AN INVESTIGATION of LARGE WHALE MORTALITY and OFFSHORE WIND DEVELOPMENT ACTIVITY IN THE U.S. SINCE 2015

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on behalf of the SAVE RIGHT WHALES COALITION

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ABSTRACT

Since 2016, the National Oceanic and Atmospheric Administration (NOAA) has declared three Unusual Mortality Events (UME) involving large whale species in the Atlantic Ocean. These are specifically the Atlantic humpback whale UME in 2017, the North Atlantic right whale (NARW) UME in 2017, and the Atlantic minke whale UME in 2018. The UMEs for the humpback and minke whales include deaths occurring in 2016 and 2017 respectively. The beginning of these declarations coincides with increased offshore wind (OSW) vessel activity in waters where the whale deaths were observed. Prior to the closing months of 2015, no notable OSW survey, construction, or maintenance vessel traffic existed in the Atlantic Ocean.[1] Commencing with the preparation and construction of five wind turbines off the southeast coast of Block Island, significant and frequently intense OSW vessel traffic has been observed.

This report documents geographic and volume-based evidence of marine mammal deaths that correlate directly to OSW vessel activity during the period from 2016 forward. Using maps of whale deaths and OSW vessel tracks, the authors endeavor to graphically display an increase in mortality against OSW vessel activity.

FINDINGS

This study identified a direct correlation between increased OSW vessel activity and whale mortality. Key findings of the study include:

a) A connection between OSW vessel activity within ocean areas and whale deaths has been an ongoing concern in the United States since the 5-turbine Block Island wind facility was under construction in 2016. OSW developers employ high resolution geophysical (HRG) equipment that uses sonar to map the seabed in the lease areas. Sound from sonar surveys and wind turbine pile driving is recognized as harmful to marine mammals.

b) Research and press accounts from the United Kingdom and Europe dating back more than a decade suggest whales and other marine mammals experienced displacement and mortality events in the North Sea related to offshore wind development. Scientific evidence detailing the impacts of OSW on marine life continues to be limited. Where studies have been performed, it is not clear the outcomes can be applied to environmental conditions of the coasts of the United States. Testimonies from the United Kingdom show that resolving the climate crisis has been the priority for the government over concerns related to wildlife and environmental impacts.

c) Ocean vessel tracks in the Atlantic prior to 2016 show that very little marine traffic beyond fishing and pleasure boats occurred within the wind lease areas. Annual aggregate vessel tracks within established shipping lanes and in areas close to shore appear relatively constant over the period from 2015 to 2023 with nominal changes year-over-year. The change in vessel activity after 2015 coincided with the U.S. Bureau of Ocean Energy Management (BOEM) finalizing lease agreements with OSW developers. Traffic within the lease areas materially increased.

d) In the period from 2007 to 2023, 60% of total whale mortality along the east coast from Maine to North Carolina occurred after 2015 (n=470 of 788 whales). This represents a 48% increase in whale deaths overall. In several states where OSW activity was significant, the percent increase in mortality was well over 60% (Tables 2 and 3). The increase in whale deaths and NOAA's declarations of unusual mortality events correlate directly with the increase in OSW activities within federally leased areas.

e) Vessel track data show whale deaths occurring within the same timeframe as the OSW sonar surveys and in proximity to the sonar activity. As the amount of OSW activity increased within an area, so did whale deaths. Shortly after pile driving to install wind turbines was initiated in late spring 2023 for the Vineyard Wind 1 and South Fork Wind facilities, additional whale deaths were observed in southern New England.

f) Using commercially and publicly available tools and data, this investigation found a positive relationship between OSW vessel activity and whale mortality. Additional in-depth investigations are necessary to determine if there is a causal connection between OSW activity and the increase in whale mortality.

[1] The Cape Wind proposal sought to construct a 468 megawatt, 130 turbine facility in Nantucket Sound.

1. BACKGROUND

U.S. energy tax policy since 1992 has been aimed at encouraging private investment in renewable energy through lucrative tax credits available to tax-burdened parties.[2] By the end of 2022, the cumulative effect of this policy was the installation of 145,000 megawatts (MW) of wind energy capacity, a 16-fold increase since 2005, including 42 MW constructed in waters off the coasts of Block Island, Rhode Island (30 MW) and Virginia (12 MW). Roughly 75,000 utility-scale wind turbines are now sited on millions of acres of land, with 73% of the operating capacity concentrated in just ten states (Table 1). In general, wind energy facilities are more frequently found in states that provide a good wind resource, favorable renewable energy legislation, and the land necessary to accommodate the sprawling facilities.

Moving eastward, large-scale renewable energy development is limited by many factors including less available land, difficult terrain, densely populated areas, and typically more stringent siting regulations. Nonetheless, the east coast states have some of the most demanding renewable energy and climate laws, which place increased pressure on their governments to comply (Linowes, 2023). For these states, the Atlantic Ocean has long been viewed as an ideal location for siting wind energy facilities to satisfy both state renewable mandates and federal clean energy policy goals.

No.	State	Wind (MW)
1	TX	40,556
2	IA	13,007
3	OK	12,522
4	KS	8,240
5	IL	7,383
6	CA	6,103
7	MN	4,850
8	NM	4,327
9	ND	4,301
10	OR	4,054
Sub-Total (10 States)		105,343
US Total end of 2022		145,000

Table 1 - US States with the most wind capacity.

Wind energy is regarded as a clean and safe source of generation based solely on a single "environmental" criterion, that it does not burn fossil fuel to produce electricity. However, installing tens of thousands of tall towers with spinning blades and miles of access roads introduces industrialization across large swaths of wildlife areas that had previously remained largely untouched by human activities. By 2014, researchers estimated that wind energy facilities alone were responsible for killing up to half a million birds in the U.S. annually, including eagles and other protected species (Johnson, 2018; Office of Public Affairs, 2022). Wind turbines were also identified as a leading cause of bat mortality in the country (Lloyd et.al., 2023). Today, the number of operating turbines has more than doubled and their heights increased but no new assessments of overall bird or bat mortality have been conducted. Absent independent studies designed to estimate the risks to airborne animals, the impacts cannot be accurately determined. The effects of renewable energy development on other wildlife are even less understood, owing mainly to a lack of meaningful pre-construction baseline studies. Pre-construction investigations are necessary to quantify post-construction impacts.

Most operating wind facilities are sited on private land where approvals, if required, fall under the jurisdiction of local land use boards, county commissioners, or state siting committees. For applications where a project is proposed on federal lands or involves a federal nexus, approval is required by the agency with jurisdiction. Onshore wind applications with a federal nexus generally involve the Bureau of Land Management (BLM) and U.S. Fish and Wildlife Service (USFWS) conducting oversight of wildlife impacts. Wind applications located in federal waters fall under the review of the BOEM, with NOAA Fisheries and USFWS serving in advisory capacity roles.

[2] Total tax credits for wind and solar were estimated at $11.5 billion in 2022 and increasing to $16 billion by 2024 (U.S. Department of Treasury, 2023).

2. U.S. OFFSHORE WIND DEVELOPMENT

The Biden Administration has placed a priority on the United States expanding its access to electricity generated from wind and solar resources. Fast-tracking OSW development is a substantial component of the administration's policy. Under the 30-by-30 plan, BOEM will approve and oversee the largest deployment of offshore wind turbines globally totaling 30,000 megawatts (MW) by 2030. This compares to 26,500 MW of offshore capacity operating in China at the end of 2022, 13,600 MW in the United Kingdom, and 8,000 MW in Germany (Buljan, 2023).

With just seven wind turbines operating offshore in the United States, very little is known about the environmental impacts of offshore wind activity, including pre-construction geophysical surveys, project construction, and operation and maintenance. The existing seven turbines are considerably smaller in capacity, hub-height, and rotor diameter than those under construction or proposed to be built and occupy a small fraction of the ocean compared to the millions of acres of wind lease areas, both active and planned.[3] The agencies involved, BOEM, NOAA Fisheries, and USFWS, have each stated in reviewing documents that insufficient data are available to determine the harms to wildlife, including the critically endangered NARW.

The United States has looked to the United Kingdom and Europe for guidance on safely building and operating offshore wind. Research and press accounts since the early 2000s suggest whales and other marine mammals have experienced displacement and mortality events in the North Sea related to offshore wind (Derbyshire, 2011). But long-term investigations of direct and cumulative impacts of large turbine installations on the environment are not available (Bergström et.al., 2014).

According to witness testimony before the House of Lords, the United Kingdom likely has no more data on wildlife impacts than the federal agencies in the U.S. (U.K. House of Lords, 2021). One reason for this comes from the same testimony where it was stated that the U.K. government placed a priority on resolving the climate crisis over concerns related to wildlife and habitat impacts. With the focus on erecting wind facilities, no time has been allocated to study the impacts. According to witness Helen Quayle, policy officer at the Royal Society for the Protection of Birds, "it is clear that we urgently need a new approach to offshore wind, how we deploy this technology and how we manage our seas. We need to find joint solutions for climate and nature" (UK House of Lords, 2021).

