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Jolie Harrison, Chief, Permits and Conservation Division, November 9, 2022
Office of Protected Resources,
National Marine Fisheries Service (NMFS)
1315 East-West Highway, Silver Spring, MD 20910
Electronic comments to ITP.PotIock@noaa.gov.

Comments by Save Long Beach Island, Inc. on the National Oceanic and Atmospheric Administration RIN 0648—XC092, Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to the Atlantic Shores Offshore Wind Energy Projects Offshore of New Jersey, Federal Register Notice, Vol. 87, No. 188, Thursday, September 29, 2022

Dear Ms. Harrison,

These comments on the Notice of Receipt and Availability (NOA) of the Atlantic Shores Offshore Wind Application for Incidental Take Authorization (the "Application") for construction and related activities are submitted on behalf of Save Long Beach Island Inc. a non-profit organization of over four thousand residents, businesses and visitors to the Island. We are not in general opposed to offshore wind energy but do seek that wherever it is pursued that it be done sensibly and in full compliance with applicable environmental law, including the Marine Mammal Protection Act (MMPA).

Our comments below are focused on the material that is presented in the Application itself, which is mainly construction related pile-driving and pre-construction vessel surveys. However, we would point out at the outset that although the title of the Notice refers to Incidental Taking for the Atlantic Shores project that is not the full project. The full project should include other survey activities being conducted or planned by the Atlantic Shores company, wind turbine operation and to some extent, decommissioning.

The comments are structured with a cover letter on the application material and pointing out those missing elements. We hope to have the opportunity to review and comment on those missing elements before the NMFS proceeds to any proposed rule. The significant impacts from and need for addressing turbine operational noise impacts is presented in Enclosures I and II. The need for a different methodology regarding vessel survey noise impacts is presented in Enclosure III.

Our concern that vessel survey impacts are not being estimated properly has been heightened by the recent observations of an unusual number of fin and humpback whales close to shore which may be correlated with ongoing survey activities. We have asked the New Jersey Department of Environmental Protection to investigate this, and we urge the National Marine Fisheries Service (NMFS) to do the same.

The applicant and its contractors, through a series of undisclosed and/or technically unsupported noise source levels, noise source attenuation assumptions, noise propagation and transmission loss models, and animal aversion models have made a valiant attempt to demonstrate a negligible impact from this project on the critically endangered North Atlantic right whale (henceforth the "right whale"), and other marine mammals.

We provide extensive technical comments below on all these issues, but more fundamentally contend that NMFS cannot credibly conclude that surveying thousands of acres with high intensity noise devices, driving three hundred and fifty-seven 12 to 15-meter diameter piles into the seasbed, and the long-term operation of 357 15-megawatt, gearbox turbines (which should be added to the scope of any rulemaking), each turbine with a noise source level of at least 180 decibels (dB), will have a negligible impact on a critically endangered whale attempting to migrate through the area. Proceeding to a rulemaking with such an incredulous proposal will have far-reaching implications regarding the strength of the MMPA, how it is being administered, and on the credibility and reputation of the NMFS.

The only way to make this project remotely compatible with the MMPA is to change the project itself, and we recommend that NMFS pursue that path with the Interior Department and the applicant, before attempting a rule-making.

Also, as shown here, the Application is not complete and does not meet MMPA requirements and its Incidental Take Authorization (ITA)-related rules, the National Environmental Policy Act (NEPA), or the Endangered Species Act (ESA). The application should be revised and resubmitted before any rulemaking proceeds. If a rulemaking proceeds substantial changes in scope and methodology would be required for a proposed rulee.

Acknowledgement of the North Atlantic right whale's Primary Migration Corridor. We are glad to see that Figure 9 of the main application recognizes that the primary migration corridor of the right whale intersects and/or is adjacent to the proposed wind turbine areas (See Exhibits B1, B2, and B3 in Enclosure II).

Restricted Construction Period. We are also glad to see that pile driving and related construction activities will not take place in January through April during the main period of the right whale's migration. We recommend however that the restricted time period also include December as there is still significant whale presence then.

At the same time, since the NMFS has declined our suggestion that high resolution geophysical (HRG) vessel surveys be scheduled to be conducted outside the right whale's primary migration corridor during December through April, we see no logical reason why all vessel survey activity shouldn't be suspended during those months as well, similar to that being done for construction, and now recommend that.

Incomplete Application. The Federal Register notice says that NMFS determined that the Atlantic Shores application was adequate and complete on August 25, 2022. We would suggest that NMFS reconsider that finding. The Application is not complete for the following reasons:

1. Limited Project Scope, Turbine Number, Power and Drive Type. The full Atlantic Shores project would consist of 357 turbines from projects 1, 2 and 3, not, as the Application indicates, just 200 turbines from projects 1 and 2. The Construction and Operations Plan (COP) for project 3 was submitted in April, 2022, using similar turbines and layouts, leaving ample time to include it here. In addition, the expected operating power and drive of the turbines is not disclosed and should be as this has a significant bearing on operational noise impacts as discussed below. The project has selected the Vesta-236 15-megawatt turbine and that and its specifications should be disclosed.

2. Limited Impact Scope. The application is not complete because it does not present the noise impacts of turbine operation, and operation is part of the COP being considered for approval by the lead agency- The Bureau of Ocean Energy Management (BOEM). As explained in Enclosures I and II, the impacts of operational noise from the project's 15-megawatt Vesta-236 gearbox drive turbines are significant and could interfere with and potentially block the essential migration of the right whale. They must be considered in this ITA review, and other ITA reviews with the same problem. In addition, the cumulative impact on the whale's full migratory path needs to be assessed in each project EIS with the same problem-see also NEPA Compliance and Coordination below.

3. Undisclosed Noise Source Levels and High Noise Transmission Loss Rates. Regarding construction-related noise, the Application is technically incomplete because it does not present critical data necessary to assess whether the modeled calculations used in the application are scientifically valid, specifically the noise source levels for the sound pressure levels (SPLs) and sound exposure levels (SEL's), and the noise transmission loss factors (LFs).

The exposure range (R) for injury and behavior disruption varies exponentially: with the noise source level (SL) directly, and inversely with the noise transmission loss factor (LF).

$$R = 10^{(SL - Threshold\ dB)/LF}$$

Based on trends of increasing noise source level with pile diameter, the SLs for driving these piles could be very large, well above 250 dB. The Application does not disclose the LF's being used, but we have estimated them (see below) based on the exposure ranges and attenuation numbers in the Application. They are very high, inconsistent with factors used elsewhere by the NMFS and other researchers, and therefore not justified.

Because of the exponential relationship, even modest changes in the SL or the LF can make a large difference in the exposure range and subsequent take estimates. For example, using the above equation for impulsive noise with a source level of

220 dB, the exposure range would be just 32 meters with the Application's transmission loss factor of 40 dB that we found. This loss factor is extremely high however, and deviates significantly from standard. With a more common and defensible loss factor of 15 dB, the exposure range would increase to 10,000 meters; more than 300 times larger.

These two numbers, the SL and the LF, are arguably the two most important pieces of information to have in order to determine whether much of the rest of the Application is scientifically sound. But neither is disclosed. These numbers and factors must be disclosed and fully explained if this exercise is to be technically and scientifically legitimate.

Without this critical data, distances to meet criteria (exposure ranges) and animal takes cannot be reviewed for consistency with mainstream scientific practices, nor can uncertainties in those calculations be addressed. Put more directly the analysis and calculations being done are not disclosed. This is a particular problem in the calculation of exposure ranges as presented just below.

4. Unexplained High Noise Dissipation. Regarding construction-related noise, the Application does not disclose or present any rationale to justify the extremely high noise transmission loss upon which its exposure range and take estimates are based. As discussed below, those transmission losses are not consistent with those normally used in the scientific community for the modest water depths encountered here.

