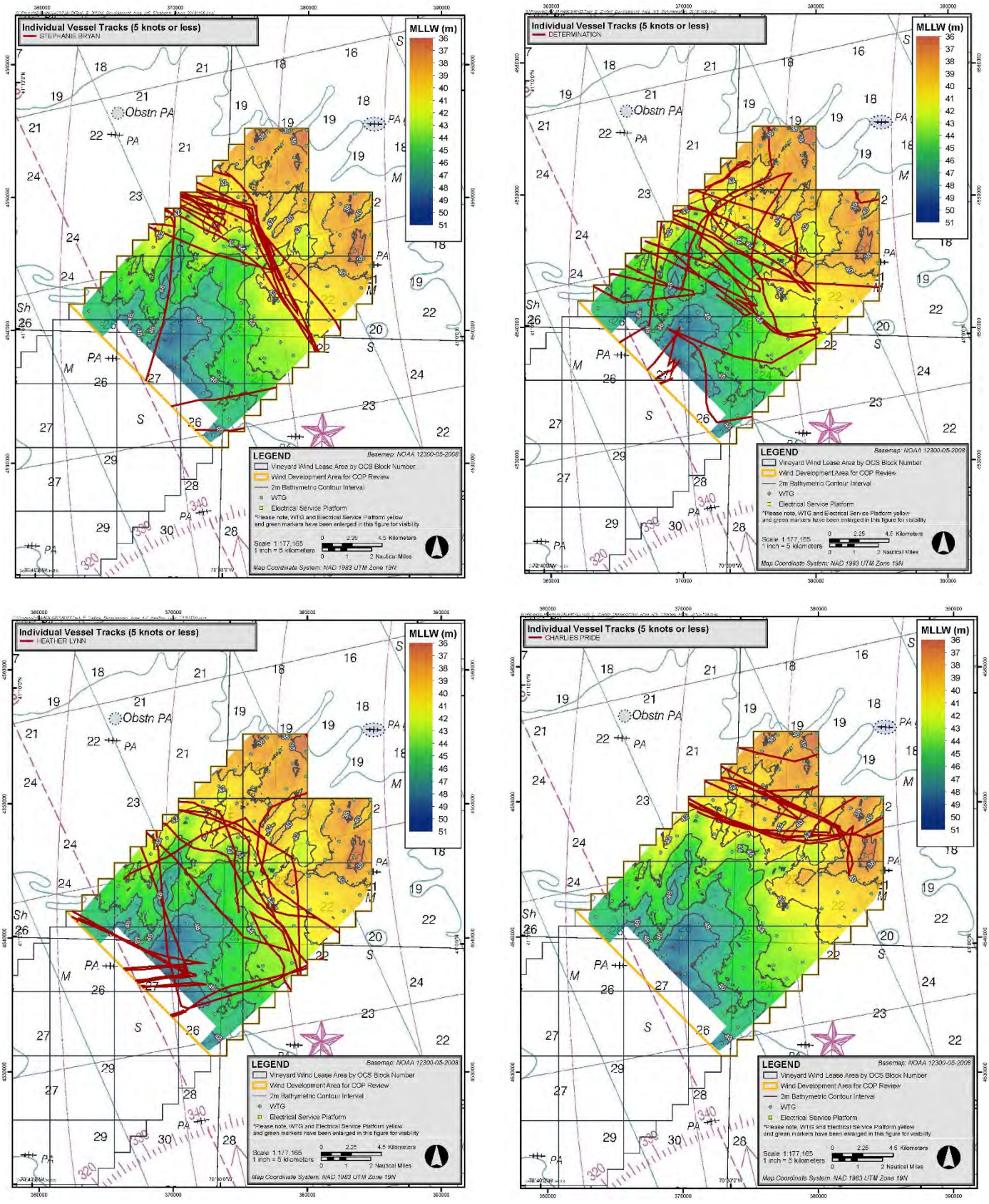
Vineyard Wind Project

VINEYARD WIND

OCS-A 0501 MASS USA

VINEYARD WIND

Attachment G– Wind Development Area - AIS Vessel Track Data (2016)

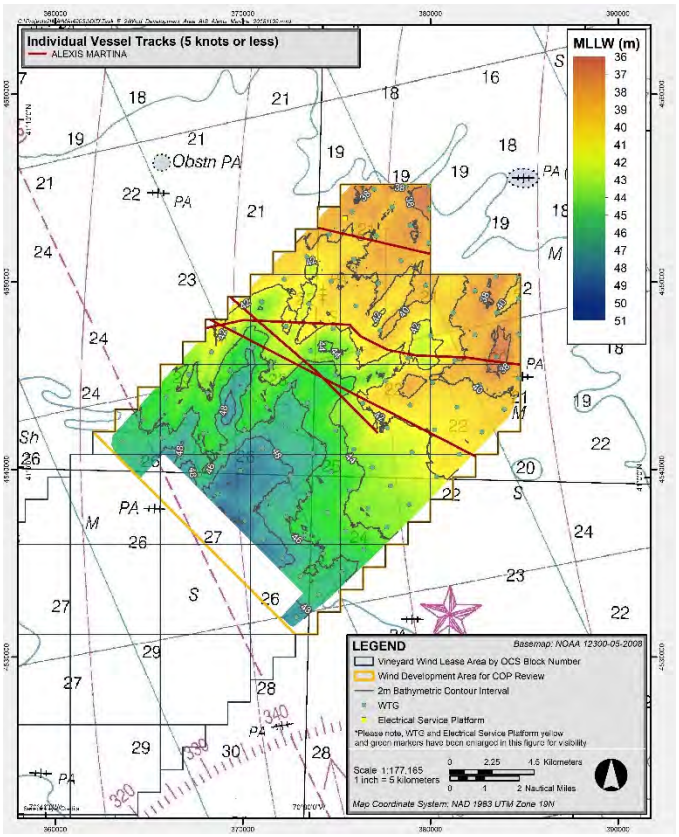


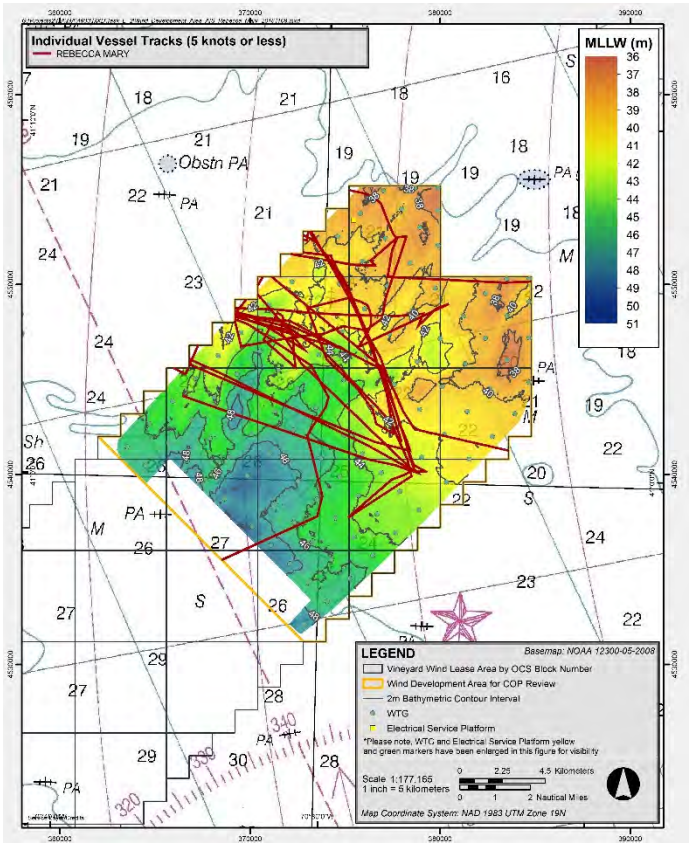
Vineyard Wind Project

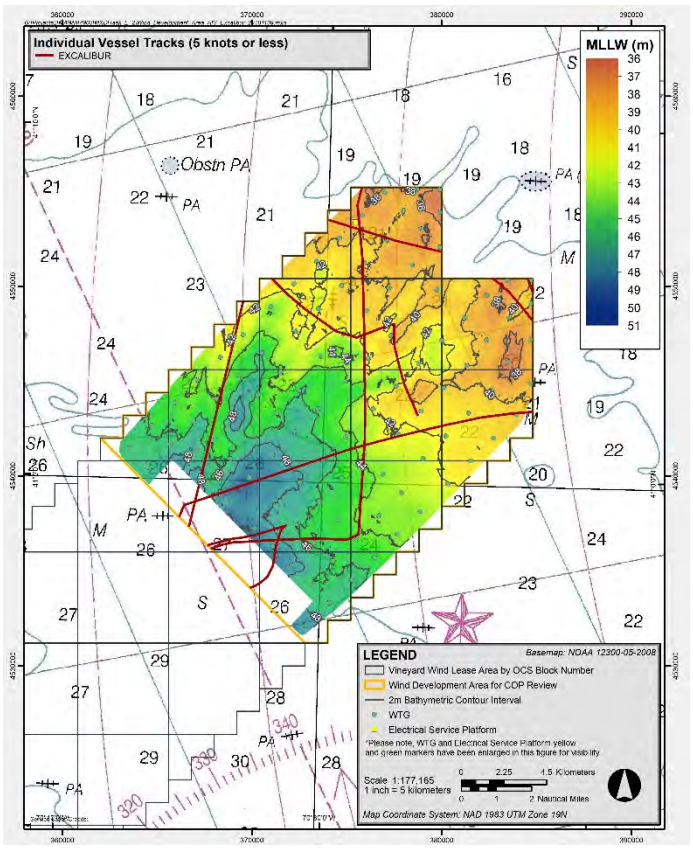
VINEYARD WIND

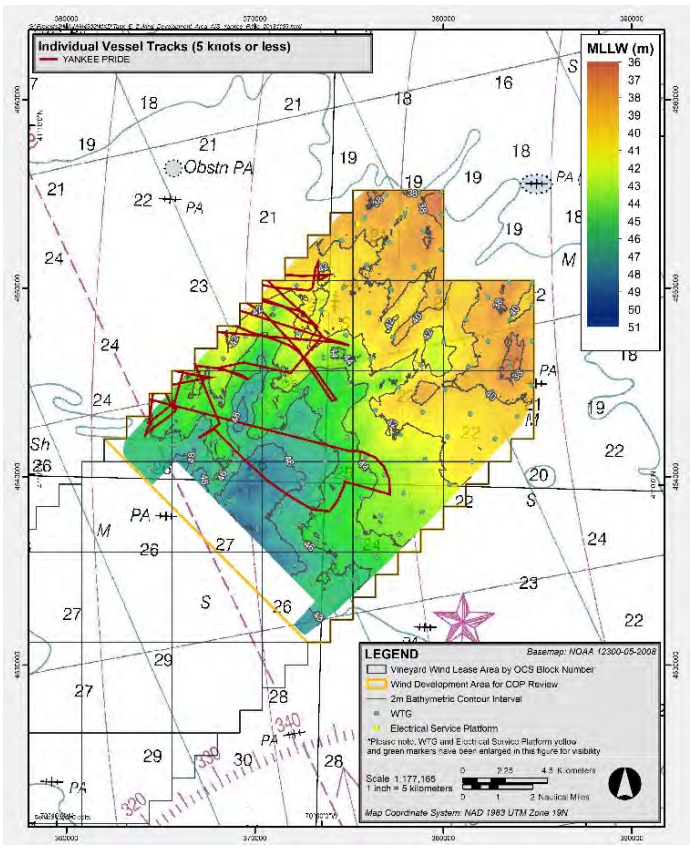
Figure 1

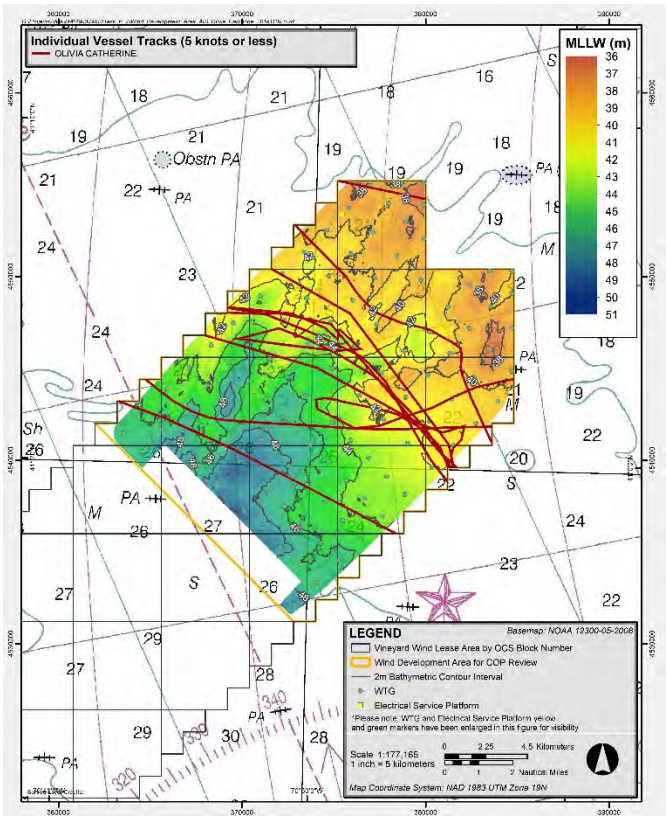
Wind Development Area – AIS Vessel Track Data (2016)

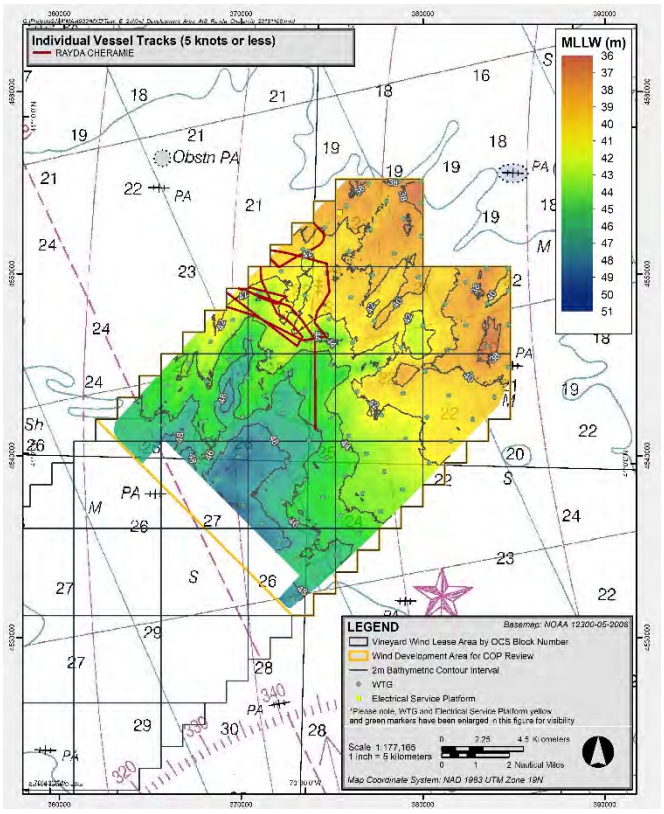

Individual Vessel Tracks (5 knots or less)
ALEXIS MARTINA
MLLW (m)
LEGEND
Basemap: NOAA 12300-05-2008
Vineyard Wind Lease Area by OCS Block Number
Wind Development Area for COP Review
2m Bathymetric Contour Interval
WTG
Electrical Service Platform
Map Coordinate System: NAD 1983 UTM Zone 19N

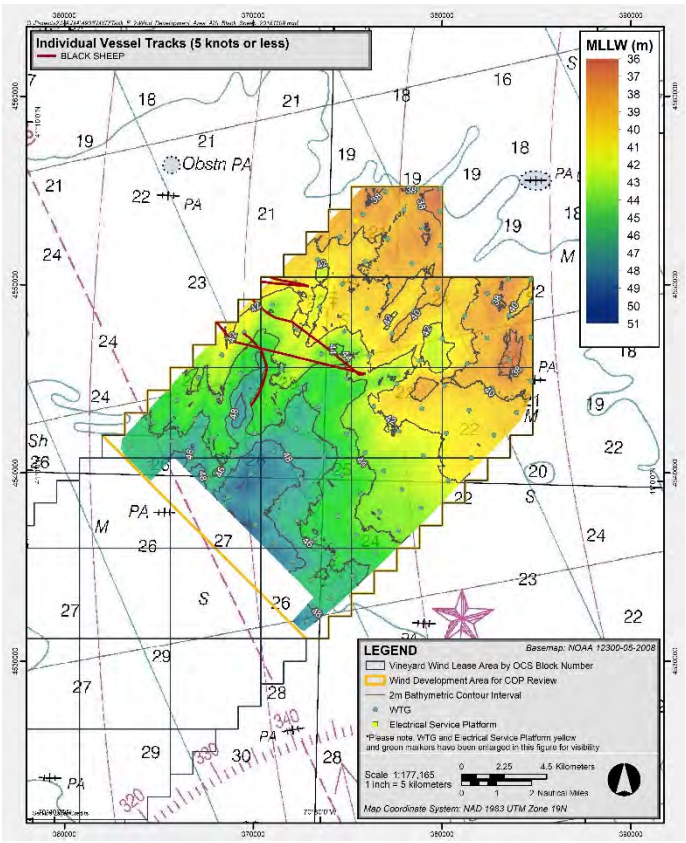

Individual Vessel Tracks (5 knots or less)
REBECCA MARY
MLLW (m)
LEGEND
Basemap: NOAA 12300-05-2008
Vineyard Wind Lease Area by OCS Block Number
Wind Development Area for COP Review
2m Bathymetric Contour Interval
WTG
Electrical Service Platform
Map Coordinate System: NAD 1983 UTM Zone 19N


Individual Vessel Tracks (5 knots or less)
EXCALIBUR
MLLW (m)
LEGEND
Basemap: NOAA 12300-05-2008
Vineyard Wind Lease Area by OCS Block Number
Wind Development Area for COP Review
2m Bathymetric Contour Interval
WTG
Electrical Service Platform
Map Coordinate System: NAD 1983 UTM Zone 19N


Individual Vessel Tracks (5 knots or less)
YANKEE PRIDE
MLLW (m)
LEGEND
Basemap: NOAA 12300-05-2008
Vineyard Wind Lease Area by OCS Block Number
Wind Development Area for COP Review
2m Bathymetric Contour Interval
WTG
Electrical Service Platform
Map Coordinate System: NAD 1983 UTM Zone 19N







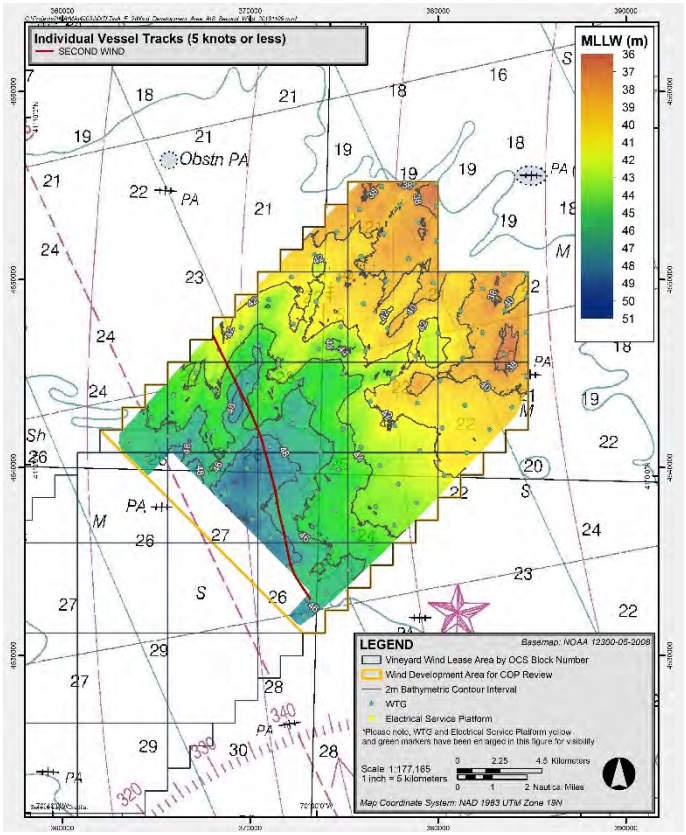


Figure 3

Wind Development Area – AIS Vessel Track Data (2016)

Appendix 15. Town Dock letter to CRMC re: Vineyard Wind 11/9/18 proposed alternatives (11/14/18)

November 14, 2018

Grover J. Fugate
Executive Director
Rhode Island Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, RI 02879-1900

Dear Mr. Fugate,

I'm writing regarding Vineyard Wind's E/W Layout document recently provided to the CRMC.

Reading through the document it reads as though Vineyard Wind will not be providing mitigation/compensation for the areas within their lease that have turbines orientated in an E/W orientation. To me it reads that E/W orientation IS the mitigation. Whether or not the turbines are in an E/W orientation, these fertile fishing grounds will be forever changed as a result of construction and development. We absolutely cannot lose sight of this.
As the lay out stands now mobile gear will not be able to coexist with the lobster and gillnet fisheries in the NE end of the WEA, meaning any mobile gear fishermen who wanted to risk fishing within the WEA would effectively be closed out of that area.
Due to the lack of research we have no idea what the biological and ecological effects of construction and operation will be on the species and habitat of the WEA's. If we find there are negative long-term and/or short-term effects mitigation/compensation will certainly be necessary.

Regarding transit lanes, it needs to be made clear that the industry supports at least a 4nm wide transit corridors. We've been vocal about this from the beginning and have not agreed to anything less than that, there seems to be a misunderstanding that we agreed to 2nm. We do not believe that 2nm wide lanes are safe and we have made that clear at every meeting.

There are a couple of statements in this document that I find very concerning. The first is: *"the project will not have significant adverse or long-term impact on Rhode Island Fishermen"*.
As you know I have personally provided tow tracks from our company owned vessels to Vineyard Wind and other companies. Those tracks clearly show how much fishing activity takes place within that lease area. After viewing that chart and meeting with the fishing industry it is extremely surprising and concerning that that statement can even be made.

The Town Dock: P.O. Box 608; 45 State St Narragansett, RI 02882
PH: 401-789-2200 FAX: 401-782-4421
Website: www.towndock.com

The next statement: *"regardless of row orientation, fishermen may still fish in any area where the turbines are located."* It has been said many times at every meeting that not every fisherman will be willing to risk their safety fishing within the turbines and should be provided compensation for loss of grounds and income.

These statements, along with the assumption that the fishing industry agreed on 2nm transit lane widths, makes me feel that once again, either we are not being listened to or our concerns and needs are simply not being considered.

I acknowledge that there will be a reduction of turbines in the Vineyard Wind area, but that does not change the fact that, as mentioned above, fishing will be forever changed in this WEA. It needs to be acknowledged by Vineyard Wind that their construction and operation in these waters will have a long-term effect on the Rhode Island Fishing community.

Thank you for taking the time to hear my concerns.

Sincerely,

Katie Almeida
Fishery Policy Analyst

The Town Dock: P.O. Box 608; 45 State St Narragansett, RI 02882
PH: 401-789-2200 FAX: 401-782-4421
Website: www.towndock.com

Appendix 16. Seafreeze letter to CRMC re: Vineyard Wind 11/9/18 proposed alternatives (11/16/18)

Seafreeze Ltd.

100 Davisville Pier
North Kingstown, R.I. 02852 U.S.A.
Tel: (401)295-2585

November 19, 2018

David Beutel
Coastal Resources Management Council
Oliver Stedman Government Center
4808 Tower Hill Road
Wakefield, RI 02879

Dear David,

I am writing in response to the November 9, 2018 Vineyard Wind submission to CRMC (CRMC File No. 2018-04-055) regarding east-west turbine layouts and transit lanes regarding the Vineyard Wind project. We disagree with the Vineyard Wind assertion in the document that "The project will not have significant adverse or long-term impacts on Rhode Island Fishermen". Our vessels will be permanently impacted by Vineyard Wind's proposed plan.

We want CRMC to be aware that the Vineyard Wind's proposed east-west turbine layouts do not benefit our vessels. Our vessels will not be able to operate and maneuver in a wind array with turbines spaced 1 nautical mile apart, regardless of the layout. We are aware that other mobile gear fishing industry members have indicated that they will be able to operate if the turbines are oriented in an east-west layout; however, this will not be the case for our vessels. We are concerned that Vineyard Wind's submission to CRMC states that they intend to implement a "compensatory mitigation program to mitigate potential impacts to commercial fisheries that result form the area of the WDA not being aligned in east-west rows". This indicates that there is no intent to compensate vessels that cannot operate in the areas even with east-west orientation, such as ours. We would ask that CRMC take this fact into consideration when conducting its federal consistency review regarding impacts to RI fisheries and vessels. We will permanently lose fishing access to these areas as a result of Vineyard Wind construction.

Vineyard Wind also states that it intends to "Adopt the 2 nautical mile wide 'Consensus Transit Corridor Plan' which has consensus support from Rhode Island Fishermen". This is also a non-factual statement. We represent Rhode Island fishermen that do not agree that 2 nautical miles is wide enough for a transit lane. At the recent October 31 RODA transit lane workshop- attended by multiple Rhode Island fishing industry representatives- a 4 nautical mile wide transit lane was the resulting fishing industry consensus. One of the pertinent discussion points was the radar interference caused by the turbines themselves. The Coast Guard's ACPARS Study (Atlantic Coastal Port Access Route Study-docket number USCG-2011-0351), referencing studies completed by the UK Maritime and Coastguard Agency (studies MGN 371 and 372) states that strong radar interference is caused by smaller offshore wind turbines up to 1.5 nautical miles away from the turbines themselves. Therefore, 2 nautical mile wide transit lanes through the Vineyard Wind project lined by turbines on both sides would be fully

encompassed by radar interference, threatening safe navigation and transit. Vessels need to transit these areas at night, when reliance on accurate radar is necessary. Therefore, wider transit lanes than 2 nautical miles are necessary.

We request that RI CRMC take these comments into consideration when developing federal consistency review. Thank you for the opportunity to comment.

Sincerely,

Meghan Lapp
Fisheries Liaison, Seafreeze Ltd.

CC: Grover Fugate, Executive Director RI CRMC

Appendix 17. RODA letter to CRMC re: Vineyard Wind 11/9/18 proposed alternatives (11/16/18)

RODA

Responsible Offshore Development Alliance

November 16, 2018

Grover Fugate, Executive Director
RI Coastal Resources Management Council
Stedman Government Center, Suite 3
4808 Tower Hill Road
Wakefield, RI 02879-1900

Re: Vineyard Wind Submission to CRMC [File No. 2018-04-055]

Dear Mr. Fugate,

The Board of Directors of the Responsible Offshore Development Alliance (RODA) today approved the following statement regarding Vineyard Wind's "Submission to CRMC regarding East-West Layout and Proposed Alternative" of November 9, 2018:

> Regardless of the orientation, the construction and operation of a wind energy facility will have significant short- and long-term impacts to any vessels that may continue to operate within the array, those that are entirely displaced, vessel operators in adjacent areas that become impacted by these displaced vessels, and fishery stocks and ecosystems themselves. These impacts cannot be solely mitigated by changes in the orientation and will require further mitigation, including substantial compensation for short- and long-term losses, both within the array and in the abutting areas.
>
> Moreover, although only two states are performing Coastal Zone Management Act consistency reviews regarding these large Northeast lease areas, fishermen and fishing businesses with homeports in other states will also be impacted. Such impacts, and the avoidance, mitigation, and compensation for those impacts, must be assessed and approached on a regional basis.
>
> To the extent to which certain vessels and gear types choose to fish within wind energy arrays that may be built in federal waters offshore Massachusetts and Rhode Island, an East-West turbine orientation may slightly lessen (but not eliminate) impacts to those operators. RODA therefore supports such an orientation for each of these lease sites and requests that there is reasonable layout continuity among the sites. However, the spacing between turbines is likely to be more indicative of impacts to fishing activity than the orientation

itself. *Even with an E-W orientation* there remain a substantial number of fishing industry professionals who will not be capable of safely operating their vessels and gears in any wind energy array if turbines are separated by only one nautical mile.

RODA and its member organizations thank you for your consideration of this matter. Please do not hesitate to contact me with any questions.

Sincerely,

Annie Hawkins, Executive Director
Responsible Offshore Development Alliance

Appendix 18. Vineyard Wind letter to CRMC re: request for stay (11/21/18)

VIA Electronic Mail

November 21, 2018

Grover Fugate
Executive Director
Rhode Island Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, RI 02879-1900

Re: Vineyard Wind – CRMC File No. 2018-04-055

Dear Mr. Fugate:

As a follow-up to the Coastal Resources Management Council's November 13, 2018 meeting regarding Vineyard Wind's request to extend the stay of the Council's consistency review period for our proposed project, we again request that the Council's consistency review period be extended to January 28, 2019 and that any hearing and/or consideration by the Council of the project's consistency with Ocean SAMP enforceable policies be continued to the Council's January 22, 2019 meeting. In support of our request for extending the stay and for a continuance, we provide the following information:

- Since the November 13, 2018 Council meeting, Vineyard Wind has continued to actively engage fishermen in discussions regarding our efforts to avoid and minimize potential project impacts, including making a formal presentation to the Fisheries Advisory Board (FAB) on November 19. In addition, we held a workshop to obtain input on our pre and post-construction monitoring plans, where FAB members actively participated. Finally, we spent considerable time preparing a mitigation proposal that we had planned to discuss with the FAB at the November 19 meeting.

- If we are granted a stay and continuance, we intend to spend the time working with FAB members, CRMC staff, and Rhode Island officials on the appropriate scale and elements of a mitigation plan in accordance with Ocean SAMP §§ 1160.1(3), (7), and (8). Because these discussions are critical to and required by the Ocean SAMP, and because FAB members stated at the November 19 meeting that they were open to discussing mitigation, Vineyard Wind wants to engage in meaningful discussions to ensure that fishermen's views are addressed. We also would intend to continue discussions on all other issues.

Thank you for your consideration of this request. Please feel free to contact me if you need any additional information.

Sincerely,

Lars Pedersen
Chief Executive Officer

Appendix 19. RIDEM DMF 1/14/19 “Rhode Island Fishing Value in the Vineyard Wind Construction and Operations Plan Area” January 14, 2019

Rhode Island Fishing Value in the Vineyard Wind Construction and Operations Plan Area

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

JANUARY 14, 2019

The following analysis briefing document created by the Rhode Island Department of Environmental Management, Division of Marine Fisheries (DMF) details an estimate of the ex-vessel value of the Rhode Island (RI) commercial fishing industry that is derived from the Vineyard Wind Construction and Operations Plan (COP) area, along with a projection of that value over 30 years. As with other analyses of this type, given limited and incomplete data over the past 15 years connecting landings to location, it was necessary to make science-based assumptions to derive a total value from this area. The area of the leased site used for this analysis is the area bounded by the turbine locations provided in the COP, released through a BOEM Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) on March 30, 2018 (federal register code 83 FR 13777). The area has been modified since this original layout, but DMF was not able to redo the analysis with this new area. This analysis does not examine any other economic, social, or ecological factors beyond ex-vessel values.

The DMF estimates that the ex-vessel value of fishing in the Vineyard Wind COP area with an assumed 2 nautical mile (nm) buffer along the north and south boundaries is $35,611,702.85 for a 30-year period (including lease and construction time). This value is premised on existing trips that either fully or partially intersect the COP area, including a 2 nm section north or south of the area (Figure 1), not being taken if the wind farm is constructed in a manner that is not consistent with traditional fishing practices. The 2 nm buffer and loss of the whole trip are assumptions based on feedback from fishermen who prosecute various fisheries in this area.

Recall that the value associated with the 2 nm assumption is $35,611,702.85 for the 30-year period of the lease including construction (Table 1). A different assumption can be made that only a 1 nm buffer around the COP area would be impacted (Figure 1). In other words, trips that utilize only the waters beyond 1 nm around the COP would not be affected. For a buffer of only 1 nm, the value associated with fishing over the 30-year period is $30,531,599.84 (Table 2).

The values in this analysis include ex-vessel value of fishing currently occurring in the COP area plus the buffer per the assumptions stated above and below and do not account for future increases in fish populations, increases in value, or inflation. The ex-vessel values therefore should not be considered an analysis of any economic value beyond the ex-vessel value of fishing in the COP area..

The following steps were taken to arrive at a range of $30,531,599.84 to $35,611,702.85, depending on the size of the buffer:

- Vessel Monitoring System (VMS) data were connected to Vessel Trip Report (VTR) data by Vessel ID. The VTR data were then linked to dealer reports (landings) by VTR number. The combined dataset was then used to select only data points where the latitude and longitude coordinates in the VMS fell within the target area including the Vineyard Wind COP, with a 2 nm buffer to the north and south of the turbines (or 1 nm, depending on the selected method). The remaining data points were then sorted to include only a single row per trip per species landed in Rhode Island. For each species, within each year, the individual trip values were summed to calculate the value of landings of trips that utilized the COP area. These values were divided by the rate of VMS coverage (number

of permits in the VMS data divided by the number of federal permits in the VTR landing the same species for the same area) to calculate total exposure.
    - Assumptions:
        - Those utilizing federal permits and fishing in the COP area are not also fishing in state waters on the trip where they were in the COP.
        - Landings characteristics from vessels covered by VMS are similar to those not covered by VMS.
        - A whole trip would be affected by avoidance of the wind development area as noted in fishermen feedback during public meetings about this area.
        - A distance (2 nm or 1 nm depending on the methodology used) around the wind turbines may also be avoided by commercial fishing vessels based on fishermen feedback during the discussions on transit lanes.
- Given that lobster and Jonah crab fishing have no VMS or VTR data requirements, separate methods were necessary. Catch information (biomass) from tows collected by the Northeast Fisheries Science Center Bottom Trawl Survey were used to understand spatial distribution of American lobster and Jonah crab. Tow information from both the spring and fall surveys were included. Biomass per tow information were spatially interpolated over the northeast U.S. shelf using inverse distance weighting. Interpolations were conducted over a 0.1-degree grid. Using annual depictions of interpolated abundances, the proportion of abundance of Lobster Management Area 2 (LMA2) within the COP was estimated by dividing the total COP abundance by that of the abundance in the entire LMA2. The proportion was then multiplied by the annual poundage of Rhode Island landings from LMA2. Finally, the poundage value was multiplied in each year by the average Rhode Island dockside sales price per pound of lobster, and Jonah crab, respectively for each year.
    - Assumptions:
        - North East Fisheries Science Center (NEFSC) trawls adequately characterize lobster abundances.
        - The NEFSC survey over the shelf provides spatial resolution useful in estimating fine scale changes, such as those in the COP and LMA2.
        - Spring and fall are adequate seasons to estimate these species abundances.
        - The weighting used in the inverse distance weighting is adequate.
        - Abundance is correlated linearly to landings in this area through time.
- Finally, since the wind farm lease will span over multiple years, and a non-east-west configuration will likely preclude all commercial fishing from this area during that period per feedback we have received from the fishing community, projections were made of the total exposure for 30 years (25 years for the lease duration and an additional 5 years for construction and decommissioning). To be able to adequately project this information, the proportion of species-specific seafood ex-vessel value coming from the COP area relative to the overall value of these same species to RI was calculated for years in which the COP specific value could be calculated. An average proportion for these years was then acquired. Species were grouped based on relevant management groupings. The

overall value for these species to RI was prorated based on this proportion. The reason for this is the number of years of direct value from the COP area is limited by VMS coverage, therefore to get an adequate time period to analyze, this proportionalization was employed. Once the RI species-specific value was prorated, an Auto-Regressive Integrated Moving Average (ARIMA) model was used on the timeseries (spanning from 2004 – 2017) to model the trends in value and project those trends forward for the projection period based on the ARIMA model parameters. ARIMA models are a class of models that capture a suite of different standard temporal structures in time series data. For this analysis, the resulting trends were largely flat given the variance in the data and the length of the time series.

- Assumptions:
  - The annual proportion of total Rhode Island species-specific value coming from the COP area scales directly to the overall species-specific value in a consistent manner.
  - Factors controlling effects on value, while different in any given year, will result in similar value trends over the projection period.
  - Effects of regulations are ignored as these could move in either a negative or positive direction and are not readily predictable.
  - Effects of climate change are not explicitly modeled, though may be picked up by the ARIMA model.

Using available data from the Standard Atlantic Fisheries Information System (SAFIS), VTR, VMS, scientific surveys, and the assumptions outlined above, and depending on the size of the requisite buffer bordering the COP, the estimated range of ex-vessel landing values associated with that portion of the total area leased by Vineyard Wind (depicted in Figure 1) range from $30,531,599.84 to $35,611,702.85 over 30 years. It is important to re-emphasize that the values presented do not include any shoreside impacts (including crew, fuel, gear, ice, processing, or packaging costs). There are entire businesses that provide these services that may also be affected, and many of these services occur in the major RI ports, which will also see impacts from the offshore wind energy area if fishing is precluded from occurring in this area. Additionally, the value of seafood served at local restaurants has not been accounted for; restaurants may also be affected by changes in seafood availability. Additionally, ecological impacts to marine resources and impacts that habitat alteration in this area may impose upon the productivity of various marine populations are not considered, which could also affect landings from the area as well as surrounding regions through time.

