Comments in Response to the Bureau of Ocean Energy Management Proposed Sale Notice for Commercial Leasing for Wind Power Development on the Outer Continental Shelf in the Gulf of Mexico (GOMW-1) 86 Fed. Reg. 11939 (February 24, 2023)

Submitted by National Wildlife Federation, Natural Resources Defense Council, National Audubon Society, Audubon Delta, Coalition to Restore Coastal Louisiana, Environment Texas, Galveston Bay Foundation, Louisiana Wildlife Federation, Mass Audubon, Oceana, Southern Environmental Law Center

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I. Introduction

On behalf of National Wildlife Federation, Natural Resources Defense Council, National Audubon Society, Audubon Delta, Coalition to Restore Coastal Louisiana, Environment Texas, Galveston Bay Foundation, Louisiana Wildlife Federation, Mass Audubon, Oceana, Southern Environmental Law Center, and our millions of members and supporters, we submit these comments on the Proposed Sale Notice by the Bureau of Ocean Energy Management (BOEM) for Wind Power Development on the Outer Continental Shelf in the Gulf of Mexico.[1]

The Gulf of Mexico's ecologically diverse and productive ecosystems have been disproportionately burdened from the impacts of fossil fuel development and are still recovering from the 2010 *Deepwater Horizon* oil spill.[2] It is imperative for the people of the Gulf, particularly for environmental justice and tribal communities, as well as for the wildlife of the region, that the nation embrace cleaner energy technologies. The human and environmental impacts of fossil fuel use in regions such as the Gulf of Mexico underpin our support for the Biden-Harris Administration's goals of reducing net greenhouse gas emissions by 50-52 percent below 2005 levels by 2030,[3] and reaching net-zero greenhouse gas emissions by 2050.[4] Our organizations further support the Administration's pursuit of offshore wind in the Gulf of Mexico to achieve these climate goals and transition the country towards a cleaner energy future.

Our groups support the responsible development of offshore wind, which: (i) avoids, minimizes, mitigates, and monitors adverse impacts on wildlife and habitats, (ii) minimizes negative impacts on other ocean uses, (iii) includes robust consultation with Native American tribes and communities, (iv) meaningfully engages state and local governments and stakeholders from the outset, (v) includes comprehensive efforts to avoid impacts to underserved communities, and (vi) uses the best available scientific and technological data to ensure science-based stakeholder-informed decision making.

These comments seek to expand upon our previous comments in response to BOEM's Request for Interest in Commercial Leasing for Wind Power Development on the Gulf of Mexico OCS (RFI),[5] Call for Information and Nominations-Commercial Leasing for Wind Power Development on the Outer Continental Shelf in the Gulf of Mexico (Call),[6] the Announcement to Prepare a Draft Environmental

[1] 88 Fed. Reg. 11939 (February 22, 2023); Gulf of Mexico Proposed Sale Notice (GOM PSN) available at: https://www.federalregister.gov/documents/2023/02/24/2023-03842/proposed-sale-notice-for-commercial-leasing-for-wind-power-development-on-the-outer-continental.

[2] Boufadel, M.C., et al., "Simulation of the Landfall of the Deepwater Horizon Oil on the Shorelines of the Gulf of Mexico," Environmental Science & Technology 48, no. 16 (2014): 9496–9505. http://pubs.acs.org/doi/abs/10.1021/es5012862. Fleeger, J.W. et al., "What promotes the recovery of salt marsh infauna after oil spills?" Estuaries and Coasts 42, no. 1 (2019): 204-217, DOI: 10.1007/s12237-018-0443-2. Hamden, L.J., et al., "The impact of the Deepwater Horizon blowout on historic shipwreck-associated sediment microbiomes in the northern Gulf of Mexico," Scientific Reports 8 (2018): 9057, https://www.nature.com/articles/s41598-018-27350-z.pdf.

[3] FACT SHEET: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies, 2021 White House Statements and Releases (April 22, 2021).

[4] Proclamation No. 14008, 86 Fed. Reg. 7619 (EO 14008).

[5] *See* eNGO RFI Comments at https://www.regulations.gov/comment/BOEM-2021-0041-0025.

[6] *See* eNGO Call Comments at https://www.regulations.gov/comment/BOEM-2021-0077-0031.

Assessment to Consider the Impacts of Potential Offshore Wind Leasing in Federal Waters of the Gulf of Mexico (Scoping),[7] Preliminary Wind Energy Areas,[8] and the Announcement on the Draft Environmental Assessment for the Gulf of Mexico.[9] Collectively, we offer recommendations for lease stipulations and incentives for a Final Sale Notice (FSN) that can further national and state goals to fight climate change while developing American offshore wind power in a manner that protects biodiversity and creates good jobs.

We strongly urge BOEM to incorporate environmental avoidance and mitigation measures and requirements directly into the FSN. This approach would increase certainty for developers and help ensure a successful and environmentally responsible offshore wind industry. Moreover, we recommend that the leases include stipulations pertinent to not only the site assessment and characterization stage, but for all phases of development and operations, up to and including decommissioning. Incorporating stipulations relevant to the project's entire potential lifespan at this juncture will outline for developers the boundaries within which future phases should be designed and serve as a crucial step in ensuring that the ultimate project will meet environmental standards.

II. Recommendations for Environmental Protections in Lease Terms

BOEM should include a set of environmental measures as lease stipulations in the FSN, to ensure that offshore wind development proceeds in a manner that avoids and minimizes ocean user conflicts and safeguards vulnerable ocean habitats and wildlife. BOEM has used such stipulations to protect species, topographic features, and benthic habitat when regulating oil and gas development.[10] We urge that

[7] *See* eNGO Scoping Comments at https://www.regulations.gov/comment/BOEM-2021-0092-0017
[8] *See* eNGO Draft WEA Comments at https://www.regulations.gov/comment/BOEM-2022-0036-0090
[9] *See* eNGO Draft EA Comments at https://www.regulations.gov/comment/BOEM-2022-0036-0090
[10] Recent offshore oil and gas lease sales have established stipulations that protect the environment. Since at least 2012, most Gulf of Mexico lease sales have included some combination of three environmental stipulations: protected species, topographic features, and live bottom. *E.g.*, Lease Sale 257, Final Notice of Sale (https://www.boem.gov/sites/default/files/documents/oil-gas-energy/leasing/Sale-257-Lease-Stipulations.pdf).

The Protected Species stipulation requires lessees and operators to comply with the reasonable and prudent measures, terms and conditions, and mitigation measures established in the relevant Endangered Species Act biological opinion. Lessees and operators also must report any dead or injured protected species. (*Id*. at 8-9). The Topographic Features stipulation requires lessees and operators to protect banks and other biologically sensitive underwater areas. This stipulation refers to the guidelines provided in the BOEM Notice to Lessees and Operators (NTL) on Biologically-Sensitive Underwater Features and Areas (NTL No. 2009-G39, https://www.boem.gov/sites/default/files/regulations/Notices-To-Lessees/2009/09-G39.pdf), which, for example, limits use of bottom-disturbing activities like anchors and chains. The Live Bottom stipulation also protects seagrass communities and areas containing biological assemblages consisting of sessile invertebrates by requiring lessees and operators to submit a live bottom survey report to BOEM prior to conducting activities that may cause disturbance. Further, BOEM can require the lessee to take protective measures, including monitoring the area and even moving operations. (*Id*. at 17).

Recent Alaska lease sales have likewise included environment-protecting stipulations. Lease Sale 244, conducted in 2013 for the Cook Inlet planning area, includes a Protection of Biological Resources stipulation and several protected species-specific stipulations. (Lease Sale 244, Final Notice of Sale, Lease Stipulations, https://www.boem.gov/sites/default/files/about-

BOEM adopt the "mitigation hierarchy" within the FSN to clarify expectations that lessees first avoid, then minimize and mitigate, potential environmental impacts from all stages of offshore wind development, and note that the monitoring stipulations will be a critical part of informing the implementation of this hierarchy.[11]

In the Leases we note that BOEM has deferred the drafting of its wildlife-focused "Standard Operating Conditions" to the FSN, including measures for vessel strike avoidance, marine trash and debris, Protected Species Observer (PSO) protocols, benthic habitat, and additional protected species mitigations.[12] While we outline our suggestions for these sections below, we want to underscore that by excluding drafted language at the PSN stage, BOEM has reduced the effectiveness of this public comment period for stakeholders to reflect on BOEM's intended actions and requirements of the lessee.