These inconsistencies arise from the exposure ranges in Tables 20 through 23 required to meet the impulsive noise Level B criteria of 160 dB. The cumulative frequency noise source level is not given, thus making it impossible to perform a direct calculation of a noise loss factor. However, by comparing the exposure ranges for the 15 dB attenuation to no attenuation for the Level B exposures, one can see that an additional 15 dB of noise loss is being achieved with an approximate doubling of the required distance.

That 15 dB loss is far greater than even the loss with spherical noise spreading which would achieve a 6 dB decrease with a doubling of distance. And even a 6 dB loss is not expected to occur beyond distances equal to the relatively modest depths encountered here.

A 15 dB doubling distance loss is substantially larger than the 4.5 dB reduction for the doubling distance for the "practical" spreading used by the MMFS and the Bureau of Ocean Energy Management (BOEM) in many other similar circumstances as shown below and in Enclosure III. It is far greater than the 3 dB reduction for cylindrical spreading for a doubling of distance, which would be expected further away from the source.

Assuming the absorption loss is small at lower frequencies, the equation describing the noise loss from the source to the receiver is,

Source Level (SL)-160 dB=Noise Transmission Loss Factor (LF) x $\log_{10}$(Exposure Range)

That equation can be used to solve for SL and LF using the exposure ranges for noise source attenuations of 0 and 15 dB (which changes the Source Level by 15 dB) in Table 20 for the right whale for behavior disturbance with the NOAA RLp50 criteria. That yields a noise transmission loss factor, TL, of 43 dB for every 10-fold increase in distance. This is much larger than the 15 dB and 10 dB loss factors for practical and cylindrical spreading respectively for a ten-fold increase in distance.

A 40 dB reduction for a tenfold distance increase close to that is also shown in Table F-1 in the Low Frequency Cetacean (LFC) 95% column as the noise level decreases from 160 dB at 1.47 kilometers (km) to 120 dB at 15.78 km. This seems especially unusual as those distances are many times the water depth where one might expect dissipation following cylindrical spreading closer to a 10 dB loss factor.

Absorption loss should be small at these low frequencies, and it is difficult to see what physical characteristics of the area or noise propagation constructs could account for such a large noise dissipation rate, well beyond even spherical spreading.

Such a large noise transmission loss factor is not consistent with the NMFS approach used and described fully as "common practice" for coastal waters in the NMFS's ITA rulemaking of December 15, 2021 titled, Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to U.S. Navy Construction at Naval Station Newport in Newport, Rhode Island. In that rulemaking document, NMFS stated that,

"SOUND PROPAGATION. Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is

$$TL = B * \log_{10} (R_1 / R_2),$$

Where

B = transmission loss coefficient (assumed to be 15)
R_1 = the distance of the modeled SPL from the driven pile, and
R_2 = the distance from the driven pile of the initial measurement.

This formula neglects loss due to scattering and absorption, which is assumed to be zero here. The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, most notably the water bathymetry and presence or absence of reflective or absorptive conditions, including in-water structures and sediments. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6 dB

reduction in sound level for each doubling of distance from the source (20*log(range)).

Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source (10*log(range)).

As is common practice in coastal waters, here we assume practical spreading (4.5 dB reduction in sound level for each doubling of distance). Practical spreading is a compromise that is often used under conditions where water depth increases as the receiver moves away from the shoreline, resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions. Practical spreading was used to determine sound propagation for this project".

Bold emphasis added. Note also that a 4.5 dB doubling distance is equivalent to using a 15 dB loss factor, "B", and in the equation above and R_1 is one meter (m)**.**

Applying a 40-43 dB loss factor is not consistent with the 15 dB loss factor presented above that was used by NMFS in approving a request from its parent agency, the National Oceanic and Atmospheric Administration (NOAA), for authorization to take marine mammals incidental to the NOAA port facility project in Ketchikan, Alaska as recently as December 1, 2021.

Regarding the Navy construction at Newport, Rhode Island and the NOAA construction in Ketchikan, Alaska, the NMFS says in its response to our comments on the Ocean Wind and Atlantic Shores surveys that these activities are not relevant to the noise surveys at hand because they occur in less than 10 m depths. However, the depths at hand are not that different.

The NMFS also states that the pile driving activity associated with those projects produces sound with higher frequency and shorter wavelengths than the noise sources being employed here-making them more amenable to the 15 dB factor. While pile driving activities do produce some noise energy at higher frequencies about 75 percent of the noise spectrum is still below the two-thousand Hz frequency level which is of interest here. That is shown in a report done by Jasco Applied Sciences of July 21, 2017 titled Acoustic Modeling Study of Underwater Sound Levels from marine pile driving in southeast Alaska, which contains results specifically for the Ketchikan facility (See Figures 1 through 5 on page 12 and Figure 10 on page 17). Therefore, that approval is relevant to the noise surveys here.

The 30-inch diameter piles modeled in that study (Table 1) are also similar to those used in the Naval construction action in Newport, Rhode Island (See Table 2 of the Federal Register notice of October 13, 2021 titled Take of Marine Mammals Incidental to Specified Activities; taking marine mammals incidental to U.S. Navy construction at Naval Station Newport in Newport Rhode Island). Therefore, that approval is relevant to the noise surveys here.

The use of a 40-43 dB factor here is not consistent with the 15 dB factor NMFS used very recently on February 8, 2022 to justify the "Taking of Marine Mammals Incidental to Kitty Hawk Wind Marine Site Characterization Surveys, North Carolina and Virginia" which used similar sound survey devices.

The use of a 40-43 dB factor here is not consistent with the Bureau of Ocean Energy Management's (BOEM's) cited factor of 15 dB for use in the Practical Spreading Loss Model for pile driving in its report titled, A Parametric Analysis and Sensitivity Study of the Acoustic Propagation for Renewable Energy, OCS study, BOEM 2020-011,

It is not consistent with NMFS's own previous recommendation in 2012 cited in that Report on page 30 for use of a 15 dB loss factor. In fact, that same report shows that the use of the 10 Log r formula, i.e., even less transmission loss than the 15 dB factor, compared better with real or simulated measurements (See Figure 3.2 on page 31). So even the practical spreading loss formula may overestimate transmission loss, and certainly the 40 log r formula does.

The use of a 40-43 dB loss factor here is not consistent with the method used by Tetra Tech Inc. for the Dominion Wind Energy Project as discussed in the report titled, Underwater Acoustic Modeling Report Virginia Offshore Wind Technology Advancement project, December 2013. In that report, Tetra Tech only uses the 20 dB factor out to the water depth distance. Tetra Tech then uses the lesser 15 dB factor from there to eight times the water depth, and beyond that uses a 10 dB factor.

The use of a 40-43 dB loss factor here is very far from the more conservative "worst case" formulas used by an Atlantic Shores noise specialist consultant, Pangea Subsea (Report 04563-1) in the Atlantic Shores application for incidental harassment authorization of December 15, 2021. Formulas 7 and 8 of that report only use a 20 dB loss factor from 1 m to 3.5 m, and a 10 dB coefficient beyond that.

A 40-43 dB noise loss factor is far from the effective transmission loss factor of 16 dB that reflects the distance to criteria results in the BOEM's own Atlantic Geological and Geophysical Activities Programmatic Environmental Impact (EIS) statement of March 2014. Using the above formula for transmission loss, that "effective" 16 dB value can be calculated from the radial distances (about 1750 meters) required to reach 160 dB in Table D-23 of the EIS for the four shallow depth scenarios 20, 26,30 and 34, and the representative source noise level of 212 dB for boomers (modeled as similar to sparkers) and sparkers, in Tables D-6 and D -13 respectively.

The use of a 40-43 dB noise loss factor here is not consistent with field measurements. A comparison of modeled transmission loss with actual measurements by Thompson et al. in the report titled, Effects of Offshore Wind Farm Noise on Marine Mammals and Fish, dated July 6, 2006, found that for pile driving events with frequencies less than 1000 hertz, the 15 dB loss factor was the

best approximation of transmission loss for shallow North Sea and Baltic waters, and other settings comparable to this survey area, pages 15-16.