Table 1 – Projected ex-vessel landing values for COP with 2 nm buffered total trip analysis

Species	30-Year Value
BLUEFISH	$116,408.13
CRAB, JONAH	$137,324.71
DOGFISH, SMOOTH	$28,921.06
DORY, AMERICAN JOHN	$12,191.76
SUMMER FLOUNDER - SCUP - BLACK SEA BASS	$4,585,714.62
GOOSEFISH	$435,638.44
GROUNDFISH	$2,160,474.76
LOBSTER, AMERICAN	$1,413,517.02
SCALLOP, SEA	$1,060,092.09
SKATES	$25,318.54
NE SMALLMESH SPECIES (HAKES)	$4,664,599.43
SQUID - MACKEREL - BUTTERFISH	$20,968,100.76
OTHER*	$3,401.53
Total	$35,611,702.85

* The other category includes Atlantic bonito, spiny dogfish, conger eel, and sea robins.

Table 2 – Projected ex-vessel landing values for COP with 1 nm buffered total trip analysis

Species	30-Year Value
BLUEFISH	$90,151.13
CRAB, JONAH	$137,324.71
DOGFISH, SMOOTH	$28,921.06
DORY, AMERICAN JOHN	$9,250.86
SUMMER FLOUNDER - SCUP - BLACK SEA BASS	$4,071,710.54
GOOSEFISH	$388,476.48
GROUNDFISH	$2,144,209.51
LOBSTER, AMERICAN	$1,465,889.13
SCALLOP, SEA	$1,059,381.71
SKATES	$25,129.43
NE SMALLMESH SPECIES (HAKES)	$4,401,443.07
SQUID - MACKEREL - BUTTERFISH	$16,706,909.04
OTHER*	$2,803.18
Total	$30,531,599.84

* The other category includes Atlantic bonito, spiny dogfish, conger eel, and sea robins.

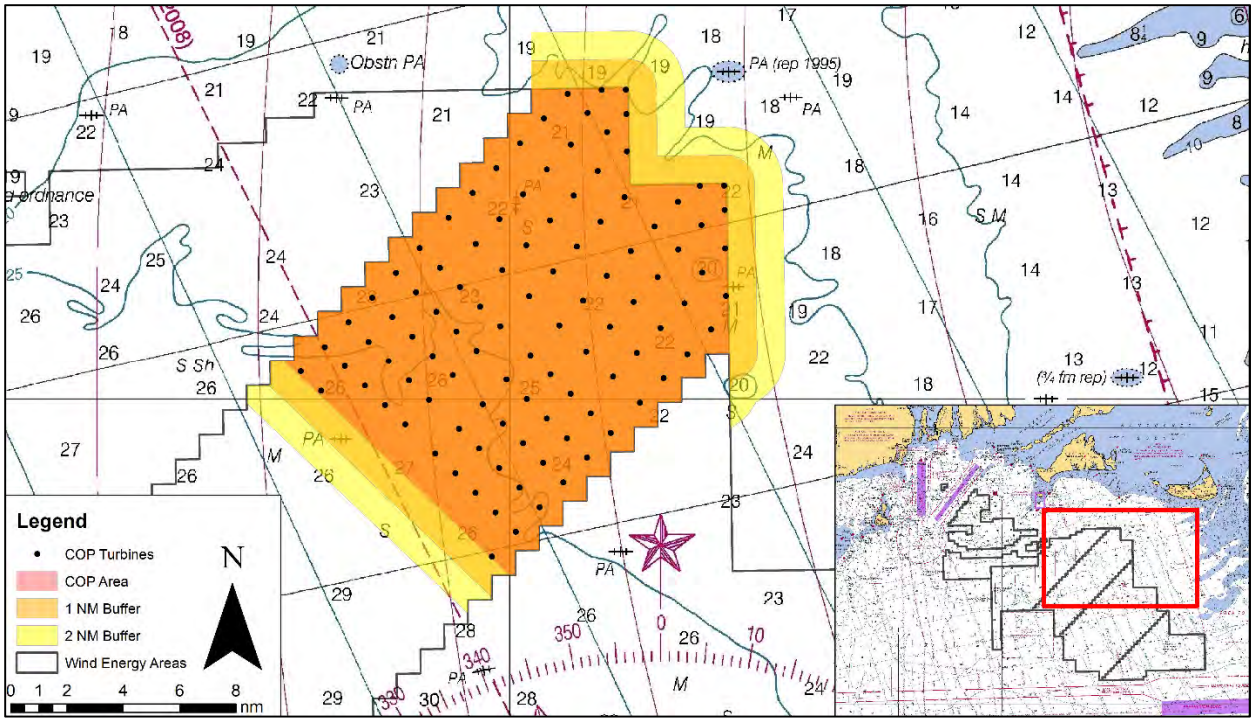


Figure 1 - The Vineyard Wind COP area (as published on 3/30/2018) with 1 nm and 2 nm buffers.

Appendix 20. Vineyard Wind 01/14/2019 letter to Massachusetts Department of Energy Resources

OCS-A 0501 MASS USA

VINEYARD WIND

January 14, 2019

Commissioner Judith Judson
Massachusetts Department of Energy Resources
100 Cambridge Street, Suite 1020
Boston, MA 02114

RE: Section 83C Request for Stakeholder Comment

Dear Commissioner Judson,

Please accept the following comments on behalf of Vineyard Wind LLC ("Vineyard Wind") in response to the Request for Stakeholder Comment recently issued by the Department of Energy Resources ("DOER"). The numbered responses below correspond directly to the Stakeholder Questions posed by DOER in the Request for Stakeholder Comment.

1. a. Vineyard Wind LLC

2. a. The primary issue with respect to timing relates to the ability of offshore wind developers to take advantage of the expiring Investment Tax Credit ("ITC") by meeting the "safe-harbor" requirements before the year is over. To meet these requirements, an offshore wind developer must purchase equipment constituting at least 5% of the qualifying cost of a project by December 31, 2019 and take delivery of the equipment shortly thereafter.

   To permit this, solicitation awards should be made no later than October 1, 2019. Working backwards from an October 1, 2019 award date, and assuming a three-month review for the evaluation team, submissions would need to be due no later than the end of June, and so the Subsequent Solicitation would need to be issued sometime prior to the end of June. We propose three months as an appropriate amount of time between issuing the Subsequent Solicitation and the bid submission due date, which means the Subsequent Solicitation should open on or around April 1, 2019.

   b. Vineyard Wind does not believe the BOEM lease sale, and any subsequent data collection at the newly leased sites, affects the potential timing of when proposals should be due under the Subsequent Solicitation.

   c. A shorter time-frame would facilitate a solicitation schedule that provides offshore wind developers the opportunity to take advantage of the expiring ITC. Depending

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TEL 508.717.8964 EMAIL info@vineyardwind.com
VINEYARDWIND.COM

on the complexity of the solicitation, two months could provide developers with the time needed to develop responsive bids while accommodating an October 1, 2019 award date. As a comparison, recent zero carbon and renewable energy solicitations in Connecticut and Rhode Island, respectively, included 6-8 week bid development windows. These solicitations were similar in scope and complexity to the first Massachusetts Section 83C offshore wind solicitation. The on-going New York offshore wind solicitation, which is broad in scope and complexity, has afforded developers three months to develop responsive bids.

Given this, Vineyard Wind suggests issuing the Subsequent Solicitation in April, requiring bid submission by the end of June, and issuing awards no later than October 1, 2019, for the reasons described above. To facilitate this timeline, DOER should seek to simplify the solicitation. Doing so would allow responsive bids to be prepared in less time and accommodate a shortened bid review period thereby increasing the likelihood of achieving an October 1, 2019 award date.

d. See response to Question 2.a.

e. See response to Question 2.a.

f. Aside from the expiring ITC, Vineyard Wind is not aware of and does not foresee any market conditions that might necessitate a shorter or longer time period for proposal development. If anything, having a shorter time period for proposal development is now more feasible given the recent increased attention to the Massachusetts market from the global offshore wind industry.

g. DOER should develop the Subsequent Solicitation with the timing of other states' procurements in mind. First, if DOER decides to move forward with issuing the Subsequent Solicitation this Spring, it is more likely than not that the winning bidders of last year's Rhode Island renewable energy procurement and the on-going New York offshore wind procurement will not have been announced. DOER can account for this by setting a bid submission deadline that occurs after the bid awards are likely to be made. An end-of-June submission deadline would be sufficient in this regard.

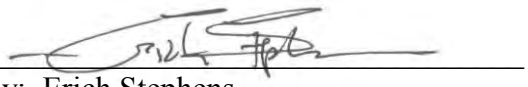
Second, Vineyard Wind would also encourage DOER to coordinate procurement schedules with neighboring states so that only one procurement is active at a time. This will reduce complexity and ensure more competitive solicitation process.

Finally, Vineyard Wind would also like to add that beyond the Subsequent Solicitation, a regular procurement schedule, along with standard evaluation criteria, available well in advance of any actual procurements would enable offshore wind developers to develop the best-targeted proposals for Massachusetts, increasing the level of competition among bidders for the benefit of the Commonwealth.

Thank you for your consideration. We stand ready to provide further information or answer any additional questions you may have.

Respectfully submitted,

Vineyard Wind LLC



By: Erich Stephens
Title: Chief Development Officer

Appendix 21. Vineyard Wind 1/15/19 “Economic Exposure of Rhode Island Commercial Fisheries to the Vineyard Wind Project” (November 30, 2018, updated January 2019)

Economic Exposure of Rhode Island Commercial Fisheries to the Vineyard Wind Project

Prepared by:

Dennis M. King, Ph.D.
KING AND ASSOCIATES, INC
24 Trillium Rise
Plymouth, MA 02360

Prepared for:

VINEYARD WIND LLC
700 Pleasant Street, Suite 510
New Bedford, MA 02740

Discussion Draft
November 30, 2018
(Updated January 2019)

Table of Contents

Table of Contents

List of Figures

Attachment 1

Attachment 2

Section 1.0

Introduction

1.0 INTRODUCTION

Commercial fishing is a historically, culturally, and economically important activity taking place in state and federal waters off the coast of Rhode Island. Commercial fishing ports in Rhode Island, including Point Judith and Newport as well as several smaller ports throughout the state, have supported Rhode Island's ocean economy for centuries.

From 2011 to 2016, the average annual dockside value of Rhode Island commercial fish landings was over $82 million which generated additional economic value in the state due to economic multiplier effects associated with the state's fishing support industries, seafood processors and dealers, and related businesses. For decades, longfin squid and American lobster (lobster) have been two important species for Rhode Island's commercial fishing fleets. Despite annual variations in the abundance and availability of these two species and changes in ocean, regulatory, and market conditions, average annual Rhode Island landings of longfin squid and lobster during 2011-2016 were valued at $16.4 million and $11.8 million, respectively (NOAA, 2018).

This report provides an overview of the economic exposure of Rhode Island commercial fisheries to offshore wind energy development in Vineyard Wind Lease Area OCS-A 0501.

Estimates of economic exposure provided here are based on the best available data and provide a reasonable basis to:

(1) Determine if the potential economic exposure of Rhode Island commercial fisheries to offshore wind energy development in the Vineyard Wind Lease Area is significant and long-term; and,

(2) Establish the basis of a compensatory mitigation program for Rhode Island commercial fishermen related to potential economic losses attributable to the project.[1]

The report's economic analysis is presented in three sections:

Section 2.0: Focus

Section 2.0 uses results from previous research to describe sources of potential fishery-related economic impacts based on possible project effects on fish resources and fishing activity. It also explains this report's focus on the economic exposure of fishing activity in and around the northern part of the Vineyard Wind Lease Area where wind turbine generators (WTGs)

[1]This report develops economic exposure estimates for all commercial fishing and for Rhode Island-based commercial fishing only. The same data and analysis can be applied to develop estimates of economic exposure for commercial fishing based in other states.

are currently proposed to be constructed. This area is referred to as the Wind Development Area (WDA), and as described in Vineyard Wind's current permit applications, occupies 306 km^2, or 45.3% of the Vineyard Wind Lease Area. As shown in Table 8 and described in Section 3.4.6, several options are being considered that reduce the size of the turbine area.

Section 3.0: Baseline Fishing Values and Economic Exposure

As discussed in BOEM (2017), economic exposure refers to potential economic impacts, not expected or actual economic impacts. As described in BOEM (2017) and demonstrated in this report, projected or actual economic impacts will most certainly be less than estimated economic exposure.

Section 3.0 uses the best available data to estimate the economic exposure of commercial fishing to potential adverse impacts from WDA development. This analysis builds on studies conducted by others, in particular the Bureau of Ocean Energy Management (BOEM), the National Oceanic and Atmospheric Administration (NOAA), and the Rhode Island Department of Environmental Management (RI DEM). Estimates of economic exposure are based on historical fishing revenues generated in and near the Vineyard Wind Lease Area.

Section 4.0: Economic Impacts

Section 4.0 describes how potential fishery-related economic impacts can be estimated based on the economic exposure estimates from Section 3.0 and information about expected changes in fishing activity during and after development within the WDA. For purposes of assessing economic impacts these changes in fishing activity can be characterized using the following measures:

- Percent decline in fishing values within the WDA during and after WTG construction due to impaired fishing within the WDA;
- Percent decline in fishing values within the WDA during and after construction as a result of vessels being precluded from fishing in the WDA, or fishermen choosing not to fish in the WDA;
- Percent increase in fishing values outside the WDA that will result from displaced fishing effort from the WDA shifting to other fishing areas; and,
- Percent decline in fishing values outside the WDA caused by increased fishing vessel congestion resulting from fishing vessels relocation from the WDA and increasing fishing effort outside the WDA.

Section 2.0

Focus

2.0 FOCUS

There are two sources of potential fishery-related economic impacts from the Vineyard Wind project, those associated with construction and operation of up to 100 wind turbine generators (WTGs) and up to two Electrical Service Platforms (ESPs) in the WDA, and those associated with the construction and use of two submarine cables within the offshore export cable corridor (OECC) that will deliver electric power from the WTGs in the WDA to a Landfall Site located on the south shore of Cape Cod. (See Figure 1)

Based on established fishery economic theory, project-related activities in both of these areas could result in potential fishery-related economic impacts along two distinct pathways: 1) effects on **fish resources**, in particular effects that reduce the abundance, availability, or catchability of fish; and 2) effects on **fishing activity**, in particular effects that result in changes in fishing time, steaming time, idle time, fishing locations, and increases in fishing congestion and gear-specific space-use conflicts.

Research cited below indicates that potential economic losses associated with impacts on **fish resources** in the WDA and in the OECC will be minor and short-term. That research also indicates that project-related effects on **fishing activity** in the OECC will be very short-term and localized and are unlikely to result in significant fishery-related economic losses. Results from that research are summarized below to explain why estimates of potential fishery-related economic impacts assessed in Section 3.0 and Section 4.0 of this report focus only on impaired and/or displaced **fishing activity** in and around the WDA.

2.1 Potential Exposure from WDA Development

The location and size of the MA WEA, the proposed Rhode Island-Amended Geographic Location Description (GLD), and the Vineyard Wind Lease Area and WDA are shown in Figure 2. For reference purposes, Figure 2 displays these areas on the most recent year (2015) NOAA fishing footprint chart for the region. This chart shows average annual fishing revenues generated in these areas and surrounding areas measured in dollars per 0.25 square kilometer [km^2]. NOAA refers to these measures as estimates of Fishing Revenue Density (FRD) and bases them on data from NOAA Vessel Trip Reports (VTRs).

Figure 2 shows that nearly all of the Vineyard Wind Lease Area and all of the WDA are ranked in the lowest FRD category. This is in contrast to the relatively high FRDs shown for nearby areas just to the north and west of the Vineyard Wind Lease Area. This helps confirm why estimates of fishing revenues from the WDA that are presented later in this report are relatively low with respect to overall fishing revenues and fishing revenues from other nearby areas. These relatively low fishing value estimates were a primary consideration when BOEM designated the MA-WEA, which includes the Vineyard Wind Lease Area, as an area highly

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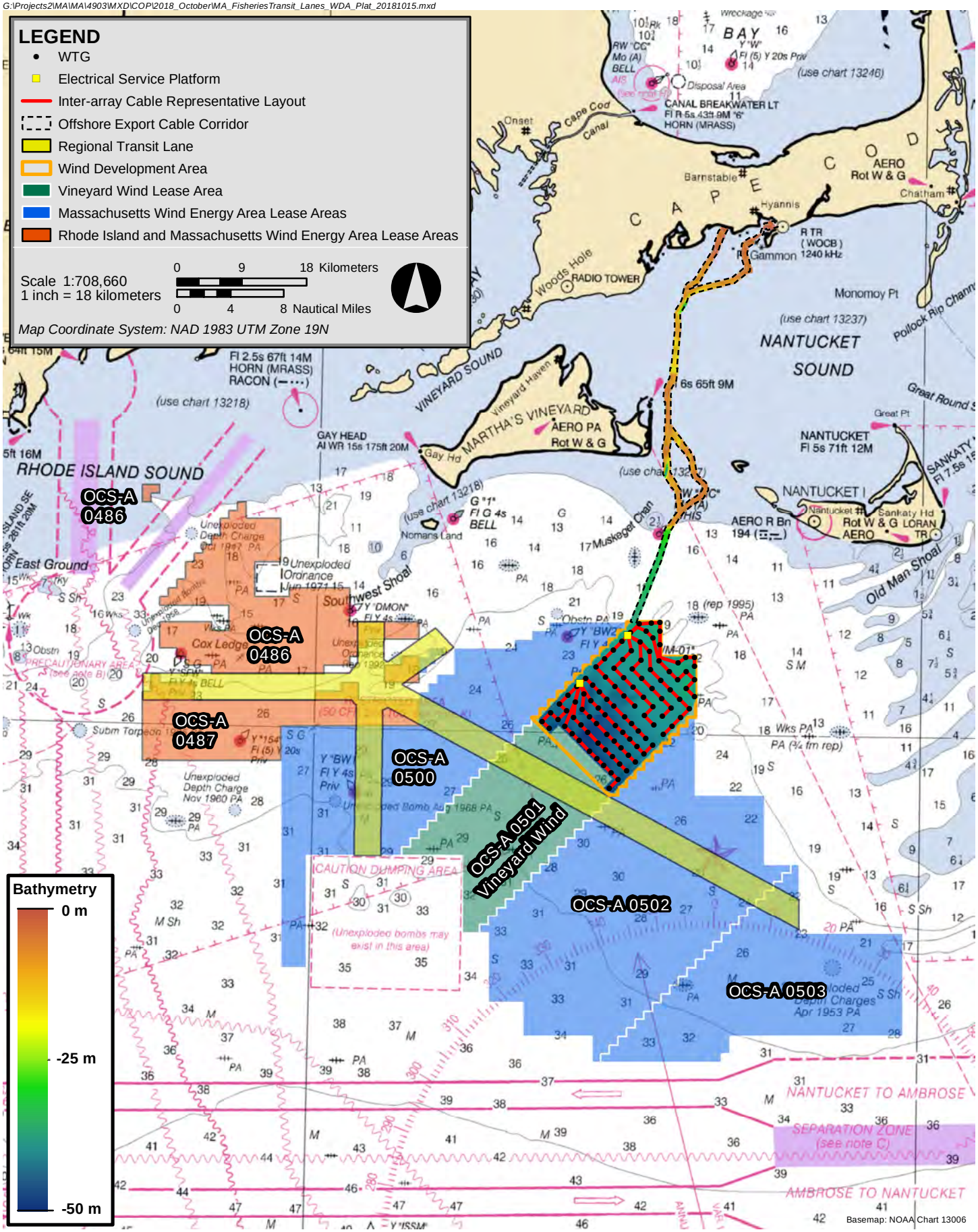

Vineyard Wind Project

VINEYARD WIND

Figure 1

Offshore Location Plat with Regional Transit Lanes

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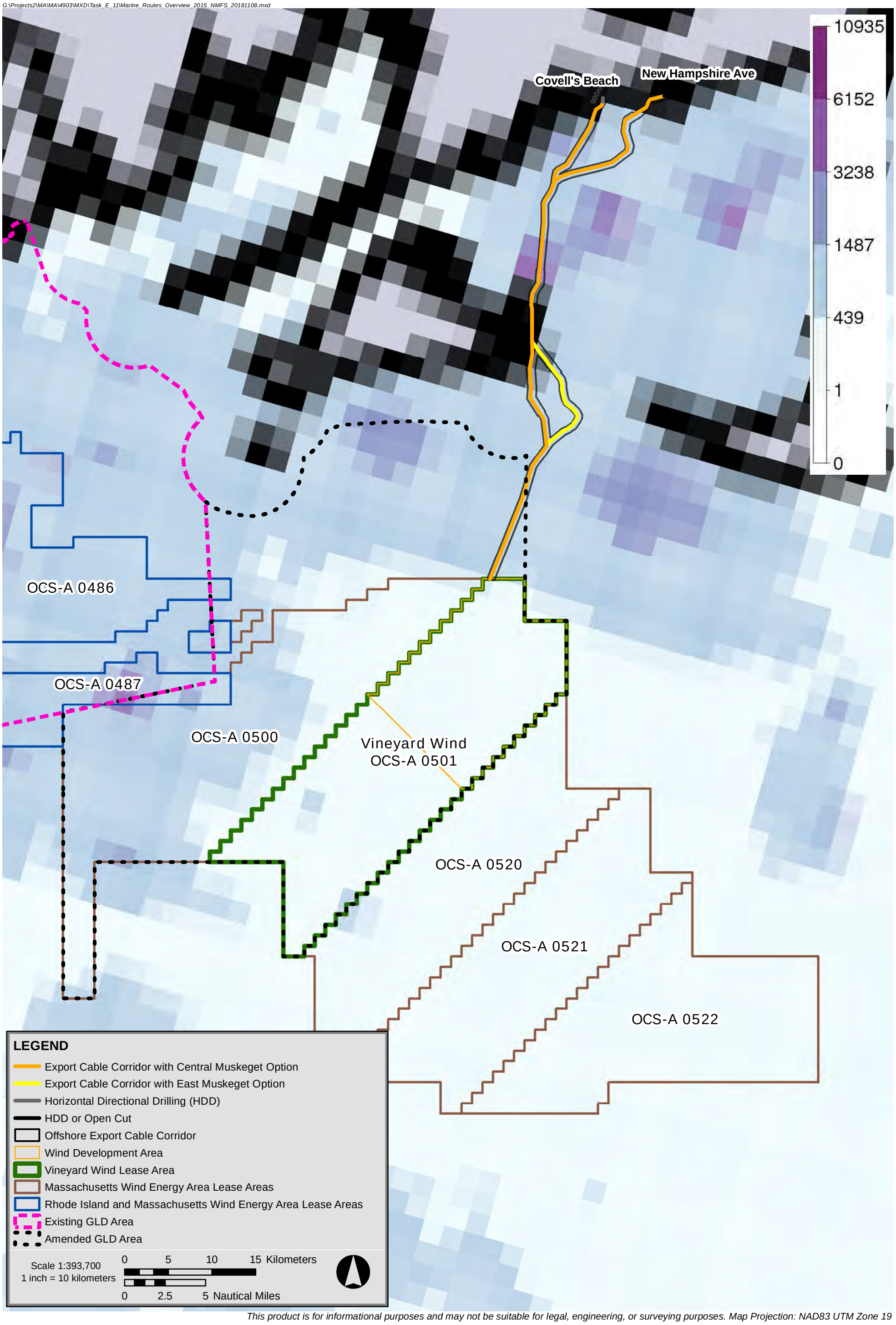

This product is for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Map Projection: NAD83 UTM Zone 19

Vineyard Wind Project

VINEYARD WIND

Figure 2

Export Cable Corridors - 2015 NMFS Fishing Footprints All Species

suitable for wind energy development.[2] Besides having sufficient wind to provide a reliable energy supply, the location of the MA WEA was selected for two reasons related to fishing. The area has relatively low fish biomass, which limits expected project impacts on individual organisms, and there is high abundance and diversity of fish resources in surrounding areas, which will allow fish populations in the MA WEA to recover quickly following any project-related disturbances (BOEM, 2017).

Research described in BOEM 2017 and the Construction and Operations Plan (COP) for the Vineyard Wind project indicate that construction and operation of WTGs and one or two ESPs in the WDA will cause only localized impacts to fish resources within the WDA (BOEM, 2017; COP, 2018).

Related research indicates that these impacts on fish resources will also be temporary because fish habitats recover, and fish communities begin to repopulate an area, within a few months of the end of the types of temporary water column and bottom habitat disturbances that are expected during WTG and ESP construction activity in the WDA (Dernie et al., 2003; Van Dalfsen & Essink, 2001).

After construction activity in the WDA is complete, the presence of WTGs and ESP(s) will result in the conversion of some non-structured bottom habitat to structured habitat which may temporarily change fish species assemblages and attract more structure-oriented species. However, post construction monitoring and surveying of fish resources in and around wind farms off the coast of Europe and elsewhere indicate that these types of impacts are also short-term and localized (COP, 2018; BOEM, 2017). Related research also indicates that once construction disturbances in the WDA end, the recolonization and recovery to pre-construction species assemblages can be expected because of the similarity of habitats and species in waters near the WDA, the limited area of temporary disturbances within the WDA, and the mobility of most impacted organisms during some or all life stages. That research shows that nearby areas unaffected by WDA construction activity will act as refuge areas and supply brood stocks for species to begin recolonizing disturbed areas once construction activity stops (Dernie et al., 2003; Van Dalfsen & Essink, 2001).

Monitoring of existing wind farms in other parts of the world also indicates that after installation, wind turbines function as artificial reefs (ARs) and fish aggregation devices (FADs) which benefit some fish resources and some types of fishing. And, to the extent that there is a decline in commercial fishing in wind farm areas after construction, those areas function in

[2]After considering comments submitted in response to BOEM's Call for Information and Nominations, BOEM excluded from offshore wind energy leasing certain areas identified as including important fish habitats or fishing areas that could be adversely affected by the installation and operation of wind turbine generators. Specifically, BOEM excluded areas with high value fisheries to reduce conflicts between offshore wind energy and commercial and recreational fishing.

the same way as marine protected areas (MPAs) with reduced fishing pressure increasing fish abundance (BOEM, 2017 Appendix A).

Direct mortality to immobile organisms and fish eggs and larvae will be unavoidable in the vicinity of WTG construction and cable installation within the WDA. Mortality of immobile fish eggs and larvae will also occur as a result of water withdrawals caused by construction vessels operating in the WDA. However, the available research indicates that fish egg and larvae mortality during construction in the WDA will not result in significant adult fish and population level impacts and should not be expected to significantly affect fishing success (COP, 2018, BOEM, 2017). This is because populations of impacted species exist in and all around the WDA and produce millions of eggs each year, and because the life histories and reproduction profiles of these species allow for maintaining healthy population levels despite naturally low larvae survival rates (COP, 2018; BOEM, 2017).

Most adult finfish will experience low project-related mortality because they are able to leave and avoid construction areas and, research shows, they can be expected to return to the WDA soon after construction ends. There will be some adult mortality to less mobile species during WDA construction. However, here again, these impacts are expected to involve only a small portion of their populations, so any significant population-level impacts were determined to be highly unlikely (BOEM, 2017, COP, 2018).

Concern has also been expressed about economic losses in commercial fisheries outside the WDA as a result of increased steaming time and lost fishing time associated with vessels going around the WDA or using transit corridors through the WDA to travel between fishing ports and fishing grounds and from one fishing ground to another. Comparisons of the most direct (without project) routes between RI, MA, and NY fishing ports and major fishing areas in the vicinity of the WDA, and routes that will be available after WDA development indicate that the development of the WDA will result in fishing vessels operating in the area experiencing little to no change in steaming distances or costs (COP, 2018).

2.2 Potential Exposure along the OECC

Research described in BOEM (2017) and COP (2018) and summarized below demonstrates that impacts along the OECC will be short-term and localized.

Construction within the OECC will involve the installation of submarine cables approximately 5 to 8 feet below the seafloor along an approximately 79 km (43 nautical mile) route from the WDA to the Landfall Site. Installation activities and impacts on fish and fishing along the cable corridor will be localized and very short-term. For example, using a simultaneous lay-and-bury technique will allow each of two offshore export cables to be installed side-by-side within the OECC in approximately 16 days per cable. If a free lay and post lay burial technique were to be utilized along the entire cable route, the cables will be installed in approximately 29 days per cable, though it is not anticipated this installation technique will be employed for the entire cable route, if at all. An additional two days per cable is required

for installation at the Landfall Site and up to 6 additional construction days per cable may be required for any necessary cable splice or joint operations. In any case, however, the period of time when the OECC will have localized impacts on fish resources and fishing activity will be a matter of only a few months during one year, and will be limited to small areas relative to the total fishing area utilized by commercial fishing vessels in the region (COP, 2018, BOEM, 2017).

Because of the short duration of the offshore export cable installation period and the relatively small portion of the OECC that will be under construction at any given time, the construction of the offshore export cables is expected to have very little impact on fishing values (COP, 2018). After construction, there will be no impacts, except for the possibility that there may be short segments of the cable corridor where bottom conditions prevent the cable from being fully buried. In these locations, the installation of cable protection on the seafloor could pose snagging risks to bottom fishing gear. Vineyard Wind intends to minimize or avoid the need for cable protection through site assessment and the use of advanced cable installation methods to achieve target burial depth. Additionally, Vineyard Wind will be establishing a mitigation program that will compensate commercial fishermen for any economic losses associated with lost or damaged gear resulting from gear snags.

Other sources of potential fishery-related impacts from the OECC that received attention in BOEM (2017) and COP (2018) are electromagnetic fields (EMFs) associated with electric power being transmitted through the submerged cables. Research summarized in these reports indicates that because the target burial depth for the cables is 5-8 feet and EMF produced by cables decrease with distance, EMF from the cable at the seafloor along the OECC will be extremely weak and detectable, if at all, only by demersal species in the immediate vicinity of the cable (Normandeau et al., 2011). A study by BOEM found that although there are observable changes in the behavior of some species, including American lobster, to the presence of energized cables, EMF from buried undersea cables did not act as a barrier to fish movements (Hutchison et al., 2018). Other research into habitat use around energized cables on the ocean floor found no evidence that fish or invertebrates were attracted to or repelled by EMF emitted by the cables (Love et al., 2017). To date, in other words, there is no evidence linking EMF from wind turbine cables to negative responses in fish (Baruah, 2016; Normandeau et al., 2011). In fact, modeling of EMF from buried submarine cables similar to those being used in the Vineyard Wind project indicate that magnetic fields they generate are less powerful than the Earth's magnetic field, and would be able to be sensed, if at all, only by fish passing along the bottom directly over the cable centerline (Gradient, 2017).

It is assumed that EMF on the ocean floor near segments of the OECC where bottom conditions prevent the offshore export cable from being buried to a full depth of 5 to 8 feet will be higher than they are in the rest of the OECC. However, there is no evidence that any avoidance of these areas by fish or fishing vessels will result in any significant or long-term fishery-related economic impacts.

For the reasons outlined above, the assessment of potential project-related economic losses presented in Section 3.0 and Section 4.0 of this report will not address the possibility of economic losses associated with OECC effects on fish resources or fishing activity. Section 3.0 and Section 4.0 will focus only on measures of potential economic losses in commercial fisheries associated with impaired or lost fishing opportunities resulting from the construction and operation of wind turbines in the WDA.

Section 3.0

Baseline Fishing Values

3.0 BASELINE FISHING VALUES

The economic value of commercial fishing in any particular area can vary significantly from year to year due to changes in the abundance and distribution of fish and changes in ocean, weather, market conditions, and fishery regulations. However, it is well established that analyzing data related to the historical economic value of commercial landings from an area is the most reliable basis for assessing the annual economic exposure of commercial fishing in that area to impacts from proposed non-fishing activities in the area.

3.1 Sources

Five recent studies provide useful data for assessing fishing value exposure within the WDA because they provide estimates of fishing values for study areas that include the WDA. These studies are described in Table 1 and are cited in the text as follows:

Source (1)	CRMC (2018) http://www.crmc.ri.gov/news/pdf/RI_Amended_GLD_092018.pdf
Source (2)	RI-DEM (2017) http://www.dem.ri.gov/programs/bnatres/fishwild/pdf/RIDEM_VMS_Report_2017.pdf
Source (3)	BOEM (2017) Volume 1: http://www.data.boem.gov/PI/PDFImages/ESPIS/5/5580.pdf Volume 2: http://www.data.boem.gov/PI/PDFImages/ESPIS/5/5581.pdf
Source (4)	NOAA-VTR Data (2018) Available Upon Request.
Source (5)	RI-DEM Addendum (2018) http://www.dem.ri.gov/programs/bnatres/fishwild/pdf/RIDEM_VMS_Report_2017.pdf

3.2 Preliminary Estimates of Fishing Values

Table 2 shows how fishing values presented in each of the five sources were scaled to provide estimates of fishing values in the WDA. This involved two steps: Step 1, divide the estimate of average annual dollar value of landings provided for each study area by the size of the study area (km^2) to generate a measure of fishing revenue density (FRD) for the study area;

and Step 2 - multiply these FRDs by the size of the WDA (306.00 km^2) to generate preliminary estimates of fishing values in the WDA.

As Table 2 shows, the same approach was used to generate fishing value estimates for the WDA based on each of the five sources. However, FRD and fishing value estimates based on the RI-DEM Addendum (Source (5)) are not comparable to those based on the other four sources. This is because the RI-DEM Addendum (Source (5)) estimates fishing values at risk in the Lease Area based on lost fishing revenues if "every trip that fished in part within the Lease Area was prevented."(Source(5)). That is, Source (5) measured fishing values at risk in the WDA as the sum of all revenues from trips that included a portion of at least one tow that intersected the Vineyard Wind Lease Area. This is not a realistic basis for estimating economic exposure because it assumes an entire trip would not occur at all, as opposed to the trip or tows on a trip being modified. This methodology also results in overestimating total exposure across a region and over time, as the full value of a trip that occurred over many study areas (e.g. lease areas) would be attributed separately to each of the study areas.

The RI DEM Addendum (Source 5) notes that estimates of trip revenues from the study, as described above, "may be interpreted as maximal estimates of economic exposure."

For reasons described above this is not a reasonable measure of economic exposure. In fact, analysis presented later in this section show that results presented in the 2018 RI-DEM addendum (Source 5) provide a means to confirm that there are much higher fishing values outside of the Lease Area or WDA than inside the Lease Area or WDA which can be expected to result in economic impacts less than economic exposure. That analysis shows that 65% of fish revenues from the trips studied is generated by fishing outside the Vineyard Wind Lease Area, and 84.2% of those trip revenues are generated by fishing outside the WDA.

Preliminary estimates of the FRD and related fishing values for the WDA based on each of the five sources described in Table 1 are presented in Table 2. Note that annual economic exposure estimates for the WDA based on Source (1) through Source (4) are very similar, ranging from $308,754 to $452,605, and are much lower than the $1,244,075 estimate of economic exposure based on the RI-DEM Addendum (Source (5)). These similarities and differences are also reflected in the preliminary estimates of average, low, and high economic exposure of overall fishing and RI-based fishing presented in Table 3. Here again, the differences between fishing value estimates based on the RI-DEM Addendum (Source (5)) and the other sources are a result of Sources 1 through 4 basing fishing values on landings from the Vineyard Wind Lease Area and the RI-DEM Addendum (Source (5)) basing them on all fishing revenues generated inside and outside the Vineyard Wind Lease Area on fishing trips that include at least one tow that intersected the Vineyard Wind Lease Area.

The fishing value estimates in Table 2 and Table 3 need to be adjusted before being used for an analysis of total economic exposure because they either do not account for, or only partially account for, landings of American lobster (lobster) and Jonah crab. This is because federal regulations that require commercial fishing vessels to file VTRs that identify where

landings were harvested do not apply to vessels that harvest only lobster and Jonah crab. As a result, it is understood that most data related to the location of lobster and Jonah crab harvests are based on VTR records from fishing vessels that catch lobster and Jonah crab and are required to file VTRs because they also harvest other species which must be reported.

A few aspects of the fishing values presented in Table 2 and Table 3 are worth addressing before describing how adjustments were made to account for unreported and underreported landings of lobster and Jonah crab.

First, even though Source (1) through Source (4) use different combinations of data (e.g., VTRs, Vessel Management System (VMS) data, observer data, landings data, etc.) and different statistical methods to allocate fishing values among fishing areas, the estimates of FRDs and annual WDA fishing values based on each of those four sources are remarkably similar across all studies. See Table 2. Across those studies, estimated FRDs range from $1,009 to $1,479, and estimates of average annual WDA fishing values based on those FRDs are shown to range from $308,754 to $452,605.

Table 2 also indicates that RI-DEM (2017) (Source (2)) and NOAA VTR Data (2018) (Source (4)) provide particularly useful fishing value data for assessing economic exposure in the WDA because they both provide fishing value estimates specifically for the Vineyard Wind Lease Area rather than broader study areas that were the focus of research in the other sources. The WDA constitutes 45.3% of the Vineyard Wind Lease Area, but only 10.2% and 14.8% of the study areas in BOEM (2017) (Source (3)) and CRMC (2018) (Source (1)), respectively. Another useful aspect of RI-DEM (2017) (Source (2)) is that it provides fishing value estimates for the Vineyard Wind Lease Area based on both overall landings and RI landings alone.