A. Recommendations for Vessel Strike Avoidance

BOEM should prioritize the development of vessel strike avoidance measures to be included in the FSN. Vessel strikes pose a documented risk of injury and death to many marine species, particularly large whales and sea turtles, but also protected Gulf fish like sturgeon and manta rays.[13] Best available scientific information shows that a collision between a large whale and a vessel of any length traveling above a speed of 10 knots is highly likely to result in a lethal strike.[14] This risk is likely higher for calves

boem/BOEM-Regions/Alaska-Region/Leasing-and-Plans/Leasing/Lease-Sales/Sale-244---Cook-Inlet/Sale-244-FNOS-Stipulations.pdf).

The Protection of Biological Resources stipulation is broad: if biological populations or habitats requiring "additional protection" are identified in the leased area, BOEM can require the lessee or operator to conduct surveys assessing "the extent and composition" of these populations or habitats. (*Id*. at 3). Based on the surveys, BOEM can require the lessee or operator to relocate operators, restrict operations to certain times, or modify operations to prevent adverse effects. (*Id*.). This stipulation also requires the lessee or operator to report discoveries of populations or habitats of biological significance and "make every reasonable effort to preserve the biological resource and protect it from damage." (*Id*.).

Lease Sale 244's Protection of Beluga Whale Critical Habitat stipulation sets seasonal prohibitions on seismic surveys and exploratory drilling (*Id*. at 6). Similarly, the Protection of Beluga Whale Nearshore Feeding Areas and Protection of Beluga Whales stipulations set seasonal prohibitions on marine seismic surveys (*Id*. at 7, 8). Lease Sale 244's Protection of Northern Sea Otter Critical Habitat stipulation prohibits lessees from certain discharges and seafloor disturbing activities within 1000 meters of Northern Sea Otter critical habitat. (*Id*. at 9).

[11] Leon Bennun et al., Mitigating biodiversity impacts associated with solar and wind energy development: Guidelines for project developers, IUCN & THE BIODIVERSITY CONSULTANCY (2021), available at https://portals.iucn.org/library/node/49283. Please note that the IUCN document provides general guidelines on how the mitigation hierarchy could be and has been applied, but its application in each case will be context and site specific, and based on best available scientific information and technologies available at the time.

[12] GOM Proposed Leases OCS-G 37334, OCS-G 37335, and OCS-G 37336 at C-11.

[13] Schoeman, R. P., Patterson-Abrolat, C., & Plön, S. (2020). A global review of vessel collisions with marine animals. *Frontiers in Marine Science*, *7*, 292; NOAA Fisheries. "Vessel Strikes." https://www.fisheries.noaa.gov/national/vessel-strikes (accessed: Apr. 19, 2023).

[14] Conn, P. B., & Silber, G. K. (2013). Vessel speed restrictions reduce risk of collision-related mortality for North Atlantic right whales. *Ecosphere*, *4*(4), 1-16; Dan E. Kelley et al., *Assessing the lethality of ship strikes on whales using simple biophysical models*, MARINE MAMMAL SCI. (Jan. 2021).

and juveniles. Sea turtles may be vulnerable at speeds exceeding four knots.[15] As we elaborate on further below, in order to reduce risk of vessel strike, we urge BOEM to create vessel speed restrictions for significant habitat areas in the Gulf of Mexico specific to the unique needs of the Gulf's species most at risk from vessel strikes.[16]

1. Sea Turtles

Hundreds to thousands of sea turtles suffer vessel strikes every year in the United States, often lethally.[17] Several endangered species of sea turtles nest in the Gulf of Mexico. In particular, the Kemp's Ridley, Green and Leatherback sea turtles have nesting sites in eastern Texas and western Louisiana.[18] Multiple Kemp's Ridley nesting sites in particular are within proximity to the proposed lease areas. Sea turtles congregate near the coast during nesting season and face risk of being struck by vessels when resting, feeding or preparing to nest in shallow waters. Vessels should slow to speeds of 4 knots to reduce collision risk through areas of visible jellyfish aggregations or other areas where sea turtles are expected to be, such as in large Sargassum seaweed mats, which often attract juvenile sea turtles.[19]

2. Rice's Whale

As we have raised in our previous comments, we are particularly concerned about the risk that vessel strikes pose to the Rice's whale, which inhabits the Gulf of Mexico and is counted among one of the most endangered marine mammal species in existence.[20] Approximately 50 individuals remain,

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[15] E.g., Hazel, J., Lawler, I. R., Marsh, H., & Robson, S. (2007). Vessel speed increases collision risk for the green turtle Chelonia mydas. *Endangered Species Research*, *3*(2), 105-113.

[16] There is precedent for sector-specific vessel strike reduction measures in the Gulf of Mexico. In the Biological Opinion on the BOEM Gulf of Mexico Oil and Gas Program, NMFS found that restricting the speed of oil and gas industry vessels within the Rice's whale's core habitat, and adopting a number of other measures for industry vessels, was necessary to avoid the likelihood of jeopardizing the continued existence of the species. See NMFS "Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico." (Mar. 2020; updated Apr. 2021). https://www.fisheries.noaa.gov/resource/document/biological-opinion-federally-regulated-oil-and-gas-program-activities-gulf-mexico.

[17]https://www.google.com/url?q=https://www.fisheries.noaa.gov/national/vessel-strikes&sa=D&source=docs&ust=1681482163352498&usg=AOvVaw0yXnmi_E6m6g9KG91g2KXq

[18] *Gulf of Mexico Data Atlas*. National Centers for Environmental Information, National Oceanic and Atmospheric Administration.
Kemp's Ridley: https://www.google.com/url?q=https://www.ncei.noaa.gov/maps/gulf-data-atlas/atlas.htm?plate%3DReptiles%2520-%2520Kemp%2520Ridley%2520Sea%2520Turtle&sa=D&source=docs&ust=1681419780337948&usg=AOvVaw2noBLOlyvIG86MBfFGsVnF
Green: https://www.google.com/url?q=https://www.ncei.noaa.gov/maps/gulf-data-atlas/atlas.htm?plate%3DReptiles%2520-%2520Green%2520Sea%2520Turtle&sa=D&source=docs&ust=1681419799396049&usg=AOvVaw35K-2wNflOnjZXwz0GZspx
Leatherback: https://www.google.com/url?q=https://www.ncei.noaa.gov/maps/gulf-data-atlas/atlas.htm?plate%3DReptiles%2520-%2520Green%2520Sea%2520Turtle&sa=D&source=docs&ust=1681419799396049&usg=AOvVaw35K-2wNflOnjZXwz0GZspx

[19] Witherington B, Hirama S, Hardy R (2012) Young sea turtles of the pelagic *Sargassum*-dominated drift community: habitat use, population density, and threats. Mar Ecol Prog Ser 463:1-22. https://doi.org/10.3354/meps09970

[20] https://www.fisheries.noaa.gov/species/rices-whale.

according to best estimates, and the species can only afford to lose one whale about every fifteen years as a result of human impacts if it is to recover.[21]

Soldevilla et al. (2017) reviewed the potential risks of vessel strikes and fisheries interactions to the Rice's whale, noting that vessel strikes could be an important source of mortality to the species.[22] Analysis of dive behaviors indicates Rice's whale may spend a considerable amount of time at night within the upper 15 meters of the water column, within the draft depths of most commercial vessels. Such behavior significantly raises the risk of vessel strikes.[23] Two Rice's whales have shown direct evidence of vessel strike. In 2009, an adult, lactating female stranded in Tampa Bay, Florida, with injuries consistent with blunt force trauma; and, in 2019, a free-swimming whale was observed in the northeastern Gulf of Mexico with a severely deformed spine posterior to the dorsal fin consistent with a vessel strike.[24] It is important to note that even when healed, injuries from vessel strikes can result in mortality at a later date. Deaths (detected and undetected) resulting from vessel collisions are therefore highly likely to exceed the number the species can withstand. In addition to vessel strikes, Rice's whale faces myriad other human-caused threats including the curtailment of habitat due to oil and gas development, oil spills and oil spill response, anthropogenic noise, marine debris, and potential fisheries interactions, as well as cumulative and synergistic effects.

