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Comments Re: BOEM-2020-0005-0001 "Supplement to the Draft Environmental Impact Statement for Vineyard Wind LLC's Proposed Wind Energy Facility Offshore Massachusetts and Public Meetings"

1. Executive Summary Comments:

As BOEM considers its decision and evaluation on the Vineyard Wind COP and issues raised both in and in response to this SEIS, it has a responsibility to follow the requirements of the Energy Policy Act 2005 amendments to the Outer Continental Shelf Lands Act (43 U.S.C. 1337) regarding Alternate Energy-Related Uses on the Outer Continental Shelf that:

"(4) *Requirements-The Secretary shall ensure that any activity under this subsection is carried out in a manner that provides for –*

Safety; …

Prevention of interference with reasonable uses (as determined by the Secretary) of the exclusive economic zone, the high seas, and the territorial seas; …

Consideration of –

(ii) any other use of the sea or seabed, including the use for a fishery, …or navigation".

Noted on page ES-1 of the SEIS, BOEM's decision on whether to approve or disapprove the Vineyard Wind COP will include consideration of natural resources and existing ocean uses. As long-time participants in the BOEM process with both Vineyard Wind and other BOEM leases, i.e. cumulative impacts leases, Seafreeze Ltd., Seafreeze Shoreside, our vessels, and our customer's vessels- as entities already federally permitted to operate on the Outer Continental Shelf and in the U.S. Exclusive Economic Zone pursuant to federal law and regulations- have repeatedly requested consideration in this process. Our pre-existing federally permitted activities, use of the sea and seabed for a commercial fishery, and associated navigation, per the Energy Policy Act, are in conflict with existing BOEM leases. Although in many instances, these conflicts were raised early in the BOEM process, leases proceeded without regard for these impacts.

For example, prior to the lease sale of the NY WEA, now Equinor "Empire Wind" lease, we provided BOEM with confidential business information from over 20 commercial fishing vessel businesses, detailing heavy use of the lease area as a fishery, and requested that the lease be re-sited.[1]

[1] See Glenn Goodwin Declaration, re Fisheries Survival Fund et al vs Jewell, Civil Action No. 2016-2409 (D.D.C. 2018).

These impacts and consideration for re-siting were also raised by the Rhode Island Senate delegation and in National Marine Fisheries Service comments,[2] and suspension of the lease was again requested by the Rhode Island Senate delegation even after leasing.[3] Regarding the Vineyard Wind Project, we repeatedly raised similar fishery and navigational concerns with both the project developer and BOEM over several years, via in person meetings, and both verbal and written public comments. Agency response over this timeframe has included dismissal of concerns, termination of stakeholder phone calls mid call while we waited to make comments,[4] and statements that our fishing and navigational concerns re the Energy Policy Act would be addressed at the end of the BOEM process during consideration of the COP.

We have continually provided information not considered by developers or BOEM, as have other agencies. For example, neither BOEM nor Vineyard Wind have included Rhode Island Department of Environmental Management's Division of Marine Fisheries analysis of the value of Rhode Island fisheries in the Vineyard Wind lease area into their decision-making process. It is not referenced in the SEIS, nor was it considered by Vineyard Wind's "compensation package" for the Rhode Island fishing industry, which we will address later in our comments. As a result, the impacts to the commercial fishing industry from the Proposed Action alone have been severely undervalued.

However, as BOEM has continually announced, these impacts to our vessels and businesses will be evaluated pursuant to the final NEPA analysis currently ongoing, at the final decision on permitting. Now is that time. We continue to contend that impacts to existing uses such as a fishery or navigation per the Energy Policy Act should be considered at the beginning of the process, to eliminate important fishery areas from lease consideration at the outset. However, as BOEM has held off its final decision until the very end, it retains considerable leeway in approval or disapproval at this late stage, a fact also made clear to project developers early in the leasing process.

We also draw attention to Table ES-1, Changes to the Limits of the PDE, on page ES-3 of the SEIS, which proposes to increase the limit of turbine size from 10 MW and associated parameters to 14 MW and associated parameters. We are unaware of any other construction project where such a significant change, or any change at all, is permissible at such a late stage. Even as insignificant a project as construction of a small backyard shed which requires town permitting approval cannot be changed 12 inches without resubmission of an application. Certainty in planning is a fundamental U.S. policy, from small municipalities to large federal projects. Allowing such tremendous last-minute changes to a PDE is not only inconsistent with established public policy at many levels, but it also significantly changes the levels of impacts. These impacts range from magnitude of pile driving and operational noise to benthic footprint to radar and national security footprints. To assume the same level of impact from a smaller structure with related impacts as from a larger structure with related impacts is unreasonable.

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[2] See Letter Senator Reed and Senator Whitehouse to BOEM Director Abigail Hopper, September 21, 2016.

[3] See Letter Senator Reed and Senator Whitehouse to BOEM Director Abigail Hopper, January 11, 2017.

[4] See footnote 1, Glenn Goodwin Declaration, re Fisheries Survival Fund et al vs Jewell. For example, at a 2016 NY Task Force meeting in Garden City NY regarding the NY WEA, now Equinor "Empire Wind" lease, and after receiving comments and information from us and others, BOEM Director Abigail Hopper opened up the meeting by stating "I'm not a marine biologist, but I'm a history maker" and proceeded to discuss how the group would make history with the NY wind farm. This was after we and others had provided substantial information and prior to completion of the NY WEA EA and determination of the lease sale. The sale was decided well in advance of the process.

While the SEIS states that changes to the proposed Project have been analyzed to the "extent they are applicable"[5] this is clearly not the case. For example, Table A-4, Offshore Wind Leasing Activities in the U.S. East Coast: Projects and Assumptions"[6] all future projects estimated to begin construction after the Proposed Project are in the 8-12 MW turbine range, i.e. smaller than the 14 MW turbines being currently proposed in the changes to the limits of Vineyard Wind's PDE. It is not reasonable to assume that if larger turbines are available for projects at this time, future projects will use smaller and outdated turbines. Therefore, all the cumulative impacts from future projects assumed in the SEIS have actually been underestimated.

In fact, developers have already stated that they plan to be using turbines larger than assumed in the SEIS. For example, the SEIS "assumes" that Empire Wind will be using 12 MW turbines,[7] while Equinor has already publicly stated that they plan to use up to 15 MW turbines.[8] It would be expected that BOEM would be aware of this regarding assumptions of future projects. Wind industry professionals have stated that they expect 20 MW turbines to be a reality by 2022,[9] and most of the anticipated future projects in the SEIS are expected to begin construction in 2022 and beyond. Additionally, if project developers are able to update PDEs throughout the application process and right up until final decision, it is reasonable to assume that they will do so with larger and larger turbines as these technologies become available. Therefore, cumulative impacts should include impacts from 15-20 MW and potentially larger turbines for coastwide leases.

An ever-changing target is nearly impossible to assess, and undoubtedly will lead to poor public policy and planning, as well as lack of timely assessments of conflicts with existing uses managed by multiple bureaucratic agencies. Such changes to PDEs not only make accurate impacts assessments nearly impossible, but it is also inconsistent with other federally permitted entity processes. For example, our commercial fishing vessels are limited in upgrades per federal regulation to a 10% length increase and 20% horsepower increase from baseline levels over the entire life of our permits for National Marine Fisheries Service to know the basic footprint of a fishery in order accurately assess impacts to commercial fish stocks. Potential impacts from proposed wind projects, such as irreversible habitat alteration/destruction and continual operational noise, to fish stocks are much greater than those of commercial fisheries, which are restricted and transient in nature. Two different standards should not be maintained by federal regulators for competing uses of the same federal waters, impacting the same natural resources.

The SEIS determines "major" adverse impacts on navigation as a result of the Proposed Action, "major" adverse cumulative impacts on commercial fisheries as a result of the Proposed Action and all Action Alternatives, "major" adverse cumulative impacts on scientific and research and surveys, and "major" adverse cumulative impacts on military and national security uses.[10] The SEIS conversely anticipates only "negligible to minor beneficial" impacts to air quality (i.e. greenhouse gas

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[5] SEIS, p. ES-2.
[6] SEIS, p. A-11.
[7] Ibid.
[8] See https://www.equinor.com/en/what-we-do/empirewind.html.
[9] See https://www.rechargenews.com/wind/offshore-wind-turbine-20mw-generator-ready-within-three-years/2-1-711845.
[10] SEIS, p. ES-3.

emission/climate change) as the result of the Proposed Action with "minor" cumulative impacts.[11] It also clearly states "construction of offshore wind facilities are not expected to impact climate change" and "overall, it is anticipated that there will be no impact on climate change as a result of offshore wind projects alone."[12]

In weighing the net benefit to the nation on whether to approve the Proposed Action or any of the Action Alternatives, major adverse impacts cannot be outweighed by negligible or potential minor impacts if placed on an objective scale. Mitigation of climate change is purportedly the driving force behind all offshore wind projects. However, if the SEIS determines that "construction of offshore wind facilities are not expected to impact climate change" but will have major negative impacts on the U.S. seafood industry and related jobs, cause loss of life due to major adverse impacts on marine navigation,[13] and cause major adverse impacts to U.S. national security, a rational conclusion is that the Proposed Action and all other anticipated future projects should not go forward unless all these issues can be fully resolved.

Additionally, the major impacts to commercial fisheries and fishing communities highlighted in the SEIS as a result of the Proposed Action would be at odds with the President's May 7, 2020 Executive Order "Promoting American Seafood Competitiveness and Economic Growth", which states, "America needs a vibrant and competitive seafood industry to create America jobs, put safe and healthy food on American tables, and contribute to the American economy….It is the policy of the Federal Government to…safeguard our communities and maintain a healthy aquatic environment… The Secretary of Commerce shall request….a prioritized list of recommended actions to reduce the burdens on domestic fishing and to increase production of sustainable fisheries." As noted in our comments below, U.S. commercial fisheries and particularly the squid/calamari fishery, which produces a sustainable product that cannot be farmed via aquaculture methods, will be even more negatively affected by the Proposed Action then assumed in the SEIS. Major impacts, as defined by the SEIS, are those with "A regional or population-level impact on the affected resource(s)…AND the affected resource would not fully recover, even after the impacting agent is gone and remedial or mitigating action is taken."[14]

Therefore, we can only support Alternative G- No Action Alternative.

Benthic Resources Comments, Section 3.3:

Sedimentation/Cable Exposure: "The geographic analysis area for benthic resources extends for a 10-mile radius around the WDA and the OECC proposed in the COP," "based upon where the most widespread impact (namely, suspended sediment) from the proposed Project could affect benthic

[11] SEIS, p. ES-5. See also Appendix A, p A-51.
[12] SEIS, p. 3-98.
[13] "BOEM anticipates the overall cumulative impacts on navigation and vessel traffic would be major, due primarily to the increased loss of life due to maritime accidents", SEIS, p. 3-114; "The overall cumulative impacts of Alternative F combined with the Proposed Action layout, when combined with past, present and reasonably foreseeable activities on navigation and vessel traffic would be of the same level as under the Proposed Action-major, due to the reduced SAR success and the resultant increased loss of life", SEIS p. 3-116.
[14] SEIS, Appendix B, p. B-5.

resources."[15] Therefore, the impacts exist well outside the WDA itself. Figure A.7-3 depicts this Benthic Geographic Analysis Area, and directly overlays with the majority of the longfin squid fishery activity in the area.[16] Suspended sediment is an impact on water quality, which in turn affects benthic resources such as longfin squid in the benthic resource area. The Water Quality Geographic Analysis Area analyzed in the SEIS overlays much of the Benthic Resource Geographic Area and also longfin squid fishery footprint.[17] The suspended sediment plume is primarily assumed by the SEIS to occur due to cable placement and maintenance; modeling results demonstrated that cable laying could result in sediment plumes/concentrations extending up to 10 miles and throughout the water column.[18] Construction activities are expected during the summer months, and therefore during the longfin squid spawning season in the area.

Both structure and water quality are a concern for the longfin squid resource, which inhabits areas of sandy bottom and deposits its eggs on this substrate. Table 3.3-1 states, "Sediment deposition could have adverse impacts on some benthic resources, especially eggs and larvae, including smothering and loss of fitness" and "The Proposed Action would cause sediment deposition on up to 2,594 acres, which would result in minor impacts."[19] We do not believe this is a minor impact. Should year classes of longfin squid eggs and larvae be smothered by sediment, there would be far-reaching impacts for both the resource and the fishery. Furthermore, suspended sediment through the water column for a 10-mile radius will also impact this stock, particularly when vibrating with underwater sound (discussed below in regards to longfin squid).

In response to concerns regarding continual sediment plumes from turbine structure on the seafloor during facility operation, the SEIS states that while sediment plumes have been a concern for water quality in Europe, the Draft EIS predicted significantly less in the Project area, due to "low current speeds and minimal seabed mobility in the WDA".[20] This is also the reasoning for lessened estimated needs of scour protection, and quotes Section 3.2.2, COP Volume II, which has been redacted in its entirety, as are many sections of the COP referenced in both the DEIS and SEIS.[21] In the SEIS section on impacts from hydrodynamic disturbance to fish and invertebrates, it states that low current speeds at the seabed in the lease area lower scour concerns and therefore that BOEM anticipates a negligible impact from scour and sediment plumes due to structure, based on COP Appendix III-K.[22]

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[15] SEIS, Appendix A, p. A-4.
[16] SEIS, Appendix A, p. A-27. Overlay with squid fishing VMS activity from 2014 and 2015-2016, available on the Mid Atlantic Ocean Data Portal at http://portal.midatlanticocean.org/visualize/#x=-72.71&y=40.90&z=8&logo=true&controls=true&dls%5B%5D=true&dls%5B%5D=0.5&dls%5B%5D=711&basemap=Ocean&themes%5Bids%5D%5B%5D=25&themes%5Bids%5D%5B%5D=4&tab=data&legends=false&layers=true, and http://portal.midatlanticocean.org/visualize/#x=-72.79&y=40.92&z=8&logo=true&controls=true&dls%5B%5D=true&dls%5B%5D=0.5&dls%5B%5D=286&basemap=Ocean&themes%5Bids%5D%5B%5D=25&themes%5Bids%5D%5B%5D=4&tab=data&legends=false&layers=true.
[17] SEIS, Appendix A, p. A-39.
[18] SEIS, Appendix A p. A-58.
[19] SEIS, Appendix B, p. B-17.
[20] SEIS, Appendix A, p. A-55, A-56, A-59.
[21] See https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/MA/Vineyard-Wind/Vineyard-Wind-COP-VolumeII-Combined.pdf.
[22] SEIS, Appendix B, p. B-22.

Appendix III-K states that while mobile seabeds and increased currents increase the potential for scour, the current speeds are only approximately 0.58 kn (according to a Marine Cadastre website) to 0.6 kn (according to the RI Ocean SAMP metocean data buoy) in the Project Area.[23] Appendix K references the COP Volume II Section 2.2.4, which is also redacted despite both of these data sources being public. Without knowing which section of the RI Ocean SAMP was quoted, it is difficult to comment on that source directly. However, the RI Ocean SAMP data primarily focused on the Block Island Wind Farm area, which is very differently hydrodynamically than the Proposed Project area and surrounding areas, and with much slower tidal currents.

To reiterate, Appendix III-K states that the tidal currents seen at European wind farms which exhibit significant sedimentation and scour have average current speeds of 1.5-2.0+ kn, as opposed to tidal speeds in the Project area, which it estimates at 0.58-0.6 kn.[24] However, Muskeget Channel, the actual Vineyard Wind export cable route and much closer than the Block Island wind project area used for the COP estimates, is so well known for strong currents that in 2006 it was the site for the proposed Massachusetts Muskeget Channel Tidal In-Stream Power Plant, and assessed with tidal flow of up to 3.8 kn.[25] Other nearby tide and current predictions show tidal speeds of 1.5 kn.[26] Older charts further away from Muskeget Channel in the vicinity of the Vineyard Wind project show tides at 1.5 kn,[27] and commercial fishermen experienced in navigating the Project area and surrounding vicinity assert tidal currents run at 1-2 kn in the area.[28] Tidal currents closer to Nantucket Shoals, in the vicinity of other planned projects in the MA/RI WEA lease area which are predicted by the SEIS to have no scour protections on cables (inter-array hard protection is assumed to be zero for all areas with the exception of the Vineyard Wind project, Vineyard Wind South, and South Fork/Revolution Wind, both part of OCS-A 0486)[29] run even harder and are more likely to cause scour/sediment plumes/unburied cables.

These tidal current speeds in and around the Vineyard Wind project area and MA/RI leases are equal to or greater than those causing sediment plumes in European projects. Therefore, we believe the SEIS underestimates the impacts of sedimentation, scour from the Proposed Project area, and also the need for cable matting and scour protection and adjacent/cumulative impacts lease sites and/or levels of exposed cables, which increases the overall footprint of structure/exposure on the seabed and

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[23] See COP Appendix III-K, p. 6 https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/MA/Vineyard-Wind/Vineyard-Wind-COP-Volume-III-Appendix-III-K.pdf.

[24] Ibid.

[25] See System Level Design, Performance, Cost and Economic Assessment- Massachusetts Muskeget Channel Tidal In-Stream Power Plant, June 10, 2006, at http://www.pstidalenergy.org/Tidal_Energy_Projects/Misc/EPRI_Reports_and_Presentations/EPRI-TP-006-MA_Massachusetts_System_Level_Design_Report_06-10-06.pdf, p. 7.

[26] See NOAA Tides and Currents, Muskeget Rock, at https://tidesandcurrents.noaa.gov/noaacurrents/Predictions?d=2020-03-09&r=1&tz=LST%2fLDT&u=1&id=ACT1701_1&i=&t=am%2fpm&threshold=leEq&thresholdvalue=.

[27] See https://www.bing.com/images/search?view=detailV2&ccid=F6uHZfSC&id=9BBAFFECF5D3533EBC3FB0535070887858E5E88E&thid=OIP.F6uHZfSC0Le0p5q8sxDLAQHaGT&mediaurl=https%3a%2f%2fwww.mapsofantiquity.com%2fstore%2fAntique_Maps_under_%24100%2fTidal_Currents_of_Nantucket_Shoals_(A_No._12)_***SOLD***%2fimages%2fMAS1806BW.JPG&exph=1363&expw=1600&q=tides+nantucket+shoals&simid=608038515766595035&ck=E8FC9A855335ED1561ABAC55538036AF&selectedIndex=4&ajaxhist=0.

[28] Captain Mark Phillips, personal communication.

[29] SEIS Appendix A, p. A-17.

sediment impacts to commercial fisheries and fisheries resources. The seabed is clearly mobile, as the SEIS repeatedly refers to it as "sandy".

EMF: The SEIS states that [w]herever a cable is not buried, the exposure of benthic resources to magnetic fields may be stronger".[30] Based on the tidal speeds and sediment type in the project area, it is reasonable to assume that cables will become unburied over time, as is the case in many wind farms in Europe, as discussed in our Commercial Fisheries comments below. Impacts from EMF to benthic resources "would be permanent as long as the cables are in operation".[31] These negative impacts will be higher than anticipated should cables become exposed, as is likely given strong tides in the vicinity.

Presence of Structures: Cumulatively, on page A-17, the SEIS states that it "is assumed for all other lease areas that a 12 MW foundation with the addition of scour protection would be 0.85 acres per foundation" and the inter-array operating footprint is "assumed" to be 1.43 acres per foundation for all lease areas, and inter-array cable hard protection assumed to be zero for all lease areas with the exception of Vineyard Wind, South Fork and Revolution Wind. As previously stated, these assumptions regarding 12 MW turbines are incorrect, and based on information we have verbally received, the footprint of scour protection estimated per foundation for projects other than Vineyard Wind is far too small. Additionally, it is reasonable to assume the need for more cable matting than estimated by the SEIS, both inside and outside of leases (in export cable corridors). This impacts not only benthic habitat, benthic resources and habitat conversion, but also removes more fishable area from trawl gear.

The SEIS mentions many times that "Structures, including tower foundations, scour protection around foundations, and various means of hard protection atop cables create *uncommon relief* in a mostly sandy seascape."[32] We do not understand how BOEM has reached this conclusion. Hard structure is not the preferred habitat type of many species, including longfin squid. Which is why they inhabit the project area. Rather than create "uncommon relief", such structure will remove their preferred habitat, the current "sandy seascape". In fact, this habitat conversion is likely to be detrimental to the overall ecosystem and marine resources in the Project area overall. According to a recent assessment of benthic habitat types on the East Coast, the highest productivity ranking habitat type in both the New England and Mid Atlantic was "loose fine bottom", i.e. sand.[33] This benthic habitat assessment went on to state, "Increased recognition of the importance of soft sediment is essential because these areas in both estuarine and marine waters are typically used for offshore energy and other development activities, in part because of an assumption that the ecological impacts will be lower than with other habitat types….it is clearly not valid with respect to the number of affected species and potential consequences of impacts on those species for ecosystem structure and function."[34]

[30] SEIS, p. 3-12.
[31] SEIS, p. 3-12.
[32] SEIS, p. 3-13, emphasis ours.
[33] Kritzer et al, "The Importance of Benthic Habitats for Coastal Fisheries", *Bioscience,* 2016, p. 7.
[34] Ibid, p. 6.

Therefore, we disagree that structure is "uncommon relief", as the SEIS repeatedly assumes and which habitat conversion it asserts will be "moderate beneficial,"[35] even for commercial fishing.[36] This assumption fails to recognize the fact that the largest fishery in the area, the longfin squid fishery, is entirely a trawl fishery, which cannot operate on or around structure bases, scour protection, or cable covering. In fact, the majority of all commercial fishing in the WDA is trawl fishing, so "moderate beneficial" impacts to commercial fishing could not be further from the truth. National Marine Fisheries Service, in their comments on the Vineyard Wind DEIS points out the faulty nature of this assumption: "this section does not provide any evidence to support the claim that a beneficial impact to hard-bottom populations will offset adverse impacts to sandy-habitat fish populations."[37] This is true both biologically and economically.

For example, the summer longfin squid fishery that occurs in the MA/RI area and Project area is not only the major economic driver for many Southern New England and Rhode Island trawl vessels, but is managed without daily trip limits. This means that the vessels can harvest substantial amounts, i.e. thousands and tens of thousands, of product per trip, both covering operational costs and creating sustainable profits. The alternative "hard bottom" habitat fish primarily harvested in the area is black sea bass. In the summer months in the state of Rhode Island, this species is currently subject to a 100 lb trip limit.[38] This is simply not a financially viable alternative for a 60-100 foot squid trawl vessel, the primary fishery vessel typically working in and around the WDA. Therefore, a "moderate beneficial" impact assessment for commercial fisheries as a result of habitat conversion is ludicrous.

We also fail to see how pile driving on and essentially paving over benthic species living in or on the sand will provide uncommon relief for those species. Neither will the increased EMF exposure to unburied cables provide "uncommon relief" for such species.

Finfish, Invertebrates, and Essential Fish Habitat Comments, Section 3.4:

EMF: Based on the estimates of tide in the area noted in our comments on benthic resources above, cables will become exposed over time due to currents and soft sediment in the Project and surrounding areas. In fact, the Block Island Wind Farm cables became exposed shortly after installation despite claims that they would remain buried; its 34,500 volt National Grid sea2shore transmission cable was exposed and visible at low tide in 2018,[39] as was the Orsted transmission export cable.[40] They are not expected to be reinstalled until 2021,[41] thus creating long term exposure. Longfin squid, the most valuable fishery resource in the WDA and surrounding areas, both stay near the seafloor by day and lay

[35] SEIS, Appendix B, p. B-16, Benthic Resources "Presence of Structures: Habitat Conversion"
[36] SEIS, Appendix B, p. B-49, Demographics "Presence of Structures: Habitat Conversoin".
[37] National Marine Fisheries Service, Comments for the Bureau of Ocean Energy and Management's Draft Environmental Impact Statement for the Vineyard Wind Proposed Wind Energy Facility, Docket Number BOEM-2018-0069**,** 2019, Attachment A, p. 22.
[38] See http://www.dem.ri.gov/programs/marine-fisheries/mfsizes.php.
[39] See https://www.blockislandtimes.com/article/grid-seeking-remedy-cable-issue/52990.
[40] See https://www.blockislandtimes.com/article/survey-conducted-exposed-cables/53825.
[41] See https://www.blockislandtimes.com/article/exposed-cables-be-reinstalled-2021/55613.

their eggs on the seafloor. The SEIS assumes that cables will remain buried and therefore impacts minimal,[42] but this would not be a valid assumption given the experiences both in Block Island and Europe.

Despite the Project area being deeper than the Block Island cables or some European wind farms, fisheries experience in the area recognizes the shifting of bottom sediments over time. Therefore, it is reasonable to assume that longfin squid eggs at the very least will be exposed directly to EMF, and most likely the adult squid themselves if they attempt to maintain their natural daytime habits near the seafloor. The EMF impacts on squid are not analyzed by the BOEM EMF study, because it labels them "pelagic" while at the same time acknowledging that longfin squid stay near the seafloor and attach their eggs to the seafloor.[43] In fact, despite being the most significant and impacted fishery/commercial species in the Project area, lomgfin squid is not even mentioned in the EMF study's Table ES-1, "Significance of potential impacts to fishes and invertebrates in the southern New England area from offshore wind energy projects' EMF".[44] This is a glaring omission considering the overlap of longfin squid habitat and fishing activity with the Vineyard Wind lease and cumulative impacts analysis leases, as is the fact that bottom dwelling shellfish such as scallops and clams are also absent from the EMF analysis yet also most likely to experience impacts.

Construction Noise: The SEIS says that noise from pile driving and construction for foundations would be "temporary."[45] But then it proceeds to say that this noise would be produced for 4-6 hours at a time for a 6-10 year period,[46] and from 2021-2030 in the MA/RI lease areas alone.[47] That is not temporary. That is long term. Particularly for species such as longfin squid that live only approximately 9 months. Such a construction time would affect many generations of this species, the most prevalent species in the Proposed Project and surrounding areas. The SEIS states that "n]oise transmitted through water and/or the seabed can cause injury and/or mortality to finfish and invertebrates in a limited space around each pile and can cause short term stress and behavioral changes to individuals over a greater space."[48] Again, regarding longfin squid impacts we do not consider these to be "short term".

The SEIS states that these pile driving impacts "would likely" extend radially up to 5.7 miles from each pile. This distance puts the impacts even outside the WDA and MA/RI WEA directly into the rest summer longfin squid fishery footprint, as detailed in our comments on Commercial Fishing Impacts below. This means that for 6-10 years, the fishery can be expected to sustain these impacts to its necessary resource, leading to stock mortality and fishery losses.

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[42] SEIS, p. 3-21.
[43] Snyder et al, "Evaluation of potential EMF Effects on Fish Species of Commercial or Recreational Fishing Importance in Southern New England" ,OCS Study BOEM 2019-049, p. ES-7, 19, 24.
[44] Ibid, p. ES-7.
[45] SEIS, p. 3-22.
[46] Ibid.
[47] Appendix A, Table A-4. Construction is planned in the NY lease area (the other primary summer squid habitat/fishery) simultaneously, from 2023-2024. This means that the squid, and the fishery, will have no other places to go if they return to their historic grounds.
[48] SEIS, p. 3-22.

The impacts may in fact extend further than 5.7 miles, as the SEIS references for these estimates the COP Section 4.2.3, which anticipated to use less than 4,000 kJ of energy per strike on up to 10 MW turbines[49] and which is the same kJ estimate given in the SEIS regarding hammer size impacts.[50] This is not reasonable, given that the new PDE anticipates 14 MW turbines with larger foundations that would logically require more force to install. The SEIS also quotes updated information in Epsilon 2020, which is fully redacted,[51] so informed comment on that document is unfortunately not possible.

Regardless, the SEIS goes on to admit that "[p]otentially injurious noise could also be considered as rendering EFH temporarily unavailable or unsuitable for the duration of the noise…Eggs, embryos, and larvae of finfish and invertebrates could also experience developmental abnormalities or mortality resulting from this noise…..The impact of pie driving noise on finfish and invertebrates would depend on the time of year it occurs; the impact could be greater if the noise occurs in spawning habitat during a spawning period, particularly for species that…spawn only once during their lifetime (e.g. longfin squid…It is anticipated that most pile-driving activity would occur in the summer months when weather windows are favorable. Thus, species that spawn in the summer (e.g. longfin squid…) would be more susceptible to disturbance from pile driving noise. Reduced reproductive success in one or more spawning seasons could result, which could potentially result in long-term effects to populations if one or more year classes suffer suppressed recruitment."[52] The SEIS also details that construction will occur simultaneously in both the MA/RI and NY areas, the two primary longfin squid summer habitat and resulting summer fishery areas on the entire East Coast.[53]

We do not understand how the SEIS has not singled out longfin squid for "major" impacts considering the above. To recap, longfin squid live 9 months and spawn once. The Proposed Project area, as well as the NY lease area re cumulative impacts, are two summer spawning areas that also support healthy and sustainable fisheries. Noise kills longfin squid and other cephalopods, see discussion below. The SEIS admits that pile driving noise may impact the entire population, because of multiple consecutive years of pile driving noise during a spawning season. The construction will happen in the summer months, which is the time of year when the squid are present.