A particularly noteworthy aspect of results presented in Tables 2 and 3 are the estimates of FRDs and WDA fishing values based on CRMC (2018) (Source (1)). These estimates are much higher than those based on the other three sources of landing values even though the CRMC analysis in Source (1) includes only RI landings, whereas the landing values presented in the other three studies are based on total (all-state) landings. To put these results in perspective when considering the Vineyard Wind Lease Area, it is important to understand that the total area analyzed by CRMC (2018) (Source (1)) is CRMC's proposed amended GLD which is comprised of three distinct areas: the Vineyard Wind Lease Area, the Bay State Wind lease area, and an area to the north of these two lease areas. The area to the north of the lease areas is known to be an extremely productive squid fishing area (NOAA, 2018, NROC, 2018). As a result, the FRD (a measure of landings value per unit area) calculated for the Vineyard Wind Lease Area on the basis of landing values for the overall amended GLD presented in the CRMC (2018) (Source (1)), shown in Figure 3, was higher than other studies because it included one of the most valuable fishing areas for the Rhode Island fishing industry. This area is not available for wind energy development and no wind development plans by Vineyard Wind or others include this valuable fishing area.

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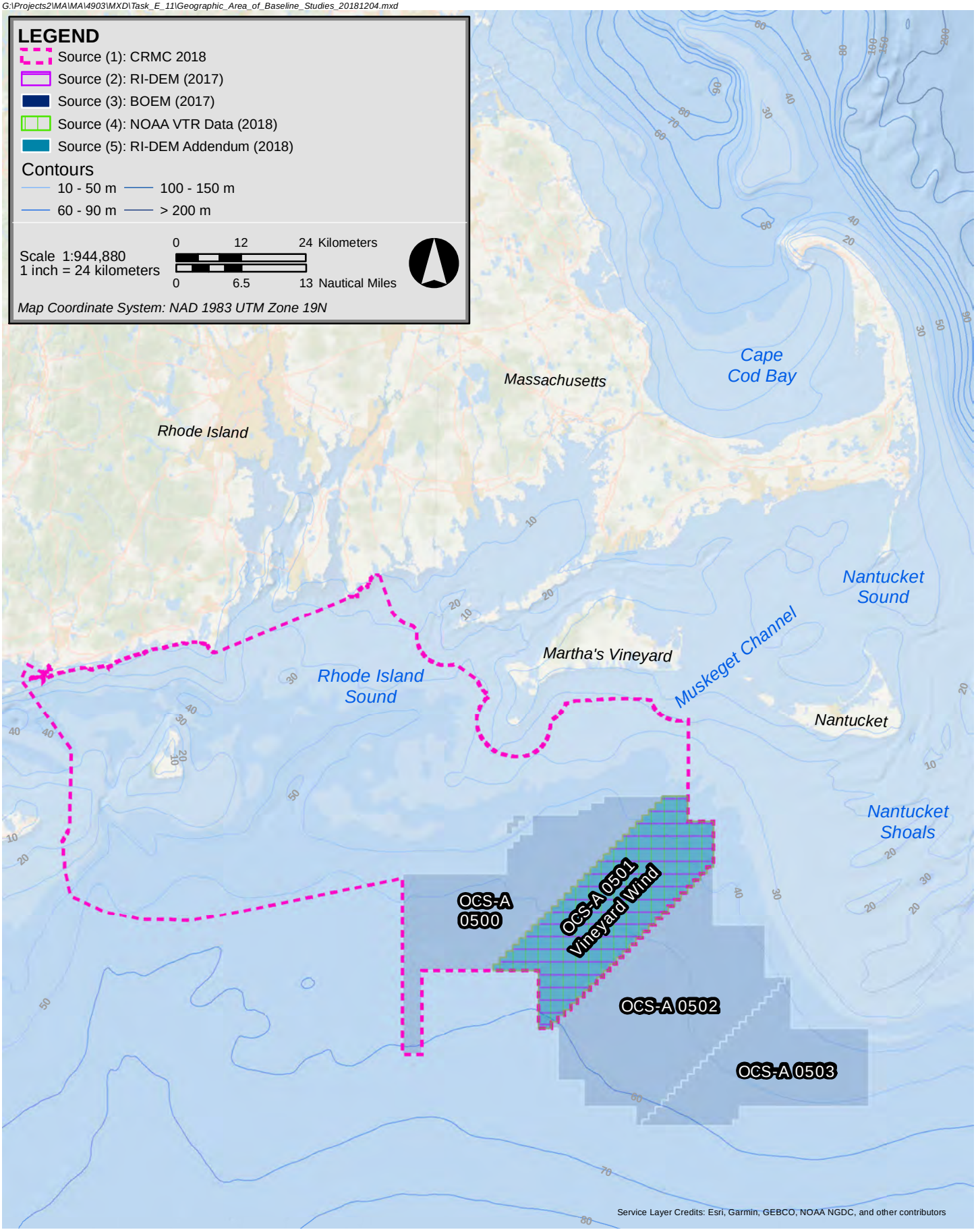

Vineyard Wind Project

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Figure 3

Geographic Area of Baseline Studies

Table 4a provides distinct annual fishing values for each of the three areas during 2011-2016 as analyzed in CRMC (2018) (Source (1)) and RI-DEM (2017) (Source (2)) and Table 4b provides estimates of FRDs for each of those areas. Note in Table 4b that the FRD for the

area of the amended GLD to the north of the two wind lease areas is approximately 140% higher than the average FRD for the entire amended GLD, while the FRD for the Vineyard Wind Lease Area is 68% lower. This explains why estimates of economic exposure in the Vineyard Wind Lease Area and the WDA based on fishing values presented for the amended GLD in the RI-CRMC (2018) (Source (1)) are so much higher than those based on the other three sources that focus specifically on fishing revenues in the Vineyard Wind Lease Area. This difference is visible in the example shown in Figure 4, depicting squid vessel activity based on the Northeast Regional Ocean Council's (NROC) VMS data visualization product (NROC, 2018).

For example, Table 4a and Table 4b show that based on RI-CRMC (2018) (Source (1)), the annual Rhode Island harvest value from the amended GLD area during 2011-2016 was $3,043,389, or $1,474 per km^2 per year; and that, based on RI-DEM (2017) (Source 2), the average annual Rhode Island harvest from the Vineyard Wind Lease Area during that same period was $318,893 or $472 per km^2 per year, and for the Bay State lease area was $506,371 or $667 per km^2 per year. That means annual average Rhode Island fishing values during this period from the part of the amended GLD area to the north of the two wind lease areas (an area for which there are no wind development proposals or plans) was $2,218,125 or $3,522 per km^2.[3] That is 7.5 times the Rhode Island-based values estimated for the Vineyard Wind Lease Area in RI-DEM (2017) (Source (2)) which is this reason an FRD using the entire area analyzed in CRMC (2018) (Source (1)) is not a useful basis for estimating fishing values within the Vineyard Wind Lease Area or the WDA.

Quantitative results presented in Table 4a and Table 4b with respect to the various segments of the Rhode Island Amended GLD confirm what is depicted in Figure 2 and Figure 4;fishing areas to the north of the Vineyard Wind Lease Area are much more valuable to Rhode Island fishermen than the Vineyard Wind Lease Area. The values shown in Table 4a for the various segments of the amended GLD also help explain why most of the trip revenues attributed to the Vineyard Wind Lease Area in the RI-DEM Addendum (2018) (Source (5)) are generated during portions of those trips that involve fishing outside the Vineyard Wind Lease Area.

Estimates of fishing value for the WDA based on BOEM (2017) (Source (3)) were also determined to be less reliable than those based on RI-DEM (2017) (Source (2)) or NOAA VTR

[3]None of the Rhode Island fishing values presented here include the value of lobster and Jonah crab landings. Adjustments in landing values to include these two species are addressed in Section 3.3.

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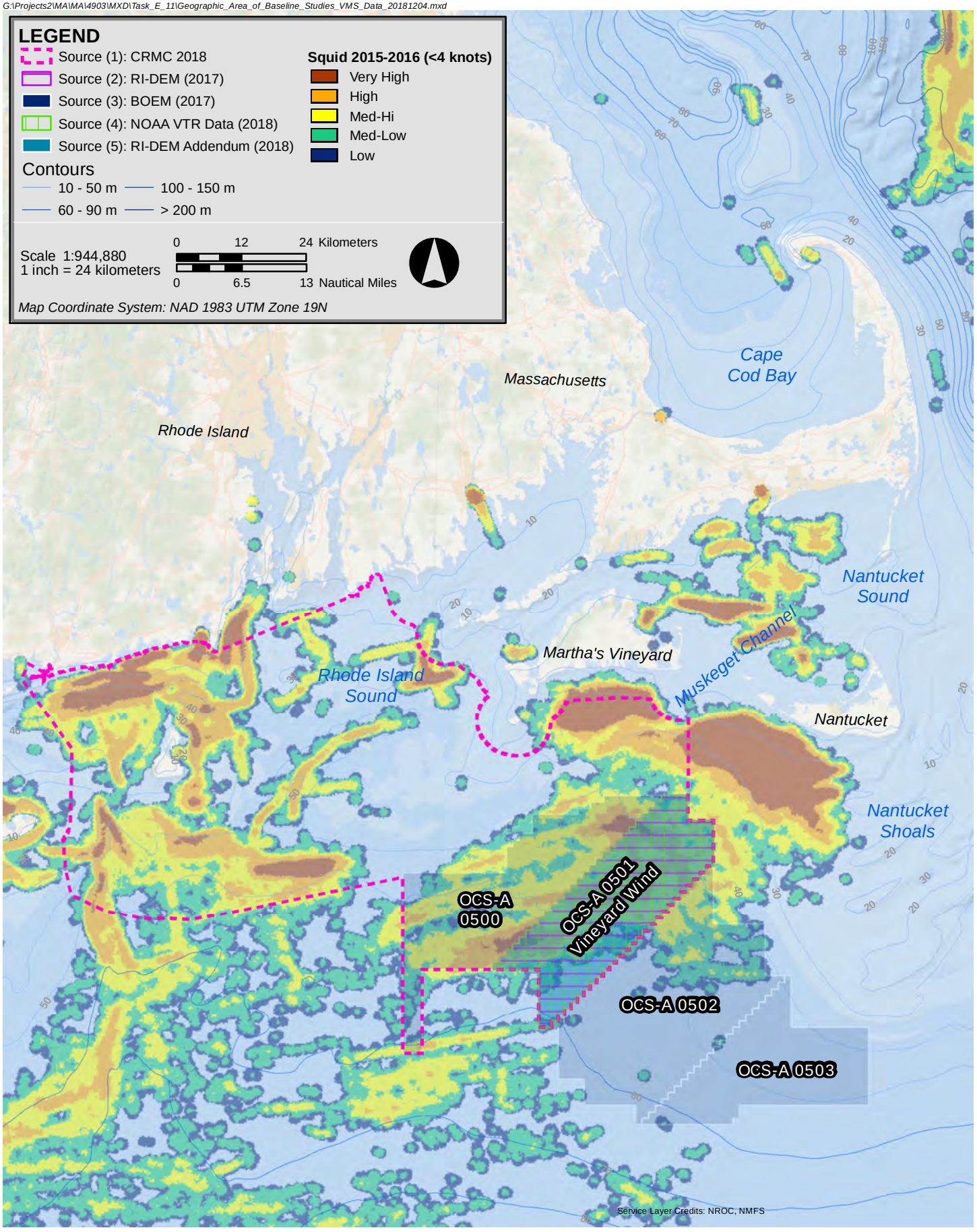


Vineyard Wind Project

VINEYARD WIND

Figure 4

Geographic Area of Baseline Studies with VMS Data (Squid, Mackerel, Butterfish Fishery Management Plan (FMP) 2015-2016, (NROC, 2018)

Data (2018) for two reasons. First, the study area of Source (3) was the entire MA-WEA which is an area of over 3,000 km^2 across which significant variability in fishing success is to be expected. Second, the fishing revenue estimates provided in BOEM (2017) (Source (3)) are from 2007-2012 and are several years older than those provided specifically for the Vineyard Wind Lease Area in RI-DEM (2017) (Source (2)) and NOAA VTR Data (2018) (Source (4)).

After examining fishing value estimates for the WDA based on all five available data sources it is my expert opinion that RI-DEM (2017) (Source (2)) and NOAA VTR Data (2018) (Source (4)) provide the most reliable basis for estimating the economic exposure of commercial fishing in the WDA based on fish harvested in the WDA.

3.3 Adjustments for Lobster and Jonah Crab

The one remaining step before using fishing values from the two sources described above to estimate fishing values for the WDA is to adjust them to account for lobster and Jonah crab values not included in those two studies. These adjustments were made as follows:

Federal fishing permit data for 2017 show that 137 vessels, accounting for 65,091 pots, are permitted to harvest lobster in Lobster Management Area 2 (Area 2), which includes the WDA. 64 of those vessels, accounting for 28,533 pots, or 43.8% of all pots possess only Area 2 permits and are not required to report any lobster or Jonah crab landings. This suggest that VTR data sets for vessels that fish species other than lobster and Jonah crab, account for 56.2% of the permitted number of pots. In the absence of fleet-specific data about the number of permitted vessels that are active, and lobster and Jonah crab catch rates, it is reasonable to assume that the portion of permitted pots that is actively fished is roughly the same for vessels that fish lobster and Jonah crab and do and do not file VTRs. This provides a reasonable basis for estimating the total landed value of the lobster and Jonah crab harvest from lobster and Jonah crab landings data in VTR records.

According to NOAA VTR Data (2018) (Source (4)), on average, $36,567 worth of lobster and $50,844 worth of Jonah crab were harvested from the Vineyard Wind Lease Area each year between 2011 and 2016. Using this measure of VTR reported fishing landings and adjusting for an estimated 43.8% unreported landings ($68,124) of these two species as described above, the average annual landings of lobster and Jonah crab from the Vineyard Wind lease area during 2011-2016 was $65,066 and $90,469, respectively, and the average annual landings of both species combined was $155,535.

Using the same federal permit data, 71 vessels, accounting for 37,395 pots fished in Area 2, or 57.5% of all pots permitted to fish in Area 2, are based in Rhode Island. Using Rhode Island's share of pots licensed to fish in the area and the above estimate of the average annual harvest from the Vineyard Wind Lease Area, it is estimated that the annual average value of Lobster and Jonah crab harvested from the Lease area and landed in Rhode Island is $89,433, which is 57.5% of $155,535.

As noted above, the WDA constitutes 45.3% of the Vineyard Wind Lease Area. Therefore, assuming harvests of lobster and Jonah crab are uniformly distributed within the Vineyard Wind Lease Area, the best available estimate of economic exposure related to Rhode Island based lobster and Jonah crab fishing in the WDA is $40,513, which is 45.3% of $89,433.

The RI-DEM (2017) study (Source (2)) did not include any landings of lobster and Jonah crab in estimates of fishing values for the Vineyard Wind Lease Area, so the full estimated average annual value of landings of these two species, $155,535, was added to fishing values provided by that source to reflect all fishing values for the Vineyard Wind Lease Area.

The unexpectedly low estimates of lobster and Jonah crab harvests in the Vineyard Wind Lease Area and the WDA were confirmed by other sources of data that show where fishing effort by pots and traps targeting these two species takes place in and around the Vineyard Wind Lease Area. Figure 5, for example, displays pot and trap fishing effort by vessels submitting VTRs for 2011 to 2015 and confirms that little fishing effort by pots and traps by those vessels took place in the Vineyard Wind Lease Area during those years, and nearly none in the WDA (MARCO, 2018).

These results are at least partly explained by well documented scientific evidence that rising ocean temperatures are affecting the location and productivity of lobster populations along the U.S. Atlantic coast. As shown in Figure 6, lobster populations have exhibited a significant northward shift away from Rhode Island as water temperatures in southern New England exceed their biological tolerances, while the warming of waters in northern New England has increased their productivity in those regions (NCA, 2018). These trends are reflected in the NOAA commercial harvest statistics for lobster which show that between 2000 and 2016 the volume of annual lobster landings declined by 49.2% in Rhode Island and increased by 172% in Maine (NOAA, 2017).

3.4 Final Estimates of Economic Exposure

The following estimates of economic exposure are based on fisheries revenues described in RI-DEM (2017) (Source (2)) and NOAA VTR Data (2018) (Source (4)).

3.4.1 Overall Economic Exposure

Table 5 provides estimates of average, low, and high annual economic exposure of commercial fishing in the Vineyard Wind Lease Area and the WDA based on RI-DEM (2017) (Source (2)) and NOAA VTR Data (2018) (Source (4)). These are the sum of unadjusted fishing

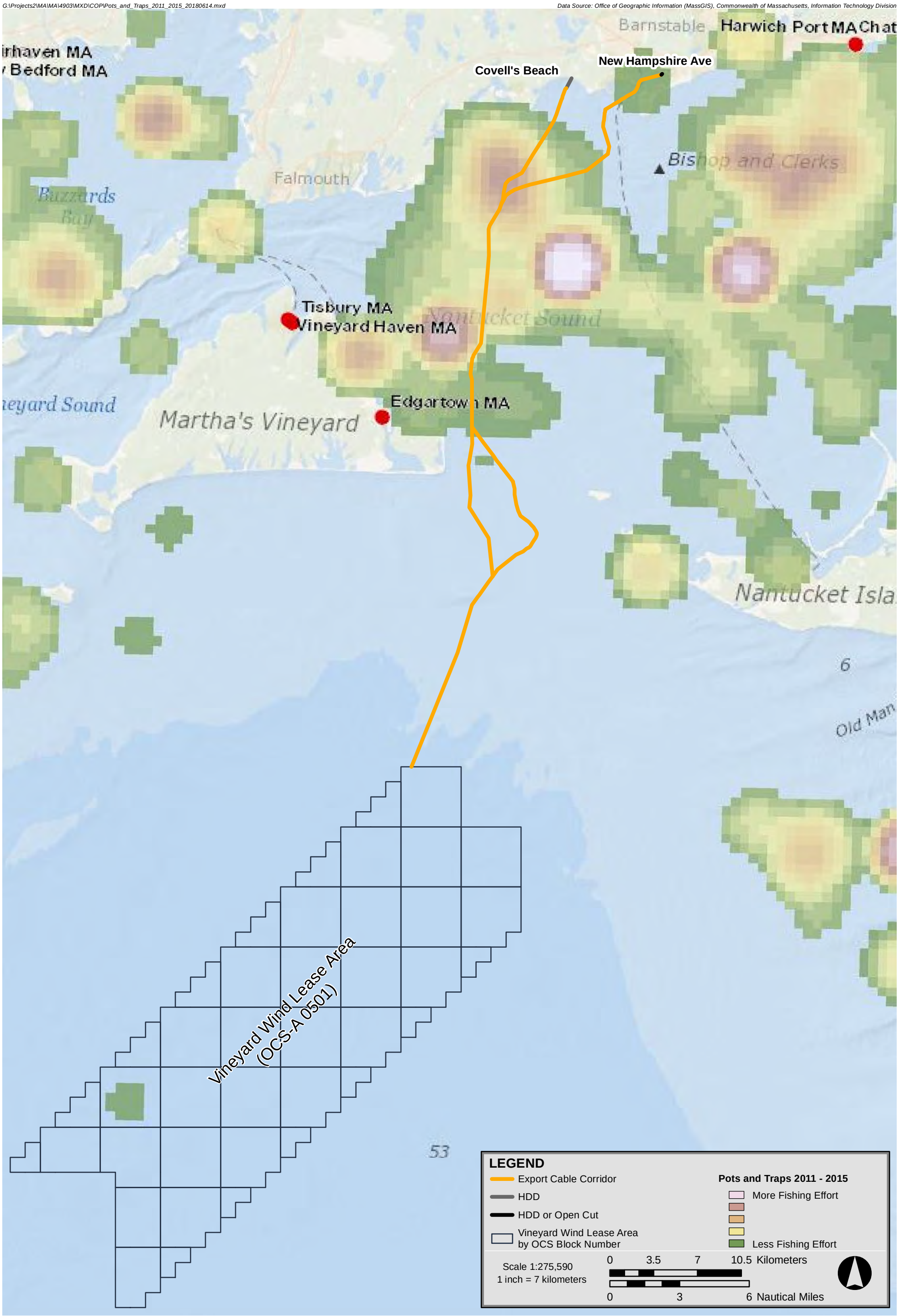
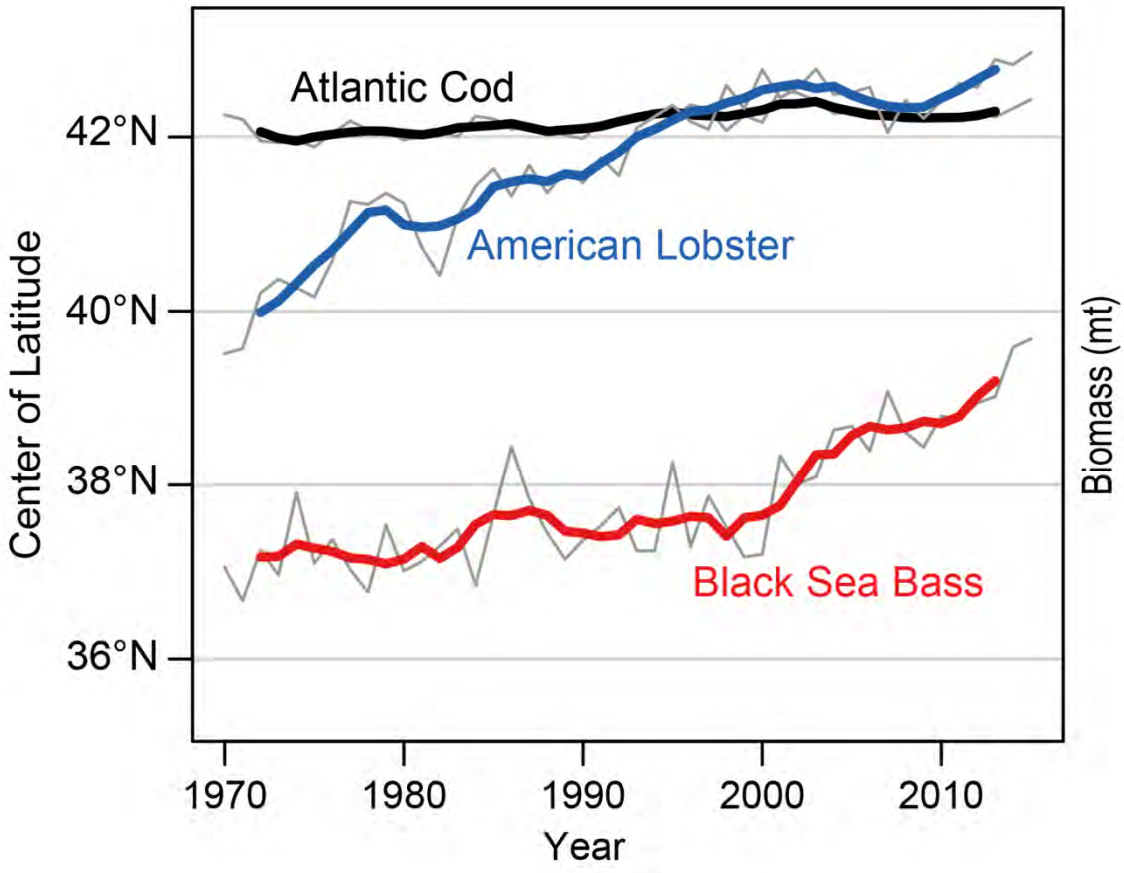
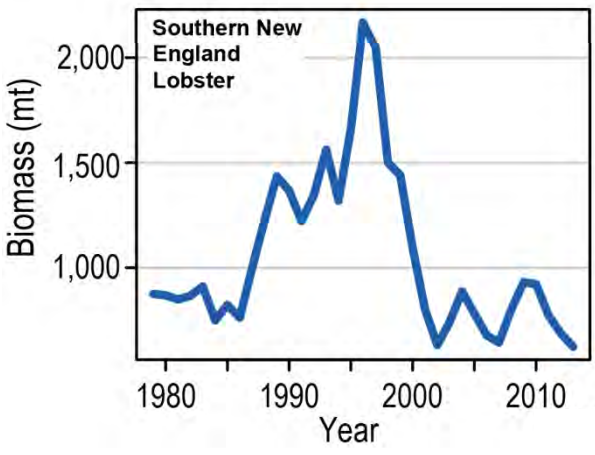


Figure 5

VTR - Pots and Traps 2011 - 2015 (MARCO, 2018)





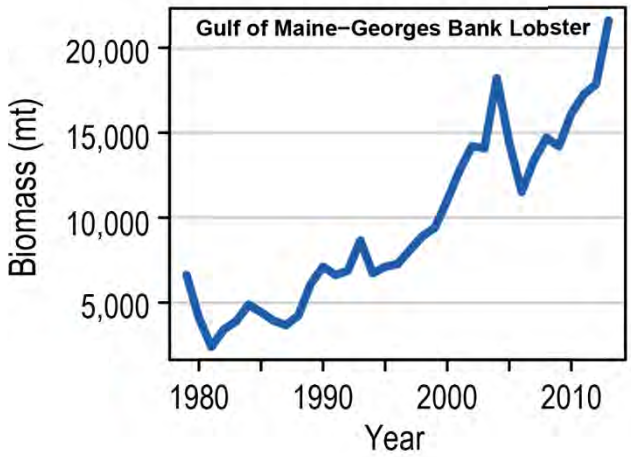


Figure 6
Changes in Distribution and Abundance of Marine Species (NCA, 2018)

values presented for each of those sources in Table 3 adjusted to account for the value of lobster and Jonah crab landings as described above.

Based on these two sources and data for years 2011-2016, the average annual economic exposure of commercial fishing in the WDA is $471,242.

3.4.2 Rhode Island Economic Exposure

Based on RI-DEM (2017) (Source (2)) Rhode Island fishermen account for 37.2% of the value of fish harvested in the Vineyard Wind Lease Area. That percentage is used in Table 5 as the basis for estimating the portion of fishing revenues in the WDA that accrue to Rhode Island fishermen and their economic exposure in the WDA. Based on the average of fishing values estimated from RI-DEM (2017) (Source (2)) and NOAA VTR Data (2018) (Source (4)) the average annual economic exposure of Rhode Island based commercial fishing in the WDA between 2011 and 2016 was $182,393.

As noted above, Rhode Island's annual commercial landings during this period averaged more than $82 million. This means the economic exposure of all Rhode Island-based commercial fishing to development of the WDA accounts for approximately 0.2% of the overall value of the Rhode Island commercial harvest. Looking specifically at the most important species harvested from the Vineyard Wind Lease Area and based on RI-DEM (2017), the average annual economic exposure of Rhode Island based commercial fishing in the WDA is $129,078 for the Squid, Mackerel, Butterfish Fishery Management Plan, or 0.8% of the $16,426,416 annual Rhode Island harvest of those species. (NOAA, 2018). As described above, the average annual economic exposure for lobster and Jonah crab in the WDA is $40,513, or about 0.3% of the $14,360,935 annual Rhode Island harvest of those two species (NOAA, 2018). This again confirms that during the years analyzed the WDA does not contain commercial fishing grounds that contribute significantly to the overall economic health of the Rhode Island fishing industry.

3.4.3 Economic Exposure Estimates Based on Fishing Trip Revenues, Source (5)

Table 6a and Table 6b can be used to compare ranges of fishing exposure estimates developed based on RI-DEM (2017) (Source (2)) with those based on the RI-DEM Addendum (2018) (Source (5)). The first source estimates economic exposure based on the landed value of fish harvested in the Vineyard Wind Lease Area; the second assigns landing values to the Vineyard Wind Lease Area based on fish revenues from all fishing trips that include at least a portion of one tow that intersects the Vineyard Wind Lease Area. Note that economic exposure associated with Rhode Island landings from the WDA presented in Table 6b, which are based on trip revenues being assigned to the WDA in this way, are roughly 4.4 times higher than those presented in Table 6a, which are based on landings in the WDA ($638,155 compared to $144,486). As described earlier, this is because most revenues on trips with one tow that at least partially transects the Vineyard Wind Lease Area are from fish harvested outside of the Vineyard Wind Lease Area.

Table 7 presents average, low, and high estimates of annual economic exposure in the WDA based on RI-DEM (2017) (Source (2)) and the RI-DEM Addendum (2018) (Source (5)).

The RI-DEM Addendum (2018) (Source (5)) recommends that fishing values developed for the Vineyard Wind Lease Area in RI-DEM (2017) (Source (2)) and presented in Table 6a, be considered the lower bound of fishery-related economic exposure in the WDA and that those values developed in RI-DEM Addendum (2018) (Source (5)) and presented in Table 6b, should be considered the upper bound. The Addendum states that the true economic exposure is somewhere between the two. However, as described previously, wind energy development and the placement of wind turbines will only take place in the WDA which occupies 45.3% of the Vineyard Wind Lease Area. For this reason, Table 7 presents estimates of these two potential measures of economic exposure based on 45.3% of fishing values developed for the Vineyard Wind Lease Area in these two sources.

3.4.4 Overall Economic Exposure

As Table 7 shows, the trip revenue approach used in the RI-DEM Addendum (2018) (Source (5)) generates an estimate of annual economic exposure in the WDA of $1,314,299, which is 2.9 times the estimate of $458,927 based on fishing revenues in the WDA using RI-DEM (2017) (Source (2)). The average of the two estimates is $886,779. Both of these annual values were adjusted as described in the previous section to include the unreported value of lobster and Jonah crab landings.

3.4.5 Rhode Island Economic Exposure

While RI-DEM (2017) (Source (2)) shows that 37.2% of fish harvested in the Vineyard Wind Lease Area is landed in Rhode Island, the RI-DEM Addendum (2018) (Source (5)) indicates that Rhode Island fishermen account for 51.3% of fishing revenues on trips that include at least a portion of one tow intersecting the Vineyard Wind Lease Area. This results in estimates of economic exposure of Rhode Island commercial fishermen in the WDA based on the RI-DEM Addendum (Source (5)) that are unexpectedly high for two reasons: 1) estimates of economic exposure based all revenues from trips with a portion of at least one tow that intersects the WDA, include all landings from the WDA plus significantly more landings from outside the WDA and, 2) Rhode Island fishermen account for a higher percentage of those trips and landings from outside the WDA than they account for landings from within the WDA. In other words, the higher economic exposure found in RI-DEM Addendum (2018) (Source (5)) is attributable to the fact that the study assigned the entire value of a trip to the Vineyard Wind Lease Area if even a portion of a tow made during that trip intersected the Lease Area. This is especially important because results from CRMC GLD (2018) (Source 1)) and RI-DEM (2017 (Source 2)), as well as from NOAA fishing footprints and other sources, show that fishing effort outside of the Vineyard Wind Lease Area results in much higher value harvests than fishing effort inside the Vineyard Wind Lease Area.

As Table 7 shows, the trip revenue approach used in the RI-DEM Addendum (2018) (Source (5)) generates an estimate of annual average economic exposure for Rhode Island fishermen in the WDA of $678,668 which is approximately 3.7 times higher than the estimate of $184,999 based on RI-DEM (2017) (Source (2)). The average of the two estimates is $431,834. These values include the estimated value of lobster and Jonah crab landings.

3.4.6 Adjustments to Economic Exposure Estimates Based on Changes in the Size of the Wind Development Area

A November 9, 2018 memo from Vineyard Wind to the RI-CRMC presented three turbine layout options for the WDA that involve the size of the WDA being between 22% and 24% smaller than originally planned. A reduction in the size of the WDA results in a proportional decline in the economic exposure of commercial fishing to development of the WDA.

Table 8 presents measures of average annual economic exposure of fishing activity based on the alternative size WDAs that are under consideration using fishing values from RI-DEM (2017) (Source (2)) and from RI-DEM Addendum (2018) (Source (5)). Table 8 shows Rhode Island economic exposure estimates associated with a 22% to 24% reduction in the size of the WDA results in average annual economic exposure estimates for the WDA that are between $37,593 and $44,535 per year lower based on fishing revenues in RI-DEM (2017) (Source (2)), and $140,869 to $163,271 per year lower based on trip revenues in the RI-DEM Addendum (2018) (Source (5)). These values are adjusted to include the estimated annual value of lobster and Jonah crab landings.

Section 4.0

Fishery-Related Economic Impacts

4.0 FISHERY-RELATED ECONOMIC IMPACTS

The economic exposure estimates developed in Section 3.0 represent potential fishery-related economic impacts from WDA development. They do not represent estimates of expected fishery-related economic impacts from WDA development. Under most types of changes in fishing activity that may result because of WDA development (e.g., impaired fishing in the WDA, fishing effort displaced from the WDA, temporary or partial closures of the WDA, etc.), economic impacts can be expected to be lower than estimates of economic exposure. That is because potential WDA impacts on fishing success or expected fishing success inside the WDA will cause changes in fishing activity that can be expected to offset those impacts.

It is not possible at this time to predict how changes in fishing activity might reduce the economic impacts of WDA development below the estimates of economic exposure developed in Section 3 and presented in Table 5. However, Table 7 presents fishing value estimates from RI-DEM (2017) (Source (2)) and the RI-DEM Addendum (2018) (Source (5)) that provide useful insights into how close actual fishery-related economic impacts will be to estimates of economic exposure presented in Table 5. As Table 7 shows:

(1) Based on RI-DEM (2017) (Source (2)), the adjusted average annual value of fish harvested **inside** the Vineyard Wind Lease Area during 2011-2016 was **$1,013,083**.

(2) Based on RI-DEM Addendum (2018) (Source (5)), the adjusted average annual value of fish harvested **inside and outside** the Vineyard Wind Lease Area on trips with tows that transected the Vineyard Wind Lease Area during 2011-2016 was $**2,901,322.**

(3) The difference between (2) and (1) is the average annual value of fish harvested **outside** the Vineyard Wind Lease Area on trips that transected the Vineyard Wind Lease Area which was **$1,888,239**, or 65% of fishing revenues on those trips.

(4) The WDA accounts for 45.3% of the Vineyard Wind Lease Area. That means approximately 45.3% of the trips with tows that at least partially transect the Vineyard Wind Lease Area transect the WDA; and **$458,927** or 15.8% of the annual value of landings from trips that transect the Vineyard Wind Lease Area are harvested in the WDA.

(5) That means the average annual value of landings **outside the WDA** on trips that "transect" the Vineyard Wind Lease Area (including landings from outside the Vineyard Wind Lease Area and inside the Lease Area, but outside the WDA) is **$2,442,309** or 84.2% of revenues from those trips.

To interpret the results presented above and shown in Table 7 in terms of economic exposure and expected economic impacts from WDA development it is useful to compare them using the following definitions from BOEM (2017):

> *"Exposure measures quantify the amount of fishing that occurs in and near individual WEAs and therefore represent the total fishing activity that may be impacted by energy development in the WEAs.*
>
> *Exposure measures ...should not be interpreted as a measure of economic impact or loss. Economic impacts also depend on a vessel's ability to adapt by changing where it fishes. For example, if alternative fishing grounds are available nearby and may be fished at no additional cost, the economic impact will be lower."*

As Table 7 shows, results presented in RI-DEM (2017) (Source (2)) and the RI-DEM Addendum (2018) (Source (5)) indicate clearly that in the case of the WDA "alternative fishing grounds are available nearby and may be fished at no additional cost." In fact, those results show that fishing areas immediately adjacent to the WDA already account for most of the fishing revenues from fishing trips with tows that transect the WDA. This means that impacts would be lower even if a vessel's "ability to adapt" was limited to avoiding fishing in the WDA altogether. It can be expected that the resulting change in fishing behavior would involve modifying tows to avoid transecting the WDA and fishing in adjacent or nearby areas, and not more costly options such as cancelling fishing trips or steaming to less familiar or less productive fishing grounds.

As pointed out in BOEM (2017) (Source (3)), it is generally accepted that "if alternative fishing grounds are available nearby and may be fished at no additional cost, the economic impact will be lower" than estimated economic exposure. The trip revenue estimates presented in the RI-DEM Addendum (Source (5)) therefore, provide strong indicators that economic impacts of WDA development will be significantly lower than economic exposure estimates developed in Section 3.0 based on potentially lost fishing revenues from fishing inside the WDA.

4.1 Economic Impacts during WDA Development

Part or all of the WDA may be closed to fishing during periods of construction, which means potential economic losses in commercial fisheries during those periods could approach the economic exposure values estimated in Section 3.0. However, during those periods some percentage of those potential economic losses will be offset by vessels that normally fish within the WDA shifting fishing effort or simply modifying tows to focus on fishing areas adjacent to the WDA. During construction in the WDA, therefore, it is reasonable to assume that fishery-related economic losses, even with temporary fishing closures in the WDA, will be significantly less than 100% of the annual fishing value exposure estimates presented in Table 6.

4.2 Economic Impacts after WDA Development

Once construction activity in the WDA is complete, the area will be fully open to commercial fishing. At that time, fishermen will decide to either continue or resume fishing in the WDA or not to fish in the WDA.

It is reasonable to assume that fishing values associated with some types of fishing in the WDA will be lower after WDA development than before. However, any lost fishing values associated with fishing in the WDA after development cannot be expected to approach 100% of the exposed fishing values shown in Table 6.

It can be expected that fishermen who decide not to fish in the WDA after construction will continue fishing and generating fishing values outside the WDA. Fishing values associated with this displaced fishing effort may be adversely affected if displaced fishermen must operate in fishing grounds that are less familiar to them or less productive than those in the WDA. However, that does not seem to be the case. As Figure 2, Figure 4, and fishing value information presented in Section 3.0 indicate, there are many highly productive fishing areas near the WDA. In fact, based on RI-DEM Addendum (2018) (Source (5)), these nearby and adjacent areas account for most revenues on fishing trips that intersect the WDA. As a result, fishing value losses experienced by fishermen who choose not to fish in the WDA will never approach 100% of the exposed fishing values shown in Table 6.

