



INCIDENTAL HARASSMENT AUTHORIZATION

Vineyard Wind 1, LLC (Vineyard Wind) is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1371(a)(5)(D)) to incidentally harass marine mammals, when adhering to the following terms and conditions.

1. This incidental harassment authorization (IHA) is valid from May 1, 2023 through April 30, 2024.
2. This IHA authorizes take incidental to pile driving associated with the construction of the Vineyard Wind Project in the Atlantic Ocean offshore of Massachusetts within the Wind Development Area (WDA) of Lease Area OCS-A 0501.
3. General Conditions
 - (a) A copy of this IHA must be in the possession of Vineyard Wind, the Holder of this IHA (Holder), supervisory construction personnel, lead protected species observers, and on each vessel associated with the Project at all times when activities subject to this IHA are being conducted.
 - (b) The species and/or stocks authorized for taking are listed in Table 1. Authorized take, by Level A and Level B harassment only, is limited to the species and numbers listed in Table 1.
 - (c) The taking by serious injury or death of any of the species listed in Table 1 or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA. Any taking exceeding the authorized amounts listed in Table 1 is prohibited and may result in the modification, suspension, or revocation of this IHA.
 - (d) Vineyard Wind must ensure that construction supervisors and crews, the monitoring team, and relevant Vineyard Wind staff are trained prior to the start of activities subject to this IHA, so that responsibilities, communication procedures, monitoring protocols, and operational procedures are clearly understood. New personnel joining during the project construction must be trained prior to commencing work.
 - (e) Vineyard Wind must abide by the Terms and Conditions of the Biological Opinion, issued by NMFS Greater Atlantic Regional Fisheries Office (GARFO) on September 11, 2020, pursuant to section 7 of the Endangered Species Act.



4. Mitigation Measures

- (a) Seasonal Restrictions on Pile Driving:
 - (i) Pile driving must not occur from January 1 through April 30.
 - (ii) Pile driving must not occur in December unless unanticipated delays due to weather or technical problems, notified to and approved by the Bureau of Ocean Energy Management, arise that necessitate extending pile-driving through December.
- (b) Time of Day Restrictions on Pile Driving:
 - (i) No pile driving may begin until at least one hour after (civil) sunrise.
 - (ii) No pile driving may begin within 1.5 hours of (civil) sunset.
- (c) No more than two monopiles may be driven per day. No more than four jacket piles may be driven per day. For all piles installed, the minimum amount of hammer energy necessary to install the piles must be used.
- (d) Vineyard Wind must use available sources of information on right whale presence, including, at least, daily monitoring of the Right Whale Sightings Advisory System, monitoring of Coast Guard VHF Channel 16 throughout the day to receive notifications of any sightings, and information associated with any Dynamic Management Areas and Slow Zones to plan pile driving to minimize the potential for exposure of any right whales to pile driving noise.
- (e) Implementation of clearance (visual and acoustic) and Passive Acoustic Monitoring (PAM) monitoring zones:
 - (i) Vineyard Wind must deploy at least two active duty protected species observers (PSOs) on the pile driving vessel at all times 60 minutes prior to, during, and 30 minutes after pile driving to monitor for marine mammals unless a Right Whale Dynamic Management Area or Slow Zone is in place that overlaps the Level B harassment zone in which case 3 PSOs must be on duty at the pile driving vessel. PSO requirements are described under condition 5(a).
 - (ii) Visual and passive acoustic monitoring must take place from 60 minutes prior to initiation of pile driving activity through 30 minutes post-completion of pile driving activity.



