

Right Whales and Wind: Possible Coexistence of North Atlantic Right Whales and Offshore Wind Development

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EXECUTIVE SUMMARY:

In order to combat the significant global threat of climate change, the Biden-Harris administration issued Executive Order 14008 to expand offshore wind development. While the dynamic coastline of the northern East Coast receives strong, consistent energetic winds, it is also the frequent migratory route of the endangered North Atlantic Right Whale (NARW) *Eubalaena glacialis*, protected under the Marine Mammal Act and Endangered Species Act. The current population is less than 400 individuals and continues to decline due to ship strikes and gear entrapment. Conservationists and marine ecologists worry about how offshore development will exacerbate the bleak status of the species and the possible impacts of its extinction on the ecosystem at large.

Regardless, the Northeast Atlantic Ocean is warming at an alarming rate and implementing offshore wind farms is a step in the right direction to decarbonize the economy and reduce America's carbon footprint. Not just large private companies have a stake in this issue, but also their employees, consumers of electricity, and people concerned about climate change are impacted. While the ocean and its inhabitants must be protected, a recoverable ocean might not exist without exploring renewable energy. Therefore, the current approach should consist of responsible offshore wind development that takes into consideration.

1. BACKGROUND:

There is an immediate and urgent need for renewable energy resources to combat the harmful effects of climate change (Javadinejad, 2019). On a global scale, the planet is undergoing detrimental changes affecting the biotic and abiotic systems that sustain us (Garcia-Soto, 2021). Governmental and private entities are focusing on the potential of offshore wind development to reduce carbon emissions into the atmosphere to lessen the greenhouse effect, which raises the ocean's temperature and causes sea level rise (Bolin, 1989). The location of (proposed and currently developing) wind farms along the East Coast is controversial as they are crucial to the existence of the endangered North Atlantic Right Whale.

1.1 North Atlantic Right Whales (NARW)

The North Atlantic Right Whale (furthermore referred to as NARW), described by Herman Melville in *Moby Dick* to be the “most vulnerable of the leviathans,” is characterized by its slow-moving nature and high blubber content (120). The NARW was given its name because it was the “right” whale to kill because it would float to the surface long after it was dead, which made it easier for whalers to collect and yield its high levels of whale oil (Ward-Geiger, 2005).

While there are existing policy regulations that protect the NARWs, such as the Endangered Species Act of 1973 (ESA) and the Marine Mammal Protection Act of 1972 (MMPA) (more context will be provided later in the background), there have been more recent regulations as well.

The International Whaling Commission 1986 issued a global moratorium that temporarily prohibited commercial whaling due to the overexploitation of commercially hunting whales. As a result, NARW's population began to recover (Wright et al., 2016). In 1991, The National Marine Fisheries Service published the “Recovery Plan for the North Atlantic Right Whale,” which further aided the growth rate of the population. The most recent revision of the document was in 2005 and found that the population was continuing to grow in a positive linear fashion (Fig. 1).

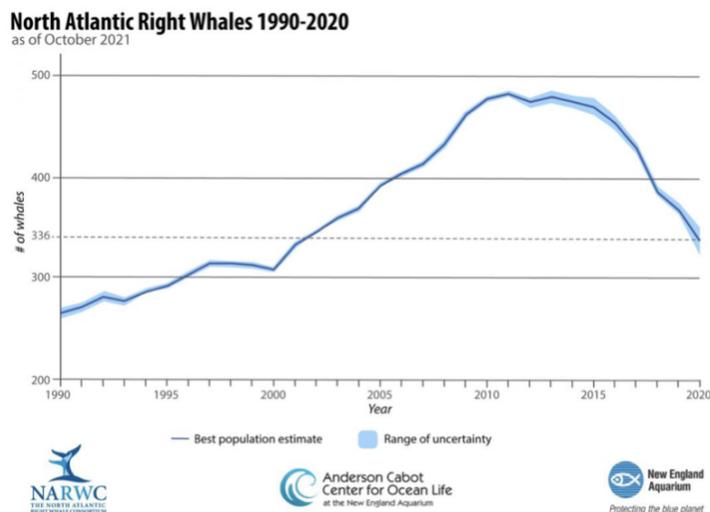


Fig 1. NARW population fluctuations from 1990-2020 (Anderson Cabot Center for Ocean Life)

However, there was a turning point between 2012-2014, right before the population hit a benchmark of 500 individuals (Fig. 1). Since then, the numbers have continued to plummet (Fig. 1). The elevated mortalities led to the declaration of an Unusual Mortality Event which has been well-documented by the North Atlantic Right Whale Consortium (NARWC) and National Oceanic and Atmospheric Administration (NOAA) ([2017–2022 North Atlantic Right Whale Unusual Mortality Event | NOAA Fisheries](#)).