The magnitude of fishing values and economic exposure estimates presented in Table 6 indicate that it is highly unlikely that the development of the WDA will cause any Rhode Island based fishermen to stop fishing all together. These fishing values also indicate that the level of fishing effort in the WDA is not significant enough to result in significant fishing congestion impacts outside the WDA if it were to shift to fishing areas outside the WDA.

While overall impacts on fishing values in the WDA can be expected to be below the fishing value exposure estimates presented in Table 6, individual fishermen who earn proportionally more from the WDA could experience a higher share of these impacts.

Section 5.0

Summary and Conclusions

5.0 SUMMARY AND CONCLUSIONS

Section 2.0: Focus

Section 2.0 summarized research indicating that the Vineyard Wind project will not result in any significant or long-term impacts on fish resources in or around the WDA or the OECC. This section also explained why this report focused only on potential economic impacts on commercial fishing based on the effects of the construction and operation of wind turbines in the WDA on fishing activity in and around the WDA.

Section 3.0: Baseline Fishing Values

Section 3.0 developed dollar measures of fishing value exposure in the WDA that reflect potential fishery-related economic impacts of WDA development. Background research consulted to prepare Section 3.0 and available fishing value data from NOAA, BOEM, RI-DEM, and RI-CRMC, resulted in estimates of average annual economic exposure of commercial fishing from wind energy development in the WDA as follows: $458,927 based on fish landings from the WDA (RI-DEM (2017) (Source 2)) and $1,314,299 based on revenues from fishing trips that include tows that intersect the WDA (RI-DEM Addendum (2018) (Source 5)). Based on RI landings alone, these numbers are $184,999 and $678,668 respectively (See Table 7). The RI-DEM Addendum (2018) (Source (5)) reached the conclusion that estimates of fishing values based on landings in an area and those based on landings from trips that include a tow that at least partially intersects that area are estimates of lower and upper bounds of economic exposure of commercial fishing in that area; and that "actual economic exposure probably falls somewhere between the two." However, Section 4.0 of this report provides a different interpretation of the results presented in RI-DEM Addendum (2018) (Source (5)) and indicates that the high value of fish landings from areas adjacent to the WDA on trips that intersect with the WDA is evidence that expected economic impacts from WDA development are likely to be lower than economic exposure estimates based on landings from the WDA, as described in RI-DEM (2017) (Source (2)).

Section 4.0: Economic Impacts

Section 4.0 described why expected losses in fishing values within the WDA are not likely to approach 100% of exposed fishing values developed in Section 3.0. During WDA construction, some parts or all of the WDA will be closed to fishing which could result in temporary economic losses in the WDA that approach 100% of exposed fishing value in the WDA. However, this can be expected to be partially offset by fishing vessels that normally fish in the WDA continuing to fish outside the WDA during construction. After WDA development, the WDA will be fully open to commercial fishing with some fishermen choosing to continue or resume fishing in the WDA, and some fishermen possibly choosing not to resume fishing in the WDA. In both cases expected economic losses associated with the WDA after construction will be significantly less than the fishing value exposure estimates developed in Section 3.0 and summarized in Table 5.

Section 6.0

References

6.0 REFERENCES

Baruah, E. (2016). A Review of the Evidence of Electromagnetic Field (EMF) Effects on Marine Organisms. Research & Reviews: Journal of Ecology and Environmental Sciences, 4(4), 22-26.

BOEM (2017). Socio-economic Impact of Outer Continental Shelf Wind Energy Development on Fisheries in the U.S. Atlantic, Volume 1: Report Narrative, and Volume 2: Appendices (BOEM, 2017).

COP (2018). Vineyard Wind, LLC. Construction and Operations Plan. Retrieved from https://www.boem.gov/Vineyard-Wind/

CRMC (2018). Rhode Island Coastal Resources Management Council. Proposed Amendment to Rhode Island's Geographic Location Description, Analysis of Reasonable Foreseeable Effects of Federal Actions Occurring within the Amended GLD on Uses of Resources of Rhode Island's Coastal Zone. Retrieved from http://www.crmc.ri.gov/news/pdf/RI_Amended_GLD_092018.pdf

Dernie, K. M., Kaiser, M. J., & Warwick, R. M. (2003). Recovery Rates of Benthic Communities Following Physical Disturbance. Journal of Animal Ecology, 72 (6), 1043-1056.

Gradient Corporation (2017). Electric and Magnetic Field (EMF) Modeling Analysis for the Vineyard Wind Connector Project. Prepared for Epsilon Associates, Inc. and Vineyard Wind LLC.

Guida, V., A. Drohan, H. Welch, J. McHenry, D. Johnson, V. Kentner, J. Brink, D. Timmons, E.Estela-Gomez. (2017). Habitat Mapping and Assessment of Northeast Wind Energy Areas. Sterling, VA: US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2017-088. p.312.

Hutchison, Z. L., Sigray, P., He, H., Gill, A. B., King, J., and Gibson, C. (2018). Electromagnetic Field (EMF) Impacts on Elasmobranch (shark, rays, and skates) and American Lobster Movement and Migration from Direct Current Cables. U.S. Department of the Interior, Bureau of Ocean Energy Management, Sterling VA. OCS Study BOEM 2018-003.

Love, M. S., Nishimoto, M. M., Clark, S., McCrea, M., & Bull, A. S. (2017). The Organisms Living Around Energized Submarine Power Cables, Pipe, and Natural Sea Floor in the Inshore Waters of Southern California. Bulletin, Southern California Academy of Sciences 116(2), pp.61-87.

MARCO (2018). Mid-Atlantic Regional Council on the Ocean (MARCO), Commercial Fishing – VTR (also referred to as Communities at Sea) maps. Retrieved from: http://portal.midatlanticocean.org/

NCA (2018). Dupigny-Giroux, L.A., et al. 2018: Northeast. In Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA. doi: 10.7930/NCA4.2018.CH18

NEFSC (2017). NOAA Northeast Fisheries Science Center (NEFSC), Spatial Analyses of Invertebrate Species. Retrieved from https://www.nefsc.noaa.gov/ecosys/spatial-analyses/

NOAA (2018). NOAA Office of Science and Technology, National Marine Fisheries Service, Fisheries Statistics Division. Retrieved from https://www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html

NOAA/SSRC (2018). NOAA, Social Science Research Center (NOAA/SSRC); special report prepared for Vineyard Wind that used VTR data to estimate annual fishing revenue density (FRD) for the Vineyard Wind Lease Area for years 1996-2017.

Normandeau Associates Inc., Exponent Inc., Tricas, T., & Gill, A. (2011). Effects of EMFs from Undersea Power Cables on Elasmobranchs and other Marine Species, Final Report. Prepared under BOEMRE Contact M09P C00014. OCS Study BOEMRE 2011-09. Published by the US Department of the Interior Pacific OCS Region.

NROC (2018). Northeast Regional Ocean Council (NROC), Vessel Monitoring System (VMS) density products. Retrieved from https://www.northeastoceandata.org/data-download/

RI-DEM (2017). Rhode Island Department of Environmental Management, Division of Fisheries, Spatiotemporal and Economic Analysis of Vessel Monitoring System (VMS) Data within Wind Energy Areas in the Greater North Atlantic.

RI-DEM Addendum (2018). Rhode Island Department of Environmental Management, Division of Fisheries, Spatiotemporal and Economic Analysis of Vessel Monitoring System (VMS) Data within Wind Energy Areas in the Greater North Atlantic, Addendum I.

Van Dalfsen, J. A., & Essink, K. (2001). Benthic Community Response to Sand Dredging and Shoreface Nourishment in Dutch Coastal Waters. Senckenbergiana marit, 31(2),329-32

Attachment 1

Tables

Table 1 Sources of Fishing Value Data Related to the Vineyard Wind Lease Area

Source (1): RI-CRMC, 2018
http://www.crmc.ri.gov/news/pdf/RI_Amended_GLD_092018.pdf

Fishing value data from RI- CRMC's September 20, 2018 submission to the National Oceanic and Atmospheric Administration (NOAA) proposing an amendment to Rhode Island's geographic location description (GLD) to include BOEM lease blocks OCS-A 0500 (the Orsted lease area), OCS-A 0501 (Vineyard Wind's lease area), and areas north of these lease areas up to the seaward extent of Massachusetts' state jurisdiction (3 miles offshore). That proposed area is referred to as the amended GLD. This submission provides dockside values of Rhode Island landings of fish harvested in the amended GLD over a 6-year period, 2011-2016, by port, species, gear type, and other metrics. These are used to represent potential impacts on Rhode Island fishermen from wind develop within the proposed GLD. The study did not provide area-specific harvest data for lobster or crab. The WDA constitutes 14.8% of the study area, the amended GLD.

Source (2): CRMC 2017
http://www.dem.ri.gov/programs/bnatres/fishwild/pdf/RIDEM_VMS_Report_2017.pdf

Fishing value data presented in this study were developed by the Rhode Island Department of Environmental Management in response to concerns by the Rhode Island fishing industry that the fishing values developed by BOEM (Source (3) below) were underestimated. Vessel Monitoring System (VMS) data, Vessel Trip Reports (VTR) data, and commercial landings data for years 2011-2016 were used to develop annual estimates of fishing revenues for the MA-WEA and for specific wind lease areas within the MA-WEA, including the Vineyard Wind Lease Area. The study did not account for lobster or crab landings. The WDA constitutes 45.3% of the Vineyard Wind lease area which is one of the focus areas of this study.

Source (3): BOEM, 2017
Volume 1: http://www.data.boem.gov/PI/PDFImages/ESPIS/5/5580.pdf
Volume 2: http://www.data.boem.gov/PI/PDFImages/ESPIS/5/5581.pdf

This study was funded by BOEM and conducted by NOAA's Northeast Fisheries Center, Social Science Research Branch. It focuses on many socio-economic issues and characterizes commercial fishing and fishing revenues generated by federally permitted fishermen operating in the U.S. Atlantic. Making use of VTR data, spatial data from the Northeast Fisheries Observer Program database (NEFOP), and VMS data, the study provides estimates of the average economic value of the commercial fish harvest during 2007 and 2012 by location, species caught, gear type, and port group. Using haul locations recorded by observers from 2004-2012, researchers were able to model the area associated with reported VTR points and identify the proportions of catch that are sourced from within the MA-WEA from any VTR record, or groups of VTR records. This methodology produced an estimate of revenue "exposure" within discrete geographic areas, including the MA-WEA. This study

accounted only for lobster and crab landings that were entered into VTRs. The WDA constitutes 10.2% of the MA-WEA study area.

Source (4): NOAA VMS data, 2018 *Available Upon Request*

NOAA uses VTR data to produce annual fishing footprint charts that show annual fishing revenues per 0.25 km^2 (referred to as fishing revenue densities or FRDs) by species and by gear type. During 2018 NOAA provided Vineyard Wind with the results of a similar VTR data analysis that focused on estimates of the annual value of landings from the Vineyard Wind lease area by species for years 1996-2017. These landing values include lobster and crab harvested by vessels that file VTRs because they hold permits to harvest other species. They do not include the value of lobster and crab landings by vessels that fish exclusively for those two species and are therefore not required to file VTRs. The WDA constitutes 45.3% of the Vineyard Wind lease area which was the focus of this analysis.

Source (5) RI-DEM Addendum, 2018
http://www.dem.ri.gov/programs/bnatres/fishwild/pdf/RIDEM_VMS_Report_2017.pdf

This Addendum to Source (2) above provides estimates of annual revenues from all commercial fishing trips during 2011-2016 that involved at least one tow that intersected the Vineyard Wind lease area. These are presented as estimates of the upper bounds of the economic exposure of commercial fishing to development of the Vineyard Wind lease area, and fishing value estimates presented in Source (2) above are characterized as lower bounds. The addendum states that "…the true economic exposure is likely between the two."

Table 2 Sources of Data and Unadjusted Estimates of Commercial Fishing Economic Exposure in Vineyard Wind's Lease Area and Wind Development Area (WDA) Based on Each Data Source

Source*	Study Period (Years)	Study Area	Basis of Fishing Values*	Size of Study Area (km^2)	Value of Harvest (all years)	Average Annual Value of Harvest	Ave. Annual Value per km^2	$ Value in WDA (306.00 km^2)	WDA as % of Study Area
(1) CRMC GLD (2018)	2011-2016	Amended GLD	RI landings	2064.2	$18,306,556[1]	$3,051,093	$1,478	$452,294	14.8%
(2) RI-DEM (2017)	2011-2016	VW Lease Area	All landings	675.4	$5,145,289	$857,548	$1,270	$388,542	45.3%
(3) BOEM (2017)	2007-2012	MA-WEA	All landings	3003.0	$18,180,000	$3,030,000	$1,009	$308,754	10.2%
(4) NOAA VTR Data (2018)	2011-2016	VW Lease Area	All landings	675.4	$5,993,648	$998,941	$1,479	$452,605	45.3%
(5) RI-DEM Addendum (2018)	2011-2016	VW Lease Area	Trip Revenues	675.4	$16,474,724	$2,745,787	$4,066	$1,244,075	45.3%

[1] *Includes confidential landings.*

* Source (1) Fishing Values are based on Rhode Island landings only and do not reflect the value of lobster and Jonah crab landings
Source (2) Fishing values do not reflect landings of lobster or Jonah crab.
Source (3) Fishing values include only VTR reported landings of lobster or Jonah crab.
Source (4) Fishing values include only VTR-recorded landings of lobster and Jonah crab and do not include landings of some low value species
Source (5) Fishing values are based on gross revenues from all fishing trips that include at least one tow that intersects the Vineyard Wind Lease Area.

Section 4 compares fishing values reported in Source (5) and Source (2) to indicate that 84.2% of revenues on trips with tows that transect the Vineyard Wind lease area are generated by fishing outside the WDA. As a result, fishing values presented for Source 5 in Table 2 are not directly comparable to those based on other sources.

Table 3 Unadjusted* Estimates of Annual Economic Exposure of Commercial Fishing in the Wind Development Area (WDA), (2014 Dollars)

**Not adjusted to account for lobster and Jonah crab landings*

Landings, All States	Period	Average	Low	High	WDA as % of Study Area
(1) CRMC GLD (2018)[1]	2011-2016	$452,294	$261,495	$1,008,775	14.8%
(2) RI-DEM (2017)	2011-2016	$388,542	$94,337	$944,693	45.3%
(3) BOEM (2017)	2007-2012	$308,754	n/a	n/a	10.2%
(4) NOAA VTR Data (2018)	2011-2016	$452,605	$293,919	$869,856	45.3%
(5) RI-DEM (2018)	2011-2016	$1,244,075	$449,566	$2,498,675	45.3%

[1]Based on species totals and does not include confidential landings

Landings, Rhode Island**	Period	Average	Low	High	RI % of Landings, All States
(2) RI-DEM (2017)	2011-2016	$144,486	$35,081	$351,300	37.2%
(5) RI-DEM (2018)	2011-2016	$638,155	$230,607	$1,281,709	51.3%

(1) Using estimated FRD based on this source multiplied by 306.0, or 14.8% of annual fish value estimated in this source for the CRMC proposed Amended GLD.

(2) Using estimated FRD based on this source multiplied by 306.0, or 45.3% of annual fish value estimated in this source for the Vineyard Wind Lease Area.

(3) Using estimated FRD based on this source multiplied by 306.0, or 10.2% of annual fish value estimated in this source for the MA-WEA.

(4) Using estimated FRD based on this source multiplied by 306.0, or 45.3% of fishing revenue estimated in this source for in the Vineyard Wind Lease Area.

(5) Using estimated revenues on fishing trips with at least one tow intersecting the Vineyard Wind Lease Area and the WDA accounting for 45.3%.

***Based on Source (2), RI landings accounted for 37.2% during 2011-2016 and based on Source (5), RI landings accounted for 51.3% of trip revenues from trips during 2011-2016 that involved at least a portion of one tow that transected the Vineyard Wind Lease Area.*

Table 4a Unadjusted* Value of Annual Rhode Island Landings from Proposed Amended GLD (CRMC 2018), by segment

**Excludes landings of American lobster and Jonah crab.*

Area	Area Size (km^2)	2011	2012	2013	2014	2015	2016	Total-All years	Annual Average	Avg. Annual ($/km^2$)
Total Amended GLD[1]	2064.22	$1,623,710	$1,107,764	$2,032,083	$2,835,043	$3,769,544	$6,892,192	$18,260,336	$3,043,389	$1,474
Vineyard Wind Lease Area[2]	675.37	$56,401	$53,036	$159,041	$257,133	$245,169	$1,142,581	$1,913,361	$318,893	$472
Bay State Wind Lease Area[2]	759	$132,863	$63,579	$623,837	$699,244	$398,902	$1,119,799	$3,038,226	$506,371	$667
Rest of Amended GLD**	629.85	$1,434,445	$991,149	$1,249,205	$1,878,666	$3,125,473	$4,629,811	$13,308,750	$2,218,125	$3,522

[1]Based on species totals and does not include confidential landings.

[2]Source: RI-DEM, 2017

***Total GLD less lease areas.*

Table 4b Annual Fishing Revenue Density (FRD) Measured as the Dollar Value of Landings per Square Kilometer in the Three Segments of the Proposed Amended GLD[+]

[+] Includes Rhode Island landings only, does not include the value of lobster and Jonah crab landings.

Area	2011	2012	2013	2014	2015	2016	Average	Average FRD of Amended GLD
Vineyard Wind Lease Area	$84	$79	$235	$381	$363	$1,692	$472	-68.0%
Bay State Wind Lease Area	$175	$84	$822	$921	$526	$1,475	$667	-54.7%
Rest of Amended GLD[++]	$2,277	$1,574	$1,983	$2,983	$4,962	$7,351	$3,522	138.9%
Average for Amended GLD	$787	$537	$984	$1,373	$1,826	$3,339	$1,474	100%

[++] Total GLD less lease areas.

Table 5 Economic Exposure Estimates for the Vineyard Wind Lease Area and Wind Development Area (WDA) based on RI-DEM (2017) and NOAA VTR Data (2018)

(Adjusted to Include VTR-reported and non-VTR reported landings of lobster and Jonah crab as described in Section 3.0.)

Landings, All States			
Vineyard Wind Lease Area	Average	Low	High
Source (2)	$1,013,083	$363,745	$2,240,559
Source (4)	$1,067,065	$716,818	$1,987,940
Average	$1,040,074	$540,281	$2,114,250
*Wind Development Area**	Average	Low	High
Source (2)	$459,013	$164,807	$1,015,164
Source (4)	$483,471	$324,779	$900,706
Average	$471,242	$244,793	$957,935
Landings, Rhode Island			
*Wind Development Area***	Average	Low	High
Source (2)	$184,999	$64,543	$558,199
Source (4)	$179,787	$120,775	$334,942
Average	$182,393	$92,695	$446,571

**WDA is 45.3% of the Vineyard Wind lease area.*

***RI fishing ports account for 37.2% of the economic exposure in the Vineyard Wind lease area (RI-DEM, 2017, Table 4)*

Table 6a Economic exposure of commercial fishing in the Vineyard Wind Lease Area and Wind Development Area (WDA) (Using landings estimates from RI-DEM (2017))*

**Values do not reflect the value of lobster and Jonah crab landings*

STATE	2011	2012	2013	2014	2015	2016	Total Landings	Ave. Annual Value, Lease Area	Ave. Annual Value, WDA**	% of total
CT	$35,943	$23,680	$36,764	$19,297	$0	$51,531	$167,216	$27,869	$12,627	3.2%
MA	$112,425	$987,431	$551,972	$199,070	$247,676	$675,235	$2,773,810	$462,302	$209,462	53.9%
NJ	$0	$4	$0	$499	$19,336	$49,532	$69,370	$11,562	$5,238	1.3%
NY	$3,440	$13,966	$26,489	$674	$10,819	$166,146	$221,533	$36,922	$16,729	4.3%
RI	$56,401	$53,036	$159,041	$257,133	$245,169	$1,142,581	$1,913,361	$318,893	$144,486	37.2%
Total Landings	$208,210	$1,078,116	$774,267	$476,672	$523,000	$2,085,024	$5,145,289	$857,548	$388,542	100.0%

***WDA is 45.3% of Vineyard Wind Lease Area.*

	2011	2012	2013	2014	2015	2016	Annual Average All Years
Lease Area Landings per km^2	$308	$1,596	$1,146	$706	$774	$3,087	$1,270
WDA Annual Landings Value	$94,337	$488,478	$350,809	$215,973	$236,963	$944,693	$388,542
RI Annual Landings Value from WDA	$25,555	$24,030	$72,059	$116,503	$111,082	$517,589	$144,486
	2011	2012	2013	2014	2015	2016	Annual Average % All Years
RI % of Annual Value from Lease Area	27.1%	4.9%	20.5%	53.9%	46.9%	54.8%	37.2%

Table 6b Economic exposure of commercial fishing in the Vineyard Wind Lease Area and Wind Development Area (WDA) (Using landings estimates from RI-DEM (2018))

STATE	2011	2012	2013	2014	2015	2016	Total All Years	Lease Area	WDA*	% of WDA Landings
CT	$111,919	C	$132,648	C	$0	$233,073	$477,640	$79,607	$36,069	2.9%
MA	$274,093	$1,789,724	$1,194,244	$796,423	$641,740	$1,605,656	$6,301,880	$1,050,313	$475,881	38.3%
NJ	$0	C	$0	C	$90,548	$87,846	$178,394	$29,732	$13,471	1.1%
NY	C	C	$296,932	C	$253,454	$515,623	$1,066,009	$177,668	$80,499	6.5%
RI	$606,221	$789,006	$1,429,130	$1,226,021	$1,327,814	$3,072,607	$8,450,799	$1,408,467	$638,155	51.3%
Total	$992,233	$2,578,730	$3,052,954	$2,022,444	$2,313,556	$5,514,805	$16,474,722	$2,745,787	$1,244,075	100.0%

(C) = confidential landings. Confidential landings are treated as $0, however, there is no confidential data for RI.

	2011	2012	2013	2014	2015	2016	Annual Average All Years
Lease Area Landings per km^2	$1,469	$3,818	$4,520	$2,995	$3,426	$8,166	$4,066
WDA Annual Landings Value	$449,566	$1,168,384	$1,383,248	$916,339	$1,048,237	$2,498,675	$1,244,075
RI Annual Landings Value from WDA	$274,670	$357,487	$647,517	$555,492	$601,613	$1,392,152	$638,155
	2011	2012	2013	2014	2015	2016	Annual Average % All Years
RI % of Annual Value from Lease Area	61.1%	30.6%	46.8%	60.6%	57.4%	55.7%	51.3%

Table 7 Comparison of Economic Exposure estimates for the WDA based on RI-DEM (2017) and RI-DEM (2018)+

+ Annual Fishing Revenues 2011-2016 (in 2014 Dollars)

All Commercial Landings from the Vineyard Wind Lease Area*	Average	Low	High
RI-DEM (2017)	$1,013,083	$363,745	$2,240,559
RI-DEM (2018)	$2,901,322	$1,147,768	$5,670,340
Difference (2018 Estimate - 2017 Estimate)	$1,888,239	$784,023	$3,429,781
% Change	286%	316%	253%
Average of both	$1,957,203	$755,756	$3,955,449
All Commercial Landings from the Wind Development Area (WDA)**	**Average**	**Low**	**High**
RI-DEM (2017)	$459,013	$164,807	$1,015,164
RI-DEM (2018)	$1,314,299	$520,036	$2,569,146
Difference (2018/2017)	$855,286	$355,229	$1,553,982
% Change	286%	316%	253%
Average of both	$886,656	$342,422	$1,792,155
Rhode Island Landings from the Wind Development Area***	**Average**	**Low**	**High**
RI-DEM (2017)	$184,999	$64,543	$558,199
RI-DEM (2018)	$678,668	$315,183	$1,432,665
Difference (2018-2017)	$493,669	$250,640	$874,466
2018 as % of 2017	367%	488%	257%
Average of both	$431,834	$189,863	$995,432

** Includes VTR-reported and non-VTR reported landings of lobster and Jonah crab as described in Section 3.0*

***WDA is 45.3% of the Vineyard Wind lease area and is estimated to account for that percent of fish revenues from the Vineyard Wind Lease Area.*

****Rhode Island fishing ports account for 37.2% of the landed value of fish harvested in the Vineyard Wind Lease Area (RI-DEM, 2017) and for 51.3% of trip revenues where at least one tow intersected the Vineyard Wind Lease Area (RI-DEM, 2018)*

Table 8 Average Annual Economic Exposure (Years 2011-2016), 2014 Dollars

Landings, All States	Area (km^2)	Percentage of Lease Area	RI-DEM (2017), Adjusted*	RI-DEM (2018), Adjusted*	Average	RI-DEM (2017), Adjusted*, 25 years
Vineyard Wind Lease Area	675.37	100%	$1,013,083	$2,901,322	$1,957,203	$25,327,078
Wind Development Area (WDA)						
Turbine Layout in Original COP	306	45.3%	$458,927	$1,314,299	$886,613	$11,473,166
Large Turbine Alternative, WDA Option 1	239	35.4%	$358,631	$1,027,068	$692,850	$8,965,786
Large Turbine Alternative, WDA Option 2	232	34.4%	$348,501	$998,055	$673,278	$8,712,515
Large Turbine Alternative, WDA Option 3	236	34.9%	$353,566	$1,012,561	$683,064	$8,839, 150

Landings, Rhode Island	Area (km^2)	Percentage of Lease Area	RI-DEM (2017), Adjusted*	RI-DEM (2018), Adjusted*	Average	RI-DEM (2017), Adjusted*, 25 years
Vineyard Wind Lease Area	675.37	100%	$408,326	$1,497,900	$953,113	$10,208,150
Wind Development Area (WDA)						
Turbine Layout in Original COP	306	45.3%	$184,999	$678,549	$431,760	$4,624,975
Large Turbine Alternative, WDA Option 1	239	35.4%	$144,547	$530,257	$337,402	$3,613,675
Large Turbine Alternative, WDA Option 2	232	34.4%	$140,464	$515,278	$327,871	$3,511,600
Large Turbine Alternative, WDA Option 3	236	34.9%	$142,506	$522,767	$332,636	$3,562,650

**RI-DEM (2017, 2018) study results were adjusted upward to account for 57.5% lobster and Jonah Crab landings in Rhode Island as described in Section 3.3.*

Attachment 2

Dennis M. King, Ph.D., Curriculum Vitae

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EDUCATION

Ph.D. Marine Resource Economics, University of Rhode Island, 1977
M.A. Food and Natural Resource Economics, University of Massachusetts, 1973
B.B.A. Corporate Finance/Economics, University of Massachusetts, 1970

CAREER PROFILE

1991 to present: *Managing Owner*, **King and Associates, Incorporated**
Marine resource economic research and consulting
1991 to present: **University of Maryland, Center for Environmental Science**
Research professor (1991 to 2014); Visiting Professor (since 2014)
1989 to 1990: *Director of Resource Economics*, **ICF International, Washington, D.C.**
1979 to 1988: *Managing Owner*, **King and Associates,** Inc.
Adjunct Professor, **University of California, San Diego,** Economics Dept.,
Adjunct Professor, **Scripps Institution of Oceanography**, La Jolla, CA
1977 to 1979 *Senior Economist*, **U.S. Dept. of Commerce**, NOAA, Oceanic Division, La Jolla, CA
1975 to 1976: *Assistant Professor,* **University of New Hampshire***,* Marine resource economics

CAREER OVERVIEW

Forty years of research and consulting experience in marine resource economics, with strong emphasis on fisheries, aquaculture, seafood markets, coastal and ocean resource management, seaports, and shipping. Recent research focuses on impacts of emerging technologies on ocean and water dependent industries and markets, and related investment opportunities and regulatory challenges.

Author of over one hundred reports, papers, and book chapters dealing with economic, business, and trade issues associated with environmental/economic linkages and related policies and regulations. Project manager on over one hundred interdisciplinary science/policy research projects dealing with economic aspects of complex scientific/engineering issues. Advisor to national and international environmental protection and natural resource development agencies, non-government organizations, insurance and financial institutions, small and large businesses, and seaport administrations. Expert witness before U.S. and state congressional committees, at administrative law judge hearings, and in more than forty cases involving private litigation related to fisheries, seafood markets, and environment-based economic losses. Served on scientific committees of the U.S. National Research Council and U.S. National Academies of Science, and as senior economic consultant to the United Nations, The World Bank, and other international organizations, and as technical advisor to U.S. congressional committees and various industry/government councils.

Developed and pioneered practical applications of widely used ecosystem valuation methods and economic tools

to assess and compare environmental restoration and mitigation projects and invasive species problems, and resolve coastal fishing-oil industry conflicts. Created widely used analytical method, Habitat Equivalency Analysis (HEA), for assessing and comparing gains and losses in ecosystem services and values for settling natural resource damage claims, and managing environmental trading and banking programs. Developed fishery-related risk assessment methods for Lloyd's of London. Ltd and other global insurers, and GIS- based global fishing fleet allocation/decision-support models for H.J. Heinz (Starkist), Van Camp (Chicken of the Sea), and other global seafood companies. Developed fishery management models, tax programs, and foreign fishing access and rental agreements for individual Pacific Island nations and for regional Pacific island multinational fishery management organizations. Developed and applied award-winning tools for assessing environmental/economic tradeoffs associated with multi-billion dollar investments in environmentally beneficial uses of dredged material, and for performing incremental cost analysis (ICA) to justify them. Developed economic tools for assessing and comparing ballast water treatment technologies and for evaluating alternative ballast water regulatory and compliance monitoring and enforcement programs. Led innovative project addressing economics of enforcement and compliance in U.S. commercial fisheries, and contributed to similar international studies.

SELECTED REPORTS / PUBLICATIONS

Ballast water treatment roll out should be revised, Maritime Executive, April 9, 2018. Available online at *http://www.maritime-enviro.org/reports.php* under King-Ballast Water Economic publications

Economics of Mid-Atlantic Fisheries in the year 2030, in Proceedings of the Mid-Atlantic Blue Ocean Economy-2030 Symposium, Urban Coast Institute, Monmouth University, October 12/13, 2017 (https://www.monmouth.edu/uci/symposium2017/)

Implementation of U.S. Coast Guard ballast water regulations is doomed to fail, The Bay Journal , September, 2017, Annapolis, MD (https://www.bayjournal.com/opinion)

Ocean Health and the Economics of Ballast Water Regulations, published by the International Network of Environmental Enforcement and Compliance, Washington, D.C. September, 29, 2016 (https://www.inece.org/library/show/57ed5b6f134c7)

Predicting Global Ballast Water Treatment Markets in Sustainable Shipping**,** March 18, 2016; Available online at *http://www.maritime-enviro.org/reports.php* under King Ballast Water Economic publications

Managing Uncertainty in Ballast Water Treatment Markets in Sustainable Shipping**,** March 14, 2016; Available online at *http://www.maritime-enviro.org/reports.php* under King Ballast Water publications.

A Preliminary National/International Study of Methods to Measure Fishery Enforcement/Compliance Outcomes Prepared for the Australian Fisheries Research & Development Corporation, Perth, Australia; February, 2016

Emerging global markets for Next-generation Wireless In-water Nutrient Sensors
Prepared for The Nutrient Sensor Challenge, an interagency initiative by NOAA, EPA, and USDA to promote the development of low-cost, low- maintenance, sensor-based, in-water tools for measuring and transmitting location-specific measures of nitrogen and phosphorous concentrations. Washington, D.C., 2015

Economic and environmental benefits of wireless, sensor-based, irrigation and water management systems in U.S. nursery and greenhouse sectors and in designing and monitoring performance of green roofs and other stormwater management practices. Report prepared for the National Institute of Food and Agriculture (NIFA) at the U.S. Dept. of Agriculture under, Specialty Crop Research Initiative (SCRI) Award no. 2009-51181-

05768, October, 2014

Economic Analysis of Amendment # 28 of the Gulf of Mexico Reef fish Management Plan regarding reallocation of red snapper quota from commercial to recreational fishing sector. Prepared for the Fishermen Defense Fund, Houston TX, October, 2014

Economic impacts of proposed Endangered Species Act critical habitat designation for the South Atlantic and Carolina distinct population segments of Atlantic Sturgeon; Report prepared for U.S. Dept. of Commerce, NOAA-Fisheries, Southeast Regional Office, St. Petersburg, FL; March, 2014

Economic impacts of proposed Endangered Species Act critical habitat designation for three northern distinct population segments of Atlantic Sturgeon; Report prepared for U.S. Dept. of Commerce, NOAA-Fisheries, Northeast Regional Office, Gloucester, MA; April, 2014

Environmental Benefits of Wireless Sensor-based Irrigation Networks: Case-study Projections and Potential Adoption Rates in Horticultural Technology 23(6): 783-793, December, 2013 (with J.C. Majsztrik and E.W. Price)

The Economic Impacts of U.S. ballast water regulations in Sustainable Shipping**,** September 14, 2013; Available at *http://www.maritime-enviro.org/reports.php* under King Ballast Water Economic publications.

Is Port-based ballast water treatment a viable option in Sustainable Shipping**,** May 9, 2013; Available at *http://www.maritime-enviro.org/reports.php* under King Ballast Water Economic publications.

Economic and logistical feasibility of port-based ballast water treatment: A case study at the Port of Baltimore, with Patrick Hagan, MERC Ballast Water Economics Discussion Paper No. 6, University of Maryland Reference Number: UMCES-CBL- 2013-011, May 7, 2013

The practicability loop in ballast water treatment markets. in Sustainable Shipping**,** July 20, 2012; Available at *http://www.maritime-enviro.org/reports.php* under King Ballast Water Economic publications.

Preview of Global Ballast Water Treatment Markets, with P. Hagan, M. Riggio, and D. Wright, Journal of Marine Engineering and Technology (JMET), Volume 12, Issue 1, January, 2012

Costs of Stormwater Management Practices in Maryland Counties, (with Patrick Hagan). A report and accompanying spreadsheet tool prepared for Maryland Department of the Environment, Science Services Administration, October 10, 2011, available online at:
http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Pages/PhaseIIBayWIPDev.aspx

Question the shipping industry should ask IMO about ballast water, (with Patrick Hagan) in Sustainable Shipping, April 11. 2011. Available at *http://www.maritime-enviro.org/reports.php* under King Ballast Water Economic publications.

Kick-starting Ballast Water Treatment Markets in Sustainable Shipping, December 17, 2010**.** Available at *http://www.maritime-enviro.org/reports.php* under King Ballast Water Economic publications.

"Gaming" Ballast Water Treatment Markets in Sustainable Shipping, September 8, 2010
Available at *http://www.maritime-enviro.org/reports.php* under King Ballast Water Economic publications.

Enforcement and Compliance in U.S. Commercial Fisheries: Results from Two Recent Studies. A report

prepared for the Lenfest Ocean Program, August, 2010

Preliminary Overview of Global Ballast Water Treatment Markets, (with Mark Riggio and Patrick T. Hagan). MERC Ballast Water Economics Discussion Paper Number 2, June 10, 2010; Available at *http://www.maritime-enviro.org/reports.php* under King Ballast Water Economic publications.

Verifying Compliance with Ballast Water Discharge Regulations, (with Mario N. Tamburri). In Ocean Development and International Law Journal, Volume 41, Number 2, April, 2010
Available at *http://www.maritime-enviro.org/reports.php* under King Ballast Water Economic publications.

Fisheries observers as enforcement assets: Lessons from the North Pacific, (with Read D. Porter). In Marine Policy Journal,Volume 34, Number 3, 2010

Rational noncompliance and the liquidation of Northeast groundfish resources, (with Jon G. Sutinen). In Marine Policy Journal, Volume 34, Number 1, 2010

Linking optimization and ecological models in a decision support tool for oyster restoration and management, (with E.W. North, J. Xu, R.R. Hood, R.I.E. Newell, K.T. Painter, M.L. Kellogg, M.K. Liddel, and D.F. Boesch). In Ecological Applications, Volume 20, Number 3, 2010

Can the concept of ecosystem services be practically applied to improve natural resource management decisions? In Ecological Economics, Volume 69, Issue 5, 2010

Preliminary Cost Analysis of Ballast Water Treatment Systems, (with Mark Riggio and Patrick T. Hagan). MERC Ballast Water Economics Discussion Paper Number 1; December 22, 2009
Available at *http://www.maritime-enviro.org/reports.php* under King Ballast Water Economic publications.