Over 2 million acres of the Atlantic Ocean, from Massachusetts to North Carolina, have already been leased to multinational energy companies for the purposes of constructing offshore wind energy facilities (BOEM, 2023). Millions of additional acres are proposed for lease. Figure 1 highlights the currently active and planned lease areas off the coasts of New England and the Mid-Atlantic states.[4] The pink areas are active leases undergoing development activity. The green areas are planned for future OSW development.

Wind lease areas selected by BOEM are situated outside heavily trafficked shipping lanes to minimize conflicts with existing marine uses. Prior to 2015, the areas selected for leases were generally lightly traveled with fishing and pleasure boats comprising most of the annual vessel activity (Figure 2).

[4] Locations off the California and Oregon coasts in the Pacific and off the coast of Louisiana in the Gulf of Mexico are under development but several years behind the east coast activity.

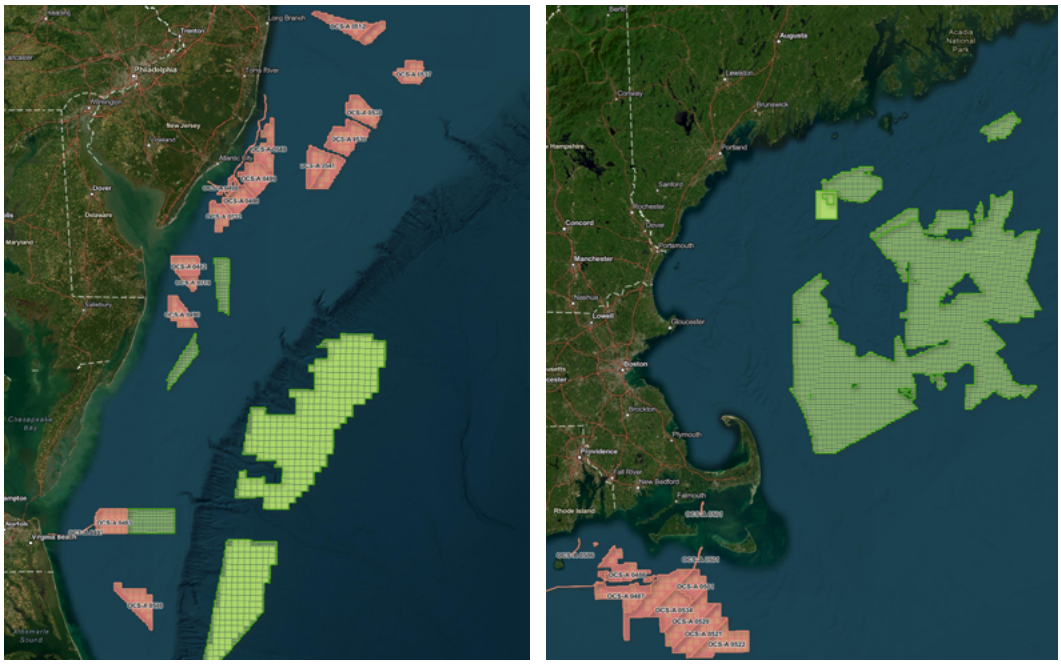


FIGURE 1 - *BOEM active (pink) and planned (green) OSW lease areas off New England and mid-Atlantic states*

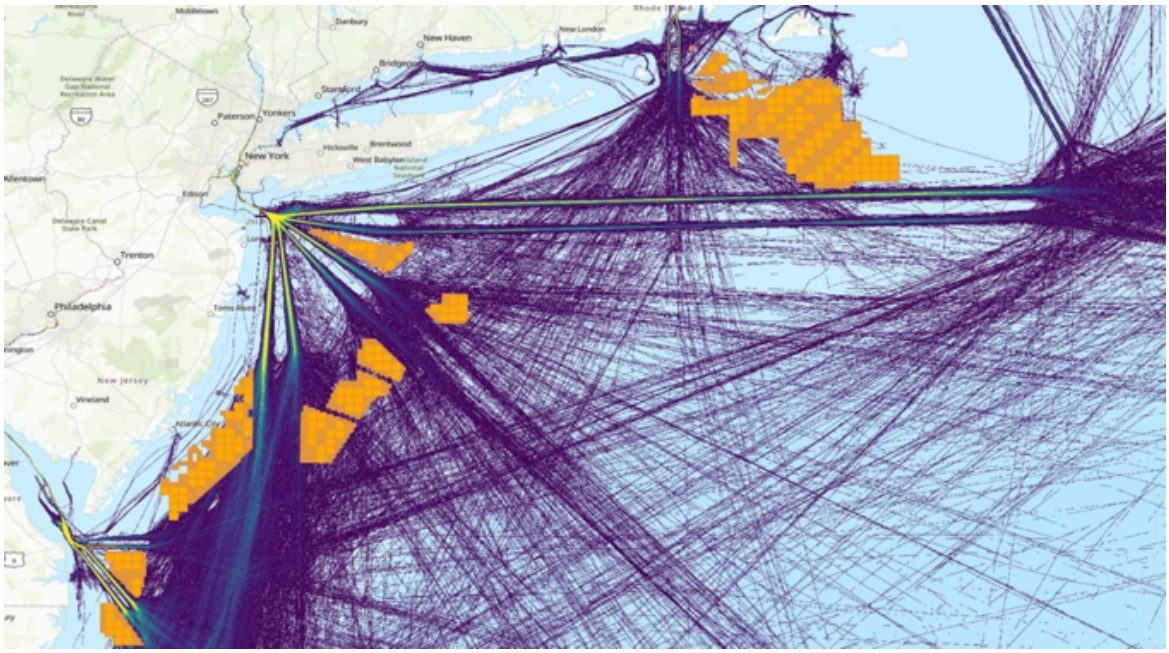


FIGURE 2 - *Wind lease areas (orange) are in lower trafficked areas outside commercial vessel lanes to limit conflicts with existing marine uses.*

Two offshore wind facilities, Vineyard Wind and South Fork Wind, have received permit approvals from BOEM and are under construction. The 800 MW Vineyard Wind project will site sixty-two turbines, 13 MW each, in waters roughly 14 miles south of Martha's Vineyard. Two high-voltage (230 kilovolt) undersea cables will transport the energy to the mainland at Covell's Beach in Barnstable, Massachusetts. South Fork Wind, a twelve-turbine, 132 MW facility situated south of Rhode Island, will transport its energy into New York State over a single 138 kilovolt cable that will make landfall at Montauk on Long Island. These projects are among 28 separate applications planned off the coasts of Rhode Island, New York, New Jersey, Maryland, and Virginia with a cumulative installed capacity of 18,500 MW.[5]

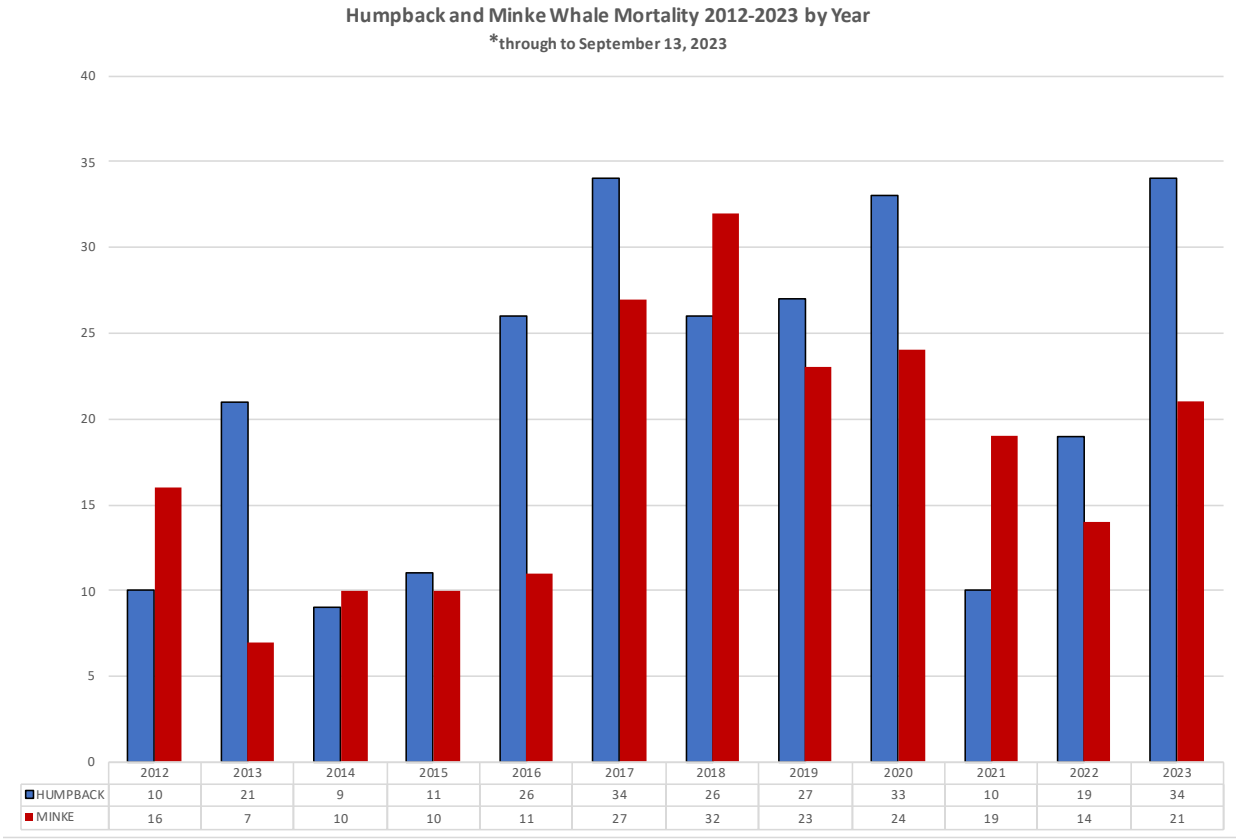
[5] Several planned projects were placed on hold or withdrawn from consideration in 2023 including the Orsted Ocean Wind 1 and Ocean Wind 2 facilities proposed off the coast of New Jersey. Leases for these projects are still active and can be restarted or transferred to new leaseholders at any time.