It is reasonable to assume that 6-10 year classes of longfin squid will suffer repressed recruitment due to consecutive years of pile driving during the summer months. This is entirely unacceptable, and will result in major, not moderate, impacts to the longfin squid stock and summer fishery. There is no mitigation for this should construction occur as planned, and no reparations to the squid industry for the potential loss of the squid population and summer fishery. Such ecological/economic impacts would be devastating to ports such as Point Judith R.I., and facilities such as Seafreeze Shoreside which rely on this summer resource and which are not considered in Vineyard Wind's compensation plan. Should population level impacts occur stockwide from both the Proposed

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[49] See Cop, Volume I, Section 4, p. 4-15. https://www.boem.gov/sites/default/files/documents/renewable-energy/Vineyard-Wind-COP-Volume-I-Section-4_0.pdf.
[50] See Appendix E, Table E-1, p. E-2.
[51] See https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Vineyard-Wind-COP-Addendum-Final.pdf. Appendix I, Data Summary and Pile Driving Assessment, is redacted in its entirety.
[52] SEIS, p. 3-22.
[53] SEIS, Appendix A, Table A-6, p. A-21. See also fishery overlap discussed in Commercial Fishing impacts comments.

Action and cumulative impacts, Seafreeze Shoreside and Seafreeze Ltd., both national leaders in longfin squid production and harvest, will experience significant and irreversible negative economic impacts.

Operational Noise: The SEIS states "while noise associated with operational WTGs may be audible to some finfish and invertebrates, this would occur at relatively short distances from the WTG foundations, and *there is no information to suggest that such noise would adversely affect finfish, invertebrates, and EHF* (English et al)," [54] "[t]here does not appear to be evidence that noise related to operations and maintenance of offshore wind energy facilities would negatively affect finfish, invertebrates and EFH", [55] and concludes that operational noise would therefore "not likely lead to noticeable impacts on commercial fisheries." [56] This is entirely false.

Firstly, the English et al paper quoted by the SEIS states that, "Once a turbine is installed, the near constant operation will produce mechanical noise which is transmitted through the structure into the water….this noise is present whenever the machinery is operational. While the noise levels are much lower than those during foundation piling, they are likely to persist for the life of the turbine, which would be 20 years or more, and potentially get worse over time as the machinery ages." [57] Therefore, the impacts will be continual for over 20 years, and get worse over time. The study also notes that individual species sensitivities play a role, and that the sound levels produced by each turbine when scaled up to large areas will lead to substantial areas being adversely affected. [58] Furthermore, it notes that "[s]tudies on the long term exposure to, and cumulative effects of, low levels of underwater noise from operational OWFs on marine species are lacking" [59] and that that "the possibility of behavioral effects around OWF should not be dismissed until greater knowledge of noise output from other [larger] turbines is available." [60]

Secondly, the paper itself states that during one actual field study, the catch rates of cod and roach were significantly higher when the turbine stopped operating, and that during turbine operation the catch rate dropped by a factor of 2 under otherwise similar conditions. [61] Older research based on small turbines shows that fish with higher sensitivity of sound pressure such as herring can detect an operational wind farm greater than 16 kilometers away. [62] Furthermore, all of the studies on operational noise included in the English at al paper only range from 2 MW- 6MW turbines, [63] not the 14 MW turbine

[54] SEIS, p. 3-22, emphasis ours.
[55] SEIS, Appendix B, Finfish, Invertebrates, and Essential Fish Habitat "Noise: O&M" p. B-20.
[56] SEIS, Appendix B, p. Commercial Fisheries and For Hire Recreational Fishing "Noise: Construction, trenching, operations and maintenance", p. B-70.
[57] English et al, "Improving Efficiencies of National Environmental Policy Act Documentation for Offshore Wind Facilities Case Studies Report, OCS Study BOEM 2017-026, p. 45.
[58] Ibid, p. 51.
[59] Ibid.
[60] Ibid, p. 50.
[61] English et al, "Improving Efficiencies of National Environmental Policy Act Documentation for Offshore Wind Facilities Case Studies Report, OCS Study BOEM 2017-026, p. 50.
[62] Andersson, "Offshore wind farms- ecological effects of noise and habitat alteration on fish", Stockholm University, 2011, p. 32.
[63] English et al, "Improving Efficiencies of National Environmental Policy Act Documentation for Offshore Wind Facilities Case Studies Report, OCS Study BOEM 2017-026, p. 49.

sizes included in the Proposed Project or potentially larger turbines being planned for future cumulative lease sites. Additionally, the larger 6 MW turbine wind farm measured was comprised of only 2 turbines,[64] in contrast to 102 for the Proposed Action and 957 WTGs overall planned for the MA/RI area according to the SEIS (although Appendix A states that there are 976 planned for the MA/RI area).[65] The impacts from the Vineyard Wind project alone, never mind cumulative impacts, are orders of magnitude larger than anything studied. It is not reasonable to assume that sound impacts from a wind farm comprised of 2 MW turbines, or measurements taken from two 6 MW turbines, will be the same level of noise generated by over 900 14 MW+ turbines. The MA/RI area alone is larger than the state of Rhode Island. Introducing that degree of noise over an area larger than an entire state is not a minor or moderate impact.

Regardless of turbine size and related noise intensity, the noise levels produced by even smaller turbines are those that have been proven in open ocean environments to be lethal to longfin squid. It stands to reason that those levels created by larger turbines over larger areas will be magnitudes worse. The entire bodies of scallops and cuttlefish, i.e. invertebrates, vibrate when introduced to underwater noise.[66] In studies conducted specifically on cephalopods (squid and cuttlefish), low frequency sound as produced by operational wind turbines has been demonstrated to cause lethal acoustic trauma to these animals. In a study entitled "Low-frequency sounds induce acoustic trauma in cephalopods", the authors state, "We present the first morphological and ultrastructural evidence of massive acoustic trauma, *not compatible with life*, in four cephalopod species subjected to low-frequency controlled-exposure experiments. Exposure to low frequency sounds resulted in permanent and substantial alterations of the sensory hair cells of the statocysts, the structures responsible for the animal's sense of balance and position. These results indicate a need for further environmental regulation of human activities that introduce high-intensity, low frequency sounds in the world's oceans."[67]

For exact levels impacting loligo/longfin squid,[68] consider the following. On actual experiments in the open ocean water column, low frequency sound levels exactly within the range of those measured at operational wind turbines, results "unequivocally deomstrate[d] the sensitivity to noise of cephalopods in their natural habitat, affecting exposed animals at physiological and pathological levels, and probably altering sound perception mechanisms and compromising their behaviour and capacity of survival in their natural habitat."[69] Furthermore, "ABR experiments on *loligo pealeii,* another decapodiforme cephalopod, showed sensitivity *at* 400 Hz up to 140 dB re 1uPa SPL. The above received levels can therefore be considered a reasonable threshold estimation of noise levels that can trigger acoustic trauma in cephalopods."[70] The English et al paper quoted as an authority in the SEIS measured

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[64] English et al, "Improving Efficiencies of National Environmental Policy Act Documentation for Offshore Wind Facilities Case Studies Report, OCS Study BOEM 2017-026, p. 49; Gunfleet Sands Demonstrator OWF, see https://en.wikipedia.org/wiki/Gunfleet_Sands_Offshore_Wind_Farm.

[65] SEIS, p. 3-85; Appendix A, Table A-6, p. A-21.

[66] André, et al*. "*Contribution to the understanding of particle motion perception in marine invertebrates" in *The Effects of Noise on Aquatic Life I. Advances in Experimental Medicine and Biology* Vol. 875, 2015, p. 47–55.

[67] Andre, et. al, "Low-frequency sounds induce acoustic trauma in cephalopods", *Front Ecol Eviron*, 2011, emphasis ours.

[68] Longfin squid was formerly known as *loligo pealeii.*

[69] Sole et al., "Offshore exposure experiments on cuttlefish indicate received sound pressure and particle motion levels associated with acoustic trauma", *Scientific Reports,* 2017, p. 9.

[70] Ibid.

wind turbine noise from 3.6 MW turbines at *below* 500 Hz up to 128 dB re 1 uPa, and the noise from 2 MW turbines at *below* 500 Hz up to 127 dB re 1 uPa.[71] Therefore, the range of noise measured at even smaller operational turbines than planned for the Proposed Action and cumulative lease sites are within the ranges found lethal to squid. And these studies exposed the animals to up to 400Hz sweeps at a one second sweep period for only two hours,[72] not 30 years.

Introducing massive levels of low frequency noise lethal to longfin squid for decades on end right on top and adjacent to their prime summer habitat and the irreplaceable fishery that relies on this stock is completely unacceptable. We agree with the authors of the above cephalopod papers that there is a "need for further environmental regulation of human activities that introduce high-intensity, low frequency sounds in the world's oceans"[73] and a need for "regulation addressing ocean noise issues on invertebrates". No offshore wind facilities should be permitted on or adjacent to longfin squid habitat or fishery areas due to these tremendous impacts.

We have repeatedly raised these concerns throughout the BOEM process regarding this project, as well as the NY project, in both verbal and written comments. Yet it continues to be unaccounted for in every BOEM analysis.

Impacts to longfin squid cannot be lumped in with general "moderate" impacts to fish and invertebrates both from the Proposed Action and cumulatively.[74] It is the most impacted commercial species in the Vineyard Wind area, and has significant overlaps with both the MA/RI and NY lease areas, as does the summer longfin squid fishery. Squid will suffer major impacts as a result of lethal sound alone, both from 6-10 years of construction noise during summer spawning and summer fishing activity as well as over 20-30 years of operational noise which is projected to worsen over time as structures age. These are major impacts by SEIS definition. They will remain throughout the life of the project(s) and cannot be mitigated. The economic impacts to the squid industry are addressed below. The Rhode Island longfin squid fishing industry, the largest in the country, cannot withstand these major impacts to its product source.

Climate Change: The SEIS contends that finfish and invertebrates will be affected by climate change, affecting species composition, leading to changes in fishing activity and frequencies of disease.[75] According to the definitions put forth in the document, all impacts are considered adverse impacts unless otherwise specified as beneficial.[76] Therefore, it assumes that climate change impacts on longfin squid will be negative. However, this is not what the science says. In fact, according to Hare et. al., which the SEIS quotes for this information, longfin squid is projected to be positively impacted by climate

[71] English et al, "Improving Efficiencies of National Environmental Policy Act Documentation for Offshore Wind Facilities Case Studies Report, OCS Study BOEM 2017-026, p. 49.
[72] Sole et al., "Offshore exposure experiments on cuttlefish indicate received sound pressure and particle motion levels associated with acoustic trauma", *Scientific Reports,* 2017, p. 10.
[73] Andre, et. al, "Low-frequency sounds induce acoustic trauma in cephalopods", *Front Ecol Eviron*, 2011; Sole et al., "Offshore exposure experiments on cuttlefish indicate received sound pressure and particle motion levels associated with acoustic trauma", *Scientific Reports,* 2017, p. 9.
[74] SEIS, p. 3-30.
[75] SEIS, p. 3-25.
[76] SEIS, p. ES-3.

change, along with several other species.[77] Therefore, productivity of this species and related fishery should actually increase, not decrease. If other fisheries are negatively impacted by climate change, the longfin squid fishery due to increased productivity would, absent negative impacts due to offshore wind development, become even more economically important to fisheries stakeholders. If it is majorly impacted by offshore wind development, the negative impacts may become even more severe in the future.

Omitted Impacts: One particularly pertinent impact not discussed by the SEIS is the potential impacts to the Massachusetts area horseshoe crab population from cable laying, EMF, cable exposure and/or scour protection in the Proposed Project area, as well as potential other construction activities for the Proposed Action and other anticipated projects, through and on horseshoe crab habitat coastwide. Neither the SEIS nor the COP analyze these impacts. For example, the COP states that "[l]ittle data exists on the distribution of Horseshoe crab in the WDA; however, older juvenile and adult horseshoe crabs could occur in the area",[78] but also lists it as a benthic resource and states that the cable export route is comprised of 75% sand/mud, which is typical horseshoe crab habitat.[79]

The BOEM study prepared for this DEIS/SEIS analysis process "Evaluation of potential EMF Effects on Fish Species of Commercial or Recreational Fishing Importance in Southern New England" does not even contain the words "horseshoe crab".[80] However, the BOEM EMF study does state that the eight bottom dwelling electrosensitive or magnetosensitive bottom dwelling species, including American lobster (which is a crustacean and therefore the most similar species to a horseshoe crab out of the eight) "likely would encounter electric fields induced by the magnetic field from undersea power cables."[81] But no EMF impact studies, or real information regarding construction impacts, has been collected on this particular species-with the exception that the COP does mention that since horseshoe crabs bury into the sediment in winter their already slow avoidance response to construction is exaggerated, with slow avoidance responses subjecting them to "increased injury or mortality during dredging and cable installation" and that "immobile benthic species …in the direct path of construction vessels would experience direct mortality or injury."[82]

Surprisingly, these potential impacts have received little attention despite being a national and international health concern. A Massachusetts state/Division of Marine Fisheries website states "Atlantic horseshoe crabs are an important species for many animals as well as in the biomedical industry" and "[t]he biomedical industry uses the blood of horseshoe crabs to produce Limulus amebocyte lysate (LAL) which is used to test medical equipment and supplies for bacteria", listing the

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[77] Hare et al, " A Vulnerability Assessment of Fish and Invertebrates to Climate Change on the Northeast U.S. Continental Shelf", 2016, Figure 5, at https://static1.squarespace.com/static/511cdc7fe4b00307a2628ac6/t/572d00f2c2ea51215901defa/1462567158802/2_ClimateVulnReport_journal.pone.0146756.pdf.

[78] COP, Volume III, Section 6 Biological Resources, p. 6-98.

[79] Ibid; p. 6-122.

[80] Snyder et al, "Evaluation of potential EMF Effects on Fish Species of Commercial or Recreational Fishing Importance in Southern New England" ,OCS Study BOEM 2019-049.

[81] Snyder et al, "Evaluation of potential EMF Effects on Fish Species of Commercial or Recreational Fishing Importance in Southern New England" ,OCS Study BOEM 2019-049, p. 24.

[82] COP, Volume III, Section 6 Biological Resources, p. 6-144.

East Coast (cumulative impacts analysis area) as the animal's habitat. [83] No real impacts have been analyzed for this tremendously important species, which buries into sand and mud and lives in the current naturally existing soft bottom habitat of various WEAs and potential cable export routes, including that of the Proposed Action.

The impacts to horseshoe crabs from both the Vineyard Wind project and other anticipated cumulative projects is much broader than a basic "fishery analysis". "Derek Perry, an invertebrate fisheries biologist at the Massachusetts Division of Marine Fisheries, said that other fisheries dwarf the impact of the biomedical industry,"[84] because all drugs certified by the FDA must be first tested using horseshoe crab blood, including ongoing COVID19 vaccine testing.[85] According to biomedical industry leaders Associates of Cape Cod, based in East Falmouth, Massachusetts and which sources local horseshoe crabs for LAL, "Horseshoe crabs may be the answer to a coronavirus vaccine next year."[86] Considering the importance of horseshoe crab blood to the FDA on all injectable drugs, in addition to the COVID19 situation, the impacts to the entire U.S. public health system and medical safety of U.S. citizens should be a factor evaluated by the SEIS for both the Proposed Project and cumulative projects if this species may experience any impacts whatsoever.

Another issue not addressed is the impact on the Mid Atlantic Cold Pool, a hydrodynamic feature of the Mid Atlantic Bight. The structure of the entire Mid Atlantic Bight food web depends on this Cold Pool.[87] There is no cumulative analysis on the impacts to this Cold Pool from the extent of structures planned in the cumulative scenario. However, in the SEIS, "using the assumptions in Table A-4, it is anticipated that the expanded cumulative scenario would include up to 373 structures in the water quality geographic analysis area and could result in alteration of local water currents."[88]

The water quality geographic analysis area only partially covers sections of the MA/RI lease area. This must be expanded to an overall NEPA cumulative impact analysis for the entire East Coast or potentially risk irreversible impacts to the Mid Atlantic Cold Pool and marine food web.

Marine Mammals Comments, Section 3.5:

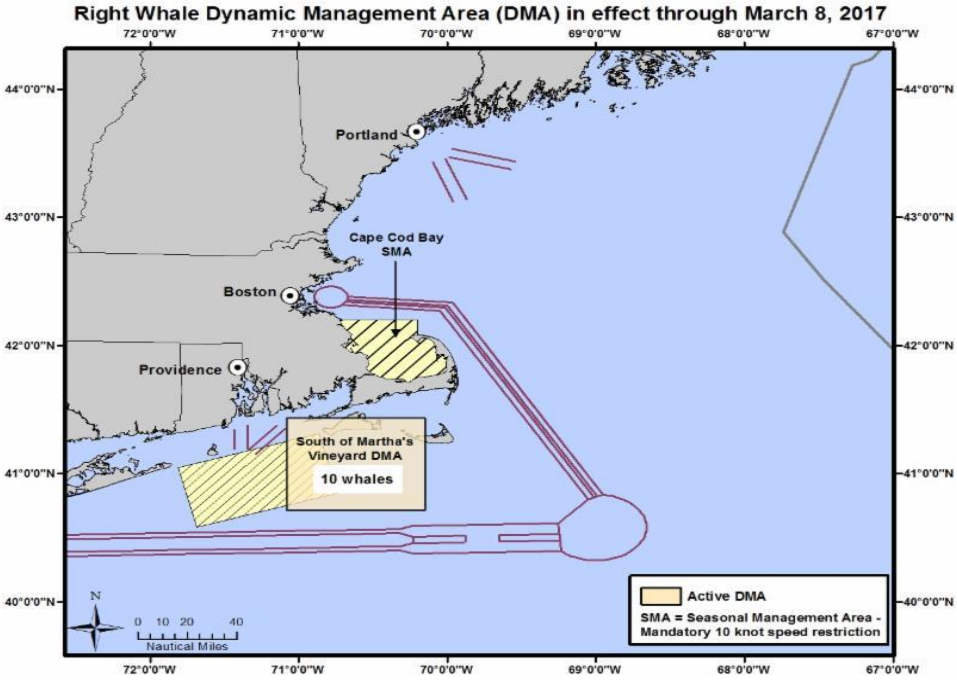
EMF: The SEIS notes that marine mammals are very sensitive to changes in magnetic fields and may react to the local variations of geomagnetic fields caused by power cable EMFs.[89] It also makes the statement that "Marine mammals have the potential to react to submarine cable EMF; however, this impact, if any, would be limited to extremely small portions of the areas used by migrating marine

[83] See https://www.mass.gov/service-details/learn-about-atlantic-horseshoe-crab.
[84] See https://www.usatoday.com/story/news/health/2020/06/15/covid-19-coronavirus-vaccine-tested-horseshoe-crab-blood/3190180001/.
[85] See https://www.unionleader.com/news/health/coronavirus/horseshoe-crabs-essential-to-finding-covid-19-vaccine-in-america/article_9fb7ea1e-b99b-5218-a54a-54054cf035c6.html?utm_medium=social&utm_source=email&utm_campaign=user-share.
[86] See https://www.acciusa.com/.
[87] See https://maracoos.org/mid-atlantic-bight-cold-pool.shtml.
[88] SEIS, p. Appendix A, p. A-55.
[89] SEIS, p. 3-31.

mammals. As such, exposure to this IPF would be low".[90] This is wholly untrue considering the number of endangered North Atlantic right whales that habitually migrate through the Project area and entire MA/RI lease area.

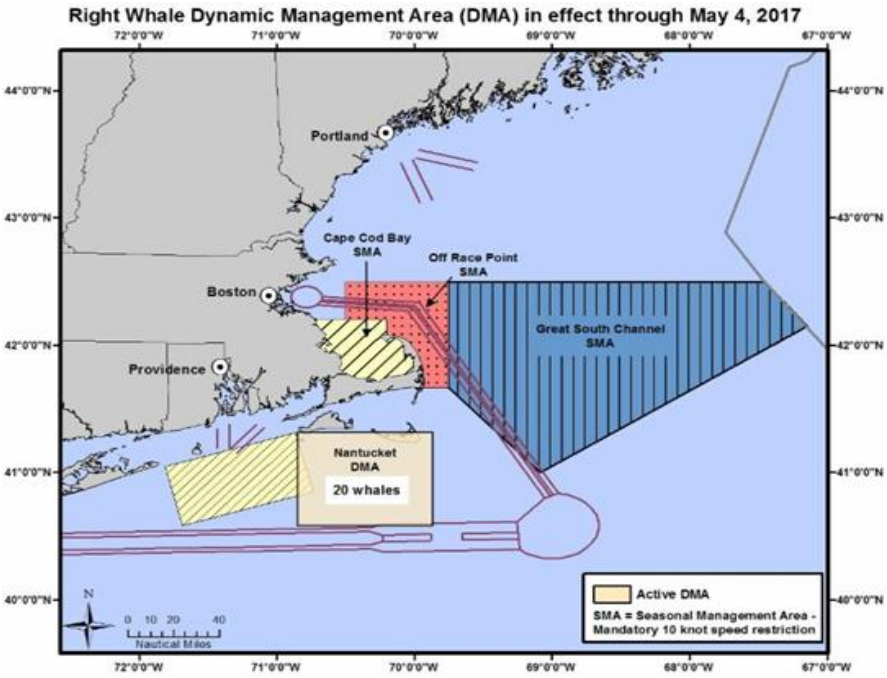
Over the past few years of Project development, we have catalogued various NOAA Fisheries notices to mariners regarding endangered North Atlantic right whale sightings in the area and resulting speed restriction zones. These notices occur every year, throughout the year, and come with applicable charts of the locations of the animals and resulting restriction zones, as included below:

1. February 22, 2017-March 8, 2017: 10 right whales sighted in the DMA 16 miles south of Martha's Vineyard:

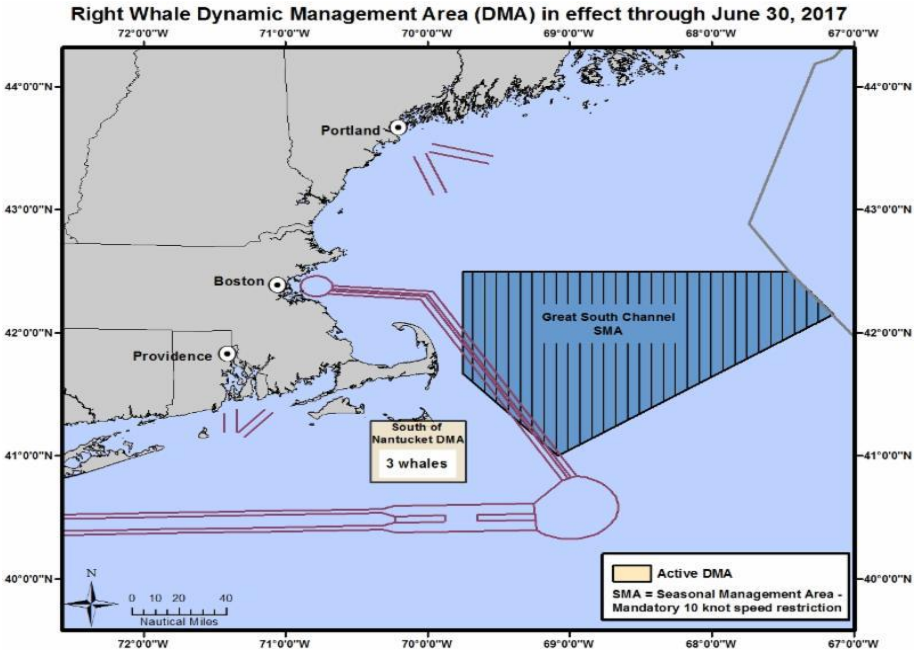


[90] Ibid.

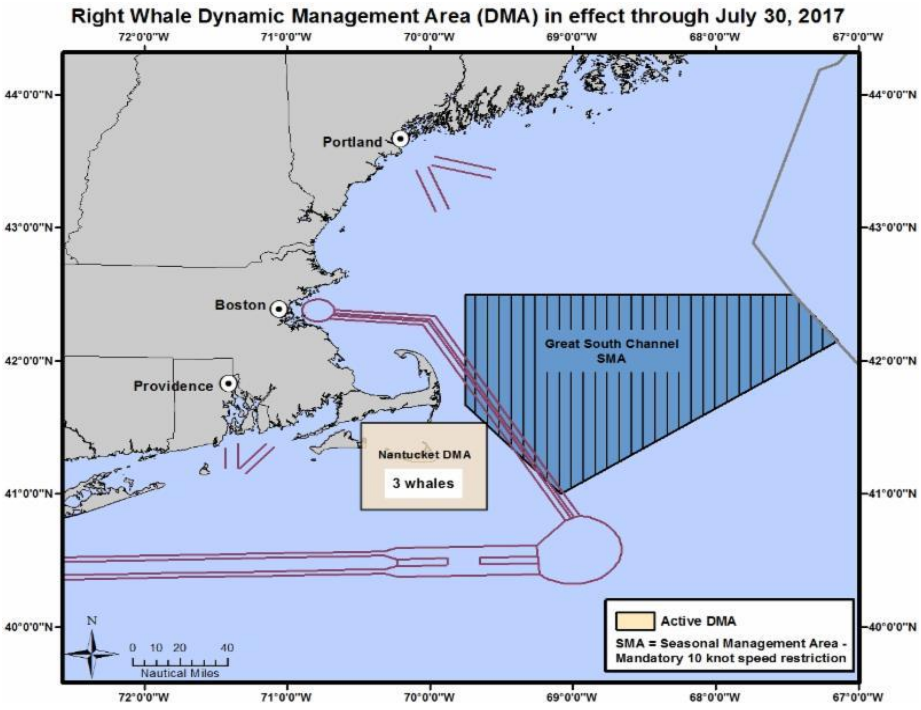
2. April 21-May 4, 2017: 20 right whales in the DMA south of Nantucket:



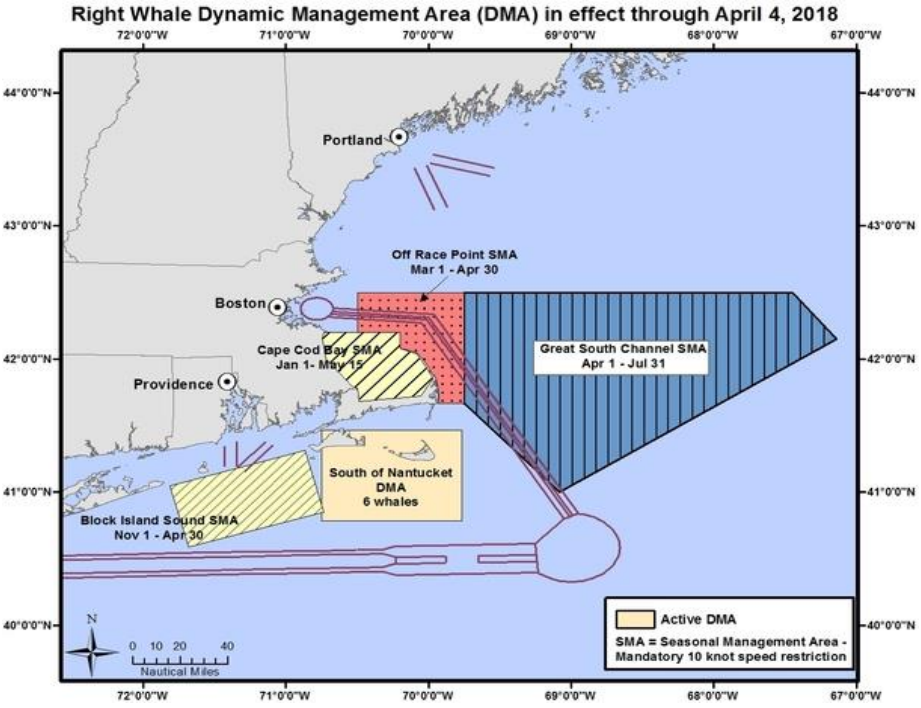
3. June 19-June 30, 2017: 3 right whales in the DMA south of Nantucket:



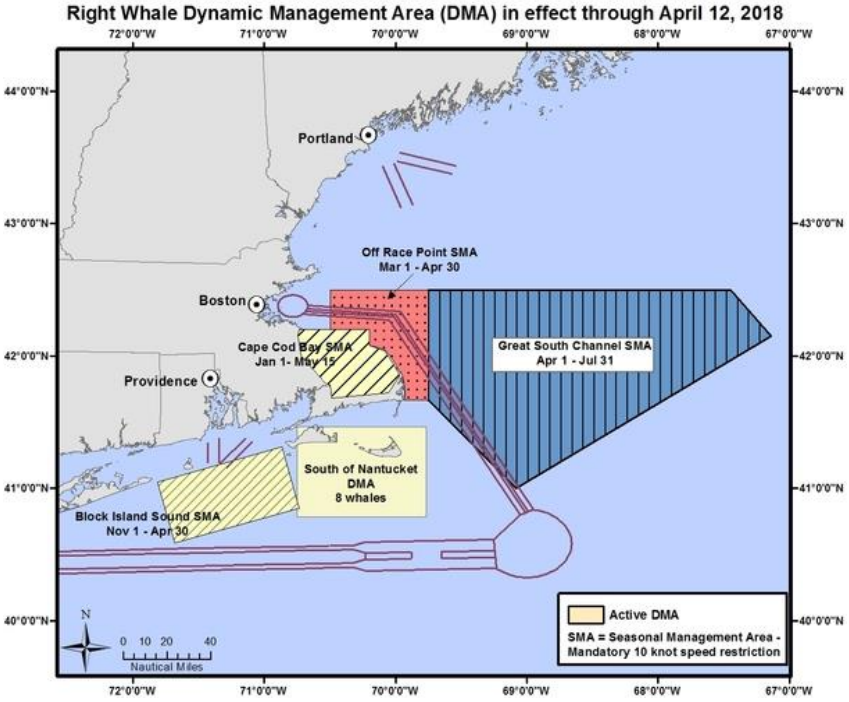
4. July 18, 2017- July 30, 2017: 3 right whales in the DMA south of Nantucket:



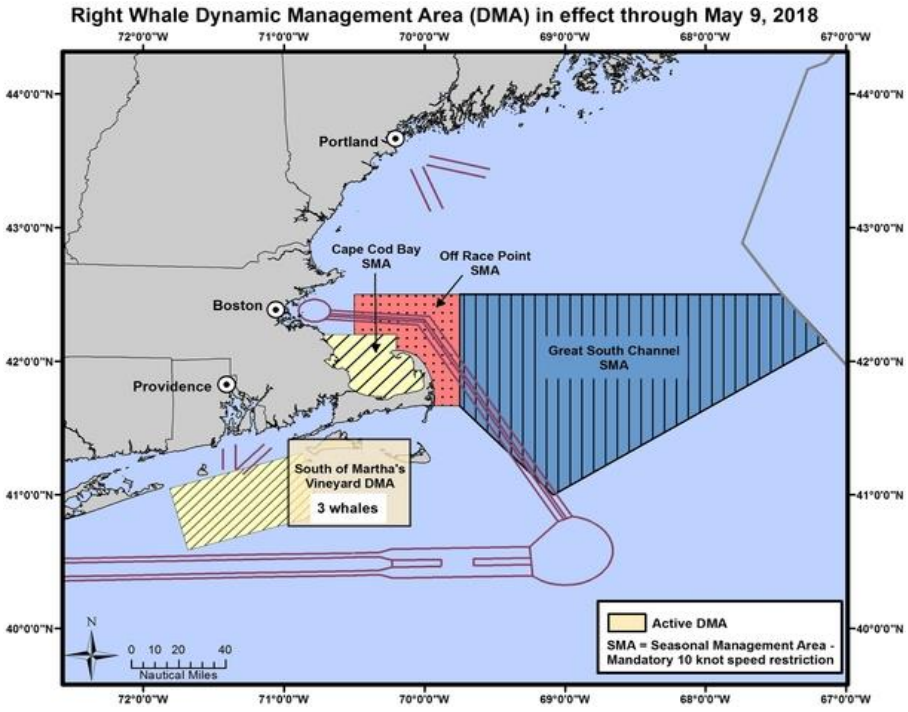
5. March 21, 2018- April 4, 2018: 6 right whales in the DMA southwest of Nantucket:



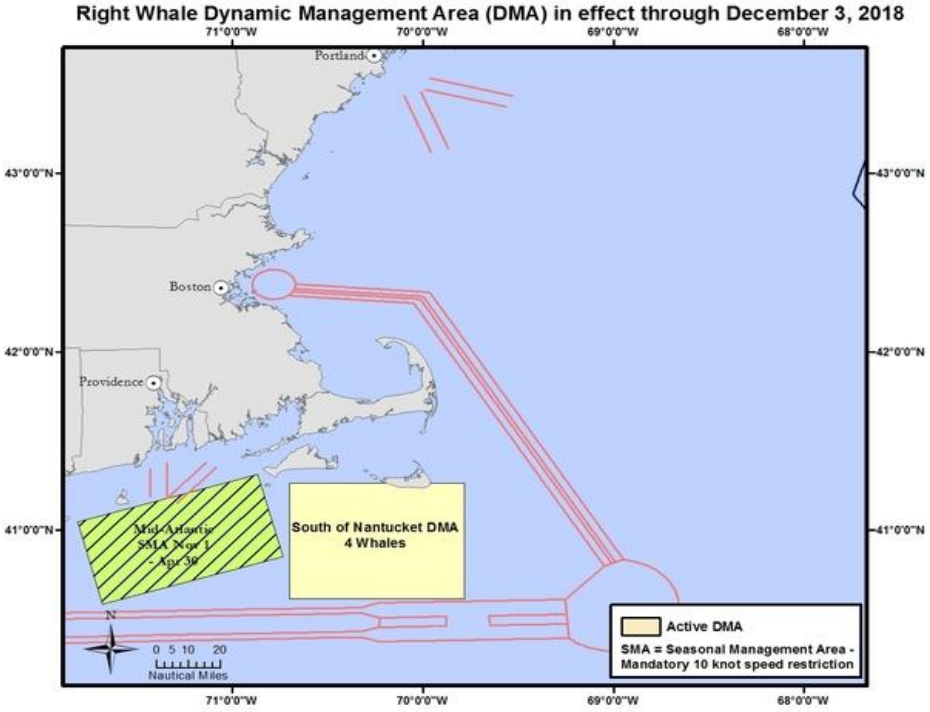
6. April 5, 2018- April 12, 2018: 8 right whales in the DMS south of Nantucket:



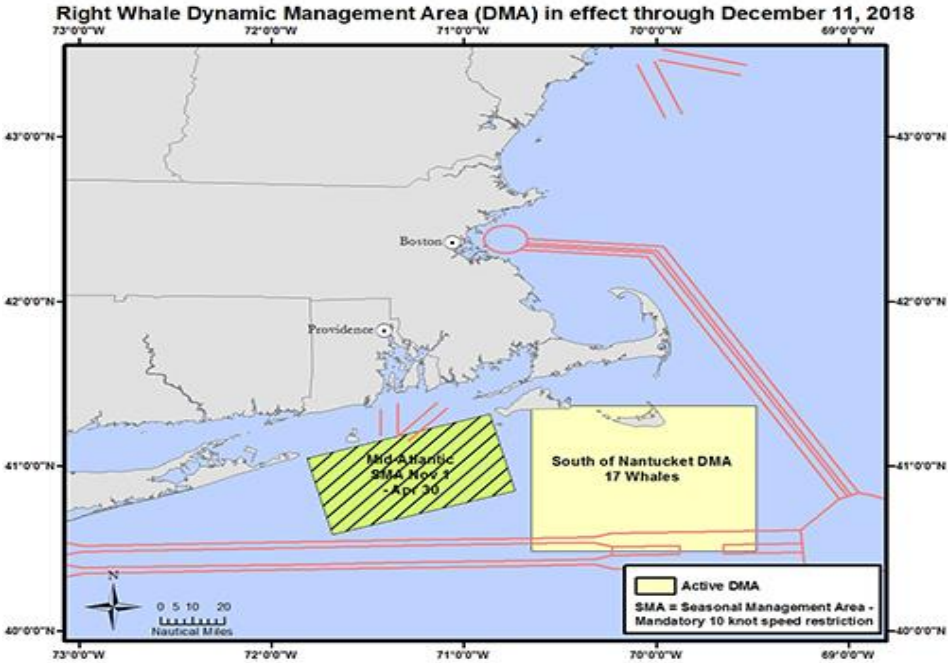
7. April 26, 2018- May 9, 2018: 3 right whales in the DMA south of Martha's Vineyard:



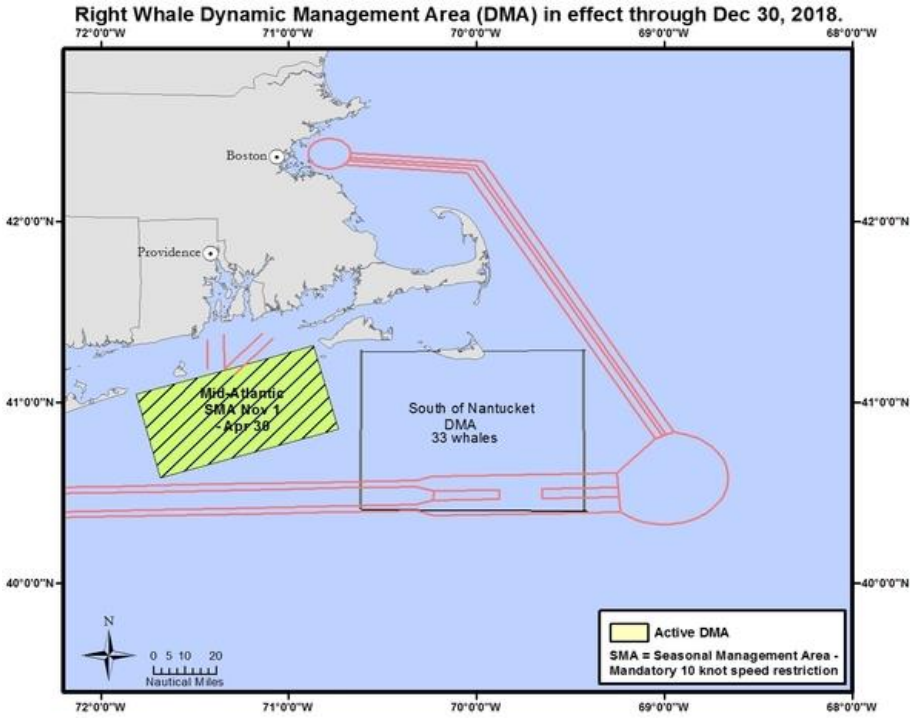
8. November 19-December 3, 2018: 4 right whales in the DMA 21 miles south of Nantucket:



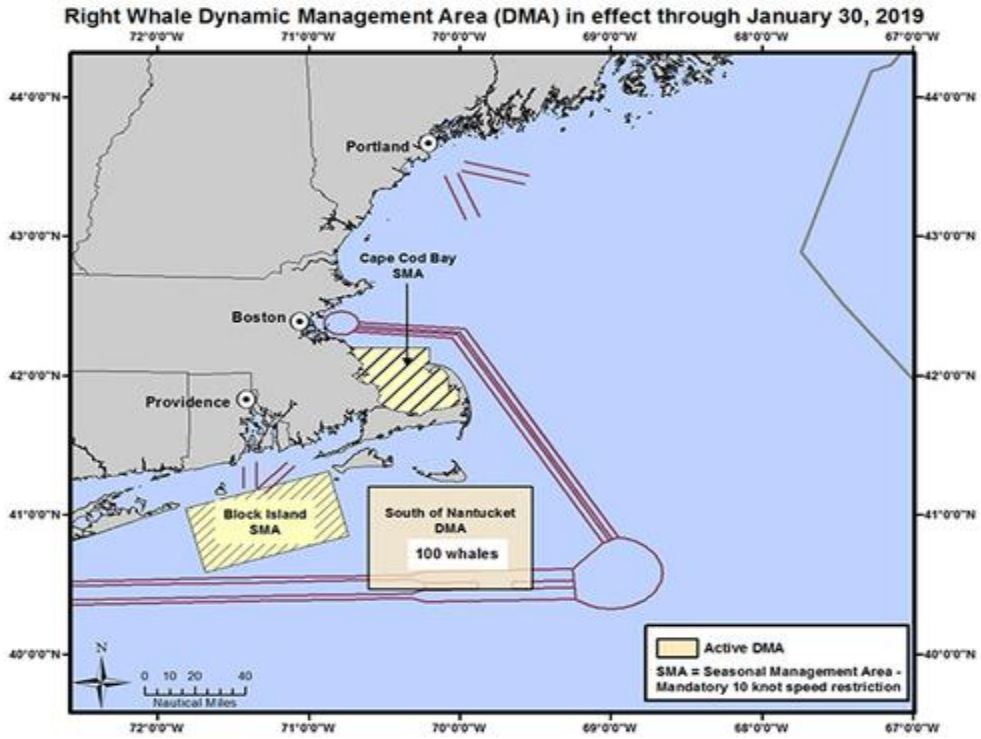
9. November 27- December 11, 2018: 17 right whales in the DMA south of Nantucket:



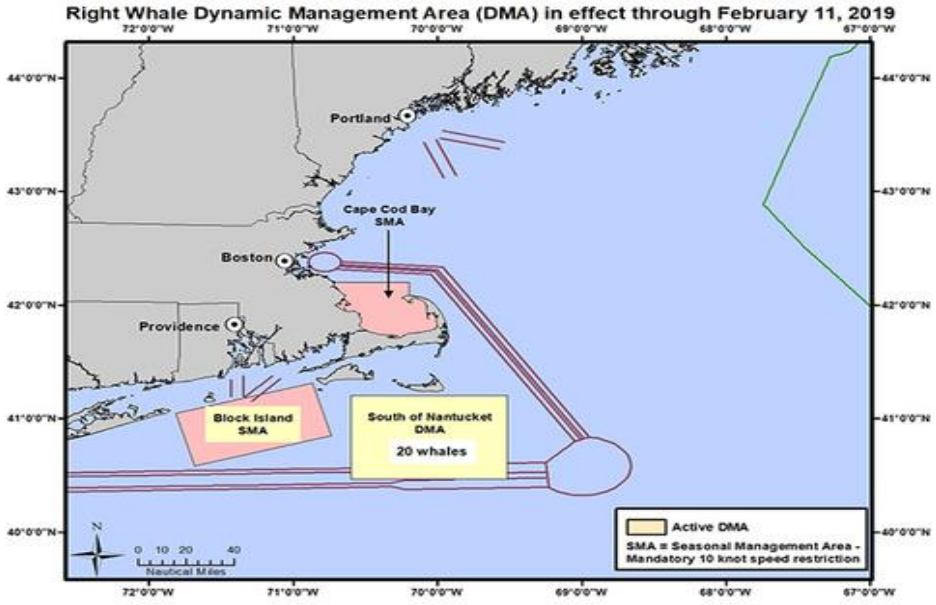
10. December 17- December 30, 2018, : 33 right whales in the DMA south of Nantucket:



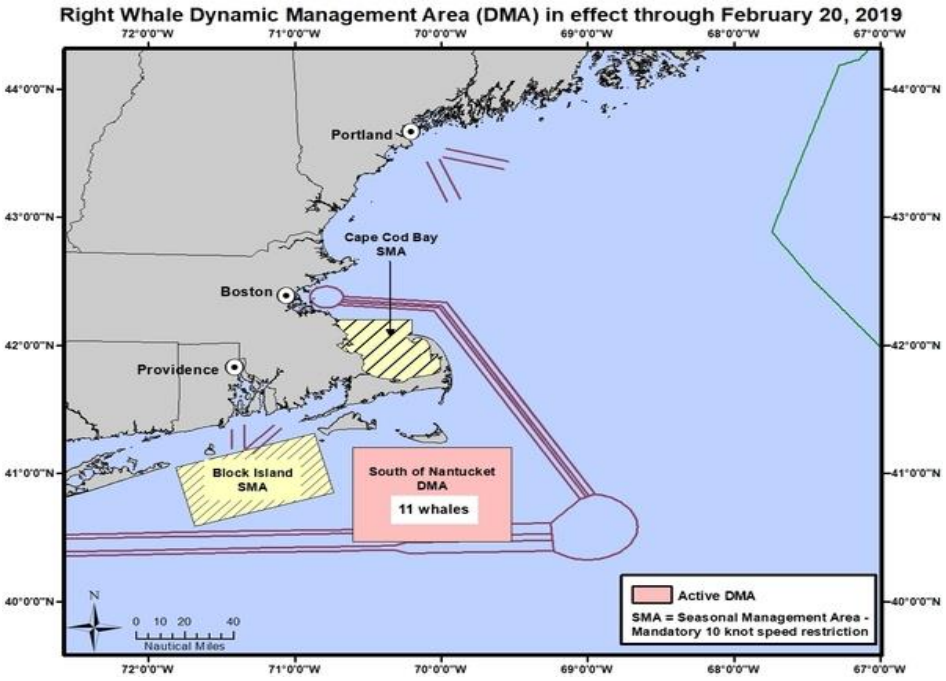
11. **January 28- January 30, 2019: 100 right whales in the DMA south of Nantucket in the WDA:**



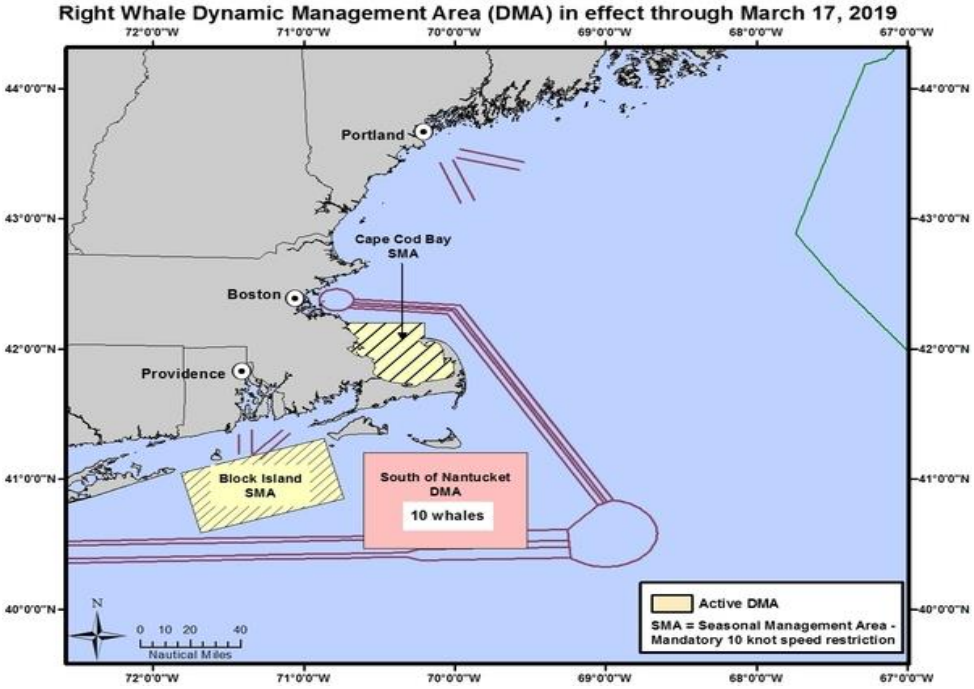
12. January 29- February 11, 2019: 20 right whales in the DMA south of Nantucket:



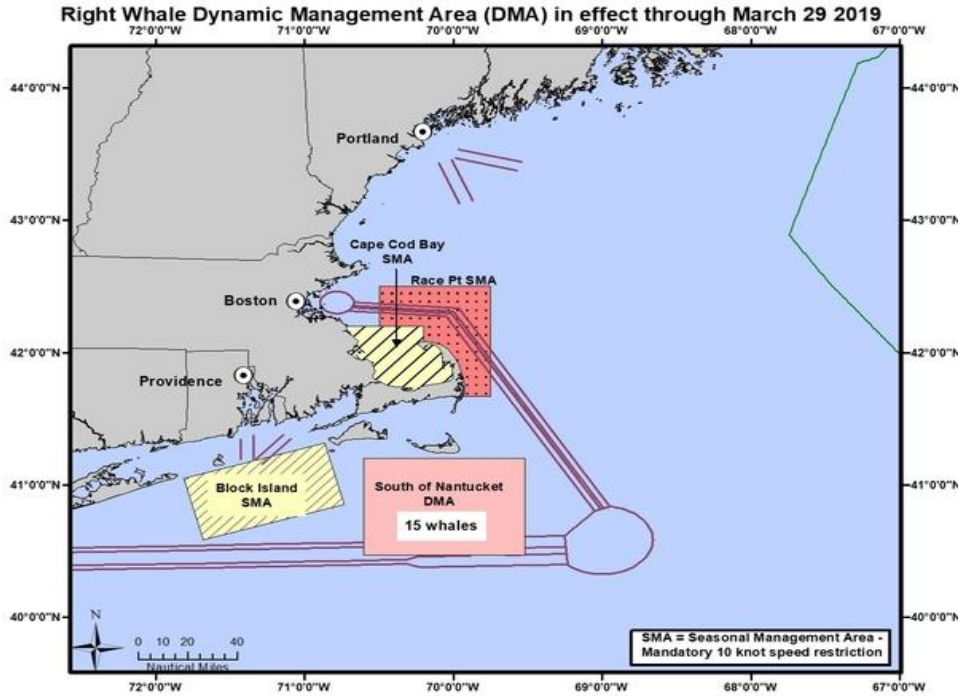
13. February 6- February 20, 2019: 11 right whales in the DMA south of Nantucket:



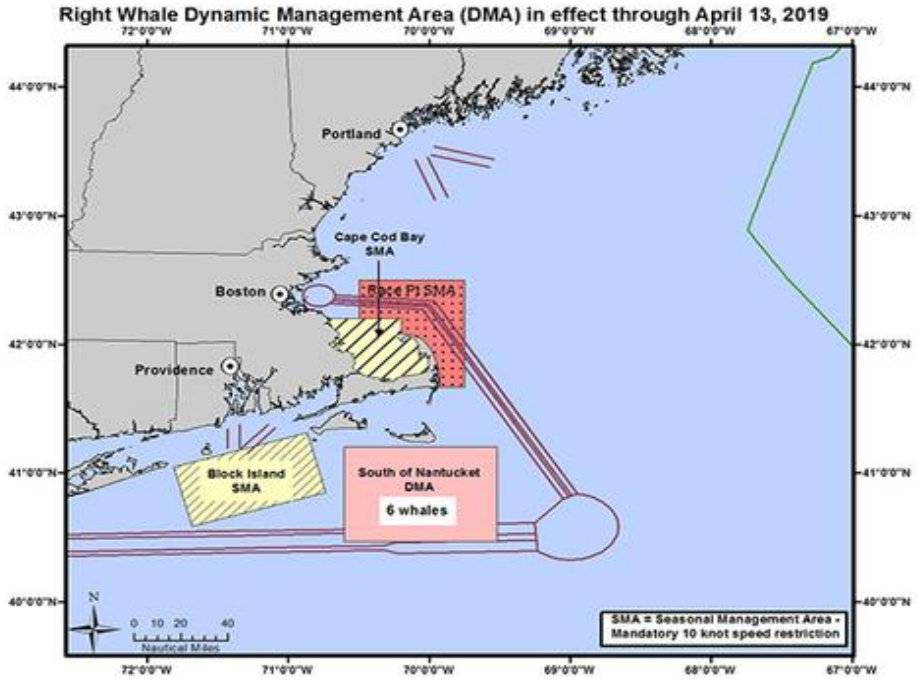
14. March 4- March 17, 2019: 10 right whales in the DMA south of Nantucket:



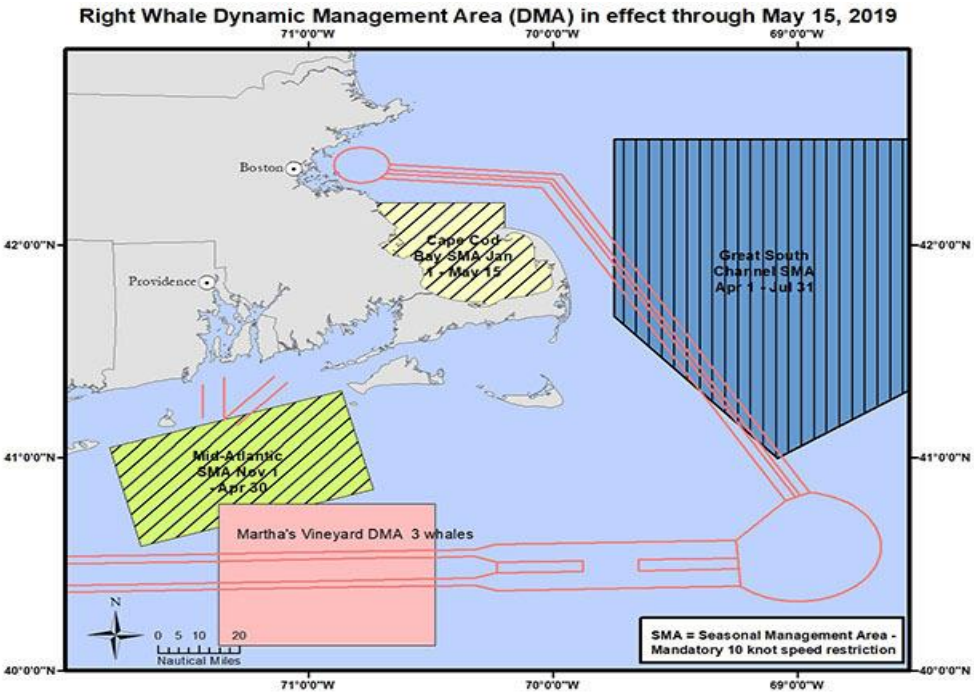
15. March 14- March 29, 2019: 15 right whales in the DMA south of Nantucket:



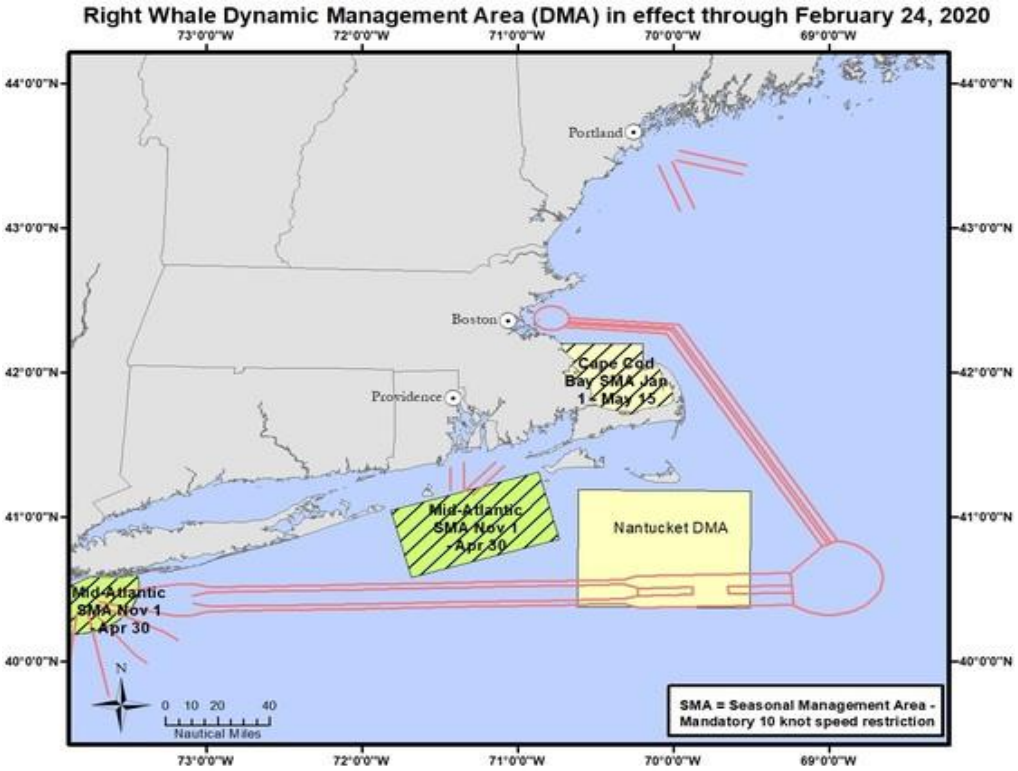
16. March 29- April 20, 2019: 6 right whales in the DMA south of Nantucket:



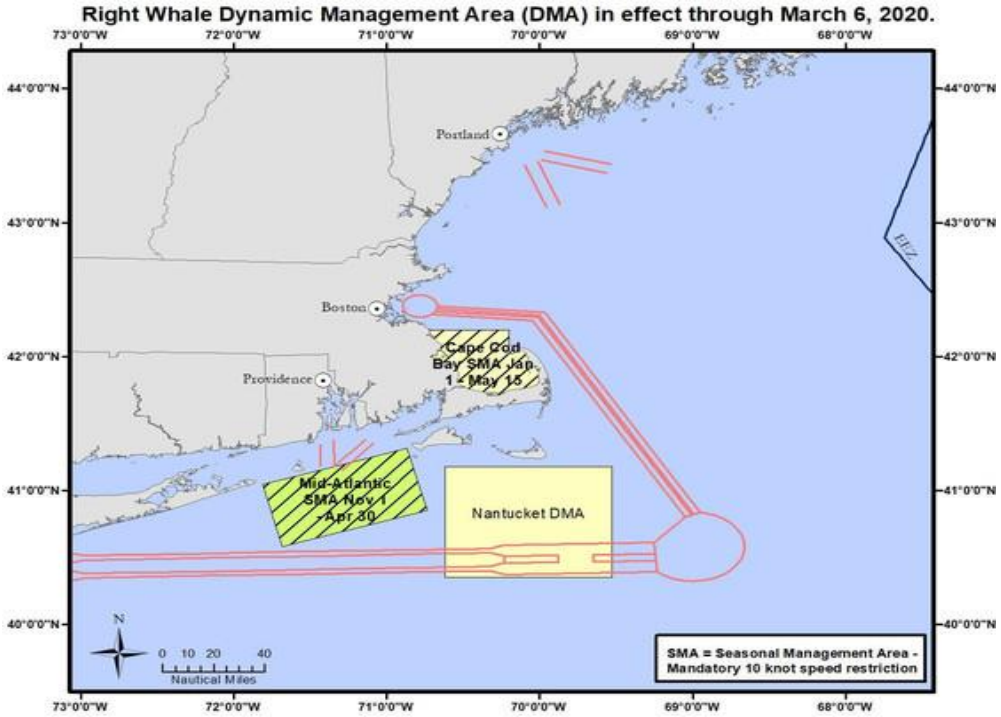
17. May 1- May 15, 2019: 3 right whales in the DMA south of Martha's Vineyard:



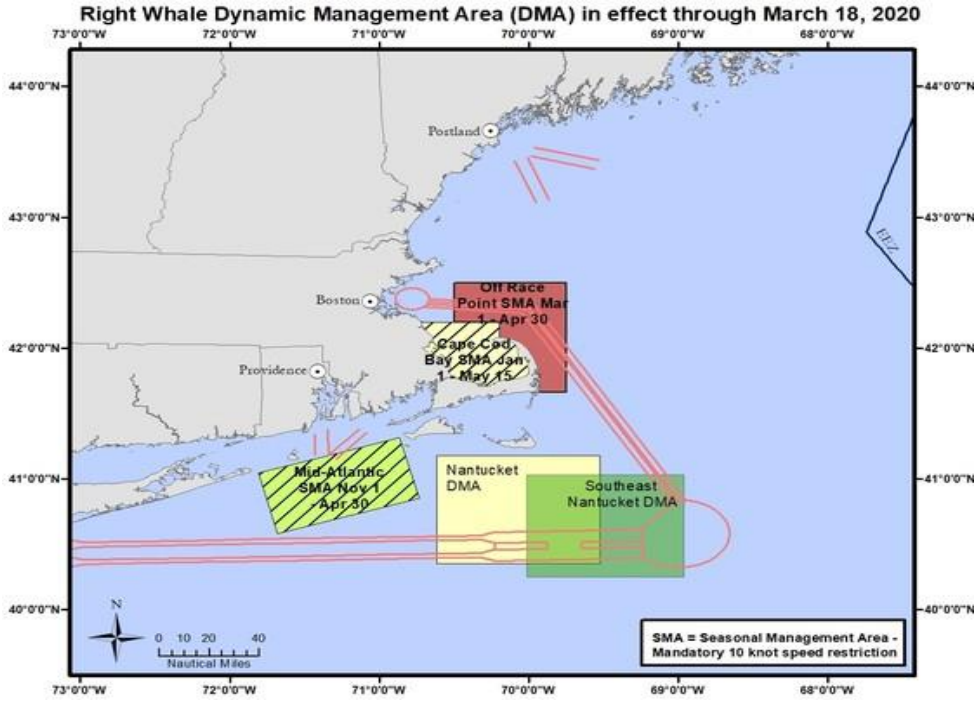
18. February 10- February 24, 2020: right whales in the DMA south of Nantucket:



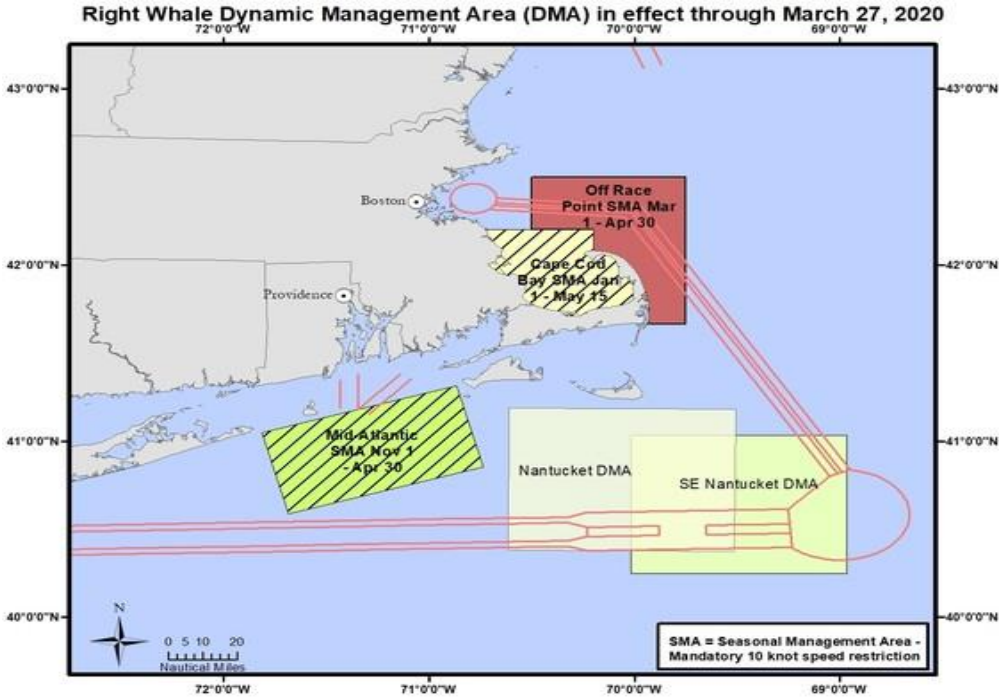
19. February 21- March 6, 2020: right whales in the DMA south of Nantucket:



20. March 5- March 18, 2020: two separate aggregations of right whales in the DMAs south of Nantucket:



21. March 14- March 27, 2020: two aggregations of right whales in the DMAs south of Nantucket:



Based on the above notices to mariners provided by NOAA fisheries regarding endangered North Atlantic right whales in the Project area and MA/RI lease areas, the SEIS is incorrect to assume that migratory exposure by this endangered species would be "low." Additionally, based on our above discussion about tidal currents, scour and potential for unburied cables in the benthic impacts section, it is unreasonable to assume that the EMF will be in the low(er) levels assumed by the COP/SEIS.

Noise: Despite "soft start" techniques, the endangered North Atlantic right whale will be exposed to pile driving impacts for 6-10 years in the MA/RI lease areas should construction move forward, and to operational low frequency noise for the life of the projects. High levels of low frequency sound can displace whales, interfere with their foraging/breeding behavior, and mask their acoustic communication, potentially leading to population level effects.[91] Noise sensitive and endangered North Atlantic right whales, have demonstrated altered behavior when exposed to background noise.[92]

North Atlantic right whale population is estimated at 400 as of 2020,[93] down from 450 in 2018.[94] There were only about 100 females of breeding age in 2018. [95] As noted above, 100 individual North Atlantic Right whales were spotted in the Proposed Project area at one time in January 2019. This is 25% of the entire known endangered population. In July 2020, the International Union for the Conservation of Nature moved the North Atlantic right whale from "Endangered" to "Critically Endangered".[96] And NOAA has declared 2017-2020 to be a North Atlantic Right Whale Unusual Mortality Event.[97] In fact, the most standings of North Atlantic Right Whales in this timeframe have been off Nantucket/Martha's Vineyard/Cape Cod.[98] This may in fact be attributed to G&G activity, given the noise sensitivity of this species.

We therefore disagree with the SEIS assessment of "moderate" adverse impacts for marine mammals because of the presence of structures and pile driving noise. Additionally, it is wholly unreasonable for the SEIS to assume "moderate beneficial" impacts due to the presence of noise and EMF-creating structures.[99] Based on the impacts to North Atlantic right whales from even ship created and background noise, we do not agree that the "continuous underwater noise of operational WTGs" will result in "negligible" impacts on this species.[100]

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[91] See for example, Romagosa, et. al., "Underwater Ambient Noise in a Baleen Whale Migratory Habitat Off the Azores", Frontiers in Marine Science, 2011, at https://www.frontiersin.org/articles/10.3389/fmars.2017.00109/full.

[92] See Romagosa, above, and Parks et al., "Individual right whales call louder in increased environmental noise", Biology Letters, 2010, at https://royalsocietypublishing.org/doi/10.1098/rsbl.2010.0451

[93] See https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2020-north-atlantic-right-whale-unusual-mortality-event .

[94] See https://www.fisheries.noaa.gov/media-release/third-north-atlantic-right-whale-mortality-2018-confirmed.

[95] See https://www.fisheries.noaa.gov/media-release/third-north-atlantic-right-whale-mortality-2018-confirmed.

[96] See https://www.smithsonianmag.com/smart-news/right-whales-now-listed-critically-endangered-180975315/.

[97] https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2020-north-atlantic-right-whale-unusual-mortality-event.

[98] Ibid.

[99] SEIS, p. 3-37.

[100] SEIS, Appendix B, Marine Mammals, "Noise: Turbines", p. B-27.

Increased vessel traffic: Up to 75% of right whale mortality is due to ship strikes.[101] In fact, the rerouting of cruise ships through right whale feeding grounds in Canada has contributed to considerable right whale deaths in recent years.[102] The SEIS determines that the Vineyard Wind project will have up to 46 vessels operating in the navigational geographic analysis area at any given time, with up to 184 vessels in the geographic analysis area at any given time during times of peak construction in the MA/RI WEA during 2022-2023.[103] This navigational analysis area includes only the areas in and surrounding the MA/RI area,[104] so these 184 vessels will be directly in the vicinity of the right whale aggregations depicted in the charts above.

Not all marine mammals are endangered North Atlantic right whales. According to the Marine Mammal Protection Act, North Atlantic right whales are listed as a "strategic stock", and the Level A harassment (i.e. that which has the potential to injure a marine mammal or marine mammal stock in the wild) and B harassment levels (i.e. that which has the potential to alter or disrupt natural behavioral patterns) that will undoubtedly occur to this stock, up to 25% of the entire stock at any given time in the WDA, would seem to be at odds with the MMPA requirement that "such taking will not be to the disadvantage of those species and populations stocks"[105] and any offshore wind construction in the area whatsoever.

Particularly given the fact that the North Atlantic right whale population has dropped from 450 to 400 in two years, and that 25% of the known world population is known to inhabit the area of the Proposed Action at one time, and knowing that the Proposed Action as well as cumulative MA/RI projects will have adverse impacts on this declining stock, it would not be in the interest of conservation to permit construction in these areas. As stated in the Endangered Species Act, "It is further declared to be the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."[106]

The SEIS notes that there are current measures being taken to reduce the interactions between certain types of fishing gear and North Atlantic right whales by 60%, which would occur as a measure to permitted entities.[107] It is not reasonable to require certain existing entities permitted in federal waters to bear conservation burdens that will be exacerbated by entities applying for new federal permits and which will not be held to the same level of conservation responsibility.

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[101] SEIS, p. 3-36.
[102] See http://fisherynation.com/most-likely-carnival-cruise-lines-is-responsible-for-18-right-whale-deaths-in-the-past-3-year-at-which-rate-they-would-soon-be-extinct.
[103] SEIS, p. 3-112.
[104] SEIS, Appendix A, Figure A.7-12, p. A-36.
[105] Marine Mammal Protection Act, Section 103. https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act.
[106] ESA, Section 2(c).
[107] SEIS, p. 3-94.

Demographics, Employment and Economics Comments, Section 3.7:

Energy generation/security: The SEIS claims that "The economic impacts of future offshore wind activities (including associated energy storage and peaker generation capacity projects) on energy generation and energy security cannot be quantified, but would be indirect, long-term and beneficial."[108]

However, the unreliability of wind power is well documented, which is a negative impact to energy security. In summer of 2018, the UK went 9 days without wind power generation due to calm conditions that were slated to continue for another two weeks, leading an analyst at Bloomberg Intelligence to state that relying on wind to supply the majority of power *is reckless for energy security*.[109] In early 2019, over 200,000 Australian households in were dumped from the electricity grid during a hot spell which coincided with collapses of wind power. [110] Lack of wind nearly collapsed Germany's power grid in early 2017, and coal, gas and nuclear had to keep the country going when renewables could not meet even 5% of total power demand.[111] This is not "beneficial" energy security.

The U.S. Department of Energy as of 2016 has the capacity factor of nuclear at 92.3%, natural gas at 55.5%, coal at 53.3%, and wind only at 34.5%.[112] Conventional power plants can ramp up at times of peak need, and can have "availability" in the 80-95% range or higher; wind power cannot do this.[113] Its unreliability means that wind power cannot be relied upon to produce electricity at times of peak need, and it can result in power surpluses when not needed. [114] For example, this often results in Germany not only giving away renewable power but paying Poland to take it off its hands.[115]

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[108] SEIS, p. 3-55.

[109] See https://www.bloomberg.com/news/articles/2018-06-07/u-k-wind-drought-heads-into-9th-day-with-no-relief-for-weeks.

[110] See https://stopthesethings.com/2019/01/30/how-subsidised-wind-solar-destroyed-australias-economic-competitiveness/ and https://stopthesethings.com/2019/01/26/worthless-wind-power-australias-re-debacle-deepens-with-200000-victorian-households-left-powerless-during-heatwave/.

[111] See https://dailycaller.com/2017/02/28/germany-facing-mass-blackouts-because-the-wind-and-sun-wont-cooperate/.

[112] See https://www.energy.gov/ne/articles/what-generation-capacity .

[113] See https://www.manhattan-institute.org/green-energy-revolution-near-impossible.

[114] For example, the Vineyard Wind project being planned off MA to feed wind power into Martha's Vineyard/Cape Cod will produce the most wind in the fall/winter/early spring months when there is more wind. But Martha's Vineyard/Cape Cod needs power in the summer months, when there are more tourists and the summer tourism boom occurs, peaking electricity demand..

[115] See https://www.manhattancontrarian.com/blog/2019-3-14-how-much-do-the-climate-crusaders-plan-to-increase-your-costs-of-electricity-part-iv?fbclid=IwAR273K5NB-PcRPBJDIpb6YG3lHH1tOU0jbSGOlY8pos5HuQH34MRht68wXs. See also https://www.cleanenergywire.org/factsheets/interconnectors-blockages-german-grid-odds-eu-power-market and https://www.cleanenergywire.org/dossiers/energy-transition-and-germanys-power-grid#updating. This also has to do with the inability of the German grid to handle or transmit the fluctuating energy. However, Germany is about 137,000 square miles with accompanying grid; the United States is 3.7 million square miles by comparison. See also https://www.manhattan-institute.org/green-energy-revolution-near-impossible : "A transition to 100% non-hydrocarbon electricity by 2050 would require a U.S. grid construction program 14-fold bigger than the grid build-out rate that has taken place over the past half-century.[9] Then, to finish the transformation, this Promethean

Additionally, according to the U.S. Energy Information Administration, offshore wind is the most expensive type of potential electricity in the nation, with estimated levelized costs of electricity for new generation resources entering service in 2023 at more than double that of natural gas.[116] According to the Brookings report, wind plants can operate only at a capacity factor of 30% or more and cost about twice as much per MW to build as a gas combined cycle plant; taking into account wind reliability, wind costs 10 times more than natural gas costs to produce the same amount of electricity with the same reliability.[117] Therefore, adoption of offshore wind results in much lower energy reliability and output compared to other energy sources, but for a much greater cost.

Recent Harvard research found that the average power density of a wind farm, i.e. the rate of energy generation divided by the encompassing area of the wind facility, was up to 100 times lower than estimates by some leading energy experts, including the U.S. Department of Energy and the Intergovernmental Panel on Climate Change.[118] That same study found that a large scale transition to wind power would require up to 20 times more area than previously thought due to the fact that real-world wind power generation has been overestimated because interactions between the turbines and the atmosphere had been inaccurately accounted for. In 2019 leading offshore wind developers were forced to acknowledge the reality of "wake effect" and that they had been overestimating power production from turbines.[119] Therefore, the projected ability of offshore wind to meet state offshore wind energy goals is less than the SEIS estimates in Section 1.2.[120]

Considering the fact that the United States is a leader in oil and natural gas production, as well as other energy technologies more reliable than offshore wind, it does not seem that national energy security will benefit from offshore wind construction by foreign offshore wind entities. Additionally, since the SEIS states that there will be no impact to climate change from offshore wind facilities, there is no logical reason to move towards unreliable energy and away from current U.S. resources.

One of impacts regarding energy generation and economics that has been completely omitted from the SEIS is that of U.S. tax credits. AWEA statistics have been utilized by BOEM in order to determine potential economic output of offshore wind.[121] As of 2016, the direct federal subsidies given

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effort would need to be more than doubled to tackle nonelectric sectors, where 70% of U.S. hydrocarbons are consumed. And all that would affect a mere 16% of world energy use, America's share."

[116] See https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf, page 7, Table 1a.

[117] See Brookings Institution, Global Economy and Development Working Paper 73, "The Net Benefits of Low and No-Carbon Electricity Technologies" at https://www.brookings.edu/wp-content/uploads/2016/06/Net-Benefits-Final.pdf, p. 24. "Assuming that reductions in carbon dioxide emissions
are valued at $50 per metric ton and the price of natural gas is not much greater than $16 per million Btu, the net benefits of new nuclear, hydro, and natural gas combined cycle plants far outweigh the net benefits of new wind or solar plants. Wind and solar power are very costly from a social perspective because of their very high capacity cost, their very low capacity factors, and their lack of reliability…. Taking account of the lack of wind reliability, it takes an investment of approximately $10 million in wind plants to
produce the same amount of electricity with the same reliability as a $1 million investment in gas combined cycle plants."

[118] https://news.harvard.edu/gazette/story/2018/10/large-scale-wind-power-has-its-down-side/.

[119] See https://www.bloomberg.com/news/articles/2019-10-29/orsted-sinks-as-company-slashes-outlook-and-warns-of-job-cuts.

[120] SEIS, p. 1-2, 1-4.

[121] SEIS, p. 3-57.

to the members of AWEA itself was $176 billion; however, when all of the subsidies, loans, and loan guarantees given to the companies on AWEA's board are counted, the grand total comes to a staggering $5.1 trillion.[122] For some large investors, this is the sole reason for investment.[123]

When it comes to offshore wind, all developers with current U.S. leases are entirely foreign owned, some majority owned by foreign governments. For example, Orsted, formerly Danish Oil and Natural Gas, which owns leases in federal waters off of MA, NJ and VA, is 50.1% owned by the Danish government, and is also the majority shareholder of a major offshore wind turbine installer (also Danish) and large shareholder of an offshore subsea cable installer (based in the UK).[124] Equinor, formerly Statoil, is 67% owned by the Norwegian government and 3% owned by the Government Pension Fund of Norway [125] and holds leases off of NY and MA.[126]

The Vineyard Wind project under consideration in this SEIS is 50% owned by Copenhagen Infrastructure Partners, a Danish fund management company which invests in renewable energy and is an investment arm of PensionDanmark,[127] one of the 50 largest pension funds in Europe.[128] PensionDanmark "has a close collaboration with Copenhagen Infrastructure partners", has made commitments to all of Copenhagen Infrastructure Partners' four funds and is the sole investor of their two initials funds.[129]

Therefore, foreign governments and European pension funds will directly benefit from U.S. taxpayer credits given to their companies should offshore wind move forward under the cumulative scenario, even as they put U.S. fishermen out of work.

In fact, during the BOEM and state processes for offshore wind leasing/energy procurement, the grab for tax credits has not been hidden. For example, the New York State Energy Research and Development Authority, or NYSERDA, is actively working with BOEM to create offshore wind projects in the NY Bight. [130] The New York State Offshore Wind Standard developed by NYSERDA weights its desired projects based 70% on bid price, which revolves around bids on the Offshore Renewable Energy Credits (ORECS).[131] Only 10% of the project weighting is based on actual project viability, and viability is also

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[122] See https://www.nationalreview.com/2016/06/wind-energy-subsidies-billions/.

[123] For example, Berkshire Hathaway's Warren Buffet only invests in wind farms for the federal tax credits, stating "That's the only reason to build them. They don't make sense without the tax credit." https://www.usnews.com/opinion/blogs/nancy-pfotenhauer/2014/05/12/even-warren-buffet-admits-wind-energy-is-a-bad-investment.

[124] See https://en.wikipedia.org/wiki/%C3%98rsted_(company), https://www.ctsom.com/, https://en.wikipedia.org/wiki/A2SEA, and https://us.orsted.com/en/Wind-projects.

[125] See https://en.wikipedia.org/wiki/Equinor.

[126] See https://www.equinor.com/en/what-we-do/empirewind.html and https://www.equinor.com/en/news/us-wind-dec2018.html.

[127] See https://www.pensiondanmark.com/en/investments/copenhagen-infrastructure-partners/.

[128] See https://www.pensiondanmark.com/en/business-model/business-model-and-strategy/.

[129] See https://www.pensiondanmark.com/en/investments/copenhagen-infrastructure-partners/.

[130] See https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/Offshore-Wind-in-New-York-State-Overview/Siting-Offshore-Wind-Facilities/New-York-Bight-Call-Areas.

[131] See NYSERDA's Technical Conference, Monday, July 23, 2018 Presentation slides at: https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/Contact/Events. See slides 9, 38. For project developers, ORECs represent an extra income beyond electricity sales ;OREC price will be negotiated on a 20- to 25-year term. Contracts for these 25 year-OREC purchases in NY were planned to be finalized in June 2019. See

focused on taking advantage of expiring tax credits.[132] Out of the 10 factors listed in order of importance when determining this 10% project "viability", the very last consideration is the wind resource assessment itself.[133] In short, the actual wind resource or viability of actual wind energy production is a trivial consideration in offshore wind development; the first and foremost focus is federal tax credits. Vineyard Wind alone plans to take a 24% U.S. federal tax credit on $2.8 billion in projected capital costs.[134]

We do not believe it is good public policy to put U.S. citizens, jobs, and existing industries such as the commercial fishing industry at risk to enrich foreign governments and pension funds with taxes derived from the very U.S. citizens being placed at economic disadvantages by their projects.

Port utilization (wind energy jobs): The SEIS admits that the majority of employment created by offshore wind development would occur during construction.[135] Therefore, these are not full time, long term jobs, like the jobs in the U.S. commercial fishing industry that they would displace. The SEIS quotes AWEA estimates that 63% of jobs created will be during construction and 37% during operations and maintenance.[136] However, we do not believe the jobs, even of operations and maintenance, will be American jobs.

First, beginning in late 2019 and finalized in early 2020, U.S. Customs and Border Protection modified key provisions of the Jones Act via an internal bulletin, rather than in a federal rulemaking process via the Federal Register. In this internal process, public comments submitted on the proposed changes could only be physically inspected at a CBP address in Washington, D.C., and only after arrangements to view these comments had been made in advance by calling a designated contact.[137] This in itself was a very poor public process for something with such drastic consequences. The Jones Act requires that all vessels engaged in coastwise commerce in U.S. waters be U.S. built, U.S. flagged, U.S. owned, and U.S. crewed.

We published an article in a well-known maritime news distributor entitled, "Proposed Customs and Border Protection Modifications Will Weaken the Jones Act", in which we detailed the exact terms being modified and how these changes appear to be a de facto Jones Act waiver for offshore wind construction and maintenance vessels.[138] These changes will allow any vessel engaged in installation, inspection, repair, maintenance, surveying positioning, modification, construction, decommissioning, or similar activities to be conducted on foreign flagged vessels manned by foreign crew. As there are no

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https://www.ny-engineers.com/blog/new-york-state-offshore-wind-power and New York Offshore Wind Supplier Forum, November 15, 2018 Presentation Slides at https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/Contact/Events, slide 11 of 47.

[132] Ibid, slide 9.

[133] Ibid, slide 50.

[134] See https://www.eenews.net/stories/1060921573

[135] SEIS, p. 3-57.

[136] Ibid.

[137] See our attached comments on this ruling, Re: Proposed Modification and Revocation of Letters Relating to CBP's Application of the Jones Act to the Transportation of Merchandise and Equipment between Coastwise Points, Customs Bulletin and Decisions, Vol. 53, No. 38, October 23, 2019.

[138] See https://gcaptain.com/proposed-cbp-modification-will-weaken-the-jones-act/.

U.S. flagged, U.S. built, U.S. crewed, Jones Act compliant wind farm construction/turbine installation vessels in existence, these jobs and associated activities will be carried on by foreign entities, not contributing to U.S. employment. Since maintenance and repair also falls within this new CBP language, offshore wind operations and maintenance jobs will most likely be majority foreign as well since these types of vessels and associated equipment already exist in foreign ownership. Already, the vast majority of site survey vessels being used by offshore wind leaseholders in U.S. federal waters are foreign-flagged.[139] This does not benefit U.S. employment. Rather, it is a negative impact, considering the potential job losses in the U.S. commercial fishing industry as a result of offshore wind development on fishing grounds.

The Proposed Vineyard Wind project has already demonstrated that job creation will be foreign and not U.S. jobs. Vineyard Wind is a joint venture between Danish fund management company Copenhagen Infrastructure Partners and Spanish utility Iberdola through Avangrid Renewables.[140] Prior to updating its PDE to 14 MW turbines, Vineyard Wind, had already named MHI Vestas Offshore Wind as the source for its turbines.[141] The jobs manufacturing these components are all overseas. MHI Vestas manufactures turbine blades, nacelles, and power converter modules in Denmark, and the 80-meter blades used for 9.5 MW turbines in the U.K. [142] Vineyard Wind's turbine bases will be manufactured by Windar Renewables, creating 400-500 jobs for their facility in Asturias, Spain.[143] Vineyard Wind has contracted with Denmark's Bladt Industries for the engineering, procurement and construction of Vineyard Wind's substation and jacket foundation.[144] Even prior to the Jones Act modification by CBP, Vineyard Wind had already contracted with Dutch offshore contractor Heerema, which operates a fleet of Panamanian- flagged ships, to transport and install the foundations, monopoles and transition pieces of the Vineyard Wind turbines.[145]

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[139] See attached Northeast Survey Activity Mariners Briefing, June 25, 2020, as an example of current foreign vessels being used in site surveying activity.

[140] https://www.iberdrola.com/about-us/lines-business/flagship-projects/vineyard-wind-offshore-wind-farm. Also http://cipartners.dk/.

[141] See http://www.mhivestasoffshore.com/vineyard-wind-selects-mhi-vestas-as-preferred-supplier/.

[142] See http://www.mhivestasoffshore.com/contact/; http://www.mhivestasoffshore.com/more-than-400-new-manufacturing-jobs-in-regional-dk/; http://www.mhivestasoffshore.com/mhi-vestas-opens-pcm-factory/; http://www.mhivestasoffshore.com/mhi-vestas-expands-uk-industrial-footprint/; and https://www.windpowerengineering.com/mhi-vestas-launches-9-5-mw-offshore-wind-turbine/.

[143] See https://www.iberdrola.com/about-us/lines-business/flagship-projects/vineyard-wind-offshore-wind-farm.

[144] See https://www.offshorewind.biz/2019/06/26/vineyard-wind-selects-offshore-substation-team/.

[145] See https://www.offshorewindindustry.com/news/vineyard-wind-heerema-participates-largest-us. Also https://hmc.heerema.com/fleet/ and https://www.marinetraffic.com/en/ais/details/ships/shipid:414824/mmsi:354590000/vessel:AEGIR; https://www.marinetraffic.com/en/ais/details/ships/shipid:413401/mmsi:353979000/vessel:THIALF; https://www.marinetraffic.com/en/ais/details/ships/shipid:415094/mmsi:354721000/vessel:BALDER; https://www.marinetraffic.com/en/ais/details/ships/shipid:5917736/mmsi:374887000/vessel:SLEIPNIR.

Current experiences also point to the fact of foreign, rather than U.S., job creation. Dominion Energy's two turbine pilot Coastal Virginia Offshore Wind project as of 2020 is having its turbine components staged in Nova Scotia and installed by a Luxembourg-flagged vessel.[146]

Therefore, expectations that jobs created will be American are unfounded, particularly for the construction phase which is projected to be the predominant job creation period. Additionally, the SEIS notes that if Vineyard Wind moves towards the larger 14 MW turbines, creating lower employment, economic output, and tax revenue, producing the smallest "beneficial economic benefit".[147] As other developers are already planning for up to 15 MW turbines, this scenario is likely and should impact the cumulative impacts analysis as well as analysis for the Proposed Action.

As future offshore activities other than offshore wind would support the existing marine industries and workforce according to the SEIS,[148] and as the U.S. marine economy in 2018 grew faster than the U.S. overall,[149] there is continued marine economy job growth for Americans without foreign offshore wind construction. According to the U.S. Department of Commerce, living resources, including commercial fishing and aquaculture, and tourism and recreation, including recreational fishing, contributed to $156 billion in gross domestic product in 2018.[150] All of these entities will be negatively impacted by offshore wind construction due to commercial fishing displacement, negative impacts on commercially harvested species- which has impacts on national food security, negative impacts on tourism due to a resultant lack of locally caught seafood for coastal restaurants, negative impacts on various recreational species and food sources for recreational species, and negative navigational impacts on fishing vessels. All of this stands in contrast to and outweighs the AWEA estimate that offshore wind would support $14.2 billion in total output by 2030,[151] with the majority of jobs created being foreign jobs.

In fact, the U.S. Department of Commerce estimates that living resources alone, i.e. U.S. commercial fishing and aquaculture, contribute $13 billion annually to the GDP.[152] As the AWEA estimates include employment impacts, which will be predominantly non-American, and as all U.S. fishing vessels must be Jones Act compliant and therefore provide American jobs, the U.S. seafood industry likely significantly outperforms projected offshore wind estimates in terms of domestic economic output. This is also true in that the U.S. commercial seafood industry does not need to operate off of and does not receive billions of U.S. tax credits. See our comments on the commercial fishing section below for more information regarding Vineyard Wind impacts to commercial fishing industry revenue and economic impact.

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[146] See https://www.dominionenergy.com/company/making-energy/renewable-generation/wind/coastal-virginia-offshore-wind and https://www.dailypress.com/news/environment/dp-nw-dominion-wind-20200604-52pf66lmmveh5kmuehjcqfkvj4-story.html.
[147] SEIS, p. 3-59.
[148] SEIS, p. 3-55.
[149] See NOAA, "Marine economy in 2018 grew faster than U.S. overall", June 2, 2020, at https://www.noaa.gov/media-release/marine-economy-in-2018-grew-faster-than-us-overall.
[150] See https://www.noaa.gov/media-release/marine-economy-in-2018-grew-faster-than-us-overall.
[151] SEIS, p. 3-57.
[152] See https://www.noaa.gov/media-release/marine-economy-in-2018-grew-faster-than-us-overall.

Finally, offshore wind development and foreign job creation at the expense of U.S. jobs would run contrary to the policy of the Office of Trade and Manufacturing Policy, "Buy American, Hire American."