The use of the 15 DP noise loss factor has also been recommended by the Marine Mammal Commission and its letter to NMFS of September 21, 2015 on impact pile driving at the Kodiak Ferry Terminal project in Alaska, and in its letter of January 23, 2020 regarding impact pile driving during the construction of a new petroleum and cement terminal in Anchorage, Alaska.

Measured noise levels versus distance in Figure 6 of the report titled "Underwater noise emissions from offshore wind turbines", 2005, Klaus Betke also show a match with a 15 dB loss rate. The BOEM report titled "Effects of Noise on Fish, Fisheries, and Invertebrates in the U.S. Atlantic and Arctic from Energy Industry Sound-Generating Activities" recommends a default factor of 15 dB on page B-50, and shows a match of root mean squared(rms) measured noise results on page B-51 with a factor of 16 dB, both of which are dramatically different acoustically from the 40-43 dB being used here, and which would result in much larger exposure ranges.

A number of other studies use the 15 dB factor such as the recent analysis by Stober et al. estimating larger turbine noise source levels titled, How Could Operational Underwater Sound from Future Offshore Wind Turbines Affect Marine Life, March 15, 2021, and the recent study on passive acoustic monitoring (PAM) detection probabilities titled, Pam Guard Quality Assurance Module for Marine Mammal Detection using Passive Acoustic Monitoring, CSA Ocean sciences Inc., August, 2020.

Without a cogent physical and scientific explanation (not just an overview of model names and general descriptions), it is very difficult to see how noise spreading and dissipation well beyond even spherical spreading is being achieved in a regime where the noise propagation is confined to the modest distances and modest depths in coastal waters. The parabolic equation method stated briefly in Section E.4 of the Application appears to have been originally designed for very large distances, 50 to 60 km, and the deeper ocean, 4 to 5 km deep, (Fred D. Tappert, The Parabolic Approximation Method, 1977, the Courant Institute of Mathematical Sciences (the writers alma mater by the way).

The current exposure range calculations therefore assume very large noise dissipation not consistent with other prior calculations used for coastal waters. As a result, these calculations significantly underestimate exposure ranges and animal takes. The Application and the NMFS need to clearly explain what unique physical characteristics and constructs are present in and around this lease area that warrants such a radical departure from accepted practices regarding noise dissipation. In the absence of such an explanation, the application should be revised based on the NMFS's and the BOEM's own previously stated preference for the 15 dB loss factor in coastal waters.

5. Unjustified Noise Source Attenuation Assumption.

Regarding pile driving, the Application is not complete because it identifies no specific noise source attenuation system. Nor does it provide technical justification for the assumed 10 dB attenuation upon which it relies for certain calculations and conclusions. Without that specific proposal and justification, the assumption appears to be arbitrary and designed to artificially keep the level A take number from direct injury, according to the current calculations, below the biological removal rate for the right whale.

As discussed below there appears to be no basis for assuming any significant noise source attenuation in the hearing frequency ranges of the right whale and other low frequency cetaceans (LFC's). Therefore, absent any evidence to the contrary the Application needs to revise its exposure range and take estimates wherever they relied on that assumption, such as in the creation of density area polygons and resulting take estimates.

Regarding source attenuation, it should be noted first that the use of bubble curtains or other systems that are placed immediately around the pile are inherently limited because they cannot attenuate ground-borne re-radiated sound. Therefore, appreciable attenuation is not achieved for the sound that resonates through the ground into the far field. More of the sound emitted during impact pile driving resonates from the ground than through the water column (Caltrans. 2015. Technical guidance for assessment and mitigation of the hydroacoustic effects of pile driving on fish. State of California Department of Transportation, Sacramento, California) and such sound is also of lower frequency impacting LFC's, such as the right whale, as discussed below in item 6.

The Level A take number for the right whale shown in Table 24 of less than one is critically dependent on the January through April exclusion timeframe (should also include December), and the assumed 10 dB attenuation of the pile driving noise source. However, regarding the assumed attenuation at the source, there is only a general reference to the use of bubble curtains in Section 11.2.12 with no specifics as to how it will be achieved in practice. That section also refers to prior measurements of noise attenuation systems that are reasonably expected to achieve greater than a 10 dB broadband attenuation. However, there is no reference provided for those measurements and that assurance, and it is unlikely that any prior measurements would be relevant to these new large diameter monopiles, and jacket foundations.

The discussion of sound attenuation methods in appendix B, Section 2.4 also does not inspire confidence regarding achieving a 10 dB attenuation. It does mention the difficulties encountered with needing larger bubbles for lower frequencies as discussed further below. According to the references provided, the single bubble systems appear limited to piles less than 8 meters in diameter, even though these piles could be as large as 15 meters. The Bellman reference states that noise attenuation systems for jacket foundations are limited, yet the Tables in the Application include 10 dB and higher attenuations for construction schedule 2 involving jacket foundations. The references indicate that for monopile foundations, double bubble curtains or other auxiliary systems will be necessary, but it's not clear that those will be successful for these diameters. In short much of the

discussion is not relevant to the large diameter monopile foundations here or the jacket foundations. There is no specific proposal made that would be expected to achieve a 10 dB attenuation in the context of this project.

Absent evidence to the contrary, assumptions regarding broadband noise attenuation from air bubble curtains should be less than 5 dB, as recommended in Buehler, 2015, titled Technical Guidance for Assessment and Mitigation of the Hydroacoustic effects of Pile Driving on Fish, (see page 4–10). On page 2–18, Buehler (2015) cites actual project results of 0 to 5 dB of attenuation. Measured noise levels in the report titled Underwater Sound Levels associated with Driving Steel Piles at the Vashon Ferry Terminal, Laughlin, April 2010, show in Table 2 the effect of bubbles on root mean square (rms) noise values to be 1 dB. The report titled Underwater Reduction of Marine Pile Driving using a Double Pile, Reinhall, December, 2015, shows a maximum 5.5 dB reduction in rms levels for a bubble curtain. The Caltrans 2015 study cited above, has also stated that even in the near field an assumed source level reduction should be limited to 5 dB, because of the uncertainties associated with the degree of attenuation that would be provided by a bubble curtain.

Thus, achieving a 10 dB reduction would require an auxiliary system such as a double wall pile. However, as discussed below, even that would not address the problem of achieving reductions at the lower frequencies relevant to the right whale's hearing range.

We have seen no written, enforceable, commitment from Atlantic Shores management to achieve a 10 dB broadband attenuation. Also, as shown below there are significant technical problems in achieving such a large attenuation for the lower whale-hearing frequencies needed to protect right whales. In addition, since noise source levels are not presented, there is no way of measuring the noise level and verifying that a 10 dB attenuation is achieved in practice.

Therefore, the NMFS should not assume more than a 5 dB broadband attenuation, and with that, even using the questionable exposure ranges and takes estimates described above, the document admits that the project would cause Level A noise takes of the right whale, absent mitigation. But as discussed below in item 6, even that 5 dB is not applicable to the lower frequency situations involving the right whale and other LFC's.

6. Noise Source Frequency Attenuation. Regarding pile driving, the Application is incomplete because it does not address attenuation in the most relevant frequency range for the right whale and other LFC's. In that regard, it is not broadband attenuation that is critical here but attenuation of noise levels in the frequency range less than 1000 Hertz, as this is the range that overlaps right whale hearing. Attenuating the sound at lower frequencies requires larger bubbles; and practical problems have been raised regarding the control of bubble size distribution and the production of a sufficient number of large bubbles (several centimeters) that are necessary to achieve efficacy at low frequencies (see Measurements of Construction Noise during Pile Driving of Offshore Research Platforms and Wind Farms, Rainier Matuschek and Klaus Betke, NAG/DAGA 2009 Rotterdam).