3. WHALE MORTALITY 2007-2023

The increase in whale mortality along the U.S. eastern seaboard since 2016 has been classified by NOAA as unusual. In 2017 and 2018, NOAA declared three Unusual Mortality Events (UME) involving large whale species in the Atlantic Ocean, specifically the Atlantic humpback whale (UME in 2017), the North Atlantic right whale (UME in 2017), and the Atlantic minke whale (UME in 2018). The UMEs for humpback and minke whales include deaths beginning in 2016 and 2017 respectively.

An unusual mortality event is defined under the Marine Mammal Protection Act as "a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response (NOAA, n.d.-a). NOAA has provided no conclusive explanation for why the whales are dying, and there is no publicly available information that suggests NOAA has determined a cause of the mortality.[6] While the UMEs coincide exactly within the period of increased OSW vessel activity and within the same geographic area, NOAA and BOEM insist there is no connection.

Figures 3 and 4 depict the timing and count of humpback, minke, and North Atlantic right whale deaths by species. The NARW is critically endangered and increasingly more rare with less than 350 individuals remaining on the planet. Fewer confirmed NARW have died compared to humpbacks and minkes, but given the small remaining population the impact of just one death on the species' population is significant.



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
HUMPBACK	10	21	9	11	26	34	26	27	33	10	19	34
MINKE	16	7	10	10	11	27	32	23	24	19	14	21

FIGURE 3 - *Number of humpback and minke whale deaths recorded by year from Maine to North Carolina.*

[6] For humpback whales, partial or full necropsy examinations were conducted on approximately half of the humpback whales. Of the whales examined about 40% showed evidence of human interaction, either ship strike or entanglement. For minke whales, full or partial necropsy examinations were conducted on more than 60% of the whales. Preliminary findings in several of the whales showed evidence of human interactions or infectious diseases. The findings were not consistent across all minke whales examined (NOAA Fisheries, n.d.-a).

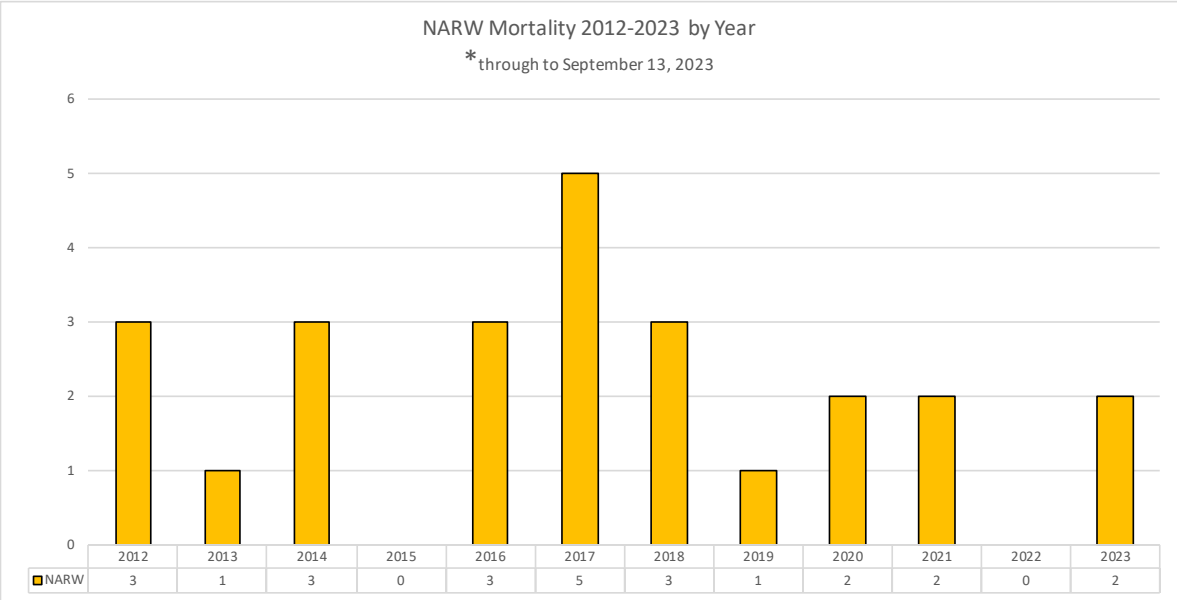


FIGURE 4 -- *Number of NARW deaths recorded by year from Maine to North Carolina*

Figure 5 presents all whale mortality from January 1, 2007 to September 13, 2023 for the east coast states from Maine to North Carolina. This includes fin, sei, sperm and other whale species together with the Atlantic humpback, Atlantic minke, and NARW. The spike in whale mortality is pronounced after 2015, when 59% of the total deaths occurred (n=470 of 788 whales). This represents a 48% increase in whale deaths overall.

In several states where OSW activity was significant, the percent increase in mortality for the 7 year, 9 month period after 2015 vs. the prior 9 years was well over 60%. The increase in whale deaths and NOAA's declarations of unusual mortality events correlate directly with the increase in OSW activities within federally leased areas. Several of the deaths in 2023 occurred after May and coincided with pile-driving for turbine bases and offshore substations (OSS) at the Vineyard Wind 1 and South Fork Wind projects in southern New England.

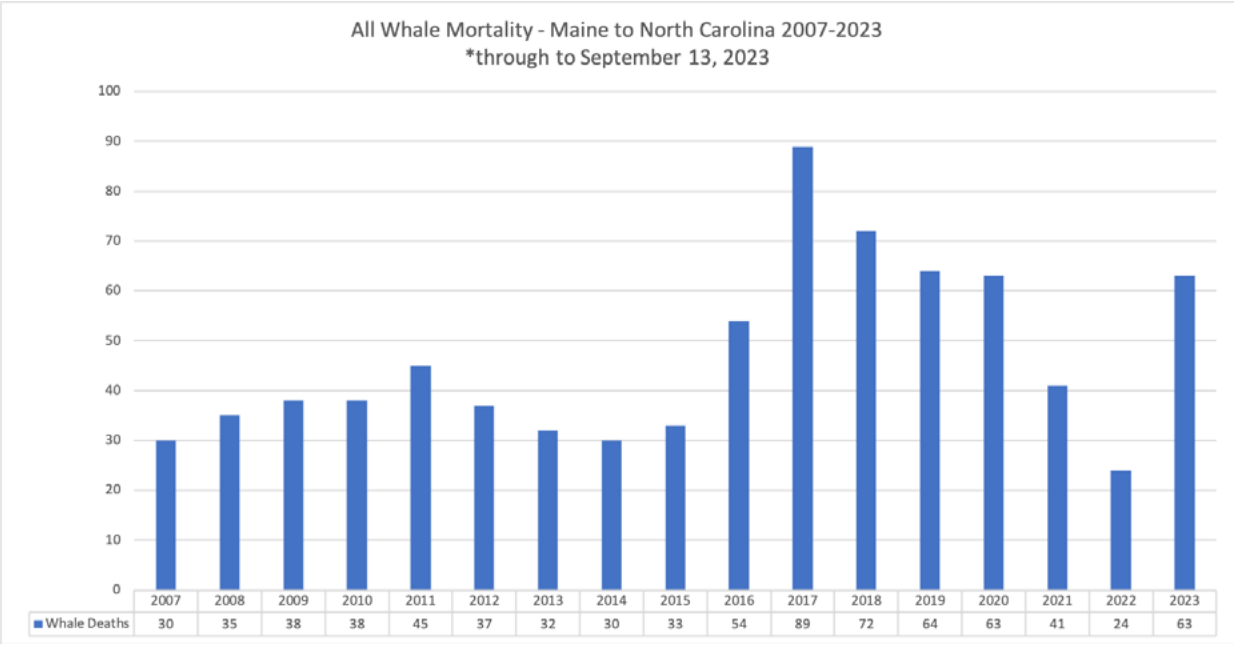


FIGURE 5 - *All large cetacean mortality from Maine to North Carolina 2007-2023 (through to September 13, 2023). States with the most OSW activity showed the highest mortality*