- (iii) For all pile driving activity, Vineyard Wind must establish clearance and PAM monitoring zones with radial distances as identified in Table 2 and Table 4.
- (iv) Pile driving may only commence when the visual clearance zones (Tables 2 and 4) are fully visible (i.e., are not obscured by darkness, rain, fog, etc.) for at least 30 minutes immediately prior to pile driving, as determined by the lead PSO.
- (f) Pre-Pile Driving Visual Clearance Measures for North Atlantic Right Whales (NARWs): The following measures apply prior to the commencement of pile driving.
 - (i) Vineyard Wind must use PSOs to visually observe for NARWs 60 minutes prior to, during and 30 minutes after all pile driving (see 4(e)(i) for the minimum number of PSOs).
 - (ii) If a PSO located on the pile driving vessel visually observes a NARW at any distance, pile driving shall not begin until PSOs have confirmed they have not detected a NARW from the pile driving vessel for at least 30 minutes.
 - (iii) The visual clearance zones identified in Table 2 must be fully visible and clear of NARWs for at least 30 minutes prior to initiating pile driving.
 - (iv) NARWs must be allowed to remain in the area (*i.e.*, must leave of their own volition), and their behavior must be monitored and documented.
 - (v) Any large whale visually observed by a PSO within 1,000 m of the pile that cannot be identified to species must be treated as if it were a North Atlantic right whale for clearance and shutdown purposes.
 - (vi) The visual clearance zones identified in Table 2 may be adjusted by NMFS for the May 15-December 31 timeframe based on sound source verification such that the minimum visual clearance zone reflects the Level A harassment zone for monopiles (but no less than 2 kms May 15-May 31 and no less than 1 km June 1- December 31, per the Biological Opinion).
 - (vii) From May 1 through May 14, an aerial or vessel-based survey must also be conducted that covers the 10 km extended clearance zone. Vessel-based surveys must not begin until the lead PSO on duty determines there is adequate visibility to detect NARWs. Aerial surveys must not begin until

the lead PSO on duty determines adequate visibility and at least one hour after sunrise (on days with sun glare) to detect NARW.

- (viii) From May 1 through May 14 and November 1 through December 31, if a NARW is detected either via real-time PAM or vessel-based or aerial surveys within 10 km of the pile driving location, pile driving must be postponed and must not commence until the following day, unless a follow-up aerial or vessel-based survey confirms the 10km clearance zone is clear of right whales upon completion of the survey, as determined by the lead PSO. Aerial surveys must not begin until the lead PSO on duty determines adequate visibility and until at least one hour after sunrise on days with sun glare. Vessel-based surveys would not begin until the lead PSO on duty determines there is adequate visibility.
 - (ix) Any sighting of a NARW by Vineyard Wind personnel or by personnel contracted by Vineyard Wind (including vessel crews and construction personnel) must be immediately reported to the lead PSO.
- (g) Pre-Pile Driving Passive Acoustic Monitoring (PAM) Clearance and Monitoring Measures for NARWs: The following PAM measures apply prior to the commencement of pile driving.
- (i) Vineyard Wind must operate PAM systems capable of detecting NARWs in the PAM monitoring zones identified in Table 2 in real-time.
 - (ii) Vineyard Wind must acoustically monitor for NARWs 60 minutes prior to, during, and 30 minutes after all pile driving.
 - (iii) The real-time PAM system must be configured to ensure that the PAM operator is able to review acoustic detections within 30 minutes of the original detection in order to verify whether a right whale has been detected.
 - (iv) The PAM operator must be trained in identification of mysticete vocalizations and is responsible for determining if the acoustic detection originated from a NARW.
 - (v) If the PAM operator has at least 75 percent confidence (e.g., probable detection or greater) that a vocalization originated from a right whale located within 10 km of the pile driving location, the detection will be treated as a NARW detection.



- (vi) Pile driving must be delayed upon a confirmed PAM detection of a NARW, if the detection is confirmed to have been located within the relevant PAM clearance zone (Table 2).
 - (vii) From May 1 through May 14 and November 1 through December 31, if a right whale were detected either via real-time PAM, pile driving must be postponed and will not commence until the following day, or, until a follow-up aerial or vessel-based survey could confirm the extended clearance zone is clear of right whales, as determined by the lead PSO.
 - (viii) From May 15 through May 31 an extended PAM monitoring zone of 10 km must be established for NARW. A confirmed PAM detection of a NARW within this zone must be immediately relayed to visual PSOs to increase situational awareness.
 - (ix) Information on any acoustic detections must be reported to NMFS, as described in Condition 6(b).
- (h) NARW Shutdown Measures: The following measures apply to NARWs during pile driving.
- (i) If a NARW is visually observed or acoustically detected entering or within the shutdown zone (Table 3) after pile driving has commenced, a shutdown of pile driving must be implemented, as described in conditions 4(i)(iv-vi).
- (i) Pre-Pile Driving Clearance and Shutdown Measures for All Other Marine Mammals (non-NARWs): The following measures apply to all non-NARW marine mammals prior to and during pile driving.
- (i) If a marine mammal is observed entering or within the relevant clearance zones (Table 4) 30 minutes prior to the initiation of pile driving activity, pile driving activity must be delayed.
 - (ii) Marine mammals observed within a clearance or shutdown zone must be allowed to remain in the zone (*i.e.*, must leave of their own volition), and their behavior must be monitored and documented.
 - (iii) Pile driving may commence when either the marine mammal(s) has voluntarily left the respective clearance zone and been visually confirmed beyond that clearance zone, or, when 30 minutes have elapsed without re-detection (for mysticetes, sperm whales, Risso's dolphins and pilot whales) or 15 minutes have elapsed without re-detection (for all other marine mammals).