According to the annual NARWC report cards, the 2011 and 2012 report cards contained significantly higher instances of necropsied NARW dying due to fishing entanglements and vessel strikes ([North Atlantic Right Whale Consortium Report Cards](#)). While NOAA’s data argues the Unusual Mortality Event began in 2017, their data also agree with the NARWC and that the two leading causes of NARW mortality are fishing entanglement and vessel strikes (Fig 2.) It is important to note that vessel strikes could account for even more NARW mortality than initially calculated, with some research estimating it could account for “64% of all cryptic mortality” (unobserved mortality, Pace III et al., 2021). The cetacean’s lack of a dorsal fin, dark coloration (making it difficult to spot), and slow-moving behavior puts them at

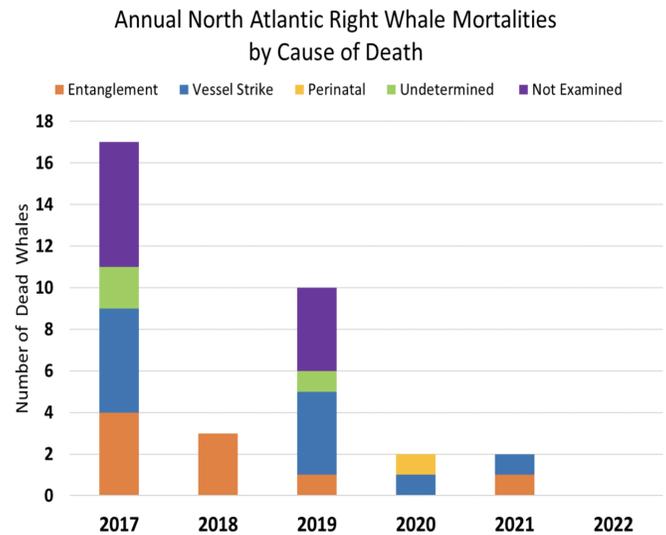


Fig 2. Annual NARW mortalities by cause of death starting from 2017 to 2022 (NOAA, 2022)

elevated risk of being struck and dying of blunt-force trauma or cuts from propellers (Fig. 3).

While anthropogenic stressors such as ship strikes and fishing gear entanglements are the leading cause of the species' high mortality rates, the reason why they are unable to recuperate quickly is due to their skewed sex ratios, lower survival rates in females, and "low calving rates" (Pace III et al. 2017). Furthermore, climate-change-related issues and ecosystem modifications have altered prey concentrations and distributions, making it more challenging for the NARW to find "dense aggregations" of copepods to feed on to survive (Baumgartner and Mate, 2003). Consequently, 42% of the population has shown morphological reductions in health and size, making them additionally harder to spot from a boat (Hamilton et al. 2021).

NARW are seasonal migratory mammals whose vast range from the southern East Coast to the Canadian Atlantic encompasses offshore wind infrastructure and busy shipping routes ([Watching for Migrating Right Whales is More Important Than Ever | NOAA Fisheries](#)). There is a significant overlap between crucial areas for the animal's survival and locations of offshore wind development that are currently being permitted, leased, or proposed for the future ([Draft BOEM and NOAA Fisheries North Atlantic Right Whale and Offshore Wind Strategy](#); Fig. 4). Given the bleak status of the endangered marine mammal, conservationists and marine ecologists are worried about additional stressors affecting their declining populations (Hayes et al. 2018; Fig. 1). A NOAA-conducted study found 368 individuals; however, in a more recent study conducted in 2022, 336 individuals were observed (Doust et al., 2018; Pettis et al., 2022). In the [North Atlantic right whale \(*Eubalaena glacialis*\) 5-year review: Summary](#)



Fig 3. NARW #3230 "Infinity" and her calf were struck off the coast of Florida in February 2021. Her calf pictured above died from the strike. Photo: (Florida Fish and Wildlife Commission. All photos taken under NOAA permit 18786)

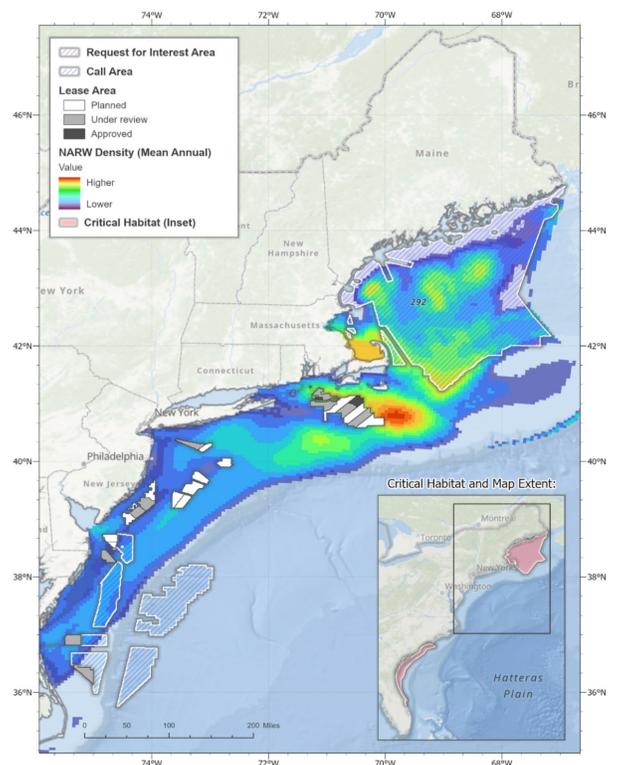


Fig 4. NARW density and critical habitats overlaid on Offshore Wind development (Roberts et al. 2016; Roberts and Halpin 2022).

[and Evaluation](#), NOAA argues that the species is on the brink of being “functionally extinct.”