Reassessing the Value of U.S. Coast Guard At-sea Fishery Enforcement, (with Read Porter, and Elizabeth Price). In Ocean Development and International Law Journal, Volume 40, Number 4, 2009

The Economic Structure of California's Commercial Fisheries, (with Elizabeth Price, Steven C. Hackett, and M. Doreen Hansen). A report to California Department of Fish and Game; June 3, 2009 PDF at: http://www.dfg.ca.gov/marine/economicstructure.asp

An Economic, Legal and Institutional Assessment of Enforcement and Compliance in Federally Managed U.S. Commercial Fisheries, (with Elizabeth Price, Anichia Van Buren, Charlotte Shearin, Kathryn J. Mengerink, Read D. Porter, Jon G. Sutinen, Andrew Rosenberg, and Jill H. Swasey). A report supported by the Lenfest Ocean Program, March 11, 2009

Managing Patuxent River Water Quality: Looking Beyond Science and Politics to the Economics of Decision-making, (with Patrick Hagan, Lisa Wainger, and Nicole Chigounis). A report to NOAA National Ocean Service, April 15, 2007

The Future of the Patuxent River - An Economic Perspective. In The Bay Journal, Volume 16, Number 2, Alliance for the Chesapeake Bay, Annapolis, MD, February, 2007

Developing Defensible Wetland Mitigation Ratios: Standard tools for "scoring" wetland creation, restoration, enhancement, and conservation, (with Elizabeth W. Price, University of Maryland Center for Environmental Science). A report prepared for NOAA, Office of Habitat Protection, Silver Spring, MD, February, 2007

WTO Rules create Farm Bill opportunities for Bay farmers. In The Bay Journal, Volume 15, Number 8, Alliance for the Chesapeake Bay, Annapolis, MD, November, 2005

Crunch Time for Water Quality Trading. In Choices, a journal of the American Agricultural Economics Association, Volume 20, Number 1, Spring, 2005

Sparing the rod spoils the bay. In The Bay Journal, Volume 14, Number 9, Alliance for the Chesapeake Bay, Annapolis, MD, December, 2004

Developing Defensible Wetland Mitigation Ratios: A Companion to *"The Five-Step Wetland Mitigation Ratio Calculator*", (with Elizabeth W. Price University of Maryland, Center for Environmental Science). A report prepared for the NOAA, Habitat Protection Division, September 30, 2004

Development of Indicators to Assess Economic Vulnerabilities to Changes in Ecosystem Services: Case Study of Counties in Maryland, USA, (with Lisa A. Wainger, et. al.). In Environmental Management, Volume 34, Number 5, Springer Publishers, New York, December, 2004

Trade-Based Carbon Sequestration Accounting. In Environmental Management, Special Issue on Carbon Sequestration, a publication of Oak Ridge National Laboratory, Oak Ridge, TN, Winter 2003

Will nutrient credit trading ever work? An assessment of supply problems, demand problems, and institutional obstacles, (with Peter J. Kuch). In The Environmental Law Reporter, a journal of the Environmental Law Institute, Washington, DC, May, 2003

Economic incentives for phasing lead out of gasoline: A review of international experiences and recommendations for the government of South Africa, (with Peter J. Kuch). In South Africa's Fuel Quality Breakthrough: Phasing out Lead in Petrol, Pretoria, South Africa; January, 2003

Managing Environmental Trades: Lessons from Hollywood, Stockholm, and Houston. In The Environmental Law Reporter, a journal of the Environmental Law Institute, Washington, DC, Fall, 2002

Anatomy of "Early" Carbon Sequestration Trading: Common sense can prevent costly and embarrassing mistakes, Special Report #5. Journal of the Forum for Environmental Law, Science, Engineering, and Finance (FELSEF), Washington, DC, Summer, 2002

Comparing investments in land-based CO_2 emission offset projects: bioenergy production vs. carbon sequestration. Chapter 19 in proceedings of the Electric Power Research Institute conference on bioenergy hosted by The World Bank, November 15-16, 2001

Assessing the economic value of biodiversity using indicators of site conditions and landscape Context. Chapter 7 in The Valuation of Biodiversity Benefits, Organization for Economic Cooperation and Development (OECD). Paris, November, 2001

Priorities for Weed Risk Assessment: Using Landscape Context to assess indicators of functions, services, and values (with Lisa Wainger). Chapter 4 in Weed Risk Assessment, edited by R.H. Groves, CSIRO Publishing, Collingwood, Australia, June, 2001

Compensation for Lost Ecosystem Services: The Need for Benefit-based Transfer Ratios and Restoration Criteria, (with James Boyd, and Lisa A. Wainger). In Stanford Environmental Law Review Volume 20: Number 2, May, 2001

Wetland Value Indicators for Scoring Wetland Mitigation Trades, (with Lisa Wainger, James Salzman, and James Boyd). In Stanford Environmental Law Review, Volume 20: Number 2, May, 2001

Reforesting Frequently Flooded Agricultural Land: Will a Market for Carbon Sequestration Credits Be Enough?, (with Leonard Shabman, Laura Zepp, and Lisa Wainger). In Journal of Sustainable Agriculture, Spring, 2001

Expanding HGM Wetland Assessment: Linking Wetland Function with Services and Values, (with Lisa A. Wainger, Candy C. Bartoldus and James S. Wakeley). Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS, October, 2000: (PDF file at: http://www.wes.army.mil/el/wetlands/pdfs/trel00-17.pdf)

Ecosystem Valuation, award-winning report/website, (with Marisa Mazzotta), funded by U.S. Department of Agriculture, NRCS, and U.S. Department of Commerce, NOAA, July, 2000 (www.ecosystemvaluation.org)

Valuing Ecosystem Services for Decision-Making. In Proceedings of a Workshop on Management and Mitigation of Non-Indigenous Species, (with Lisa A. Wainger), Department of Defense and Environmental Protection Agency, Legacy Resource Management Program. Washington, D.C., June, 2000

The Benefits and Costs of Reforesting Economically Marginal Cropland in the Mississippi Delta, (with Lisa A. Wainger, Leonard Shabman and Laura Zepp). Delta Land Trust, Jackson, MS, August, 2000

Expanding Wetland Assessment Procedures: Landscape Indicators of Relative Wetland Value with Illustrations for Scoring Mitigation Trades, (with Lisa A. Wainger and James W. Boyd). Army COE, Waterways Experiment Station, Vicksburg, MS, April, 2000

Assessing the economic value of biodiversity using indicators of site conditions and landscape context, (with Lisa A. Wainger). In Benefit Valuation of Biodiversity Resources, Organization for Economic Cooperation and Development, Paris, France, November, 1999

Managing Risk in Carbon Sequestration Programs: The Role of Spatial and Temporal Variables in C Credit Scoring, (with Lisa A. Wainger). U.S Department of Agriculture, Natural Resources Conservation Service, Social Sciences Institute, September, 1999

Prioritizing Weed Risks: Using Landscape Context as a Basis for Indicators of Functions, Services and Values, (with Lisa A. Wainger). First International Workshop on Weed Risk Assessment, Adelaide, Australia, CSIRO Publishing. In press. August, 1999

Prioritizing Weed Threats: An Exercise in Integrated Risk Management, (with Lisa A Wainger). U.S. Department of Agriculture, Economic Research Service; University of Maryland, Center for Environmental Studies Publication Number UMCES-CBL-99-0019, January, 1999

The Dollar Value of Wetlands: Trap Set, Bait Taken, Don't Swallow. In National Wetland Newsletter, Volume 20, Number 4, July/Aug., 1998 Environmental Law Institute, Washington, D.C.

A Study of Emerging International Management Systems. Prepared for and published by the International Environmental Business and Technology Institute, Inc., Amherst, MA; February, 1998

Criteria for Certifying that Seafood Products are From Healthy, Sustainably Managed Fisheries. World Wildlife Fund (US) and Marine Stewardship Council (UK); September, 1997

The Fungibility of Wetlands. In National Wetland Newsletter, Volume 19, Number 5, Sept/Oct, 1997 Environmental Law Institute, Washington, D.C.

Valuing Wetlands for Watershed Management. In National Wetland Newsletter, Volume 19, Number 3, May/June, 1997 Environmental Law Institute, Washington, D.C.

Economic Analysis of Noxious Weed Problems. A report prepared for the U.S. Department of Agriculture, Economic Research Service, Washington, D.C. (Draft Submitted, May 5, 1997)

Comparing Ecosystem Services and Values: With Illustrations for Performing Habitat Equivalency Analysis. Technical Report prepared for the U.S. Department of Commerce-NOAA, Resource Damage Assessment and Restoration Center, Silver Spring, MD, January, 1997

The Use of Ecosystem Assessment Methods in Natural Resource Damage Assessment. Technical Report prepared for the U.S. Department of Commerce–NOAA, Resource Damage Assessment and Restoration Center, Silver Spring, MD., January, 1997

Assessing Local Sustainability: Conceptual Framework and Practical Obstacles, (with Joel Darmstadter, Ken Frederick, Ronald Lile, and Michael Toman, Resources For the Future). Technical Report, prepared for the U.S. Dept. of Interior, Washington, D.C., January, 1997

Criteria for Targeting Market-based Initiatives to Promote Sustainable Ocean Fisheries. Prepared for the World Wildlife Fund (Washington, D.C.) and the Marine Stewardship Council (London), December, 1996

Prioritizing Investments in Vegetative Riparian Buffers: with illustrations for three Chesapeake Bay subwatersheds, (with Patrick Hagan and Curtis Bohlen). Prepared for U.S. EPA, Office of Policy Analysis, Washington, D.C., December, 1996

Wetland Location and Watershed Values. Prepared for U.S. EPA, Office of Policy Analysis, Washington, D.C., November, 1996

Wetland Location and Watershed Values: Some Hidden Costs of Mitigation Banking. A report prepared for the Water Resources Institute, U.S. Army Corps of Engineers; Fort Belvoir, Alexandria, VA; May, 1996

The Role of Ecosystem Restoration Technologies in 21st Century Economies.
Proceedings of ECOSET95, Tokyo; Sixth International Conference on Ecosystem Restoration Technologies, Japan International Marine Science and Technology Federation; Tokyo, November, 1995

The Economics of Environmental Mitigation Banking, (with Paul Scodari). In Mitigation Banking: Theory and Practice, edited by Lindell March, et. al; Island Press, Washington, D.C., July, 1995

Natural Capital Indicators, (with Pierre R. Crosson). In Developing Indicators for Environmental Sustainability, Proceedings of The 1995 Resource Policy Consortium, The World Bank, Washington, D.C., June, 1995

Natural Resource Accounting and Sustainable Watershed Management: with Illustrations for the Upper Mississippi River Basin, (with Curtis C. Bohlen and Pierre R. Crosson). A report prepared for the President's Council on Sustainable Development, Washington, D.C.; February, 1995

Expanding Opportunities for Successful Wetland Mitigation: The Private Credit Market Alternative, (with Leonard Shabman and Paul Scodari). A report of the National Mitigation Banking Study of the U.S. Army Corps

of Engineers, Water Resources Institute, Alexandria, VA, April, 1994

Making Sense of Wetland Restoration Costs, (with Curtis C. Bohlen). A report prepared for U.S. EPA, Office of Policy Analysis, and the U.S. Department of Energy, CEES Contribution # UMCEES-CBL- 94-045, January, 1994

The Cost of Wetland Creation and Restoration, (with Curtis C. Bohlen). A report prepared for the US Department of Energy under Contract DE-AC22-92MT92006, CEES Contribution # UMCEES-CBL- 94- 044, March, 1994

Estimating the Cost of Wetland Restoration, (with Curtis C. Bohlen). In National Wetland Newsletter 16 (3):3-5, May/June, 1994

Wetland Compensation Costs in the Southwest United States, (with Curtis C. Bohlen). A report prepared for EPA Region IX, San Francisco. CEES Contribution # UMCEES–CBL–94–051, 1994

Wetland Compensation Costs in the Southeast United States, (with Curtis C. Bohlen). A report prepared for EPA Region IV, Atlanta. CEES Contribution # UMCEES–CBL–94–049, 1994

Stream Restoration: The Cost of Engineered and Bio-engineered Alternatives, (with Curtis C. Bohlen and Mark L. Kraus). A report prepared for the EPA, Office of Policy Analysis, Washington, D.C., CEES Contribution # UMCEES–CBL–94–046, April, 1994

Compensation Ratios for Wetland Mitigation: Guidelines and Tables for Applying the Methodology in Wetland Mitigation: A Framework for Determining Compensation Ratios, (with Curtis C. Bohlen). A report prepared for the EPA, Office of Policy Analysis, Washington, D.C, CEES Contribution # UMCEES–CBL–94–047, March, 1994

A Method of Estimating Sector Contributions to National and Regional Economic Income. A report prepared for the President's Council on Sustainable Development, Washington, D.C., September, 1994

Location and Wetland Values: Some Pitfalls of Offsite Wetland Mitigation in the Chesapeake Watershed, (with Curtis C. Bohlen). In Toward a Sustainable Coastal Watershed: The Chesapeake Experiment, edited by Steve Nelson and Paula Hill, Chesapeake Research Consortium, Edgewater, Maryland, 1994

A Technical Summary of Wetland Restoration Costs in the Continental United States, (with Curtis C. Bohlen). A report prepared for the EPA, Office of Policy Analysis, CEES Contribution # UMCEES– CBL–94–048, June, 1994

Watershed Management and Wetland Mitigation: A Framework for Determining Compensation Ratios, (with Curtis C. Bohlen and Kenneth J. Adler). A report prepared for the EPA, Office of Policy, Planning and Evaluation; Washington, D.C., July, 1993

The Economics of Wetland Mitigation Markets, (with Leonard Shabman and Paul Scodari). A report prepared for the U.S. Army Corps of Engineers, Water Resources Institute, Fort Belvoir, VA. (Preliminary report released August, 1992)

The Use of Economic Incentives for Environmental Protection in Developing Nations, (with Pierre Crosson and Jason Shogren). Winrock Environmental Alliance, Morrilton, Arkansas and O.E.C.D., Paris, October, 1992

Can We Justify Sustainability: New Challenges Facing Ecological Economics. In Ecological Economics,

Volume II, Proceedings of 2nd Meeting of the International Society for Ecological Economics, Stockholm, August, 1992

The Economics of Ecological Restoration. In Natural Resource Damage Assessment: Law and Economics, edited by John Duffield and Kevin Ward, John Wiley Publishers, New York, April 1992

Wetland Mitigation Banks - Avoiding Another Taxpayer Bailout. In The National Wetland Newsletter, Volume 9 Number 1, Washington, D.C., January 1992

Scientifically Defensible Compensation Ratios for Wetland Mitigation, (with Kenneth A. Adler). EPA Office of Policy Analysis, Washington, D.C., March 1992

Costing Out Restoration. In Restoration and Management Notes, the Journal of the Society for Ecological Restoration, University of Wisconsin, Summer, 1991 (pp 21)

Wetland Creation and Restoration: An Integrated Framework for Estimating Costs, Expected Results, and Compensation Ratios. EPA, Office of Policy Analysis, Washington, D.C., April, 1991 (pp 79)

Sea Level Rise and Wetlands: Economic Modeling of Impacts and Response Strategies. In Climate Change and Ocean Processes: What Are the Consequences, edited by Gary D. Sharp; Texas Institute of Oceanography, February, 1991

A Method to Estimate Compensation Ratios for Wetland Mitigation Projects. EPA, Office of Policy Analysis; Washington, D.C., May, 1990 (pp 7)

Methods to Value the Aesthetic Impacts of Marine Debris on the Beach. EPA, Office of Policy Analysis; Washington, D.C., January, 1989 (pp 13)

The Economics of Global Billfish Fisheries. In Proceedings of the Second International Billfish Symposium, National Coalition for Marine Conservation, Honolulu, 1989, (pp. 33)

Toward a More Abundant Ocean: Improving Fisheries Management in California, (with Robert Knecht and Biliana Cicin-Sain). National Coalition for Marine Conservation, San Diego, April, 1988. (pp. 189)

Economic Impacts and Net Economic Values Associated with Washington State Salmon and Sturgeon Fisheries. State of Washington, Department of Community Development, Olympia, March, 1988 (pp 71)

U.S. Tuna Markets - A Pacific Island Perspective. In Development of Tuna Fisheries in the Pacific Islands Region, (D. Doulman, editor), University of Hawaii, East-West Center, April, 1987 (pp. 22)

Global Tuna Markets - A Pacific Island Perspective. In Tuna Issues in the Pacific Island Region, (D. Doulman Editor), East-West Center, University of Hawaii, Honolulu. April, 1987 (pp. 88)

Recent Problems in the U.S. Tuna Industry and an Outlook. 37th Annual Tuna Conference, Lake Arrowhead, California, August, 1986

Global Tuna Markets and Hawaii Aku. U.S. Dept. of Commerce, Southwest Fisheries Center Administrative Report H-86-12C, Honolulu, August, 1986

The Economic Impact of Recent Changes in the U.S. Tuna Industry, (with Harry A. Bateman). Sea Grant

Working Paper Number P-T-47, Scripps Institution of Oceanography, La Jolla, August, 1985

The Economic Structure of California's Commercial Fisheries, (with Virginia G. Flagg). Sea Grant Publication Number P-T-32, Scripps Institution of Oceanography, La Jolla, March, 1985

An Economic Impact Calculator for California Fisheries. Sea Grant Publication Number P-T-41, Scripps Institution of Oceanography, La Jolla, March, 1985

Evaluating the Payoff From Fishery-Related Research and Development Projects. Sea Grant Working Paper, Scripps Institution of Oceanography, La Jolla, January, 1984

Fishing Effort and the Production by Individual Vessels. Sea Grant Working Paper, Scripps Institution of Oceanography, La Jolla, January, 1984

The Economic Structure of California Seaports, (with James Liedke-Konow). Sea Grant Technical Report P-T-42, California Sea Grant College Program, La Jolla, 1984

Seaport Impacts: A Broader Basis for Analysis. Sea Grant Working Paper P-T-33, Center for Marine Studies, California State University, San Diego, 1983

Alternative Products and Markets for West Coast Mackerel Landings, (with Harry A. Bateman). West Coast Fisheries Development Foundation Technical Report, 1983

A Review of Products and Markets for California Market Squid, (with Harry A. Bateman). West Coast Fisheries Development Foundation Technical Report, 1983

The International Market for Shrimp, (with Robin Rackowe). Food and Agriculture Organization of the United Nations, Fisheries Division, Rome, 1982

A Forecasting Model for U. S. Tuna Markets. Proceedings of the Thirty-Third Annual International Tuna Conference, Lake Arrowhead, California, 1982

An Interindustry Analysis of California Fisheries, (with Kenneth L. Shellhammer). Sea Grant Technical Report Number P-T-5, California Sea Grant, Institute for Marine Resources, La Jolla, 1982

An Economic Impact Calculator for California Fisheries and Seafood Industries, (with Kenneth L. Shellhammer). Sea Grant Technical Report Number P-T-6, California Sea Grant, Institute for Marine Resources, La Jolla, 1982

A Game-Theoretic Bargaining Model of Tuna Fishing in the South Pacific: Island Nations vs. Multinational Corporations, (with Fred Galloway). Proceedings of the Western Economic Association Annual Meeting, San Francisco, 1981

Trading-off Specification and Measurement Error in Bio-economic Fishing Models. Proceedings of the Western Economic Association Annual Meeting, San Francisco, 1981

Evaluating Capital Requirements in Developing Fisheries. Center for Marine Studies Technical Report, San Diego State University, San Diego, California, 1981

International Management of Highly Migratory Species: A Reply. Journal of Marine Policy, Volume 4, Number 3, July, 1980

Projecting U.S. Consumer Demand for Tuna. Center for Marine Studies Technical Report 80-3, San Diego State University, San Diego, California, February, 1980

Global Tuna Fisheries: Status, Trends and International Outlook. National Academy of Sciences, Ocean Policy Paper, August, 1980

The Development of the Papua New Guinea Tuna Fishery. United Nations, FAO Publication WS/N7173, Food and Agriculture Organization Technical Cooperation Program, Rome, Italy, 1980

International Management of Highly Migratory Species: Centralized vs. Decentralized Economic Decision-Making. Journal of Marine Policy, Volume 3, Number 4, October, 1979

An Economic Evaluation of Alternative International Management Schemes for Highly Migratory Species. S.W.F.C. Administrative Report MS293, San Diego, California, 1978

Measuring the Economic Value of the Eastern Tropical Pacific Tuna Fishery. Proceedings of the Western Division Meetings of the American Fisheries Society, July, 1978

The Economic Theory of Natural Resources Applied to Global Tuna Fisheries. Transient Tropical Tuna, Center for Public Economics, San Diego State University, San Diego, California, 1978

The Application of Polynomial Distributed Lag Models to Problems in Fish Population Dynamics. Proceedings of the Twenty-Eighth Annual Tuna Conference, Lake Arrowhead, California, October, 1977

The Economic Impact of 1978-1980 Tuna/Porpoise Regulations. W.F.C. Admin. Report LJ-77-27, San Diego, California, 1977

The Use of Polynomial Distributed Lag Functions and Indices of Surface Water Transport in Fishery Production Models with Applications for the Georges Bank Ground Fishery. Published Ph.D. Dissertation, University of Rhode Island, University Microfilms International, Ann Arbor, Michigan, 1977

Offshore Fisheries and the 200-Mile Limit. Proceedings of the Marine Science and Ocean Affairs Program, University of New Hampshire, Durham, New Hampshire, 1976

The Use of Economic-Environmental Input-Output Analysis for Coastal Planning, (with D. A. Storey). Special Report Number 40, University of Massachusetts, Water Resources Center, Amherst, Massachusetts, 1974

CLIENTS/PROJECTS

(Sorted by Private Sector, Public Sector and Non-profit sector, from most recent to least recent)

Private Sector

Southwest Florida Joint Wetlands Joint Venture, Prepared a report submitted to the Army Corps of Engineers that challenged certain historical and ongoing applications of the "King equation" to assign credits to Florida-based wetland mitigation banks and form the basis for the Army Corps of Engineers allowing them to be sold as legitimate offsets to wetland impacts.

American Commodities, Incorporated, Expert consultant to plaintiff in litigation involving "breach of contract" and "fraud" associated with the overpricing and mislabeling of China-produced frozen shrimp products that were

imported to the U.S.A. as products of Malaysia in order to avoid U.S. anti-dumping duties on Chinese shrimp.

Glosten Engineering, Serving as head economist on a study funded by the Delta Stewardship Council to determine the technical, logistical, and economic feasibility of shore-based ballast water treatment at California seaports.

Hausfeld Law Offices, Expert consultant to plaintiffs (USA Direct buyers) in price fixing lawsuit involving USA sales of canned tuna and other processed seafood products by the three large foreign-based seafood companies.

EA Engineering/NOAA Managed preparation of economic sections of Programmatic Environmental Impact Statement (PEIS) for gulf coast restoration projects related to the 2010 BP Deepwater Horizon oil spill.

EA Engineering, Inc./NOAA Managed economic analysis and drafting of report to form the basis of NMFS Section 4(b)(2) Report on impacts of proposed Endangered Species Act critical habitat designation for the South Atlantic and Carolina distinct population segments of Atlantic Sturgeon.

Integrated Statistics, Inc./NOAA Managed economic analysis and drafting of report to form the basis of NMFS Section 4(b)(2) Report on impacts of proposed Endangered Species Act critical habitat designation for three northern distinct population segments of Atlantic Sturgeon.

Avatar Environmental. EPA-funded project to develop an integrated ecological risk assessment and ecosystem valuation database to allow users to find studies that can be combined using common end points.

Weston Solutions, Inc. Environmental/economic analysis of dredged material placement options, including NER (National Ecosystem Restoration) analysis to prioritize options and establish Federal cost sharing.

Oil Spill Class Action. Lead economic expert for property owners, businesses, and commercial fishermen in lawsuit for natural resource damages resulting from the April, 1999 Pepco Chalk Point Power Station Oil Spill in the Patuxent River, Maryland

Scientific Certification Systems, Oakland, California. Development of guidelines and protocols for answering production and chain of custody questions to support global seafood certification and labeling programs of the newly formed Marine Stewardship Council.

Fuji Bank, Tokyo. Analysis of competitive forces in global fisheries and fish markets, and assessment of long-term investment risks in Asian and Latin American seafood industries.

Bumblebee Seafoods, Thailand. Analysis of competitive conditions in global tuna markets and evaluation of alternative strategies for expansion and diversification of U.S. and Thai operations.

Asian Development Bank, Manila. Prepared report on tuna export opportunities for Pacific Island nations. Included price forecasts by product, type, and fish size and an assessment of most promising joint-venture strategies in the Pacific basin.

H.J. Heinz and Co., (Star-Kist, International), Pittsburgh, Pennsylvania. Analysis of international and domestic markets for raw/frozen and canned tuna and the impact of market changes on: 1) the financial performance of various national fishing fleets and seafood processing industries and 2) long-term investment and production strategies.

Lloyd's of London, Ltd. Retained four years (1980-1984) as lead consultant and expert witness evaluating risks, estimating losses, developing settlement offers, and supporting legal proceedings related to claims of lost earnings from high-seas fisheries and related losses in fish processing sectors.

Castle and Cooke, Inc., San Francisco, California. Analysis of recent changes in global fisheries and markets and their short-term and long-term impacts on various segments of Asian, Latin, and Pacific seafood industries.

Worldcom Corp. Use regional economic "input-output" models to estimate state-level impacts on business sales, household income, jobs, taxes, and value added if Worldcom/MIC was not allowed to restructure and come out of bankruptcy.

Zapata-Haine Corporation, Mexico City. Evaluation of investments in high seas fisheries and global fish canning facilities and assessment of trends in international seafood markets.

Asian Development Bank/United Nations. Analysis of world shrimp demand and forecast of international shrimp markets through 1985. Report supported successful expansion of global shrimp aquaculture industry during the 1980's.

Booz–Allen, Hamilton, Inc., Los Angeles. Optimization of global fish harvesting, processing, and distribution operations by Fortune 100 firm; integrated management of seafood, fishmeal, fish oil production systems.

Exxon Company, USA, California. Forecast impacts of offshore oil development on seven central California commercial fisheries. Provided basis for cash payments to fishermen for temporary fishing area preclusions.

Banpesca (National Fisheries Development Bank of Mexico). Development of a National Tuna Development Plan and financial/economic models to evaluate investment, production and financing decisions and joint venture and marketing proposals related to global tuna fisheries.

Van Camp Seafood, P.T. Mantrust, Indonesia. Analysis of global tuna fleet allocation and tuna procurement strategies using linear programming and other computerized decision models.

Exxon Company, USA, California. Post-project analysis of economic losses to commercial fishing operations from a three-year offshore oil development project in central California. Provided basis for final settlements with seven commercial fishing fleets for temporary fishing area preclusions.

Florida Wetlandsbank, Inc. Evaluation of Florida Mitigation Banking Review Team debit/credit guidelines and related methodologies, and an evaluation of their potential financial impacts on wetland mitigation ventures in Florida.

Fishermen's Cooperative Association of San Pedro. A study of alternative products and international markets for California market squid.

Southern California Investment Bank. Forecasts of risk and economic performance for selected U.S. commercial aquaculture industries.

Bechtel Group, Inc. San Francisco. Economic/financial analysis of fishery-oil conflicts associated with potential offshore/onshore facilities in Central California.

Cities Service Oil and Gas Corp. San Francisco. Economic/financial analysis of fishery-oil conflicts associated with potential offshore/onshore facilities in Central California.

Non-profit Sector

Fishermen Defense Fund (USA), Prepared paper assessing local and national economic impacts of Amendment 28

to the Gulf of Mexico Reef fish management plan which would reallocate less annual quota to commercial fishers and more to recreational fishers.

Harry R. Hughes Center for Agro–ecology, Inc. Prepare and present economic analysis of county Watershed Implementation Plans (WIPs) at 5 regional workshops in Maryland.

Maryland Environmental Services. Environmental economic analysis of dredged material placement options and GIS-based assessments of aesthetic and other localized impacts of placement alternatives.

UMCES/Campbell Foundation. Development of optimization model for prioritizing oyster restoration in the Chesapeake Bay and examining the opportunity costs of high risk oyster restoration investments.

Canaan Valley Institute. Assessment of environmental restoration alternatives in the mid-Atlantic Highlands region and develop criteria for prioritizing sites and identifying opportunities to develop export- oriented regional industries to provide ecosystem restoration materials, equipment, and skills.

Pennsylvania Environmental Council. Consultant to the PEC and local partnership organizations on projects to develop a registry, scoring criteria, and trading protocols for a prototype water quality credit trading system for the Conestoga River watershed to be used, eventually, in the Susquehanna River and Chesapeake Bay watersheds.

Florida Southwest Water Management District. Evaluation of proposed rules for sector-based water use restrictions during moderate, extreme, and severe droughts.

Civil Engineering Research Foundation (CERF) and International Institute for Energy Conservation (IIEC). Review of international experiences with the use of economic incentives for phasing lead out of gasoline, and recommendations for developing the least-cost strategy for effectively phasing lead out of gasoline in South Africa.

National Science Foundation. Develop indicators and decision-support flow charts and prototype software to help focus wetland conservation/restoration initiatives. (through University of Rhode Island).

Canaan Valley Institute. County-level assessment of ecosystem restoration opportunities and related business opportunities and economic impacts.

Center for International Environmental Law. Applications of geographic information system to prioritize and support enforcement of environmental laws.

Resources for the Future. Legally defensible non-monetary indicators of ecosystem services and values based on site/landscape characteristics.

Winrock International, Inc. Development of carbon sequestration supply function for U.S. forest and agricultural lands to support future greenhouse gas trading.

Resources for the Future, Washington, D.C. Assessing boundary and scale issues in the development of community, regional, and national environmental and economic indicators.

Organization for Economic Cooperation and Development, Paris. Evaluate current applications of economic incentives for environmental protection in developed nations and assess potential in less developed nations.

Center for International Environmental Law. Applications of geographic information system to prioritize and support enforcement of environmental laws.

Environmental Law Institute. Economics of controlling agriculture-based nonpoint source pollution, and estimates of compliance costs for various regulatory alternatives.

World Wildlife Fund/Marine Stewardship Council. Guidelines for using non-government initiatives and industry and market-based incentives to encourage sustainable world fisheries.

East-West Center, Pacific Island Development Program, Honolulu. Prepared publication describing international trade in tropical Pacific fishery products, trade opportunities for central/western Pacific Island nations, and the role of multinationals in markets for Pacific seafood.

Pacific Fisheries Development Foundation, Honolulu, Hawaii. A benefit-cost and cost-effectiveness study of eleven fisheries and aquaculture research and development projects including: Micronesia - Port Development in Truk and Ponape; Guam - Transshipping Facilities; Saipan - High-seas Fisheries; Palau - Cold Storage/Transshipping Facilities; Samoa - Near-shore Fisheries; Tinian - Transhipping Facilities.

South Pacific Forum, Solomon Islands. Feasibility studies for tuna fishery support facilities, tuna fleet development and local cold storage and transshipping operations.

World Wildlife Fund, Washington, D.C. Development and testing of criteria for certifying that seafood products were harvested in fisheries that are sustainable and well managed.

Joint Fishing-Oil Industry Committee, Santa Barbara, California. Study of fishing industry-oil industry interactions in central California area and economic impact of OCS development on financial performance of commercial fishing operations in Santa Barbara Channel and Santa Maria Basin.

South Pacific Forum, Solomon Islands. Development of computerized databases to monitor foreign fishing in 200 mile fishing zones of seventeen member nations, and bio-economic vessel budget simulators to estimate appropriate access fees for various types of fishing vessels.

West Coast Fisheries Development Foundation, Portland, Oregon. Economic potential of alternative product forms and markets for U.S.-caught Pacific and jack mackerel.

National Coalition for Marine Conservation, Pacific Region. Conduct study of alternative ocean management policies for the state of California with consideration of recreational and non-consumptive uses of the marine environment as well as commercial ocean uses.

National Academy of Sciences, National Research Council, Washington, D.C. Analysis of global tuna fisheries, international tuna markets and the role of multinational corporations in high-seas fishery development.

Pacific Marine Fisheries Commission, Portland, Oregon. Prepared report describing the economic impacts of changing global patterns of tuna harvesting and processing and documented methodology for use in studies of changes in other fisheries.

Scripps Institution of Oceanography, Office of Sea Grant, La Jolla, California. Development of regional input-output models and economic multipliers for 19 coastal communities in California using the U.S. Dept. of Agriculture "IMPLAN" economic modeling system.

Scripps Institution of Oceanography, Office of Sea Grant. 1980/1981 Development of California Interindustry Fisheries (CIF) model. Bio-economic extension of 1980/1981 California Interindustry Fisheries (CIF) model. Financial/economic analysis of California seaports and harbors.

Environmental Law Institute, Washington, D.C. Prepare information for the revision of the 1987 "Cost of Environmental Protection Report" under contract to the EPA, Office of Policy Analysis.

President's Council on Sustainable Development. Application of natural resource accounting to evaluate alternatives for sustainable watershed management in the Upper Mississippi River Basin.

Environmental Business Council of the U. S., Boston, MA. Prepared a report for environmental industry trade organizations evaluating the legal, institutional, and technical barriers to increasing U.S. environmental technology exports.

Environmental Business Council of the U.S., Boston, MA. Analysis of technical, institutional, and market barriers to the export of U.S.-based environmental technologies.

Environmental Defense Fund, Washington, D.C. Profile conceptual and practical problems with applying Benefit-Cost Analysis to the environment.

Greenpeace, International, Amsterdam. Analysis of global high seas fishing industries and related markets and their relationships to the incidental kill of marine mammals. Strategy development for promoting "dolphin-safe" canned tuna label in U.S. markets and similar labeling initiatives in Europe and Asia.

Public Sector

Maryland Port Administration. Integrated economic and environmental analysis of environmentally beneficial dredge material placement options, including applications to protect and restore wetlands and create island habitats in the Chesapeake Bay.

Maryland Port Administration. Economic analysis of current U.S. and pending International Maritime Organization (IMO) ballast water regulations and emerging global markets for ballast water treatment technologies and other methods to manage harmful marine invasive species.

U.S. Department of Agriculture, (USDA) Lead Economist on 5 year/$5 million study of innovative applications of wireless moisture sensor networks to guide irrigation and nutrient management decisions in the production of specialty crops and in other intensive agricultural practices.

Maryland Department of the Environment. Development of a full cost accounting framework for urban stormwater best management practices including spreadsheets to determine planning level unit cost estimates for implementing stormwater BMPs in MD counties.

Maryland Port Administration. Integrated economic and environmental analysis of environmentally beneficial dredge material placement options, including applications to protect and restore wetlands and create island habitats in the Chesapeake Bay.

U.S. Dept. of Transportation, Maritime Administration. Assess economic feasibility of converting MARAD ships and ships involved in maritime trade to use alternative fuels and establishing supply chains for providing alternative fuels to selected U.S. seaports.

Maryland Port Administration. Economics of ballast water treatment technologies for marine invasive species.

Mid-Atlantic Regional Coastal Ocean Observing System (MARCOOS). Assessing the value of physical ocean observations to users along several pathways involving fishing, fishery management, search and rescue, shipping, offshore energy, weather predictions, etc.

U.S. Department of Commerce, NOAA. Managing economic component of the Chesapeake Inundation Prediction System (CIPS), a new NOAA storm-generated flooding prediction system for the Chesapeake Bay.

Maryland Environmental Services. Environmental economic analysis of dredged material placement options and GIS-based assessments of aesthetic and other localized impacts of placement alternatives.

NOAA, Office of Habitat Protection. Development of formulae and related guidebook and software for developing science-based and legally-defensible wetland mitigation (compensation) ratios; prepare workshops for NOAA field staff on east coast (Silver Spring, MD) and west coast (Seattle, WA).

NOAA, Office of Habitat Protection. Integrated environmental/economic analysis of derelict fishing gear (ghost traps) in the Chesapeake Bay and cost/risk/benefit analysis of alternative gear identification and retrieval systems.

USDA, Economic Research Service. Develop cost/risk profiles associated with invasive weeds using Cheatgrass in the Columbia River Basin as a case study. Use cost, risk, benefit data to test potential of innovative "risk-optimizer" software to prioritize responses on agricultural and natural lands.

EPA, Regional ecosystem Vulnerability Assessment (ReVA). Use of regional environmental risk/vulnerability indices and other landscape and land use data to guide cross-media and out-of-kind environmental trades, with illustrations for North Carolina and South Carolina.

EPA, Regional ecosystem Vulnerability Assessment (ReVA). Use of landscape indicators and other measures of geographic and socio-economic heterogeneity to develop rules to guide cross-media/inter-state environmental trading involving air and water credits in 15 counties in NC and SC in the vicinity of Charlotte, NC.

NOAA, Office of Habitat Protection. Guidelines for using economic analysis to prioritize and manage habitat protection and restoration strategies.

NOAA, Office of the Administrator. Prepare report on supply and demand conditions and other economic aspects of proposed water quality credit trading programs with special focus on the Chesapeake Bay region.

U.S. Department of Agriculture, APHIS. Development of Cost/Risk and Cost/Benefit Protocols to prioritize and manage spending to control harmful invasive plants on uncultivated land (natural habitats).

U.S. EPA, Office of Atmospheric Programs, (through Stratus Consulting, Inc.). Develop a standard method to "score" carbon sequestration credits and illustrate it using a sample of early U.S.-based carbon sequestration trades.

U.S. Environmental Protection Agency, Office of Air. Economic assessment of voluntary carbon sequestration trading in the United States – comparing cost, performance, and credits under alternative "scoring" systems.

U.S. Army Corps of Engineers, Waterways Experiment Station. The development of wetland indicators to guide national/regional wetland mitigation programs and to debit /credit wetland mitigation banking trades.

Environmental Protection Agency, Office of Policy Analysis. Economic Potential of Carbon sequestration in national and international carbon trading markets: practical methods of verifying and debiting and crediting trades that involve changes in land use and farm and forest management practices.

U.S. Department of Agriculture, Economic Research Service. Develop and test a general analytical framework for assessing the economic effects of agricultural nutrient policies on fisheries and related coastal industries.

U.S. Department of Agriculture, Forest Service and Economic Research Service. An integrated cost-risk- benefit framework for prioritizing and developing response protocols related to noxious weed threats.

U.S. Department of Agriculture/NRCS. Development of an ecosystem benefit website for field office staff; including methods and examples of related to absolute (dollar-abased) and relative (non-dollar) ecosystem value estimates to guide environmental investments and to assess and compare mitigation trades.