Presence of structures: The SEIS is correct to state that commercial fishing operators would experience impacts during both construction and operations, although we do not agree that construction over a 6-10 year period is "short term".[153] The SEIS is correct to state that "Commercial fishing …businesses could experience impacts due to higher costs and reduced income during operations and maintenance, and decommissioning, resulting from the need to adjust routes and fishing grounds to avoid offshore construction areas, as well as operational WTGs and ESPs during operations…Commercial fishing businesses would also be affected y the use of concrete mattresses to cover cables in hard-bottom areas during offshore wind operation. Commercial trawlers/dredges would need to be aware of the locations of concrete coverage to avoid potential gear loss, damage, or entanglement."[154] However, we do not agree that "the long term impacts of concrete cable protection on commercial fishing businesses would be indirect and localized" or that "[o]perators would be able to adjust to avoid affected locations."[155]

As we have commented throughout the BOEM process on both Vineyard Wind and other lease areas, all hard structure creates a no-go area for trawl gear, whether turbine towers and bases, scour protection, cables and cable coverings, ESPs, etc. Trawl gear will tear on such structures, destroying the net, and potentially snagging trawl doors and wires, which would in turn potentially put the vessel in a dangerous position to swing into a turbine or fixed structure itself. The entire area both inside the Project area, as well as outside the Project area wherever cables are present, will be a complete loss to trawl fisheries. We discuss cables at length below in the Commercial Fishing Impacts section.

Commercial fishing vessel operators may not be able to simply "adjust to avoid affected locations" due to both the affected areas/related species and fisheries, seasonality of those fisheries, and other factors not considered by the SEIS. The summer longfin squid fishery primarily occurs in two areas- off Martha's Vineyard/Nantucket where the Proposed Action and construction of other MA/RI leases are planned to occur, and off Long Island, where the construction NY leases are planned to occur. Although this fact was well known to BOEM prior to the lease of the NY WEA, requests by ourselves, other industry members, and both Rhode Island Senators to re site the NY lease and reduce cumulative impacts were ignored. The cumulative impacts of both of these offshore wind development areas is huge for this fishery.

Therefore, for years at a time during construction, which requires exclusion zones for safety purposes, both of these areas will be off limits to the summer longfin squid fishery, as construction is planned to occur in the summer months when the fishery also occurs. This seasonal aspect is significant, as many of the vessels engaged in this fishery have no other fishery options at this time of year. The SEIS ignores this seasonal aspect, as do the fishery charts of squid fishing activity made available through the Mid Atlantic Data Portal and other sites and which we discuss in further detail below. Should these

[153] SEIS, p. 3-57.
[154] Ibid.
[155] Ibid.

vessels have no income for months at a time for many years in a row during construction, particularly of these two areas at the same time, and then suffer permanent loss of area in the future during operations, many vessels in this fishery will not survive the impacts. And this does not even account for the mortality that the squid themselves will most likely suffer for generations in a row, as discussed in our comments above. This would result in lack of product overall, regardless of location, leading to population level impacts and the overall decline or disappearance of the fishery and associated jobs/infrastructure/businesses.

The areas in and around/outside the Project Area already contain pre-existing "hangs", whether rocks or shipwrecks, etc. Commercial trawl vessels participating in the squid fishery already have detailed charts marking each of these hangs, with the purpose of avoiding that coordinate and preserving their fishing gear. Avoidance of new structure, concrete mats and cables even outside the WDA may not be possible due to these existing avoidance areas.

Additionally, it is likely that "available space" left even outside the WDA, inside of which trawling will be impossible, will be taken up by many of the 184 construction vessels in the MA/RI navigational analysis area at times of peak construction, and lesser but considerable numbers of construction vessels over the 6-10 year construction period.[156] Even during surveying activities over the past few years by various developers in the area, site assessment G&G vessels have demanded ½ mile of clearance from commercial fishing vessels.[157]

Environmental Justice Comments, Section 3.8:

New cable emplacement/maintenance: The SEIS states, "As described in Sections 3.7.1.1 and 3.11.1.1, cable installation and maintenance would have localized, temporary, short-term, impacts on the revenue and operating costs of commercial and for-hire fishing businesses. Commercial fishing operations may temporarily be less productive during cable installation or repair, resulting in reduced income and also leading to short-term reductions in business volumes for seafood processing and wholesaling businesses that depend upon the commercial fishing industry. Although the commercial and for-hire fishing businesses could temporarily adjust their operating locations to avoid revenue loss, the impacts would be greater if multiple cable installation or repair projects are underway offshore of the environmental justice geographic analysis area at one time. Business impacts could have impacts on environmental justice populations due to the potential loss of income or jobs by low-income workers in the commercial fishing industry."[158] We do not agree that these impacts will be temporary and/or short term. We also do not agree that commercial fishing vessels can simply "adjust" their operations to avoid cables, as laid out in our comments on the Demographics, Employment and Economics section. They will certainly, however, result in substantial revenue and local job loss. As we discuss in our comments in the

[156] SEIS, p. 3-112.
[157] Personal communications with commercial fishing vessel captains operating in the area.
[158] SEIS, p. 3-65.

Commercial Fisheries Impacts section, all cabled areas will become a complete exclusion zone for trawl fisheries.

Presence of Structures: The SEIS states, "Commercial fishing businesses would need to adjust routes and fishing grounds to avoid offshore work areas during construction, and to avoid WTGs and ESPs during operations."[159] We agree with this statement. However, we continue to emphasize that commercial fishing vessels, and therefore related businesses, may not simply be able to "adjust". Adjustment may be impossible due to permit restrictions, fishery regulations, and the lack of available alternative species for harvest. This is particularly true of the summer longfin squid fishery operating in and adjacent to the Project area. The construction timeline of 6-10 years in the MA/RI area alone is not short term. As we have stated, squid trawl vessels will be unable to work in the WDAs, which will be long- term and essentially permanent impacts to these vessels. Many would not be able to remain financially viable until the end of the life of the offshore wind facilities.

The fishing industry is one of the few industries left in the country where an American without higher education can work hard and make a good living. Land-based seafood facilities also employ a diverse workforce of various ethnicities and income levels.

Therefore, the most impacted environmental justice populations as a result of the Proposed Action are in fact a part of the commercial fishing and seafood industries and therefore have the most to lose. In light of this fact, we would disagree with the SEIS "overall minor adverse impacts". Lumping in the most negatively affected environmental justice population with a general geographic environmental justice analysis masks the true impacts to this affected environmental justice population.

Commercial Fisheries and For-Hire Recreational Fishing Comments, Section 3.11:

Anchoring: Impacts from anchoring are assumed to pose localized and temporary navigational hazards to fishing vessels, with the location and level of impacts dependent on specific locations/durations of anchoring activity.[160] As no commercial fishing vessels will be permitted in the construction zone during construction due to safety/exclusion areas, if the construction vessels anchor in areas outside the exclusion zones, there could be very significant impacts to commercial fishing activity in these areas (providing there are any harvestable animals still in the vicinity of construction). During the peak of construction for the Proposed Project, there will be up to 46 vessels in the area, and up to 184 in the navigational analysis area (which is restricted to the MA/RI vicinity only) during peak construction for multiple projects. [161] As this anchoring activity would occur primarily in the summer months, the impacts may not be insignificant, particularly if anchoring occurs in the middle of longfin squid fishing tows/fishing grounds which have not already been made construction exclusion zones or de fact exclusion zones due to cable placement or installation of structure.

[159] SEIS, p. 3-66.
[160] SEIS, p. 3-94.
[161] SEIS, p. 3-112.

New cable emplacement and maintenance activities: The SEIS states that "Fishing vessels may not have access to impacted areas, which could lead to reduced revenue and/or increased conflict over other fishing grounds" during cable placement/maintenance.[162] This is correct. However, the assumption that this would be "temporary displacement and disruption of fishing activities" is incorrect.

Avoidance of wind farm cables will be a permanent displacement for mobile bottom tending gear vessels such as trawl vessels. This particularly impacts the longfin squid fishery, a trawl fishery which is overwhelmingly the predominant existing fishery in the MA/RI and NY lease areas. Contrary to all assumptions made in the SEIS and assertions by wind developers both to BOEM and the U.S. commercial fishing industry, mobile bottom tending gear fishing in wind energy areas and along export cable routes will not be possible without risk of loss of life.

In the U.K., the only European country which allows commercial fishing inside of wind farms, mobile gear fishing does not occur where cables are present.[163] This is due to potentially fatal interactions with the cables themselves. The below notice to U.K. fishermen from offshore wind developer DONG Energy (now Orsted) and the Kingfisher Information Service, a fisheries information service providing fishermen the location of subsurface and subsea hazards around the U.K.,[164] reads, "The closer to the surface a subsea cable is lifted when fouled by fishing gear, the more damage there is to the fishing vessel. In the interests of fishing safety and to prevent damage to subsea structures fishermen are advised to exercise caution when fishing in the vicinity of subsea cables and renewable energy structures. Loss of gear, fishing time, and catch can result if a trawler snags a subsea structure and there is serious risk of loss of life."

See below:

[162] SEIS, p. 3-94.
[163] Gray et al., "Changes to fishing practices around the UK as a result of the development offshore wind farms-Phase 1 (Revised)", The Crown Estate, 2016, p. 29.
[164] See https://www.seafish.org/article/kingfisher-information-services.

DONG energy

Westermost Rough Offshore Wind Farm

SEAFISH
The Kingfisher Information Service

Description

The Westermost Rough Offshore Wind Farm is situated 8km off the Yorkshire Coast, north of Hull and contains 35 turbines of 6MW capacity- the first time anywhere in the world that these turbines have been used on a large scale.

Covering a total area of 35km^2, Westermost Rough should provide enough electricity to power around 150,000 UK homes.

Reducing the Risks whilst Fishing

To reduce the risks of fishing near offshore structures, it is essential to be up to date with KIS-ORCA information. KIS-ORCA information is easy to install on your vessel's fishing plotter and ensures skippers are able to make informed decisions for their safety.

The closer to the surface a subsea cable is lifted when fouled by fishing gear, the more danger there is to the fishing vessel. In the interests of fishing safety and to prevent damage to subsea structures, fishermen are advised to exercise caution when fishing in the vicinity of subsea cables and renewable energy structures. Loss of gear, fishing time and catch can result if a trawler snags a subsea structure and there is serious risk of loss of life.

Emergency Procedures

1. If you suspect you have snagged a subsea cable, DO NOT endanger your vessel and crew by attempting to recover your gear.
2. Carefully plot your vessel's position as accurately as possible.
3. Advise the Coastguard of your situation, and call the 24 hour Emergency Number and state that an incident is occurring concerning a subsea cable.

Advisory Safety Zones

An Advisory Safety Zone of 50m around each turbine and substation structure is requested. An 200m anchorage exclusion zone around the export cable is requested. All vessels are asked to respect the Advisory Safety Zones, which as well as reducing the risk of collision damage, will provide protection to vessels, the export cable, and wind turbine structures.

If any major maintenance works are planned, Notices to Mariners will be promulgated in advance as required. During such works a Mandatory Safety Zone of 500m is likely to apply to certain turbines and/or vessels.

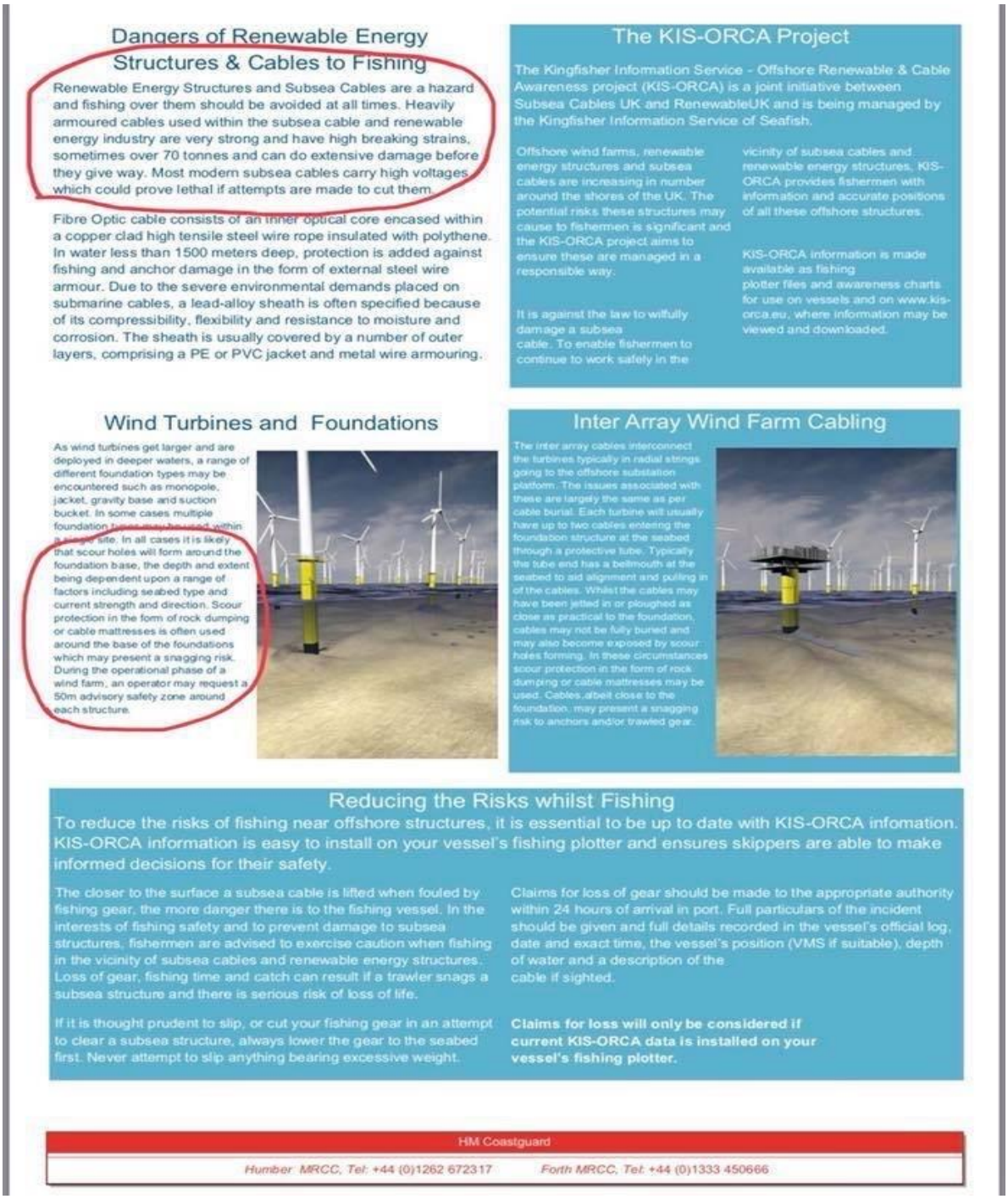
Contact Details

EMERGENCY CONTACT NUMBER:
08455 441037

Always ensure you have the latest Kingfisher Information onboard your vessel

Edition: January 2016

Another notice to U.K. fishermen, below, as part of the KIS-ORCA (Kingfisher Information Service-Offshore Renewable & Cable Awareness project) states, “Renewable Energy Structures and Subsea Cables are a hazard and fishing over them should be avoided at all times….Most modern subsea cables carry high voltages which could prove lethal if attempts are made to cut them.”



Dangers of Renewable Energy Structures & Cables to Fishing

Renewable Energy Structures and Subsea Cables are a hazard and fishing over them should be avoided at all times. Heavily armoured cables used within the subsea cable and renewable energy industry are very strong and have high breaking strains, sometimes over 70 tonnes and can do extensive damage before they give way. Most modern subsea cables carry high voltages which could prove lethal if attempts are made to cut them.

Fibre Optic cable consists of an inner optical core encased within a copper clad high tensile steel wire rope insulated with polythene. In water less than 1500 meters deep, protection is added against fishing and anchor damage in the form of external steel wire armour. Due to the severe environmental demands placed on submarine cables, a lead-alloy sheath is often specified because of its compressibility, flexibility and resistance to moisture and corrosion. The sheath is usually covered by a number of outer layers, comprising a PE or PVC jacket and metal wire armouring.

The KIS-ORCA Project

The Kingfisher Information Service - Offshore Renewable & Cable Awareness project (KIS-ORCA) is a joint initiative between Subsea Cables UK and RenewableUK and is being managed by the Kingfisher Information Service of Seafish.

Offshore wind farms, renewable energy structures and subsea cables are increasing in number around the shores of the UK. The potential risks these structures may cause to fishermen is significant and the KIS-ORCA project aims to ensure these are managed in a responsible way.

It is against the law to wilfully damage a subsea cable. To enable fishermen to continue to work safely in the vicinity of subsea cables and renewable energy structures, KIS-ORCA provides fishermen with information and accurate positions of all these offshore structures.

KIS-ORCA information is made available as fishing plotter files and awareness charts for use on vessels and on www.kis-orca.eu, where information may be viewed and downloaded.

Wind Turbines and Foundations

As wind turbines get larger and are deployed in deeper waters, a range of different foundation types may be encountered such as monopole, jacket, gravity base and suction bucket. In some cases multiple foundation types may be used within a single site. In all cases it is likely that scour holes will form around the foundation base, the depth and extent being dependent upon a range of factors including seabed type and current strength and direction. Scour protection in the form of rock dumping or cable mattresses is often used around the base of the foundations which may present a snagging risk. During the operational phase of a wind farm, an operator may request a 50m advisory safety zone around each structure.

Inter Array Wind Farm Cabling

The inter array cables interconnect the turbines typically in radial strings going to the offshore substation platform. The issues associated with these are largely the same as per cable burial. Each turbine will usually have up to two cables entering the foundation structure at the seabed through a protective tube. Typically the tube end has a bellmouth at the seabed to aid alignment and pulling in of the cables. Whilst the cables may have been jetted in or ploughed as close as practical to the foundation, cables may not be fully buried and may also become exposed by scour holes forming. In these circumstances scour protection in the form of rock dumping or cable mattresses may be used. Cables,albeit close to the foundation, may present a snagging risk to anchors and/or trawled gear.

Reducing the Risks whilst Fishing

To reduce the risks of fishing near offshore structures, it is essential to be up to date with KIS-ORCA infomation. KIS-ORCA information is easy to install on your vessel's fishing plotter and ensures skippers are able to make informed decisions for their safety.

The closer to the surface a subsea cable is lifted when fouled by fishing gear, the more danger there is to the fishing vessel. In the interests of fishing safety and to prevent damage to subsea structures, fishermen are advised to exercise caution when fishing in the vicinity of subsea cables and renewable energy structures. Loss of gear, fishing time and catch can result if a trawler snags a subsea structure and there is serious risk of loss of life.

If it is thought prudent to slip, or cut your fishing gear in an attempt to clear a subsea structure, always lower the gear to the seabed first. Never attempt to slip anything bearing excessive weight.

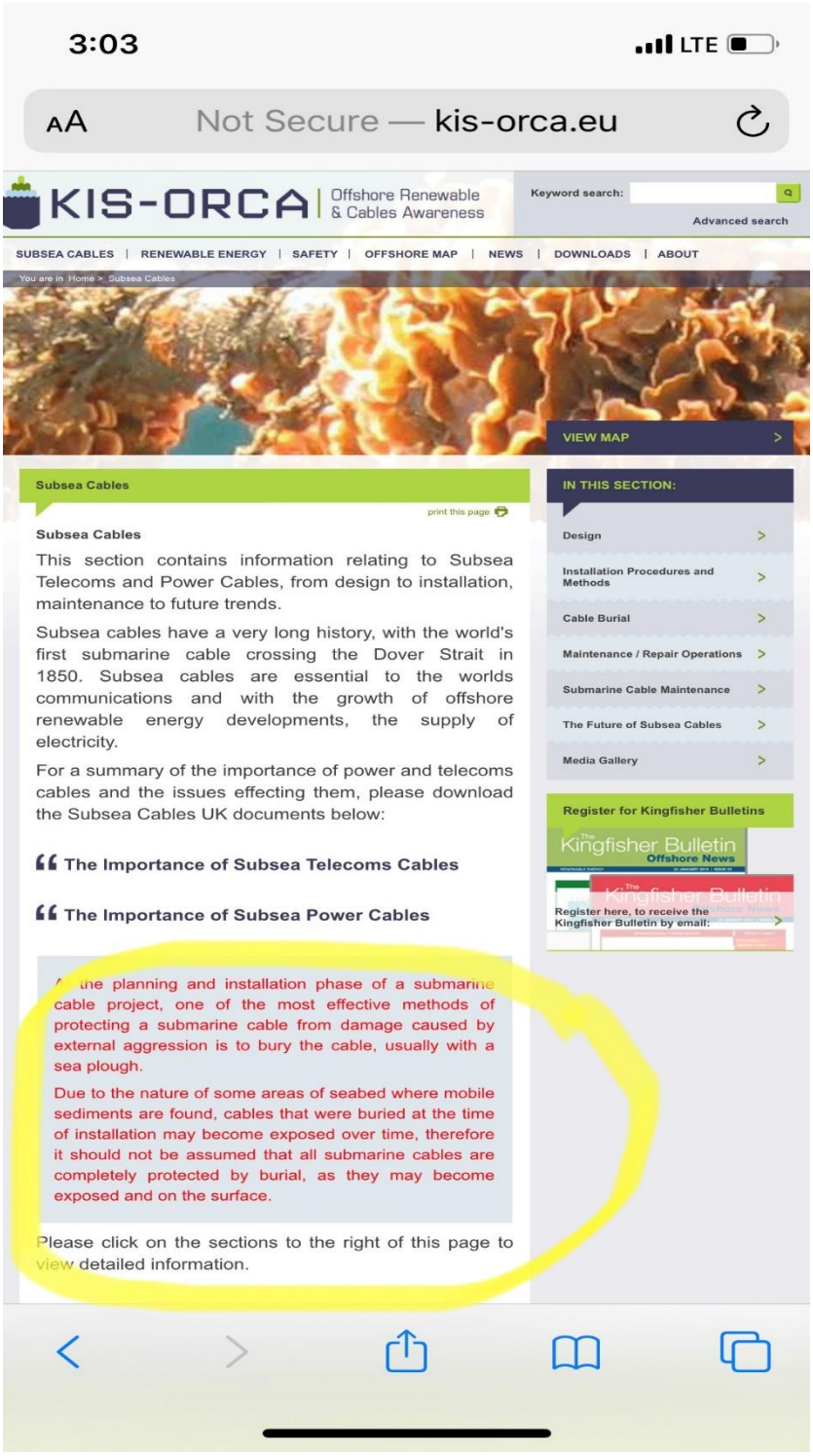
Claims for loss of gear should be made to the appropriate authority within 24 hours of arrival in port. Full particulars of the incident should be given and full details recorded in the vessel's official log, date and exact time, the vessel's position (VMS if suitable), depth of water and a description of the cable if sighted.

Claims for loss will only be considered if current KIS-ORCA data is installed on your vessel's fishing plotter.

HM Coastguard

Humber MRCC, Tel: +44 (0)1262 672317 *Forth MRCC, Tel:* +44 (0)1333 450666

Another notice, below, reads “Due to the nature of some areas of seabed where mobile sediments are found, cables that were buried at the time of installation may become exposed over time, therefore it should not be assumed that all submarine cables are completely protected by burial, as they may become exposed and on the surface.”



Due to the tidal currents in the Project area and surrounding MA/RI lease areas including the massive tidal currents along the export cable route discussed in our comments on the Benthic Resources section, as well as the fact that the area is a "mostly sandy seascape"[165] and therefore comprised of mobile sediment, it is reasonable to assume that even cables which are buried at the time of construction will become exposed over time. This is a common occurrence in the U.K., leading to fishery exclusions.

For example, one Kingfisher Bulletin "Offshore News" 16 November 2017, attached as a part of our comment, includes "Notice to Fishermen" sections where new "Fishing Hazards" areas are highlighted to alert fishermen to newly exposed cables. Such notices include warnings such as "Cable Spans Along Greater Gabbard WF Export Cable; Recent results from the export cable surveys at Greater Gabbard show that there are 8 free-spans which are listed below. Whilst the results continue to be processed, Balfour Beatty have asked that in the interest of safety and the integrity of the cable, extreme caution be used when Fishing near the export cables and that Fishermen refrain from using towed gear across the export cables whenever possible."[166]

Another "Notice to Fishermen" from the same Kingfisher Bulletin states "Fishing Hazard- Gunfleet Sands WF Export Cable (Exposure Update); Recent surveys at the Gunfleet Sands offshore wind farm have illustrated that some array/in field cables are lying exposed on the seabed and are no longer buried and there is one freespan."[167]

Yet another states, "Inter Array Cables- exposed sections; There are some sections of the installed inter array cables that are currently either shallow buried or exposed on the seabed. The shallow buried/exposed sections of cable could represent a significant hazard to fishing vessels and their gear (if fishing gear is deployed over them) and any vessels anchoring over them. Cable hazards will remain until completion of cable protection works planned for Q4 2017 and Q1 2018."[168] This particular notice to fishermen was first published on December 3, 2015.[169] This means that the exposed cables and associated fishing hazards would be in place for 3 years before remedy was taken. This is similar to the timing of repair of the currently exposed Block Island Wind Farm cables. As such, the area would represent a life-threatening hazard to fishermen for consecutive years in a row.

Considering all of the above, the SEIS assumption that cables will only result in temporary fishing displacement while installation occurs is erroneous. During the entire life of the Proposed Action and all other cumulative actions, inter-array and export cables will present a default exclusion zone for mobile bottom tending gear vessels, such as longfin squid trawl vessels. Unless the vessel is willing to risk "loss of life." We believe this is a major impact. The SEIS and all BOEM analysis must therefore consider all inter array areas within the wind farm as well as export cable routes a complete loss of trawl fishing activity and revenue.

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[165] SEIS, p. 3-13.
[166] Kingfisher Bulletin "Offshore News" 16 November 2017, Issue 23, p. 9.
[167] Ibid.
[168] Ibid, p. 10.
[169] Ibid.

Additionally, the Vineyard Wind export cable is planned to go directly through the middle longfin squid trawl fishery area on the outside of the MA/RI lease area. As this export cable is both a hazard in itself and will also be covered with concrete matting in some areas, this will cut some of the fishery's most productive tows outside the WDA in half. We raised this problematic issue to Vineyard Wind early on in the process during port meetings, as well as throughout the process with Vineyard Wind fishery liaisons, in an attempt to route the cable through a less disruptive route, but to no avail. Cutting off a tow halfway can mean half the harvest and more lack of maneuverability as the vessel is forced to set and reset its gear. If all vessels are forced to do this at the same exact spot, it can lead to congestion and other issues. See charts of longfin squid fishing activity below.

The SEIS mentions in this section that "It is anticipated that most construction activities would take place in the summer months due to more favorable weather conditions. Thus fisheries and fishery resources most active in the summer will likely be impacted more than those in the winter."[170] And we again point out that the fishing activity that occurs in this area from the most impacted fishery from the Proposed Action, is the summer longfin squid fishery which takes place in the area *only* in the summer. There is no fishing in the area in the winter. The SEIS fails to assess the seasonality of this fishery and therefore assess accurate impacts. This is true for both cable construction and construction noise, as well as operations, below.

Despite the fact that this fishery is a purely summer fishery in the area, it can provide individual vessels with over 50% of their annual income. Loss of this fishery would therefore mean bankruptcy for those vessels, including our customers. The impacts of cable exclusions and inability to operate in the wind farm itself as well as export cable corridors would be permanent for the life of the project(s). The DEIS acknowledges that large portions of fishing vessels' annual income may be inaccessible during operations, resulting in major impacts to these vessels.[171] This is true. Consideration of the longfin summer squid fishery, the most impacted fishery by the Proposed action, cannot be lumped together with general "commercial fishing" impacts.

Noise: The noise impacts to the longfin squid resource both inside and outside the Proposed Action area by both construction and operation of offshore wind facilities will be major, long term, and adverse for the stock, potentially and likely causing population level impacts. See our detailed Finfish, Invertebrates, and Essential Fish Habitat comments above. This would result in serious fishery decline and possibly fishery collapse.

The SEIS again assumes that "Noise from construction site assessment G&G survey activities, operations and maintenance, pile driving, trenching, and vessels could cause localized, temporary impacts on commercial fisheries".[172] We continue to assert that 6-10 years of construction is hardly temporary. The SEIS states, "The greatest impact of noise is likely to be caused by pile driving. Noise from pile driving would occur during installation of foundations of offshore structures. This noise would be produced for 4 to 6 hours at a time over a 6- to 10-year period. Noise transmitted through water and/or through the seabed can cause injury and/or mortality to fish and invertebrates in a limited space

[170] SEIS, p. 3-94.
[171] DEIS, p. 3-184.
[172] SEIS, p. 3-94.

around each pile and can cause stress and short-term behavioral changes over a greater space."[173] These impacts, which we believe are underestimated as detailed in our comments on Finfish, Invertebrates, and EFH, are estimated to extend 5.7 miles outside of the Project area.[174] Even at the 5.7 mile range, this is well into fishing activity outside the Project area. Therefore, the Project would be simultaneously killing off the product attempted to be harvested by the fishery while the fishery is actually occurring.

What this means in terms for the summer longfin squid fishery is likely loss of a resource for up to 10 years in the MA/RI area and surrounding vicinity. And continued loss of product over the life of the Project considering the impacts to longfin squid from the operational noise of turbines, as detailed in our comments on Finfish, Invertebrates, and EFH. This is not sustainable.