1.2 Political Climate

The Biden-Harris administration plans to increase clean energy production and bolster the economy by creating new jobs. The recently administered Executive Order 14008 in section 207 states there will be an “increase in renewable energy production [in offshore waters] ... with the goal of doubling offshore wind by 2030 while ensuring robust protection for our lands, waters, and biodiversity and creating good jobs” ([Executive Order on Tackling the Climate Crisis at Home and Abroad | The White House](#)). The Department of the Interior, working in conjunction with the Secretaries of Energy, Commerce, and Transportation, as well as other federal agencies such as the Bureau of Ocean Energy Management (BOEM), are committed to acquiring their target of installing wind farms that will produce “30 gigawatts of offshore winds by 2030” and ultimately establishing “nearly 80,000 jobs” [Interior Joins Government-Wide Effort to Advance Offshore Wind](#).

To accomplish this, BOEM has expanded permitting offshore wind development significantly in the Atlantic Outer Continental Shelf. Depending on the state’s coastline, the Outer Continental Shelf is usually three nautical miles offshore and extends for 200 miles ([Draft BOEM and NOAA Fisheries North Atlantic Right Whale and Offshore Wind Strategy](#)). As of September 2022, BOEM has permitted 27 renewable energy lease areas in the Atlantic Outer Continental Shelf ([Draft BOEM and NOAA Fisheries North Atlantic Right Whale and Offshore Wind Strategy](#)). Off Martha’s Vineyard and Block Island, there are wind farms currently in the renewable energy leasing process that will be fixed onto the substrate and export the energy through submarine cables ([Draft BOEM and NOAA Fisheries North Atlantic Right Whale and Offshore Wind Strategy](#); Fig. 10). The focus of this inquiry is the South Fork Wind Farm.

1.3 South Fork Wind LLC

The South Fork Wind Farm, currently owned by Ørsted, has had a long history of offshore development of oil. The company is the “poster child” for rapidly changing the business model, says Andrew Mowry, the senior manager of strategy at Ørsted. What was once the Danish Oil and Natural Gas Company has transformed into a renewable

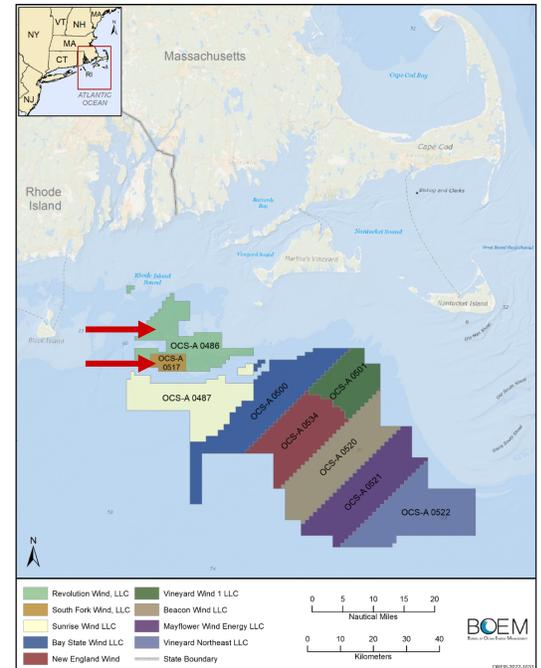


Fig 5. Map of Wind Farms off Block Island with key depicting company ownership (BOEM)

energy company. In 2019 they acquired Deepwater Wind and, in 2016, began partnering with Eversource Energy to construct the South Fork wind farm.

The South Fork Wind Project will be located within federal waters on the Outer Continental Shelf in BOEM Renewable Energy Lease Area built in OCS-A 0517, roughly 19 miles off Block Island. The company is currently leasing the larger section OCS-A 0486 ([Lease OCS-A 0486](#); Fig. 5). The proposed wind farm is located in OCS-A 0517 and is expected to generate 132 megawatts of electricity, enough to power 70,000 homes ([South Fork Wind](#); Fig. 5).

Like any commercial wind farm, there is a two-pronged approach to construction: the turbine and the infrastructure to deliver clean electricity (Fig 6,7). The South Fork Wind Farm will contain 15 turbines, submarine cables, and an offshore substation (as well as an onshore facility). Secondly, the Export Cable Project requires an alternating current cable that connects the facility with an existing mainland electric grid, which will be in East Hampton. Pre-construction monitoring to determine operational noise levels in the proposed area began in June 2021, but the Passive Acoustic Monitoring, specific to the NARW, will commence in May 2023 ([South Fork Wind Farm and South Fork Export Cable Project Final Environmental Impact Statement](#))

In August of 2021, BOEM released the [South Fork Wind Farm and South Fork Export Cable Project Final Environmental Impact Statement](#), which detailed the future construction and proposed environmental protection measures (further details regarding the leasing process will be discussed in policy analysis later). January 18th of, 2022, BOEM approved the construction and operations plan of the project as well as their South Fork Export Cable Project. Just recently, in November, the Department of the Interior and BOEM released the [Record of Decision South Fork Wind Farm and South Fork Export Cable Project Construction and Operations Plan](#) allowing for the construction and operation of the wind project to continue (Fig 6,7).