- (iv) In cases where pile driving has commenced and a shutdown is called for, the lead engineer on duty must evaluate the following to determine whether shutdown is technically feasible:
 1. Use site-specific soil data and real-time hammer log information to judge whether a stoppage would risk causing piling refusal at re-start of piling; and
 2. Check that the pile penetration is deep enough to secure pile stability in the interim situation, taking into account weather statistics for the relevant season and the current weather forecast.
 3. Determinations by the lead engineer on duty will be made for each pile as the installation progresses and not for the site as a whole.
- (v) If shutdown is called for but Vineyard Wind determines shutdown is not technically feasible due to human safety concerns or to maintain installation feasibility (as described under 4(i)(iv)), then reduced hammer energy must be implemented, when the lead engineer determines it is practicable.
- (vi) Following a shutdown, pile driving may not commence until either the animal has voluntarily left and been visually confirmed beyond the relevant clearance zone, or, when 30 minutes have elapsed without re-detection (for mysticetes, sperm whales, Risso's dolphins and pilot whales) or 15 minutes have elapsed without re-detection (for all other marine mammals).
- (vii) If an individual from a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized take number has been met, is observed entering or within the clearance zone, pile driving activities must shut down immediately (when technically feasible as described under 4(i)(iv)). Activities must not resume until the animal has been confirmed to have left the relevant clearance zone or the observation time period (as indicated in condition 4(i)(iii)), has elapsed with no further sightings.
- (viii) For in-water construction, heavy machinery activities other than pile driving, if a marine mammal comes within 10 meters of equipment, Vineyard Wind must cease operations until the marine mammal has moved more than 10 m and on a path away from the activity.

- (j) Soft Start:
 - (i) Vineyard Wind must implement soft start techniques for impact pile driving. The soft start must include an initial set of three strikes from the impact hammer at reduced energy, followed by a one-minute waiting period. This process must be repeated a total of three times prior to initiation of pile driving.
 - (ii) Soft start is required at the beginning of driving a new pile and at any time following a cessation of impact pile driving of 30 minutes or longer.
- (k) Vineyard Wind must implement a noise attenuation device(s) during all impact pile driving.
 - (i) If the initial sound field verification (SFV) measurements indicate that the distances to isopleths are larger than those modeled assuming a 6 dB reduction (Tables 5 and 6), Vineyard Wind must apply additional sound attenuation measures before additional piles are installed. Until SFV confirms the distances to isopleths are equal or less than those modeled assuming a 6 dB reduction, the exclusion and monitoring zones must be expanded to match the actual distances to the isopleths of concern. If the use of additional sound attenuation devices still does not achieve distances less than or equal to those modeled assuming a 6 dB reduction and no other actions can reduce sound levels (e.g., reduced hammer energy), then Vineyard Wind must expand the zones to those identified through SFV, in consultation with NMFS.
 - (ii) If the exclusion zones are expanded beyond an additional 1,500 m, additional PSOs must be deployed on additional platforms, with each observer responsible for maintaining watch in no more than 180° an area with a radius no greater than 1,500 m.
 - (iii) If a bubble curtain is used, the following requirements apply:
 1. The bubble curtain(s) must distribute air bubbles around 100 percent of the piling perimeter for the full depth of the water column.
 2. The lowest bubble ring must be in contact with the seafloor for the full circumference of the ring, and the weights attached to the bottom ring must ensure 100 percent seafloor contact.
 3. No parts of the ring or other objects may prevent full seafloor contact.