More specifically, in the study titled Underwater Noise Emission Due to Offshore Pile Installation: A Review Article in Energies · June 2020 DOI: 10.3390/en13123037 by Tsouvalas of Delft University of Technology, it was stated that,

"For piles with diameters larger than 6 meters, that are used as foundation piles of offshore wind turbines, the acoustic energy is radiated at frequencies between 100 and 400 Hz (Section 4.3). At such low frequencies, the desired bubble radii to stimulate resonance range between 8 mm and 32 mm near the surface are between 14 mm (1.4 cm) and 50 mm (5 cm) at a water depth of 30 meters. The creation of bubbles of such large radii is rather difficult, especially in the harsh offshore environment. Thus, despite the role that resonance phenomena may play in sound absorption, the wave reflection caused by the impedance mismatch between the seawater and the air bubble curtain seems to be the single most significant mechanism leading to noise reduction".

As discussed above, achieving a 10 dB attenuation would require an additional auxiliary system such as a double walled pile. Such a system was employed and measured in the Vashon Ferry Terminal report cited above. However, a frequency analysis of the noise reductions between the unmitigated piled driving and the double wall pile shows, e.g., in Figures 9c and 11a, very little noise attenuation occurring below 1000 Hz in the right whale's primary hearing range, and the addition of bubble curtains in Figure 11d does not change that. This was not unexpected because, as discussed above, much of that low frequency sound was re-radiated from the seabed and not affected by the double pile or the close to source bubble curtains.

Therefore, even such auxiliary systems will not provide significant attenuation in the low frequency range, nor will bubble curtains. ***Consequently, the application needs to be revised to assume no attenuation in its calculation of exposure ranges and take estimates for the right whale and other low frequency cetaceans.***

In light of all these noise attenuation difficulties, it would be irresponsible for the NMFS to simply accept the applicant's assurances that a 10 dB can or will be achieved and proceed with a rulemaking based in large part on such a broad (frequency-wise), tenuous and unsupported assumption. Since many of the conclusions in the Application depend on that assumption, a rulemaking cannot logically proceed based on it.

Therefore, if a rulemaking proceeds absent a specific source attenuation proposal and justification, it should assume no noise source attenuation for the right whale and other low frequency cetaceans, and other more realistic attenuation numbers less than 5 dB for higher hearing frequencies, with technical justification for them.

7. Incomplete Level A Take Count- the Harm and Fatality from Level B Exposures.

Even with the very high unexplained transmission loss of 40 dB per decade used, the Application still shows a significant exposure range for the right whale for Level B exposures. For example, Table 20 shows a 6.33 km or 4-mile range using the NOAA RLp50 160 dB criteria, and no source attenuation which is appropriate as discussed above. Using more appropriate transmission loss factors closer to 15 dB per decade that exposure range is expected to increase significantly, and one would expect that exposures above the 160 dB behavior disruption criteria will extend across the entire 12-mile wide right whale's primary migration corridor.

Similarly, notwithstanding the restriction on pile driving from January through April, using the Wood et.al. more accurate approach for estimating takes, the Application in Table 24 still shows a significant 23 Level B takes for the right whale assuming the appropriate no source attenuation as discussed above. Therefore, using more appropriate transmission loss factors both the Level B exposure range and the number of Level B takes are expected to increase significantly requiring the additional analysis below.

Injury and fatality to marine mammals from noise can come from other ways besides hearing loss. The Application does not account for the potential for such harm and fatality from the results of Level B exposures, and therefore does not present a full and complete Level A take number. Rather, it estimates and separates Level A injury from Level B disturbance. But in the regulatory and the real whale world that distinction is not present, and level B disturbance exposures can indirectly lead to worse injury and fatality outcomes.

Under the MMPA, a Level A incident or "take" includes any annoyance that has the "potential to injure" a marine mammal. That linkage is also presented in the December 21, 2016, NMFS interim guidance, defining the term "harass," under the Endangered Species Act (ESA), as to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering".

Therefore, the Application should have included this linkage from reactions to level B exposures to create the "potential to injure" or the "likelihood of injury" with a level of analyses comparable to that given to direct Level A injury take from hearing loss.

With the use of proper construction-related noise source and noise transmission loss numbers, and for the turbine operational noise impacts as explained in Enclosures I and II, level B exposures will extend across all of the right whale's approximately primary 12- mile-wide migration corridor. Under the setting here of a critically endangered whale attempting to complete a migration that is essential to its survival through a well-defined and relatively narrow migration corridor that could now be blocked, that "potential to injure" or to "create the likelihood of injury" certainly exists from a number of possible results of a level B exposure including:

A. The whale is very likely to avoid the elevated Level B noise and its primary migration corridor, and seek a different migration path. But in this setting, to

where? Due to proximity of the project (9 miles), elevated noise levels will persist all the way to shore. Wind turbines will also be placed in the Hudson South area directly adjacent to and on the opposite, eastern side of its primary migration corridor. To avoid that wind complex as well, it would have to go far out to sea, make a turn and continue, with a substantial increase in the distance to be traveled. Would it find food along the way?, would it arrive late?, would it complete, or would it abandon its migration? What are the implications of this on its feeding, health, reproduction, and survival? These are critical questions to be addressed here.

B. The whale may be disrupted from foraging and lose the energy it needs to complete its migration.

C. Since the level B impulsive noise criteria of 160 dB is greater than the normal vocalization range of the right whale of 125 to 150 dB, communication between migrating mothers and calves can be lost resulting in a calf fatality, and

D. A level B exposure can cause whales to ascend, and swim just below the surface where they are more susceptible to vessels strike, not just from construction-related vessels, but from other vessels as well. This behavior has been demonstrated experimentally by Nowacek et al in the paper titled, North Atlantic right whales ignore ships but respond to alerting stimuli, The Royal Society, May 20, 2003.

From the estimated level B exposure numbers, the number of whales likely to experience any of these above results needs to be estimated and added to the direct level A injury take numbers from hearing loss to get a full and complete level A take estimate. As discussed above, the level B exposure number used should assume no noise source attenuation for the right whale and other LFC's. In addition, as discussed further below, the level B exposure numbers used should be based on the Wood et al. probability of response approach to account for reactions of the more noise-sensitive members of the right whale population.

All the reactions A through D above and perhaps others will affect the right whale's migration. Therefore, the effect of all should be summed to present the full impact on its migration, and what that means for its survival. **For this migratory setting, a new and separate Migration Impact Report (MIR) should be done.**

8. Masking of Whale Communications that could impair or prevent its migration, leading to serious injury or death.

The whales use sound to communicate with each other during migration. The impacts of masking those communications, including obstruction or delay of the right whale's migration, should have been (but was not) analyzed in the ITA Application, as it has direct implications on the survival of the species.

The Application only provides a general discussion of masking in section 7.1.1 and limited information about the right whale's vocalizations in section 4.1.4 where it mentions a tonal call as low as 137 dB. However, it does not tie the two together to discuss the problem, as explained below.

One path to such injury involves separation of calves from mothers as a result of masking of their communication from elevated noise levels. Such communications can employ low-amplitude signals susceptible to masking as discussed in the report, Acoustic crypsis in communication by North Atlantic right whale mother–calf pairs on the calving grounds, Susan E. Parks, Dana A. Cusano†, Sofie M. Van Parijs and Douglas P. Nowacek, Published:09 October 2019.

The right whale's vocalizations are normally at the 125 dB rms level for low background noise (lower than mentioned in the application), but can rise to 150 dB in the presence of high background noise (Parks et.al., The Royal Society, Individual right whales call louder in environmental noise, July 7, 2010).

The potential for loss of mother/calf communication was presented in, Acoustic propagation modeling indicates vocal compensation in noise improves communication range for North Atlantic right whales, Jennifer B. Tennessen, Susan E. Parks, June 15, 2016. The 125 to 150 dB range is lower than the impulsive disturbance criteria of 160 dB. Therefore, masking will occur at distances greater than those calculated for the behavior criteria. Those masking distances need to be calculated, and considered in determining the potential for harm and Level A takes as discussed above, and to delineate monitoring and mitigation zones.