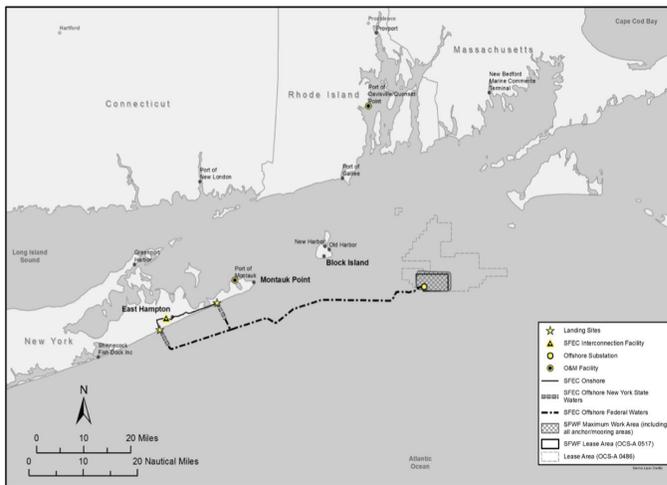


Fig. 6. The proposed project area and associated facilities (BOEM)

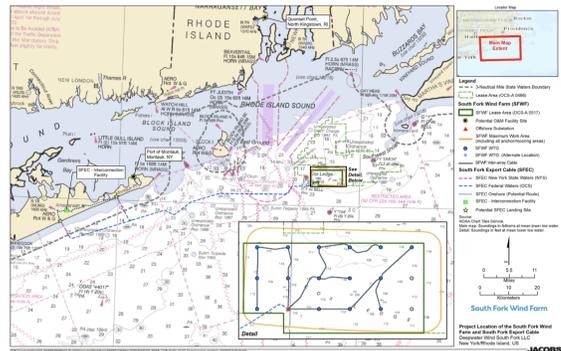


Fig. 7. Proposed South Fork Wind Farm and South Fork Export Cable Project and preliminary design of turbine arrangement (BOEM)

1.3.1 Offshore Wind Development Stakeholders

Kyle Cassidy, the Fisheries and Environmental Specialist at Ørsted, described that South Fork Wind is not the only wind farm project in the future, and Atlantic offshore development wind companies are working in conjunction with BOEM, with projects “coming down the pipeline.” Ørsted (Deepwater Wind) and Eversource are the primary companies invested in the South Fork Wind Project. These projects will require infrastructure and facilities to mass-produce machinery and equipment. In January 2021, New York Governor Andrew Cuomo announced that a wind turbine assembly plant located in South Brooklyn Marine Terminal will be partially funded by New York State ([Cuomo Announces Wind Turbine Assembly Plant Headed to South Brooklyn Marine Terminal](#)). This initiative is part of the \$29 billion ‘Green Initiative’ plan for New York and will create 1,200 new jobs for the inhabitants of Brooklyn. The wind farm will also provide 70,000 Long Island homes ([Biden administration approves second major offshore wind project to provide power to N.Y.](#)).

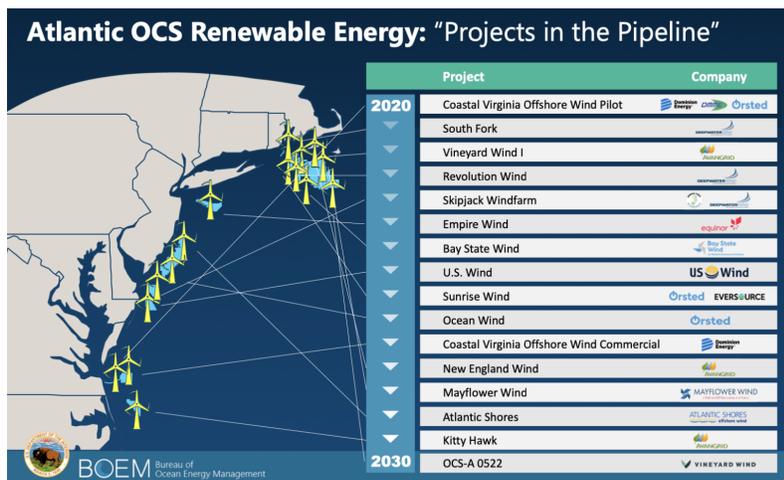


Fig.8. Atlantic region outer-continental shelf renewable energy wind farm projects both current and expected (BOEM)

While politicians such as Governor Kathy Hochul are proud of the “tremendous opportunity we have to create a new industry from the ground up to drive our green energy economy, deliver clean power to millions of homes and create good jobs across the state,” homeowners nearby proposed South Fork Wind Projects are not ([Simon Kinsella vs. South Fork Offshore Wind \(eco-issues aplenty\) - Master Resource](#)). The community of Wainscott, New York, tried to fight the location of the 138-kilovolt electricity transmission line (export cable) by trying to incorporate the proposed land as part of the village (Fig 6). Their petition was deemed to be “legally insufficient” in March 2021.

1.3.2 NARW Stakeholders

NOAA (National Oceanic Atmospheric Administration) and BOEM (Bureau of Ocean Energy Management) are the primary federal agencies involved in responsibly developing Offshore Wind, given the overlap of crucial NARW habitats. NOAA is in charge of continually updating the status of marine mammal stocks and maintaining them at healthy levels under Section 117 of the Marine Mammal Protection Act ([Scientific Review Groups | NOAA Fisheries](#)). BOEM leases and permits wind areas and promotes sustainable ocean use ([Draft BOEM and NOAA Fisheries North Atlantic Right Whale and Offshore Wind Strategy](#)).

Outside of federal agencies, there are two broad categories of NARW stakeholders that fall under conservation marine policy groups and marine biology research institutions. Non-governmental organizations (NGOs) such as the National Wildlife Federation, Natural Resources Defense Council, and the Conservation Law Foundation are vital in the implementation of voluntary agreements (which I will discuss later on). There are many other organizations dedicated to the preservation of the vulnerable charismatic megafauna, such as the Marine Mammal Alliance Nantucket, NY4 WHALES, Oceana, Allied Whale, and Oceanic Preservation Society (to name a few, but the list goes on). Marine biology research institutions such as the Anderson Cabot Center Research, the New England Aquarium, and the North Atlantic Right Whale Consortium are the leading institutions publishing data regarding their spatial distribution and population statistics.