- (iv) Construction contractors must train personnel in the proper balancing of air flow to the bubblers. Construction contractors must submit an inspection/performance report for approval by Vineyard Wind within 72 hours following the performance test. Corrections to the attenuation device to meet the performance standards must occur prior to impact driving.

- (l) Vessel Strike Avoidance Measures: The following measures apply to Vineyard Wind vessels and vessels contracted by Vineyard Wind throughout the project area. These measures do not apply in cases where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of that maneuverability restriction, cannot comply.
 - (i) Year-round, vessel operators will use all available sources of information on right whale presence, including at least daily monitoring of the Right Whale Sightings Advisory System, WhaleAlert app, and monitoring of Coast Guard VHF Channel 16 throughout the day to receive notifications of any sightings and/or consideration of information associated with any Dynamic Management Areas to plan vessel routes to minimize the potential for co-occurrence with any right whales.
 - (ii) On all vessels, regardless of size or speed it is traveling, operators and crews must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any marine mammal.
 - (iii) Whenever multiple vessels are operating, any visual observations of ESA-listed marine mammals must be communicated to a PSO and/or vessel captains associated with other vessels.
 - (iv) Vessel speeds will immediately be reduced to 10 knots or less if a NARW is sighted by the observer or anyone on the vessel.
 - (v) All vessels traveling over 10 knots must have a dedicated visual observer on duty at all times. The dedicated visual observer must receive prior training on protected species detection and identification, vessel strike minimization procedures, how and when to communicate with the vessel captain, and reporting requirements in this IHA. Visual observers may be third-party observers (i.e., NMFS-approved PSOs) or crew members.
 - 1. Observer training related to these vessel strike avoidance measures must be conducted for all vessel operators and crew prior to the start of in-water construction activities.

2. Confirmation of the marine mammal training and understanding of the IHA requirements must be documented on a training course log sheet and reported to NMFS (see Condition 6(c)).
- (vi) From November 1 through May 14, all vessels, regardless of size, must travel at less than 10 knots (18.5 km/hr.) within the WDA.
 - (vii) From November 1 through May 14, when transiting to or from the WDA, vessels must either travel at less than 10 knots, or, must implement visual surveys with at least one visual observer to monitor for North Atlantic right whales (with the exception of vessel transit within Nantucket Sound unless a DMA is in place).
 - (viii) In the event that any Dynamic Management Area (DMA) is established that overlaps with an area where a vessel would operate, that vessel, regardless of size, will transit that area at 10 knots or less unless it is a crew transfer vessel.
 - (ix) Crew transfer vessels traveling within any designated DMA must travel at 10 knots (18.5 km/hr.) or less, unless NARWs are clear of the transit route and WDA for two consecutive days, as confirmed by vessel based surveys conducted during daylight hours and real-time PAM, or, by an aerial survey, conducted once the lead aerial observer determines adequate visibility.
 1. If confirmed clear by one of the measures above, vessels transiting within a DMA over 10 kts must employ at least two visual observers to monitor for North Atlantic right whales.
 2. If a NARW is observed within or approaching the transit route, vessels must operate at less than 10 knots until clearance of the transit route for two consecutive days.
 - (x) Crew transfer vessels travelling over 10 kts within a Right Whale Slow Zone must employ an additional observer or other enhanced detection methods (e.g., thermal cameras) to monitor for North Atlantic right whales in addition to PAM monitoring in the transit corridor.
 - (xi) All vessels greater than or equal to 65 ft (19.8 m) in overall length must comply with the 10 knot speed restriction in any Seasonal Management Area (SMA) per the NOAA ship strike reduction rule (73 FR 60173; October 10, 2008).