9. Cumulative Impact. Regarding nearby projects, the Application does not address, as suggested in the MMPA, the cumulative impact of similar actions in the same geographical area, such as the Ocean Wind project just to the south of this project and the wind energy development planned for the Hudson South area to the east of this project, both of which would add to the intensity and duration of the noise received by marine mammals in the area from this project alone.

Regarding the scope and duration of impacts, the Application does not address the full range of activities involving each project from ocean surveys, to construction, to operations, to decommissioning as there are issues with each phase and the harassment will be basically be continuous from now for the next 40+ years.

10. Decommissioning. Deferring all consideration of decommissioning for many years is not in our view a responsible planning approach. Without some definition and binding commitment on the applicant, that could easily lead to misunderstandings, and foreclose the use of hundreds of thousands of acres of a precious ocean resource in perpetuity.

While the exact number of turbines to be decommissioned may have to await, at a minimum "decommissioning" should be defined. There should be a condition of project approval that for these wind turbines "decommissioning" means dismantling, removal, and disposal of the blades, the nacelle, and the tower entirely, and for foundation removal to a minimum pre-specified depth below the seabed. Corresponding definitions should be specified for the cables and substations as well.

In addition, the application should, *for a single turbine*, present the technical feasibility of doing it, and then assuming it can be done, each step involved and its environmental impact. For example, for cutting the foundation, what are the

techniques to be used, e.g., by diamond wire or water jetting, and their noise and other impacts? Also, how many ships, how large, what flag, how many trips, and how many workers will be involved? What equipment will be needed? How long will the removal process take? For each component what are the recycling and disposal options?

Since it has never been done before, without some confidence that these large turbines can in fact be decommissioned, it would not be responsible to just assume it.

Without these ten essential pieces of information above, the Application cannot be considered complete. It should be returned to the applicant for revision.

Additionally, there are a number of other problems that require attention before proceeding to a rule making.

Project Scope: Number of turbines. Regarding the number of turbines considered, the scope of the proposal is too small. It should include the full project in the lease areas of 357 turbines for which COPs have been submitted. The COP for project 3 was submitted in April, 2022, using similar turbines and layouts, leaving ample time to include it here. The EIS and this take authorization should address the full project to determine the full impacts on marine mammals, and not segment and break it up into pieces to minimize impacts.

Project Scope: Turbine Power and Drive. The Application does not disclose the power of the proposed turbines (WTGs), which is a significant omission, because the size and power of the turbines not only affects pile diameter and driving depth and thus pile driving duration and pile driving noise; it also affects the operational noise generated by the turbine and by the wind array as a whole. This is especially the case where (as here) the turbines in question are gearbox-driven.

Enclosures I and II, attached hereto, provide the operational noise source level for the Vesta-236 turbines selected here based on two excellent studies: "How could operational underwater sound from future offshore wind turbines impact marine life?" by Uwe Stober and Frank Thomsen, *The Journal of the Acoustical Society of America* 149, 1791 (2021). and Tougaard et al., How loud is the underwater noise from operating offshore wind turbines?, Journal of the Acoustical Society of America 148(5), November, 2020**.**

Project Impact Scope, Operational Noise: The scope of the impacts to be considered in the ITA is not sufficient. Using the noise source levels derived as mentioned above, along with accepted noise propagation loss methods just for an array of seven turbines, it is shown in Enclosures I and II that the continuous noise behavioral criteria of 120 dB will be exceeded throughout the right whale's primary migration corridor. This could potentially block the essential migration of the right whale. The problem is summarized in Enclosure I in a presentation given to the North Atlantic Right Whale Consortium on October 26, 200, and explained in more

detail in Enclosure II. Therefore, the scope of this rulemaking should be expanded to include a thorough analysis of operational noise impacts, particularly on the migration of the North Atlantic right whale.

Disclosure of Noise Source Levels. Noise source levels should be disclosed for all phases of the project. That is not the case here regarding pile driving. In Table F1 for the LFC 95% range, a single strike sound exposure level (SEL) value of 180 dB is listed at 50 meters (m). Back calculating that to 1 m using a spherical spreading 20 dB loss factor would result in a single strike SEL source level of 214 dB.

The simultaneous solution pf the transmission loss equation, Source Level-183 dB=Noise transmission loss factor x log (exposure range), for the L_E exposure range numbers in Table 20 for the North Atlantic right whale and source attenuations of zero and 15 dB yields a SEL source level of 243 dB.

Elsewhere, the 2007 report by Sub-acoustictech titled "Measurement and interpretation of underwater noise during construction and operation of offshore wind farms in UK waters", shows peak levels of pile driving noise increasing strongly with pile diameter. Extrapolating that data to a 12-meter diameter pile yields a peak source level of approximately 270 dB. Applying a ratio of 0.89 for SEL to peak numbers (Table 7–9 of the Nuclear Regulatory Commission report on Construction Noise Impact Assessment) gives a SEL number of 240 dB.

The Application should state whether the 240 to 243 dB range is the SEL source level and explain its relationship to the single strike value. Similarly, the source levels used to calculate Level B exposure ranges should be disclosed, including clarification of peak, SPL, and rms levels.

Marine Mammal Densities. Regarding pile driving, the 3.9 km polygon created around the lease area for calculating marine animal densities is too small and its use will miss the higher densities of the right whale in much of its primary migration corridor. It should not be based on the tenuous 10 dB attenuation assumption. Rather as described above, for the right whale and other LFC's it should be based on no source attenuation, and for higher frequencies it should assume no more than 5 dB reduction.

Similarly, regarding the HRG surveys the areas shown around the lease area in Figure 14 of the Application should be expanded based on the exposure ranges for a 211 dB noise source and a 15 dB noise loss factor as discussed in detail in enclosure III. Again, the use of a small technically unjustified 141-meter exposure range misses most of the North Atlantic right whale's primary migration corridor.

Further, regarding the HRG vessel surveys proposed here, using average seasonal numbers based on the human calendar (Section 6.1.1.3) is arbitrary and not conservative-as stated in the application. Since the applicant will not commit to, nor will NMFS require, that the 60-day vessel surveys be avoided during the right whale's primary migration months that scenario must be considered. Therefore, the density for the right whale should be the average of the February and March

numbers in Table 12, or 0.656 animals per 100km2, which will double the density number being used in Table 14.

Animal Noise Aversion Modeling. The behavior of marine mammals, in particular the right whale in response to elevated noise levels is the subject of considerable scientific work and uncertainty. While there is general consensus that the whale will seek to avoid the noise, it is less clear how quickly the whale will isolate the directional source of the noise and move away from it. The Application presents none of the basic assumptions being made in the animal aversion modeling nor any scientific justification for them. Absent such disclosures to allow for a review of them based on current scientific knowledge all the aversion modeling should be dispensed with.

Take Estimates for the Sound-Sensitive Population. As discussed in the Enclosures, the precarious state of the North Atlantic right whale and its very low biological removal rate require that the NMFS show with high statistical confidence that not a single whale will be seriously harmed or killed as a result of this take authorization.

Take estimate analysis by the NMFS to date have not done that. They rely on mean estimates of animal density, vessel and animal speeds and other factors. They also use the 160 decibel (dB) criteria for impulsive noise and 120 dB criteria for continuous noise which are based on thresholds at which half of the animals respond (RLp50). This can grossly underestimate the number of animals affected as shown in the paper by Tyack and Thomas, titled, Using dose-response Functions to improve calculations of the impact of anthropogenic noise, September, 2019.

Providing that statistical confidence starts with an acknowledgment that that a sensitive sub population will be affected at levels below 160 dB for impulsive noise and 120 dB for continuous noise. Although the density of that sensitive population is less, the distance required to meet those lower dB numbers increases exponentially, and for a point source like pile driving the area affected increases by the square of that distance. So, it is likely that the product of the lower density and the much larger area affected, or the number of takes, will be greater than that calculated using the fifty- percent affected criteria. The NMFS needs to include such an analysis in its take estimates.