Critical habitat designation under the ESA is expected in late 2023,[25] and an updated Biologically Important Area for the species is also forthcoming;[26] however, the area presently occupied by the species has been defined by a multi-year study, led by the National Oceanic and Atmospheric Administration (NOAA), and consists of waters along the continental shelf break, running from Florida to Texas.[27] While the lease areas are located outside of the area between the 100-400m isobaths, the

[21] NMFS. Draft 2022 Marine Mammal Stock Assessment Report for Rice's whale (Balaenoptera ricei): Northern Gulf of Mexico Stock at 139-140. https://www.fisheries.noaa.gov/s3/2023-01/Draft%202022%20Atlantic%20SARs_final.pdf. Potential Biological Removal (PBR) is the product of the minimum population size, one-half the maximum net productivity rate, and a recovery factor (MMPA Sec. 3.16 U.S.C. 1362; Wade and Angliss 1997; Wade 1998). According to the 2022 Draft Stock Assessment Report, the minimum population size for Rice's whale is 34, the maximum productivity rate is 0.04, the default value for cetaceans, and the recovery factor is 0.1 because the stock is listed as endangered. PBR is calculated as 0.07 before rounding (we note that the 2023 Revisions to the Guidelines for Assessing Marine Mammal Stocks (GAMMS) states that when PBR is equal to or less than 1, it should be reported with two decimal places. GAMMS at 32. https://www.fisheries.noaa.gov/s3/2023-03/02-204-01-Final-GAMMS-IV-Revisions-clean-%281%29_kdr.pdf).).

[22] Soldevilla, M.S., Hildebrand, J.A., Fraser, K.E., Dias, L.A., Martinez, A., Mullin, K.D., Rosel, P.E., and Garrison, L.P., "Spatial distribution and dive behavior of Gulf of Mexico Bryde's whales: Potential risk of vessel strikes and fisheries interactions," Endangered Species Research, vol. 32, pp. 533-550 (2017)..

[23] *Id*.

[24] Rosel, P.E., Wilcox, L.A., Yamada, T.K. and Mullin, K.D., "A new species of baleen whale (Balaenoptera) from the Gulf of Mexico, with a review of its geographic distribution." Marine Mammal Science. (Published online: Jan. 10, 2021).

[25] Order, NRDC v. Raimondo, Civ. No. 1:20-cv-2047 (D.D.C. Oct. 14, 2021) (consent order, adopting agreement that requires, inter alia, submission of any final rule designating critical habitat by Oct. 31, 2023).

[26] Harrison, J., Ferguson, M. C., New, L., Cleary, J., Curtice, C., DeLand, S., ... & Van Parijs, S. M. (2023). Biologically Important Areas II for cetaceans within US and adjacent waters-Updates and the application of a new scoring system. Frontiers in Marine Science, 10, 355.

[27] NOAA RESTORE Science Program, Trophic interactions and habitat requirements of Gulf of Mexico Rice's whales, available at https://restoreactscienceprogram.noaa.gov/projects/rices-whales (accessed Feb. 7, 2022); Soldevilla, M.S., Debich, A.J., Garrison, L.P., Hildebrand, J.A. and Wiggins, S.M., 2022. Rice's whales in the northwestern Gulf of Mexico: call variation and occurrence beyond the known core habitat. *Endangered Species Research*, *48*, pp.155-174. https://doi.org/10.3354/esr01196.

identified boundaries of Rice's whale habitat, the species is still vulnerable to strikes from vessels transiting through this area.[28]

We recommend the following requirements be included as lease stipulations:
I. Vessel transits of the area between the 100-400 m isobaths should be avoided during the day and must be prohibited at night, except for reasons of human safety.
II. If vessels are unable to avoid transiting the area during the day, vessels must travel through the area at speeds of 10 knots or less.
III. All vessels must maintain a minimum separation distance of 500 m from Rice's whales. If a whale is observed but cannot be confirmed as a species other than a Rice's whale, the vessel operator must assume that it is a Rice's whale and take appropriate action for avoidance.
IV. Visual observers must monitor the vessel strike avoidance zone (500 m). Observers can be either third-party observers or crew members, but crew members responsible for these duties must be provided sufficient training to distinguish aquatic protected species to broad taxonomic groups. Operators transiting through Rice's whale habitat must report their plans to BOEM and NOAA Fisheries.
V. All vessels (developer- and contractor-operated) must have a functioning Automatic Identification System (AIS) onboard and operating at all times.
VI. If a vessel operates in violation of these conditions, the operator must report the noncompliance to BOEM and NOAA Fisheries within 24 hours.

3. Marine Mammals and Sea Turtles

Additionally, the following measures are designed to first avoid, and then minimize and mitigate potential impact to marine mammals during the site assessment and characterization phase of offshore wind energy development in the Gulf of Mexico within the Lease Areas. Several of these recommendations also confer benefits to sea turtles. These recommendations may change as new scientific data and/or technological developments occur.

I. Require diel restrictions on site assessment and characterization activities:

A. Site assessment and characterization activities should not be initiated within 1.5 hours of civil sunset or in times of low visibility when the visual "clearance zone" and "exclusion zone" (as defined below) cannot be visually monitored, as determined by the lead PSO[29] on duty.

II. Require the following clearance zone and exclusion zone distances prior to activities that could injure or harass marine mammals:

A. A visual and acoustic clearance zone and exclusion zone of at least 500 m for whales and dolphins must be established around each vessel conducting activities with noise levels that could result in injury or harassment.

[28] Some of our organizations submitted a petition (https://www.fisheries.noaa.gov/s3/2023-03/Rices-Whale-Petition.pdf) to NOAA to establish vessel speed measures to protect the Rice's whale, and that petition is currently undergoing public comment (88 FR 20846). This petition calls for the creation of a Vessel Slowdown Zone, which would institute year-round, mandatory speed restrictions in Rice's whale's core habitat, which includes the waters between 100m and 400m deep. The Vessel Slowdown Zone stretches from approximately Pensacola, Florida to just south of Tampa, Florida, with an additional 10 km buffer. We note that the petition's submission date preceded the publication date of Soldevilla et al. (2022), *supra*, which documents through passive acoustics the persistent occurrence of Rice's whales in the northwestern Gulf of Mexico (i.e., to the west of the core habitat area previously identified by NMFS).

[29] The term "PSO" refers to an individual with a current NOAA Fisheries approval letter as a Protected Species Observer.

III. Require shutdown of activities if marine mammals are detected visually or acoustically:

A. If a small whale or dolphin is visually or acoustically detected within the clearance zone, site assessment and characterization activities with noise levels that could result in injury or harassment should not be initiated.
B. If a large whale (Rice's whale or sperm whale) is detected acoustically and confirmed visually, or visually detected within the visual exclusion zone, site assessment and characterization activities with noise levels that could result in injury or harassment to large whales must be halted.
C. Once halted, site assessment and characterization activities may resume following the methods set forth in subsection (iv) and after the lead PSO confirms no other marine mammals have been detected within the relevant acoustic and visual clearance zones.

IV. Require robust monitoring protocols during pre-clearance and when site assessment and characterization activities are underway:

A. Acoustic and visual monitoring must be required and begin at least 30 minutes prior to the commencement or re-initiation of site assessment and characterization activity and be conducted throughout the activity.
B. Monitoring of the acoustic clearance zone should be undertaken using near real-time passive acoustic monitoring (PAM) from a vessel other than the survey vessel, or from a stationary unit, to avoid the hydrophone being masked by the survey vessel or development-related noise.
C. Monitoring of the visual clearance zone should be undertaken by vessel-based PSOs stationed on the survey vessel to enable monitoring of the entire 500 m clearance zone for marine mammals. On each vessel, there must be a minimum of four PSOs following a two-on, two-off rotation, each responsible for scanning no more than 180° of the horizon.