- (xii) Crew transfer vessels may travel at over 10 knots if, in addition to the required dedicated observer (see condition 4(l)(v)), real-time PAM of transit corridors is conducted prior to and during transits.
 - 1. If a North Atlantic right whale is detected via visual observation or PAM within or approaching the transit route, all crew transfer vessels must travel at 10 knots or less for the remainder of that day.
- (xiii) All vessels will reduce vessel speed to 10 knots (18.5 km/hr.) or less when any large whale, any mother/calf pairs, pods, or large assemblages of non-delphinoid cetaceans are observed near (within 100 m (330 ft.)) an underway vessel.
- (xiv) All vessels must maintain a minimum separation distance of 500 m (1,640 ft) from a NARW. If a whale is observed but cannot be confirmed as a species other than a right whale, the vessel operator must assume that it is a right whale and take appropriate action.
- (xv) If underway, vessels must steer a course away from any sighted North Atlantic right whale at 10 knots (18.5 km/hr.) or less such that the 500 m (1640 ft.) minimum separation distance is not violated. If a NARW is sighted within 500 m (1,640ft.) of an underway vessel, the underway vessel must shift the engine to neutral. Engines will not be engaged until the right whale has moved outside of the vessel's path and beyond 500 m.
- (xvi) All vessels must maintain a minimum separation distance of 100 m from sperm whales and non-NARW baleen whales. If one of these species is sighted within 100 m (330 ft.) of an underway vessel, the underway vessel must shift the engine to neutral. Engines will not be engaged until the whale has moved outside of the vessel's path and beyond 100 m.
- (xvii) All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m (164 ft) from all delphinoid cetaceans and pinnipeds, with an exception made for those that approach the vessel (e.g., bowriding dolphins). If a delphinoid cetacean or pinniped is sighted within 50 m (164 ft.) of an underway vessel, the underway vessel must shift the engine to neutral, with an exception made for those that approach the vessel (e.g., bowriding dolphins). Engines will not be engaged until the animal(s) has moved outside of the vessel's path and beyond 50 m.
- (xviii) When marine mammals are sighted while a vessel is underway, the vessel must take action as necessary to avoid violating the relevant separation distances, e.g., attempt to remain parallel to the animal's course, avoid

excessive speed or abrupt changes in direction until the animal has left the area. If marine mammals are sighted within the relevant separation distance, the vessel must reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. This does not apply to any vessel towing gear or any vessel that is navigationally constrained.

- (xix) All vessels underway will not divert or alter course in order to approach any marine mammal. Any vessel underway will avoid excessive speed or abrupt changes in direction.

5. Monitoring

- (a) Vineyard Wind must prepare and submit Pile Driving and Marine Mammal Monitoring Plans to NMFS for review and approval at least 90 days before the start of pile driving. The plans must include final project design related to pile driving (e.g., number, type of piles, hammer type, sound attenuation systems, anticipated start date, etc.) and all information related to PSO monitoring protocols, respectively.
- (b) Vineyard Wind must submit an Alternative Monitoring Plan to NMFS for NMFS' review and approval at least 90 days prior to the planned start of pile driving (this plan may be included in the Marine Mammal Monitoring Plan). This plan may include deploying additional observers, alternative monitoring technologies (i.e. night vision, thermal, infrared), and/or use of PAM with the goal of ensuring the ability to maintain all exclusion zones for all ESA-listed species in the event of unexpected poor visibility conditions.
- (c) Vineyard Wind must employ qualified, trained PSOs to conduct marine mammal monitoring during pile driving activity. PSO requirements are as follows:
 - (i) PSOs must be independent observers (i.e., not construction personnel).
 - (ii) At least one PSO on active duty must have prior experience working as a PSO in offshore environments.
 - (iii) Other PSOs may substitute education (i.e., degree in biological science or related field) or training for experience.
 - (iv) One PSO must be designated as lead observer or monitoring coordinator. The lead observer must demonstrate prior experience working as a PSO in offshore environments.