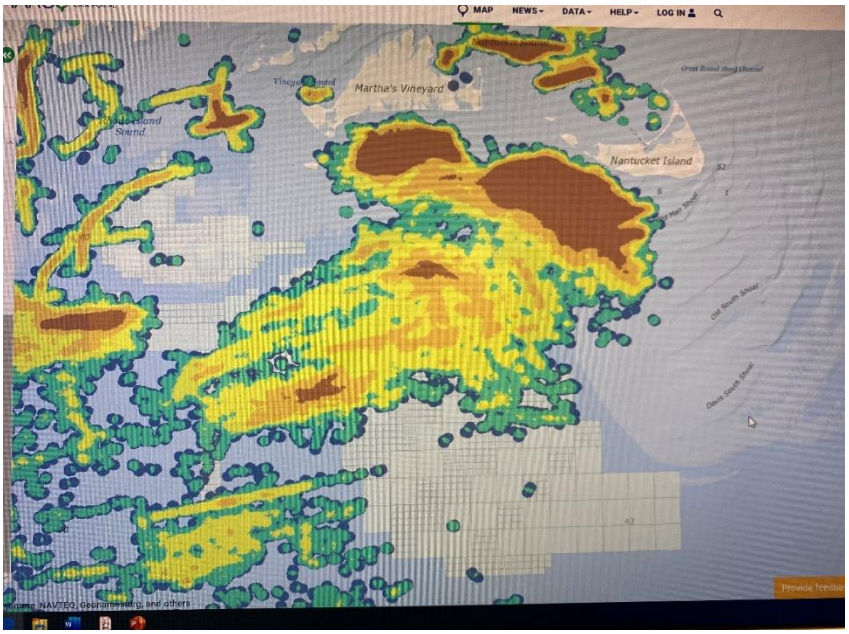
Even the SEIS acknowledges that "Finfish and invertebrate eggs, embryos and larvae could also experience developmental abnormalities or mortality resulting from this noise…In the area of behavioral effects, it is anticipated that some fishing activities may experience less catch due to movement of fish away from sounds….In the event that pile driving noise were to negatively affect spawning behavior, then reduced reproductive success in one or more spawning seasons could result. This could potentially result in long-term effects on populations and harvest levels if one or more year classes suffer suppressed recruitment…The chance of exposure to behavioral levels of impact on fish populations is highly likely for concurrent projects in adjacent areas."[175] As longfin squid only live 9 months, and spawn once in their lifetime, they *will* suffer consecutive years of suppressed recruitment in the Proposed Project and surrounding areas. The fact that these fish both spawn and support a summer fishery not only in and around the Proposed Project and other MA/RI lease areas *and* NY Equinor lease area at the same time, and as construction and operations for all of these areas will be simultaneous, is a tremendous cumulative population and fishery level impact.

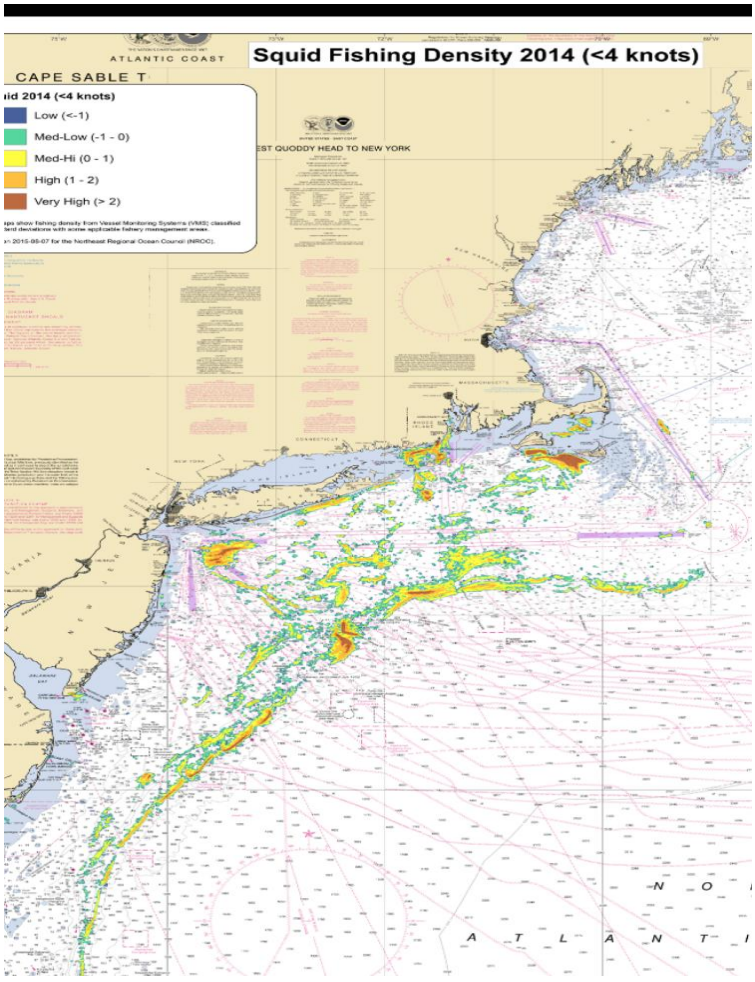
Considering the extreme sensitivity of longfin squid to both construction and operational sound, and the very real possibility for stock collapse should the Proposed Action move forward, we agree with the authors of the Andre et al and Sole et al papers that there is a need for environmental regulation prohibiting noise such as results from wind farm construction and operations in known longfin squid habitat and spawning areas. If there is not, the entire fishery and associated infrastructure may collapse.

The SEIS assumes "These direct impacts on fish could impact fishing activities if vessels need to temporarily relocate to other fishing locations in order to avoid or reduce impacts on revenue. This could lead to increased conflict in those locations, increased operating costs for vessels (e.g. additional fuel costs), and lower revenue (e.g., less productive area, less valuable species)."[176] What it does not acknowledge is that the summer longfin squid fishery occurs in primarily two areas: the Vineyard Wind lease/ MA/RI WEA and surrounding areas, and the NY Equinor lease and surrounding areas south of Long Island. To demonstrate this, we have attached a picture below taken from the MARCO Data Portal of longfin squid fishing activity in 2015-2016 overlapped with the MA/RI WEA, including the Proposed Project, as well as a coastwide chart of longfin squid fishing activity in 2014. The areas depicted on that chart fished by the fishery in deeper waters further out on the continental shelf occur in the fall/winter.

[173] SEIS, p. 3-94.
[174] Ibid.
[175] SEIS, p. 3-95.
[176] SEIS, p. 3-95.

The entirety of the summer fishery is in the areas closer to shore which have been identified as areas for offshore wind development.





There is essentially nowhere else to go. And for most vessels engaged in this fishery, no other viable fishery alternatives at this time of year. For example, other trawl caught species such as summer flounder and black sea bass have minimal possession limits in the summer months. Typical summer trip limits for these species range from 50-150 lbs per trip, respectively, in the state of Rhode Island.[177] These trip limits cannot support a 60-100+ foot trawl vessel. The revenue would not cover operating costs alone.

By stark contrast, the same vessel engaging in the summer longfin squid fishery will bring in tens of thousands of pounds of product per trip. More squid harvested by federally permitted longfin squid vessels is landed in the state of Rhode Island than all other East Coast states combined,[178] with an average of 56% of all U.S. longfin squid revenues being attributed to Rhode Island landings.[179] Therefore, comparison of these two non-"fishery alternatives" to the longfin squid fishery is the reality for most summer longfin squid vessels. It is also the reality for shoreside based facilities such as Seafreeze Shoreside which rely on volume of product flow.

Additionally, the idea that a vessel can simply engage in another fishery is flawed. Fishing vessels are limited by their federal permits and associated species permit suite, and cannot simply shift effort into other fisheries. Furthermore, permits cannot be added to or consolidated into one vessel in order to expand permitted fisheries alternatives. On top of this, federal fisheries permits are vessel length and horsepower specific, meaning that one permit may not be legally allowed to transfer to another vessel of a different size and horsepower. This severely limits fisheries opportunities to re direct effort away from traditional fisheries. Therefore, if a traditional fishery such as the squid fishery becomes out of bounds sue to fixed structures, cables, or radar interference, a vessel may not have the option to move into other fisheries even if it possesses the finances to purchase additional permits (which it may and probably does not).

Nearly all U.S. East Coast fisheries are limited access, meaning that no new permits will ever be issued. Therefore, one cannot apply for a new permit and is restricted in permit opportunities to existing permits that may be for sale but that must fit a vessel baseline length and horsepower.

Vessels may only fish in areas open for that particular fishery. There is a myriad of spatial and gear restrictions, as well as other types of regulations, that limit where and when a vessel can fish and for what species, even if the vessel does possess the permit for that species. For example, longfin squid vessels are prohibited from fishing east of Nantucket and onto Georges' Bank with small mesh for squid, because that area is designated as a large mesh gear restricted area.[180] Fishing is more regulated in the United States than oil and gas extraction and pharmaceutical manufacturing, and ranks 7th among the

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[177] See RI DEM Marine Fisheries minimum size and possession limits at http://www.dem.ri.gov/programs/marine-fisheries/mfsizes.php.

[178] See for example, quota reports by state at https://www.greateratlantic.fisheries.noaa.gov/aps/monitoring/quotareportarchives.html.

[179] Scheld, Andrew, "Economic Impacts Associated with the Commercial Fishery for Longfin Squid (Doryteuthis pealeii) in the Northeast U.S.", Virginia Institute of Marine Science, March 2020 at https://scemfis.org/finfish-publications/. A Science Center for Marine Fisheries project, in partnership with the National Science Foundation.

[180] For management area and closure maps for the Greater Atlantic Region, see https://www.fisheries.noaa.gov/new-england-mid-atlantic/science-data/maps-and-geographic-information-systems-data-program-new-england-mid-atlantic.

nation's top 10 regulated industries.[181] Therefore, adaptation is much more difficult for the fishing industry than for the offshore wind industry which is highly unregulated.

Presence of structures: The SEIS is correct to assess that the presence of structures can lead to impacts on commercial fisheries through allisions, entanglement or gear loss/damage …navigation hazards (including transmission cable infrastructure) and space use conflicts.[182] These will primarily impact the longfin squid trawl fishery in the area, as this fishery will be forced to avoid all fixed structure for the preservation of trawl nets and doors. Should trawl gear become snagged on underwater infrastructure, the vessel could suffer severe damage and endanger the crew if it were to swing into a turbine or ESP due to wind, tide/current, or inclement weather.

We agree with SEIS statements that "The presence of structures (including transmission cable infrastructure) would have long-term impacts on commercial fisheries and for-hire fishing by increasing the risk of allisions, entanglement or gear loss/damage, and navigational hazards. The presence of WTGs could also lead to long-term changes to fishing vessel transit routes during operations, which could affect travel time and trip costs. With respect to risk of fishing gear snares and maneuverability restrictions (including risk of allisions) within WDAs, fishermen have expressed specific concerns about fishing vessels operating trawl gear that may not be able to safely deploy gear and operate in a WDA given the size of the gear, the spacing between the WTGs, and the space required to safely navigate, especially with other vessels present and during poor weather conditions."

None of the Seafreeze vessels will be able to safely operate in a wind farm, for these reasons and all of the reasons we have stated throughout this comment. None of our customer vessels will be able to work inside a wind facility. Longfin squid trawl vessels will suffer complete exclusions from developed areas, as well as cable areas. This is true regardless of the 1x1 nm layout that developers and the SEIS assume will alleviate these issues, and has also been the experience in the U.K. the only European country that allows vessels to fish within wind farms. Interviews with U.K. fishermen highlight the same problems being faced by U.S. fishermen with respect to safety and operations in wind farms:

"the majority of fishermen stated that potential hazards inside OWFs caused a reduction in fishing effort and many fishermen identified specific hazards, such as snagging trawl gear on cables, rock armouring of cables and general seabed debris, together with the risk of collision with turbines in the event of engine failure. Typical comments were: "although there is no exclusion it would be unsafe to fish in OWF areas"; "Fishing within OWF is…too risky due to the combination of tides and weather should a vessel breakdown"; "The risk of snagging cables, losing fishing gear and the risk of collision with turbines in the event of engine failure deters fishing within the OWF". The risks to trawling dissuaded or reduced the amount of trawling undertaken by the majority of Northern Irish skippers in and around the wind farms once they had been constructed…. Another reason to avoid OWFs and cable routes was the financial risk of damage to nets."[183]

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[181] See https://www.mercatus.org/publications/regulation/mclaughlin-sherouse-list-10-most-regulated-industries-2014.

[182] SEIS, p. 3-95.

[183] [183] Gray et al., "Changes to fishing practices around the UK as a result of the development offshore wind farms-Phase 1 (Revised)", The Crown Estate, 2016, p. 27.

One significant difference between the U.S. and the U.K. is the liability level for lawsuits in the legal system. In the U.S., tort lawsuits are much easier to prosecute. Should accidents occur, resulting in vessel damage, harm or loss of life for crew members, damage even to turbines themselves, it is likely that U.S. fishermen will bear a higher level of financial and legal liability than their U.K. counterparts, potentially leading to such reasonably foreseeable consequences as exclusions for wind farms imposed as a requirement of vessel insurance.

We also submit that the SEIS should consider the enormity of the MA/RI lease areas and account for potential lack of vessel maneuverability due to the fact that this combined lease area is larger than any other continuous wind area/wind farm in the world. As of September 2018, the largest offshore wind farm in the world, the Walney Extension, opened, covering approximately 50 square miles.[184] This wind farm is a part of a complex of other wind farms, including the Walney 1 and 2 and West of Duddon Sands projects.[185] However, all of these projects combined cover an area of approximately 112 square miles; the combined MA/RI wind lease areas cover an area of over 1,400 square miles.[186] This makes the issue of conflict with fixed structure orders of magnitude larger than the U.K. experience in just the MA/RI lease area alone.

Also important to note is that these are not just any fixed structures; they are structures that cause marine radar interference. We discuss that in our comments in the Navigation and Vessel Traffic Impacts section.

The SEIS notes that fixed structure may attract more recreational for-hire and private anglers, which could lead to space conflicts with commercial fisheries.[187] This is a huge issue that is not well explained in the SEIS. As recently as 2019, the New England Fishery Management Council enacted Herring Amendment 8, which creates a midwater trawl exclusion zone from Canada to Montauk, NY simply because of perceived "user conflicts" between trawl vessels and recreational anglers/HMS anglers.[188] This was in spite of the fact that the trawl vessels excluded from the area would lose up to 30% of their annual income as a result.[189] Therefore, user conflicts have the ability to permanently alter huge portions of a fishery revenue. Should these types of issues occur to vessels after they have already lost significant amounts of revenue due to fixed structure and wind farm displacement, provided there was anywhere else to go which would be doubtful at best for the summer longfin squid fishery, the rest of a vessels' revenue could easily be swallowed by a management action due to "user conflicts" borne out of wind farm displacement. In 2017, the Mid Atlantic Fishery Management Council considered a similar "squid buffer zone" that would have extended from Nantucket/Martha's Vineyard all the way to the Vineyard Wind lease area, due to similarly reported conflicts with recreational anglers.[190] While this

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[184]See https://maritime-executive.com/article/world-s-largest-offshore-wind-farm-opens

[185] See https://c1cleantechnicacom-wpengine.netdna-ssl.com/files/2015/10/Map_Walney_Extension_projects.jpg. And https://deepresource.wordpress.com/2017/05/26/walney-extension-wind-farm-irish-sea-under-construction/.

[186] See attached Excel spreadsheet.

[187] SEIS, p. 3-96.

[188] See https://www.nefmc.org/library/amendment-8-2.

[189] See https://s3.amazonaws.com/nefmc.org/Herring-A8-FEIS.FINAL_191007_135918.pdf, p. 8.

[190] See https://static1.squarespace.com/static/511cdc7fe4b00307a2628ac6/t/5a21a3afe4966b4c30393327/1512154040109/Tab06_Squid-Buffer-Framework-Dec2017.pdf.

action was discontinued,[191] the fact that perceived user conflicts can result in radical fishery management decisions is real.

Mitigation and Fishery Reparations: The SEIS states that "Vineyard Wind has committed to voluntarily establish gear loss and revenue compensation funds for fishing interests in Rhode Island and Massachusetts, which is intended to compensate for gear and/or revenue losses over the life of the Project (Table 3.11-5)." This fund in no way provides reparations to the Rhode Island commercial longfin squid fishing industry for the economic activity that would be lost as a result of the Proposed Action. As such, the impacts have not been mitigated and have not been reduced from "major" to "moderate".

Both the SEIS estimates of squid fishery value in the WDA and the Vineyard Wind compensation plan severely underestimate the value of the longfin squid fishery in the area. The SEIS estimates the total revenue exposure from the squid fishery to all cumulative projects, including the Proposed Project, at only $1.16 million from 2020-2030.[192] This is ludicrous. And the Vineyard Wind "Direct Compensation Fund" would provide only $4.2 million over a 30-year period, for all fishery claims.[193] The fund would initially only contain $1million initially, with subsequent annual payments starting at $76,000, and paid claims would require a release of liability from future claims. This is also ludicrous and does not represent the true impacts to the Rhode Island summer longfin squid fishery alone. In fact, $76,000 would cover the cost of one net and set of trawl doors lost on subsea structure.

Neither the SEIS nor the Vineyard Wind Rhode Island Direct Compensation Fund acknowledge the fishery values analysis compiled by the Rhode Island DEM Division of Marine Fisheries specifically for the Vineyard Wind project. This analysis is much more aligned with the true level of fishery impacts experienced by the fishing industry in the Proposed Project area. Yet, it is glaringly absent from any mention in the SEIS.

According to Rhode Island DEM's Division of Marine Fisheries analysis "Rhode Island Fishing Value in the Vineyard Wind Construction and Operations Area"[194], the ex-vessel value of the Vineyard Wind COP area for Rhode Island fisheries alone is up to $35,611, 702.85 for a 30- year period. [195] The value in this analysis do not include adjustments for inflation or increases in value, and is ex-vessel value *only*. This means that it is the value of the product to the boat only, and does not include shoreside impacts. "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."[196]

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[191] See https://www.mafmc.org/newsfeed/2017/council-discontinues-development-of-squid-buffer-framework.
[192] See Appendix B, Table 3.11-3, p. B-78.
[193] See http://www.crmc.ri.gov/windenergy/vineyardwind/Agreement_RIFFVT.pdf.
[194] RI DEM, "Rhode Island Fishing Value in the Vineyard Wind Construction and Operations Area", January 14, 2019 at http://www.dem.ri.gov/programs/bnatres/marine/pdf/RIDEM_VWValue.pdf.
[195] Ibid.
[196] Ibid.

Of the $35, 611,702.85 of projected Rhode Island ex-vessel landings values for the Vineyard Wind COP, $20,968, 100.76 is attributed to the squid fishery.[197] When economic multipliers are applied to this fishery, the numbers significantly increase.

In a Science Center for Marine Fisheries study, in partnership with the National Science Foundation, Seafreeze and Seafreeze Shoreside participated in a study entitled ""Economic Impacts Associated with the Commercial Fishery for Longfin Squid (Doryteuthis pealeii)[198] in the Northeast U.S", along with all other major processors participating in the longfin squid industry. [199] Combined, the longfin squid fishery, under average landing conditions, was estimated to have produced 2,539 full time jobs, $99.74 million in total income, and $246.56 million in total economic output, with an economic multiplier of 7.64 (i.e., every dollar in landings leads to $7.64 in total economic output).[200] This analysis accounts for not just ex-vessel revenue, but the impacts to shoreside infrastructure as well.

If a 7.64 multiplier is applied to the Rhode Island DEM analysis, the total economic impact and necessary mitigation fund to the Rhode Island longfin squid industry as a result from the Vineyard Wind project would amount to $160,196,289.80 over the 30-year project. Not $4.2 million as the Vineyard Wind Rhode Island Compensation Fund provides for the life of the project, including Construction, Operations and Maintenance, and Decommissioning.[201]

It is not surprising that the Vineyard Wind Rhode Island Compensation Fund is woefully inadequate for realistic reparations to the affected squid fishing community, as the plan was negotiated with the Rhode Island Fisherman's Advisory Board (FAB) behind closed doors. At the time of these negotiations the FAB was completely lacking any offshore squid vessels representation, as well as any shoreside infrastructure representation despite the fact that the squid fishery is the most affected fishery by the Vineyard Wind project and that Rhode Island is the largest longfin squid processing state on the East Coast. Therefore, the most affected interests were completely unrepresented in the deal reached by the FAB and Vineyard Wind. In fact, we were not even allowed to be present in the room while our businesses were valued and essentially given away in negotiations to Vineyard Wind. See the attached petition from the Rhode Island squid industry to the Rhode Island Coastal Resources Management Council (CRMC) regarding this topic, which was subsequently ignored by CRMC.

Conclusions: We agree with the SEIS conclusion that cumulative impacts from all the IPFs together would result in "major" impacts to commercial fisheries from offshore wind activities in the geographic analysis area,[202] and that the cumulative impacts associated with the Proposed Action combined with reasonably foreseeable activities would result in "major" impacts on commercial

[197] Ibid, Table 1.
[198] Formerly known as loligo pelaeii
[199] Scheld, Andrew, "Economic Impacts Associated with the Commercial Fishery for Longfin Squid (Doryteuthis pealeii) in the Northeast U.S.", Virginia Institute of Marine Science, March 2020 at https://scemfis.org/finfish-publications/. A Science Center for Marine Fisheries project, in partnership with the National Science Foundation.

[200] Ibid, p. 12 of 24.
[201] See Appendix B, Table 3.11-5, p. B-80.
[202] SEIS, p. 3-98.

fisheries.[203] However, we disagree that "The financial compensation agreements outlined in Table 3.11-5 may result in a lower impact specific to the Proposed Action",[204] as the compensation level is only 2.6% of the actual economic impacts from the Proposed Action to the longfin squid industry in the state of Rhode Island alone. We will again point out that the figures contained in the Rhode Island DEM analysis, even when combined with the economic multipliers of the Science Center for Marine Fisheries study, do not take into account the stock level/population impacts to the longfin squid stock that are likely to occur due to construction and operational noise of planned wind farms, both of the Proposed Action and cumulative lease areas. The economic impacts of stock decline would require additional discussions and valuations.

Navigation and Vessel Traffic Comments, Section 3.13:

Marine Radar: The SEIS states, "The Proposed Action's structures would increase risk of allision, as well as collision with other vessels navigating through WTGs; would interfere with marine radars (although other navigation tools are available to ship captains); and could cause long-distance sailing races to alter course."[205] This is the *only* place in the entire SEIS that marine radar is mentioned, despite the fact that marine radar interference has been a topic of concern for the fishing industry for years, and for years we have asked that a model be created to assess radar interference impacts from the turbine sizes and project sizes planned for all cumulative East Coast leases, and specifically for the Vineyard Wind and MA/RI lease area.

Omission of so great an impact results in the SEIS navigational analysis being seriously flawed. Wind turbines are not simply fixed structure. They are moving structures that create significant marine radar interference. The SEIS simply asserts, "other navigational tools are available". Such as what? The stars? Sextants and the horizon? Marine radar is the primary, and oftentimes only, means of vessel navigation. This is especially true as vessels navigate in at night, in the fog, and inclement weather. The Proposed Action area is notorious for foggy conditions, and is a primary transit area for many vessels headed to offshore fishing grounds even outside the Project area and MA/RI WEA.

Other "navigational tools" such as AIS do not track all targets. AIS can only track targets which also possess AIS. AIS is only required on commercial fishing vessels greater than 65 feet and inside of 12 nm, and is not found on the majority of recreational, or sailing vessels that frequent the Proposed Project area and other cumulative lease areas. The SEIS itself states that "commercial fishing and recreational vessels comprise a large majority of vessel activity in the geographic analysis area for navigation and vessel traffic". It also discusses sailing activity in the area ("could cause long distance sailing races to alter course"[206] and "Recreational and tourist-oriented activities in the geographic analysis area…include boating…sailing"[207]). Fiberglass vessels such as recreational fishing boats and sailboats do not return strong radar signals and do not carry AIS. As the SEIS mentions frequently, it

[203] SEIS, p. 3-101.
[204] Ibid.
[205] SEIS, p. 3-113.
[206] SEIS, p. 3-113.
[207] SEIS, p. 3-83.

expects that fixed structures will attract even more recreational fishing boats to the area.[208] Virtually none of these recreational vessels and recreational sailing vessels have AIS, and marine radar is the sole means of target tracking and avoidance, particularly in summer fog banks off Martha's Vineyard/Nantucket.

Of the HMS vessels listed The SEIS notes that HMS fishing vessels frequent the Proposed Action area,[209] are likely to overlap offshore energy areas, and often spend more time than other anglers on fishing trips, and that there were 20,020 vessels with a permit for Atlantic HMS in 2016. [210] What it does not mention is that these are nationwide numbers, and that 2,317 of these permits reside in Massachusetts alone.[211] The majority of these vessels are also without AIS.

Therefore, a good portion of the vessel traffic in the analysis area is visible on marine radar only. This is true especially in the summer months, when recreational and sailing traffic is at its height, and also when the summer longfin squid fishery is at its peak. Marine radar is and always will be the primary means of navigation for all maritime vessels. The marine radar interference scatter, false targets and sidelobes associated with offshore wind turbines can mask true targets, especially those with weaker radar returns.

Solutions proposed by developers at meetings we have attended include solutions such as adjusting radar gain. This is a method already used by vessels to reduce the amount of sea scatter and rain scatter picked up by radars during various weather conditions. However, if radars are adjusted too much to "drown out the noise", they also will drown out true targets.

For example, consider the below excerpts, taken from an actual 2018 Furuno marine radar manual aboard one of our Seafreeze vessels:

"The gain control adjusts the sensitivity of the receiver. The proper setting is such that the background noise is just visible on the screen. If you set it up for too little sensitivity, weak echoes may be missed….

"Echoes from waves cover the central part of the display with random signals known as sea clutter…Be careful not to remove all sea clutter, because you may erase weak echoes….

"When echoes from precipitation mask solid targets, adjust the A/C RAIN control to split up these unwanted targets into a speckled pattern, making recognition of solid targets easier. Be careful removing all rain clutter, because you can erase weak echoes. Further, the possibility of losing weak echoes is greater when you use A/C RAIN and A/C SEA to reduce clutter."[212]

Therefore, interference to marine radar interference due to turbines cannot simply be tuned out by the vessel radar operator without losing true targets. This is especially true in inclement weather conditions. Navigation in and around the Proposed Project and other cumulative projects is even more dangerous and the impacts more severe than already estimated in the SEIS. These impacts due to the

[208] For example, SEIS, p. 3-96, SEIS 3-111.
[209] SEIS, p. 3-92.
[210] SEIS, p. 3-58.
[211] 2016 Stock Assessment and Fishery Evaluation (SAFE) Report for Atlantic Highly Migratory Species, NOAA Fisheries, p.46.
[212] Furuno Operator's Manual, Marine Radar, FAR-1513 FAR 1523 FAR 1513-BB FAR 1523-BB FAR 1518 FAR 1528 FAR 1518-BB FAR 1528-BB, Furuno Electric Co., Ltd, Mar 5, 2018, p. 1-20, 1-22.

presence to wind turbines, even without the consideration of radar interference, range from ""increased risk of allisions with stationary structures or vessels and collisions with other vessels, along with risk of damage to vessels or injury to crews"[213] and "major" impacts "due primarily to the increased loss of life due to maritime accidents, which would produce significant local and possibly regional disruptions for ocean users in the RI and MA Lease Areas."[214]

The USCG MARIPARS report quoted by the DEIS and whose recommendations BOEM plans to use as a consultation document during this NEPA process as a cooperating agency,[215] did not investigate marine radar interference as a part of its study. This is a serious flaw that cannot go unnoticed or unaddressed.

The MARIPARS denies being aware of an authoritative study that confirms or refutes the concern that WTGs will degrade marine radar.[216] This is despite the fact that the USCG ACPARS Interim Report of July 13 2012, Appendix IX, page 1, states, "Equally important to an encounter analysis (which was the focus of the ACPARS report) is the effect that a basic array of wind turbines might have on marine radar used in the area. The possibility of misinformation as a result of radar interference in the marine domain is a frightening prospect…."[217]

This is also despite the fact that the USCG itself oversaw a study modeling these effects regarding the previously proposed Cape Wind project off Massachusetts, entitled "Appendix M, Report of the Effect on Radar Performance of the Proposed Cape Wind Project and Advance Copy of USCG Findings and Mitigation".[218] The results concluded:

"Although it cannot be shown in a still image, the sidelobes and false targets constantly change over several frames or even frame to frame. As the radar moves, the orientation of individual turbines changes with respect to the radar. This changes the reflectivity, which changes the extent of the beamwidth/sidelobe spreading and also changes the reflectivity to secondary (false) reflections."[219]

And

"Targets within the wind farm, however, compete with numerous false targets caused by the turbines. These false targets are caused by a combination of sidelobes and secondary reflections. Of the two, the most distracting seem to be the secondary reflections. …The 130 turbines proposed for Nantucket Sound provide for a much greater number of potential false targets than the 30 wind turbines of Kentish Flats."[220]

We and others in the commercial fishing industry have repeatedly requested a similar modeling study for all U.S. offshore lease areas using the sizes of turbines actually being proposed for projects

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[213] SEIS, p. 3-111.
[214] SEIS, p. 3-114.
[215] SEIS, p. 3-115.
[216] Draft MARIPARS, Section III H (2), p. 24.
[217] Emphasis mine.
[218] Appendix M to the Cape Wind Energy Project Final EIS, January 2009. Submitted to the United States Coast Guard, December 16, 2008; USCG Order #HSCG24-08-F-16A248 Cape Wind Radar Study.
[219] Ibid, p. 10.
[220] Ibid, p. 26-27.

since larger turbines throw false radar signals further from the structure than smaller turbines, and for the various types of radar used by vessels in the area. However, no such modeling has occurred.