1.4 Physical Intersection

As discussed previously in Fig. 4, there is a significant spatial overlap between areas of proposed offshore wind development and crucial habitats for the NARW ([Draft BOEM and NOAA Fisheries North Atlantic Right Whale and Offshore Wind Strategy](#)). NARW utilizes different offshore waters for distinct purposes. Studies confirm that northern waters in the Atlantic are crucial for feeding, while areas around Southern New England are important NARW breeding grounds (Quintana-Rizzo et al. 2021). Circled in purple in figure 8 demonstrates the area of importance regarding South Fork Wind development and a seasonal hotspot of NARW. Even before there is construction associated with offshore wind development, there is a robust system of vessel lanes that encompass the surrounding lease area and overlap with the seasonal migration route of the NARW. While there are documented cases of ship strikes, auditory injuries, and behavioral disturbances of NARW, there is a

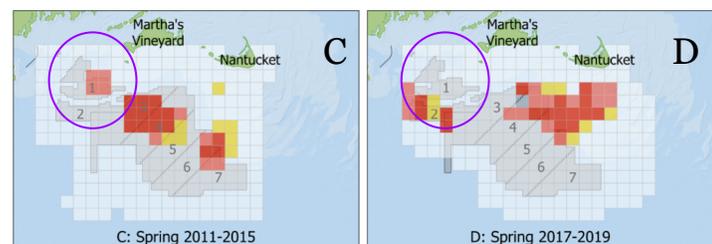


Fig 9. NARW seasonal distribution hotspots (Red = 99% confidence, pink = 95% confidence, yellow = 90%) All indicated hotspots were significant (Quintana-Rizzo)

significant lack of research regarding the impacts of offshore wind development on the species (Hiltz, 2019; Fig. 9). Dr. Sean Todd, marine mammal researcher and director of Allied Whale, describes the precarious nature of the issue, stating we can theorize potential impacts, but there is currently no research regarding the effects. Dr. Sean Todd and other esteemed marine mammal researchers have found that offshore wind development could detrimentally affect NARW in two main ways; the introduction of construction-related noise (particularly the “percussive nature”) impacting the auditory environment of the marine mammals and increased boat traffic will yield a higher chance of fatal collisions or vessel strikes.

2. ANALYSIS OF CURRENT AND PROPOSED POLICIES:

2.1 The Endangered Species Act, Marine Mammal Protection Act, and National Environmental Policy Act

The existing federal regulations, such as the Endangered Species Act of 1973 (ESA) and the Marine Mammal Protection Act of 1972 (MMPA), protect the NARW differently. The MMPA prohibits a “take” of marine mammals, which includes harassment, hunting, capturing, collecting, or killing ([Marine Mammal Protection | NOAA Fisheries](#)). Under the ESA, the species can only be classified as endangered if there are fewer than 2,500 mature individuals and the species is considered to be facing an “extremely high risk of extinction in the wild” ([What does 'endangered species' mean? | Pages | WWF](#)). The ESA forbids the “import, export, or taking of species listed as threatened or endangered” under this act (Sheikh et al., 2021). Section 7 of the ESA is of particular importance to the topic, as it states that federal agencies must consult with NOAA if “any action the agency carries out, funds, or authorizes may affect either a species listed as threatened or endangered under the Act or any critical habitat designated for it” ([Section 7: Types of Endangered Species Act Consultations in the Greater Atlantic Region | NOAA Fisheries](#); (*Endangered Species Act of 1973, As Amended through the 108th Congress, 2003*). Through the Outer Continental Shelf Lands Act, BOEM is entrusted with the responsibility of offshore wind development by balancing the needs of the average consumer of electricity and protecting coastal biodiversity. Conserving habitats that are vital for ESA-listed species requires an environmental review or impact report of the

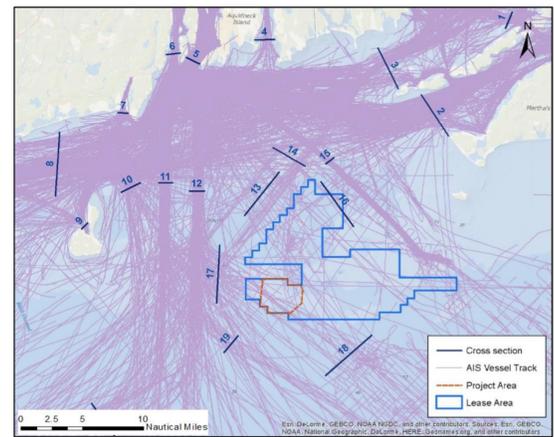


Fig 10. AIS vessel traffic tracks for June 2016 to July 2017 in proximity to the lease and project area of South Fork Wind Farm (BOEM)

proposed action to determine the situation's outcome and whether or not to implement the project.

