



# Draft Construction and Operations Plan Addendum for the Phase 2 Offshore Export Cable Corridor South Coast Variant

## Appendices

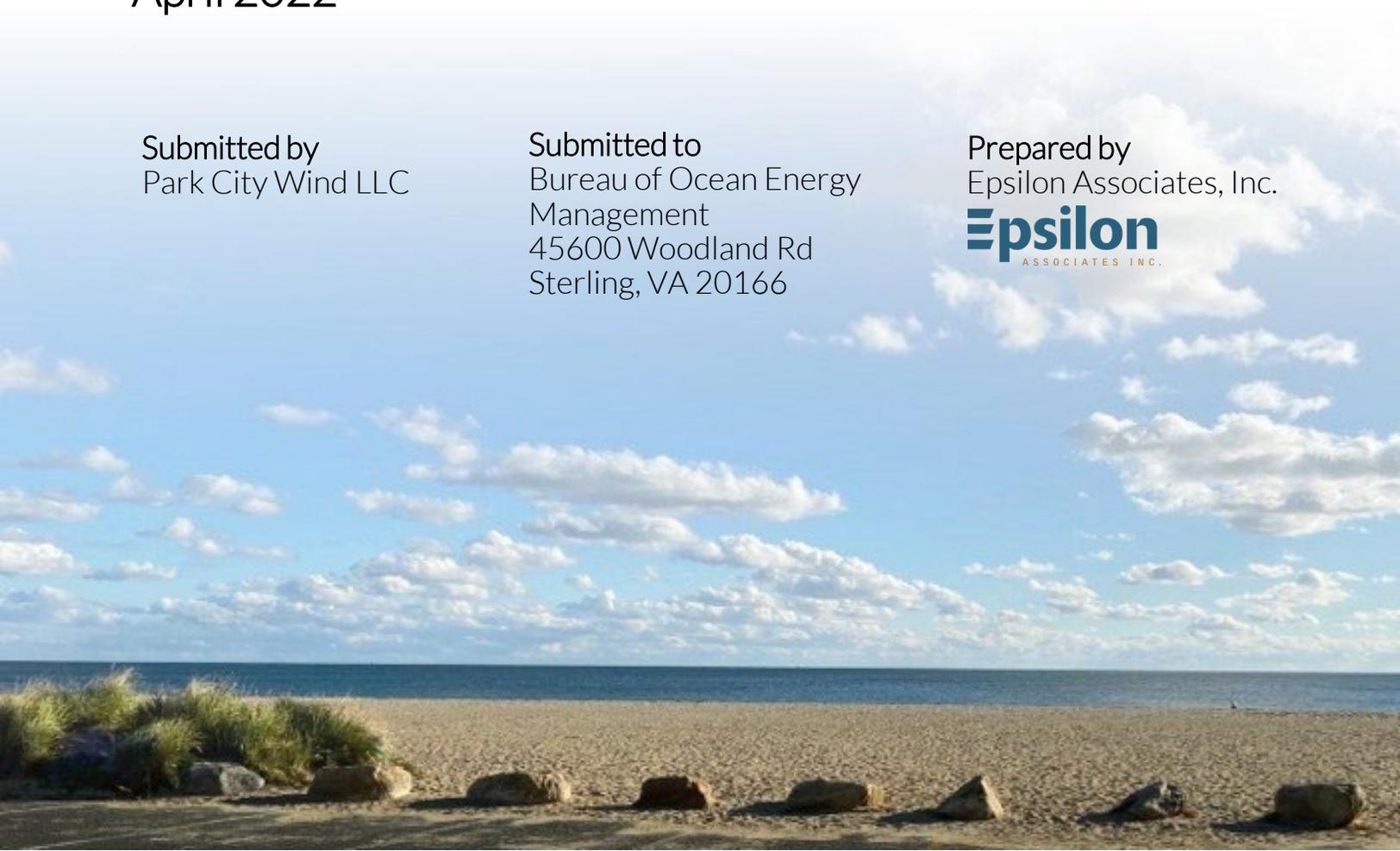
April 2022

Submitted by  
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Submitted to  
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## **Appendices**

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**April 2022**

**Appendix F**

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Economic Exposure of Commercial Fisheries

# Economic Exposure of Commercial Fisheries to the New England Wind Phase 2 Offshore Export Cable Corridor South Coast Variant

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## 1.0 INTRODUCTION

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New England Wind is an offshore renewable wind energy development proposed for Bureau of Ocean Energy Management (BOEM) Lease Area OCS-A 0534 along with associated offshore and onshore cabling, onshore substations, and onshore operations and maintenance (O&M) facilities. New England Wind will be developed in two Phases: Phase 1 (also known as Park City Wind) and Phase 2 (also known as Commonwealth Wind). Four or five offshore export cables (two for Phase 1 and two or three for Phase 2) will transmit electricity generated by the wind turbine generators (WTGs) to onshore transmission systems (see Figure 1). Park City Wind LLC, a wholly owned subsidiary of Avangrid Renewables, LLC, is the Proponent and will be responsible for the construction, operation, and decommissioning of New England Wind.

The Proponent has identified an Offshore Export Cable Corridor (OECC) for the installation of the offshore export cables (see Figure 1). The OECC travels north from Lease Area OCS-A 0534 along the eastern side of Muskeget Channel towards landfall sites in the Town of Barnstable, Massachusetts. The expected grid interconnection point for both Phases of New England Wind is the West Barnstable Substation. While the Proponent intends to install all Phase 2 offshore export cables within this OECC, the Proponent has identified two variations of the OECC that may be employed for Phase 2: the Western Muskeget Variant, which differs from the OECC only in that it passes along the western side rather than the eastern side of Muskeget Channel, and the South Coast Variant, which follows a different route than the OECC and the Western Muskeget Variant and connects to a potential second grid interconnection point along the southwest coast of Massachusetts) (see Figure 1). These variations are necessary to provide the Proponent with commercial flexibility should technical, logistical, grid interconnection, or other unforeseen issues arise during the Construction and Operations Plan (COP) review and engineering processes.

