December 12, 2022

Re: BOEM Draft Pile Driving Sound Exposure Modeling Recommendations

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I. Introduction

The American Clean Power Association[1] welcomes the opportunity to comment on the Bureau of Ocean Energy Management's (BOEM) Draft Pile Driving Sound Exposure Modeling Recommendations (the Draft Recommendations).[2] Offshore wind is projected to expand throughout the nation in the coming years in an effort to address the climate crisis by achieving the U.S. national goals of deploying 30 gigawatts (GW) of offshore wind by 2030 and net-zero carbon emissions by 2050.[3][4] ACP members are committed to advancing these national goals in a responsible way and continuing to develop technologies and methods for reducing and avoiding possible impacts to marine wildlife during construction and operation of offshore windfarms.

ACP appreciates that the Draft Recommendations are not intended to be prescriptive, and acknowledges how important offshore wind developers' pile driving sound exposure modeling is to the environmental analysis of offshore wind, particularly with respect to the National Marine Fisheries Service's (NMFS's) Endangered Species Act (ESA) consultation and Marine Mammal Protection Act (MMPA) incidental take authorizations. However, we are concerned that BOEM's recommendations pertaining to individual-based modeling (IBM) could dampen technological innovation by discouraging developers from implementing scientifically robust modeling and new technologies for better data collection where it is needed. This could limit the breadth of tools developers and the public can use to better understand the environmental effects of offshore wind, and could even create misinformation in the process.

The offshore wind industry has developed and adopted new technological innovations to mitigate biological impacts, including those to marine mammals. One of the most successful technologies developed for marine mammal impact reduction are bubble curtains, which attenuate pile driving noise.[5] The industry is committed to responsible offshore wind development including through accurate and efficient modeling practices. The Final Recommendations will be most beneficial if they incentivize continued industry investment in technology development and allow for site-specific decisions to direct modeling methods. ACP offers comments on the Draft Recommendations to help inform how this kind of modeling can contribute to both (a) timely COP submissions and (b) informing the appropriate construction specifications necessary for responsible offshore wind development and NMFS approval.

II. The Final Recommendations Should Provide Flexibility In Modeling Techniques To Achieve Greater Accuracy, Efficiency, and Innovation.

[1] American Clean Power Association represents the renewable energy industry in the United States, bringing together over 1,000 member companies, 120,000 members, and a national workforce located across all 50 states. By uniting the power of wind, solar, storage, and transmission companies and their allied industries, we enable the transformation of the U.S. power grid to a low-cost, reliable, and renewable power system. Additional information is available at http://www.cleanpower.org.
[2] DRAFT BOEM Nationwide Recommendations for Impact Pile Driving Sound Exposure Modeling and Sound Field Measurement for Offshore Wind Construction and Operations Plans (October 2022), *available at* https://www.boem.gov/sites/default/files/documents/renewable-energy/DRAFT%20BOEM%20Impact%20Pile%20Driving%20Sound%20Exposure%20Modeling%20BOEM-2022-0057.pdf.
[3] https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/
[4] https://www.whitehouse.gov/wp-content/uploads/2021/10/US-Long-Term-Strategy.pdf
[5] https://tethys.pnnl.gov/sites/default/files/publications/Dahne-et-al-2017.pdf

BOEM errs by recommending that lessees use only one type of modeling, IBM, because prescribing a certain type of modelling is not responsive or accommodating of diverse data sets that may need to be used for modelling in this application. Model selection and parameters should be decided based on site-specifications, data availability, its suitability to the question at hand, and other business constraints.

Although BOEM states that these recommendations are not meant to be "prescriptive" in real-world application,[6] BOEM guidance and recommendations become de facto "requirements" because they are interpreted by industry to represent the conditions under which BOEM will process applications fastest – adherence reduces risk in BOEM approval. BOEM guidance can be very helpful in the context of data formats, general contents of construction and operation plans (COPs) and site assessment plans (SAPs), minimum needs for survey planning, etc., but a BOEM guidance that prescribes modelling approaches for very complex processes for a very wide swath of highly divergent taxa, in any part of the US Exclusive Economic Zone, with a recommendation that even when data are insufficient to do the IBM with generic variables, is likely to be an unwarranted burden to industry with few useful results. There are targeted situations in which IBM can bring substantive value to impact assessment, but we do not believe that it brings such value for all taxa and in all situations. Recommending a specific modelling technique for all taxa (Section 2.5.1) is overly prescriptive and will stifle innovation in development of other more scientifically appropriate modelling and assessment approaches for some taxa.