In a November 2019 letter, when asked by the Rhode Island State Senate Fisheries Task Force chairwoman about whether the USCG has conducted any radar interference analysis to even determine if its own vessels will be able to conduct SAR operations safely inside a wind far, the USCG Director of Marine Transportation Systems responded that "the Coast Guard has not completed an independent analysis", but that the Coast Guard supported the Department of Energy by providing key input and reviewing elements of its 2013 Final Report entitled *Assessment of Offshore Wind Farm Effects on Sea Surface, Subsurface and Airborne Electronic Systems* and that the findings therein could be applied to Coast Guard vessels and capabilities.[221]

This study[222] states:

"Investigations on the effect of offshore wind farms on marine navigation have been conducted as early as 2004….measurements were collected on marine radar, communications and positioning systems…It was found that the effect of wind farms on radar systems is prominent, while those on communications and positioning systems are minor….It was found that wind farm induced clutter was clearly visible on radar screens….In the US, studies on offshore wind farm effect on marine navigation have focused on the Cape Wind project in Nantucket Sound, MA [EM-1.US1, EM-1.US2, EM-1.US3, EM-1 US4] and the US Coast Guard [EM-1.US1]. In [EM-1.US1], it was shown that wind farm induced clutter on radar screens can be modeled through radar simulation, and the simulations resembled the measurements reported in the Kentish Flats study. Subsequently, the US Coast Guard issued an assessment of 'moderate risk' in [EM-1.US2] for the presence of offshore wind farms on marine navigation for Cape Wind.[223]

X-Band marine radar, the type most commonly employed on commercial fishing vessels, was a part of this analysis and is also some of the most affected marine radar. See also below our comments on marine radar inference which we submitted as a part of the MARIPARS public comment period:

"The MARIPARS should examine radar interference from offshore wind farms as a major influence on safe navigability, particularly since the area in question is often enveloped in fog and is a main route for vessels heading into harbor from points east due to hazardous weather conditions. Earlier this year, an offshore wind farm service vessel collided with the turbines while inside a wind farm; of note is the fact that the captain of the vessel had put the radar in standby mode, which is standard practice by vessels operating inside the wind farm due to radar unreliability caused by false targets and reflections. [224] In the past week, the U.S. House Appropriations Committee also highlighted

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[221] See letter to Senator Susan Sosnowski, November 25, 2019, attached.
[222] Final Report DE-EE0005380 Assessment of Offshore Wind Farm Effects on Sea Surface, Subsurface and Airborne Electronic Systems, The University of Texas at Austin, prepared for the U.S. Department of Energy, 9/30/2013.
[223] Ibid, p. 5.
[224] See https://www.marineinsight.com/case-studies/wind-farm-vessel-collides-with-turbine-tower/. "The captain, as was the practice once 'inside' the wind farm, had put the radar into standby mode.
Trials have demonstrated that, at close range, a wind farm may produce multiple reflected and side lobe echoes that can mask real targets. Employing radar within a wind farm is not reliable; therefore, the decision by the captain not to employ the radar while transiting the wind farm was understandable."

this issue of radar interference by including defense appropriations to study the impacts of offshore wind farm radar and sonar interference on military capabilities.[225]

Previous U.K. Maritime and Coast Guard Agency Guidance Notes have cited an actual on-the-ground 2004 study demonstrating serious marine radar interference up to 1.5 nautical miles from a wind farm comprised of 2 MW turbines.[226] As the turbines planned for the MA/RI wind areas are 9.5 MW turbines and up,[227] and as turbine height, blade size and number impact the extent of that interference,[228] radar impacts in the MARIPARS area will undoubtedly be greater and these factors should be accounted for in any analysis. For example, the rotors of the turbines causing interference in the 2004 U.K. analysis were 80 meters wide;[229] newer offshore wind turbine models have rotor diameters up to 220 meters wide and will continue to climb.[230] The number of turbines which would cover the extremely large area of the MA/RI wind leases will increase the radar degradation as compared to studies performed on smaller wind farms, and as such should be a key consideration of the MARIPARS. The previous USCG radar study on the Cape Wind project examined a smaller area with smaller turbines, and concluded that "there is a difference between a target being visible and a target being noticeable……Targets within the wind farm…compete with numerous false targets caused by the turbines….The 130 turbines proposed for Nantucket Sound provide for a much greater number of potential false targets than the 30 wind turbines of Kentish Flats…"[231] Therefore, previous studies completed on smaller or fewer turbines may significantly underestimate the impacts which would result from a buildout of the MA/RI wind area leases.

Particularly pertinent to the MARIPARS discussion of transit corridors through the MA/RI leases is safe transit widths from radar interference when turbines are located on both sides of the transit lanes. The U.K. Maritime and Coast Guard Agency Marine Guidance Note 543 states that greater than 3.5 nautical miles is the minimum recommended separation distance between turbines when they occur on opposite sides of the route.[232] All but one of the transit lanes proposed by the MARIPARS Federal Register notice have turbines on opposite sides of the route. Therefore, we would request that the

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[225] See https://www.eenews.net/climatewire/stories/1060387351.

[226] See MGN 372 at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/440734/MGN_372.pdf, p. 4.

[227] The Vineyard Wind turbines planned for construction are 9.5 MW, see http://www.mhivestasoffshore.com/vineyard-wind-selects-mhi-vestas-as-preferred-supplier/. See note 12 for turbine prototypes available in coming years.

[228] Ohs, Skidmore and Bedrosian, "Modeling the Effects of Wind Turbines on Radar Returns", Military Communications Conference, October 2010, p. 1. https://www.researchgate.net/publication/261050163_Modeling_the_effects_of_wind_turbines_on_radar_returns and http://s3.amazonaws.com/windaction/attachments/1513/windturbineeffectsonradarreturns.pdf.

[229] See https://en.wind-turbine-models.com/turbines/668-vestas-v80-offshore#datasheet ; https://en.wikipedia.org/wiki/North_Hoyle_Offshore_Wind_Farm; and https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/440734/MGN_372.pdf.

[230] See https://www.ge.com/renewableenergy/wind-energy/offshore-wind/haliade-x-offshore-turbine. See also 984 foot tall turbines envisioned by Orsted by 2020 at https://bloximages.newyork1.vip.townnews.com/stltoday.com/content/tncms/assets/v3/editorial/6/d7/6d717557-187b-5aae-a966-b4f87b86b791/59523730a065b.image.jpg.

[231] Appendix M, Report of the Effect on Radar Performance of the Proposed Cape Wind Project and Advance Copy of USCG Findings and Mitigation, January 2009, p. 26.

[232] See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/502021/MGN_543.pdf, p. 21.

MARIPARS analysis include this recommendation. Prior U.S. Coast Guard recommendations for turbine setbacks were 2 nautical miles from traffic lanes, based on previous U.K. guidance; however these were recommended in an instance where a wind lease occurred only on one side of the traffic lanes and where the U.K. recommendations were based off of much smaller turbine size than those being planned for the MA/RI areas.[233]

Another important aspect of any radar analysis as part of the MARIPARS will be wind turbine interference on multiple target tracking. The larger the wind farm area and the more turbines that exist, the greater the deterioration of radar's multiple target tracking performance, and radar tracking events related to genuine targets may be corrupted by the wind turbines because of detection misses and incorrect associations with false detections.[234] Previous studies simulating multiple target tracking of vessels in wind farms only simulated 2-3 vessels at a time in a much smaller area.[235] As the MARIPARS study area is nearly a million acres, over 1,400 square miles of projected wind farm buildout, and as there can be many more than 2-3 vessels in this area particularly at certain times, we would request that significant multiple target tracking radar analysis, combined with analysis of 9.5 MW and up turbine scatter, generated over the entire area, be conducted, particularly for vessels transiting through the wind areas. We have also attached a photo with this comment taken of an actual radar off a vessel inside a U.K. wind farm, which can be ascertained from the GPS coordinates, as a means of an example of the many false targets produced which may cause issues with multiple vessel tracking inside a wind area. This type of multiple tracking radar interference analysis should include pleasure craft and recreational fishing vessels, as these vessels are not required to carry AIS and may not be made of material that produces strong radar signals."[236]

This image is reproduced below:

[233] See https://www.boem.gov/USCG-NY-Area-ID-recommendation/.
[234] Karabayir et.al, "Investigation of wind farm effects on radar multiple target tracking", Journal of Electromagnetic Waves and Applications, 2015, p. 2; at https://www.researchgate.net/publication/286932946_Investigation_of_wind_farm_effects_on_radar_multiple_target_tracking.
[235] See See Final Report DE_EE0005380 "Assessment of Offshore Wind Farm Effects on Sea Surface, Subsurface and Airborne Electronic Systems", University of Texas at Austin, Prepared for the U.S. Department of Energy, 2013, at https://www1.eere.energy.gov/wind/pdfs/assessment_offshore_wind_effects_on_electronic_systems.pdf, Appendix C; and [235] Appendix M, Report of the Effect on Radar Performance of the Proposed Cape Wind Project and Advance Copy of USCG Findings and Mitigation, January 2009.
[236] See the comments at https://www.regulations.gov/document?D=USCG-2019-0131-0026.

Also reproduced below is an actual fishing vessel radar screen when passing the Block Island Wind Farm. One side of the radar screen depicts the actual structures, while the other side depicts a false reflection mirror image. This screen is on a 6 nm range, approximately 4 nm from the nearest turbine, and as there is no sea clutter visible, it is clear that the gain has already been adjusted.

In the expanded cumulative scenario for the geographic analysis area for navigation and vessel traffic, which only comprises the MA/RI lease areas, the SEIS predicts approximately 955 WTGs and 20

ESPs for a 30-year period.[237] As the radar interference arising from 955 WTGs will be a significant issue for the commercial fishing vessels both inside and outside the area to navigate, and as there is likely to be difficulty target tracking recreational and sailing vessels both inside the area, in any transit lanes through the area, and in the areas adjacent to the wind farm, these are not minor considerations. For the SEIS to completely ignore this issue and only mention "marine radar" one time in the entire document with absolutely no analysis of this impact is a huge shortfall.

Presence of Structures: The SEIS states, "The most prevalent vessel route pattern though the WDA is a roughly northwest/southeast orientation."[238] This is in fact the current transit route taken by our vessels through the area. However, even in the Draft MARIPARS recommendation for 1x1 nm grid spacing of turbines, the NW-SE spacing would only be 0.6 to 0.8 nm wide.[239] This means that the most heavily trafficked area will be the narrowest part of the layout. This is not rational.

As the MARIPARS is heavily relied upon by the SEIS, it is also important to notify BOEM of the mathematical and other errors contained in this report. Additionally, we believe it is important to highlight that the MARIPARS recommendation exactly aligns with the joint developer layout announced in November 2019 which we and others in the fishing industry first heard about in the media.[240] We have consistently maintained throughout the BOEM process that a 1x1 nm layout would not be adequate for safe operation or transit of our vessels, particularly through large wind energy areas such as the MA/RI lease area, which is larger than the state in which we are located.

Regarding the significant mathematical and other flaws revealed in the MARIPARS document, consider the below excerpts from the comments of Dr. Thomas Sproul submitted as part of the MARIPARS comment period:

" The MARIPARS Draft defines navigational safety corridors (Appendix B, p. 1) consistently with USCG Marine Planning Guidelines in COMDTINST 16003.2B,1 Appendix E:
'Navigation Safety Corridors identify the amount of area necessary for vessels to safely transit along a route under all situations'……
Despite this acknowledgment, the Draft fails to mention that the Marine Planning Guidelines contained in COMDTINST 16003.2B, Appendix E, also explicitly provide guidance related to the width of navigation safety corridors: the Closest Point of Approach (CPA) is "the safe distance at which a vessel can pass a fixed or moving hazard" (p. E-4). Depending on the assessment of risk factors, COMDTINST 16003.2B, Appendix E indicates a CPA of 0.5 – 1.0 NM may be acceptable under ideal conditions, but that under less ideal conditions a CPA of 2 NM or more may be necessary (p. E-4). When identifying a straight-line route as a navigation safety corridor with hazards present on both sides, the CPA guidelines must apply on both sides of any vessel transiting the route. This means the minimum CPA distance of 0.5 NM to either side of a route corresponds to a diagonal navigation safety corridor width of 1.0 NM *plus the*

[237] SEIS, p. 3-111.
[238] SEIS, p. 3-110.
[239] SEIS, p. 3-115.
[240] See https://www.renewableenergyworld.com/2019/11/20/new-england-offshore-wind-developers-submit-uniform-layout-proposal-to-the-u-s-coast-guard/.

width of the route itself. Not counting the width of the route, a 1.0 NM diagonal corridor width corresponds to 1.41 NM grid spacing due to geometry.
Thus, the leaseholders' 1x1 uniform grid proposal conflicts with the barest minimum USCG guidance for CPA with respect to travel along the diagonals. This conflict is neither mentioned nor evaluated in the MARIPRAS Draft, which makes spacing recommendations exactly conforming to the leaseholders' proposal.
The Marine Planning Guidelines in COMDTINST 16003.2B, Appendix E do not give exact prescriptions for the width of a shipping route, other than indicating that space should be available for "a minimum of two vessels passing abeam of one another and other vessel operations in the area" (p. E-4). Using the calculations in the Baird report accompanying the leaseholders' proposal, the shipping route width would be 0.32 NM. Using the calculation in the MARIPARS Draft (Fig. 21, p. 36), the shipping route width would be 23 lengths of the largest vessel anticipated. Based on submissions by the leaseholders, I use a length of 195 ft (see item 5 below) for the calculation, giving a shipping route width of 0.74 NM. Depending on the minimum CPA distance being 0.5 NM or 1 NM, these estimated shipping route widths correspond to minimum diagonal navigation corridor widths of 1.32 – 2.32 NM using the Baird methodology, or 1.74 – 2.74 NM using the MARIPARS methodology. Applied to the uniform grid layout advocated in the MARIPARS Draft, these diagonal navigation corridor widths correspond to minimum grid spacing of 1.87 – 3.28 NM using the Baird methodology or 2.46 – 3.87 NM using the MARIPARS methodology. In a general setting where less than ideal conditions are anticipated and a 2 NM CPA is required, diagonal corridor widths are 4.32 NM or 4.74 NM, corresponding to minimum grid spacing of 6.11 NM or 6.70 NM.
While these distances may seem large in contrast to the developers' proposal, some context is important. Well-known recommendations from Europe (mentioned below) make either the same "shipping route + 4 NM" recommendation as derived here for the diagonals, or encourage use of a "20-degree rule" which would require navigation corridors substantially wider than 6.70 NM along the longest transections of the WEA. Similar widths have previously been requested by members of the commercial fishing industry and by RODA….
….The alternative spacing analysis contains computation errors. Corrected computations give diagonal corridor widths of 1.28 NM, and resulting grid spacing of 1.81 NM.
According to the MARIPARS draft, the calculation is based on the so-called "Netherlands study,"4 which clearly indicates the 500 m (0.270 NM) UNCLOS Safety Zone applies on each side of the route if vessels are passing between turbines (Appendix 6, p. 62). The calculation error is prominently shown in MARIPARS Figure 21 (p. 36), in which the missing UNCLOS Safety Zone for the second row of turbines breaks the symmetry of the colored bands in the Figure.
The recommendations of the alternative spacing analysis depend critically on the maximum length of vessels contemplated to navigate through the developed wind energy area (WEA). The MARIPARS Draft assumes these vessels to be only fishing vessels, and reports their maximum length as 144 ft. With respect to maximum vessel length, there appear to be additional data sources *submitted by the developers* documenting the presence of significantly larger vessels. These submissions were apparently ignored despite BOEM's explicit request that the Coast Guard "consider vessel traffic analyses already submitted through developer NSRAs (Navigation Safety Risk Assessments)." (MARIPARS Draft Appendix E, Synopsis of Comments, p. 4)."[241]

Due to the flaws and omissions on this report, we do not believe that the SEIS can rely on its recommendations alone in determining navigational impacts to vessels in and around wind energy

[241] See https://www.regulations.gov/document?D=USCG-2019-0131-0072 and attached.

areas. Both the omitted radar analysis and flawed structural analysis should be rectified prior to authoritative use by BOEM.

SEIS utilizes AIS to assert that fishing vessels will be able to make 180-degree turns inside the wind farm, using AIS data.[242] We presume this is implying that fishing activity can take place within the array, as we know is not the case for trawl vessels based on our comments regarding cables in the Commercial Fishing Impacts section. However, even if there were a cable-free corridor, the assumption that trawl fishing activity could continue within the area is still flawed. Trawl vessel tracks themselves may show maneuverability, but the trawl gear is not where the vessel is located. It may be in fact up to half a mile behind the vessel itself, and can shift in tides and currents requiring the vessel to position itself accordingly to ensure that trawl gear remains in areas free of undersea hangs and structure. Operating a trawl vessel inside either the Proposed Action or 1x1 nm spacing recommended by the MARIPARS will still be impossible for larger vessels, including those in the longfin squid fishery.

The SEIS impacts regarding SAR in the Project Area, as both a result of the Proposed Action (which lacks uniform 1x1 nm spacing and therefore less desirable according to the document)[243] as well as other alternatives such as Alternative D2 (which the SEIS asserts will contribute to USCG SAR success)[244] do not consider marine radar interference impacts on USCG SAR vessel capabilities, and associated computational flaws of the MARIPARS.

Omitted Impacts: Additionally, radar interference with the HF radars associated with SAR will experience impacts as a result of cumulative lease areas. NOAA's National Ocean Service Integrated Ocean Observing System, in comments to BOEM regarding the Equinor lease off NY, highlighted the fact that wind turbines offshore NY would result in loss of coastal monitoring for 100 miles of the NY, NJ and RI coasts due to interference with high frequency (HF) radars.[245] These HF radars require 24/7/365 monitoring and are used by the US Coast Guard for search and rescue and by NOAA for oil spill response,[246] both of which are frequently discussed in the SEIS analysis as impacts from the Proposed Action and cumulative projects. Although this issue has clearly been raised with BOEM in the past, no mention of it occurs in the SEIS. In fact, a word search of "HF radar" in the SEIS turns up zero results. This is a serious omission and affects much of the analysis in the document.

According to a webinar on July 27, 2020, hosted by the U.S. Department of Energy and part of its "Offshore Wind Turbine Radar Interference Mitigation Webinar Series", "36 radar systems affected to some degree by the 9 proposed and hypothetical wind farms evaluated- every wind farm evaluated affected at least 1 radar" and recommends that "BOEM consider radar LOS in COP reviews."[247]

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[242] SEIS, p. 3-113.
[243] SEIS, p. 3-113.
[244] SEIS, p. 3-115.
[245] Comment letter, Zdenka Wllis, Director, U.S. IOOS Program Office, comment on BOEM-2014-0087 and BOEM-2014-0003, July 14, 2014.
[246] Ibid.
[247] For webinar slides referenced, see https://www.energy.gov/eere/wind/articles/offshore-wind-turbine-radar-interference-mitigation-webinar-series, July 27 webinar, when posted.

A June 2019 "High Frequency Radar Wind Turbine Interference Community Working Group Report" states the following:

"High Frequency (HF) radar is a critical component of our nation's efforts to observe and monitor the coastal ocean. These land-based, remote sensing systems are the only instruments capable of making both high spatial resolution and high temporal resolution observations of the movement of waters at the ocean's surface over the outer continental shelf. In the U.S., a distributed network of research scientists, in partnership with the U.S. Integrated Observing System (IOOS), have been operating HF radar systems for more than two decades. Data from the HF Radar Network is used by the U.S. Coast Guard and NOAA for search and rescue operations and spill response as well as by individual scientists on a daily basis.

However, the rapidly emerging offshore wind energy industry in the U.S. has the potential to degrade the performance of HF radar systems operating in the vicinity of wind turbines. A recently completed study (Trockel et al.2018) has documented the wind turbine interference (or "WTI") on HF radars and shown that the location and the magnitude of the interference can directly interfere with accurate measurements over broad areas of the radar's coverage. For small numbers of turbines, pathways to mitigate the interference exist. Yet, the offshore wind industry will soon outpace these simplified solutions as plans for large farms of turbines are moving towards installation. This near-future scenario greatly exceeds the scope of initial efforts and at present no operational solutions exist to mitigate the future interference."[248]

Regarding the Vineyard Wind Project the document states:

"South of Martha's Vineyard, Massachusetts, construction in the Vineyard Wind lease area, will begin in the fall of 2019. The developer of this first major U.S. wind farm has proposed significantly larger turbines (9.5 MW) than those located in land-based wind farms, increasing the impact of each turbine on radar observations. Additionally, their proposed array of 80-100 turbines would result in significantly more interference signals than were seen in initial studies using the small Block Island wind farm.."[249]

To compound the issue, the SEIS acknowledges that fixed structures alter water flow , and that it expects changes in water flow caused by wind farm development on the OCS.[250] In fact, according to the SEIS, models conducted on only 297 turbines (as compared to approximately 2,000 turbines planned for the U.S. OCS and 955 in the MA/RI area alone)[251] there was a 5% difference in water flow.[252] . According to the SEIS, "using the assumptions in Table A-4, it is anticipated that the expanded cumulative scenario would include up to 373 structures in the water quality geographic analysis area

[248] See ""High Frequency Radar Wind Turbine Interference Community Working Group Report" June 2019 at https://darchive.mblwhoilibrary.org/bitstream/handle/1912/25127/HFRadar_2019_WindTurbineInterference_WorkingGroupReport_Final2.pdf?sequence=1&isAllowed=y, p. 2.
[249] Ibid, p. 4-5.
[250] SEIS, p. 3-23.
[251] SEIS, p. ES-2; SEIS, p. 3-111.
[252] SEIS, p. 3-23.

and could result in alteration of local water currents."[253]This means that currents will change due to the presence of fixed structures, and previous experience with typical current direction in the area may not be useful in predicting future currents. It is shocking that such impacts would go completely unmentioned in the SEIS. Lack of accurate SAR has life threatening implications for mariners, and lack of accurate oil spill response has potential far reaching consequences for natural resources, including commercially harvested species.

One additional omission is the fact that the USCG does not provides towing services for disabled vessels. Therefore, if a vessel becomes disabled in or near a wind farm, it is up to either a Good Samaritan or a professional towing company to recover the vessel. It is questionable whether professional towing companies or Good Samaritans will risk the liability of hooking up to a vessel slamming against turbines or in the middle of a field of fixed structure. This is particularly true in inclement weather.

Conclusions: Realistic radar modeling and impacts assessments should and must occur as part of the SEIS Navigational Impacts analysis section, especially for marine radar and HF radar impacts. Absolutely no offshore wind construction should occur until all radar interference issues and related impacts on vessel safety can be properly assessed. Maritime safety and lives are at stake and should not be left to experience these impacts via potentially fatal trial and error. All flaws in the MARPARS methodology should and must be addressed and the results used to reassess the Navigational and Vessel Traffic section of the SEIS.

We do agree with the SEIS conclusion that overall cumulative impacts of any alternative when combined with past, present, and reasonably foreseeable activities on navigation and vessel traffic would be "major",[254] and that the impacts of the Proposed Action even including Alternative F would be "major".[255] However, we disagree with the SEIS assessment that Alternative D2 or Alternative F with the D2 layout will be "moderate",[256] as asserted by the SEIS, given the facts above.

Other Uses Comments, Section 3.14:

Military and National Security Uses: We will address both National Security and Radar issues together, as these issues frequently overlap and according to the U.S. Department of Defense in 2017, "the impact from a group of turbines, each with three rotating blades, can quickly burden a radar system with thousands of false targets."[257]

According to an April 20, 2020 webinar in the U.S. Department of Energy's "Offshore Wind Turbine Radar Interference Webinar Series", DOD radars vulnerable to offshore wind turbine radar

[253] SEIS, p. Appendix A, p. A-55.
[254] SEIS, p. 3-117.
[255] SEIS, p. 3-116.
[256] SEIS, p. 3-117.
[257] See http://greenfleet.dodlive.mil/files/2017/03/Win16-17_Interagency_Group_Wind_Turbines.pdf.

interference include: Near-shore Military "terminal area" air traffic control radars, "Enroute" Air Traffic Control radars (in support of DOD, FAA), Air defense long-range air surveillance radars (CARSRs, DARSRs, ARSR-4s…), Weather radars (NEXRAD), Ground based military unique radars (ADAMS, ROTHR, BMD), Missile tracking radars (Wallops Island, Cape Canaveral…). The DOD identified this a potential impact to flight safety, homeland security, homeland defense, weather observation, and barrier to offshore development. No comprehensive solutions exist, attempted upgrades have been unsuccessful, and the DOD is looking for solutions from foreign offshore wind developers.[258] According to Steve Sample, Deputy Director of the DOD Wind Siting Clearinghouse, they are currently at a loss for solutions and "Need [wind] industry to work with us and identify solutions." Considering the fact that these wind companies are owned by foreign governments, this would not seem to be the best idea for U.S. national security.

Wind developer Orsted shared that radar mitigation attempts in the U.K. had failed, after the wind farms were already installed. The U.K. Ministry of Defense in 2018 "informs that trials….determine that the wind farms had a detrimental effect on radar operations, specifically on probability of detection and the aviation specification performance" and "Pop up targets, for example helicopters that originate from within the affected area would only be detectable once they exit the affected detection area. Could be exploited by flying under the radar cover and then into the windfarm region, only being detected once they exit the affected detection area."[259]

Considering the fact that wind leases have been sited on the approach to potential terrorist targets such as New York, Philadelphia, Norfolk Virginia, and in the case of the Proposed Project, the approaches to Quonset, RI and Groton, CT, the primary construction sites for U.S. Navy nuclear submarines, this would seem to pose a grave and immediate threat to U.S. military and homeland defense capabilities.

According to the U.S. Department of Defense as of May 2019, ARSR-4 primary long range air surveillance radars, which are located along the US East Coast and all US borders, are "very susceptible" to interference from wind turbines, and that target tracking abilities decrease as turbine number, size, and density increases.[260] Work in 2017 for the Department of Energy identified ARSR-4 and ASR-9 long range air surveillance radars as the most impacted types by future offshore wind development, identifying sea clutter as a compounding factor:

"…the ARSR-4 LRR and ASR-9 SRR are the most impacted types by future offshore wind deployment based on this analysis…Low cost upgrades may be challenging given the legacy hardware and processing constraints…Many infill radar systems tested during the IFT&E program also exhibited

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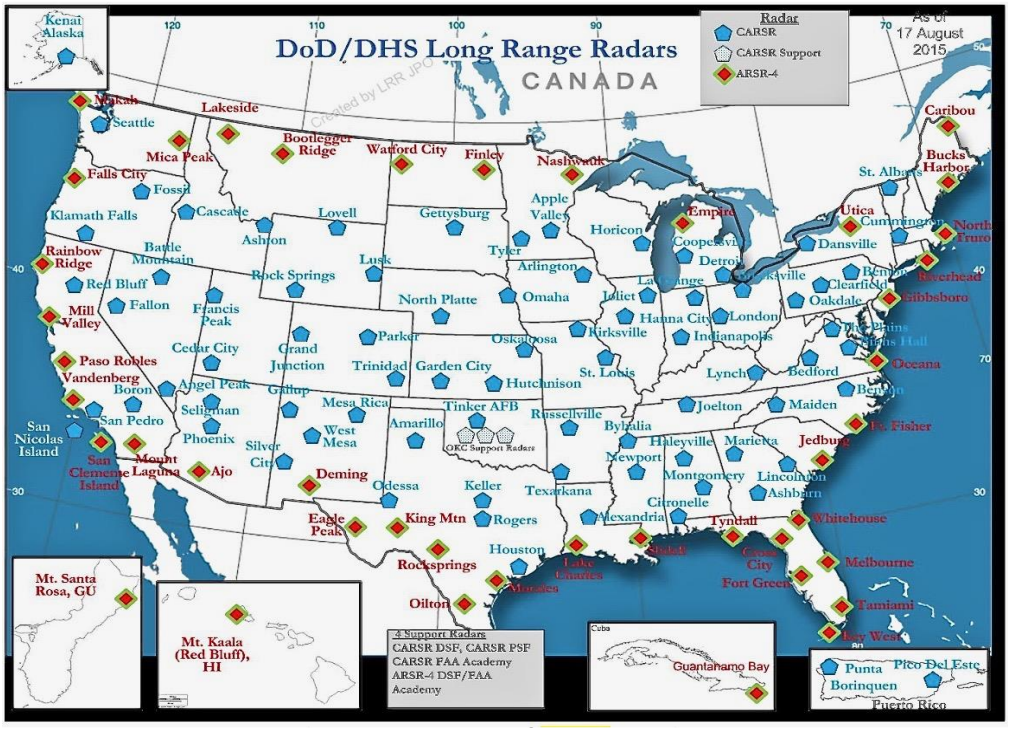
[258] [258] U.S. Department of Energy Office of Energy Efficiency and Renewable Energy, Wind Energy Technologies Office, webinar on April 20,2020, "Offshore Wind Turbine Radar Interference Webinar Series", first in a series of webinars (April 20, May 18, June 15, Fall 2020). See slides at https://www.energy.gov/sites/prod/files/2020/04/f74/offshore-wind-turbine-radar-interference-mitigation-webinar-4-20-2020.pdf. Steve Sample, Deputy Director of the DOD Wind Siting Clearinghouse: Some solutions have no next step (they are at a loss); "Need [wind] industry to work with us and identify solutions."