The Proponent has submitted a draft New England Wind COP that describes the OECC and both potential Phase 2 OECC variants, and includes an appendix that provides data, analysis, and estimates of the economic exposure of commercial fisheries to the OECC and the Western Muskeget Variant. The purpose of this report is to provide similar estimates of the economic exposure of commercial fisheries to the South Coast Variant. The commercial fisheries economic exposure analysis presented in this report incorporates by reference the results of some general analyses of cable corridor impacts on commercial fishing that were presented in Appendix III-N Economic Exposure of Commercial Fisheries to the New England Wind Offshore Wind Energy Development (Appendix III-N) of COP Volume III and is focused on describing impacts that are unique to the South Coast Variant. Accordingly, descriptions of impacts that are associated with the OECC or its variants more generally and that are not specific to the South Coast Variant are not repeated in this report.

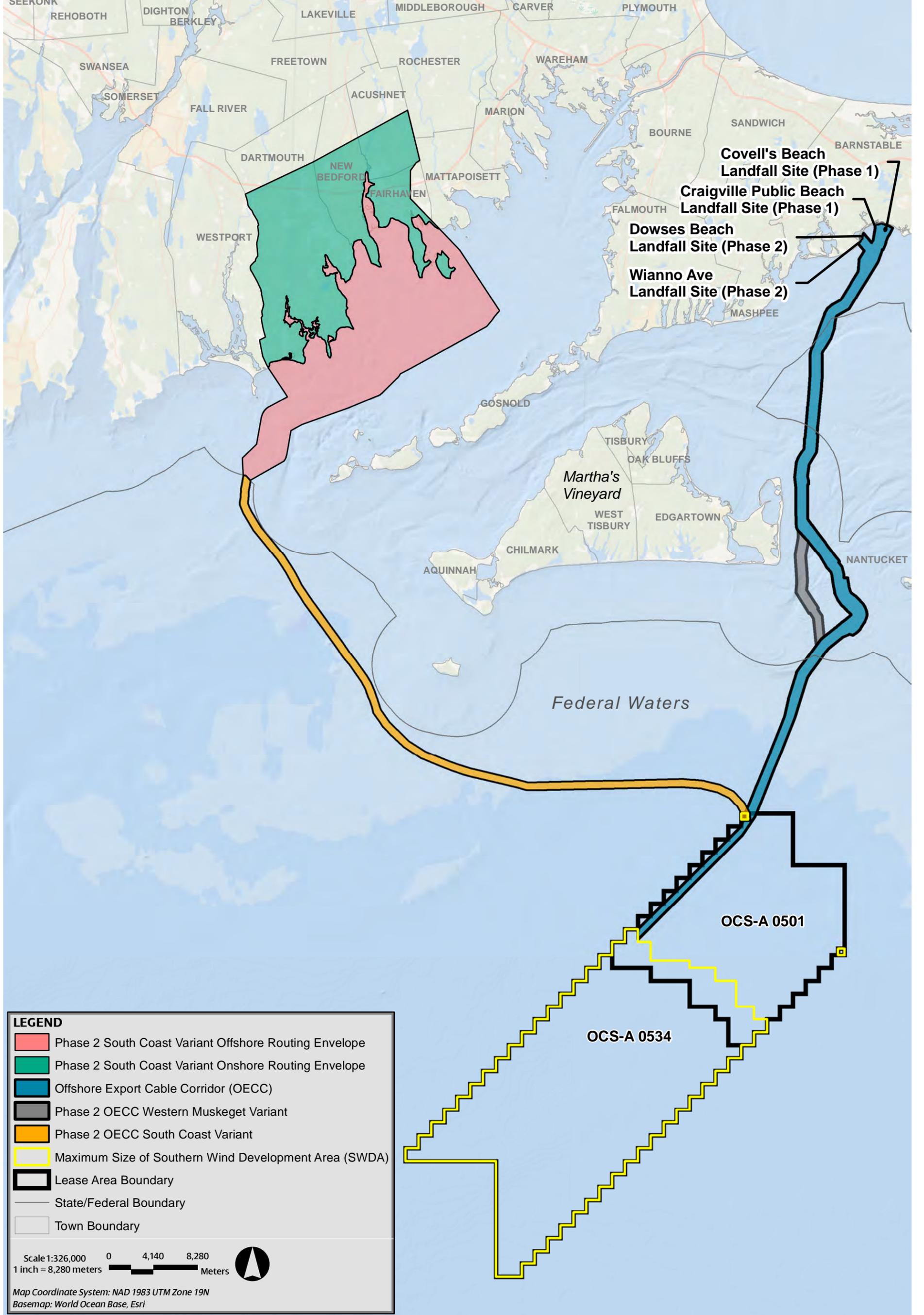
The report focuses only on economic exposure of commercial fishing to the South Coast Variant in federal waters. If it becomes necessary to employ the South Coast Variant and a second grid interconnection point is secured, the Proponent understands that BOEM would conduct a supplemental review of those

portions of the South Coast Variant not otherwise considered in the final environmental impact statement. This report focuses on commercial fisheries, not recreational fisheries, and potential impacts of the South Coast Variant on fishing activity, not potential South Coast Variant impacts on fish resources.<sup>1</sup>

## **1.1 Overview of the Phase 2 OECC South Coast Variant**

As shown in Figure 1, the South Coast Variant diverges from the OECC at the northern boundary of Lease Area OCS-A 0501 and travels west-northwest to the Massachusetts state waters boundary near Buzzards Bay. From the Southern Wind Development Area (SWDA)<sup>2</sup> boundary (excluding the two separate aliquots that are closer to shore) through federal waters to the Massachusetts state waters boundary, the South Coast Variant is approximately 79 kilometers (km) (42 nautical miles [NM]) in length and approximately 720 meters (m) (2,360 feet [ft]) in width. To allow additional cable length for turns and micro-siting of the cable within the corridor, the maximum length of each cable within this variation of the OECC (from the SWDA boundary to the state waters boundary) is estimated to be 84 km (~45 NM).<sup>3</sup> At the state waters boundary, the South Coast Variant broadens to a “Phase 2 South Coast Variant Offshore Routing Envelope” that designates a region within Buzzards Bay where the Phase 2 offshore export cable(s) may be installed before making landfall along the southwest coast of Massachusetts within the Offshore Routing Envelope

The South Coast Variant is included in the COP to provide the Proponent with an alternative if unforeseen circumstances preclude one or more Phase 2 export cables from using either the OECC or the Western Muskegat Variant to interconnect at the West Barnstable Substation. If the South Coast Variant is used for Phase 2, there will be either: (1) one export cable installed in the South Coast Variant and two export cables installed in the OECC, (2) two export cables installed in the South Coast Variant and one export cable installed in the OECC, or (3) three export cables installed in the South Coast Variant.