The level B exposure estimates using the Wood et al (2012) probabilistic approach for different sound levels that is presented in the Application are a good start for doing that, and should be used for the starting Level B numbers to estimate indirect Level A takes discussed in Section 7 above. The NMFS needs to provide a similar does-response relationship to calculate its Level A takes from hearing loss.

Inconsistent Treatment of Vessel Survey Impacts. With regard to the treatment of vessel survey impacts in a proposed rule we ask that the NMFS reconsider the comments we provided on the previous Atlantic Shores vessel survey and others, presented now in Enclosure III. We raised concerns regarding the use of low noise source levels (203 dB for the Dura-Spark unit), high noise dissipation

rates (20 dB per decade for horizontal distances greater than the water depth), the justification for the NMFS small numbers criteria, and the lack of evidence and scientific support for findings of negligible impact.

Regarding the 203 dB level presented in Table 3, the Application uses data from a much smaller less powerful device merely because it had a data point for the power level to be used, rather than simply interpolating between two power levels for the actual device, which would result in a source level of 211 dB. This to us has no rational technical basis. In addition, it has ignored the fact that the 211 dB noise source number for the Dura spark 240 unit appears in a number of other technical reports as shown in Enclosure III. The NMFS should require the use of the 211 dB number for the source level which of course would make a large difference in the actual exposure range and ensonified area.

Regarding noise dissipation for vessel surveys, as explained in Enclosure III, the NMFS is allowing the use of a 20 dB per decade noise loss factor for vessel surveys for this project which is inconsistent with the 15 dB "practical spreading" factor it has used for many other Incidental Take and Harassment Authorizations, as summarized above.

Even within this same ITA Application, the NMFS would be using two different noise loss methodologies for vessel survey noise versus pile driving construction noise. For impulsive noise reaching the behavioral level of 160 dB it is apparently using a 40-43 dB transmission loss factor for pile driving versus 20 dB for vessel surveys.

The NMFS needs to either explain the departure here from its prior practice and why it would allow the use of two very different noise loss factors for impulsive noise sources in the same area, or revise its vessel survey methodology to use the 15 dB factor as recommended above and in Enclosure III.

Therefore, these concerns are presented again in Enclosure III along with certain NMFS responses, which as explained we do not find convincing. We again ask that the NMFS change its calculation methodology regarding the analysis of vessel survey noise impacts. We ask again that NMFS adopt mitigating measures for vessel surveys such as passive acoustic monitoring (PAM) and simply scheduling surveys to avoid the right whale's primary migration corridor during its main migration months. We note that the failure to schedule vessel surveys to avoid the right whale's migration corridor and months is inconsistent with its better approach on scheduling pile driving.

Inadequate Mitigation of Pile Driving Noise, Leading to Level A Take of North Atlantic Right Whales. The Application, even with its very large noise loss factor, admits that under certain construction scenarios, project pile driving will expose North Atlantic right whales to direct Level A harassment noise, resulting in Level A take from hearing loss. With the realistic noise loss and low frequency attenuation described above, that take will increase and exceed the right whale's biological removal rate. With the addition of the indirect harm from Level B exposures discussed in Section 7, above the Level A take will get even larger.

The Application, however, then pivots and contends that no such take will occur due to the detect-and-avoid mitigation measures that Atlantic Shores will implement. As shown below, these mitigation measures are facially inadequate and will not sufficiently protect right whales from the project's Level A noise.

1. **Soft Start Procedure Unproven and Unlawful.** The Application indicates that Atlantic Shores will implement a "soft start" pile driving procedure where each pile driving episode begins with hammer drops at less than maximum intensity, thereby providing a "warning" to whales and encouraging them to leave the pile driving impact area. There is no evidence that this soft start strategy will work as planned, especially if any of the whales are actively foraging. The data indicate that whale behavior in response to noise stimuli varies dramatically among species and even among individuals within a single species. Further, the data indicate that whale behavior in response to noise also varies depending on context. Note also that the "soft start" is a form of animal hazing and thus constitutes *intentional* harassment rather than *incidental* harassment. As such, it cannot be authorized under either the MMPA or the ESA. See 50 CFR § 18.27(c) (Subchapter B) [MMPA distinguishing "incidental" take from "intentional" take]; see also 16 USC §§ 1538 and 1539 [ESA prohibits all take unless "incidental" to a lawful activity]; see also *Strahan v. Roughead, supra,* 910 F.Supp.2d at 367.

2. **Soft Start Clearance Procedure, If Successful, May Expose Right Whales to Other Threats.** The purpose of the soft start procedure is to clear all right whales from the pile driving impact area during each day's pile driving operations. If successful in this effort, the soft start procedure will effectively force right whales out of their preferred foraging areas and/or migration routes, an impact not addressed in the application. The soft start clearance process will also push whales into areas where they may encounter other threats, including but not limited to heavy vessel traffic and fishing gear. This impact, too, is omitted from the Application's analysis.

3. **PSOs Will Not Be Able to Detect and Protect Right Whales.** According to the Application, Protected Species Observers (PSOs) will ensure no right whales enter (or remain in) the Level A "ensonification" zone. However, PSOs have a limited visual range (approximately 1,500 meters from an elevated platform, approximately 1,000 meters from a vessel bridge). Worse, PSOs cannot observe right whales more than a few feet (5-10) below the water's surface; whales swimming at depth will go undetected. It also appears that pile driving will be allowed to take place after sundown, provided the pile driving event in question commences during daylight hours. This means that PSOs will be asked to look for and detect right whales in the dark using night-vision goggles and heat sensing devices. There is no evidence that these specialized pieces of equipment will allow PSOs to detect whales in the dark at distances more than a few hundred meters. And, of course, night goggles and heat sensing devices

will be of little use when the whales are swimming under the water at depth.

4. **PAM Systems Have Significant Limitations.** The Application indicates that the PSO detection effort will be supplemented by passive acoustic monitoring (PAM) equipment. However, according to a recent study titled "PAMGuard Quality Assurance Module for Marine Mammal Detection Using Passive Acoustic Monitoring (2020)," PAM systems have critical limitations when it comes to detecting marine mammals, especially baleen whales like the right whale, which tend to vocalize much less frequently than other cetaceans. The study was published in August 2020 and prepared by CSA Ocean Science, Inc., with assistance from scientists at the University of St. Andrews (Scotland) and the Scripps Institution of Oceanography, University of California, San Diego. The primary author of the study is Mary Jo Barkaszi of CSA Ocean Sciences, Inc.

   The study explains that PAM systems may have a significant "miss rate" when attempting to detect marine mammals, even those that vocalize many times an hour. In addition, a PAM system's performance efficiency depends on many factors, including (i) the system's ability to detect weak signals that may be masked by background sound levels and (ii) the operator's ability to stay attentive and interpret the sound data produced by the monitoring equipment. The chief limitation, however, is that PAM systems only detect whales that are actively vocalizing; whales which are not vocalizing simply do not register. Given that right whales often go days or weeks without uttering a sound, there is a real possibility that such "silent" whales will enter the Level A impact zone undetected by either PSOs or PAM. If this happens, those whales will be exposed to Level A noise and potentially sustain auditory damage and permanent threshold shift (PTS).

5. **PAM Coverage Area and Shutdown Zone Not Defined.** Despite its limitations, PAM does provide some ability to detect vocalizing whales when they are within the coverage area of the PAM equipment. Unfortunately, however, the Application does not adequately describe or define the PAM coverage area during project pile driving operations. Nor does it define the size or the boundary of the "shutdown" zone – i.e., the area where, if a right whale is detected within it, will require an immediate shutdown of pile driving. Much greater detail needs to be provided regarding the deployment of the PAM system as to where and how many monitors will be placed and how data will be gathered in real time.