V. Implement vessel speed restrictions:[30]

A. All project-associated vessels should adhere to a 10-knot speed restriction during times and in areas identified to be of relatively higher risk for large whale and sea turtle vessel strikes.[31]
B. Slowing to 4 knots must be required while transiting through areas of visible jellyfish aggregations or floating vegetation lines or mats to improve protection for sea turtles.

VI. Implement other vessel-related measures while underway:

A. All personnel working offshore should receive training on observing and identifying marine mammal and sea turtle species, distinguishing large whale species, and noting the presence of small cetaceans and manatees.
B. Vessels must maintain a separation distance of 100 m for cetacean species (and 500 m for Rice's whale), maintain a vigilant watch for large whale species and sea turtles, and slow down or maneuver their vessels as appropriate to avoid a potential interaction with large whale and sea turtle species, and, in coastal areas, manatees.
C. All vessels responsible for crew transport should use thermal detection systems to supplement visual monitoring of marine mammals.

[30] Additional measures to protect Rice's whale from vessel strike must also be required, as detailed in Section A.2 of this letter.

[31] We recommend that BOEM work with expert stakeholders, in advance of Project-associated vessel activity commencing in the lease areas, to develop and apply area-specific and/or time-specific vessel slowdown measures to reduce risk to marine mammal and sea turtle species in the Gulf of Mexico. In the absence of these measures, or until they are able to be developed, we recommend that all vessels adhere to a 10-knot speed restriction at all times, except for reasons of safety.

VII. Require underwater noise reduction to the fullest extent feasible:

A. The impacts of underwater noise must be minimized to the fullest extent feasible, including through the use of technically and commercially feasible and effective noise reduction and attenuation measures. For example, project proponents should select and operate sub-bottom profiling systems at power settings that achieve the lowest practicable source level for the objective.

VII. Require mandatory reporting of marine mammal and sea turtle detections:

A. Project proponents must immediately report an entangled or dead marine mammal or sea turtle to NOAA Fisheries, the Marine Animal Response Team (1-800-900-3622) or the United States Coast Guard via one of several available systems (e.g., phone, app, radio). Methods of reporting are expected to advance and be streamlined in the coming years, and projects should commit to supporting and participating in these efforts.

B. Quarterly reports of PSO sightings data should be made publicly available to inform marine mammal and sea turtle science and protection.

These mitigation recommendations do not include the entire range of prospective site assessment and characterization activities for all potentially impacted species.

B. Recommendations for Protected Species Observer Protocols

The FSN offers an opportunity to implement protocols that mitigate risk to vulnerable species, such as the use of PSOs.[32] Our detailed recommendations for PSO protocols can also be found in Attachment I, though generally, BOEM should require a minimum of four PSOs during both site assessment and construction activities on each vessel following a two-on, two-off rotation. Each PSO on duty would be responsible for scanning no more than 180° of the horizon. We note that BOEM only requires a minimum of one "qualified third-party PSO" on each vessel", for the recent California leases in Morro Bay and Humbolt leases, which would not sufficiently allow for the 360° canvassing of visual clearance and exclusion zones.[33] We urge BOEM to strengthen this Standard Operating Condition for the Gulf of Mexico leases to include a minimum of four PSOs on surveying and construction vessels.

BOEM should also include the measures below, which were included in the final Morro Bay and Humbolt leases:[34]

- 5.2.1.2 Protected Species Observers: The Lessee must ensure that observers have the safety and monitoring equipment adequate to conduct their activities (including night-vision equipment for nighttime survey operations).[35]
- 5.2.1.3 Protected Species Observer Authority: The Lessee must ensure that the observers have the authority to stop any activity that could result in harm to a protected species, except when

[32] The term "PSO" refers to an individual with a current NOAA Fisheries approval letter as a Protected Species Observer.
[33] CA Lease OCS-P 0561, 0562, 0563, 0564, 0565 can be found at https://www.boem.gov/renewable-energy/state-activities/california.
[34] *Id.* at pg. C-13.
[35] Please see Attachment I for our recommendations on nighttime operations. Pile driving must not be initiated within 1.5 hours of civil sunset or in times of low visibility when the visual "clearance zone" and "exclusion zone" (as hereinafter defined) cannot be visually monitored, as determined by the lead PSO on duty.

the stopping of the activity would put the safety of the vessel or crew at risk. In the event that a marine mammal is struck by a vessel or survey equipment or becomes entangled in any cable or lines, the Lessee must ensure that the observer immediately notifies NMFS so that appropriate response measures can be implemented. Similarly, if the vessel or its crew causes any harassment or harm to a marine mammal occurs, the Lessee must ensure that the observer immediately notifies NMFS and any other required regulatory agency.

- 5.2.1.4 Monitoring Reporting: The Lessee must submit a final report summarizing the results of monitoring activities to BOEM, NOAA ... and other appropriate agencies no more than 90 days following yearly completion of survey activities. Yearly completion dates must be defined in the associated survey plan. The report must, at a minimum, include: (a) an evaluation of the effectiveness of monitoring protocols and (b) reporting of: (i) marine mammal, sea turtle, and other wildlife sightings (species and numbers); (ii) any wildlife behavioral changes; and (iii) any interactions or conflict with marine wildlife, including reporting of any project delays or cessation of operations due to the presence in the project are of marine wildlife species subject to protection.

C. Recommendations to Reduce Risk of Secondary Entanglement of Marine Mammals, Sea Turtles, Sharks, and Diving Birds

BOEM should require lessees to develop and implement management practices to monitor for and minimize the risk to marine species most susceptible to entanglement, including marine mammals, sea turtles, sharks, and diving birds, from secondary entanglement in marine debris (including fishing gear). This form of entanglement could occur if marine debris becomes ensnared on project infrastructure and subsequently entangle marine wildlife. BOEM and NOAA should also be responsible for approving these management plans and practices following public review and input. If the use of floating wind were to be considered, BOEM should require further mitigation measures that can be found in Attachment II.

D. Noise Avoidance and Mitigation Measures

Acoustic impacts from offshore wind's siting, construction, operation, and decommissioning activities are of significant concern for marine wildlife. BOEM should require lessees to demonstrate how underwater noise will be avoided, minimized, and mitigated to the fullest extent feasible during site assessment and characterization activities, including through the use of effective noise reduction and attenuation measures (e.g., using survey equipment that can be deployed at depth, and operating sub-bottom profiling systems at power settings that achieve the lowest practicable source level for the objective).

Noise impacts will continue through the construction, operation, and decommissioning phases, with varying degrees of severity reliant on the technologies adopted. Committing to minimization of underwater noise throughout the project's lifetime will yield significant benefits to marine wildlife

and the broader ecosystem, and will direct developers to seek quieter development and operation options early in the leasing process.

We have stressed in previous comments to BOEM that the most effective way to reduce noise during construction is to install quieter foundation types. If pile-driving cannot be avoided, we encourage BOEM to work closely with the NOAA Fisheries on activities that could lead to greater levels of noise reduction during impact pile driving for future projects, as noise minimizing approaches during discrete phases of development have been identified by experts as the most promising solution to overcoming noise challenges associated with offshore wind development.[36] Such activities may include the development of a noise reduction standard[37] (akin to the German standard for harbor porpoise) that is tailored to protect species of concern in U.S. waters and designed to account for the specific foundation technologies planned to be installed in the U.S., as well as other project- and site-specific conditions in the United States. Given that underwater noise pollution negatively affects species across frequency hearing groups, in the pursuance of this standard we encourage BOEM and NOAA Fisheries to consider a hybrid approach, where risk is reduced for low-, mid-, and high frequencies, rather than solely at the low frequencies at which baleen whales are most vulnerable. A hybrid approach would help support overall marine ecosystem health rather than prioritize a single species or species group (i.e., low-frequency hearing cetaceans).