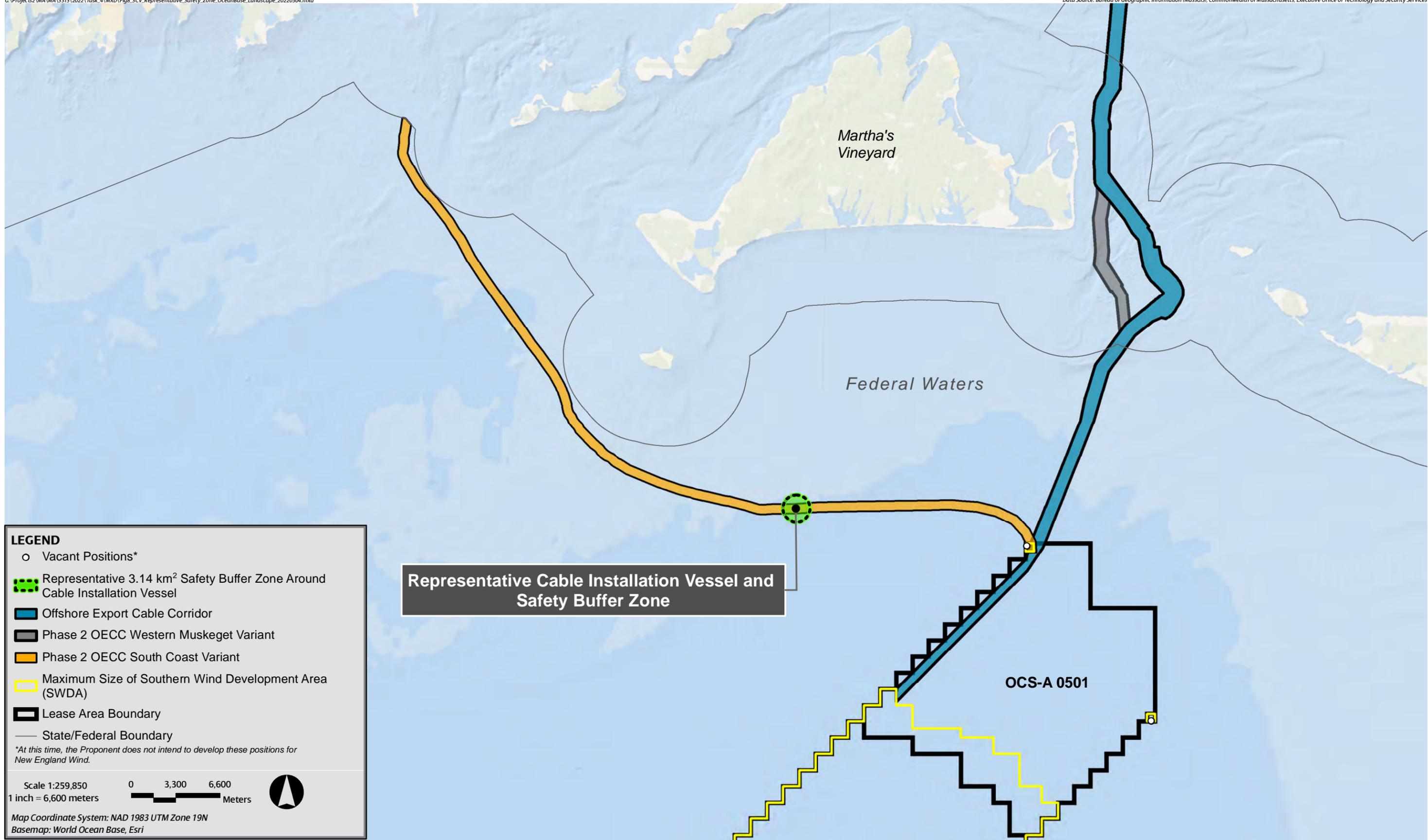


## 1.2 Focus

BOEM states that “*economic exposure* refers to potential economic impacts, not predicted or expected economic impacts” and refers to it as “a starting point to understanding potential *economic impacts* of future offshore wind project development if a harvester opts to no longer fish in the area and cannot recapture that income in a different location” (Kirkpatrick et al. 2017). BOEM emphasizes that “revenue exposure measures should not be interpreted as a measure of economic impact or loss” (BOEM 2021) and 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*” (BOEM 2018).

Following BOEM guidance, estimates of economic exposure developed in this report are based on the assumption that the South Coast Variant will result in the cessation of all fishing activity in areas of active cable installation activity along the South Coast Variant resulting in the loss of all fishing revenues from those areas. Multiple communication methods will be used to share the locations and durations of planned cable installation activities in the South Coast Variant with commercial fishermen. At any given time during construction ongoing cable laying activity will only preclude commercial fishing in a small portion of the cable corridor (approximately 2.5%), leaving the rest of the South Coast Variant and surrounding areas open to commercial fishing (Figure 2). During operations, commercial fishing vessel operators will have the opportunity to continue to operate in the entire South Coast Variant. BOEM guidance indicates that expected economic impacts will be less than economic exposure if fishing vessel operators can adapt and recoup at least some lost revenues by shifting fishing effort from impacted areas to other nearby areas. Overall, fishery-related economic impacts during and after cable installation in the South Coast Variant should be expected to be significantly lower than economic exposure.<sup>4</sup>