Page 9, Section 2.5.1, could be interpreted as BOEM recommending that IBM be applied to all protected species. This would require the development of statistically robust IBM for sea turtles and fish which requires a major development in our understanding of sea turtle and fish densities, seasonal densities, and behavior (movement patterns, etc.) that is not currently available. This would be excessive for lessees looking to install OSW turbines. The Final Recommendations should clarify that IBM should only be used when the data available supports IBM.

BOEM states that "When it comes to predicting exposure of individual marine organisms to underwater sound, it is generally accepted that IBMs provide the most accurate assessment methods currently available (Stöber and Thomsen 2019)."[7][8] Stöber and Thomsen (2019) do not state this. They compare Danish and US guidelines for temporary threshold shift in a modelling framework based on a simulated pile driving action. BOEM's statement seems to imply that IBMs are more accurate than other modelling approaches and encourages the use of random movements and uniform distributions in the event data are insufficient for IBMs. The Stöber and Thomsen (2019) paper clearly states in several places that decisions around use of IBMs and their accuracy are data driven (e.g., they state that "Animal movements as outlined in the [Danish] approach could be incorporated as well *if data are available* [our emphasis] as is the case for harbor porpoises" and "criteria that consider hearing capabilities and animal response movement can improve the accuracy of the assessment *if data are available* [our emphasis]."[9] There are a few reasons that we request that BOEM make clear that IBM is not a requirement and is only recommended when data are sufficient to support such modelling:

- IBM is time, cost, and computationally expensive modeling, so it should only be undertaken when it adds value to an impact analysis (it is not a simple analysis with little impact on COP development)

- There are many species or stocks of marine animals (as marine mammals, fish, and sea turtles are included in BOEM's recommendations) for which there are insufficient data to develop such

[6] Draft Recommendations at 1.
[7] Draft Recommendations at 9.
[8] Stöber U, Thomsen F. 2019. Effect of impact pile driving noise on marine mammals: a comparison of different noise exposure criteria. Journal of the Acoustical Society of America. 145:3252–3259.
[9] Stöber & Thomsen (2019).

models without substantive uncertainty that would not be lower than static or qualitative assessments of impacts. Some reasons for this are:

  - There are many species or stocks of marine animals for which there are insufficient data to develop such models with statistically robust results
  - Inter-annual variation in some data are high, making short-term studies insufficient to inform such models well
  - Some species are logistically difficult (if not impossible at this point in time) for which to collect sufficient data for statistically robust outcomes
  - Shifting dynamic habitats with climate change and other distribution drivers make using long-term datasets to augment understanding of data poor species challenging
  - For some species the costs and time necessary to collect sufficient data to have reasonable accuracy in model outcomes would be impracticable

- Depending on the likelihood and severity of potential impacts, the cost and time of IBM may not be warranted even if data may be sufficient to perform such modelling
- Modelling should be developed for the purpose of addressing a question; depending on the question, other approaches than IBM may be most appropriate
- The use of models that are not statistically robust to the data available for purposes of quantifying impacts may result in inaccurate outcomes that may under- or over-estimate likely impacts, potentially missing an important impact or diverting resources from addressing impacts that are more severe or likely

We agree that the best available science and data should be brought to bear on understanding and assessment of potential impacts of sound exposure from pile driving, and we expect that BOEM will use these recommendations to provide some ideas and context for analyses but, as noted in the introduction to the Draft Recommendations, BOEM should avoid being too prescriptive and avoid enforcing modelling that may not be scientifically appropriate, depending on the data and potential for impacts. Overly prescriptive requirements to use IBM in inappropriate or ill-fitted situations could result in less accurate results or at the least require more time and money than other comparable methods without comparatively improved results.

Given that the Draft Recommendations are not meant to be prescriptive, we encourage BOEM to consider accepting different modelling approaches, including non-IBM models, that may be appropriate based on available data and the needs related to impact assessment. We suggest that the final recommendations include the statement: "Modelling choices are data driven, so BOEM understands that different approaches and levels of complexity in modelling will be related to quality and quantity of data, uncertainty, reasonable assumptions, and impact assessment needs."

III. The Final Recommendations Should Prioritize Efficient Reporting and Analysis for Modeling

Offshore wind developers rely on accurate and up to date data and modeling to inform their business decisions and to provide to BOEM and other consulting agencies for permitting and regulatory compliance. The Final Recommendations should support this effort by prioritizing efficiency in modeling

reporting and analysis by avoiding redundant or overly burdensome provisions that would not substantively improve the results.