[259] Ibid.

[260] Communication, Undersecretary of Defense Lord, May 30, 2019.

high false alarm rates from ground clutter well beyond wind farms, and sea clutter may be even more challenging." [261]

See the below chart for locations of ARSR-4 radars along the perimeter of the United States:



Wind turbines located in the radar line of sight of air defense radars can adversely impact the ability of those unites to detect and track, by primary radar return, any aircraft or other aerial object, depending on the number and locations of the turbines.[262] Should an aircraft stop "squawking" through its transponder, incoming aircraft may be lost over an offshore wind facility due to this interference. In the terrorist attacks of 9/11, aircraft transponders were turned off and aircraft could only be tracked via primary radar return. According to DOD interviews on this topic, "Once PD [primary detection] is lost, can't really get it back with anything in the toolbox."[263]

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[261] See Ground Based Coastal Air Surveillance Wind Turbine-Radar Interference Vulnerability Study Public Summary, provided by MIT Lincoln Laboratory and Wind Turbine Radar Interference Working Group to the U.S. Department of Energy, 12/8/17, p. 7. https://www.energy.gov/sites/prod/files/2017/12/f46/Final%20Coastal%20Radar%20Public%20Summary%20-%20Comments%20Incorporated.pdf.

[262] See Report to the Congressional Defense Committees, "The Effect of Windmill Farms on Military Readiness", Department of Defense Office of the Director of Defense and Research Engineering, 2006, p 4.

[263] [263] See Final Report DE_EE0005380 "Assessment of Offshore Wind Farm Effects on Sea Surface, Subsurface and Airborne Electronic Systems", University of Texas at Austin, Prepared for the U.S. Department of Energy, 2013, at https://www1.eere.energy.gov/wind/pdfs/assessment_offshore_wind_effects_on_electronic_systems.pdf, Appendix B, p. 63, 64.On probability of detection issues, see also Report on the Mission Compatibility Evaluation

According to both the SEIS and the COP, "Any impacts on long-range radar systems are anticipated to be mitigated by overlapping coverage and radar optimization"[264] and states that the "FAA would evaluate potential impacts on radar systems, as well as mitigation measures for those when Vineyard Wind refiles Form 7460-1 for individual WTGs."[265] This reasoning is flawed for two reasons. First, the FAA form 7460-1 is only for assessing if the height of fixed structure poses a threat to airspace use and any antenna/frequency transmission,[266] and FAA authority only extends out to 12 nm. Second, in 2017 the federal interagency Wind Turbine Radar Interference Mitigation Working Group comprised of the DOE, DOD, FAA, DHS, NOAA, determined that radar interference caused by offshore wind leases off Massachusetts and Rhode Island could *not* be solved by overlapping coverage mitigation approaches and that such approaches could not restore low altitude radar coverage:

"Effects of land-based wind turbines on radar systems are well understood. Wind turbines within radar line-of-sight can increase clutter that may inhibit target detection, increase the generation of false targets, interfere with target tracking, and hinder weather forecasting. However, the effects of offshore wind turbines on U.S. coastal radar systems are not well understood….Offshore wind turbines may pose unique impacts to coastal radar systems given the difference in propagation of radar signals over the ocean versus land, as well as the larger size of offshore wind turbines compared to land-based turbines….[The five Block Island Wind Farm] wind turbines increase the false alarm rate by approximately two orders of magnitude….For lease or planning areas where an impact is predicted, one mitigation approach would be to fuse output from a nearby unimpacted LRR or SRR ….However there are some lease and planning areas, particularly those along the coasts of Hawaii, as well as Massachusetts and Rhode Island, where unimpacted overlapping coverage does not exist and different mitigations would be needed. It is also important to note this fusion mitigation approach cannot restore low altitude coverage from 500-1000 feet AGL….".[267]

Therefore, according to the information above, the assumptions of the SEIS and the COP are invalid. In 2016, the same Wind Turbine Radar Interference Mitigation Working Group acknowledged radar interference as an impediment to air traffic control, homeland security, national defense and

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Process and the Department of Defense Siting Clearinghouse for Calendar Year 2014, Office of the Undersecretary of Defense for Acquisition, Technology and Logistics, 2015, p. 7 at https://www.acq.osd.mil/dodsc/library/CY14%20RTC%20on%20MCE%20BOD%20Final-%20ES%20Clean.pdf. "Wind turbine and high-voltage electrical power transmission projects can present a risk to DoD's military readiness in various ways. The rotating blades from a wind turbine project can affect the sophisticated Doppler shift software algorithms incorporated in air surveillance radars, thus reducing the radar's "probability of detection" and increasing the radar's incidence of "lost tracks." The 60 Hz (and associated higher-frequency harmonics) electromagnetic interference (EMI) that naturally radiates from high-voltage power lines can impact sophisticated military communications equipment and associated testing activities."

[264] SEIS, p. 3-126; COP Volume III, Section 7.9.2.2.6.

[265] SEIS, p. 3-126.

[266] See FAA Form 7460-1 at https://www.faa.gov/documentLibrary/media/Form/FAA_Form_7460-1_042023.pdf.

[267] See Ground Based Coastal Air Surveillance Wind Turbine-Radar Interference Vulnerability Study Public Summary, provided by MIT Lincoln Laboratory and Wind Turbine Radar Interference Working Group to the U.S. Department of Energy, 12/8/17, at https://www.energy.gov/sites/prod/files/2017/12/f46/Final%20Coastal%20Radar%20Public%20Summary%20-%20Comments%20Incorporated.pdf.

weather forecasting, and "seeks, by 2025" to address these issues.[268] According to the SEIS, all the MA/RI leases are projected to be developed and operational by 2025.[269] This development prior to comprehensive solutions would be inconsistent with the paramount importance of U.S. national security and homeland defense.

Despite the claim by the SEIS that "the cumulative impacts on radar systems would be localized…and minor and potential conflicts addressed through established processes"[270] if no solutions exist at this time, as detailed by the information above and discussed as recently as April 2020, the impacts are anything but minor. In fact, any permitting of offshore wind on the U.S. OCS could result in catastrophic consequences.

Furthermore, it is clear that deconflicting has *not* occurred through established processes. For example, in 2013, prior to the BOEM lease of the Equinor lease area off NY, the Department of Homeland Security/USCG submitted comments to BOEM requesting that BOEM consider the fact that the lease area was sited directly on top of a Weapons Training Area:

"The proposed NYPA wind farm overlaps with one of two Weapons Training Areas (WTA) in the Sector of New York area of responsibility. The U.S. Coast Guard uses WTAs to maintain law enforcement proficiency. The Coast Guard would like this WTA to be given consideration as an existing use as BOEM reviews the project….Additionally, it is advisable that any future offshore renewable energy installations maintain a safe distance from our Approaches to New York, Atlantic Ocean Security Zone…"[271] BOEM leased the area anyway.

We reproduce the chart submitted by DHS/USCG to BOEM below, as well as a chart of the Equinor lease area on the page below:

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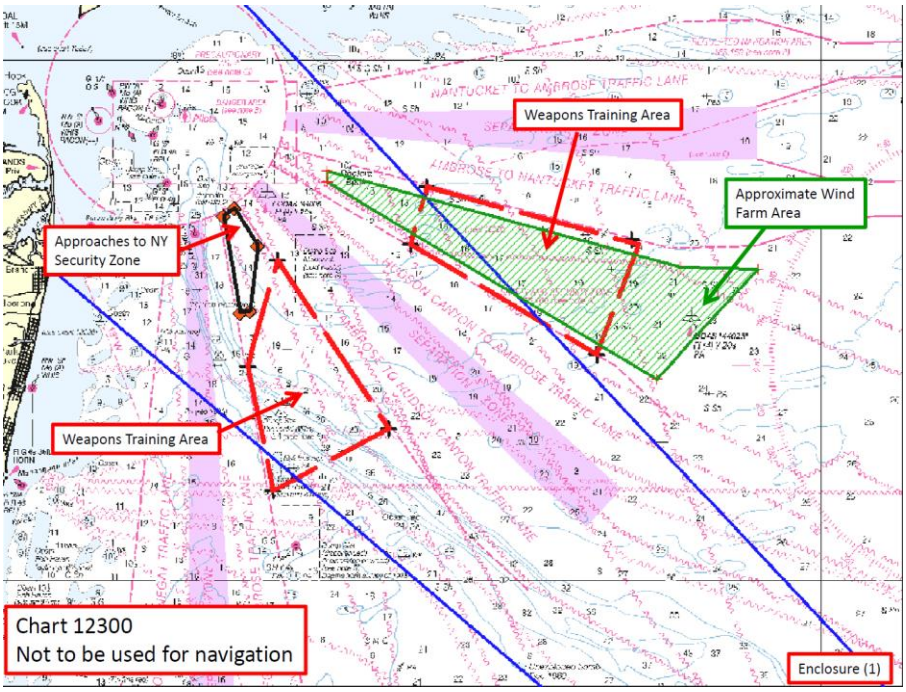
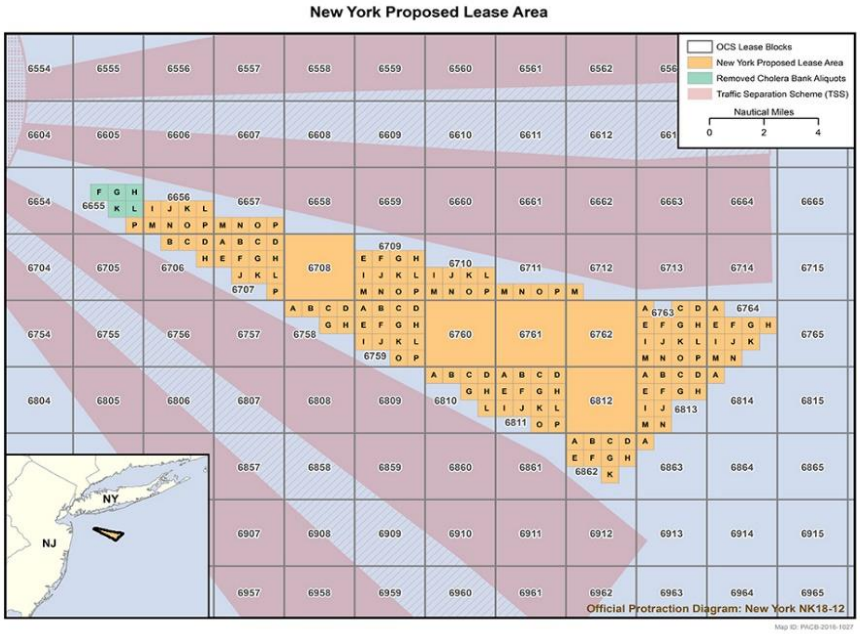
[268] See Federal Interagency Wind Turbine Radar Interference Mitigation Strategy, Jan. 2016. "Wind development located within the line of sight of radar systems, however, can cause clutter and interference, which at some radars has resulted in significant performance degradation...the probability for wind development to present conflicts with radar missions related to air traffic control, weather forecasting, homeland security, and national defense is also likely to increase, as is the potential severity of those conflicts." As a result, DOD, DOE, FAA and NOAA established the Wind Turbine Radar Interference Mitigation Working Group to address these conflicts. The "WG seeks, by 2025, to fully address radar interference as an impact to critical radar missions, ensure the long term resilience of radar operations in the presence of wind turbines…." P. vii. https://www.energy.gov/sites/prod/files/2016/06/f32/Federal-Interagency-Wind-Turbine-Radar-Interference-Mitigation-Strategy-02092016rev.pdf

[269] SEIS, Appendix A, Table A-6, p. A-21.

[270] SEIS, p. 3-126.

[271] Department of Homeland Security/U.S. Coast Guard, comments at https://www.regulations.gov/document?D=BOEM-2012-0083-0031 , March 8, 2013.

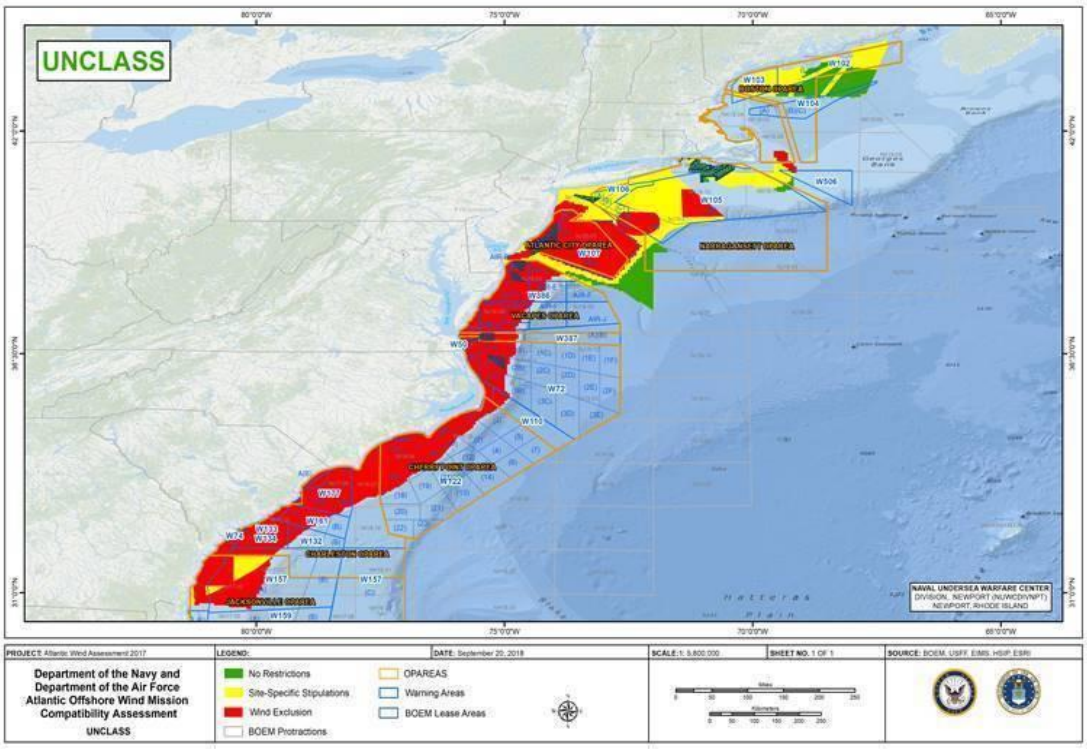




As another example, the U.S. Department of Defense has already assessed most of the East Coast, including currently leased offshore wind lease areas,[272] as a "Wind Exclusion Zone" and these

[272] See https://navysustainability.dodlive.mil/rsc/department-of-the-navy-atlantic-offshore-wind-mission-compatibility/ and https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/NY/DoD_Task-Force-Briefing_28NOV2018v2-%281%29.pdf.

areas have clearly not been deconflicted:



This analysis was completed in 2018, after some areas had already been leased, but before the lease of others. The SEIS states "It is assumed that all project operators would coordinate with relevant agencies during the COP development process to identify and minimize conflicts with military and national security operations." This is clearly not happening, and has not happened during the progression of the BOEM and offshore wind process if existing leases are in wind farm exclusion zones, if the Vineyard Wind COP assumes radar mitigation techniques that are invalid, and if BOEM has not even assessed or included all of the above information in its SEIS. The process is clearly broken and there is a lack of interagency and interdepartmental communication and transparency. For an issue which puts the lives of millions of Americans at stake, this is completely unacceptable.

Scientific Research and Surveys:

The SEIS correctly states that "Collectively, [offshore] developments would prevent continued NMFS scientific surveys under current vessel capacities and monitoring protocols in the geographic analysis area and may reduce opportunities for other NMFS research studies in the area."[273] This statement cannot be overemphasized from a commercial fishing perspective. All commercial and recreational quotas and harvest limits are derived from these surveys. Lack of data increases the amount of uncertainty in scientific models, stock assessments, and management decisions. The lack of having a functional fishery survey in all of the areas under consideration by the SEIS, including the

[273] SEIS, p. 3-121.

Proposed Action, could will result in lower harvest limits and quotas, potentially leading to zero possession limits over time, which would in essence eliminate commercial and recreational fishing. Making commercial fisheries economically responsible for a lack of survey and scientific data caused by offshore wind projects is unacceptable.

We would also mention that baseline surveys being conducted by developers such as Vineyard Wind will be essentially useless for determining stock level impacts due to wind farm construction. The Vineyard Wind survey will only collect one year of data. It is standard scientific fisheries protocol that a survey must have 5 to 7 years of consecutive data in order to be used in stock assessments.[274] The Northeast Fisheries Science Center comments on Vineyard Wind's baseline survey highlight additional inefficacies with this Vineyard Wind's baseline survey:

"Unfortunately, NOAA Fisheries is not able to provide official comments on the Vineyard Wind Monitoring Plan as the submitted plan lacks sufficient detail and critical information to evaluate its efficacy. Clearly defined objectives, underlying research, methods, and justification would be essential given the scale and magnitude of the proposed Vineyard Wind project…. It is not clear from the proposed submittal what research questions and hypotheses are being tested and why. The proposed plan lacks necessary supporting data, research, and analysis, including an evaluation of sampling strategies; and recommendations to justify the conclusions presented in the proposed monitoring plan…. Specifically, there is little description of the survey and sampling designs that would be utilized for the various monitoring methods nor any description of the statistical methods that would be used to test these hypotheses. For example, What was the question posed to the power analysis that was conducted? Similarly, it is not evident that any stratification has been planned in either the trawl or drop-camera surveys though there is certainly very good benthic habitat survey data available to build a survey design. There are also likely specific habitats of concern that were identified by industry and resource agencies that should be treated in the survey design…. The proposed plan provides no basis for the selection of sample sizes and thus this can not be evaluated. Initial evaluation by NEFSC staff indicate that the proposed sample size is likely too small to be able to be used in any reasonable manner. However, without presentation/evaluation of any data and clearly articulated hypotheses to test against; it is impossible for NOAA to review the effectiveness of the proposed sampling and justify the activities proposed."[275]

The SEIS does acknowledge that, "Regulated fishing effort refers to fishery management measures necessary to maintain maximum sustainable yield under the Magnuson–Stevens Fishery Conservation and Management Ac. This includes quota and effort allocation management measures. Offshore wind development could influence regulated fishing effort by two primary pathways, by changing fishing behavior to such an extent that overall harvest levels are not as predicted, and by impacting fisheries scientific surveys on which management measures are based. If scientific survey methodologies are not adapted to sample within wind energy facilities, then there could be increased uncertainty in scientific survey results, which would increase uncertainty in stock assessments and quota

[274] See for example, the time series required before the NEAMAP survey was accepted by the Northeast Fisheries Science Center for use in fisheries stock assessments.
[275] Northeast Fisheries Science Center, February 28, 2019. Letter attached.

setting process. Future spatial management measures may change in response to changes in fishing behavior due to the presence of structures."[276]

However, what it does not adequately discuss is that due to the legal constraints of the Manguson Act, the fishing industry will be held as the wholly responsible and accountable entity for both lack of data and any negative stock impacts as the result of offshore wind development. This is unethical. However, absent adequate 5-7 year baseline data in each wind energy area, and absent any requirements that the offshore wind industry be held responsible for stock decline, this will be the reality if construction moves forward. Compensation to the fishing industry would need to be part of these requirements. However, the permanent loss of U.S. natural resources cannot truly be quantified in terms of mere dollars.

Omitted Impacts: One issue not discussed in the SEIS at all is the potential impact to U.S. submarine detection and capabilities. The DOD acknowledged in May 2019 that offshore wind turbines that underwater noise generated by offshore wind turbines disturb acoustically sensitive environments.[277] Associated concerns were raised by DOD interviews in 2013.[278] This disturbance is likely to be exacerbated by the suspension of sediment in the water column vibrating against over 2,000 coastwide turbines of sizes never before installed anywhere in the world, as projected by the SEIS.

According to U.S. Navy Vice Admiral Woody Lewis, as of 2020 the East Coast is no longer a "safe haven" for US ships and submarines, due to an increase of Russian submarine activity in the Atlantic.[279] In 2018, the Navy's 2nd fleet was reactivated to deal with this threat.[280] According to one news source, a large number of Navy ships, submarines and patrol craft unsuccessfully spent weeks in the fall of 2019 attempting to locate one of the new quiet classes of Russian submarines in the North Atlantic. This is a

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[276] SEIS, p. 98.

[277] Communication, Undersecretary of Defense Lord, May 30, 2019.

[278] "Sonar issue could be challenging. Harmonics into seafloor"; "Acoustics: Have a lot of questions about that. Don't know how much noise will be radiated into the water from either a monopile or a floating platform. No one has taken a look at it" in
Final Report DE_EE0005380 "Assessment of Offshore Wind Farm Effects on Sea Surface, Subsurface and Airborne Electronic Systems", University of Texas at Austin, Prepared for the U.S. Department of Energy, 2013, at https://www1.eere.energy.gov/wind/pdfs/assessment_offshore_wind_effects_on_electronic_systems.pdf, Appendix B p. 60-61. Previous modeling prepared for the DOE regarding acoustics was based on measurements taken from the Utgrunden wind farm off the coast of Sweden, which consists only of 1.5 MW turbines and not the 12- 14 MW turbines currently envisioned for the US East Coast per the SEIS. See Final Report DE_EE0005380 "Assessment of Offshore Wind Farm Effects on Sea Surface, Subsurface and Airborne Electronic Systems", University of Texas at Austin, Prepared for the U.S. Department of Energy, 2013, at https://www1.eere.energy.gov/wind/pdfs/assessment_offshore_wind_effects_on_electronic_systems.pdf, Section 3, p. 24 and https://tethys.pnnl.gov/publications/utgrunden-offshore-wind-farm-measurements-underwater-noise. Additionally, The UK Maritime and Coastguard Agency's Marine Guidance Note MGN 371 (M+F), utilized by the USCG in its ACPARS study, states, "The structures and generators might produce sonar interference affecting fishing, industrial or military systems in the area [of an offshore wind facility]" and "The site might produce acoustic noise which could mask prescribed sound signals." See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/441130/371.pdf, p. 9.

[279] See https://www.thedrive.com/the-war-zone/32087/admiral-warns-americas-east-coast-is-no-longer-a-safe-haven-thanks-to-russian-subs.

[280] Ibid.

concerning development to homeland security, particularly if detection issues are exacerbated by underwater noise caused by offshore wind turbine construction and operations. As the U.S. Navy is currently underway with construction on the new Columbia class ballistic missile submarines, as well as Virginia class attack submarines,[281] it is paramount that these new technologies and vessels be able to uncompromisingly operate along the U.S. East Coast.

Additional Comments:

Birds: The SEIS states that "The Proposed Action would likely result in both long-term and localized, temporary negligible to minor impacts on birds and may include minor beneficial impacts" as well as "BOEM anticipates that the impacts associated with future offshore wind activities in the geographic analysis area would result in moderate adverse impacts but could possibly include moderate beneficial impacts because of presence of structures."[282] Assuming minor or beneficial impacts to birds is incorrect. In a 2020 study entitled "Mortality limits used in wind energy impact assessment underestimate impacts of wind farms on bird populations", scientists showed that rather than having a negligible effect, just a 1% additional mortality in postfledgling cohorts of studied populations resulted in up to 24% decrease in population level after 10 years, and allowing a 5% mortality resulted in up to a 77% reduction in the populations after 10 years.[283] This level of impact is in line with those observed on the Isle of Man as wind farms have continued to be constructed in the Irish Sea. In an Isle of Man study, partly supported by the Walney Extension Offshore Wind Farm project, populations of herring gulls were found to be down 82%, European Shag down 51% and Razorbills down 55%.[284] These potential types of population level impacts would appear "major."

National Food Security: The SEIS does not assess the impacts to national food security arising from major commercial fishing impacts associated with offshore development and relative to the President's Executive Order on "Promoting American Seafood Competitiveness and Economic Growth". American citizens cannot eat electricity.

Process: In the development of this entire Proposed Project, as well as the whole BOEM offshore leasing process, there has been a complete lack of rational procedure or really any process at all. Almost all, if not all, existing East Coast offshore wind lease sites were sited based off of BOEM's "Smart from the Start" initiative, designed to "speed offshore wind energy development off the Atlantic

[281] See https://fas.org/sgp/crs/weapons/R41129.pdf and https://www.defensenews.com/naval/2019/04/04/the-us-navy-seeking-savings-shakes-up-its-plans-for-more-lethal-attack-submarines/.
[282] SEIS, Appendix A, p. A-71.
[283] Schippers, et. al. "Mortality limits used in wind energy impact assessment underestimate impacts of wind farms on bird populations", Ecology and Evolution, June 4, 2020, at https://onlinelibrary.wiley.com/doi/full/10.1002/ece3.6360.
[284] See http://manxbirdlife.im/seabirdcensus2017-18/ and https://www.thegwpf.com/isle-of-man-seabird-populations-plummet-as-wind-farms-overwhelm-the-irish-sea/.

Coast",[285] as previously mentioned. [286] This process has led to poor siting decisions and created conflict with existing ocean users it allows state and/or federal entities, as well as offshore wind developers, to site wind energy areas and proceed with the leasing process without comprehensively considering pre-existing uses which would determine whether or not a site is appropriate for offshore wind development prior to lease sale. BOEM's Path Forward developed in 2018-2019 likewise opted to consider the interest of offshore wind developers and the "viewshed concerns" of those living in areas intended to receive the electricity from offshore wind development as greater priorities than existing ocean uses such as commercial fishing which are protected under the Energy Policy Act.[287]

The current lack of rational BOEM process and clear federal leadership in what is a federal jurisdiction affecting existing federal permit holders has allowed offshore wind lease siting and development to be driven by state renewable energy goals, multiple state Task Forces, and other state groups. This is not acceptable for a federal issue.

Lack of process has also led to unassessed impacts discussed in our comments due to lack of interagency and interdepartmental coordination. Nobody seems to know "who's on first". This was evident when we spoke with the USCG Chief of Navigation Systems in November 2018 at USCG Headquarters regarding marine radar interference. Not only did the officer in charge not know about marine radar interference caused by WTGs, but those present were also under the impression that turbines were much smaller than were planned even a that time. When we were preparing to end the meeting and asked what our next steps should be, we were told that those present did not have answers at that time, "this is the first we have heard about this."

Furthermore, there are some decisions that should not be left in the hands of BOEM. Wind exclusion zones, defense radar impacts, and issues affecting national security should not be relegated to mere "Cooperating Agency" status. These should take first and foremost priority in any process and eliminate any conflict areas whatsoever at the outset.

Current DOD "Criteria for Unacceptable Risk to National Security from Commercial Wind Energy Projects" should have already eliminated some of the wind development lease areas already. These Criteria state that an Unacceptable Risk is any that would:

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[285] See Smart from the Start press release at: https://www.doi.gov/news/pressreleases/Salazar-Launches-Smart-from-the-Start-Initiative-to-Speed-Offshore-Wind-Energy-Development-off-the-Atlantic-Coast; see BOEM, Massachusetts Leases at https://www.boem.gov/Commercial-Wind-Leasing-Offshore-Massachusetts/; and see BOEM's Massachusetts Area ID Announcement at https://www.boem.gov/uploadedFiles/BOEM/Renewable_Energy_Program/State_Activities/MA_AreaID_Announcement_052412_Final.pdf.

[286] See https://www.doi.gov/news/pressreleases/Salazar-Launches-Smart-from-the-Start-Initiative-to-Speed-Offshore-Wind-Energy-Development-off-the-Atlantic-Coast; "The accelerated leasing process is being simplified through a regulatory change, enabling leases to be issued in 2011 and 2012…Under the 'Smart from the Start' initiative, BOEMRE will work with state partners to identify WEAs off the coasts of a number of Atlantic states, including Maryland, Delaware, New Jersey, Virginia, Rhode Island and Massachusetts within the next 60 days." Issued November 23, 2010.

[287] See https://www.boem.gov/renewable-energy/renewable-energy-path-forward-atlantic and our comments on BOEM Proposed Path Forward for Future Offshore Renewable Energy Leasing on the Atlantic OCS- BOEM-2018-0018, June 22, 2018.

(1) Endanger safety in air commerce, related to the activities of the Department;

(2) Interfere with the efficient use and preservation of the navigable airspace and of airport traffic capacity at public-use airports, related to the activities of the Department;

(3) Significantly impair or degrade the capability of the Department to conduct training, research, development, testing and evaluation, or operations or to maintain military readiness.[288]

These Criteria were developed in 2013, before the advent of offshore wind farm development. As maritime commerce and navigable waterways are now involved, similar to air commerce and navigable airspace already included in the Criteria, it would seem reasonable to amend these Criteria to account for offshore wind development impacts.

In summation, the entire federal offshore wind process needs to be redesigned from the bottom up. This would result in greater certainty for all involved, and much better public policy than currently exists on this issue.

Conclusion:

Based on all of the information we have detailed in this comment, the only Alternative that we can support is Alternative G- No Action. As national and world leaders in longfin squid production, the cannot accept these major impacts to our product source, our vessels, our customers vessels, the safety of our vessel crew, our shoreside facilities, livelihoods and our nation. We demand a 5 year moratorium on all offshore wind permitting off the U.S. East Coast until all these issues are completely addressed.

Thank you for the opportunity to comment.

Sincerely,

Meghan Lapp
Fisheries Liaison, Seafreeze Ltd.
General Manager, Seafreeze Shoreside

[288] See https://www.acq.osd.mil/dodsc/library/RTC%20UR%20Final.pdf.