Year	CT	DE	MA	MD	ME	NC	NH	NJ	NY	RI	VA	TOTAL
2007	0	0	9	1	8	3	0	1	4	2	2	30
2008	0	1	11	2	6	6	0	3	3	3	0	35
2009	0	2	13	1	1	5	0	6	5	2	3	38
2010	0	2	11	2	4	6	1	2	5	1	4	38
2011	1	1	14	1	6	7	2	4	5	1	3	45
2012	0	0	10	2	10	3	0	3	3	3	3	37
2013	0	0	5	0	6	12	0	1	4	0	4	32
2014	0	0	11	0	4	3	0	6	2	1	3	30
2015	0	0	6	1	6	4	0	4	7	1	4	33
2016	0	2	9	1	13	6	2	4	9	3	5	54
2017	0	3	30	1	5	9	2	7	15	6	11	89
2018	0	1	24	0	14	3	2	7	12	2	7	72
2019	0	1	17	2	3	5	0	12	12	3	9	64
2020	0	1	18	0	5	6	0	9	13	3	8	63
2021	0	1	14	1	8	4	0	3	4	4	2	41
2022	0	0	2	0	4	5	0	7	5	0	1	24
2023	0	0	14	1	8	4	0	10	12	4	10	63
TOTAL	1	15	218	16	111	91	9	89	120	39	79	788

TABLE 2 - *Whale deaths from Maine to North Carolina, 2007 to 2023. States shaded in gray have active OSW development.*

Year	CT	DE	MA	MD	ME	NC	NH	NJ	NY	RI	VA	TOTAL
2007-2015	1	6	90	10	51	49	3	30	38	14	26	318
2016-2023	0	9	128	6	60	42	6	59	82	25	53	470
Percent change	-100%	50%	42%	-40%	18%	-14%	100%	97%	116%	79%	104%	48%

TABLE 3 - *Percent change in whale mortality between 2007-15 and 2016-23. In many states where significant OSW development has been occurring, the percentage increase in whale deaths is substantial.*

CREDIT: *BOEM*

4. INCIDENTAL HARASSMENT AUTHORIZATIONS (IHAS)

Under current BOEM regulations, an OSW construction and operation plan (COP) cannot be finalized until developers conduct marine site characterization surveys that inform as to the conditions of the seabed where the turbines and other project infrastructure will be embedded. High resolution geophysical (HRG) equipment is used to generate pulsating sonar that reflects off the seabed and produces an image of the bottom topography. Other types of HRG equipment penetrate below the seabed to assess subsurface conditions.

BOEM and the NOAA Fisheries acknowledge that sonar-based survey equipment can produce sounds that are harmful to marine mammals. For this reason, NOAA Fisheries requires OSW developers to secure incidental harassment authorizations (IHA) which provide exemptions to the 'take' prohibitions under the Marine Mammal Protection Act (MMPA). An IHA grants project developers conditional permission for sonar surveys to proceed provided the areas around the offending sonar equipment are monitored and actions are taken to ensure marine mammals are not exposed to harmful noise levels. Exposure to noise above a permitted level is deemed a 'take' under the IHA. In all cases an exclusion or shut down distance is defined where surveying must be halted should an animal come within that distance of the sonar-producing equipment. This distance varies by species, but it is typically 500 meters for the critically endangered North Atlantic right whale and other listed species, and 100 meters for other marine mammals including the Atlantic humpback whale.

An IHA can only be requested if "there is no potential for serious injury or mortality, or the potential for serious injury or mortality can be negated through mitigation requirements" (NOAA, 2013). If the applicant cannot meet these conditions, then they must request a letter of authorization (LOA) which seeks permission to injure or kill the marine mammal. IHAs permit two levels of harassment, Level A and Level B, which are defined as follows (NOAA, n.d.-b):

> **Level A** harassment means any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild.
>
> **Level B** harassment refers to acts that have the potential to disturb (but not injure) a marine mammal or marine mammal stock in the wild by disrupting behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

Since 2016, NOAA Fisheries has issued over fifty 1-year conditional IHAs for the purposes of surveying and constructing wind energy facilities along the U.S. coast from Massachusetts to the southern tip of North Carolina.[7] As of this writing, fifteen IHAs remain active with another fourteen new applications for IHAs and Letters of Authorization (5-year permits) under review by NOAA.

In the aggregate, the active and pending applications, according to NOAA's own calculations, authorize nearly 600,000 instances of take, corresponding to more than 20,000 individual whales, 477,000 dolphins, and over 101,000 seals, including over 292,000 of a single species (common dolphin). For the critically endangered North Atlantic right whale, active and pending applications permit just over 1000 incidences of Level B take (Green Oceans, 2023).

In most cases, the authorizations allow Level B harassment, however, pending applications before NOAA seek Level A takes of 450 individual whales including the endangered blue, fin, sei, and sperm whales.

For several of the earlier IHAs, NOAA prohibited sonar surveys within Seasonal Management Areas (SMAs) which are areas along the U.S. east coast where NARWs are likely to be present at certain times of the year (NOAA, n.d.-c). This prohibition was not applied uniformly, and in many of the later-issued IHAs no such seasonal limits were mandated.

Many of these authorizations overlap in time and general location and place no restrictions with regard to time of day, or year. Consequently, several wind lease areas adjacent to each other could be undergoing sonar surveys at the same time, thus raising the chances of marine mammals encountering the sonar activity multiple

[7] The number of IHAs issued since 2016 for offshore wind development and the number of acres involved within the U.S. eastern continental shelf exceeds IHAs requested for all other activities during that same period including military sonar and training exercises, oil and gas development, exploration, and production activities, and construction projects.

times during migration. Mitigation largely relies on trained observers that look for marine life within a specified distance from the sonar boats. Nighttime surveys limit the opportunity for observers to monitor for whales that could be in the vicinity.

In early IHAs issued by NOAA, the agency required the use of passive acoustic monitoring (PAM) equipment that could electronically detect the presence of whales when they called. NOAA did not recognize until years later that PAM recordings were ineffective during HRG surveys as the monitoring was overwhelmed by the sonar activity itself including the sounds emitted by the survey vessel and water flow over the cables that pulled the hydrophones. (86 FR 21289 April 22, 2021)

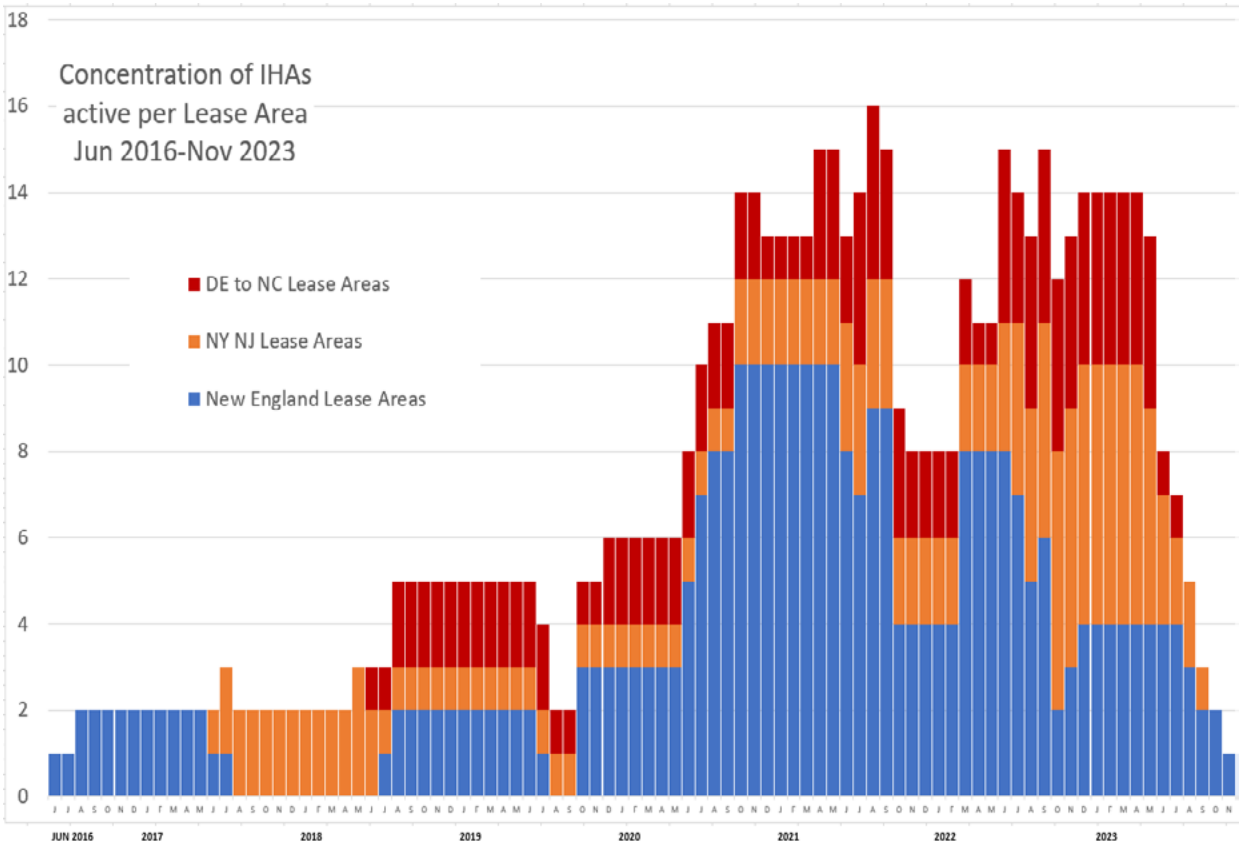


FIGURE 6 - *This chart shows the number of IHAs active for sonar activity by geographic region in the Atlantic Ocean. IHAs are generally granted for 1-year. The colors indicate the location of the wind lease for which an IHA applied. For example, in January 2022, 8 IHAs were active: 4 in the New England region, 2 in NY/NJ, and 2 from DE to NC.*