BOEM indicates that "number of animals" that may be impacted should be reported.[10] First, as noted in a previous comment, for some stocks, species, or guilds of animals, there will not be sufficient data to provide numerical estimates of exposures in a scientifically robust way. Second, neither OCSLA nor NEPA require numerical estimates of take.[11] ESA allows for non-numeric take surrogates to be used when obtaining those values is not practical, which is often the case for marine wildlife; NMFS and USFWS interpret MMPA to generally require it (though there have been exceptions), but there is no consultation for BOEM under MMPA, so permit application responsibility will fall on the developer in direct collaboration with NMFS and USFWS.[12] Thus, although reporting estimates of take of some species has often been done in COPs to date, prescribing this as part of BOEM recommendations for all marine protected species, is unnecessarily burdensome and is duplicative with MMPA permitting in the case of marine mammals.

Moreover, MMPA has standards of "negligible impacts" and "small numbers."[13] Thus, with respect to pile driving during construction, which must be conducted under an MMPA permit, the level of impact to any marine mammal stock cannot exceed small numbers or negligible impacts.[14] If the number of marine mammals assessed as part of a COP proposal exceeds what NMFS or USFWS would ultimately determine to be a small number or the level of impact rises above negligible by NMFS or USFWS standards, NMFS and/or USFWS will, as part of permitting, require that the project parameters or mitigation be used to reduce impacts to the required standards.[15] BOEM should anticipate that regardless of modelling conducted for a COP that a project will achieve "no jeopardy" standards for ESA-listed species and "small numbers" and "negligible impact" standards for marine mammals, with respect to pile driving activities.[16]

BOEM refers to providing summary tables that show radial acoustic thresholds for "each faunal group," but it is unclear at what level of granularity BOEM is expecting "faunal groups" to be.[17] We suggest a modification to this language to "…the main text should include summary tables that show the radial threshold applicable each faunal group described in Tables 1-4. Modelling does not necessarily need to include all criteria in Tables 1-4."[18]

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[10] Draft Recommendations at 10.
[11] *See generally* 43 U.S.C. § 1331 et seq. (providing for offshore leasing scheme and not including numerical estimates); 42 U.S.C. § 4332(C) (NEPA) (requiring detailed statement on environmental impacts, adverse effects and alternatives and not requiring numeric take numbers).
[12] 16 U.S.C. § 1371(a)(5)(A)(i), (D)(i) ("citizens of the United States" may request marine mammal incidental take and harassment allowances for specified activities); 16 U.S.C. § 1374(d) (MMPA permit application procedures).
[13] 16 U.S.C. § 1371(a)(5)(A)(i)(I) (standards for incidental take of "small numbers" with "negligible impact"); 16 U.S.C. § 1371(a)(5)(D)(i)(I) (standards for harassment of "small numbers" with "negligible impact").
[14] *Id.*
[15] 50 C.F.R. § 18.27 (USFWS marine mammal incidental take regulations); 50 C.F.R. §§ 216.101-106 (NMFS incidental take and harassment authorization regulations).
[16] *See* 50 C.F.R. § 402.14 (detailing "no jeopardy" biological opinions as a possible outcome of ESA consultation).
[17] Draft Recommendations at 10.

[18] Table 1 also cites NMFS (2018) (NMFS Greater Atlantic Regional Fisheries Office. 2018. Section 7: consultation technical guidance in the Greater Atlantic Region. Washington (DC): National Oceanic and Atmospheric Administration, NOAA Fisheries. [updated 2018 Jul 9; accessed 2021 Sep 29]. www.fisheries.noaa.gov/new-england-midatlantic/consultations/section-7-consultation-technical-guidance-greater-atlantic.) as the source of sirenian criteria, which should be corrected to Finneran or to USFWS criteria. BOEM cites NMFS (2018) as a source for criteria associated with otters and manatees. NMFS (2018) specifically states on page one in footnote 3 that the acoustic guidance from NMFS does not apply to marine mammal species under USFWS jurisdiction (manatees, sea otters, walruses, and polar bears). Data sets regarding those species are included, and Appendix A is the technical report upon which the criteria are mainly based (Finneran Technical Report), which includes marine mammals under USFWS jurisdiction. We suggest that BOEM engage with USFWS to determine what thresholds USFWS is using under ESA and MMPA as regards animals under their jurisdiction to improve consistency.

It is unclear from Tables 6a-7b, which are meant to be examples, whether BOEM is suggesting that all of these criteria be applied, analysed, and reported. We suggest that BOEM include a statement in the bullet points on page 10 that not all criteria necessarily need to be reported, as there are some redundancies, there may be newer publications that provide updated thresholds in the future, and not all faunal groups will be present for all projects. Specifically, as regards redundancy, NMFS does not require that both Wood et al (2012) and the 160 dB rms criteria be applied to behavioural take under MMPA.[19] The Wood step function was developed for seismic surveys and was not published. Applicants should be able to determine in collaboration with NMFS and USFWS which criteria (Wood step function or 160 dB rms) will be applied for permitting, and that decision should carry over into the NEPA assessment to support the permit. It is redundant to provide model outcomes for both criteria in the COP across the suite of marine mammal stocks that will be present near OSW projects. If NMFS and USFWS set new thresholds or apply new policies, BOEM should be flexible in accepting NMFS and USFWS criteria for impact assessment, as the NEPA document is meant to support permitting across the suite of federal permits.

