Interim report on RECENT Whale Deaths and Offshore Wind Vessel Surveys

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Summary

This report summarizes key facts and information regarding what is known about wind vessel survey noise magnitude, extent and impact and its potential connection to a recent unprecedented number of whales washed up along the Jersey Shore.

The key findings of the report are:

- Based on the Coast Guards Local Notice to Mariners of January, 23 there were at least six vessels doing geotechnical surveys off the New Jersey coast during the December/January time frame. Another dead whale was spotted by a survey vessel on January 28th, about 12 miles off Long Beach Island.

- The noise levels and distance ranges above the National Marine Fisheries Service (NMFS) criteria for whale behavior disturbance for approved vessel surveys have been underestimated. The NMFS estimated that noise levels above their general 160 dB criteria would only exist a**tenth of mile** from the vessel. Using documented, measured noise source levels, a generally accepted noise dissipation rate, and a noise-level criteria to avoid disturbance more relevant to baleen whales, that distance **increases exponentially to 13 to 34 miles**, depending on noise device settings.

- The noise from the vessel survey devices is not likely to cause permanent hearing damage to whales in the vicinity unless they got very close to the vessel, so that damage would not show up on post-mortem examinations, even if it was looked for.

- However, the noise levels are sufficient to create extended ranges, 13-34 miles, where the whale's behavior will be disturbed, potentially leading to other serious outcomes.

- The situation calls for a prompt, serious and transparent investigation by those with the skills and independence to reach fact and science-based conclusions.

- The NMFS and Bureau of Ocean Energy Management (BOEM) response to the episode has not provided relevant and sufficient justifications to dismiss the matter, and the agencies should create the team necessary to do the investigations.

It is beyond the scope of this report but there are similar issues and concerns about the noise levels and impacts from pile driving during construction and from the normal operation of large turbines.

Vessel Survey Noise Impact

In a recent five-week period, five whales were washed up on New Jersey shores with no evident cause of death, as listed below, and there have been an unusual number of close-to-shore sightings. Another dead whale was spotted offshore on January 28th.

- 12/5/2022, Keansburg, NJ: infant sperm whale, 12-feet long
- 12/10/2022, Strathmere Beach, NJ: juvenile humpback whale, 30-feet long
- 12/23/2022, Atlantic City, NJ: humpback whale, near juvenile, 30-feet long
- 1/7/2023, Georgia Avenue beach, Atlantic City, NJ, humpback whale, 30-feet long.
- 1/13/2023, North End, Brigantine Beach, NJ, sub-adult, humpback whale 20-feet long.

According to data from the Marine Mammal Stranding Center, over the last 20 years, there have been an average of seven whale strandings per year in New Jersey. At this recent rate, whale strandings will far exceed those in past years, and the only relevant thing that we are aware of that has recently changed is the large number of wind energy vessel surveys being conducted off the coast concurrently using high intensity noise devices to characterize the seabed for future wind turbine placement. In many cases those vessels are traversing the same areas collecting similar data.

Adding to that coincidence, Save LBI commented extensively[W22] a year ago to the National Marine Fisheries Service (NMFS) that the noise impact from these devices was being underestimated, and that it could drive whales towards shore seeking relief.

Taken together, it creates the potential for the vessel surveys as the cause, so, for the whale's sake, let's explore what we know.

- Based on the Coast Guards Local Notice to Mariners of January 23 there were at least six vessels doing geotechnical surveys off the New Jersey coast during the December/January time frame.
- The controlling noise device on these vessels i.e., the one with the highest noise level at the vessel and that spreads the noise underwater in all directions is the Dura Spark UHD unit. That unit produces enough sound energy to penetrate the ocean floor to a depth of 328 ft with a blast frequency of 2 times a second.
- Based on Table 10 in the reputable and detailed measurement study[W26] that the NMFS cites often, when operating at an energy 750 joules (a level mentioned in the Atlantic Shores survey approval), the root mean square noise source **level from that device should be 205 or 211 dB** based on whether it's operating with 400 or 240 tips respectively.