5. THE CONNECTION: OSW AND WHALE DEATHS

The notion of a connection between OSW work and whale mortality in the United State is not new. In 2017 a humpback whale washed up at Beavertail State Park in Jamestown, Rhode Island, just months after the 5-turbine, 30 MW Block Island wind energy facility was energized. The Rhode Island Coastal Resources Management Council, a state agency, published a letter on its website by University of Rhode Island scientists dismissing as unfounded any of the concerns raised by the public that the turbines contributed to the event (RI CRMC, 2017).

BLOCK ISLAND

The humpback death was not an isolated incident. Since the Block Island wind project started construction in 2016, five verified humpback whale deaths have been observed either on or near Block Island in the immediate vicinity of the turbines. These include one in 2016, two in 2017, a fourth in 2022 and fifth in 2023. NOAA data do not show any humpback whales found dead in this area prior to 2016. The authors are unaware of any investigation undertaken to determine if the Block Island wind turbines or related vessel activity contributed to these deaths.

However, vessel tracking data show that traffic during project construction in 2016 and every year thereafter has substantially increased from the mainland and to/around the five turbines situated south-southeast of Block Island. The heat map in Figure 7 graphically depicts typical yearly vessel activity both before (left) and after (right) 2016 when the project was placed in service. The red dots show the location where the dead humpback whales were observed. The blue lines represent typical vessel tracks for vessels categorized as 'other' in the AIS marine system. As vessels repeatedly follow the same track over a given year, the blue lines intensify in color from dim green to bright green to yellow.[8]

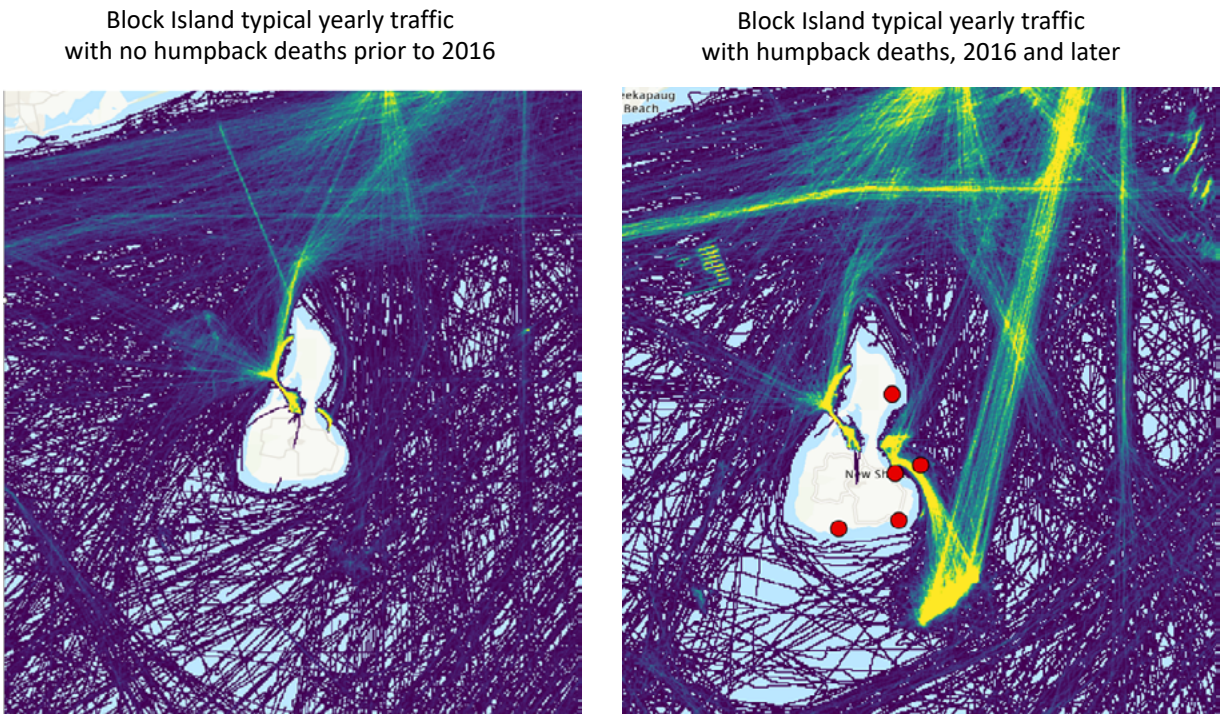


FIGURE 7 - *Block Island typical yearly vessel activity pre-OSW shown on the left and post-OSW shown on the right. There were no Humpback strandings or deaths on or near Block Island prior to 2016 and before the start of the wind farm construction and operation there. There have been five confirmed Humpback deaths in the vicinity of Block Island since OSW work began and through to 2023.*

[8] It should be noted that the vessel tracks for Block Island wind show intensity of activity to, between, and from the turbines. This activity can be seen every month since the project was constructed and suggests that larger OSW facilities will experience similarly high levels of vessel activity.

MARTHA'S VINEYARD

Similarly, NOAA data show that seven NARWs were found dead on or near Martha's Vineyard in Massachusetts between August 2017 to August 2018. The heat map in Figure 8 shows the locations of where the dead NARW (red dots) were observed relative to the bright orange wind lease areas sited roughly 14 miles south of the island. The blue lines on the map represent aggregate vessel tracks over the 13-month period for vessels categorized as "other" in the AIS marine system. The dense concentration of vessel activity in the lease area is typical of how HRG sonar activity appears.

In contrast, Figure 9 shows the aggregate tracks for the same vessel type and the same August to August period but over the years 2015 to 2016 and prior to OSW surveys in the area. Vessel traffic close to shore and between the mainland and Martha's Vineyard and Nantucket Island did not change materially between the two periods. However, the difference in vessel activity leading to and within the wind lease areas intensified. No NARWs died in U.S. waters in 2015.

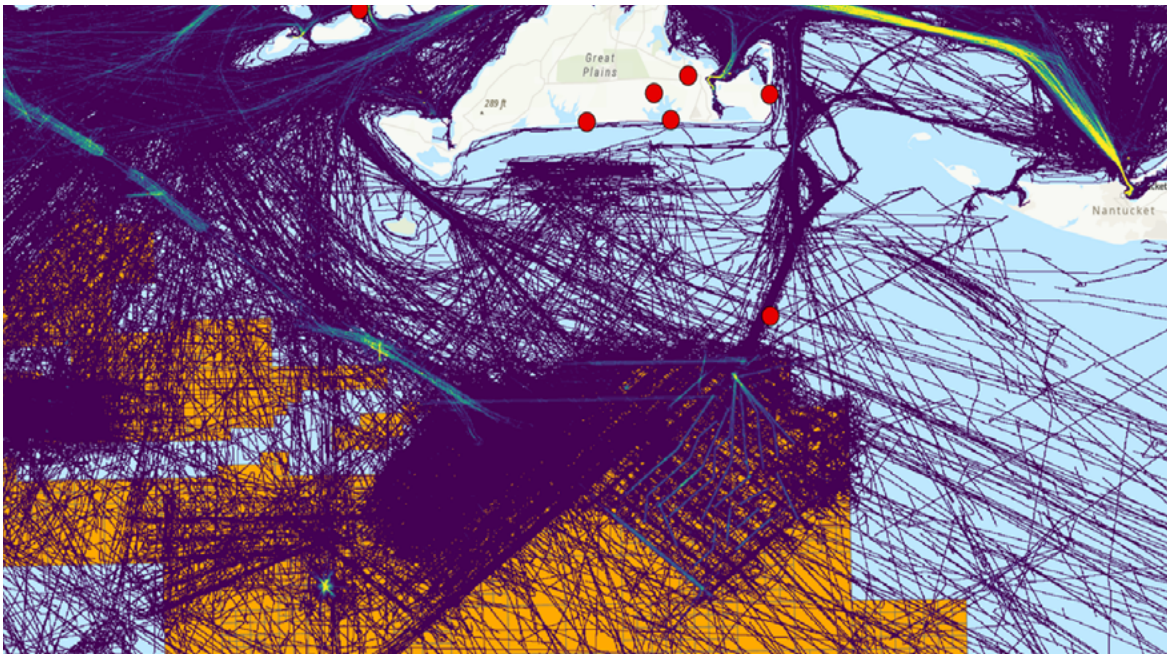


FIGURE 8 -- *NARW deaths on/near Martha's Vineyard over 13 months (Aug 2017-Aug 2018)*