In the FSN, BOEM should require the lessee to implement the best commercially available combined noise abatement system technology to achieve the greatest level of noise reduction and attenuation possible, in line with the mitigation hierarchy. Based on the findings of Bellman et al. (2020, 2022), which indicate a reduction of 20 dB SEL is feasible for monopiles 8 meters in diameter, we recommend that up to a 10-dB (re: 1 μPa^2s) reduction of SEL be viewed as a floor only. BOEM should require developers to deploy technologies proven in Europe to be capable of a 15 dB (re: 1 μPa^2s) reduction in SEL, or greater. The noise reduction requirement should apply to all aspects of pile driving operations, including pile strikes, compressors, and operations vessels engaged in construction. Field measurements must be conducted on the first pile installed and data must be collected from a random sample of piles throughout the construction period. We do not support field testing using unmitigated piles. Sound source validation reports of field measurements must be evaluated by both BOEM and NOAA Fisheries prior to additional piles being installed and be made publicly available.

BOEM should also require that lessees take measures to reduce underwater noise levels generated by turbines during operations (e.g., engineering solutions to acoustically decouple the turbine from the mast and platform, use of direct drive wind turbine generators as opposed to generators that rely on a gear box).

[36] Lee, J. and Southall, B. Practical Approaches for Reducing Ocean Noise Associated with Offshore Renewable Energy Development. Global Alliance for Managing Ocean Noise, Workshop Report. 2022 [hereinafter GAMeON 2022].

[37] Note that building robust regulatory standards for noise reduction and attenuation which can be used internationally was identified by ocean noise experts as an important next step (GAMeON 2022). Our groups support this recommendation and encourage BOEM's rapid development of this standard.

E. Recommendations Regarding Collision and Lighting for Birds and Bats

The FSN should require lessees to adopt the measures detailed below to monitor, avoid, and minimize bird and bat collisions. There is significant concern for collision impacts during turbine operation as well as during site assessment and characterization activities. There is a need for much greater understanding of bat distributions in the lease areas, greater understanding of the risk of turbine strikes and bird and bat mortality, and identification of species most at risk. Nevertheless, our current understanding of offshore wind-avian interactions and avian at-sea distribution along the Gulf of Mexico OCS is sufficient to predict that potential impacts are likely to occur, and therefore it is important to integrate monitoring and protections for birds and bats into the FSN.

A number of species warrant specific consideration within the lease areas, such as those listed under the Endangered Species Act and the Migratory Bird Treaty Act, as well as species of birds covered under obligations for conservation of birds under the Fish and Wildlife Conservation Act as amended in 1988, Executive Order (EO) 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds" (January 17, 2001), North American Waterbird Conservation Plan, the Memorandum of Understanding (MOU) between Department of the Interior U.S. Minerals Management Service and the Department of the Interior U.S. Fish & Wildlife Service (FWS) Regarding implementation of EO 13186 (June 4, 2009) and BOEM, Department of Interior (DOI), FWS, and NOAA membership in the International Union for Conservation of Nature.[38]

We appreciate that BOEM has included a requirement for Motus Wildlife Tracking Systems to be installed on meteorological or environmental data buoys.[39] Installing Motus systems helps to address information gaps on offshore movements of birds and bats, including ESA-listed species. The FSN should also include the below stipulations during all phases of development to maintain healthy populations of bird and bat species and to avoid further adverse impacts to vulnerable populations. The FSN should also specify that if monitoring efforts reveal a need to minimize bird or bat fatalities, developers must deploy commercially available and technologically feasible minimization and avoidance technology and/or strategies that the regulatory and conservation communities agree are appropriate.

The following suggestions are adapted from the New York State Energy Research and Development Authority's Environmental Technical Working Group and existing lease stipulations:

I. To avoid and minimize attraction and disorientation-related impacts to birds and bats, artificial lighting on offshore wind projects (e.g., flight safety and navigation lighting, work-related lighting) should be reduced to the extent possible while maintaining human safety and

[38] Mandated under 16 U.S.C. 2901–2912 and developed by the U.S. Fish and Wildlife Service.

[39] GOM Lease OCS-G 37334, 37335, and 37336 can be found at https://www.boem.gov/renewable-energy/state-activities/gulf-mexico-activities.

compliance with Federal Aviation Administration, U.S. Coast Guard, Department of Defense and BOEM regulations. This should be implemented during all phases of offshore wind energy development, from pre-construction to decommissioning, and include the following:

A. Use of 'On demand' transportation safety lighting systems (e.g., Aircraft Detection Lighting Systems).
B. Use the fewest number of lights on structures possible under regulatory requirements and protection of human safety.
C. To the extent possible, avoid use of white lights in favor of red or other colors and use flashing lights instead of steady burning lights.
D. Avoid high intensity lights (e.g., sodium vapor, quartz, halogen).
E. Lighting should be hooded, down-shielded, and/or directional (e.g., down-lit).
F. Activities that would require extensive lighting should be planned during daylight hours when feasible. This is particularly important for activities requiring flood lighting during periods of high risk to birds and bats.
G. Where feasible, lighting intensity should be reduced, or lights should be extinguished during periods when birds are most likely to be present and on overcast nights when lights are most likely to attract/disorient birds.

II. Collision Monitoring

A. Collision Risk Assessment: BOEM should require lessees use comprehensive and complementary tools to evaluate risks and document impacts to birds and bats vulnerable to population-level impacts from turbine collision, including marine radar, acoustic detectors, thermal photo and videography, and collision detection technologies; lessees should be required to deploy strike detection technologies once commercially available for use on offshore wind turbines.
B. Documenting Collision Events: Understanding the population-level cumulative impacts of the offshore wind build out along the Gulf of Mexico OCS will require a method for accurately estimating the *observed* level of take of birds and bats of all sizes. The Department of Energy (DOE) has recently funded development of collision detection technology from the Albertani Lab[40] at Oregon State University and WT Bird from WEST, Inc.[41] Similar technologies are being tested at Block Island Wind Project and other offshore locations in the European Union and United Kingdom and are making rapid gains in being effective, officially verified, commercially available, and affordable at scale in the near future, possibly at the same time as the projects would be ready for construction and operation.[42] Incorporating multiple sensor types,[43] or using available integrated monitoring systems that combine acoustic detection with visual camera

[40] Clocker, K., et al. 2021. Autonomous Sensor System for Wind Turbine Blade Collision Detection. Inst. Elec. & Elec. Eng'rs.
[41] Verhoef, J.P., et al. 2004. WT-Bird: A Low Cost Solution for Detecting Bird Collisions. Energy Research Center, Netherlands.
[42] Dirksen, S. 2017. Review of methods and techniques for field validation of collision rates and avoidance amongst birds and bats at offshore wind turbines. Sjoerd Dirksen Ecology.
[43] Suryan R. et al. 2016. A Synchronized Sensor Array for Remote Monitoring of Avian and Bat Interactions with Offshore Renewable Energy Facilities (No. DOE-OSU-EE0005363). Oregon State Univ., Corvallis, OR; Lagerveld S. et al. 2020. Assessing fatality risk of bats at offshore wind turbines. (No. C025/20). Wageningen Marine Research.

technologies, thermographic imaging, and very high frequency (VHF) detection,[44] would be an appropriate system to collect monitoring data. DOE is currently evaluating the development status of these integrated systems based on their readiness for offshore wind deployment.[45] BOEM should support the development of these technologies and should require turbine developers to integrate these systems into their turbine designs.

C. Data transparency: All incidences of observed avian and bat collision with turbines, vessels, platforms, buoys or other structures associated with site assessment, construction, and operation activities should be promptly made publicly available and reported to USFWS.

III. Turbine Collision Minimization Strategies. In addition to the lighting recommendations provided above, BOEM should require the following strategies to minimize collision risk with lease stipulations:

A. Developers should commit to rigorous monitoring and collaboration with subject matter experts to determine how turbine design affects species collisions, which will inform appropriate height limits and minimum turbine air gaps in subsequent construction and operation plans. The newest contracted offshore wind turbines are reaching heights of more than 300 meters. Further increasing this maximum turbine height could increase risk to trans-Gulf migrants. Decreasing the turbine air gap - the distance between the water surface and the rotor swept zone - could increase collision risk for lower flying foraging and commuting birds in the marine environment.