To achieve this, companies must abide by the National Environmental Policy Act (NEPA), which combines the companies' construction plans with the subsequent potential impacts. After successfully leasing the property, the company must submit a Site Assessment Plan (SAP). If approved by BOEM, the company may proceed and monitor the location under the parameters outlined in the SAP. Secondly, the company must draft a Construction and Operations Plan that carefully details every aspect of the project and offers mitigation techniques to solve potential issues ([South Fork Wind Farm COP](#)). Once accepted, BOEM conducts an environmental and technical review. This plan, otherwise known as (DEIS) assesses the “foreseeable impacts to physical, biological, socioeconomic, and cultural resources that could result from the construction and installation, operations and maintenance” as well as decommissioning of the large-scale commercial wind farm ([South Fork Wind Farm and South Fork Export Cable Project Final Environmental Impact Statement](#)). Once BOEM considers the COP “complete and sufficient,” their environmental findings and Record of Decision (ROD) get published. Afterward, the company must submit its designs and installation plants to begin construction.

Currently, the South Fork Wind farm is in the process of installation and is currently working on the Facility Design Report and Installation Report Review, which will need to be submitted to BOEM for approval (Fig. 11).

2.2 Voluntary Agreements

Education and awareness regarding the charismatic megafauna have increased due to its endangered status leading to NGOs such as National Wildlife Federation, Natural Resources Defense Council, and the

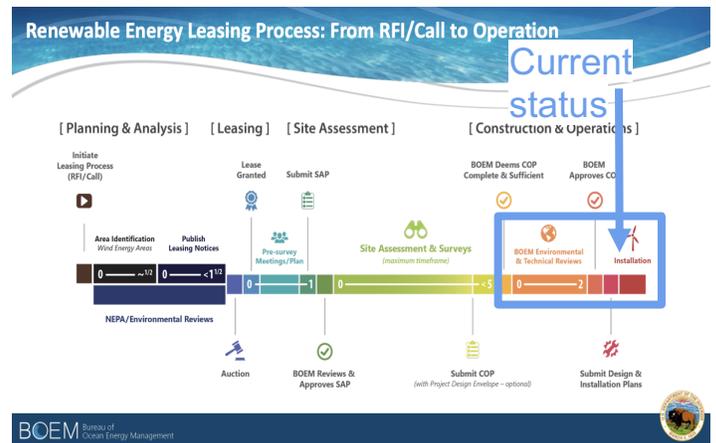


Fig. 11. The Renewable Energy Leasing Process: From RFI/ Call to Operation (BOEM)

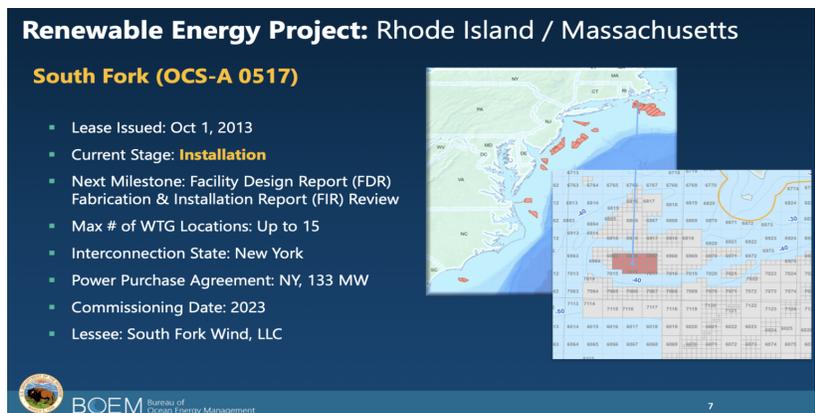


Fig. 12. Current status of South Fork Wind Farm (BOEM Lease OCS-A 0517) (BOEM)

Conservation Law Foundation to create voluntary agreements with offshore wind developers such as Vineyard Wind and Deepwater Wind (since acquired by Ørsted). NARW is protected under the Endangered Species Act and Marine Mammal Protection Act, and all offshore development sites are subject to the National Environmental Protection Act. However, the NGO Agreement for South Fork Wind LLC builds upon protective policy foundations such as the ESA, MMPA, and NEPA and targets the more local pressing issues of the area, specifically by stating, “the protection of the North Atlantic Right Whale is a top priority” ([South Fork Wind, LLC – NGO Agreement for the Protection of North Atlantic Right Whales](#)).

If a party does not want to sign the voluntary agreement, it will not get signed. However, both parties spend a significant amount of time negotiating and compromising before a party decides not to sign or pull out of the agreement (*Personal communication Hiltz*). The benefits of the agreement tend to benefit mostly the NGOs, while the developers enjoy good publicity and favorability in the public eye. These documents open clear lines of communication between the parties and allow NGOs to submit concerns and or suggestions to the developers. This mode of correspondence allows the NGOs to address and mitigate their concerns directly to the developers (*Personal communication Hiltz*).

Jessica Hiltz, an offshore wind program administrator who completed her thesis about the efficacy of voluntary agreements of NARW, has found that the model is sufficient but not nearly protective enough for the NARW. Like any “soft law,” creating it and getting both parties to agree is much easier and faster than procuring “hard law,” which could take much longer but be more guaranteed. Outlined in the agreement are several mitigation techniques to prevent NARW injuries or mortalities, including seasonal restrictions of pile-driving, specific times for comprehensive monitoring and geophysical surveys during construction and post-construction, reporting, underwater noise reduction, and vessel speed restrictions ([South Fork Wind, LLC – NGO Agreement for the Protection of North Atlantic Right Whales](#)).