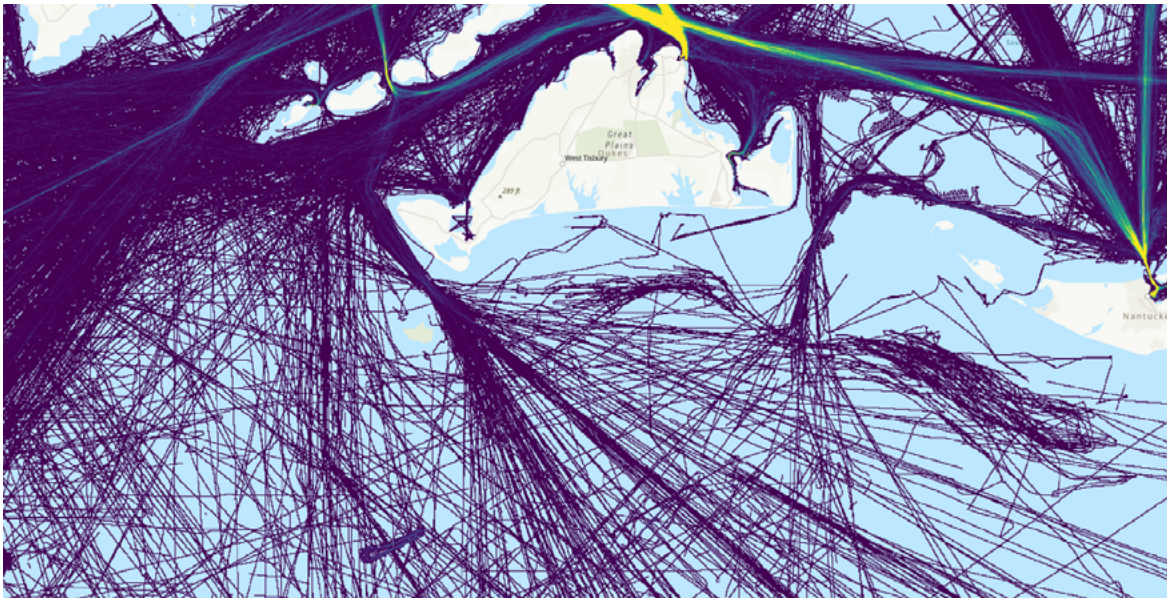


FIGURE 9 -- *The same geographic area around Martha's Vineyard prior to OSW sonar surveys (Aug 2015-Aug 2016)*

6. OSW AND A PATTERN OF MORTALITY

Increased whale mortality since 2016 is not isolated to Block Island and Martha's Vineyard. Rather these locations are representative of a much larger pattern occurring in the northeast from Massachusetts to North Carolina where the highest concentration of OSW development is underway. To demonstrate this point, comparison maps are presented below showing vessel track activity and whale deaths.

COMPARISON: 2017

Figure 10: This map shows vessel activity and whale deaths off the southern coast of New England, and part of Long Island. The timeframe is January to May in 2017 to coincide with a period of limited OSW activity. The blue lines represent tracks for vessels categorized as "other" in the AIS marine system. The bright orange areas depict wind leases, and the red dots are confirmed dead whales observed within that time period. There is relatively little activity in the lease areas and few dead whales were observed.

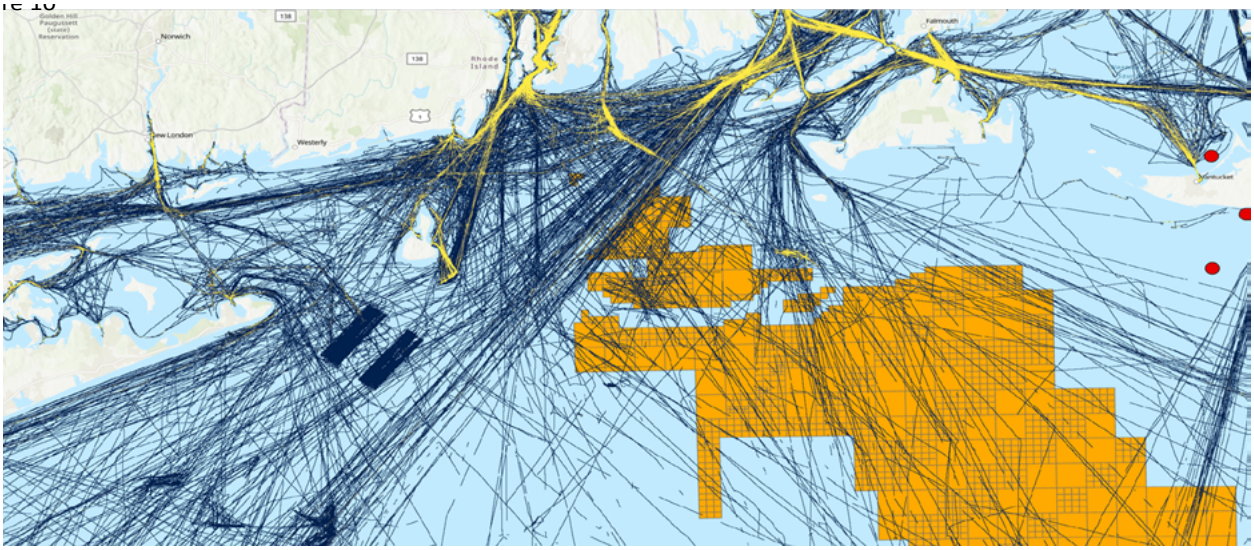


FIGURE 10 - *January 2017 to May 2017*

Figure 11: This map shows vessel activity and whale deaths in the same general area as depicted in Figure 10 but during the timeframe from June to December 2017. This timeframe covers the summer months where there is typically more vessel activity close to the shoreline. This is also the period when the concentration of OSW vessels is pronounced, and the number of dead whales (red dots) observed has increased.

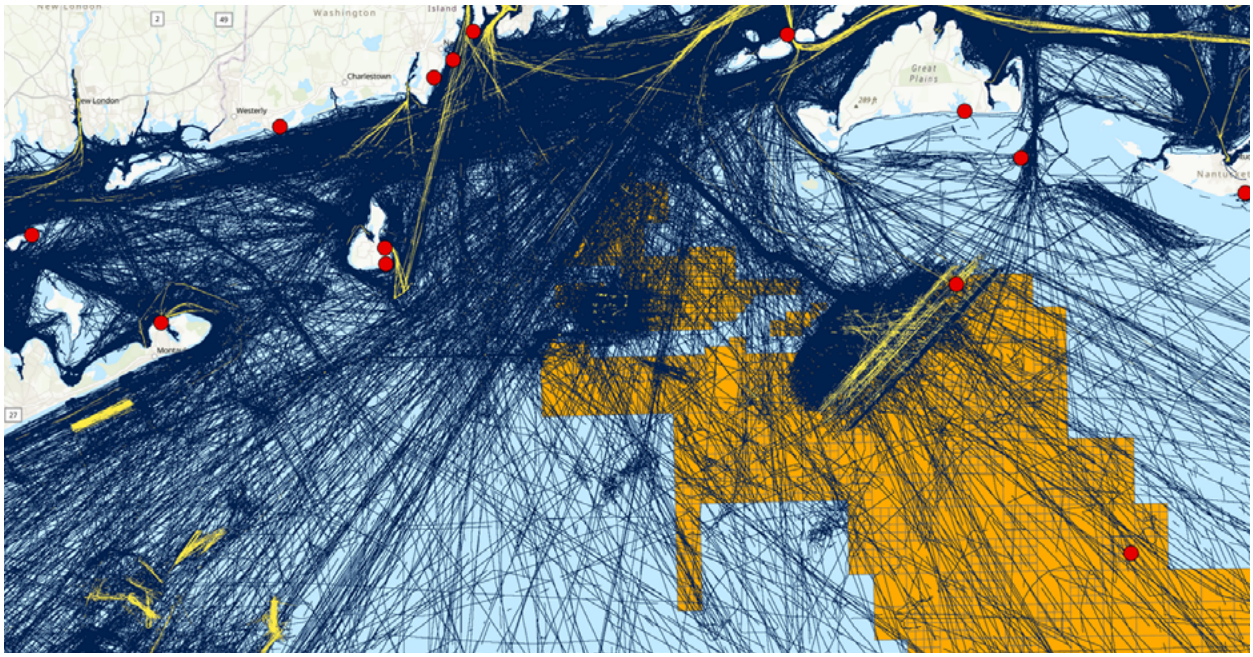


FIGURE 11 - *June 2017 to December 2017*

COMPARISON: 2019

FIGURE 12: This map provides a view of the same area as depicted in Figures 11 and 12 but with a timeframe from January to May in 2019. Again, there is limited OSW activity occurring. The blue lines represent tracks for vessels categorized as “other” in the AIS marine system. The bright orange areas depict wind leases, and the red dots are dead whales observed within that period. There is relatively little activity in the lease areas and fewer dead whales are observed.