U.S. Department of Justice, Washington, D.C. Development of ecosystem valuation methods to facilitate the settlement of natural resource damage claims; expert witness on specific cases involving coastal oil spills.

U.S. Department of Commerce, NOAA. Methods of comparing ecosystem functions, services and values and performing habitat equivalency analysis under Jan. 5, 1996 NRDA - Final Rule (15 CFR Part 990).

U.S. Army Corps of Engineers, Water Research Institute. Wetland location and watershed values: economic and environmental equity issues associated with off-site wetland mitigation banking.

U.S. Environmental Protection Agency, Office of Policy Analysis. Framework for assessing the benefits and costs of vegetative riparian buffers: with case studies for three Chesapeake Bay area sub-watersheds.

U.S. Environmental Protection Agency, Office of Policy Analysis. Relocating wetlands–the hidden costs of wetland mitigation: including case studies for the Chesapeake Bay and San Francisco Bay watersheds.

U.S. Department of Agriculture, Economic Research Service. A framework for evaluating the costs and benefits of managing noxious weeds, prioritizing problem areas, and selecting among weed management alternatives.

Government of Thailand. Economic assessment of proposed changes in U.S. tariffs and quotas related to imported processed seafood products.

Government of Papua New Guinea. Evaluation of export markets and joint venture pricing policies for shrimp, lobster and tuna.

Federated States of Micronesia. Financial feasibility and economic impact of proposed port and fishery development projects.

U.S. Dept. of Commerce, NMFS, Honolulu. Development of Linear Economic Models to analyze the potential economic impacts of statewide Limited Entry programs applied in a multifishery context (groundfish, lobster, shrimp, tuna).

U.S. Dept. of Interior, Office of Territorial Affairs, Washington, D.C. Evaluation of joint venture and marketing arrangements involving U. S. Trust Territories and multinational corporations.

U.S. Farm Credit Bank, Pacific Region, Sacramento, California. Phase I: Financial/economic analysis of fish processing and fishery-related joint venture opportunities in Asia, Europe and Latin America. Initial negotiation with potential joint venture partners for production. Phase II: Evaluation of raw/frozen and canned tuna markets in U.S., Japan and Europe; evaluation of trading opportunities and initial discussions with marketing joint venture partners.

U.S. Dept. of Commerce, NMFS, Honolulu. Prepared report describing economics of Hawaii skipjack tuna industry and identified fishery development strategies and global market opportunities.

Federal Trade Commission, Bureau of Economics, Washington, D.C. Analysis of market and non-market barriers to entering the U.S. food processing industry.

U.S. Dept. of Commerce, NMFS, Seattle. Detailed financial analysis of U.S. high seas fishing operations including bio-economic analysis based on different resource/fishing conditions and delivery/market systems at locations around the world.

U.S. Dept. of Commerce, NMFS, La Jolla, California. Survey and analysis of financial performance for west coast salmon/albacore trollers.

Federated States of Micronesia. Evaluation of U.S. and Japanese investment proposals for new port facilities and investments in national fishing industries.

United Nations, Food and Agriculture Organization, Rome, Italy. Preparation of global fisheries chapter for "U.N. Report on State of Food and Agriculture, 1980-1985."

United Nations, Food and Agriculture Organization, Rome, Italy. Evaluation of port development and seafood industry development alternatives in the southwest Pacific.

United Nations, Food and Agriculture Organization, Rome, Italy. Evaluation of proposed food processing and marketing investments in Solomon Islands and Papua New Guinea.

United Nations, Technical Assistance Program, Rome, Italy. Assessment of financial feasibility and economic impacts of alternative industrial complexes proposed for western Pacific island nations by U.S. and Japan-based multinational corporations.

U.S. Army Corps of Engineers, Water Resources Institute. Development of decision tree framework for identifying and comparing environmental restoration alternatives.

U.S. Dept. of Commerce, NOAA, NMFS. Analysis of economic data for west coast fishing industries.

U.S. Dept. of Commerce, NOAA, NMFS. A cost and earnings study of selected fish harvesting and processing industries.

Government of Solomon Islands. Evaluation of infrastructure requirements and logistical systems to support development of high seas and coastal fishing operations and seafood processing industries.

Government of Kiribati, (Gilbert Islands). Evaluation of joint-venture, fleet acquisition and fish marketing opportunities for newly formed national fisheries corporation.

State of Washington. Economic Impacts of Alternative Fishery Management Policies Related to Salmon and Sturgeon Fisheries. Conducted analysis, prepared report, and testified at Congressional and Senate hearings.

U.S. Dept. of Commerce, NMFS, Terminal Island, California. Survey and analysis of west coast shrimp and groundfish trawlers and development of economic database for vessel budget simulators.

U.S. Interstate Commerce Commission, Washington, D.C. Study of economic impacts of proposed abandonment of Eel River Line by Northwest Pacific Railroad and assessment of transportation alternatives for Humboldt County industries.

U.S. Department of Transportation, FHWA, Environment Division, Washington, D.C. Evaluate the cost and

performance of wetland mitigation and mitigation banking alternatives related to highway projects.

U.S. Department of Energy; Pittsburgh Energy Technology Center. Evaluate the costs and cost-effectiveness of wetland creation, restoration, and enhancement projects associated with mitigation for wetland impacts related to offshore oil development.

U. S. Environmental Protection Agency, Office of Policy Analysis, Washington, D.C. Integrated ecological-economic analysis of stream restoration. Evaluation of site selection criteria and the cost-effectiveness of engineered and bio-engineered alternatives.

Agency for International Development. Evaluate potential of environmental economic tools for applications involving development-environment problems in sub-Saharan Africa.

U.S. Army Corps of Engineers, Water Resources Institute. Economics of Wetland Mitigation Banks. Evaluation of economic factors affecting supply and demand for wetland mitigation credits using four case studies.

U. S. Environmental Protection Agency, Region IX (San Francisco). Regional economic profile of wetland creation and restoration activities.

U. S. Environmental Protection Agency, Region IV (Atlanta). Economics of wetland restoration and development of methodologies for estimating appropriate mitigation "compensation ratios" for wetland regulations.

U.S. Bureau of Mines. Development and testing of a training program on the economics of ecological restoration.

U.S. Department of Interior, Minerals Management Service. Estimation and valuation of potential wetland impacts from 5-year OCS oil and gas leasing program (1992-1996) in 26 OCS lease areas.

U.S. Environmental Protection Agency, Office of Policy Analysis. Development of an environmental benefits database and an analytical framework for estimating environmental protection costs.

U.S. Department of Justice, Environment Division, Washington, D.C. Develop procedures for tracing and measuring ecological-economic linkages and estimating ecosystem values to support natural resource damage claims; provide support for related litigation.

U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. Prepared economic analysis for benefits chapter of Regulatory Impact Analysis (RIM) of proposed revision to regulations governing EPA's Spill Prevention Control and Countermeasures program for oil. Project included development of market and non-market benefits associated with fishing, hunting, boating, beach-use, and tourism.

U.S. Environmental Protection Agency, Office of Radiation Programs, Radon Division. Economic analysis of user fees for training and testing of radon professionals. Project required cost and market analysis for regional programs to certify contractor proficiency in the design and use of radon testing equipment.

U.S. Environmental Protection Agency, Office of Policy Planning and Evaluation. Assessment of how offshore oil development affects coastal tourism. Project involved a comprehensive review of literature and comments received at public hearings and the development of a work plan for quantifying adverse impacts on visitations and use of coastal recreation facilities.

U.S. Environmental Protection Agency, Office of Solid Waste. Development of methods to evaluate impacts of

potentially catastrophic releases of hazardous waste on wetland functions and values in order to develop location standards.

U.S. Environmental Protection Agency, Office of Policy Analysis. Development of cost/performance guidelines for evaluating wetland creation and restoration projects.

U.S. Environmental Protection Agency, Office of Policy Analysis. Assessment of methods to value economic losses associated with the aesthetic impacts of plastic debris wash-ups on U.S. beaches.

U.S. Environmental Protection Agency, Office of Air and Radiation. Economic analysis federal indoor radon measurement training and proficiency testing program.

U.S. Environmental Protection Agency, Office of Policy Analysis. Assessment of the economic impacts of medical waste tracking systems in ten Eastern States.

U.S. Environmental Protection Agency, Office of Solid Waste. Development of rapid-response economic impact and screening tools to assess the significance and incidence of industry-specific regulatory compliance costs.

State of California, Commercial Salmon Limited Entry Review Board, Sacramento. Analysis of interim salmon management regulations and evaluation of alternatives for permanent California salmon management legislation.

Appendix 22. Vineyard Wind 1/16/19 “Vineyard Wind Fisheries Mitigation Proposal to the FAB”

OCS-A 0501 MASS USA

VINEYARD WIND

January 16, 2019

Via Email

To: Lanny Dellinger, Chairman, Fisheries Advisory Board
Grover Fugate, Executive Director, CRMC

RE: Vineyard Wind Fisheries Mitigation Proposal to the FAB

Dear Lanny, Dear Grover:

As discussed in yesterday's FAB meeting, Vineyard Wind is pleased to forward our proposal of a full package of mitigation to avoid and minimize potential fisheries impacts. This package includes a commitment to reduce the total turbine area by over 20% from our original proposed project design. We are also proposing an escrow fund for financial compensation for direct fisheries impact claims. In addition, Vineyard Wind is proposing a substantial contribution to an "Ocean SAMP Fisheries and Wind Fund". Vineyard Wind is proposing that this fund be used to further the goals of the Ocean SAMP by providing funds necessary to assess and provide for measures and technologies that promote safe and effective fishing around and through offshore wind structures and developments.

Vineyard Wind considers this proposed package a significant and comprehensive package that addresses concerns raised by the FAB, while recognizing economic exposures based on best available data of fisheries patterns and impacts.

Further details of our mitigation proposal follow below. We look forward to hearing from you regarding scheduling a meeting time to discuss the proposal with the FAB and CRMC staff.

Sincerely,

Lars Pedersen
Chief Executive Officer

700 Pleasant Street, Suite 510, New Bedford, MA 02740
TEL 508.717.8964 EMAIL info@vineyardwind.com
VINEYARDWIND.COM

Vineyard Wind Fisheries Mitigation Proposal to the FAB

Related to Vineyard Wind's 800MW project located in the northern-most portion of BOEM Wind Lease Area A-501

January 16, 2019

Mitigation Program Overview

Vineyard Wind is committed to providing a financial mitigation package that totals $30 million over the 30 year life of the project (2 years of construction, 25 years of operation, 1-2 years of decommissioning with 1-2 year(s) extra added as buffer)

As described below, the package is structured in two funds: (1) an escrow fund for financial compensation for direct fisheries impact claims and (2) an Ocean SAMP Fisheries and Wind Fund designed to further the goals of the Ocean SAMP by providing funds necessary to assess and provide for measures and technologies that promote safe and effective fishing around and through offshore wind structures and developments.

In addition, Vineyard Wind is committed to non-compensatory mitigation, which includes the commitment to reduce the project size by over 20% and to align turbines for its future projects within the CRMC CZM Geographic Location Description ("GLD") in an east-west alignment.

I. Direct Compensation Fund

Basis for the Direct Compensation Fund

As previously reported to the FAB, Vineyard Wind has had detailed discussions with the Rhode Island Department of Environmental Management (hereinafter referred to as "RI DEM") to seek a common understanding of how to appropriately assess any potential impact of the proposed project to existing fisheries in Rhode Island, based on best available data.

As reported yesterday, we have not been able to reach a common understanding with RIDEM on how to best evaluate such impacts. Yesterday we provided the FAB and CRMC with a discussion draft report prepared by a fisheries economist, Dr. Dennis King (the "King Report"). In our view, this report, which incorporates findings of RIDEM's previous studies, among others, and also data on lobster and Jonah crab, provides a solid basis for identifying potential fisheries impacts. Based on the King Report, Vineyard Wind is committed to providing $ 6.2 million to compensate for direct impacts from the project.

The report published by RIDEM on January 14, in which RIDEM assessed the economic exposure of the proposed project, relies on a number of assumptions that, in Vineyard Wind's opinion, are not substantiated. Vineyard Wind disagrees with the following main assumptions:

1. RI DEM assumes that all fishing will cease for the duration of the project within the project area. Based on our experience and conversations with New England fishermen, we strongly believe that fishing will continue in the project area to some degree.
2. The RIDEM report does not account for the fact that Vineyard Wind has reduced its project area by over 20%.
3. RIDEM's analysis includes buffer zones around the project area, on the assumption that fishing vessels cannot approach within 1 or even 2 nautical miles of the turbines. But given the fishermen's stated need for 1 nm between rows, it is clear that fishermen intend to fish within at least a half mile of the turbines, if not closer.
4. RIDEM's methodology assumes that all catch value of any historic trip (each trip consisting of multiple tows) is considered to never happen again in the next 30 years if any portion of a tow, however small, intersected the project area and the applied buffer zones. In previous RIDEM studies, it was acknowledged by RIDEM that this method overstates potential fisheries impacts.
5. The addition of buffer zones and the methodology described above has the combined effect of including the richest fishing grounds north of the proposed project area in the potential impact assessment, and therefore significantly overstates potential impacts of the project.

All of these studies are identifying ex-vessel values, which is widely considered a reasonable estimation of potential impacts, or economic exposure. Economic exposure does not equal loss of profit, since any future adaption of the fisheries to continue fishing, including fishing in areas outside of the project area, would compensate for potential losses. Moreover, economic exposure does not equal loss of profit since landing values have to be offset against cost of operation, salaries, and other expenses.

The recent RIDEM report also references so-called shoreside multipliers to be added to potential impacts. However, since the estimated impacts of Vineyard Wind's project, even in the RIDEM report, is a very small portion of the total RI fish landings, Vineyard Wind would not consider such impacts to be significant for this project, especially since economic exposure is already overstating likely actual impacts, for the reasons described above. We recognize that the FAB and Vineyard Wind most likely disagree on the right methodology and therefore propose to use ex-vessel values as a pragmatic and fair solution to bridge the differing views of how to translate economic exposure to financial compensation.

Structure of the Direct Compensation Fund

The following processes would be used to disburse the financial compensation:

a) Funding to be held in trust to compensate for any claims of direct impacts to fisheries in the project area. This mitigation is in consideration that the turbine row alignment of the project, not being in an east-west direction, is expected by the FAB to impact the level of fishing activity in the project area. Therefore, for future projects which have an east-west layout turbine row lay-out, our understanding is that no compensatory mitigation will be expected by the FAB during the operational phase of a project.

b) Vineyard Wind to make annual funding payments to a trust or escrow fund.

   i) First payment made prior to the calendar year in which offshore construction is planned to begin.

   ii) Annual payments for 30 years total, with a 2.5% annual inflator.

   iii) Initial, annual funding payment amount of $140,464, based on fisheries exposure identified in the King Report (total funding of $6.2 million, final year payment of $287,189)

c) The trust or fund will be administered by a third-party to be selected in consultation with CRMC and FAB.

   i) Fishermen and fishing companies can submit claims of direct impacts or losses during any phase of the project (construction, operation, decommissioning) to the trust administrator.

   ii) A claims review and decision process to be established.

   iii) Paid claims accompanied by a release of liability.

   iv) Funds remaining after making claims payments for any given year will be set aside for any future claims or for fisheries related purposes, following provisions determined at the time the fund is established and in consultation with the CRMC and FAB.

II. Ocean SAMP Fisheries and Wind Fund

The Rhode Island Ocean SAMP is the nation's first regulatory structure whose principal purposes include providing a framework for addressing the compatibility of the offshore wind and fishing industries through its goal of supporting offshore wind development while promoting and enhancing existing uses. The Ocean SAMP also recognizes that Rhode

Island's fisheries industry is especially important to Rhode Island, as well as the need for offshore wind to address climate change.

In order for Vineyard Wind, the nation's first large-scale offshore wind project, to better align with and support the purpose and objectives of the Ocean SAMP, Vineyard Wind will provide funding to an Ocean SAMP Fisheries and Wind Fund for this project totaling $23 million.

This funding will be used to further the goals of the Ocean SAMP by providing funds necessary to assess and provide for measures and technologies that promote safe and effective fishing around and through offshore wind structures and developments. The measures and activities supported by this fund will be designed to benefit those who fish in the Ocean SAMP's geographic location description (GLD). Examples of such measures might include improvements in fishing vessels and gear, supporting widespread deployment of navigational equipment, or development of new gear types or fishing methods.

The activities supported by the Ocean SAMP Fisheries and Wind Fund are intended to enable safe, effective, and profitable fishing to continue throughout the Ocean SAMP's GLD while the offshore wind industry in the region continues to grow. As such, Vineyard Wind's contributions to the Ocean SAMP Fisheries and Wind Fund are being made because of Vineyard Wind's desire to contribute to and support Rhode Island's leadership role in ocean planning and management, and developing approaches for fisheries and offshore wind to continue profitably alongside each other.

Vineyard Wind's contributions to this fund are not intended as fisheries mitigation, and as such Vineyard Wind's contribution to this Ocean SAMP Fisheries and Wind Fund should not be considered a precedent or model for direct fisheries impacts mitigation programs, which should be based on best available fisheries data and reasonable estimates of possible or potential fisheries impacts based on this data (as described in Section I for determining level of funding for the Direct Compensation Fund).

Structure of the Ocean SAMP Fisheries and Wind Fund

a) Vineyard Wind will make annual payments to an Ocean SAMP trust, foundation, or similar entity, as directed by CRMC, with an initial amount of $544,536 per year for 30 years, with a 2.5% annual escalator (total funding of $23 million, final year payment of $ 1,114,342.)

b) The programs and activities supported by the Ocean SAMP Fisheries and Wind Fund to be decided by a board or panel, the structure and composition of which to be determined by CRMC in consultation with the FAB.

III. Avoidance and minimization of impacts (non-compensatory mitigation)

a) Vineyard Wind to minimize the "non E-W"-area by selecting world's largest commercially available turbine, reducing project area for the 800MW Vineyard Wind 1 project by over 20%.

b) Vineyard Wind commits to an E-W turbine row alignment in all future developments within the CRMC CZM Geographic Location Description (GLD), thereby negating the need for any compensatory mitigation for these future developments.

c) Gear loss/damage compensation program throughout all phases of the project, and for any future projects in the GLD.

d) Vineyard Wind commits to a target cable burial depth sufficient to allow fishing to continue over cables, and to implement a long-term monitoring plan to ensure continued burial.

e) Vineyard Wind commits to an on-going fisheries communications program, including offshore communications and communications during construction, designed in consultation with the FAB and other fishermen.

f) Other measures as described in the project's Construction and Operations Plan.

Summary

Vineyard Wind believes this mitigation package provides a substantial financial contribution to the impacted fishermen. It also provides a unique opportunity for Rhode Island's CRMC to ensure the long-term success of commercial fishing and offshore wind development in the SAMP GLD, through the Ocean SAMP Fisheries and Wind Fund. This is a once only proposal by Vineyard Wind in recognition of the important role the Ocean SAMP has played in supporting offshore wind development while promoting and enhancing existing uses.

If the mitigation package is agreeable to the Fisheries Advisory Board, the package is contingent on the following:

1. The Fisheries Advisory Board voting to recommend to CRMC, prior to the CRMC meeting on January 29, that Vineyard Wind should be granted a federal consistency determination;
2. Vineyard Wind being granted a federal consistency determination by CRMC by January 31, 2019; and
3. Vineyard Wind achieving financial close (expected in late 2019) and thereby progressing towards actual construction.

Appendix 23. Stay Agreement between Massachusetts CZM and Vineyard Wind; executed 10/4/18

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
251 Causeway Street, Suite 800, Boston, MA 02114-2136
(617) 626-1200 FAX: (617) 626-1240

August 27, 2018

Vineyard Wind Project
C/o Erich Stephens
Chief Development Officer
Vineyard Wind LLC
700 Pleasant Street, Suite 510
New Bedford, MA 02740

Re: CZM Federal Consistency Review of the Vineyard Wind Project – Bureau of Ocean Energy Management Action.

Dear Mr. Stephens:

The Massachusetts Office of Coastal Zone Management (CZM) is currently reviewing the proposed project to construct an ~800 megawatt (MW) wind energy project within BOEM Lease Area OCS-A 0501, consisting of offshore Wind Turbine Generators (WTGs) (each placed on a foundation support structure), Electrical Service Platforms (ESPs), an onshore substation, offshore and onshore cabling, and onshore operations & maintenance facilities to ensure consistency with CZM enforceable program policies. The ~800 MW project will be located in the northern portion of the over 675 square kilometers (km2) (166,886 acre) Lease Area (referred to as the Wind Development Area or WDA). CZM received your completed federal consistency certification package on April 6, 2018 and a consistency determination would ordinarily be issued no later than October 6, 2018.

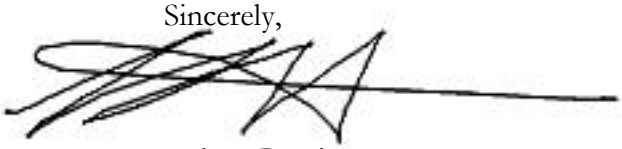
CZM's federal consistency review is ongoing. As a networked program, the authorities and expertise of other state agencies are integrated and coordinated in CZM's review of projects to ensure compliance with the policies of our approved coastal program. Because consistency with CZM's enforceable policies cannot be achieved without compliance with their underlying state authorities, CZM will generally not issue a consistency decision until our networked agencies have completed their reviews of license, permit, and certificate applications identified as necessary data and information. Our records indicate the review by the Massachusetts Environmental Policy Act (MEPA) office has not been completed. Our records also indicate that the applications for the Massachusetts Department of Environmental Protection's (MassDEP) 401 Water Quality Certificate and Chapter 91 License for the proposed project have not yet been filed, and that MassDEP's review has not commenced. Our records also indicate that petitions to construct, operate, and maintain transmission facilities have been filed with the Energy Facilities Siting Board (EFSB) and that EFSB review has not been completed.

As discussed, the Coastal Zone Management Act Federal Consistency Regulations at 15 CFR 930.60(b) allow for a stay in the six month review period, if mutually agreed upon by both the applicant and the state agency. The rules also hold that the stay shall only be for a defined period, and the agreement must state the specific date on which the stay will end. CZM and the proponent previously agreed to a stay of the review period, ending December 6, 2018. In order for CZM to coordinate with the MEPA office, MassDEP, and EFSB to ensure that the proposed activity is consistent with the CZM's enforceable policies, we propose an additional stay of the review, for six months, beginning on October 2, 2018, with CZM's review re-starting on April 2, 2019, and completed by June 6, 2019. If the coordinated review is completed earlier than April 2, 2019, CZM may contact you to amend the end date of the stay to allow for an earlier determination. In the event that the review has not been completed within the review schedule noted above, CZM may contact you to propose an additional stay with dates to be determined. Please indicate your agreement to this schedule by signing below and returning this letter to my attention.

Pursuant to applicable provisions of NOAA's Federal Consistency Regulations at 15 CFR 930.63, CZM may object to the consistency certification if any application for a specified state permit is denied, or if the applicant has failed to provide copies of final decisions on all applications identified as necessary data and information. CZM may stipulate conditions as may be necessary to achieve consistency with enforceable policies pursuant to provisions of NOAA's Federal Consistency Regulations (15 CFR 930.4, and 930.62). In the event an applicable plan, project proposal, or application is not modified accordingly, such conditional concurrence shall be treated as an objection to a federal consistency certification.

If you have questions about the federal consistency review process, please contact me at the above address or (617) 626-1050.

Sincerely,



Robert Boeri
Project Review Coordinator

RLB/pb
CZM #15779

Agreed to by Applicant DocuSigned by: CD11D0E41BEA423... 10/4/2018 7:43:35 PM EDT

Erich Stephens
Chief Development Officer
Vineyard Wind LLC

CZM# 17853

cc: Barbara Newman, Chief
Regulatory Branch, NED, US Army Corps of Engineers
Lealdon Langley, Director
Wetlands and Wastewater Program, MA DEP
Ben Lynch, Program Chief,
Waterways Regulation, Massachusetts DEP
Derek Standish, Environmental Engineer,
Wetlands Program, Massachusetts DEP
Jim Mahala, Section Chief
Southeast Regional Office, MassDEP
Eileen Feeney, John Logan, and Kathryn Ford
MA DMF
Steve McKenna,
CZM Cape Cod Regional Coordinator

Appendix 24. CRMC Enforceable Policy Response to Addendum Table 3-1

Vineyard Wind
Addendum to Table 3-1
Coastal Zone Management Act Consistency
Certification Rhode Island Enforceable Policies

Enforceable Policy		Response
Overall Regulatory Standards		
1160.1.1	All Offshore Developments regardless of size, including energy projects, which are proposed for or located within state waters of the Ocean SAMP area, are subject to the policies and standards outlined in Sections 1150 and 1160 (except, as noted above, Section 1150 policies shall not be used for CRMC concurrence or objection for CZMA Federal Consistency reviews).	This Project is subject to CZMA Federal Consistency review and therefore the Section 1160 policies are reviewed. **CRMC Response: Vineyard Wind voluntarily filed a consistency certification with the CRMC on April 6, 2018, and thus is subject to CRMC's enforceable policies pursuant to 15 CFR § 930.54(f).**
1160.1.2	In assessing the natural resources and existing human uses present in state waters of the Ocean SAMP area, the Council finds that the most suitable area for offshore renewable energy development in the state waters of the Ocean SAMP area is the Renewable Energy Zone depicted in Figure 11.1 below. The Council designates this area as Type 4E waters. In the Rhode Island Coastal Resources Management Program these waters were previously designated as Type 4 (or multipurpose) but are hereby modified to show that this is the preferred site for large scale renewable energy projects in state waters. The Council may approve offshore renewable energy development elsewhere in the Ocean SAMP area, within state waters, where it is determined to have no significant adverse impact on the natural resources or human uses of the Ocean SAMP area. Large-scale Offshore Developments shall avoid areas designated as Areas of Particular Concern consistent with Section 1160.2. No large-scale offshore renewable energy development shall be allowed in Areas Designated for Preservation consistent with Section 1160.3.	The Project is not located in state waters of the Ocean SAMP area; therefore, this policy does not apply. The Project is located in federal waters within BOEM's designated Wind Energy Area. **CRMC Response: The Project is not located in Rhode Island state waters or the 2011 Geographic Location Description (Ocean SAMP boundary). The CRMC has not officially identified any APCs within the Vineyard Wind WDA at the time of the COP filing with BOEM.**

Enforceable Policy		Response
Overall Regulatory Standards		
1160.1.3	Offshore Developments shall not have a significant adverse impact on the natural resources or existing human uses of the Rhode Island coastal zone, as described in the Ocean SAMP. Where the Council determines that impacts on the natural resources or human uses of the Rhode Island coastal zone through the pre-construction, construction, operation, or decommissioning phases of a project constitute significant adverse effects not previously evaluated, the Council shall, through its permitting and enforcement authorities in state waters and through any subsequent CZMA federal consistency reviews, require that the applicant modify the proposal to avoid and/or mitigate the impacts or the Council shall deny the proposal.	Volume I of Vineyard Wind's Construction and Operations Plan (COP) provides detailed technical information on the construction and operations phases on the project. Volume III identifies the impact producing factors during construction, operations, and decommissioning activities and analyzes potential impacts to multiple resources. CRMC has previously informed Vineyard Wind that its principal concerns are with respect to fisheries and commercial and recreational fishing. The sections of the COP most relevant to these issues are located in Volume III and include Section 6.5 (Benthic Resources), Section 6.6 (Finfish and Invertebrates), Section 6.7 (Marine Mammals), Section 6.8 (Sea Turtles), Appendix III- F (Essential Fish Habitat), and Section 7.6 (Commercial and Recreational Fishing). **CRMC Response: CRMC has indicated to Vineyard Wind that the principle coastal effect is to RI-based commercial fishing interests (a coastal use). Vineyard Wind relies upon a BOEM fisheries study (Kirkpatrick et al. 2017) and DEM fisheries statistics from the WEA (Livermore 2017) and has underestimated the value of the commercial fishing harvest within the WDA due to inherent flaws in data analysis and methodology in both studies. In addition, the Vineyard Wind Project turbine layout within the WDA is detrimental to the current RI-based commercial mobile and fixed gear operations, as discussed with Vineyard Wind at the April 11 and July 26, 2018 FAB meetings. Accordingly, the enforceable policy requires modification of the layout to mitigate project impacts. The CRMC has provided an alternative project layout of east-west alignment of turbine rows with 1nm spacing to minimize adverse impacts. The applicant must provide mitigation if it does not modify the Project to avoid significant adverse impacts. Vineyard Wind has provided mitigation (February 15 and 21, 2019) as accepted by the FAB and CRMC to meet this enforceable policy.**

1160.1.4	Any assent holder of an approved Offshore Development shall: i. Design the project and conduct all activities in a manner that ensures safety and shall not cause undue harm or damage to natural resources, including their physical, chemical, and biological components to the extent practicable; and take measures to prevent unauthorized discharge of pollutants including marine trash and debris into the offshore environment.	Vineyard Wind has developed a draft Safety Management Systems Plan ("SMS") included as Appendix I-B of the COP, which includes an Environmental Management Plan. The final Environmental Management Plan will be completed before construction begins and will contain detailed plans for ensuring compliance with all environmental laws and regulations. Under the SMS, the Environmental Coordinator will report to the Project Director and will ensure that all local, state and federal permit requirements and laws relating to environmental protection and reporting are followed. The Environmental Coordinator will monitor contractors' compliance with Project-specific environmental requirements and shall be responsible for verifying compliance with environmental protection programs and protocols for environmental incident response. In addition, all equipment suppliers and construction firms are being evaluated to ensure compliance with regulatory and Project requirements. The evaluation includes a comprehensive gap analysis review of the equipment supplier and/or construction firm's SMS and Environmental Management System to ensure that work can performed in compliance with regulatory requirements. This evaluation includes ensuring that contractors have compliant oil spill response plans, hazardous waste plans, and waste management plans in place. A list of solid wastes and liquid wastes generated, including disposal methods and locations is provided in Section 4.2.5 of Volume I. A list of chemicals used, including the volume stored on location, their treatment, discharge or disposal methods used, and the name and location of the onshore waste receiving, treatment, and/or disposal facility is provided in Section 4.2.6 of Volume I (see Table 4.2-3).

Enforceable Policy		Response
Overall Regulatory Standards		
1160.1.4		**CRMC Response: Based on the COP it appears that Vineyard Wind can demonstrate regulatory compliance with construction safety and pollution prevention practices, and proper management of solid wastes and liquid wastes. However, it is still not clear that construction of the Project will not cause undue harm or damage to natural resources, particularly squid, other finfish and crustaceans. Several studies show the potential for acoustic harm to adult squid from underwater noises. In particular, the "most significant potential impact from monopole installation is noise associated with pile driving." See COP Vol. III, p. 3-3. The COP states that "noise mitigation measures can be considered." *Id*. Absent baseline scientific studies specifically on the impacts of underwater noise on squid, and in particular squid eggs (squid mops), it is difficult to assess the likely impacts to a species that only lives about 18 months. The project could potentially impact two or more year classes of squid within the WEA.**

1160.1.5	Any Large-Scale Offshore Development, as defined in section 1160.1.1, shall require a meeting between the Fisherman's Advisory Board (FAB), the applicant, and the Council staff to discuss potential fishery-related impacts, such as, but not limited to, project location, construction schedules, alternative locations, project minimization and identification of high fishing activity or habitat edges. For any state permit process for a Large-Scale Offshore Development this meeting shall occur prior to submission of the state permit application. The Council cannot require a pre-application meeting for federal permit applications, but the Council strongly encourages applicants for any Large-Scale Offshore Development, as defined in Section 1160.1.1, in federal waters to meet with the FAB and the Council staff prior to the submission of a federal application, lease, license, or authorization. However, for federal permit applicants, a meeting with the FAB shall be necessary data and information required for federal consistency reviews for purposes of starting the CZMA 6-month review period for federal license or permit activities under 15 C.F.R. part 930, subpart D, and OCS Plans under 15 C.F.R. part 930, subpart E, pursuant to 15 C.F.R. § 930.58(a)(2). Any necessary data and information shall be provided before the 6-month CZMA review period begins for a proposed project.	To date, Vineyard Wind has attended three meetings with the FAB (on (on July 24, 2017, February 19, 2018, and April 11, 2018), the first of which of which was a combined FAB/Habitat Advisory Board (HAB) meeting. The first two of these meetings were held prior to CRMC's 6-month review period, which started on April 6, 2018. Another, publicly noticed meeting, with the FAB/HAB is scheduled for July 26, 2018. In addition, we have met or spoken with Julia Livermore, Rhode Island Department of Environmental Management's ("RI DEM") FAB representative, numerous times beginning in September, 2017 to discuss the Project, ongoing survey work, lessons learned from the Block Island project, and RI DEM's study of fishing activity. **CRMC Response: Although Vineyard Wind indicates that they attended three FAB meetings on July 24, 2017, February 19, 2018, and April 11, 2018, it was not until the April 11, 2018 meeting when Vineyard Wind showed their wind farm turbine layout to the FAB. There was no discussion of areas of high fishing activity or the likely effects of the Project to RI-based commercial fishing resources or uses. It was not until the FAB meeting of July 26, 2018 that Vineyard Wind met the full requirements of Ocean SAMP § 1160.1.5, which are necessary for the Council's consideration of coastal effects. It should be noted that a FAB meeting held pursuant to Ocean SAMP § 1160.1.5 did not occur until after the CRMC's CZMA 6-month review period started.**

Enforceable Policy		Response
Overall Regulatory Standards		
1160.1.6	The Council shall prohibit any other uses or activities that would result in significant long-term negative impacts to Rhode Island's commercial or recreational fisheries. Long-term impacts are defined as those that affect more than one or two seasons.	A detailed construction schedule is provided as Figure 4.1-1 in Volume I. Offshore construction activities will be complete within two years and therefore will not disrupt fishing activities over more than two seasons. The schedule takes into consideration weather delays, as well as provides that no pile driving will be conducted from January through April when endangered whales may migrate through the Project area. Vineyard Wind is working closely with BOEM, and the expert agency, the NOAA Fisheries Service (NOAA Fisheries), on the identification and analysis of potential impacts to marine mammals during Project construction, as well as potential mitigation measures. During the operational phase of the Project, commercial and recreational fishing can continue within the WDA. **CRMC Response: Given the logistics of constructing such a large project (now 84 WTGs), and the experience from construction of the Block Island wind farm (only 5 WTGs), there is valid concern that Vineyard Wind will not be able to meet the construction schedule presented in the COP for offshore activities (May 2020 - April 2022). There is a likelihood that commercial fishing activities will be disrupted by construction activities for more than 2 seasons. In addition, based on the facts and evidence the CRMC has determined that there will be long-term impacts to some commercial fishing operators for the 30-year life of the Project. Therefore mitigation is required by § 1160.1.3. Also, it is unclear at this time that there will not be long-term impacts to commercial species, particularly squid, resulting from significant underwater noise generated by pile-driving activity. Vineyard Wind has provided mitigation (February 15 and 21, 2019) as accepted by the FAB and CRMC to meet this enforceable policy**

1160.1.7	The Council shall require that the potential adverse impacts of Offshore Developments and other uses on commercial or recreational fisheries be evaluated, considered, and mitigated as described in section 1160.1.9.	Section 7.6 of Volume III of the COP provides a thorough analysis of the Project's potential impact to commercial and recreational fisheries and measures to mitigate those impacts. Appendix III-E presents the Fisheries Communication Plan which includes information on financial compensation. Appendix III-I presents the Navigational Risk Assessment which analyzes existing fishery vessel use within the Wind Development Area ("WDA") and presents measures to promote safe navigation through the WDA during operations, as well as measures to mitigate impacts during construction. Volume I also includes information on cable burial and anchoring. <u>Cable burial:</u> Section 3.1.5 of Volume I conservatively estimates that up to 10% of the total length of the offshore export cable system could require protection measures. However, Vineyard Wind will minimize the need for cable protection to the greatest extent feasible through careful site assessment and thoughtful selection of the most appropriate cable installation tool to achieve sufficient burial. Therefore, the 10% represents a worst case estimate. For the inter-link cable and inter-array cables within the WDA, this worst case estimate represents only 0.089% of the total area of the WDA. It is also important to understand that the majority of the WDA is comprised of homogeneous fine sand and silt-sized sediments. Therefore, it is expected that cable protection would only be necessary where difficult soils, such as boulders or rock formations are encountered and burial depth cannot be achieved. Areas with cable protection will be made known to area fishermen so the areas can be avoided.

Enforceable Policy		Response
Overall Regulatory Standards		
1160.1.7		Anchoring: Volume I explains that within the WDA, anchored vessels will not be used as primary construction and installation vessels. Thus, any anchoring that may occur in the WDA will likely be limited and sporadic. And, as discussed in the COP, there are no sensitive seafloor habitats within the WDA that could be impacted by anchoring. The COP also explains that anchoring along the export cable route may occur through Muskeget Channel or in the shallower waters of Lewis Bay near the New Hampshire Avenue Landfall Site, though anchoring could occur at any point along the offshore export cable route. If used, anchored vessels will avoid sensitive seafloor habitats to the greatest extent practicable. Importantly, based on Vineyard Wind's analysis and the information received from our extensive outreach to fishermen, we are not aware that any Rhode Island fishermen who fish within Muskeget Channel or in Lewis Bay near the New Hampshire Avenue Landfall Site. Therefore, even if anchoring does occur, Rhode Island fishermen would not likely be affected. Finally, any potential impacts from anchoring activities are within the scope of the worst-case analysis of potential impacts to benthic resources, fish, and commercial and recreational fishing included in Sections 6.5, 6.6, and 7.6 of Volume III of the COP, respectively.