Research conducted for this report also addresses three potential indirect sources of South Coast Variant economic impacts on commercial fishing and on fishery-dependent shoreside businesses. These are associated with: (1) potential for fishing effort diverted from the South Coast Variant to cause adverse “fishing congestion” impacts in other fishing areas, (2) potential increases in fishing vessel transit times, and (3) potential for reduced fishing effort and fish landings in the South Coast Variant to cause economic losses in shoreside businesses that either support commercial fishing (upstream economic impacts) or rely on commercial fish landings (downstream economic impacts).<sup>5</sup> As the analyses presented in Section 2.1 and Section 2.2 indicate the small size and short duration of fishing area closures associated with cable installation activities in the South Coast Variant, and the limited amount of fishing effort and fish harvest that could be impacted by these activities, result in potential indirect economic impacts associated with these three sources being insignificant and not measurable



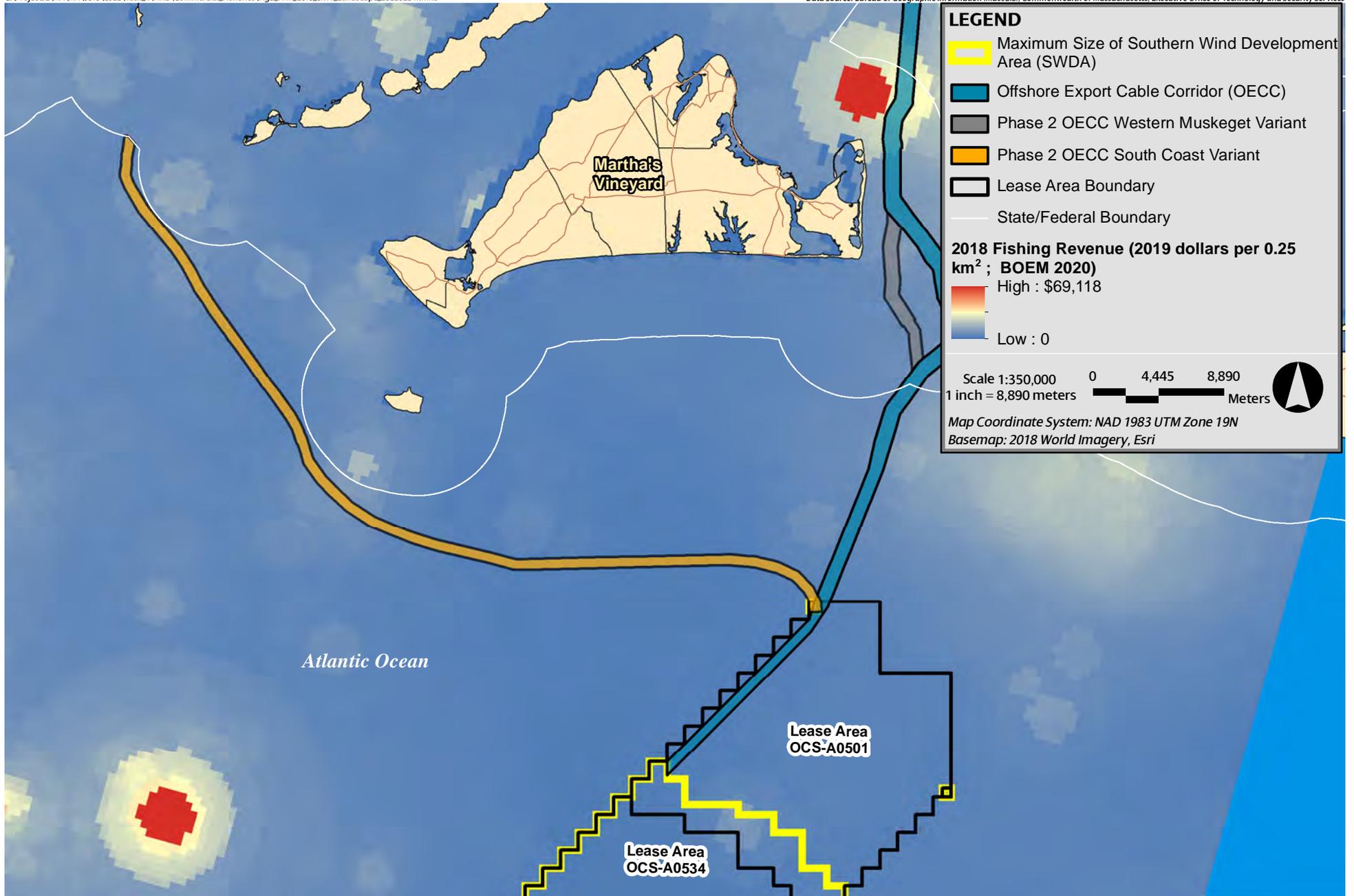
### 1.3 Data Sources

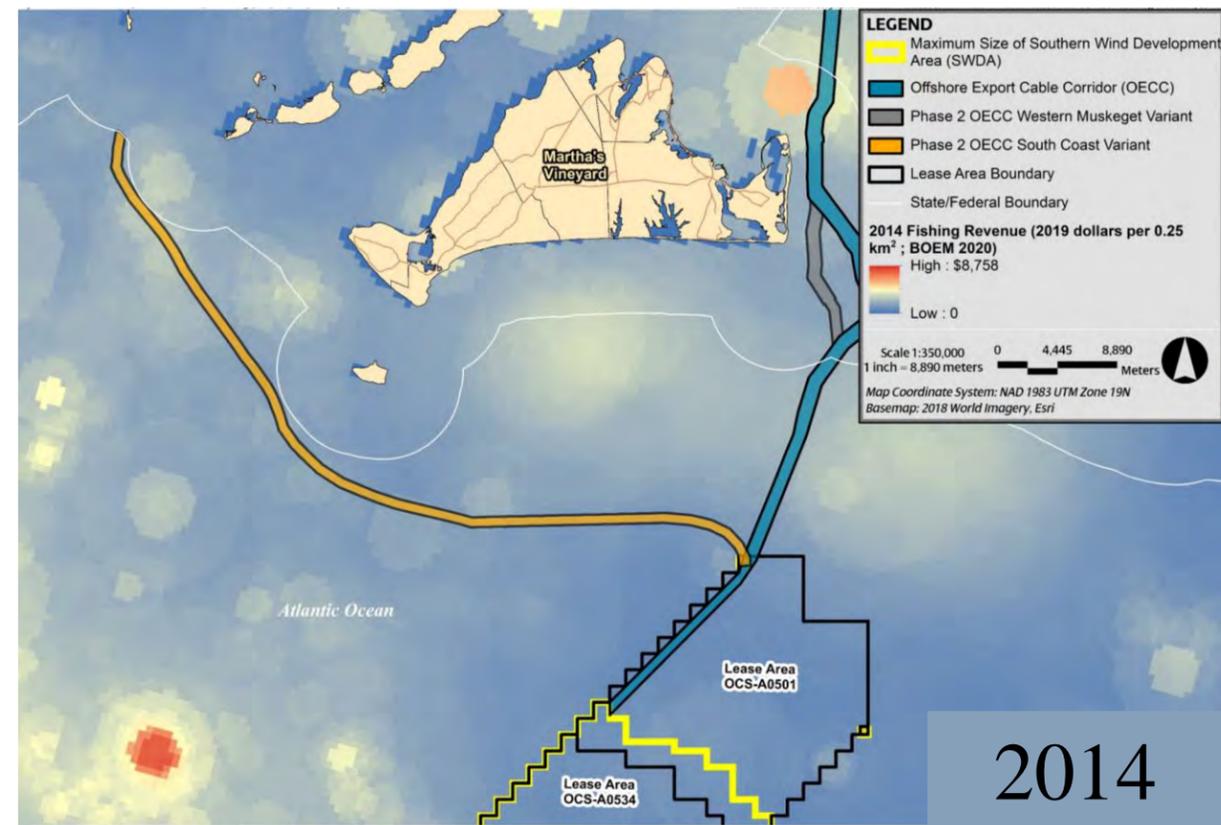
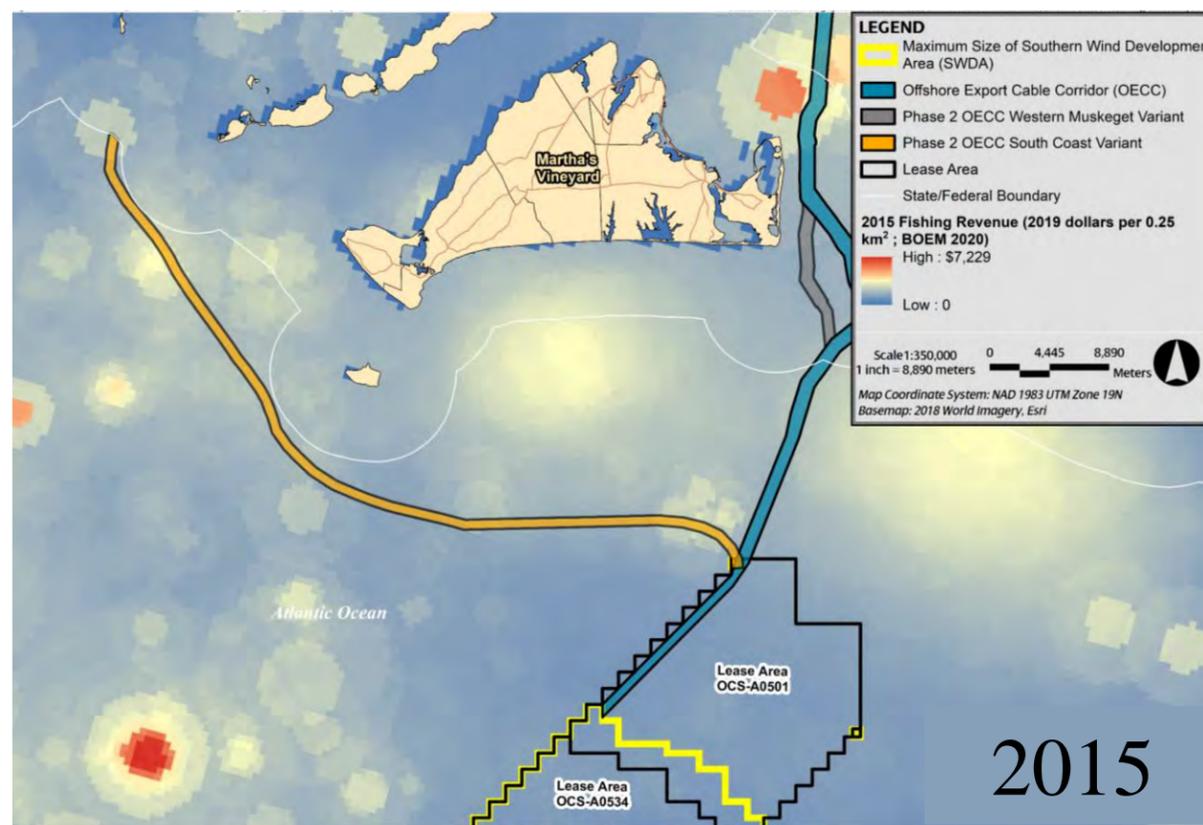
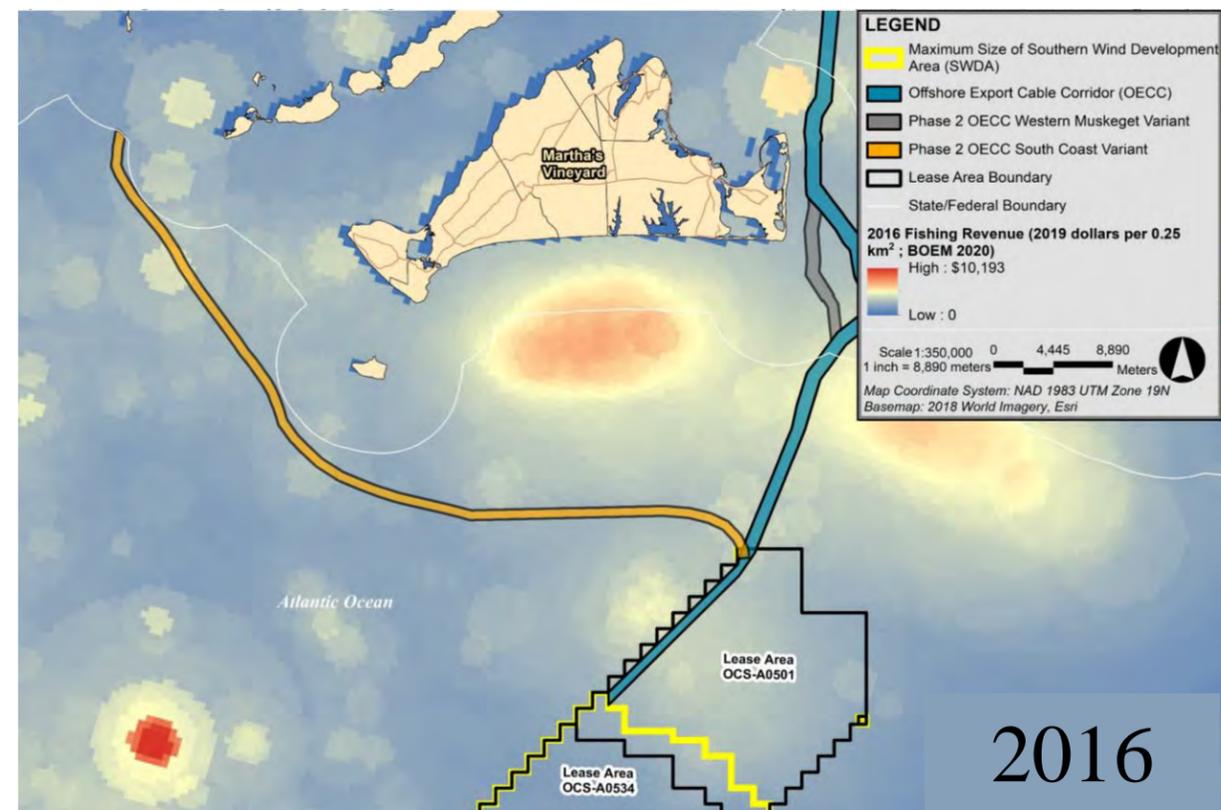
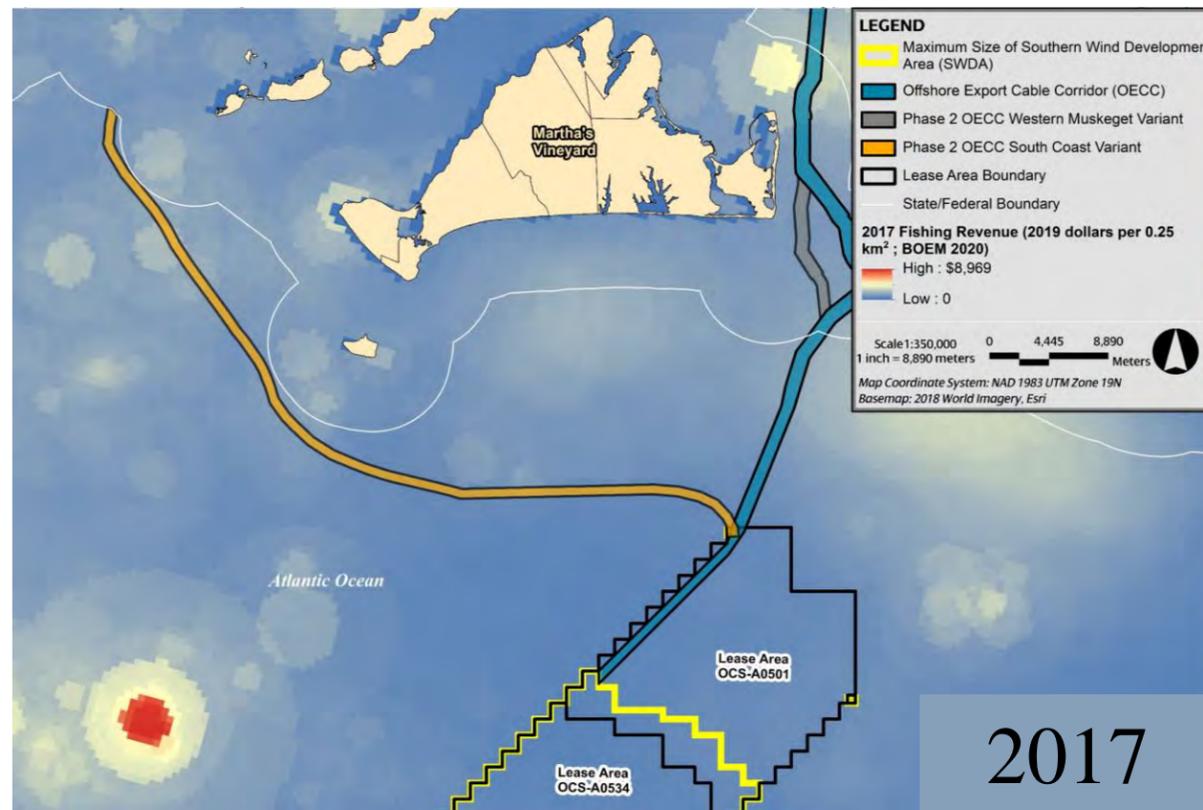
The four main sources of fishing revenue data that are available to estimate expected fishing revenues in the South Coast Variant are Vessel Trip Report (VTR) data, Vessel Monitoring System (VMS) data, commercial landings data, and Fishing Revenue Intensity (FRI) data.<sup>6</sup> For the purposes of this report, average annual fishing revenues generated within the South Coast Variant were estimated based on fishing revenue intensity data (US dollars per 0.25 km<sup>2</sup>) generated by BOEM and NOAA Fisheries for years 2007 through 2018 (BOEM 2020). NOAA Fisheries and BOEM developed revenue intensity rasters summarized by fishery management plan by merging VTR information with data collected by at-sea observers.