B. Developers should be required to prepare a bird and bat adaptive management plan that commits the lessee to using the best available minimization technologies or strategies if monitoring reveals significant collision impacts:

1. Developers should evaluate the feasibility of automated, smart, and/or seasonal curtailment strategies. We note that reasonably tailored smart curtailment strategies could be an important mitigation strategy for responsibly operated offshore wind energy facilities. Developments in Next Generation Weather Radar, or “Nexrad”, System make it easier to predict migration timing. Research into the timing and environmental cues driving migration dynamics along the Gulf Coast can inform specific periods when collision risk might be highest. Developments in collision detection technology will also likely provide a mechanism for smart curtailment based on the proximity of individual birds and bats to the turbines. This type of automated curtailment system has resulted in significant decreases in collision mortality events within land-based wind farms where it has been deployed.[46]
2. Bat deterrent systems. Deterrent technologies are being developed for land-based turbines, including turbine coatings (to counteract bat attraction to

[44] https://www.normandeau.com/environmental-specialists-consultant-atom-technology/

[45] Brown-Saracino, J. Technologies and Approaches for Monitoring Bird and Bat Collisions Offshore (Presentation to the State of the Science Workshop on Wildlife and Offshore Wind Energy Development), N.Y. ETWG (Nov. 13-14, 2018).

[46] McClure et. al. 2021. Eagle fatalities are reduced by automated curtailment of wind turbines, J. Applied Ecology.

smooth surfaces which might be perceived as water),[47] ultraviolet lighting (which many bat species can see),[48] and ultrasonic noise emitters (to possibly "jam" bats' radars and make wind facilities unappealing to bats).[49] One of the ultrasonic deterrent technologies, NRG Systems, has been commercially deployed at land-based wind facilities.[50] These technologies need to be assessed for use in the offshore environment, especially on turbines with large swept areas.

F. Recommendations for Benthic Habitat

Benthic habitat in the Gulf of Mexico supports biodiverse marine communities, ecologically and commercially important fisheries, and biogeochemical cycling. BOEM should require the lessee to implement management practices to first avoid, then minimize and mitigate adverse impacts from all stages of development and types of project infrastructure that would destroy or significantly alter benthic habitat. It is also particularly important to protect sand resources[51] critical to restoration efforts, biogenic structural habitat,[52] which is comprised of three-dimensional structures created by slow-growing living organisms (e.g., corals, sponges) that support a high density and diversity of marine species, and Habitat Areas of Particular Concern (HAPC), which are subsets of Essential Fish Habitat that have a particularly important ecological role in fish life cycles or are especially sensitive, rare, or vulnerable to degradation. BOEM should prioritize avoidance of development in these areas. Additionally, the proposed lease areas overlap with an area that is sometimes impacted by the seasonal development of oxygen-depleted bottom waters (defined as dissolved oxygen < 2 mg/L) due to excess nutrient input into the Gulf along with intense water stratification in the summertime.[53] Hypoxia can

[47] Victoria J. Bennett & Amanda M. Hale, Texturizing Wind Turbine Towers to Reduce Bat Mortality: DE EE0007033 (PowerPoint presentation), U.S. Department of Energy (DOE) (last visited Feb. 9, 2022), https://www.energy.gov/sites/prod/files/2019/05/f63/TCU%20-%20M17%20-%20Hale-Bennett.pdf.

[48] National Renewable Energy Lab., Technology Development and Innovation Research Projects (last visited Aug. 30, 2021), https://www.nrel.gov/wind/technology-development-innovation-projects.html; *see also,* USGS, Paul M. Cryan *et. al.*, Influencing activity of bats by dimly lighting wind turbine surfaces with ultraviolet light (2022); https://www.usgs.gov/publications/influencing-activity-bats-dimly-lighting-wind-turbine-surfaces-ultraviolet-light

[49] Kinzie, K., et al., 2011. Ultrasonic bat deterrent technology, U.S. DOE.; Weaver, S.P. et al. 2020. Ultrasonic acoustic deterrents significantly reduce bat fatalities at wind turbines. Glob. Ecology & Conservation; Arnett, E.B., et al. 2013. Evaluating the effectiveness of an ultrasonic acoustic deterrent for reducing bat fatalities at wind turbines. PLoS One.

[50] Duke Energy, Duke Energy Renewables to Use New Technology to Help Protect Bats at its Wind Sites (June 26, 2019), https://news.duke-energy.com/releases/duke-energy-renewables-to-use-new-technology-to-help-protect-bats-at-its-wind-sites.

[51] R.B. Nairn, Q. Lu, S.K. Langendyk, M.O. Hayes, P.A. Montagna, T.A. Palmer, and S.P. Powers. Examination of the Physical and Biological Implications of Using Buried Channel Deposits and other Non-Topographic Offshore Features as Beach Nourishment Material. U.S. Dept. of the Interior, Minerals Management Service. OCS Study MMS 2007-048. 231 pp. + appendices.

[52] Biogenic habitats "encompass both a) those living species that form emergent three-dimensional structure, that separate areas in which it occurs from surrounding lower vertical dimension seafloor habitats and b) non-living structure generated by living organisms, such as infaunal tubes and burrows." Source: New Zealand Government Ministry for Primary Industries, "Linking marine fisheries species to biogenic habitats in New Zealand: a review and synthesis of knowledge. New Zealand Aquatic Environment and Biodiversity Report No. 130. May 2014. https://fs.fish.govt.nz/Doc/23651/AEBR_130_2514_HAB2007-01%20(obj%201,%202,%20RR3).pdf.ashx.

[53] National Centers for Environmental Information: Hypoxia Watch https://www.ncei.noaa.gov/maps/hypoxia/

impact the diversity and abundance of the benthic community. Modeling results from the North Sea suggest that offshore wind farms have the potential to exacerbate low oxygen conditions by reducing current velocities.[54] We recommend BOEM implement baseline monitoring and require continued monitoring during the life of the project to measure any impacts of wind turbines on hypoxia in the lease area.

We recommend the FSN include the additional measures below to inform what steps are needed to fully protect benthic habitat.

I. Site assessment and characterization
    A. Detailed benthic surveys of HAPC and sand resource areas must occur as part of site assessment and characterization activities.[55]
    B. Bottom water characterization, including current velocities and dissolved oxygen concentrations, are recommended as part of the site assessment.
    C. Prior to deployment of anchored meteorological buoys, the lessee shall obtain a box core sample in the expected location of each buoy's anchor to confirm benthic sediment composition. The lessee shall avoid biogenic structural habitat (as confirmed by the core sample) when anchoring meteorological buoys.[56]

II. Construction and operations
    A. The lessee shall conduct detailed benthic habitat surveys of prospective offshore wind development sites, ensuring that designated HAPCs and sand resource areas receive particular attention.
    B. Where surveys affirm the presence of biogenic structural habitat, and responsible agencies determine that adverse impacts to biogenic structural habitat cannot be avoided, the lessee shall submit a mitigation plan to the responsible agencies for their approval prior to advancing development. This mitigation plan shall include, but not be limited to, plans for a mooring system with a minimally intensive benthic footprint. Such plans should be made available during responsible agencies' process for approving construction and operations activities.

G. Preventing spread of invasive species

Future development activities may lead to an increase in introduced/invasive species due to the presence of floating foundations, mooring lines, and anchors. However, site assessment activities may also lead to the introduction of species that may travel on survey boats' hulls, anchor chains, etc. We recommend the FSN require lessees provide a plan to reduce the likelihood of the

[54] Daewel, U., Akhtar, N., Christiansen, N. et al. Offshore wind farms are projected to impact primary production and bottom water deoxygenation in the North Sea. Commun Earth Environ 3, 292 (2022). https://doi.org/10.1038/s43247-022-00625-0

[55] We continue to recommend that mapping be required before leasing to best inform siting decisions and avoid or minimize adverse impacts to benthic habitat. As that is not possible at this stage, we recommend that BOEM require detailed mapping during site assessment and characterization.