Enforceable Policy		Response
Overall Regulatory Standards		
1160.1.7		**CRMC Response: Vineyard Wind cannot evaluate potential adverse impacts on commercial fisheries without an adequate pre-construction baseline assessment of commercially targeted species. The baseline assessment and monitoring of commercially targeted species is necessary to determine any effects to the fish resources and fishing industry resulting from the wind project. In order to meet the enforceable policies of the Ocean SAMP, the applicant has to provide a biological assessment of commercially targeted species covering all four calendar seasons of the year, which necessitates a minimum of one full year of monitoring before any offshore construction activity can take place within the WDA. Vineyard Wind states within the COP that it is developing a framework for a pre- and post-construction fisheries monitoring program to measure the Project's effect on fisheries resources. Vineyard Wind filed its commercial fishery biological assessment and monitoring plan with the CRMC on February 18, 2019 to meet this enforceable policy requirement. In addition, Vineyard Wind has provided mitigation (February 15 and 21, 2019) as accepted by the FAB and CRMC to meet this enforceable policy.** **Reconfiguration of the Project's wind turbine layout and spacing of 1 nm between turbines is necessary to mitigate adverse impacts to Rhode Island coastal uses (the commercial fishing fleet fixed and mobile gear operations within the WDA).** **Under the worst case scenario up to 10% of the inter-array and inter-link cables would require cable protection (rocks or concrete mats). This would result in up to 18 linear miles of cable protection within the WDA, which would be an impediment to commercial fishing mobile gear operations. See COP Vol. III, Table 6.5-4.**

1160.1.8	Mitigation measures shall be consistent with the purposes of duly adopted fisheries management plans, programs, strategies and regulations of the agencies and regulatory bodies with jurisdiction over fisheries in the Ocean SAMP area, including but not limited to those set forth above in 1150.4.2.	Section 7.6 of Volume III of the COP provides a thorough analysis of the Project's potential impact to commercial and recreational fisheries and measures to mitigate those impacts. **CRMC Response: Vineyard Wind's proposed mitigation measures do not include modification of turbine layout to East-West oriented rows with 1 nm spacing to avoid impacts to RI-based commercial fishery operations. The proposed acoustic (air curtain) mitigation for pile driving may not be sufficient to prevent impacts to squid egg mops or adult squid in vicinity of pile driving. Vineyard Wind filed its biological assessment and monitoring plan for finfish, squid and other commercial species as of February 18, 2019. The baseline pre-construction biological assessment is necessary to determination whether construction activities have an impact on squid and other species. In addition, Vineyard Wind has provided mitigation (February 15 and 21, 2019) as accepted by the FAB and CRMC to meet this enforceable policy.**
1160.1.9	The Council recognizes that moraine edges, as illustrated in Figures 11.3 and 11.4, are important to commercial and recreational fishermen. In addition to these mapped areas, the FAB may identify other edge areas that are important to fisheries within a proposed project location. The Council shall consider the potential adverse impacts of future activities or projects on these areas to Rhode Island's commercial and recreational fisheries. Where it is determined that there is a significant adverse impact, the Council will modify or deny activities that would impact these areas. In addition, the Council will require assent holders for Offshore Developments to employ micro-siting techniques in order to minimize the potential impacts of such projects on these edge areas.	Volume II confirms there are no glacial moraines within the Project area. **CRMC Response: Based on available information in the COP and other sources it appears that there may not be any glacial moraines within the WDA.**

Enforceable Policy		Response
Overall Regulatory Standards		
1160.1.10	The finfish, shellfish, and crustacean species that are targeted by commercial and recreational fishermen rely on appropriate habitat at all stages of their life cycles. While all fish habitat is important, spawning and nursery areas are especially important in providing shelter for these species during the most vulnerable stages of their life cycles. The Council shall protect sensitive habitat areas where they have been identified through the Site Assessment Plan or Construction and Operation Plan review processes for Offshore Developments as described in section 160.5.3 (i).	Section 6.5 of Volume III contains a detailed description of benthic habitats within the Project area, Section 6.6 of Volume III contains an extensive discussion of fish and invertebrates within the Project area, and Essential Fish Habitats are discussed in Appendix III-F. These sections specifically address fish habitats within the Project area and the life histories of fishes found in the area, including species targeted by commercial and recreational fishermen. **CRMC Response: The issue of sensitive habitat for squid and other commercial species has not been adequately addressed in the COP. Vineyard Wind relies upon MADMF squid data that only covers MA state waters (out to 3 miles) and not federal waters or the WDA. The MADMF April 30, 2018 comments to BOEM regarding the NOI to prepare an EIS for the Vineyard Wind project states "[t]he distribution of demersal longfin squid eggs ("mops") was not addressed in the Construction and Operations Plan. More information regarding the distribution and temporal persistence of longfin squid mops and their vulnerability to project activities is needed in the EIS." Vineyard Wind filed its biological assessment and monitoring plan for finfish, squid and other commercial species as of February 18, 2019.**

1160.1.11	Any Large-Scale Offshore Development, as defined in Chapter 11 in section 1160.1.1, shall require a meeting between the HAB, the applicant, and the Council staff to discuss potential marine resource and habitat-related issues such as, but not limited to, impacts to marine resource and habitats during construction and operation, project location, construction schedules, alternative locations, project minimization, measures to mitigate the potential impacts of proposed projects on habitats and marine resources, and the identification of important marine resource and habitat areas. For any state permit process for a Large-Scale Offshore Development, this meeting shall occur prior to submission of the state permit application. The Council cannot require a pre-application meeting for federal permit applications, but the Council strongly encourages applicants for any Large-Scale Offshore Development, as defined in Section 1160.1.1, in federal waters to meet with the HAB and the Council staff prior to the submission of a federal application, lease, license, or authorization. However, for federal permit applicants, a meeting with the HAB shall be necessary data and information required for federal consistency reviews for purposes of starting the CZMA 6-month review period for federal license or permit activities under 15 C.F.R. part 930, subpart D, and OCS Plans under 15 C.F.R. part 930, subpart E, pursuant to 15 C.F.R. § 930.58 (a)(2). Any necessary data and information shall be provided before the 6-month CZMA review period begins for a proposed project.	As discussed under policy 1160.1.3, Vineyard Wind met with the FAB/HAB on July 24, 2017, at which time it presented an overview of the Project and discussed ongoing activities to address numerous issues, including planned fisheries studies. Detailed information on the potential impacts to marine resource and habitats during construction and operation, project location, construction schedules, project minimization, measures to mitigate the potential impacts of proposed projects on habitats and marine resources, and the identification of important marine resource and habitat areas can be found in *S*ection 2.0 of Volume I (Project Location); Section 4.1 of Volume I (which includes a detailed construction schedule); Section 6.5 of Volume III (Benthic Resources), Section 6.6 (Finfish and Invertebrates), Section 6.7 (Marine Mammals), Section 6.8 (Sea Turtles), and Appendix III-F (Essential Fish Habitat). **CRMC Response: Vineyard Wind indicates that they attended the FAB/HAB meeting on July 24, 2017, but that FAB/HAB meetings did not meet the requirements of Ocean SAMP § 1160.1.11, because there was no discussion on the potential impacts to marine resource and habitats during construction and operation, project location, construction schedules, project minimization, measures to mitigate the potential impacts of proposed projects on habitats and marine resources, and the identification of important marine resource and habitat areas. It was not until the FAB/HAB meeting of July 26, 2018 that Vineyard Wind met the requirements of Ocean SAMP § 1160.1.11. It should be noted that a proper HAB meeting pursuant to Ocean SAMP § 1160.1.11 did not occur until after the CRMC's CZMA 6-month review period started.**

Enforceable Policy		Response
Overall Regulatory Standards		
1160.1.12	The potential impacts of a proposed project on cultural and historic resources will be evaluated in accordance with the National Historic Preservation Act and Antiquities Act, and the Rhode Island Historical Preservation Act and Antiquities Act as applicable. Depending on the project and the lead federal agency, the projects that may impact marine historical or archaeological resources identified through the joint agency review process shall require a Marine Archaeology Assessment that documents actual or potential impacts the completed project will have on submerged cultural and historic resources.	A marine archaeological assessment was prepared in accordance with the requirements of the federal agency responsible for reviewing the Project, in this case BOEM. Vineyard Wind retained Gray & Pape of Providence, Rhode Island, to conduct a marine archaeological assessment for the WDA and export cable corridor. The assessment was conducted in accordance with BOEM regulations and guidance, and included archival and document research and field investigations. Section 7.3 of Volume III provides an overview of the assessment and the full report is provided in Volume II-C. **CRMC Response: The CRMC will defer to the National Historic Preservation Act implementation through BOEM's licensing and permit process to assess potential project impacts on cultural and historic resources.**
1160.1.13	Guidelines for Marine Archaeology Assessment in the Ocean SAMP Area can be obtained through the RIHPHC in their document, "Performance Standards and Guidelines for Archaeological Projects: Standards for Archaeological Survey" (RIHPHC 2007), or the lead federal agency responsible for reviewing the proposed development.	A marine archaeological assessment was prepared in accordance with the requirements of the federal agency responsible for reviewing the Project, in this case BOEM. Vineyard Wind retained Gray & Pape of Providence, Rhode Island, to conduct a marine archaeological assessment for the WDA and export cable corridor. The assessment was conducted in accordance with BOEM regulations and guidance, and included archival and document research and field investigations. Section 7.3 of Volume III provides an overview of the assessment and the full report is provided in Volume II-C. **See preceding response.**

Enforceable Policy		Response
Overall Regulatory Standards		
1160.1.14	The potential non-physical impacts of a proposed project on cultural and historic resources shall be evaluated in accordance with 36 CFR 800.5, *Assessment of Adverse Effects, (v) Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features.* Depending on the project and the lead federal agency, the Ocean SAMP Interagency Working Group may require that a project undergo a Visual Impact Assessment that evaluates the visual impact a completed project will have on onshore cultural and historic resources	Sections 7.3 and 7.4 of Volume III discuss cultural, historic and archaeological resources and Appendix III-H.b contains a visual impact assessment. However, there are no areas along the Rhode Island coast from which the Project is visible. This is because the Project is more than 41 miles from the nearest point on the Rhode Island coast with the most direct line of sight towards the Project. The maximum distance any of the Project's turbines could be visible due to the curvature of the earth and horizon line is 35.3 miles. Moreover, most of the Project is shielded from the Rhode Island coast by an intervening land mass, i.e., Martha's Vineyard. Thus, Rhode Island is not within the Area of Potential Effects (APE) for visual effects. BOEM has initiated its Section 106 process under the National Historic Preservation Act, to which it is understood that CRMC and the Narragansett Historic Preservation Office have been invited to participate as consulting parties. **See preceding response.**
1160.1.15	A Visual Impact Assessment may require the development of detailed visual simulations illustrating the completed project's visual relationship to onshore properties that are designated National Historic Landmarks, listed on the National Register of Historic Places, or determined to be eligible for listing on the National Register of Historic Places. Assessment of impacts to specific views from selected properties of interest may be required by relevant state and federal agencies to properly evaluate the impacts and determination of adverse effect of the project on onshore cultural or historical resources.	See above response under 1160.1.14; there are no areas along the Rhode Island coast from which the Project is visible. **CRMC Response: It appears that there are no areas along the Rhode Island coast from which the Project will be visible.**

Enforceable Policy		Response
Overall Regulatory Standards		
1160.1.16	A Visual Impact Assessment may require description and images illustrating the potential impacts of the proposed project	A Visual Impact Assessment is included in Appendix III-H.a and was prepared in accordance with BOEM's guidelines. However, as described in the above response under 1160.1.14; there are no areas along the Rhode Island coast from which the Project is visible. **CRMC Response: It appears that there are no areas along the Rhode Island coast from which the Project will be visible.**
1160.1.17	Guidelines for Landscape and Visual Impact Assessment in the Ocean SAMP Area can be obtained through the lead federal agency responsible for reviewing the proposed development.	A Visual Impact Assessment is included in Appendix III-H.a and was prepared in accordance with BOEM's guidelines. However, as described in the above response under 1160.1.14; there are no areas along the Rhode Island coast from which the Project is visible. **CRMC Response: It appears that there are no areas along the Rhode Island coast from which the Project will be visible.**

Areas of Particular Concern		
1160.2.1	Areas of Particular Concern (APCs) have been designated in state waters through the Ocean SAMP process with the goal of protecting areas that have high conservation value, cultural and historic value, or human use value from Large-Scale Offshore Development. These areas may be limited in their use by a particular regulatory agency (e.g. shipping lanes), or have inherent risk associated with them (e.g. unexploded ordnance locations), or have inherent natural value or value assigned by human interest (e.g. glacial moraines, historic shipwreck sites). Areas of Particular Concern have been designated by reviewing habitat data, cultural and historic features data, and human use data that has been developed and analyzed through the Ocean SAMP process. Currently designated Areas of Particular Concern are based on current knowledge and available datasets; additional Areas of Particular Concern may be identified by the Council in the future as new datasets are made available. Areas of Particular Concern may be elevated to Areas Designated for Preservation in the future if future studies show that Areas of Particular Concern cannot risk even low levels of Large-Scale Offshore Development within these areas. Areas of Particular Concern include: i. Areas with unique or fragile physical features, or important natural habitats; ii. Areas of high natural productivity; iii. Areas with features of historical significance or cultural value; iv. Areas of substantial recreational value; v. Areas important for navigation, transportation, military and other human uses; and Areas of high fishing activity.	No physical structures of the Project are located within an area of particular concern (APC) in state waters that is listed in the Ocean SAMP. The Project is located within federal waters in BOEM's designated Wind Energy Area. There are no important habitats or areas of high natural productivity within the Project area. The historic and cultural aspects of the Project area have been fully evaluated. See COP Volume III, Sections 7.3 and 7.4, and Appendix II-C. While some recreational fishing occurs within the Project area, it is not an area of high recreational value. Moreover, recreational fishing will not be precluded by the Project. In addition, it is not an area considered important for navigation, transportation, military and other human uses. See COP Appendix III-I. Finally, the available data on fishing activity in the Project area does not indicate that it is an area of high fishing activity. **CRMC Response: The CRMC has not designated any Areas of Particular Concern within the WDA. However, based on the available information CRMC disputes Vineyard Wind's assertion that "the available data on fishing activity in the Project area does not indicate that it is an area of high fishing activity."**

Enforceable Policy		Response
Areas of Particular Concern		
1160.2.1	Particular Concern cannot risk even low levels of Large-Scale Offshore Development within these areas. Areas of Particular Concern include: vi. Areas with unique or fragile physical features, or important natural habitats; vii. Areas of high natural productivity; viii. Areas with features of historical significance or cultural value; ix. Areas of substantial recreational value; x. Areas important for navigation, transportation, military and other human uses; and xi. Areas of high fishing activity.	**See preceding response.**

1160.2.2.	The Council has designated the areas listed below in section 1160.2.3 in state waters as Areas of Particular Concern. All Large-scale, Small-scale, or other offshore development, or any portion of a proposed project, shall be presumptively excluded from APCs. This exclusion is rebuttable if the applicant can demonstrate by clear and convincing evidence that there are no practicable alternatives that are less damaging in areas outside of the APC, or that the proposed project will not result in a significant alteration to the values and resources of the APC. When evaluating a project proposal, the Council shall not consider cost as a factor when determining whether practicable alternatives exist. Applicants which successfully demonstrate that the presumptive exclusion does not apply to a proposed project because there are no practicable alternatives that are less damaging in areas outside of the APC must also demonstrate that all feasible efforts have been made to avoid damage to APC resources and values and that there will be no significant alteration of the APC resources or values. Applicants successfully demonstrating that the presumptive exclusion does not apply because the proposed project will not result in a significant alteration to the values and resources of the APC must also demonstrate that all feasible efforts have been made to avoid damage to the APC resources and values. The Council may require a successful applicant to provide a mitigation plan that protects the ecosystem. The Council will permit underwater cables, only in certain categories of Areas of Particular Concern, as determined by the Council in coordination with the Joint Agency Working Group. The maps listed below in section 1160.2.3 depicting Areas of Particular Concern may be superseded by more detailed, site-specific maps created with finer resolution data.	No physical structures of the Project are located within an area of particular concern (APC) listed in the Ocean SAMP. Additionally, Volume II demonstrates that there are no glacial moraines or other habitat features within the Project area considered an APC in the Ocean SAMP. Fishing activity within the Project Area is discussed in Section 7.6 of Volume III. **CRMC Response: The Project is not located within an area of particular concern (APC) listed in the Ocean SAMP. And, based on available information it does not appear that there are any glacial moraines within the WDA.**

Enforceable Policy		Response
Areas of Particular Concern		
1160.2.3	Areas of particular concern that have been identified in the Ocean SAMP area in state waters are described as follows. i. Historic shipwrecks, archeological or historical sites ii. Offshore dive sites within the Ocean SAMP area, as shown in Figure 11.2. iii. Glacial moraines are important habitat areas for a diversity of fish and other marine plants and animals because of their relative structural permanence and structural complexity. Glacial moraines create a unique bottom topography that allows for habitat diversity and complexity, which allows for species diversity in these areas and creates environments that exhibit some of the highest biodiversity within the entire Ocean SAMP area. The Council also recognizes that because glacial moraines contain valuable habitats for fish and other marine life, they are also important to commercial and recreational fishermen. Accordingly, the Council shall designate glacial moraines as identified in Figures 11.3 and 11.4 as Areas of Particular Concern.	Section 7.3 of Volume III provides an overview of the marine archaeological assessment and the full report is provided in Volume II-C. The assessment includes identification of historic shipwrecks, archaeological or historical sites. Appendix III-I contains a comprehensive Navigational Risk Assessment that was developed in consultation with the Coast Guard and incorporates comments received by both BOEM and the Coast Guard. The Navigational Risk Assessment addresses shipping lanes, precautionary areas, recommended vessel routes, ferry routes, dredge disposal sites, military testing areas, unexploded ordinance, pilot boarding areas, anchorages, racing activities, and high intensity commercial marine traffic. The available data on fishing activity in the Project area does not indicate that it is an area of high fishing activity. **CRMC Response: The Project is not located within Rhode Island state waters or the Ocean SAMP boundary (2011 GLD).**

Enforceable Policy		Response
Areas of Particular Concern		
	iv. Navigation, Military, and Infrastructure areas including: designated shipping lanes, precautionary areas, recommended vessel routes, ferry routes, dredge disposal sites, military testing areas, unexploded ordnance, pilot boarding areas, anchorages, and a coastal buffer of 1 km as depicted in Figure 11.5 are designated as Areas of Particular Concern. The Council recognizes the importance of these areas to marine transportation, navigation and other activities in the Ocean SAMP area. v. Areas of high fishing activity as identified during the pre-application process by the Fishermen's Advisory Board, as defined in section 1160.1.6, may be designated by the Council as Areas of Particular Concern. vi. Several heavily-used recreational boating and sailboat racing areas, as shown in Figure 11.6, are designated as Areas of Particular Concern. The Council recognizes that organized recreational boating and sailboat racing activities are concentrated in these particular areas, which are therefore important to sustaining Rhode Island's recreation and tourism economy. vii. Naval Fleet Submarine Transit Lanes, as described in Chapter 7, Marine Transportation, Navigation, and Infrastructure section 720.7, are designated as Areas of Particular Concern.	**See preceding response.**

Enforceable Policy		Response
Areas of Particular Concern		
	viii. Other Areas of Particular Concern may be identified during the pre-application review by state and federal agencies as areas of importance	**CRMC Response: The Council has not yet designated any areas of high fishing activity within the WDA as an APC identified during the pre-application process by the Fishermen's Advisory Board.**
1160.2.4	Developers proposing projects for within the Renewable Energy Zone as described in section 1160.1.2 shall adhere to the requirements outlined in 1160.2 regarding Areas of Particular ~~Concern in state waters,~~ including any Areas of Particular Concern that overlap the Renewable Energy Zone (see Figure 11.7).	The Project is not proposed within the Renewable Energy Zone or any Areas of Particular Concern located within Rhode Island state waters. As noted in Section 2.0 of Volume I, the Project is located within BOEM Lease Area OCS-A 0501 in federal waters. **CRMC Response: The Project is not located within the Renewable Energy Zone or any Areas of Particular Concern located within Rhode Island state waters.**

Prohibitions and Areas Designated for Preservation		
1160.3.1	Areas Designated for Preservation are designated in the Ocean SAMP area in state waters for the purpose of preserving them for their ecological value. Areas Designated for Preservation are afforded additional protection than Areas of Particular Concern (see section 1160.2) because of scientific evidence indicating that Large-Scale Offshore Development in these areas may result in significant habitat loss. The areas described in Section 1160.3 are designated as Areas Designated for Preservation. The Council shall prohibit any Large-Scale Offshore Development, mining and extraction of minerals, or other development that has been found to be in conflict with the intent and purpose of an Area Designated for Preservation. Underwater cables are exempt from this prohibition. Areas designated for preservation include: i. Ocean SAMP sea duck foraging habitat in water depths less than or equal to 20 meters [65.6 feet] (as shown in Figure 11.8) are designated as Areas Designated for Preservation. The current research regarding sea duck foraging areas indicates that this habitat is depth limited and generally contained within the 20 meter depth contour. Thus, the entire area within the 20 meter contour is being protected as an Area Designated for Preservation until further research allows the Council and other agencies to make a more refined determination.	The Project is not located within an Area Designated for Preservation in the Ocean SAMP area in state waters. Further, all offshore components of the Project, excluding underwater cables, are located in greater than 20 m of water depth (as indicated in Section 2.0 of Volume I of the COP, water depths in the WDA are approximately 37-49.5 m). BOEM specifically excluded from the MA WEA sea duck foraging habitat. **CRMC Response: The Project is not located within an Area Designated for Preservation in the Ocean SAMP area or in in state waters. Further, water depths within the WDA are greater than 20m.**

Enforceable Policy		Response
Prohibitions and Areas Designated for Preservation		
1160.3.2	The mining and extraction of minerals, including sand and gravel, from tidal waters and salt ponds is prohibited. This prohibition does not apply to dredging for navigation purposes, channel maintenance, habitat restoration, or beach replenishment for public purposes.	No mining or extraction of minerals from tidal waters and salt ponds is proposed. As noted in Section 2.0 of Volume I, the Project is located within BOEM Lease Area OCS-A 0501 in federal waters. **CRMC Response: The Project is not located within state waters.**
1160.3.3	The Council shall prohibit any Offshore Development in areas identified as Critical Habitat under the Endangered Species Act.	As described in Sections 6.6 and 6.7 of Volume III, no structures are proposed within areas identified as Critical Habitat under the Endangered Species Act. **CRMC Response: The CRMC will defer to NOAA NMFS for issues related to Critical Habitat under the federal Endangered Species Act.**

1160.3.4	Dredged material disposal, as defined in RICRMP Section 300.9 and subject to the regulations of RICRMP Section 300.9, is further limited in the Ocean SAMP area by the prohibition of dredged material disposal in the following Areas of Particular Concern as defined in section 1160.2: historic shipwrecks, archaeological, or historic sites; offshore dive sites; navigation, military, and infrastructure areas; and moraines. Beneficial reuse may be allowed in Areas Designated for Preservation, whereas all other dredged material disposal is prohibited in those areas. All disposal of dredged material will be conducted in accordance with the U.S. EPA and U.S. Army Corps of Engineers' manual, *Evaluation of Dredged Material Proposed for Ocean Disposal*.	As described in Section 4 of Volume I, dredging of the tops of sand waves may be required and, once dredged, the removed sediments will be redeposited (via bottom dumping or side-casting) within the 810 m wide offshore export cable corridor. No dredged material will be redeposited on historic shipwrecks, archaeological, or historic sites; offshore dive sites; navigation, military, and infrastructure areas; and moraines. No beneficial reuse is proposed; sediments will be retained in the vicinity of the area from which they are dredged. As applicable, all disposal of dredged material will be conducted in accordance with the U.S. EPA and U.S. Army Corps of Engineers' manual, *Evaluation of Dredged Material Proposed for Ocean Disposal*. **CRMC Response: The project is not subject to RICRMP Section 300.9, now referenced as 650-RICR-20-00-1.3.1(I).**

Enforceable Policy		Response
Other Areas		
1160.4	Large-scale projects or other development which is found to be a hazard to commercial navigation shall avoid areas of high intensity commercial marine traffic in state waters. Avoidance shall be the primary goal of these areas. Areas of High Intensity Commercial Marine Traffic are defined as having 50 or more vessel counts within a 1 km by 1 km grid, as shown in Figure 11.9.	Appendix III-I includes a Navigational Risk Assessment (NRA). The NRA found that the Project will create only minor impacts to navigational safety within the Offshore Project Area once operational. During the construction phase, increased construction vessel traffic within the area could potentially increase risk to navigational safety in the approach channels leading to the construction ports and within the offshore export cable corridor (OECC) during cable–laying activities. Specific to Rhode Island, the Project may use a port facility in Rhode Island to offload, store, and stage the turbine blades or other components for delivery to the offshore WDA, as needed and furthers identifies that either the Port of Providence or the Quonset Point port may be used, both of which are existing industrial ports. Section 4.2.3.7 of Volume I explains that feeder barges would transport components, i.e. blades, from the port to the installation vessel. Table 4.2- 1 in Volume I specifically describes the vessels that will be used to transport the blades from Europe to the port and from the port to the WDA. As Table 4.2-1 demonstrates, approximately 3 to 5 vessels would transport the blades from Europe to the Rhode Island port, where the blades would be stored until needed.

Enforceable Policy		Response
Other Areas		
1160.4		Two feeder vessels would be used to transport the blades from the Rhode Island port to the WDA for installation. Worst case, it is estimated in Attachment C of Appendix III-B that up to approximately 100 roundtrips would be needed to transport the blades for installation on 100 WTGs (i.e., each roundtrip carrying one full blade set for a WTG). As shown on the construction provided as Figure 4.1-1 in Volume I, WTG installation is expected to begin in Spring 2021 and will take approximately 8 months to complete. Thus, there would be approximately 2 round trips per day out of the Rhode Island port. The types of vessels and the level of vessel activity associated with the Project is consistent with the Rhode Island ports' current industrial usage and does not represent a significant increase in traffic. Mitigation measures have been developed to minimize and reduce impacts to commercial and recreational navigation safety during all Project phases to the greatest extent practicable. **CRMC Response: CRMC agrees that during the construction phase, increased construction vessel traffic could potentially increase risk to navigational safety in the approach channels leading to the construction ports, of which RI ports (Quonset or Providence) may be used as secondary construction staging locations. Again, based on experience with construction of the Block Island wind farm, CRMC believes Vineyard Wind has underestimated the construction phase vessel traffic impacts on local ports due to the magnitude and complexities of constructing up to 106 turbines within 18-24 months. WTG installation is now expected to begin in July 2020 based on the revised COP construction schedule.**

Application Requirements		
1160.5	Tables 11.4 through 11.6 relate to COP requirements	Table 1.6-1 of Volume I lists where all the required information in Tables 11.4 and 11.6 can be found in the COP. **CRMC Response: Vineyard Wind did not initially provide the required information listed in enforceable policy § 11.10.5(C)(2)(f)(1). Specifically, Table 11.5 in § 1160.5 (Necessary data to be provided in the COP) requires "A biological assessment of commercially and recreationally targeted species. This assessment shall assess the relative abundance, distribution, and different life stages of these species at all four seasons of the year. This assessment shall comprise a series of surveys, employing survey equipment and methods that are appropriate for sampling finfish, shellfish, and crustacean species at the project's proposed location." Vineyard Wind filed its biological assessment and monitoring plan with the CRMC on February 18, 2019 to meet this enforceable policy requirement.**
Design, Fabrication and Installation Standards		
1160.6	1. Certified Verification Agent- The Certified Verification Agent (CVA) shall use good engineering judgment and practices in conducting an independent assessment of the design, fabrication and installation of the facility. The CVA shall certify in the Facility Design Report to the Council that the facility is designed to withstand the environmental and functional load conditions appropriate for the intended service life at the proposed location. The CVA is paid for by the applicant, but is approved and reports to the Council.	The Project is utilizing a CVA, which reports to BOEM as the lead federal agency. Appendices I- C through I-E describes the statement of qualifications, CVA scope of work, and hierarchy of standards. **CRMC Response: CRMC will defer to federal BOEM process for CVA**
Pre-Construction Standards		
1160.7.1-3	Standards 1-3 explain standards and requirements for an applicant that holds an assent with the state of Rhode Island.	The Project is located in federal waters under lease OCS-A 0501 with BOEM; therefore, these policies are not applicable. **CRMC Response: The Project is located in federal waters and no state permit is required.**

1160.7.4 and 5	The Council shall consult with the U.S. Coast Guard, the U.S. Navy, marine pilots, the Fishermen's Advisory Board as defined in section 1160.1.6, fishermen's organizations, and recreational boating organizations when scheduling offshore marine construction or dredging activities. Where it is determined that there is a significant conflict with season limited commercial or recreational fishing activities, recreational boating activities or scheduled events, or other navigation uses, the Council shall modify or deny activities to minimize conflict with these uses.	The Navigational Risk Assessment provided as Appendix III-I of the COP describes how the Project will minimize interference with existing marine traffic and promote navigational safety. **CRMC Response: This enforceable policy will be partially met through the establishment of USCG approved navigation transit corridors through the WEA. The current navigation transit corridor plan is being disputed by Ørsted and may be subject to further modifications. Further, the project will not be obtaining a state permit. Nevertheless, Vineyard Wind indicates that it will be issuing Notice to Mariners during construction phases.**

Enforceable Policy		Response
Pre-Construction Standards		
	The Council shall require the assent holder to provide for communication with commercial and recreational fishermen, mariners, and recreational boaters regarding offshore marine construction or dredging activities. Communication shall be facilitated through a project website and shall complement standard U.S. Coast Guard procedures such as Notices to Mariners for notifying mariners of obstructions to navigation.	As described in the Navigational Risk Assessment, the Project has consulted with the US Coast Guard, the US Navy, marine pilots, and various stakeholders and will continue to consult with other fishermen's boards and organizations as construction approaches. The Project anticipates issuing Notices to Mariners and providing a website with frequently updated information. **See preceding response.**
1160.7.6	For all Large-Scale Offshore Developments, underwater cables, and other development projects as determined by the Council, the assent holder shall designate and fund a third-party fisheries liaison. The fisheries liaison must be knowledgeable about fisheries and shall facilitate direct communication between commercial and recreational fishermen and the project developer. Commercial and recreational fishermen shall have regular contact with and direct access to the fisheries liaison throughout all stages of an offshore development (pre-construction; construction; operation; and decommissioning).	Vineyard Wind's Fisheries Communication Plan (Appendix III-E of the COP) explains that Vineyard Wind's fisheries communication is conducted through several roles including Fisheries Liaisons (FLs) and Fisheries Representatives (FR). The FR is intended to represent a particular fishery industry, organization, gear type, port or region, or sector(s) to the project, communicating concerns, issues and other input for the life of the project, from development and pre-construction through decommissioning. Typically, the FR is an active fisherman, or group representing active fishermen, within the region, fishery, or sector they represent. The FL facilitates the work of the FRs by serving as a knowledgeable point of contact to which the FRs can efficiently and effectively communicate. The FL also serves to communicate on behalf of the Project to the fisheries sectors directly, and with the FRs. The FL communicates across fishery communities and regions in order to educate and disseminate vital information regarding the project to fishermen, and receive input back to the project. The FL works to validate fisheries information through cross-referencing among data sources.

Enforceable Policy		Response
Pre-Construction Standards		
1160.7.6		Vineyard Wind has had a FR in place since 2010 and a FL in place since 2016. Currently, Crista Bank is the Vineyard Wind FL. Ms. Bank is a researcher who has been working with fishermen along the New England coast, including fishermen from Rhode Island, for more than 12 years. Nate Mayo, Vineyard Wind, serves as the FL specifically for scallopers and shellfish farmers in Lewis Bay. Their contact information is posted on Vineyard Wind's website. **CRMC Response: Vineyard Wind has a fisheries liaison and plans to communicate with mariners and commercial fishermen during construction phases.**

1160.7.7	Where possible, Offshore Developments should be designed in a configuration to minimize adverse impacts on other user groups, which include but are not limited to: recreational boaters and fishermen, commercial fishermen, commercial ship operators, or other vessel operators in the project area. Configurations which may minimize adverse impacts on vessel traffic include, but are not limited to, the incorporation of a traffic lane through a development to facilitate safe and direct navigation through, rather than around, an Offshore Development	Section 3.1.1.1 of Volume I describes the site layout and how the Project layout incorporates two transit corridors. The proposed Project layout is a result of input from numerous stakeholders, including the Coast Guard and fishermen who use or transit the Project area. As described in Section 3.0 of Volume III, the original layout was designed to optimize energy development, which requires that the WTGs be scattered and closer together, not aligned in a grid pattern with large separation distances. Vineyard Wind heard and understood the need for transit corridors and separation distances that allow the area to be fished. Vineyard Wind also considered the available data on vessel activity in the area, most of which shows that fishing activity takes place north of the Project area. Vineyard Wind worked closely with the Coast Guard to establish the separation distances, transit corridors, and the orientation of the grid. Thus, the Project layout was designed to address many competing interests, including competing fishing interests. Of particular concern was the potential impact of the Project on the scallop fishery out of New Bedford, which according to NOAA data, has an annual average value of over $281 million. The orientation of the transit corridor through the Project was specifically designed in consultation with the scallop industry to allow passage through the Project to fishing areas, and the wide distances between the turbines allows for mobile and fixed gear fishing within the Project area. Appendix III-I of the COP includes a Navigational Risk Assessment.