Figure 3 displays annual FRI data in and around the South Coast Variant for 2018, the most recent year FRI data are available, and Figure 4 displays FRI data for the previous four years, 2014-2017 (BOEM 2020). These figures provide two types of useful general indicators: how much fishing revenues might be exposed to impacts from the South Coast Variant; and how much fishing revenues lost in the South Coast Variant might be expected to be recouped as a result of fishing effort shifting from there to adjacent and nearby fishing areas. The figures also provide context for assessing the magnitude of fishing revenue exposure estimates presented in this report by confirming three observations:

- ◆ The South Coast Variant is not a high value fishing area.
- ◆ The South Coast Variant is surrounded by many equally or higher valued fishing areas.
- ◆ Fishing revenues generated within the South Coast Variant are fairly uniformly distributed and relatively consistent from year to year.

In order to use fishing revenue data to estimate the economic exposure of commercial fishing to offshore wind energy development assumptions must be made about thresholds or minimum standards for defining what BOEM refers to as fishing values that “may be impacted” (Kirkpatrick et al. 2017). For the purposes of this report, it is assumed that during construction of the South Coast Variant all fishing values in safety areas established around where cable installation activities are taking place “may be impacted.” After construction it is assumed that fishing revenues associated with harvests by mobile bottom fishing gear in areas where cable protection may be placed on the seafloor “may be impacted.”





## 2.0 ESTIMATE OF ECONOMIC EXPOSURE AND IMPACTS

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### 2.1 Assessment of Economic Exposure and Economic Impacts During Construction

#### 2.1.1 *Duration of Cable Installation Activity*

As described in Section 1.1, one to three cables may be installed within the South Coast Variant. Based on analyses by New England Wind’s export cable engineers, typical cable laying speeds in the South Coast Variant are expected to range from 328 ft to 656 ft (100 to 200 meters) per hour and cable laying is expected to occur 24 hours per day. Cable installation will require several “pre-lay activities” such as a survey of the cable alignment, a pre-lay grapnel run of the cable alignment, and boulder relocation, and some “post-lay activities” such as cable splicing and the placement of cable protection. These activities have areas of commercial fishing impact that are similar to those associated with cable laying itself. Based on analyses completed by New England Wind’s export cable engineers, it is currently expected that the full potential duration of cable installation impacts on commercial fisheries in the portion of the South Coast Variant in federal waters, including all cable laying and pre-lay and post-lay activities, is approximately 4.5 months per cable for a maximum duration of 13.5 months if three cables are installed.

#### 2.1.2 *Area of Cable Installation Activity*

Based on U.S. Coast Guard guidance, a safety buffer will be established around where cable installation activities are taking place. While safety buffer zones typically have a radius of 500 m, a radius of 1 km is used for the purposes of this economic analysis to account for the possibility that multiple vessels may be used for cable laying and possible variations in the size of the safety buffer zones. This assumed safety buffer of approximately 1 km around where cable installation activities are taking place results in a 3.14 square kilometers (km<sup>2</sup>) area where fishing will be precluded around those areas. (Figure 2). As Figure 2 illustrates, the area of fishing impacts shifts along the South Coast Variant as cable installation activities take place resulting in fishing impacts at any particular time only along 2 km, or approximately 2.5%, of the South Coast Variant.<sup>7</sup> At any given time during cable installation, therefore, approximately 97.5% of the South Coast Variant, where cable laying activity is either completed or planned, will be open to commercial fishing.

#### 2.1.3 *Fishing Revenues Exposed to Cable Installation Activity*

Based on fishing revenue intensity data generated by BOEM and NOAA Fisheries for years 2007-2018, annual fishing revenue intensities in the South Coast Variant area average \$2,621 per km<sup>2</sup> (2019 dollars; BOEM 2020). Assuming that fishing revenue intensity is relatively uniform across this area, therefore, a reasonable estimate of the economic exposure of commercial fishing in the South Coast Variant during cable installation can be generated by multiplying the three factors described above. That is,

$EE_{scv}$  = Economic Exposure in the South Coast Variant (measured in 2019 Dollars)

Where:

$EE_{scv} = A \times B \times C$ ; and

A = expected annual fishing revenues per km<sup>2</sup> of the South Coast Variant (\$2,621)

B = area precluded to fishing during an ongoing cable installation activity (3.14 km<sup>2</sup>); and

C = the 13.5 month duration of cable installation activities associated with a total of three cables installed, expressed in years (1.125 years).

And therefore:

$$EE_{scv} = A \times B \times C = \$2,621 \times 3.14 \times 1.125 = \$9,259.$$

Based on the analysis described above, economic exposure in the South Coast Variant is estimated to be \$9,259 during approximately 13.5 months of cable installation based on the maximum design scenario of three cables installed in the South Coast Variant. If only one or two cables are installed, the economic exposure would be approximately \$3,086 during 4.5 months of cable installation for one cable or approximately \$6,172 during 9 months of cable installation for two cables.

This economic exposure estimate of \$9,259 represents the maximum potential losses in fishing values if the South Coast Variant caused all fishing effort in areas of active cable installation activity to cease. Following BOEM guidelines, this estimate of economic exposure is based on the assumption that none of the fishing revenues lost in areas where fishing will be precluded in the South Coast Variance will be recouped by fishing effort shifting from those areas to other areas (Kirkpatrick et al. 2017). However, as BOEM guidelines indicate, “economic exposure should not be interpreted as a measure of economic impact or loss because economic impacts depend on a vessel’s ability to adapt by changing where it fishes” and “if alternative fishing grounds are available nearby and may be fished at no additional cost, the economic impact will be lower” (Kirkpatrick et al. 2017).

This report does not attempt to estimate what portion of lost fishing revenues in the South Coast Variant can or will be recouped by fishing effort shifting from areas temporarily closed to fishing because of cable installation to other fishing areas. However, it is reasonable to assume that if fishermen are temporarily precluded from fishing in small parts of the South Coast Variant because of cable installation activity they will act in an economically rational manner and shift fishing effort to other areas. The highly unlikely alternative would be for them to choose to generate no offsetting fishing revenues by remaining idle at sea or staying in port.<sup>8</sup> That is, while it is reasonable to assume that fishing disruptions in the South Coast Variant may result in modifications to fishing strategies that could reduce fishing revenues, it is not reasonable to assume that these disruptions will result in fishing vessels spending more time in port or idle at sea, resulting in reductions in overall fishing effort and lost fishing revenue as high as estimated economic exposure.<sup>9</sup>

## 2.2 Assessment of Economic Impact During Operations and Maintenance

The offshore export cables will have a target burial depth of 1.5 to 2.5 m (5 to 8 ft) below the seafloor, which the Proponent's engineers have determined is more than twice the burial depth required to protect the cables and prevent them from interfering with commercial fishing operations. While the Proponent will make every effort to achieve that target burial depth, it is conservatively estimated that bottom conditions may prevent achieving proper cable burial depth along up to approximately 8% of the South Coast Variant (from the SWDA boundary to the state waters boundary), which may require cable protection to be installed on the seafloor. Cable protection will be designed to minimize potential impacts to bottom fishing gear to the maximum extent practicable, and fishermen will be informed about where cable protection has been used. However, during O&M of New England Wind, there will be a possibility that mobile bottom fishing gear, such as bottom trawl nets, could snag on cable protection resulting in gear or vessel damage, personal injuries, and lost catches and fishing time.