[56] Biogenic habitat is described in Buhl-Mortensen, 2010 et al. Biological structures as a source of habitat heterogeneity and biodiversity on the deep ocean margins. https://onlinelibrary.wiley.com/doi/full/10.1111/j.1439-0485.2010.00359.x.

introduction of species during site assessment and characterization, as well as future development activities.

III. Lessees should contribute to robust scientific research pertaining to offshore wind development and develop monitoring plans to inform avoidance, minimization, mitigation, and compensatory mitigation strategies

Standardized monitoring is vital to ensuring a successful and efficient buildout of environmentally responsible offshore wind in the Gulf of Mexico. Environmental baseline data collection and long-term environmental monitoring of offshore wind, at both the regional level and at specific project sites, will help explain whether and how offshore wind projects impact the surrounding environment. Standardized monitoring is necessary to assess the degree to which efforts to avoid, minimize, and mitigate harm have been successful, while also enabling the adaptive management and effective mitigation of adverse environmental impacts that may occur.

To that end, BOEM should include stipulations in the FSN requiring lessees provide robust plans for monitoring potential individual and cumulative impacts on wildlife - marine mammals, sea turtles, birds, bats, fish, sharks, and invertebrates - from site assessment and characterization, construction, operation, and decommissioning of all offshore wind infrastructure and other activities that support these activities from generation to distribution through the life of the project. BOEM, NOAA, and other relevant agencies should establish monitoring standards and should be responsible for approving these monitoring plans and practices. As noted below, there are also instances where BOEM should require lessees to contribute to research by independent third parties to better understand baseline conditions and develop mitigation measures.

Monitoring plans must include sufficient baseline data collection to effectively assess development impacts in a Before After Control Impact (BACI) or BAG design strategy, as appropriate. These surveys should be designed for long-term review and regularly sampled during the life of the wind farm and through its decommissioning.

In addition to the monitoring recommendations provided in this letter in previous sections, as well as the monitoring recommendations in Attachment III, we recommend general monitoring for the following:

1. **Noise**

All activities associated with offshore wind, from siting and installation through operation and decommissioning will be accompanied by noise, posing adverse impacts for marine mammals and other marine life. Underwater noise from increased vessel traffic as well as turbine installation and operation also poses a potential threat to diving birds occurring within and around the Lease Areas.[57]

Robust baselining of the Lease Areas would reveal the acoustical changes to the habitat as a consequence of the development, deployment, and operation of floating offshore wind turbines, and the associated ongoing support and maintenance of the equipment. Changes in the soundscape are a necessary complement to behavioral studies to assess potential displacement from important habitat areas due to increased noise.

We recommend that BOEM, in coordination with lessees, collect sufficient data (broadband soundscape recordings through all seasons) to analyze noise levels prior to project development to assess the extent to which development will increase underwater noise and subsequent risks to marine life, and to promptly make this data publicly available. Broadband baseline soundscape recordings are needed across all four seasons within and adjacent to the Lease Areas, vessel traffic routes, and transmission corridors to shore, and provide for control sites for future monitoring. It is critical to assess baseline noise prior to project development, as well as to conduct continuous, ongoing broadband soundscape recordings of the Lease Areas throughout all phases of project development to inform adaptive management and inform mitigation measures for future projects.

2. Biophysical processes

It is critical that comprehensive pre-installation and continued monitoring at the WEAs is implemented to assess impacts on the biophysical processes which encompass abiotic and biotic conditions, including the chemical, biological, physical, and ecological components. This type of monitoring will allow for assessment of adverse impacts from installation and operation of offshore wind farms. Traditional oceanographic sampling of the water column, including instrumentation to sample water movement, chemical components (e.g., NO_2, NO_3, CO_2, P), water quality (e.g. O_2 saturation, pH, turbidity, nutrient load), and upwelling characteristics, in spatiotemporal conjunction with benthic biological sampling, will be needed to accurately assess ecosystem conditions pre- and post-installation.

3. Survey needs and data collection regarding species, displacement, and population level impacts

For offshore wind development to proceed responsibly in the Gulf of Mexico, there is a need for additional survey and data collection on a wide array of species that scientists have identified as expected to occur in the Lake Charles WEA and the Galveston WEA. There is also a need for additional surveys and data collection on environmental variables for preferred habitat conditions. As BOEM progresses with leasing in the Gulf of Mexico, the agency should concurrently work to fill critical gaps in baseline data on wildlife at a variety of spatial and temporal scales.

[57] Anderson Hansen K, Hernandez A, Mooney TA, Rasmussen MH, Sørensen K, Wahlberg M. 2020. The common murre (Uria aalge), an auk seabird, reacts to underwater sound. The Journal of the Acoustical Society of America 147:4069–4074.

Given the potential of displacement from offshore wind developments, BOEM should require lessees to develop comprehensive monitoring plans for species using the Lease Areas. These monitoring plans are necessary to: (1) support the collection of baseline distribution and habitat use data, (2) detect the degree of displacement (if any), (3) help quantify the consequences of displacement to population vital rates, including survival and reproductive parameters; and (4) document changes in important life history behaviors such as foraging and socializing. For example, in the case of avian species, there are potential population-level impacts of displacing birds from important foraging areas or migratory routes.[58]

A comprehensive monitoring plan must include transect surveys in concert with additional methods, including environmental data to inform the development of predictive spatial density models, to identify suitable habitat, and to assess potential changes in distribution, behavior, or migratory patterns before and after construction. Transect surveys must be designed with high enough spatial and temporal scale and resolution to be able to detect seasonal as well as inter-annual changes in species distribution and behavior. Telemetry (e.g., radio and/or satellite telemetry as appropriate) and marine radar monitoring methods should also be employed as they serve different (though complimentary) objectives for different suites of species.

Coordinated regional monitoring will be critical for understanding cumulative impacts, particularly to monitor and account for population level effects resulting from all phases of development. BOEM should lead coordination of regional monitoring, in collaboration with lessees and other relevant agencies, and require lessees develop regional monitoring plans, which will be approved by responsible agencies.

4. Data transparency and collaboration

To ensure sound stewardship of ocean resources, science should be conducted in a collaborative and transparent manner, involve recognized marine and wildlife experts, engage relevant stakeholders, and results made publicly available. All baseline, monitoring, incident, and assessment data should be made publicly available and shared with standard metadata conventions used by the Marine Cadastre, the U.S. Integrated Ocean Observing System, regional ocean data portals, or other long-term collaborative data-management efforts.[59] One useful model for housing data with an independent entity could be that used by the Northeast Regional Ocean Council,[60] which among other functions, provides access to regional data on marine life, seafloor habitat, and other data relevant to planning

[58] Mendel B, Schwemmer P, Peschko V, Müller S, Schwemmer H, Mercker M, Garthe S. 2019. Operational offshore wind farms and associated ship traffic cause profound changes in distribution patterns of Loons (Gavia spp.). Journal of Environmental Management 231:429–438; Peschko V, Mendel B, Müller S, Markones N, Mercker M, Garthe S. 2020. Effects of offshore windfarms on seabird abundance: Strong effects in spring and in the breeding season. Marine Environmental Research:105157.

[59] We recommend incorporation of the detailed recommendations for data transparency and equitable data sharing found in Amy Trice et al., Challenges and Opportunities for Ocean Data to Advance Conservation and Management, OCEAN CONSERVANCY (2021), https://oceanconservancy.org/wp-content/uploads/2021/05/Ocean Data-Report-FINAL.pdf.

[60] https://neoceanplanning.org/data-issues/northeast-ocean-data-portal-work-plan/

for offshore wind development.

As mentioned previously in this letter, data on entanglements, vessel strikes and fatalities, and turbine collisions should promptly be made publicly available. Survey activities could be completed over several years, so providing monitoring data only annually[61] or after completion is not adequately informative when impacts could arise at any point prior to completion. Delaying the release of monitoring data precludes adaptive management and prevents meaningful mitigation. Frequent reporting is necessary to alert agencies, lessees, and the public to impacts in a timely manner and to enable avoidance, minimization, and mitigation of adverse impacts throughout all phases of development, operations, and decommissioning.