Recalculation of Level A and B Exposure Ranges. As discussed above, the noise dissipation modeling and the assumption of a 10 dB noise source attenuation are flawed. Therefore, the Level A exclusion zone and the level B monitoring zone distances need to be re-calculated for Table 1 in appendix E. In addition, the

terminology in the text does not match the labels in the Table making it very difficult to understand the material.

Shut Down Procedures Must Be Applied to Animal Detections within the Level B Monitoring Zone for Migrating Species. The shut down and mitigation procedures adopted for the level A exclusion zone need to be applied to the level B monitoring zone as well.

In a migratory setting, Level B disturbances may not be just some innocuous short-term inconvenience to the right whale that it can easily avoid and continue its migration, as the Application suggests. As discussed above in Section 7 and in the Enclosures, in a migratory setting, a level B disturbance can lead to serious harm or fatality, the same as for a direct Level A exposure.

This can occur from several pathways. As mentioned just above, a Level B disturbance may disrupt foraging that is necessary for the whale to continue its migration. Avoiding a Level B disturbance can block or delay the right whale's migration. Since the impulsive Level B criteria here of 160 dB is greater than the right whale's normal vocalizations of 125 -150 dB, a Level B exposure will mask mother/calf communication during migration likely leading to separation and death of the calf. Based on the Nowacek et al. experiments described above and in Enclosure III, Level B exposures can cause the whale to surface and swim just below the surface where it is more vulnerable to vessel strike. The simple, inescapable, logic here is that if a right whale is attempting to migrate through a Level B exposure zone, we must let it pass. Therefore, the same shut down and other mitigation procedures applied to direct Level A injury should also be applied to indirect injury from a level B disturbance.

Vessel Strike Mitigation Measures are Inadequate. Vessel strikes pose a major threat to right whales. The Atlantic Shores project will require the use of a wide range of vessels, some with the ability to travel at speeds in excess of 15 knots – the speed at which a collision with a right whale is 100 percent fatal for the whale. For example, according to the Application, all project vessels must travel at 10 knots or less, ***except*** crew transfer vessels, which need not adhere to the 10-knot speed limit. Not only are crew transfer vessels the most common vessel type used by the project, they are large (averaging about 90 feet in length) and they are fast (averaging 25 to 29 knots). By allowing crew transfer vessels to travel at speeds in excess of 15 knots, Atlantic Shores and NMFS effectively undermine the protective benefits of the 10-knot speed limit, leaving right whales vulnerable to vessel strikes and mortal injury.

The Application argues that PSOs and PAM equipment will ensure that no whales are harmed, even by crew transfer vessels traveling at speed. But as shown above, PSOs and PAM, whether working in concert or individually, are not sufficient to protect whales from fast-moving vessels. The PSOs cannot detect whales under the water's surface or hidden by high swells, and PAM cannot detect whales that are not actively vocalizing.

Another defect in the Application is that it does not clearly disclose how many total trips will be made by each vessel type; nor does it clearly disclose how many vessel miles each vessel type will travel during the course of the project's construction, operation, and decommissioning.

Mitigation Measures Provide Atlantic Shores with Too Much Discretion. One of the major structural defects of the project's mitigation program is that it gives too much discretion to Atlantic Shores in terms of when certain protective measures can and should be implemented. For example, the Application allows Atlantic Shores to determine when whale protective measures are infeasible or would otherwise jeopardize construction activities. This approach provides little assurance that the welfare of right whales and other federally-listed species will be prioritized over construction schedules and other economic considerations. In short, the mitigation measures provide too little regulatory oversight by NMFS.

Transparency. Regarding noise impacts from construction activities, notably pile driving, we note that in prior EISs, Biological Assessments and Take Authorizations, noise source levels have not been provided. Noise dissipation factors are also obscured by the use of various opaque models. These are critical disclosure omissions because it does not allow for scrutiny of the calculations of distances to meet NMFS noise criteria or take numbers to see if those calculations are compatible with current scientific practice. Noise source levels and the basic driving equations in any "models" used must be disclosed in any rulemaking.

In Appendix E, paragraph E.4, the Application provides several references to support the use of its marine operations noise model (MONM) noise propagation model. One reference was available to us but does not compare and explain that modeling approach to other traditional methods. It only shows that model inputs can be adjusted to produce a wide range of exposure range results, which actually amplifies the concerns here, i.e., that in addition to the physical and mathematical depictions within the model we do not know what key inputs are being used. The other references were not accessible, and were requested from the NMFS, but not received. We also note here that the Marine Mammal Commission has raised questions regarding the JASCO MONM model as well as the JASCO pile driving source model (PDSM) in its letter to the NMFS dated March 1,2021, on the South Fork Wind project.

Compounding this problem here, we note that the calculation of exposure ranges and take estimates has been further obscured by the use of an opaque "Jasmine" model purporting to account for whale behavior in the presence of elevated noise levels, for which basic assumptions, equations and inputs are not made available. This is a subject of with considerable uncertainty and the assumptions made need to scrutinized for their scientific justification. This information must be disclosed in any subsequent rulemaking to allow comparison of the equations and numbers used and the results with main stream scientific practices. If it is not disclosed the NMFS should not allow the use of this model.

MMPA Review Criteria. In any subsequent rule making, the NMFS should reconsider and lower its thirty-three percent of the species population criteria for determining "small numbers". As explained in Enclosure III this is not consistent with prior case law which requires a number less than twelve percent, a number of recent scientific impact studies which point towards numbers of a few percent, or the common English language usage of the word "small".

We have also noted that the NMFS casually assumes that a whale encountering an elevated noise level will simply avoid it. We do not believe the situation is that simple as whales may not know where the noise is coming from, and other factors come into play in determining the whale's behavior. The NMFS reliance on an opaque Jasmine model to predict such behavior does not provide sufficient disclosure of this issue, so again, the NMFS needs to disclose the basic assumptions equations and inputs for that model. In general, it needs to provide much better justification for these simple but sweeping whale behavior conclusions regarding noise avoidance and other behaviors.

NEPA Compliance and Coordination. Considering the magnitude of the construction proposed, the noise generated and the proximity of marine mammals to the site, the granting or denial of this take authorization would constitute a major federal action significantly affecting the environment. It must therefore by supported by an environmental impact statement (EIS). Therefore, the NMFS must prepare its own EIS or work with the BOEM as a cooperating agency in the preparation of its EIS, and then consistent with NEPA rules, this ITA review must be coordinated with the EIS review to the "maximum extent possible".

That logically means that the proposed rule here should go out coincident with the draft EIS so the public can see and benefit from the NMFS perspective on this critical subject in its review of the EIS, and the final rule released with the final EIS. This sequencing was recommended in our comments on the EIS Notice of Intent but apparently ignored.

Since this action has been initiated late relative to the EIS, a draft of which is expected soon, either the proposed ITA rule release should be accelerated or the **release of the draft EIS should be delayed until the proposed ITA rule is ready, which we understand to be May of 2023.**

Also, according to BOEM's new NEPA policy, to consider projects with power levels from the lease area limited only to those that have been approved by the State, the scope of the Application would be too large. The State of New jersey has only approved the turbines for project 1 for 1,510 megawatts, not the 800 megawatts for project 2. Therefore, to be consistent with BOEM policy, the scope of this Application would have to be limited to project 1. However, we believe the BOEM NEPA policy is flawed legally and is far too restrictive in its lack of consideration of alternate power levels, and as said just above the required course is to consider the full 357 turbine project.

Compliance with the Jones Act. To confirm compliance with the Act, regarding foundation installation and Table 5 of the Application, the specific transport barges that may be used should be identified. It is our understanding that these must be US flag vessels and that virtually none exist today of the size necessary to transport these large turbines to the installation site. In addition, the wind turbine installation vessel to be used should be identified and how its operation will comply with Act explained.