FIGURE 13: This map depicts the same location and view as Figure 12 but during the period from June to December 2019. This timeframe covers the summer months where there is typically more vessel activity close to the shoreline. However, the concentration of OSW vessels is pronounced, and the number of dead whales (red dots) observed has increased.

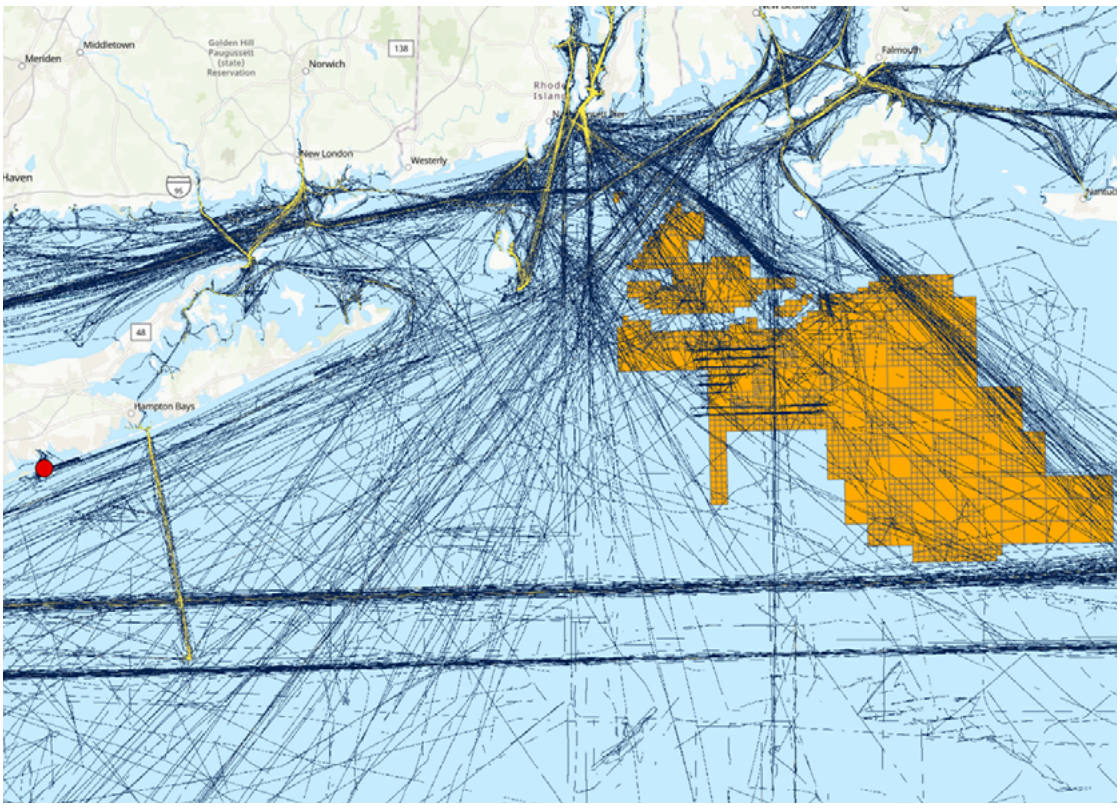


FIGURE 12 - *January 2019 to May 2019*

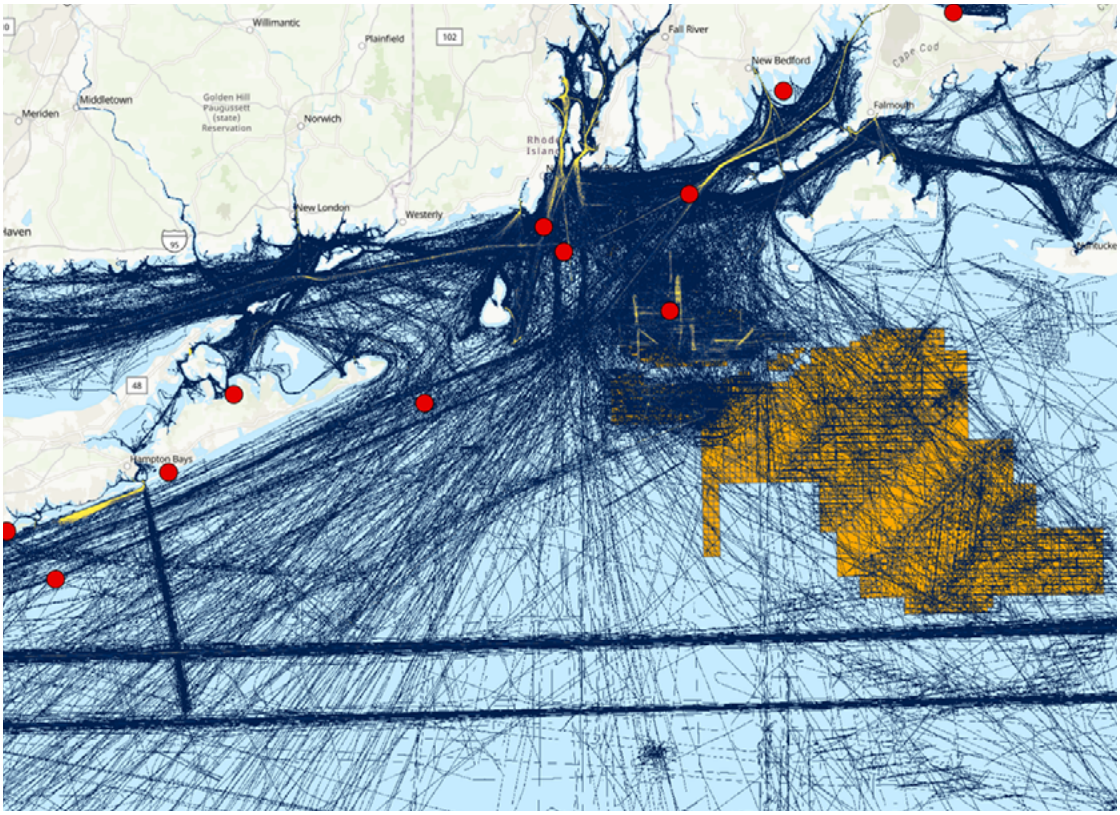


FIGURE 13 - *June 2019 to December 2019*

COMPARISON: WINTER 2021-22 AND 2022-23

Beginning in December 2022 through February 2023, the deaths of whales and other cetaceans (dolphins) reached unprecedented levels in the New Jersey and New York waters from Montauk on Long Island to Cape May, New Jersey, with 12 whales confirmed dead. These whale deaths coincided with a significant increase in OSW vessel activity in the region at the time. To demonstrate the increase in deaths, two maps were produced showing vessel activity and whale deaths.

Figure 14: This map provides a view of vessel activity and whale deaths off the coasts of New York and New Jersey during the timeframe from October 2021 to February 2022. As in all other maps in this report, the blue lines represent tracks for vessels categorized as “other” in the AIS marine system. The bright orange areas depict wind leases. The red dots are dead whales observed within that period while the green dots are other cetaceans. There is relatively little activity in the lease areas and relatively few dead mammals were observed.