- (v) All PSOs must be approved by NMFS. Vineyard Wind must submit the CVs of the initial set of PSO necessary to commence the project to NMFS for approval at least 60 days prior to the first day of pile driving activity.
- (d) Vineyard Wind is required to adhere to visual monitoring protocols as follows:
 - (i) Vineyard Wind must conduct briefings between construction supervisors and crews and the PSO team prior to the start of all pile driving activities, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures. An informal guide must be included with the Marine Mammal Monitoring Plan to aid in identifying species if they are observed in the vicinity of the project area.
 - (ii) A minimum of two PSOs must be on active duty on the pile driving vessel from 60 minutes before, during, and for 30 minutes after all pile installation activity concludes. If a DMA is established that overlaps with the Level B harassment zone (Table 6), three PSOs must be on active duty on the pile driving vessel.
 - (iii) PSOs must not exceed four consecutive watch hours on duty at any time, must have a minimum two hour break between watches, and must not exceed a combined watch schedule of more than 12 hours in a 24-hour period.
 - (iv) PSOs must be located at the best vantage point(s) on the pile driving vessel in order to observe the entire clearance zones, while still considering human safety, and have no other construction-related tasks.
 - (v) PSOs must record all incidents of marine mammal occurrence, regardless of distance from the construction activity.
 - (vi) PSOs must observe and collect data on marine mammals in and around the project area as described under 5(b)(ix).
 - (vii) During all observation periods during pile driving, PSOs must use high-magnification (25X), as well as standard handheld (7X) binoculars, and the naked eye to search continuously for marine mammals. During periods of low visibility (e.g., darkness, rain, fog, etc.), PSOs must use alternative technology to monitor clearance zones (e.g., night vision devices, IR/Thermal camera).
 - (viii) Monitoring distances must be measured with range finders or reticule binoculars. Distances to marine mammals observed must be based on the

best estimate of the PSO, relative to known distances to objects in the vicinity of the PSO. Bearings to animals shall be determined using a compass.

- (ix) When monitoring is required during vessel transit, observers must be stationed at the best vantage point (while still considering observer safety), to ensure maintenance of separation distances between marine mammals and vessels. When an observation of a marine mammal occurs during vessel transit, observers must record the following:
1. Time, date and location (lat/long);
 2. The vessel's activity, heading and speed;
 3. Sea state, water depth and visibility;
 4. Marine mammal identification to the best of the observers ability (e.g., NARW, whale, dolphin, seal);
 5. Initial distance marine mammal was observed from the vessel and closest point of approach; and
 6. Any avoidance measures taken in response to the marine mammal sighting.
- (x) For all marine mammal sightings by PSOs on the pile driving vessel, the following information must be collected and reported to NMFS:
1. Identification of the animal(s) (e.g., genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species;
 2. Pace of the animal(s);
 3. Estimated number of animals (high/low/best);
 4. Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.);
 5. Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics);

6. Description of any marine mammal behavioral observations (e.g., observed behaviors such as feeding or traveling), including an assessment of behavioral responses thought to have resulted from the activity (e.g., no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching);
 7. Animal's closest distance from the pile being driven and estimated time spent within the harassment zone;
 8. Construction activity at time of sighting (e.g., ramp-up, active pile driving, delay, etc.);
 9. Distance and bearing of each marine mammal observed relative to the pile being driven for each sighting (if pile driving was occurring at time of sighting);
 10. Description of any mitigation-related actions called for but not implemented in response to a sighting (e.g., delay, shutdown, etc.), including time, location, and the reason why the mitigation-related action was not implemented;
 11. Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);
 12. PSO who sighted the animal;
 13. Time of sighting;
 14. Location of sighting;
 15. Water depth;
 16. Sea and weather state; and
 17. Marine mammal occurrence within relevant Level A or Level B harassment zones must be documented.
- (e) Vineyard Wind must adhere to Passive Acoustic Monitoring protocols as follows:
- (i) Acoustic monitoring must be conducted during all pile driving.
 - (ii) Acoustic monitoring must begin at least 60 minutes prior to initiation of pile driving, during, and 30 minutes post pile driving.