5. Additional survey needs and data collection

For offshore wind development to proceed responsibly in the Gulf of Mexico, there is a need for additional survey and data collection on a wide array of species that scientists have identified as expected to occur in the Lake Charles WEA and the Galveston WEA. There is also a need for additional surveys and data collection on environmental variables for preferred habitat conditions. As BOEM progresses with leasing in the Gulf of Mexico, the agency should concurrently work to fill critical gaps in baseline data on wildlife at a variety of spatial and temporal scales.

A. Lessees should provide plans for adaptive management and compensatory mitigation

We recommend that BOEM require lessees to provide plans for adaptive mitigation strategies and compensatory mitigation for project development, as needed, based on monitoring outcomes. The first key to effective adaptive management is the generation of meaningfully and publicly accessible data concerning impacts from project operation. Concerns about the transparency of project data are addressed elsewhere in this letter. Effective adaptive management also requires clear, objective standards or "triggers" that are biologically meaningful.

Comprehensive baseline and post-project monitoring and implementation of an adaptive management framework are critical to understanding cumulative adverse impacts and minimizing them. We urge BOEM to adopt conditions that require comprehensive monitoring of entanglement, noise, benthic habitat changes, and habitat displacement, as well as requirements for adaptive management (as recommended above).

[61]Gulf of Mexico Draft EA, Appendix H, at H-7: "Avian annual reporting to BOEM and FWS may be required to document any dead or injured birds or bats found during activities conducted in support of plant submittal as part of the lease or later as a condition of plan approval."
GOM Lease OCS-G 37334, 37335, and 37336, pg. C-15: "Annual Avian Reporting: The lessee must provide an annual report to the Lessor and USFWS…This report must document any dead or injured birds and bats found during activities conducted in support of plan submittal."

BOEM should set expectations that developers be prepared to adapt project construction and operation procedures based on new information or changes to wildlife populations and the levels at which these populations interact with the lease areas. For example, should rates of avian collision be higher than anticipated, lessees should have plans in place for increased collision avoidance measures, as well as plans for compensatory mitigation; or, should an oceanographic change (e.g. marine heatwave) affect the distribution or increase vulnerability of marine species, lessees should be prepared to adopt precautionary measures to reduce adverse project impacts to cumulative risk.

IV. Recommendations for Developer Incentives

A. BOEM should increase the amount of bid credits

In the Gulf of Mexico PSN, BOEM has proposed allowing bid credits of up to 20 percent for workforce training or domestic supply chain investments, and up to 10 percent for a fisheries compensatory mitigation fund.[62]

We recommend additional investments below to support environmental research and the health of the local economy, beyond investments in supply chain and workforce development. As such, we urge BOEM to increase the cap on bid credits beyond 30 percent to accommodate a wider array of issues.

B. Incentives for Environmental Research and Mitigation

As we have noted above, additional research is needed to understand the full suite of effects from offshore wind development. Further, as developers gather site assessment and characterization data and data gleaned from these activities and operations, it will be necessary to house, synthesize and integrate the information so that appropriate monitoring, avoidance, minimization and mitigation measures can be developed. This data integration and utilization effort will require consistent and dedicated resources from a third party or government agency.

In addition to bid credits for workforce training programs, domestic supply chain investments, and fisheries compensatory mitigation fund, BOEM should also grant bid credits to support a consolidated research center or hub. The funds would be used to support research into infrastructure design, analysis of monitoring data, data sharing and transparency agreements, and research to support adaptive management (e.g., research into improving monitoring, avoidance, and mitigation measures).

Developers could provide funding to an academic institution researching the effects of offshore wind, or to a public agency analyzing the effects of offshore wind, or to an independent entity created to further

[62] GOM PSN at 19.

environmental research, such as the Regional Wildlife Science Collaborative for Offshore Wind,[63] in order to receive credit. Research priorities could be directed by the Intergovernmental Renewable Energy Task Force, in consultation with stakeholders. As with the workforce training or domestic supply chain development credit, or the fisheries mitigation bid credit, BOEM would provide developers with a discount on the bid price for investing in environmental research.[64] And as with existing bid credits, there should also be a documentation and enforcement mechanism – developers should be required to show documentation of the research they have funded, as well face a penalty if such funding cannot be verified.[65]

The use of an environmental bid credit in a multi-factor auction is well within BOEM's authority. OCSLA requires BOEM to provide for "protection of the environment," as well as to ensure that offshore wind development is "subject to environmental safeguards." 43 U.S.C. §§ 1337(p)(4), 1332(3). In BOEM's regulations, "environmental considerations" are explicitly authorized as a permissible factor in a multi-factor bidding process. 30 C.F.R. § 585.220(a)(4). BOEM should include a 10 percent bid credit for developers who provide funding to support research on the environmental impacts of offshore wind in the Gulf of Mexico.

C. Incentives for Investments to Benefit Underserved Communities

In the PSN, BOEM is requesting input on stipulations to ensure consideration and engagement of underserved communities throughout the offshore wind energy development process.[66] Our organizations believe that BOEM not only has the authority to include such mechanisms in the FSN, but that these are critical for successful and responsible offshore wind leasing. Lease provisions that help protect and mitigate adverse impacts on the human environment would help BOEM meet its goals under OCSLA.

Establishing lease stipulations *or credits* for investments that environmentally, economically, and socially benefit environmental justice communities will further BOEM's goals under OCSLA. Congress recognized that the development of the Outer Continental Shelf "will have significant impacts on coastal and non-coastal areas of the coastal States," that there is a "national interest in the effective management of the marine, coastal, and human environments." 43 U.S.C. § 1332(4). The "human environment" is defined as "the physical, social, and economic components, conditions, and factors which interactively determine the state, condition, and quality of living conditions, employment, and health of those affected, directly or indirectly, by activities occurring on the outer Continental Shelf." *Id.* § 1331(i). Assistance to states and local governments to protect affected areas from adverse effects may be required, and states and local governments' rights to preserve and protect their marine, human, and coastal environments should be considered and recognized. *Id.* § 1332(5). In addition,

[63] *See https://neoceanplanning.org/rwse/*
[64] GOM PSN at 19-24.
[65] *Id.* at 22.
[66] *Id.* at 15.

BOEM's regulations allow consideration of "public benefits" and "compatibility with State and local needs" in a multi-factor bidding process. 30 C.F.R. § 585.220(a)(4). Under OCSLA and its implementing regulations, BOEM has the authority to include stipulations or credits to provide a broad suite of benefits to community organizations.

The same logic that holds for crediting investments in community-based organizations (CBOs), as BOEM has done in previous lease auctions and as it does in the California PSN,[67] applies to investments in environmental justice community-based organizations (EJCBOs). Further, investments in environmental justice communities can help meet BOEM's obligations under OCSLA by mitigating adverse impacts on the human environment through better informing infrastructure development and reducing local pollution (including air and water pollution and soil contamination). Targeted investments could also help ameliorate adverse impacts on the human environment by supporting improvements in energy efficiency in under-resourced communities and other programs to help mitigate potential disproportionate adverse economic and environmental impacts of offshore wind development. Development of port and transmission infrastructure, for example, is likely to disproportionately impact under-resourced communities. Impacted communities should have decision making power to decide if, where, and how this development is done.

Given BOEM's authority, the history of energy-driven marginalization of communities in the Gulf of Mexico, and prior use of a Community Benefit Agreement Bid Credit,[68] we are surprised that BOEM has not included such a bid credit for the Gulf of Mexico PSN, and believe this should be added for the FSN.

V. Conclusion

We greatly appreciate the opportunity to provide these recommendations for advancing responsible development of offshore wind through the leasing process, and urge BOEM to take action to establish lease stipulations and incentives that can realize this vision. We urge BOEM to move forward expeditiously with issuance of the FSN and lease auction for the Gulf of Mexico. We must seize the opportunity to ensure that this critical climate change solution is developed in a manner that protects our environment, maximizes quality job creation, and furthers environmental justice.

Sincerely,

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[67] See 79 Fed. Reg. 34,771, 34,779 (June 18, 2014); 87 Fed. Reg. at 32,50.
[68] *Id.*

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