2.1 Mitigation of Acoustic Environment Disruption

The auditory environment is crucial for the NARW because to communicate with each other, the NARW utilize low-frequency sounds. Even before offshore wind development and its associated construction noise, ambient ocean noise can deter inter-species communication altering social development and breeding activities (Matthews & Parks, 2021). The proposed fixed offshore wind farm construction and associated activities will aggravate the NARW’s precarious population stability (Dorrell et al., 2022; Leiter et al., 2017; Maxwell et al., 2022; Quintana-Rizzo et al., 2022). Given the decline of the NARW with fishing entanglements and vessel traffic, additional

large construction ships intruding into areas fundamental to the organism's existence will likely escalate the issue and decimate the population. Due to increased vessel traffic during either the initial construction of the infrastructure, monitoring of the site, or long-term maintenance may lead to an increased chance of a NARW being struck and killed ([Draft BOEM and NOAA Fisheries North Atlantic Right Whale and Offshore Wind Strategy](#)).

The noise produced by the construction, specifically pile-driving, where the turbines are secured to the ocean floor using a standard hydraulic hammer, is loud and travels through the water quickly ([Assessing Environmental Impacts of the Block Island Wind Farm](#)). The acoustic environment of a construction site for offshore wind development may result in "injury, hearing impairment, or behavioral disturbances" of the NARW (Martin et al., 2014; Horne et al., 2013; [Assessing Environmental Impacts of the Block Island Wind Farm](#)). Disturbances in the aquatic environment, such as the installation of the anchors, the mixing occurred by the implemented structures, removal of boulders or debris, and the establishment of the submarine cable system set in place to export the produced currents may negatively affect the NARW's habitat and ecology ([Draft BOEM and NOAA Fisheries North Atlantic Right Whale and Offshore Wind Strategy](#)). Due to the marine mammal's nomadic tendencies, not all habitats serve the same purpose (Quintana-Rizzo et al., 2021). Northern waters with high productivity are crucial for feeding; Southern waters with warmer temperatures are more conducive to breeding and are important reproductive areas (Quintana-Rizzo et al., 2021).

In the voluntary NGO Agreement for the Protection of the NARW, there is an attempt to conserve the acoustic environment of the NARW through the seasonal restriction of pile-driving. NARW emits low-frequency sounds when communicating with other members of its species, and obscuration of vocalizations can result in altered behavioral activities such as foraging and reproduction (Matthews & Parks, 2021). As a result, the noise associated with construction, specifically pile-driving, can negatively affect the NARW through injury, hearing impairment, and behavioral disturbances. Cetaceans' hearing varies significantly; however, baleen whales have specialized ears for lower frequencies ranging from 7Hz-35kHz (Amaral et al., 2020). Depending on the depth of the anchor, the total number of hammer strikes to reach desired depth can vary between 500 to more than 5,000 times. Every time that occurs, the pile vibrates at frequencies between 20-40Hz with spectral peaks between 100 and 400 Hz.

Under the MMPA and NOAA policies, there are auditory thresholds that boats and underwater construction must obey ([Marine Mammal Acoustic Technical Guidance | NOAA Fisheries](#)). Level B harassment occurs when the activity causes a "negligible impact" on the animal's behavior, such as swimming away from the area. Level A is more severe and results in an "unmitigable adverse impact" such as an injury or hearing

impairment, subsequently making them more vulnerable to ship strikes ([Incidental Take Authorizations Under the Marine Mammal Protection Act | NOAA Fisheries](#), [Draft BOEM and NOAA Fisheries North Atlantic Right Whale and Offshore Wind Strategy](#)).

In the voluntary agreement, South Fork Wind proposes using innovative near-field (Hydrosound Damper) and far-field (single or double bubble curtain) noise reduction technology. Bubble curtains and Hydro Sound Damper are new and exciting forms of noise mitigation that utilize compressed air to create pressure differences in the water and ultimately distribute and reduce low and high frequencies (Bellmann et al., 2020). The South Fork Wind Farm is committed to “achieving a minimum of 10 dB (SEL) reduction,” and these new technologies are expected to reduce underwater noise by 15 dB ([South Fork Wind, LLC – NGO Agreement for the Protection of North Atlantic Right Whales](#)).



Fig.13. Double Big Bubble Curtain. Left: circular deployment due to the very low current. Right: elliptic deployment due to the current (larger diameter if in line with current direction). (Hydrotechnik Lübeck GmbH)

2.3 Vessel Speed Restrictions

Vessel strikes are one of the primary sources of anthropogenic mortality in NARW. The voluntary agreement outlines general restrictions for vessels to maintain a safe distance of 500 meters from the NARW. If the creature approaches the boat, slow down and maneuver away. All ships will operate thermal cameras to detect whale spouts unobservable.

In 2008, NOAA established Seasonal Management Areas (SMAs) where all vessels more significant than 65 ft must reduce their speed to 10 knots or less in allotted areas during specific times of the year to evade lethal collisions (Garrison et al., 2022). Similarly, in the voluntary agreement between South Fork Wind and NGOs, the project promises to abide by the aforementioned plan, otherwise referred to as the “Standard Plan.” In the agreement, there is also the possibility to create an “Adaptive Plan” to modify the Standard Plan, allowing the company to alter the original plan to improve its efficacy. By stating this, it will enable the company wiggle-room to adjust speed limits to how they see fit.

During my personal communication with Dr. Francine Kershaw, senior scientist and policy advocate at the Marine Mammal Protection & Oceans Division at the Nature Program at Natural Resources Defense Council (NRDC), she urges more protections

for NARW. She agrees with the National Marine Fisheries Service (NMFS) that existing vessel speed regulations must be bolstered to significantly reduce vessel strikes. There are several proposed strategies from the NMFS:

1. Expanding the seasonal speed zone (or previously named Seasonal Management Area) to capture areas with elevated vessel strike risk.
2. Modifying the requirement of the mandatory 10-knot speed restriction on vessels 65 feet and above and make it mandatory for vessels greater than or equal to 35 ft in length to transit at 10 knots or less within active Seasonal Speed Zones ([Proposed Vessel Speed Rule Adds Protections for Right Whales | NRDC](#)).