- (iii) Acoustic monitoring must be conducted by at least one acoustic PSO. The acoustic PSO(s) must demonstrate that they have completed specialized training for operating PAM systems and detecting and identifying NARWs.
- (iv) Acoustic PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least two hours between watches.
- (v) The acoustic PSO(s) must immediately communicate all detections of marine mammals to visual PSOs, including any determination regarding species identification, distance, and bearing and the degree of confidence in the determination.
- (vi) The PAM system must not be located on the pile installation platform.
- (vii) For all marine mammal acoustic detections, the following information must be recorded:
 - 1. Identification, location and depth of recording unit
 - 2. Time zone for sound files and recorded date/times in data and metadata
 - 3. Duration of recording (start/end dates and times)
 - 4. Type of recording (continuous/duty cycled)
 - 5. Species identification (if possible)
 - 6. Call type (if known)
 - 7. Temporal aspects of vocalization (date, time, duration, etc.)
 - 8. Comparison with any visual sightings
 - 9. Name of observer/data collector/analyst
 - 10. A record of the PAM operator's review of any acoustic detections.
 - 11. Location (if geometry/density of bottom-mounted or sonobuoy array allows) or directionality (directional hydrophones and/or lateral information from towed array) of detected calls including references to location of coincident human sound-producing activities.

- (viii) A Passive Acoustic Monitoring Plan must be submitted to NMFS for review and approval at least 90 days prior to the planned start of pile driving. The Plan must describe all proposed PAM equipment, procedures, and protocols.
- (f) Sound Field Verification
 - (i) To validate the estimated sound fields, Sound field verification (SFV) measurements must be conducted during pile driving of the first monopile and first jacket pile installed over the course of the project, with noise attenuation activated;
 - (ii) In the event that subsequently driven piles are installed that have a larger diameter, or, are installed with a larger hammer or greater hammer energy than the first monopile and jacket foundation, sound field measurements must be conducted for those subsequent piles.
 - (iii) A Sound Field Verification Plan must be submitted to NMFS for review and approval at least 90 days prior to planned start of pile driving. This plan must describe how Vineyard Wind will ensure that the location selected is representative of the rest of the piles of that type to be installed and, in the case that it is not, how additional sites will be selected for sound field verification, or, how the results from the first pile can be used to predict actual installation noise propagation for subsequent piles. The plan must describe how the effectiveness of the sound attenuation methodology will be evaluated based on the results. This plan must also include methodology for collected data on at least three piles, in addition to the information above, if reductions to the clearance zones in Table 2 are requested.
 - (iv) Vineyard Wind must provide the initial results of the field measurements to NMFS as soon as they are available.
- (g) Level A and Level B Harassment Zone Distance Verification
 - (i) Vineyard Wind must conduct SFV monitoring during:
 1. Impact driving of the first monopile used over the duration of the IHA.
 2. Impact driving of the first jacket pile used over the duration of the IHA.

3. Impact driving any piles that have a larger diameter, or, are installed with a larger hammer or greater hammer energy than the first monopile and jacket pile or subsequent pile.
 4. At least three piles of the same size if a reduction to the clearance and shutdown zones in Tables 2 and 4, where possible, is requested.
- (ii) Vineyard Wind must conduct SSV monitoring to empirically determine the distances to the isopleths corresponding to Level A and Level B harassment thresholds, either by extrapolating from *in situ* measurements conducted at several distances from the pile being driven, or by measurements at the distances where the received levels reach the relevant thresholds.
 - (iii) For extent of Level B harassment zone verification, Vineyard Wind must report the measured or extrapolated distances where the received levels SPL_{rms} decay to 160 dB_{rms} , as well as integration time for such SPL_{rms} .
 - (iv) If initial acoustic field measurements indicate distances to the isopleths corresponding to Level A and/or Level B harassment thresholds are greater than the distances predicted by modeling (Tables 5 and 6), Vineyard Wind must implement additional sound attenuation measures prior to conducting additional pile driving. Additionally, in the event that field measurements indicate distances the isopleths corresponding to Level A and Level B harassment thresholds are greater than the distances predicted by modeling, NMFS may expand the relevant clearance and shutdown zones.
- (h) Vineyard Wind must submit a NARW strike avoidance plan 90 days prior to commencement of vessel use. The plan will, at minimum, describe how the required vessel, PAM, or aerial based monitoring will be conducted to ensure the transit corridor is clear of NARWs. The plan will also provide details on the vessel-based observer protocol on transiting vessels and PAM required between November 1 and May 14.