- But the NMFS survey approval for the Atlantic Shores project used a low 203 dB noise source level for the controlling “Dura-Spark 240 unit” in the application-apparently operating with 240 tips. So, this underestimates the source level by 8 dB or about 1/6th of the noise intensity.
- Save LBI also criticized all of the vessel incidental harassment authorizations because the NMFS accepted the use of a 20 dB noise loss factor which is too optimistic. That represents a noise level loss of 20 dB for every tenfold increase in distance, referenced to a meter from the source, but such “spherical” spreading only occurs in the proximity of the vessel at distances comparable to the water depth. Beyond that, the noise spreads out in a more “cylindrical” manner constrained by the seabed and the sea surface with noise dissipation closer to 10 dB. In many other take reviews that we cited in our comments, the NMFS has used a “practical” spreading factor of 15 dB, and we see no reason why that wasn’t used here for surveys off New Jersey.
- The NMFS criteria for permanent hearing loss for these whales is 198 dB and the NMFS criteria for disturbing their behavior is 160 dB for impulsive noise
- Since the threshold for permanent auditory damage and hearing loss is fairly close to the noise source levels that is not expected to occur here unless the whale was very close to the vessel.
- **On the other hand, the NMFS 160 dB threshold for disturbance is much lower, and that is what is of interest here** Disturbing the whale’s behavior can mean many things. It very often means first that the whale will seek to avoid the noise or “standoff “from it. If the whale is in between the shore and the vessel that could mean it being driven towards the shore seeking relief. It can also involve the whale surfacing to seek a lower noise level at the surface and becoming more vulnerable to vessel strike. It can mean separation of mothers and calves due to the ‘masking” of their normal communications by the vessel device noise and fatality for the calf. It can also mean the loss of its navigational ability, disruption of a migration, cessation of feeding or mating, and the loss of the ability to detect predators or oncoming ships. Finally, because whales use sounds to determine the very nature of their surroundings, the effects may be much more profound than that. We do not fully know what whales perceive when they experience these sounds, and that we are elevating noise levels in large area swaths with up to six or more vessels likely compounds whatever the effects are
- **So, behavior disturbance is not as innocuous as the name implies, and this should be the focus of the attention to this issue.**
- Taking the low noise source level and high loss rate together, **the magnitude and extent of noise disruption to the whales is significantly underestimated**. The NMFS estimated that noise levels above its 160 dB criteria **would only exist 0.1 miles from the vessel.**
- However, the 160 dB criterion was set at the level at which 50 percent of the general animal population would be disturbed by the noise. The Bureau of

Ocean Energy Management (BOEM) and the NMFS have recently adopted the use of the disturbance probabilities developed by Wood et al.[2] in the recent draft guidance document on pile driving noise and the Take Application for the Atlantic Shores Offshore Wind project, respectively. Using those probabilities, 50 percent of the baleen population, including humpback and right whales, would be disturbed by a level of 140 dB, well below the 160 dB.

- Regarding humpback whales specifically, since several were washed ashore here, one study [W24, W25] tracked their behavior in the presence of survey vessels using air guns. It also showed humpback whale avoidance of received noise levels at 140 dB. Therefore, the 140 dB level to avoid disturbance is more relevant and should be used here.

The Table below shows how dramatically the affected range from the vessel survey ship changes using these different source levels, transmission loss factors and criteria to avoid disturbance. The affected range and the density of marine mammals in it determines the number of disturbances and potential harm.

Vessel Surveys –Noise Impact

	NMFS	Alternate
Source Level	203 dB	205-211
Transmission Loss	20	15
Criteria- Noise Level to Get Down to	160	140 (for baleen whales)
Range to 140 dB	**-----**	**13-34 miles**
Range to 160 dB	**1/10 mile**	**1/2-16 miles**

- To reach 140 dB with the use of the 211 dB noise source level and the 15 dB noise loss factor above **requires a distance of 34 miles** Such a large elevated noise range, with the vessel making passes less than 0.1 miles apart, also results in repeated exposures to marine mammals to those elevated levels. **Even using the 205 dB source level requires 13 miles**
- Therefore, the distances at which these whales could be disturbed the vessel noise are significantly greater than the 0.1 miles that the NMFS assumes.
- Surveys are typically conducted within 36 miles of shore. Therefore, there is a high likelihood that a **significant percentage of the baleen whale population,** finding itself between the shore and a survey vessel,**will experience elevated noise levels that will disturb its behavior**, and in

all likelihood **drive it** away from the source **toward shore** seeking relief.

The NOAA and BOEM response

- Confronted with the unprecedented number of whale standings in the area the National Oceanic and Atmospheric Administration (NOAA) and the BOEM held a Press Conference that promptly dismissed the vessel noise surveys as the cause. Their reasoning was flawed.
- It spoke of the lack of information supporting the noise devices “directly” leading to the death of a whale, but as mentioned above that is not the contention here, but rather indirect harm from behavior disturbance.
- It spoke of no “known connections” between offshore wind activities and whale deaths but failed to mention that auditory damage is rarely looked for in post-mortem examinations.
- It was stated that 50 percent of recent deaths were investigated and that 40 percent of those implicated vessel strike or fishing entanglements. But that leaves 80 percent unaccounted for, including 60 percent of those that were investigated.
- The real problem here, behavioral disruptions and the consequences of those, received only one inconclusive line in the response.

Therefore, the federal response so far in our view is not germane to the problem faced. Save LBI will continue to press for the vessel track and noise operational noise data, including device settings, and field noise measurement verification studies to see whether or not the vessel surveys are a plausible cause of these recent deaths.

On January 16, 2023 we wrote to the NMFS, BOEM and the NJDEP to obtain all necropsy reports, field noise measurement verification data-if itexists, and vessel-related information to determine whether survey vessels were in the samevicinity at the same time as the above incidents, and therefore find out whether the vessels surveys were or were not a plausible cause of the whale deaths here. While the whales remain at risk, we are still awaiting that data.

Conclusions

The noise from the offshore wind vessel surveys is a potential cause of the recent whale washups on the shore and increased near shore sightings. The NMFS and the NJ DEP should investigate the cause of death and whether these survey vessels

were in the same vicinity at the same time as those events, and make public those results. Until that study is done and confirms otherwise, the Interior Department should suspend the vessel surveys.

References-Whales

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