Compliance with Other Statutes, e.g., ESA Consultation. The NOA makes no mention of compliance with the ESA. We would hope that a Section 7 consultation is underway. If so, that should have been coordinated with the EIS and this ITA process. Specifically. the biological assessment should be made available at the time the draft EIS and proposed ITA rule are released, so again the public can benefit from both the BOEM's and NMFS's perspective on these subjects in its review of the EIS. This was recommended in our comments on the Atlantic Shores EIS notice of intent but apparently disregarded.

Historical Perspective. The FR Notice incorrectly states that Atlantic Shores secured the lease area through a competitive process. It purchased the area from another company. For a full background discussion, The FR Notice also needs to explain how the New Jersey wind energy area came into being, because in our view that process was flawed and did not take into account the impacts to marine mammals being reviewed now. This provides perspective on why, in order for this project to proceed, the NMFS at this late stage now has to reach the rather arbitrary conclusion that 357 large, noisy, wind turbines in or adjacent to the migration path of a critically endangered whale will have a negligible impact on it.

Conclusions and Recommendations.

1. Project Redefinition. Regarding injury to the right whale, i.e., Level A takes, from construction noise, both the 10 dB source attenuation assumption, and the high noise transmission loss factors used in the Application are technically unsupportable and arbitrary, and appear designed to just produce a Level A take estimate from hearing loss less than its biological removal rate of one animal.

Using appropriate noise transmission loss factors, assuming no attenuation of noise source levels at the lower frequencies relevant to the right whale's hearing range, and counting the number of level A occurrences resulting from level B exposures, the number of Level A takes for the right whale will significantly exceed its biological removal rate, and create major implications for its decline. The addition of operational noise and survey impacts will increase that Level A exceedance even further.

Regarding Level B disturbances to the right whale's behavior, even with the very high unexplained transmission loss of 40 dB per decade used, the Application still shows a significant exposure range for the right whale. For example, Table 20 shows a 6.3 km or 4-mile range using the NOAA RLp50 160 dB criteria, and no source attenuation, which is appropriate for the whale as discussed above. Using appropriate transmission loss factors closer to 15 dB per decade, that exposure range is expected to increase significantly, and one would expect that exposures above the 160 dB behavior disruption criteria will extend across the entire 12-mile-wide right whale's primary migration corridor here.

Similarly, notwithstanding the restriction on pile driving from January through April, and the very high transmission loss factors, using the Wood et.al. more accurate approach for estimating takes, the Application in Table 24 still shows a significant

23 Level B exposures for the right whale assuming again the appropriate no source attenuation as discussed above.

Therefore, using appropriate transmission loss factors and no noise source attenuation, both the Level B exposure range and the number of Level B exposures impacting its behavior are expected to increase significantly creating major implications for the whale's migration as discussed above in item 7. The addition of operational noise will increase Level B exposures further and complicate the situation since turbine shut-down procedures will likely not be practical.

Based on the above, any finding of negligible impact to the right whale from this project would be arbitrary. If numerous vessel surveys, the driving of 357 foundation piles, 12 to 15 meters in diameter, and the long-term operation of 357 15-megawatt gearbox turbines each turbine with a noise source level of at least 180 dB, will have a negligible impact on a critically endangered whale attempting to migrate through the area, then it is hard to imagine any ocean activity that would violate the MMPA take provisions.

We would recommend that NMFS take a step back from the comment/response mode, and consider the implications and precedent-setting nature of pursuing this rule-making. In essence, it would be proposing is that placing and operating 357 huge gearbox turbines in and near the migration path of a critically endangered whale will have a negligible impact on it. Such an incredulous proposal would have far-reaching implications regarding the strength of the MMPA, how it is being administered, and frankly on the credibility and reputation of the NMFS.

Rather, we would suggest that NMFS exercise judgement and its legal authority here, and not proceed with this rule making absent a significant change in the proposed project itself. Those changes could include establishing buffer or turbine exclusion zones away from the whale's primary migratory corridor, and reducing the number, size and drive type of the turbines to be used, to produce less construction and operational noise. This is the only way that this project could possibly be made compatible with the MMPA. We would be glad to discuss with the NMFS more detailed changes along these lines.

2. Technical and Scientific Transparency and Justification. As explained above many factors going in to the exposure range and take estimates need to be fully justified scientifically. The Application and the NMFS need to clearly describe the basic mathematical constructs and inputs being used for its modeling. It needs to explain what unique physical characteristics and mechanisms are present in and around this lease area that warrant such radical departures from the scientific literature in terms of accepted noise dissipation factors.

3. Revision of Level A and B Exposure Ranges and Takes. In the absence of such disclosures and justifications, the exposure range and take numbers in the application, or in any other technical support document used for a rule-making, should be revised using the NMFS's and the BOEM's own previously stated preference for use of the 15 dB noise loss factor in shallow coastal waters. Noise

source Levels used should be disclosed and justified. Marine mammal densities should be adjusted as described above. The Wood et al, probabilistic approach should be used for calculating Level B takes and a similar relationship developed and used for Level A takes from hearing loss. Indirect injury from Level B exposures should be added to the Level A takes from hearing loss.

Regarding noise source attenuation, the Application or any other technical support material used for a rulemaking should be revised to assume ***no noise source attenuation*** for the right whale and other low frequency cetaceans, and other more realistic attenuation numbers ***less than 5 dB*** for higher hearing frequencies, with technical justification for them. As demonstrated above, it would not be appropriate for the NMFS to proceed with a rulemaking based in large part on a tenuous, unsupported and unverifiable 10 dB source attenuation assumption.

3. Application Revision. As explained above in Sections 1 through 9, this Application is not complete in other respects. It should address, among the other omissions described above, the full project scope of 357 turbines and operational turbine noise impacts. It should be revised before any rulemaking proceeds.

4. Corrections and Additions Needed to Support any Rulemaking. If the NMFS proceeds with this rulemaking absent changes in the application,

Its timing relative to the EIS and a Section 7 ESA review should be adjusted as described above.

It should address the full project of 357 turbines.

It should address, as referenced in the MMPA, the cumulative impact of similar actions in the same geographical area, such as the Ocean Wind project to the south of this project and development in the Hudson South area to the east of this project, both of which would add to intensity and duration of the noise received by marine mammals.

It should identify the Vesta-236 15-megawatt turbines to be used, their expected mean power output, and their operational noise source levels.

It should include turbine operational noise impacts.

It should address all vessel surveys undertaken.

It should create a new technical support document (TSD) disclosing and justifying all SPL and SEL noise source levels, noise transmission loss factors, and noise source attenuation assumptions.

It should, in that TSD, use disclosed and justified source levels, and revised noise transmission loss factors and noise source attenuations in new calculations of exposure ranges and takes,

It should provide a description and rationale for the whale behavior assumptions being employed in the Jasmine model, otherwise it should dispense with the animal avoidance scenarios.

It should revise its monitoring and mitigation zones and procedures as discussed above, consistent with those new calculations.

It should revise its vessel survey impact methodology as explained in Enclosure III, and adopt much more protective mitigation measures to achieve the least practicable adverse impact.

It should provide for a lower "small numbers" criteria of a few percent, a noise-sensitive subpopulation analysis, an analysis of potential harm and fatality from the results of Level B exposures, and PAM system details.

To summarize, there are many scope and technical and informational deficiencies with the current Application, and based on it, this action is not ready for a rulemaking. We suggest that substantial more work needs to be done before proceeding to that.

If a rulemaking proceeds, we strongly recommend that a new technical support document be created by an independent contractor that would address the deficiencies presented here.

Sincerely,

Bob Stern, Ph.D., former Director, Office of Environmental Compliance, U.S. Department of Energy, on behalf of Save Long Beach Island, Inc., drbob232@gmail.com, 917 952-5016.

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Enclosure I Operational Turbine Noise Impact, Summary
Enclosure II Operational Turbine Noise Impact, Detail
Enclosure III Vessel Survey Noise Impacts