IV. Further Proposed Modifications to the Draft Recommendations

ACP recommends the following modifications to further support clear and efficient modeling applications in the Final Recommendations:

- When BOEM states "If any of the values used in the modelling are based on prior empirical measurements, they should be derived from peer-reviewed publications or technical reports that have been reviewed by BOEM subject matter experts."[20] We believe that engagement early and often with BOEM is important to COP development, but if this statement is meant to develop a process prior to COP submission for vetting model parameters and the peer-reviewed literature and technical reports that support models, it would be helpful for BOEM to explain what the expectations are so industry has the opportunity to comment on this process.

- Regarding BOEM's mention of: "A list of species that could potentially be present during the construction period."[21] It is unclear if the "list of species that could potentially be present during the construction period" is meant to be MMPA protected and ESA-listed species. Please specify that this refers only to those species protected under the ESA and/or MMPA, and not 'all species.'

- We suggest that BOEM change the statement "Seasonality and changes in density and abundance of protected species over the construction period, including a description of any seasonal restrictions based on species' occurrences and an explanation why only certain months were modelled"[22] to "Seasonality and changes in density and abundance of protected species over the construction period, as available, applicable, and practicable to determine, including a description of any seasonal restrictions based on species' occurrences and an explanation why only certain months were modelled." With respect to species seasonality, not all species are seasonal and not all seasonality is well documented. There are other cycles, like decadal cycles, that may be important.

[19] Wood J, Southall BL, Tollit D J. 2012. PG&E offshore 3-D seismic survey project EIR – marine mammal technical draft report. SMRU Ltd. [accessed 2021 Sep 24]. https://www.coastal.ca.gov/energy/seismic/mmtechnical-report-EIR.pdf. Report No.: SMRUL- NA0611ERM. 121 p.
[20] Draft Recommendations at 3.
[21] Draft Recommendations at 6, section 2.5, first bullet.
[22] Draft Recommendations at 6.

- In the bullet list on page 6 and Table 2, BOEM should specify that the NMFS behavioral thresholds are in units that include root mean square where applicable.[23]

- Although BOEM includes what it refers to as the NMFS "Marine Mammal Single Behavioral Threshold" of 160 dB in the bullet points in Section 2.5 (page 6), Table 2's footnote states "Probabilistic thresholds by Wood et al. (2012) (required by BOEM for NEPA; note that Wood et al. [2012] was developed to assess noise impacts from seismic airguns)."[24] NMFS accepts the 160 dB threshold, and BOEM should also accept this threshold, should an applicant choose to use it. NEPA does not require the unpublished 10-year-old step thresholds used in Wood et al. (2012) for seismic surveys in statute or regulation. We do not think it is appropriate for BOEM to require this particular model over others (the word "required" is in the footnote), because, as BOEM notes at other places in The Draft Recommendations, models are constantly being refined and improved and The Draft Recommendations are meant to be general and not prescriptive. NMFS' and USFWS' policies also evolve over time, and allowable thresholds by NMFS and USFWS should be allowable by BOEM and sufficient for NEPA.

- BOEM states "for large PDEs, the range of impacts from both the lower and upper PDE should be represented when there are notable differences in the level of impacts or number of animals that may be impacted."[25] Assessing a low-end PDE departs from the purpose and intent of the PDE guidance of assessing the maximum design scenario. It is unclear what BOEM's intent is with including a low-end PDE representation in sound exposure modeling and how this would be used in federal permitting. We recommend that BOEM omit this statement.

V. Conclusion

BOEM's modeling recommendations for pile driving activities have the potential to provide much-needed certainty to the offshore wind industry as we assess potential mitigation measures. ACP cautions BOEM to avoid having the Final Recommendations be prescriptive, which could stifle innovation and limit the breadth of tools developers can use to produce scientifically robust modeling. Our members look forward to continuing to work with BOEM to develop efficient, biologically relevant, and scientifically accurate modeling methods to best assess possible impacts of offshore wind construction and operations. Offshore wind can coexist with healthy marine wildlife through technological innovation and thoughtful engagement. We urge BOEM to consider our comments to produce effective and efficient modeling recommendations.

Sincerely,

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[23] Draft Recommendations at 6 and Table 2.
[24] Draft Recommendations at 6.
[25] Draft Recommendations at 10.