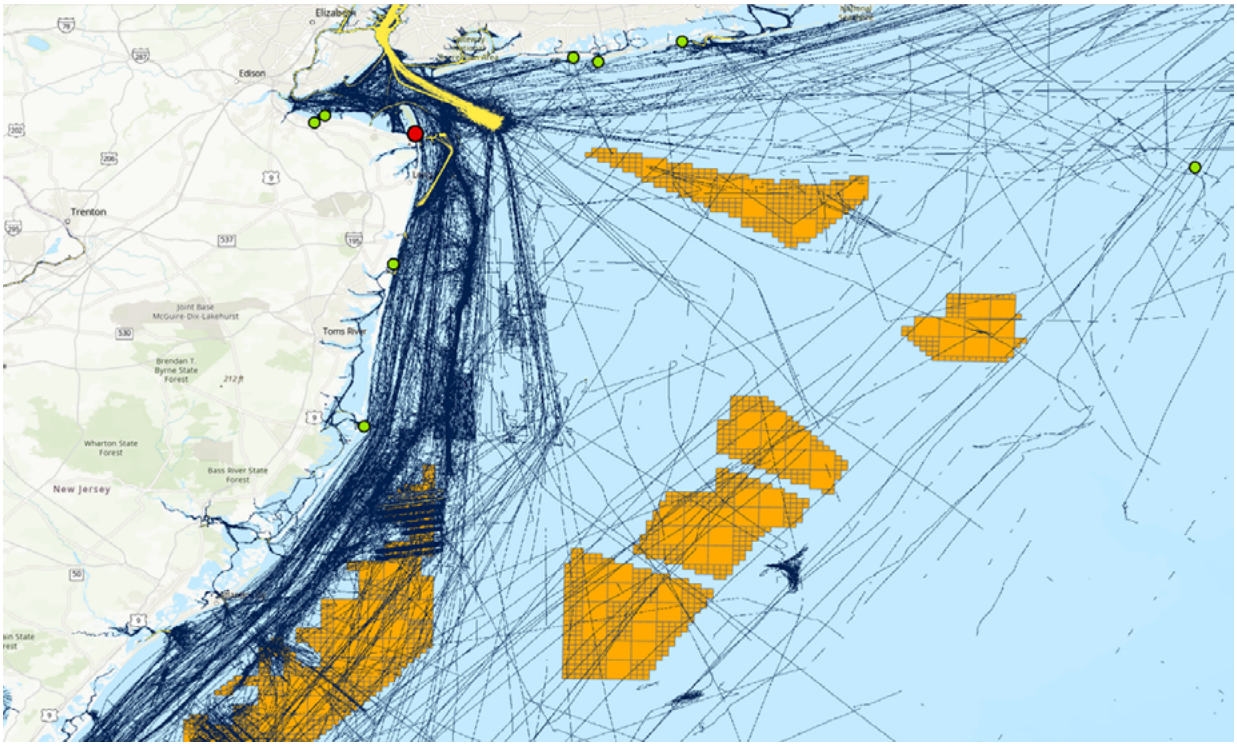


FIGURE 14 – *All Cetacean – October 2021 to February 2022*

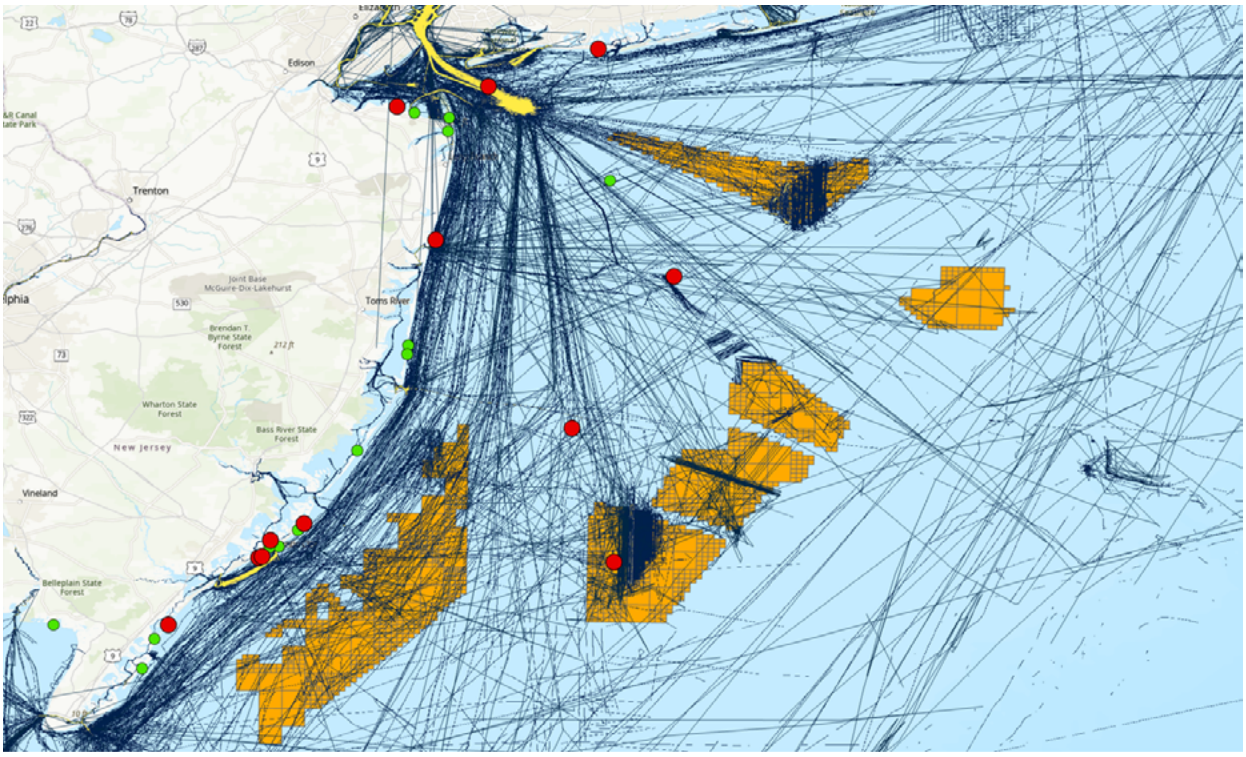


FIGURE 15-- *October 2022 to February 2023*

Figure 15: This second map depicts the same location and view as Figure 14 but during the period from October 2022 to February 2023. The concentration of OSW vessels is evident, and the number of dead whales (red dots) and other marine mammals (green dots) observed has increased. Another fourteen large whales died along the New Jersey/New York coast since February that are not depicted on this map.

7. DISCUSSION

Since 2016, significant increases in whale deaths along the Atlantic coast have coincided with offshore wind energy development activities. NOAA Fisheries has recognized the increased mortality of Atlantic humpback, NARW, and Atlantic minke whales and declared Unusual Mortality Events for each species but has yet to release any determinative cause for the whale deaths. NOAA Fisheries and BOEM insist there is no connection between OSW and whale deaths. Beyond general statements regarding threats to whales including vessel strikes, fishing-gear entanglement, and climate change, the agencies have offered no evidence or concrete data that show the OSW activity is not a contributing factor to the increased mortality. In fact, the silence surrounding these concerns raises questions as to whether the agencies have been forthcoming with the data they do possess. What is known is that prior to 2016, no notable offshore wind activity was occurring in the northeast. At the point when the OSW work began in 2016, whale mortality spiked.

This study examines the pattern of whale deaths during multiple time periods since 2016 and maps the deaths to OSW vessel activity within the wind lease areas off the coasts of New England, New York, and New Jersey. The pattern of mortality is evident and shown graphically through a series of maps of these areas. Showing a correlation between whale deaths and OSW activity does not prove causation. However, this study highlights a possible connection that should not be ignored or dismissed.

APPENDIX A - DATA AND TOOLS

To conduct this study the authors relied on the following data sources and tools:

DATA			
Data description	Provider	Years	Source
NOAA UME files	NOAA website	2016-2023	https://www.fisheries.noaa.gov/national/marine-life-distress/active-and-closed-unusual-mortality-events
NOAA Incidental take authorizations	NOAA website	2014-2023	https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable
NOAA Fisheries whale/cetacean strandings	NOAA Fisheries Marine Mammal Health and Stranding Response Program's National Stranding Database	2015-July, 2023	e-mail inquiry to NOAA
NOAA Fisheries all whale mortality 2007-2023	Greater Atlantic and Southeast Regional Marine Mammal Stranding Networks	2007-2023	e-mail inquiry to NOAA
Maritime vessel tracking data	Publicly available Marine AIS vessel tracking system; Additional acquisition of data.	2015-2023	Northeast Ocean Data: https://www.northeastoceandata.org/data-download/ Spire Global: https://spire.com/maritime/
Weekly local notices to mariners (District 1 and District 5)	U.S. Coast Guard	2022-2023	https://www.dco.uscg.mil/Featured-Content/Mariners/Local-Notice-to-Mariners-LNMs/

MAPPING TOOLS		
Tool	Provider	Source
Data Explorer	Northeast Ocean Data	https://www.northeastoceandata.org/data-explorer/
ArcGIS	ESRI	https://www.esri.com/en-us/arcgis/products/arcgis-online/overview

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The Authors wish to thank Bonnie Brady, Michael Dean, and the Team at Green Oceans in Rhode Island for their important contributions to this report. We wish to thank Environmental Progress whose generous support made this report possible.

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ATTRIBUTION

About the Authors

Lisa Linowes is a founding member of the Save Right Whales Coalition. Since 2006, Linowes has served as the Executive Director for the WindAction Group, a national advocacy organization analyzing the impact and benefits of energy development on the natural environment, communities, and regional electricity grids. Linowes also serves on the board of Environmental Progress.

Eric Turner is a member of the Save Right Whales Coalition. He has over thirty years of experience working with small businesses in systems analysis and business and data analytics. He has degrees in Data Analytics specializing in Data Integration, Analytics and Reporting. Turner has vacationed on Martha's Vineyard's since 1990 and for the past several years worked to preserve the island's natural beauty and maintain the natural habitat for marine life that depends on the waters of New England to survive.

About the Save Right Whales Coalition

The Save Right Whales Coalition is an alliance of grassroots environmental and community organizations, scientists, and conservationists working to protect the critically endangered North Atlantic right whale and other marine life from the industrialization of ocean habitat.

About Environmental Progress

Environmental Progress is a 501(c)3 nonprofit dedicated to incubating ideas, leaders, and movements that promote nature, peace, and prosperity for all. EP's work consists of cutting-edge, independent, and nonpartisan research, organizing, and grant-making to defend and strengthen the pillars of civilization.

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