It is not possible at this time to assess the likelihood or potential magnitude of fishery-related economic losses associated with bottom fishing gear snags on cable protection along the South Coast Variant. However, the area where cable protection may be required will be small and NOAA Fisheries data show that there is little bottom trawling or dredging along the South Coast Variant, so it is reasonable to expect that economic exposure associated with such incidents will be very low (NROC 2009; MARCO 2016; Fontenault 2018). The Proponent will be designing and installing cable protection to the maximum practicable extent to avoid interfering with bottom fishing gear and expects to establish a gear loss/damage protocol that will compensate fishermen for economic losses associated with incidents involving cable protection if and when they occur.

## 2.3 Conclusions

Fishing revenue data and fishing revenue intensity rasters published by BOEM and NOAA Fisheries indicate that the South Coast Variant does not include high-value commercial fishing grounds. During approximately 13.5 months of construction activities in the South Coast Variant, it is expected that commercial fishing will be restricted only in the 3.14 km<sup>2</sup> temporary safety buffer zone established around where cable installation activities are taking place. Based on an analysis of fishing revenues in the South Coast Variant, annual fishing revenues in these areas during periods when cable installation activities will be taking place can be expected to range from approximately \$3,086 to \$9,259, depending on the number of cables used in the South Coast Variant. This represents the expected economic exposure of commercial fisheries to the South Coast Variant in federal waters during cable installation. The expected economic impact of the South Coast Variant on commercial fishing revenues during cable installation will be significantly lower than expected economic exposure of \$3,086 to \$9,259 because any fishing effort diverted from the South Coast Variant to other fishing areas within and outside the South Coast Variant during cable installation can be expected to generate at least some fishing revenues to offset at least some of the fishing revenues lost in Areas where fishing is temporarily precluded.

During O&M of New England Wind, the South Coast Variant is expected to have nearly no impact on commercial fishing, with the exception of mobile bottom fishing gear, such as bottom trawl nets, possibly snagging on cable protection that may need to be installed on the seafloor in parts of the South Coast Variant. However, this can be considered a low probability event because: (1) NOAA Fisheries revenue data indicated that there is little bottom fishing along most of the South Coast Variant; (2) cable protection will be used along up to 8% of the South Coast Variant (from the SWDA boundary to the state waters boundary); and (3) the Proponent will have all cable protection designed and installed to the maximum extent practicable to minimize potential interference with bottom fishing. The Proponent also expects to establish gear loss/damage and fishermen compensation protocols to respond to accidents involving fishing gear interacting with cable protection. Therefore, while there is a small possibility that cable protection in the South Coast Variant could result in fishery-related economic impacts during the O&M phase of New England Wind, but this possibility does not constitute a significant source of economic exposure in the South Coast Variant and is not likely to result in any net economic losses in commercial fisheries.

### 3.0 REFERENCES AND ENDNOTES

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Volume II: <https://espis.boem.gov/final%20reports/5581.pdf>
- [MARCO] Mid-Atlantic Council on the Ocean. 2016. Mid-Atlantic Ocean Data Portal. <https://portal.midatlanticocean.org/>
- [NROC] Northeast Regional Ocean Council. 2009. Northeast Ocean Data Portal. <https://www.northeastoceandata.org>

## Endnotes

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- <sup>1</sup> Estimates of economic exposure and potential economic impacts presented in this report are based on the ex-vessel value of recent year commercial harvests and so would not be affected by predictions of potential South Coast Variant impacts on the future abundance, availability, or distribution of fish resources.
- <sup>2</sup> New England Wind will occupy all of Lease Area OCS-A 0534 and potentially a portion of Lease Area OCS-A 0501 in the event that Vineyard Wind 1 does not develop “spare” or extra positions included in Lease Area OCS-A 0501 and Vineyard Wind 1 assigns those positions to Lease Area OCS-A 0534. For the purposes of the COP, the SWDA is defined as all of Lease Area OCS-A 0534 and the southwest portion of Lease Area OCS-A 0501, as shown in Figure 1.
- <sup>3</sup> The offshore export cable length includes a 15% allowance for micro-siting within Lease Areas OCS-A 0534 and OCS-A 0501 and a 5% allowance for micro-siting within the OECC and South Coast Variant outside the lease areas.
- <sup>4</sup> For additional details about BOEM guidance see Section 1.2 of Appendix III-N of COP Volume III.
- <sup>5</sup> For additional information about potential indirect sources of offshore wind energy economic impacts on commercial fisheries and related shore-based businesses, see Sections 4.6 through 4.8 of Appendix III-N of COP Volume III.
- <sup>6</sup> The fishing revenue data available in each of these four sources are described fully in Section 2.2 of Appendix III-N of COP Volume III.
- <sup>7</sup> See Section 3.2 of Appendix III-N of COP Volume III for additional information on the typical size of temporary safety buffers around cable installation activities.
- <sup>8</sup> After construction, the entire South Coast Variant will be open to commercial fishing so opportunities for fishermen to continue generating fishing revenues during O&M of New England Wind will include fishing in the South Coast Variant, as well as redirecting fishing effort to other areas.
- <sup>9</sup> A basic tenet of economics is that businesses will continue to operate in the short-term as long as revenues (e.g. ex-vessel value of landings) exceed operating costs (trip expenses), which allows net operating profits to offset at least some fixed costs. In many meetings related to Vineyard Wind 1, commercial fishermen themselves acknowledged that fishing will likely continue in or at least around offshore wind farms.