Francine Kershaw and her associates argue that two other measures should be incorporated into the final ruling:

1. Given the important year-round foraging habits for the NARW, there should be a year-round vessel Speed Zone in the waters off Southern New England
2. “Trigger Dynamic Speed Zones” should be implemented once there is a confirmed visual detection (therma-red camera or person) of a single NARW. Currently, the rule only requires the vessel to slow down if there is at least three NARW ([Proposed Vessel Speed Rule Adds Protections for Right Whales | NRDC](#)).

3. RECOMMENDATIONS FOR CHANGE:

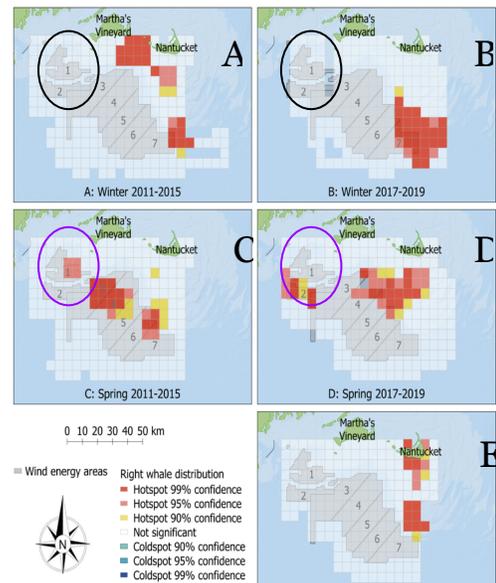
While the ocean and its inhabitants must be protected, a recoverable ocean might not exist without exploring renewable energy. My first recommendation would be

to adjust some of the languages in the voluntary act between the NGOs and South Fork Wind, as there are scientific areas of discrepancy and vague language.

During my perusal of the voluntary agreement, I noticed several caveats the company included in the document to demonstrate possible escape routes of being held accountable. Removing these footnotes/ addendums would illustrate the company’s authentic values of conservation and protection of marine biodiversity, even at the expense of investing more money.

Firstly, I noticed in the voluntary agreement that it asserts to shut down pile driving between January 1-April 30 due to “highest relative abundance”; however, they do not credit their data on the document. Other studies, such as the recent 2021 Quintana-Rizzo study, demonstrates NARW is seen most often during the spring, **specifically in the area they are planning to pile-drive** (Fig 14). While the agreement does state they will update the seasonal restriction periods “to account for the best available science,” nowhere in the document does it state when these updates will occur and who will bring them up ([South Fork Wind, LLC – NGO Agreement for the Protection of North Atlantic Right Whales](#)).

Secondly, in the Underwater Noise Reduction section of the agreement, South Fork Wind will choose a technology that best suits its conditions, including the “availability of equipment” ([South Fork Wind, LLC – NGO Agreement for the Protection of North Atlantic Right Whales](#)). Despite praising the concept, the company can avoid spending large sums of money on the equipment because it could be deemed readily unavailable. While these technologies benefit the NARW, there is not much information regarding what the Bubble Curtain does to the turbidity of the water nor the consequences of upheaving benthic communities.



Timeframe	Mitigation Protocol
Red Period: January 1 – April 30	No impact pile driving
Green Period: May 1 – November 30	Comprehensive monitoring / Clearance Zone protocol required
Period to be Avoided: December 1 – December 31	Avoid impact pile driving to the extent specified in Subsection I.A.3; however, if impact pile driving should occur during this period, utilizing the “Pile Driving Enhanced Mitigation Protocol” (as defined in Subsection I.A.3) is required.

Fig. 15. Table of seasonal restrictions on pile driving activities (South Fork Wind Farm & NGO Agreement)

Thirdly, regarding more general recommended solutions, technology and innovation are continuously evolving, and companies need to instill a dynamic procedure of implementing contemporary technologies into their projects. Artificial Intelligence and neural networks are becoming increasingly more accurate and are paving the way for better monitoring. Currently, according to Kyle Cassidy, the Fisheries and Environmental Specialist at Ørsted, South Fork Wind Farm is utilizing ECO POD and ECO PAM monitoring which depends on passive acoustic monitoring to determine the spatial distribution of NARW; however, there are more efficient technologies that can pinpoint the number of individuals in the pod and even predict the size of the whale from its spout ([Vineyard Wind adopts marine mammal detection tech - reNews](#), [Awarion - Charles River Analytics](#)). For example, Vineyard Wind is installing software called Awarion, which combines electro-optical and infrared cameras, which elucidate more resolution than radar or sonar ([Awarion - Charles River Analytics](#)). With the help of specialized cameras, the interface can detect, and classify ships, pinpoint objects' location on a map, and even decide whether to focus on an object or continue to scan the horizon, like a human. If the wind farms were to collaborate and share data using artificial intelligence such as Awarion, the companies would be able to keep track of NARW locations and detect vessel movements and fishing gear.

Despite the tension between long-term solutions to mitigate climate change and the responsibility of protecting marine biodiversity, the root issue remains the same. Nothing will be left to save if the ocean continues to warm at its accelerated rate.

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