Enforceable Policy		Response
Pre-Construction Standards		
		CRMC Response: A navigation transit corridor plan has been adopted by the USCG, but has been disputed by Ørsted. The plan may be subject to further modifications. More importantly, the configuration and orientation of the wind farm must be modified to incorporate an East-West alignment and 1 nm spacing between turbine foundations and rows to minimize adverse impacts on commercial fishermen and vessel traffic, and to be consistent with the alignment of other planned wind farms that have committed to an east-west alignment.
1160.7.8	Any assent holder of an approved Offshore Development shall work with the Council when designing the proposed facility to incorporate where possible mooring mechanisms to allow safe public use of the areas surrounding the installed turbine or other structure.	The Project is located in federal waters under lease OCS-A 0501 with BOEM. Vineyard Wind is working with BOEM, BSEE, and the US Coast Guard regarding the design of the Project to ensure the safe use of the area. **See preceding response.**
1160.7.9	The facility shall be designed in a manner that minimizes adverse impacts to navigation. As part of its application package, the project applicant shall submit a navigation risk assessment under the U.S. Coast Guard's Navigation and Vessel Inspection Circular 02-07, "Guidance on the Coast Guard's Roles and Responsibilities for Offshore Renewable Energy Installations."	Appendix III-I of the COP includes a Navigational Risk Assessment. The Navigational Risk Assessment has been updated to incorporate comments from the US Coast Guard and will continue to be refined in consultation with the US Coast Guard. **See preceding response.**

1160.7.10	Applications for projects proposed to be sited in state waters pursuant to the Ocean SAMP shall not have a significant impact on marine transportation, navigation, and existing infrastructure.	The Project is not located in RI state waters; nevertheless, the Navigational Risk Assessment provided in Appendix III-I of the COP demonstrates that the Project will not have a significant impact on marine transportation or navigation. **See preceding response.**
1160.7.11	Prior to construction, the Applicant shall provide a letter from the U.S. Coast Guard showing it meets all applicable U.S. Coast Guard standards.	BOEM is consulting with the U.S. Coast Guard and Vineyard Wind will also obtain a Private Aids to Navigation authorization from the U.S. Coast Guard. **CRMC Response: CRMC will defer to USCG on this matter.**
Standards for Construction Activities		
1160.8	Standards 1-10 are listed for Assent Holders.	The Project is located within federal waters in BOEM Lease Area OCS-A 0501; therefore, these standards do not apply. However, because these standards are modeled after BOEM's standards they are addressed in COP Volume I. **CRMC Response: CRMC will defer to required BOEM standards.**

Enforceable Policy		Response
Monitoring Requirements		
1160.9.1	1. The Council in coordination with the Joint Agency Working Group, as described in Section 1160.1.4, shall determine requirements for monitoring prior to, during, and post construction. Specific monitoring requirements shall be determined on a project by-project basis and may include but are not limited to the monitoring of: i. Coastal processes and physical oceanography ii. Underwater noise iii. Benthic ecology iv. Avian species v. Marine mammals vi. Sea turtles vii. Fish and fish habitat viii. Commercial and recreational fishing ix. Recreation and tourism x. Marine transportation, navigation and existing infrastructure xi. Cultural and historic resources	The Project will be carefully monitored during construction, operation, and decommissioning. Resource specific monitoring plans are discussed throughout Volume III of the COP. Specific examples of such monitoring plans include but are not limited to: • Section 5.2 describes water quality monitoring. • Section 6.2 describes avian monitoring. • Section 6.6 of Volume III describes how Vineyard Wind is working with the Massachusetts School for Marine Science and Technology and local stakeholders to develop a monitoring plan to measure the Project's effect on fisheries resources. • Sections 6.7 and 6.8 of Volume III describe the monitoring and mitigation measures that will be utilized for marine mammals and sea turtles. • Section 7.3 describes ongoing investigations into cultural and historic resources. • Appendix III-D includes the Benthic Habitat Monitoring Proposal It is expected that the Project's monitoring plans will continue to be refined through the federal and state review and approval processes. **CRMC Response: See response for § 1160.1.7, above. Vineyard Wind filed its biological assessment and monitoring plan with the CRMC on February 18, 2019 to meet this enforceable policy requirement.**

1160.9.2	The Council shall require where appropriate that project developers perform systematic observations of recreational boating intensity at the project area at least three times: pre-construction; during construction; and post-construction. Observations may be made while conducting other field work or aerial surveys and may include either visual surveys or analysis of aerial photography or video photography. The Council shall require where appropriate that observations capture both weekdays and weekends and reflect high-activity periods including the July 4th holiday weekend and the week in June when Block Island Race Week takes place. The quantitative results of such observations, including raw boat counts and average number of vessels per day, will be provided to the Council.	The Navigational Risk Assessment included as Appendix III-I of the COP includes an assessment of vessel traffic within the Project area based on various available datasets (Automatic Identification System, Vessel Monitoring System, etc.) over several years. **CRMC Response: Based on information within the COP (AIS data, etc.) it appears that there is low density recreational boating intensity within the Vineyard Wind WDA.**

Enforceable Policy		Response
Monitoring Requirements		
1160.9.3	The items listed below shall be required for all Offshore Developments: i. A biological assessment of commercially and recreationally targeted species shall be required within the project area for all Offshore Developments. This assessment shall assess the relative abundance, distribution, and different life stages of these species at all four seasons of the year. This assessment shall comprise a series of surveys, employing survey equipment and methods that are appropriate for sampling finfish, shellfish, and crustacean species at the project's proposed location. Such an assessment shall be performed at least four times: pre-construction (to assess baseline conditions); during construction; and at two different intervals during operation (i.e. 1 year after construction and then post-construction). At each time this assessment must capture all four seasons of the year. This assessment may include evaluation of survey data collected through an existing survey program, if data are available for the proposed site. The Council will not require this assessment for proposed projects within the Renewable Energy Zone that are proposed within 2 years of the adoption of the Ocean SAMP. ii. An assessment of commercial and recreational fisheries effort, landings, and landings value shall be required for all proposed Offshore Developments. Assessment shall focus on the proposed project area and alternatives. This	Section 6.5 (Benthic Resources), Section 6.6 (Finfish and Invertebrates), and Appendix III-F (Essential Fish Habitat) of Volume III of the COP describe commercially and recreationally targeted species. An assessment of commercial and recreational fisheries is provided in Section 7.6 (Commercial and Recreational Fishing) of Volume III of the COP. **CRMC Response: See response for § 1160.1.7, above. Vineyard Wind filed its biological assessment and monitoring plan with the CRMC on February 18, 2019 to meet this enforceable policy requirement. Additionally, Vineyard Wind underestimates the economic value of RI commercial fishery landings because they rely upon flawed methodology of BOEM WEA study (Kirkpatrick et al., 2017). Vineyard Wind estimates total average annual value of catches within the WDA during 2011-2016 at $348.450. See COP Vol. III, p. 7-59. Based on a subsequent revised analysis by RIDEM (2018) for squid harvest alone, the annual squid harvest value from RI-based vessels in the Vineyard Wind lease area for the period 2011-2016 was $1,333,260. The WDA is 45% of the lease area.**

Enforceable Policy		Response
Monitoring Requirements		
1160.9.3	assessment shall evaluate commercial and recreational fishing effort, landings, and landings value at three different stages: preconstruction (to assess baseline conditions); during construction; and during operation. At each stage, all four seasons of the year must be evaluated. Assessment may use existing fisheries monitoring data but shall be supplemented by interviews with commercial and recreational fishermen. Assessment shall address whether fishing effort, landings, and landings value has changed in comparison to baseline conditions. The Council will not require this assessment for proposed projects within the Renewable Energy Zone that are proposed within 2 years of the adoption of the Ocean SAMP.	
1160.9.4	The Council in coordination with the Joint Agency Working Group may also require facility and infrastructure monitoring requirements, that may include but are not limited to: i. Post construction monitoring including regular visual inspection of inner array cables and the primary export cable to ensure proper burial, foundation and substructure inspection.	Vineyard Wind plans to conduct post construction monitoring of various Project components, including offshore export cables and inner-array cables. The details of such post construction monitoring are described in Sections 4.3.2 and 4.3.4 of Volume I of the COP. **CRMC Response: The CRMC will rely upon BOEM construction monitoring requirements, including Certified Verification Agent inspections.**

Appendix 25. CRMC and Vineyard Wind executed trust agreement (2/21/19)

AGREEMENT
REGARDING THE ESTABLISHMENT AND FUNDING OF THE
RHODE ISLAND FISHERMEN'S FUTURE VIABILITY TRUST

This Agreement Regarding the Establishment and Funding of the Rhode Island Fishermen's Future Viability Trust (the "Trust"), dated as of February 21, 2019, is made between Vineyard Wind, LLC ("Vineyard Wind") and the Rhode Island Coastal Resources Council ("CRMC") (collectively the "Parties").

WHEREAS, Vineyard Wind holds a federal Commercial Lease of Submerged Lands for Renewable Energy Development with the U.S. Bureau of Ocean Energy Management ("BOEM"), OCS-A-0501 (the "Lease"), located in federal waters approximately 14 miles south of Martha's Vineyard, Massachusetts;

WHEREAS, the Lease grants Vineyard Wind the exclusive right to submit to BOEM a Construction and Operations Plan ("COP") for a wind energy project and to conduct the activities described in the COP if approved by BOEM;

WHEREAS, on December 19, 2017, Vineyard Wind submitted a COP to BOEM proposing to construct an 800 MW wind energy project in the northern portion of its lease area (the "Project");

WHEREAS, the Vineyard Wind Project area has historically been fished by Rhode Island commercial fishermen;

WHEREAS, CRMC's Ocean Special Area Management Plan ("Ocean SAMP") identifies commercial fishing as an important contributor to the state's economy;

WHEREAS, CRMC requested to review Vineyard Wind's COP for consistency with the Ocean SAMP pursuant to the federal Coastal Zone Management Act, 16 U.S.C. § 1456, and its implementing regulations, 15 C.F.R. Part 930, Subparts D and E;

WHEREAS, Vineyard Wind voluntarily agreed to CRMC's review and filed a consistency certification with BOEM on April 6, 2018, certifying that the proposed activities in the COP will be conducted in a manner consistent with the Ocean SAMP enforceable policies;

WHEREAS, the Ocean SAMP supports the policy of increasing offshore renewable energy production as a means of mitigating the potential effects of global climate change, 650-R.I.C.R. 20-05-11.9.2;

WHEREAS, the Ocean SAMP is the nation's first regulatory structure whose principal purposes include providing a framework for addressing the compatibility of the offshore wind and commercial fishing industries through its goal of supporting offshore wind development while promoting and enhancing existing uses;

WHEREAS, it is the policy of the Ocean SAMP to protect commercial and recreational fisheries within the Ocean SAMP area, including within the Rhode Island geographic location description (GLD 2011 and 2018) from the adverse impacts of other uses, while supporting actions to make ongoing fishing practices more sustainable, 650-R.I.C.R. 20-05-11.9.4(C);

WHEREAS, the Ocean SAMP enforceable policies provide that the potential adverse impacts of offshore developments on commercial or recreational fisheries be evaluated, considered, and mitigated, 650-R.I.C.R. 20-05-11.10.1(G);

WHEREAS, Rhode Island commercial fishing interests believe the Project's layout will have an impact on their historical methods of fishing within the Project area;

WHEREAS, pursuant to federal requirements, Vineyard Wind will separately establish a direct compensation fund to compensate Rhode Island fisheries for any claims of direct impacts to Rhode Island vessels or Rhode Island fisheries in the project area (the "Direct Compensation Fund");

WHEREAS, Vineyard Wind will establish the Direct Compensation Fund in accordance with the final term sheet dated February 15, 2019 regarding Vineyard Wind Fisheries Mitigation Proposal (attached hereto as Exhibit A);

WHEREAS, CRMC will include the terms agreed to regarding the Direct Compensation Fund in its federal consistency concurrence letter, thereby making the terms set forth in the final term sheet federally enforceable;

WHEREAS, Vineyard Wind, as the first utility scale wind energy project in the United States, desires to provide additional funds to support and promote the compatibility of the offshore wind and commercial fishing interests;

WHEREAS, Vineyard Wind obtained input from the Fishermen's Advisory Board ("FAB") and CRMC staff in developing its proposal to establish a Trust to support and promote the compatibility of the offshore wind and commercial fishing interests, which resulted in the final term sheet attached hereto as Exhibit 1; and

WHEREAS, the purpose of the Trust is to further the policies of the Ocean SAMP with respect to the continued viability and success of Rhode Island's fishing industry by providing funds to address concerns raised about safety and effective fishing in and around the Vineyard Wind project area and wind farms generally.

NOW THEREFORE, the Parties agree as follows:

Purpose of the Trust

1. The establishment of the Rhode Island Fishermen's Future Viability Trust is an effective means to advance the goals of the Ocean SAMP and support and promote the compatibility of the offshore wind and commercial fishing interests within Rhode Island's GLD (2011 and 2018).

2. The purpose of the Trust is therefore to further the policies of the Ocean SAMP with respect to the continued viability and success of Rhode Island's fishing industry by providing funds to address concerns raised about safety and effective fishing in and around the Vineyard Wind project area and wind farms generally. It is intended to benefit Rhode Island fishermen and Rhode Island fishing interests within the Rhode Island GLD (2011 and 2018). There are no restrictions on the use of the funds provided they fulfill the purpose of the Trust. Examples of how the funds may be used include, but are not limited to, improvements in fishing vessels and gear, supporting widespread deployment of navigational equipment, development of new gear types or fishing methods, financial support for individual fishermen, purchase of updated safety equipment such as radar, GPS, survival suits, emergency position-indicating radio beacons, life rafts, etc., and payment of increased insurance costs related to fishing in or around wind farms.

Establishment of the Trust

3. A Rhode Island Fishermen's Future Viability Trust shall be established as a non-profit entity in accordance with Rhode Island law to fulfill the purposes set forth in Paragraph 2 herein. CRMC shall consult with CRMC's Fishermen's Advisory Board ("FAB"), as that body is defined in Ocean SAMP § 11.3(E), 650-R.I.C.R. § 20-05-11.3(E), regarding establishment of the Trust.

4. Vineyard Wind agrees to pay the legal costs associated with establishing the Trust up to fifty thousand dollars ($50,000). Vineyard Wind will pay the $50,000 to CRMC's legal counsel's IOLTA trust account at Vineyard Wind's financial close (expected late 2019). Vineyard Wind shall have no other role in the establishment of the Trust.

5. CRMC agrees to assist the FAB in selecting appropriate legal counsel to establish the Trust. CRMC's legal counsel will review and pay the invoices from counsel's Interest on Lawyers Trust Account (IOLTA) trust account in accordance with CRMC counsel's routine practices for handling similar arrangements. Any funds remaining after all invoices are paid will be returned to Vineyard Wind.

6. CRMC will work with the FAB and its appointed counsel to ensure that the Trust is established within 60 days following Vineyard Wind's financial close. CRMC will notify Vineyard Wind that the Trust has been established.

7. Once the Trust is established, Vineyard Wind, in consultation with CRMC, will arrange for and pay the costs associated with conducting up to three sessions to train the Trust's first Board members as to their roles and responsibilities with respect to the Trust.

Payments to the Trust

8. Vineyard Wind will make annual payments to the Trust to be paid in five (5) equal installments of two million five hundred thousand dollars ($2,500,000) per year. The first installment will be paid within 60 days of Vineyard Wind's financial close and the next four payments paid annually on the anniversary date thereafter. In the event that the Trust is not established within the time prescribed in Paragraph 6 herein, Vineyard Wind

will pay the first installment, and, if necessary, any future installments, to CRMC's legal counsel to be held in escrow until such time that the Trust is established.

Precedent Conditions

9. This Agreement is contingent on Vineyard Wind achieving financial close for the Project. Vineyard Wind will notify CRMC of the financial close date once it is established. If Vineyard Wind fails to reach financial close for the Project, it shall have no further obligations under this Agreement.

10. This Agreement is contingent upon CRMC's Fishermen's Advisory Board (1) voting to recommend to CRMC staff on or before February 25, 2019, that Vineyard Wind's mitigation proposal is acceptable for purposes of federal consistency and (2) the FAB members not objecting to the Project before the Council. If the FAB does not vote to recommend to CRMC staff that Vineyard Wind's mitigation proposal is acceptable for purposes of federal consistency, this Agreement is null and void.

11. This Agreement is contingent upon the CRMC concurring with Vineyard Wind's consistency certification on or before March 1, 2019.

Dispute Resolution

12. If either Party alleges that there exists a dispute or disagreement regarding the matters covered by this Agreement, it shall notify in writing the other Party of such alleged dispute or disagreement ("Dispute Notice"). The Parties shall attempt to resolve the alleged dispute or disagreement through good faith negotiations. If the Parties fail to resolve the alleged dispute or disagreement within sixty (60) days of the Dispute Notice, the Party alleging the dispute or disagreement may enforce this only by specific performance, injunctive relief or a declaratory judgment action pursuant to R.I.G.L. § 9-30-1 *et. seq.* The remedies of specific performance, injunctive relief and declaratory judgment shall be cumulative of all other rights and remedies at law or equity of the parties under this Agreement.

Governing Law

13. This Agreement shall be construed in accordance with and all disputes hereunder shall be controlled by the laws of the State of Rhode Island without regard to its conflict of laws principles. Rhode Island shall be the forum state for all forms of dispute resolution, including but not limited to judicial actions to enforce the Agreement.

Entire Agreement

14. This Agreement constitutes the entire agreement of the parties as to the subject matter herein, and supersedes any and all prior oral or written agreements of the parties. This Agreement cannot be changed or modified except in a written instrument mutually agreed-upon and signed by both parties.

Successors and Assigns

15. This Agreement shall be binding upon and inure to the benefit of the Parties and their respective successors and assigns.

Severability

16. If any part of this Agreement is found to be unenforceable, the rest will remain in full force and effect and shall be interpreted so as to give full effect to the intent of the parties.

Execution in Counterparts

17. This Agreement may be executed in counterparts and by the different parties hereto on separate counterparts, each of which when so executed and delivered shall be an original, but all counterparts shall together constitute one and the same instrument. This Agreement may be delivered by the exchange of signed signature pages by facsimile transmission, electronic signatures, or by attaching a pdf copy to an e-mail, and any printed or copied version of any signature page so delivered shall have the same force and effect as an originally signed version of such signature page.

Term; Termination

18. The term of this Agreement shall start on the date of this Agreement and shall expire upon Vineyard Wind's payment of the fifth (5th) and final installment as set forth in Paragraph 8 herein unless otherwise mutually agreed to in writing by the Parties.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed as of the date first written above.

VINEYARD WIND, LLC

DocuSigned by:
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Lars Pedersen
Chief Executive Officer

COASTAL RESOURCES MANAGEMENT COUNCIL

Grover Fugate
Executive Director

Vineyard Wind Fisheries Mitigation Proposal

TERM SHEET

Related to Vineyard Wind's 800MW project located in the northern-most portion of BOEM Wind Lease Area A-501

January 16, 2019
(amended February 12. 2019 based on input from CRMC and the FAB)
(FINAL February 15, 2019)

Mitigation Program Overview

Vineyard Wind is committed to providing a financial mitigation package for its proposed 800 MW project located in the northern-most portion of BOEM Wind Lease Area OCS-A-0501 (Project Area). The package is structured in two funds: (1) an escrow fund for financial compensation for direct Rhode Island fisheries impact claims and (2) a Rhode Island Fishermen's Future Viability Trust that will disperse funds in accordance with the purpose of the Trust and the goals of the Ocean SAMP.

I. Direct Compensation Fund

Structure of the Direct Compensation Fund

a) Funds to be held in escrow to compensate for any claims of direct impacts to Rhode Island vessels or Rhode Island fisheries in the project area.

b) Vineyard Wind will make an initial payment of $1 million to the escrow within 60 days following financial close (expected late 2019).

c) Vineyard Wind will make annual funding payments to the escrow as follows:

   i) First annual payment will be made in the second calendar year after offshore construction begins.

   ii) The annual payments over 29 years total $3.2 million (starting with $76, 000 escalating 2.5% per year).

d) The escrow will be administered by a third-party selected by Vineyard Wind. Vineyard Wind will consult with CRMC staff and the FAB regarding the selection of the administrator.

   i) Administration costs associated with managing the fund, establishing a claims procedure, reviewing claims, and, dispersing financial compensation will be paid by Vineyard Wind directly and will not be deducted from the escrow funds.

ii) Rhode Island fishermen, Rhode Island fishing companies, and companies that support Rhode Island fishing interests can submit claims of direct impacts or losses during any phase of the project (construction, operation, decommissioning) within the Project Area to the claims administrator.

iii) A claims review and decision process to be established by Vineyard Wind. Vineyard Wind will seek input from the FAB with respect to the claims review and approval process.

iv) Paid claims will be accompanied by a release of liability for future claims.

v) Funds remaining after making claims payments for any given year will be rolled over to the following year for future claims.

vi) After 5 years of commercial operations, the fund administrator will evaluate the claims history against the fund and make reasonable projections regarding future claims. The claims administrator will use his/her best professional judgment as to whether the balance of the fund and future payments to the fund exceed the amounts necessary to pay anticipated claims. If the fund administrator determines that the balance of the fund exceeds an amount deemed necessary to pay future claims, the administrator may transfer the excess funds, in an amount as determined by the administrator, to the Rhode Island Fishermen's Future Viability Trust to be used in accordance with the purposes of the Trust. The fund administrator will conduct this assessment every 5 years thereafter and transfer funds accordingly. Upon completion of decommissioning, any funds remaining after all claims are paid will be transferred to the Rhode Island Fishermen's Future Viability Trust to be used in accordance with the purposes of the Trust.

II. RHODE ISLAND FISHERMEN'S FUTURE VIABILITY TRUST

Purpose of the Rhode Island Fishermen's Future Viability Trust

The Rhode Island Ocean SAMP is the nation's first regulatory structure whose principal purposes include providing a framework for addressing the compatibility of the offshore wind and fishing industries through its goal of supporting offshore wind development while promoting and enhancing existing uses. It is the policy of the Ocean SAMP to protect commercial and recreational fisheries within the Ocean SAMP area, including within the Rhode Island geographic location description (GLD 2011 and 2018) from the adverse impacts of other uses, while supporting actions to make ongoing fishing practices more sustainable. The Ocean SAMP recognizes that the commercial and recreational fishing industries, and the habitats and biological resources of the ecosystem they are based on, are of vital economic, social, and cultural importance to Rhode Island's fishing ports and communities, as well as the need for offshore wind to address climate change.

The purpose of the Trust is to further the policies of the Ocean SAMP with respect to the continued viability and success of Rhode Island's fishing industry by providing funds to address concerns raised about safety and effective fishing in and around the Vineyard Wind project area and wind farms generally. It is intended to benefit Rhode Island fishermen and Rhode Island fishing interests within the Rhode Island GLD (2011 and 2018).

Structure of the Rhode Island Fishermen's Future Viability Trust

a) The FAB, in consultation with CRMC staff, will establish the Rhode Island Fishermen's Future Viability Trust as a non-profit entity independent of the State of Rhode Island.

b) Vineyard Wind will make annual payments to the Rhode Island Fishermen's Future Viability Trust to be paid in five (5) equal installments of $2.5 million per year. The first installment will be paid within 60 days of financial close (expected late 2019) or when the Trust is established, whichever is later.

c) The programs and activities supported by the Rhode Island Fishermen's Future Viability Trust to be decided by a trust board, the structure and composition of which to be determined by the FAB in consultation with CRMC staff. There are no restrictions on how the funds may be used provided they further the purpose of the Trust.

d) Vineyard Wind will pay the legal costs associated with establishing the Trust up to $50,000 payable 30 days after receiving an invoice for the costs associated with establishing the Trust.

e) Costs associated with conducting up to three sessions to train the board as to their roles and responsibilities with respect to the Trust.

Contingencies

This mitigation package is contingent on:

1. The Fisheries Advisory Board (FAB) voting to recommend to CRMC on or before February 25, 2019, that Vineyard Wind's mitigation proposal is acceptable for purposes of federal consistency;
2. CRMC staff recommending to the Council that Vineyard Wind's consistency certification is consistent with the Ocean SAMP enforceable policies;
3. FAB members not objecting to the project before the Council;
4. The Council concurring with Vineyard Wind's consistency certification by March 1, 2019; and
5. Vineyard Wind achieving financial close (expected in late 2019) and thereby progressing towards actual construction.

Appendix 26. Vineyard Wind Commercial Fisheries Biological Assessment and Monitory Plan Summary (2/18/19)

OCS-A 0501 MASS USA

VINEYARD WIND

February 18, 2019

Grover Fugate
Director
Rhode Island Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 3
Wakefield, RI 02879-1900

Re: Vineyard Wind – CRMC File No. 2018-04-055

Dear Mr. Fugate:

As described in Vineyard Wind's Construction and Operations Plan ("COP"), Vineyard Wind has been working with the University of Massachusetts Dartmouth's School for Marine Science and Technology (SMAST) and local stakeholders to develop a pre- and post-construction fisheries monitoring program to measure the project's potential effects on fisheries resources ("Monitoring Plan"). Vineyard Wind took this approach to designing the pre- and post-construction fisheries studies so that those who work directly in the fishing industry — most importantly fishermen but also regulators and academics — would have a lead role in identifying the issues to be addressed through the studies, and methods used. In order to better ensure active participation from the fishermen themselves, SMAST held a series of workshops specifically for fishermen in order to get their input, in which 63 fishermen participated. These workshops were held around the region, including one at the Commercial Fisheries Center of Rhode Island on November 15, 2018.

Further, in October, 2018 SMAST conducted an initial bottom trawl survey of the Vineyard Wind lease area. These surveys served two purposes: First, to provide an initial season of data, so as to have more data than required by the SAMP even though pre- and post-construction survey design had not been finalized, and second to test the effectiveness of an innovative open codend/video sampling technology. Both purposes were achieved. SMAST concluded that the video system was not effective for use in the lease area because of the nature of the substrate, which severely affected visibility, and therefore the pre- and post-construction surveys will not use this sampling method. SMAST also successfully conducted 21 closed cod end tows which were utilized to assess abundance, spatial distribution, size structure, and length-weight relationships of commercially and recreationally targeted species in the area. In addition to providing additional data beyond what is required by the SAMP, the data collected by these surveys helped to inform the number of stations required to increase the statistical power of the "beyond BACI" study design for the trawl survey monitoring plan that is recommended to follow the NEAMAP protocols. These data will also be made available to a

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long-term, regional fisheries studies program, in which Vineyard Wind has committed to supporting and participating.

Input from the fishermen's workshops, along with results of the initial trawl survey, was incorporated and considered by SMAST in developing its recommendations. Academic researchers, as well as federal, Rhode Island, and Massachusetts regulators, also provided input and comment that informed the plan's design.

Vineyard Wind is in the process of obtaining federal agency (NMFS and BOEM) comments and approval of the Monitoring Plan, which has taken longer than expected due to the federal government shutdown. Nevertheless, for purposes of federal consistency, Vineyard Wind is providing CRMC with a description of the Monitoring Plan, which demonstrates that the plan is consistent with Ocean SAMP §§ 11.10.5 and 11.10.9:

> A biological assessment of commercially and recreationally targeted species shall be required within the project area for all offshore developments. This assessment shall assess the relative abundance, distribution, and different life stages of these species at all four seasons of the year. This assessment shall comprise a series of surveys, employing survey equipment and methods that are appropriate for sampling finfish, shellfish, and crustacean species at the project's proposed location. Such an assessment shall be performed at least four times: pre-construction (to assess baseline conditions); during construction; and at two different intervals during operation (i.e. one (1) year after construction and then post-construction). At each time this assessment must capture all four seasons of the year. This assessment may include evaluation of survey data collected through an existing survey program, if data are available for the proposed site.

Overview of the Monitoring Plan

Under the Monitoring Plan, sampling will be conducted before, during and after construction in the project area and control areas to support a "beyond BACI" analysis (e.g., sampling at multiple control sites at multiple periods before and after impact). (Underwood 1991, 1992). Sampling will be conducted four times: pre-construction (to assess baseline conditions); during construction; and at two different intervals during operation (i.e. one (1) year after construction and then post-construction). Each of these four assessment periods will capture all four seasons of the year. Vineyard Wind expects to commence pre-construction sampling in Spring 2019, which is more than one year in advance of the expected start of offshore construction in the Summer 2020 or perhaps even later.

The Monitoring Plan is designed to both make use of existing survey data (as contemplated in the SAMP), as well as to support and maximize the utility of longer-term, regional fisheries studies. Although regional sampling has relatively low spatial resolution (i.e., few observations in the impact area), these existing regional surveys offer years of standardized sampling for evaluating inter-annual variability, samples many candidate control areas for different species, and offer regional context for coordinated monitoring of adjacent wind energy lease sites. Integrated analysis of regional sampling and impact monitoring data will

also facilitate the evaluation of regional impacts and will support federal agency requests to coordinate monitoring plans among adjacent lease areas.

To capture each group of taxa over multiple life history stages, several sampling methods will be utilized. For example, trawl surveys monitor several important species of finfish and squid, a benthic survey would monitor several demersal invertebrate species, and a plankton survey would sample all commercial and recreational target species. To supplement these multispecies surveys, surveys would target priority species, e.g., lobster.

The Monitoring Plan will follow a collaborative and adaptive approach. A scientific advisory group will be formed to review the annual monitoring data, review data analyses and interpretations, and recommend improvements to the Monitoring Plan if needed. There will also be ongoing collaboration with the fishing industry to ensure that local ecological knowledge and expertise with fishing gear is incorporated into the surveys. Vineyard Wind expects to form a fishermen's monitoring working group to provide perceptions of local and regional changes in fishery resources, review survey results, and recommend revisions to the Monitoring Plan.

Sampling Methods

1. Trawl Survey for Finfish and Squid

The Northeast Area Monitoring and Assessment Program (NEAMAP) was developed to support stock assessment and fisheries management in the northeast United States (Bonzek et al. 2016). NEAMAP has sampled from Cape Cod to Cape Hatteras since 2006. The net used by NEAMAP (4 seam, 3 bridle, 400 x 12 cm net with a cookie sweep and 1" knotless liner in the cod end) was designed by the Northeast Trawl Advisory Panel (NTAP, www.mafmc.org/ntap), an advisory panel of the Mid-Atlantic and New England Fishery Management Councils composed of Council members, fishing industry, academic, and government and non-government fisheries experts. The net was initially developed for the Northeast Fisheries Science Center's (NEFSC) offshore trawl survey to efficiently sample a wide range of commercially and recreationally important species (Johnson & McCay 2012). The NEFSC offshore survey uses rockhopper footrope to survey hard bottom habitats (e.g., in the Gulf of Maine), but the NEAMAP survey uses a foot rope that is more suited to sampling flatfish and appropriate for the relatively soft bottom in the Vineyard Wind lease area. The smaller vessel used by the NEAMAP inshore survey is also more suitable for sampling near turbines than the much larger vessel used by the offshore NEFSC survey. Both NEAMAP and NEFSC survey data are used in many stock assessments, so the relative efficiency of the two surveys is well established for many species. Therefore, the Monitoring Plan will follow the NEAMAP survey protocol to allow comparison with regional NEAMAP and NEFSC trawl survey data.

The optimal sample size for detecting impacts for twelve species is approximately 20 tows in both the project area and control area. See Figure 1. The tows will be conducted four times a year to capture each season. SMAST will conduct the surveys, contracting with vessels who have experience fishing in the project area. SMAST will solicit bids from vessels homeported in Massachusetts, Rhode Island, Long Island, and New Jersey.

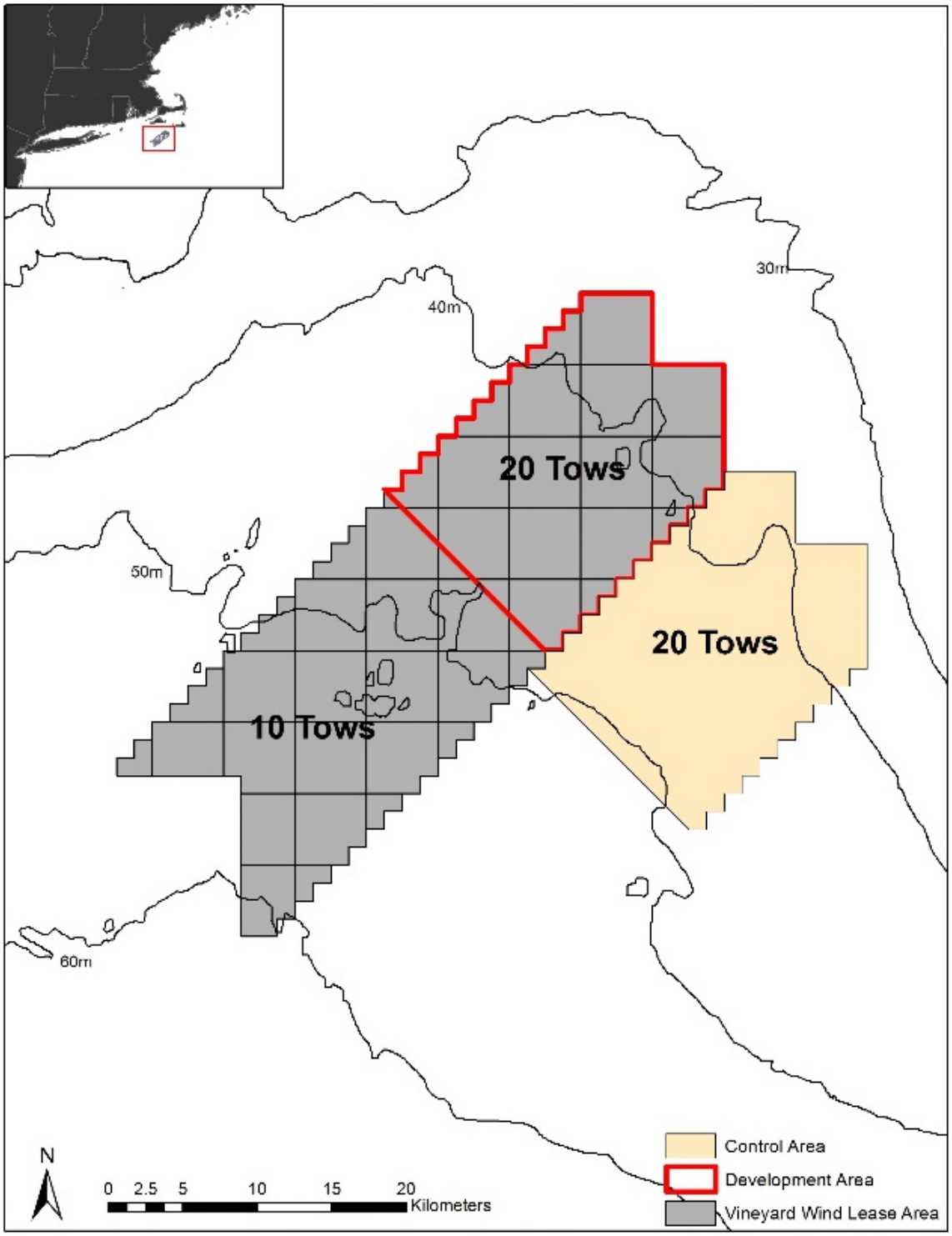

Figure 1. *Proposed tow areas for the spring 2019 survey in the Vineyard Wind development area (grey with red outline), adjacent control area (yellow), and southern undeveloped area (grey).*

2. Ventless Trap Survey

The Massachusetts Division of Marine Fisheries (MADMF) has conducted ventless lobster trap surveys since 2006 (Pugh et al. 2015). MADMF contracts Massachusetts lobstermen to set and haul ventless traps from June through September at random locations in state waters to monitor the abundance of lobster, crabs and whelk (www.mass.gov/service-details/american-lobster-research-and-monitoring). The Rhode Island Department of Environmental Management Division of Marine Fisheries has also conducted a ventless trap survey since 2006 (RIDEM 2018). A Southern New England Cooperative Ventless Trap Survey was developed in 2014 to assess the seasonal distribution, movement, and habitat use of the American lobster and Jonah crab in the Cox's Ledge Wind Energy Area for a pre-construction baseline for lobster and Jonah crab (www.cfrfoundation.org/snecvts). The survey is a partnership with commercial lobstermen to sample 24 lease blocks in the lease area. The RI/MA WEA was selected for the study, based on their potential for development of offshore wind energy. Biological sampling is conducted within each lease block two times per month from May to November. Survey gear includes trawls of six ventless traps and four standard traps, which are sampled twice per month, with a target soak time of 5 days.

The Monitoring Plan will follow the protocol developed by the Southern New England Cooperative Ventless Trap Survey. Sampling will be conducted two times per month from May to October. Per direction from the federal agencies, November sampling will not be included because of the potential presence of the North American Right Whale in the project area. Trawls will be conducted twice per month, with a target soak time of 3- 5 days. The Massachusetts Lobstermen's Association will lead the effort to provide vessels and equipment. SMAST will provide the scientific staff and conduct the sea data collection and data analysis with the Massachusetts Department of Marine Fisheries assisting with the final survey design.

Vineyard Wind is exploring with the federal agencies the possibility of tagging lobsters and using sensors on pots to record bottom temperature, current flow, acidification, and sound characteristics. This would allow more detailed, continuous tracking of lobster movements. In addition, in support of the broader effort to address concerns regarding potential North Atlantic Right Whale (NARW) entanglement in fishing gear, Vineyard Wind intends to use experimental break-away lines with sleeves. The use of this new gear technology in the surveys provides fishermen an opportunity to gain experience working with the technology and evaluating its effectiveness offshore. If proven feasible offshore, greater use of this gear could provide significant benefits to the lobster fishery and NARW.

3. Plankton Survey

The NEFSC samples phytoplankton, microzooplankton, and mesozooplankton on the northeast U.S. continental shelf from Cape Hatteras to the Gulf of Maine during the spring and fall bottom trawl surveys and during some of the Ecosystem Monitoring cruises in winter, late spring, late summer and late autumn (www.nefsc.noaa.gov/epd/oceanography/shelfwide.html). The current Ecosystem Monitoring survey protocol has been conducted since 1988. Zooplankton and ichthyoplankton are sampled using paired 61-cm Bongo samplers equipped with 333 micron mesh nets. At each

station, double oblique tows are made to 5 m above the bottom, or to a maximum depth of 200 m. A digital flowmeter is suspended in the mouth of each Bongo sampler to quantify the volume of water filtered by each net. Plankton tows are conducted at a speed of 2.8 km/h. Plankton samples are preserved in a 5% solution of formalin in seawater, and stored for subsequent laboratory analysis. Over 300 plankton taxa are sorted, identified and enumerated, including major target species in commercial and recreational fisheries.

The monitoring will utilize the NEFSC Ecosystem Monitoring nets and will follow the NEFSC Ecosystem Monitoring survey protocol as to the extent feasible to allow comparison with regional and baseline sampling. The plankton tows will be conducted concurrently with the ventless trap surveys, i.e., two times per month from May to October.

4. Optical Survey of Benthic Invertebrates and Habitat

Region-wide drop camera surveys have been conducted by SMAST since 2003 (Stokesbury et al. 2004, Bethoney and Stokesbury 2018). The survey design is systematic centric, including four samples at each station, and stations are placed in a (5.56 km) grid. Baseline sampling with the SMAST drop camera survey was completed in the lease area in 2012 and 2013. The survey sampled a diverse assemblage of benthic invertebrates and habitats, and the spatial resolution of stations has been sufficient for quantifying changes in abundance of several species in a beyond BACI design (e.g., scallops, skates, flounder, hake, echinoderms, sponges, bryozoan/hydrozoa; Stokesbury and Harris 2006).

The Monitoring Plan will emulate the SMAST drop camera survey as much as possible to allow comparison with regional and baseline sampling. Drop camera surveys would be conducted annually in spring and fall in the lease area.

Summary

In addition to providing the biological assessment of commercially and recreationally targeted species as called for in the Ocean SAMP, Vineyard Wind's Monitoring Plan makes important contributions to understanding and managing fisheries in the years ahead, including:

- Developing a model for active fishermen to provide significant input in the design of fisheries studies;
- Establishing a fishermen/researcher working group to guide studies underway—this working group could be continued and expanded to benefit longer-term, regional studies;
- Identifying appropriate sampling methods that could initially be adopted by other wind developers in neighboring lease areas, therefore contributing to longer-term, regional studies;
- Providing first data to such longer-term regional surveys, and also providing data that is useful in the context of existing long-term data sets;
- Testing and developing innovative survey methods;

- Testing or demonstrating new fishing gear that can benefit the region's important and iconic lobster fishery.

Vineyard Wind takes its leadership role as the first commercial offshore wind project in the region very seriously, and has worked hard to ensure that our fisheries Monitoring Plan described here contributes to the on-going success of the offshore wind and fisheries industries' continued growth alongside one another.

Please let me know if you have any questions.

Sincerely,

Erich Stephens
Chief Development Officer