6. Reporting

- (a) If a North Atlantic right whale is observed at any time by PSOs or personnel on any vessel, during any project-related activity or during vessel transit, Vineyard Wind must report sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System: (866) 755-6622 and to the U.S. Coast Guard via channel 16 and through the WhaleAlert app (<http://www.whalealert.org/>) as soon as feasible but no longer than 24 hours after the sighting. Information reported

must include, at minimum, time of sighting, location, and number of NARWs observed.

- (b) If a North Atlantic right whale is detected via PAM, the date, time, location (i.e., latitude and longitude of recorder that had detection) of the detection as well as the recording platform and organization (e.g., Vineyard Wind slocum glider) must be reported to *nmfs.pacmdata@noaa.gov* as soon as feasible but no longer than 24 hours after the detection. Full detection data and metadata must be submitted within 48 hours via the webform on the NMFS North Atlantic right whale Passive Acoustic Reporting System website (www.fisheries.noaa.gov/new-england-mid-atlantic/endangered-species-conservation/passive-acoustic-research-atlantic-ocean). For assistance, contact *nmfs.pacmdata@noaa.gov*.
- (c) All required training for Vineyard Wind personnel, including vessel crew and captains, and PSOs must be reported to NMFS (*itp.daly@noaa.gov*) prior to initiation of project activities.
- (d) Vineyard Wind must compile and submit weekly reports to NMFS during pile driving that document the start and stop of all pile driving daily, any mitigation actions or if mitigation actions could not be undertaken, the start and stop of associated observation periods by the PSOs, details on the deployment of PSOs, and a record of all observations of marine mammals. Weekly reports are due on Wednesday for the previous week (Sunday – Saturday).
- (e) Vineyard Wind must compile and submit monthly reports that include a summary of all information in the weekly reports including project activities carried out in the previous month, including vessel transits (number, type of vessel, and route) and piles installed, and all observations of marine mammals. Monthly reports are due on the 15th of the month for the previous month.
- (f) Vineyard Wind must submit its annual final draft report(s) on all visual and acoustic monitoring conducted under this IHA within 90 calendar days of the completion of monitoring. A final report must be prepared and submitted within 30 calendar days following receipt of any NMFS comments on the draft report. If no comments are received from NMFS within 30 calendar days of receipt of the draft report, the report shall be considered final.
- (g) All draft and final monitoring reports must be submitted to *PR.ITP.MonitoringReports@noaa.gov* and *itp.daly@noaa.gov*.
- (h) Acoustic Sound Source Monitoring Reporting: Results of sound field verification of pile driving must be submitted as soon as possible but no later than within 30 days following completion of acoustic monitoring. The final report must include, at minimum, the following:



- (i) Peak sound pressure level (SPL_{pk}), root-mean-square sound pressure level that contains 90% of the acoustic energy (SPL_{rms}), single strike sound exposure level (SEL_{ss}), integration time for SPL_{rms}, SEL_{ss} spectrum, and 24-hour cumulative SEL extrapolated from measurements. All these levels must be reported in the form of (1) median, (2) mean, (3) maximum, and (4) minimum.
 - (ii) The sound levels reported must be in median and linear average (i.e., taking averages of sound intensity before converting to dB).
 - (iii) A description of depth and sediment type at the recording location.
 - (iv) Number of strikes per pile measured, one-third octave band (or decade) spectrum and/or power spectral density.
 - (v) Hydrophone equipment and methods: recording device, sampling rate, distance from the pile where recordings were made; depth of recording device(s).
 - (vi) Description of the PAM hardware and software, including software version used, calibration data, bandwidth capability of hydrophone(s), any filters used in hardware or software, any limitations with the equipment, and other information.
 - (vii) Local environmental conditions, such as references to visibility metrics, transmission loss data collected on-site (or the sound velocity profile), baseline pre- and post-activity ambient noise levels (broad-band and/or within frequencies of concern).
 - (viii) Spatial configuration of the noise attenuation device(s) relative to the pile.
 - (ix) The extents of the Level A and Level B harassment zones.
 - (x) Any action taken to adjust noise attenuation devices.
- (i) Reporting injured or dead marine mammals:
- (i) In the event that personnel involved in the activities covered by the authorization discover an injured or dead marine mammal, Vineyard Wind must immediately report the observation the NOAA Fisheries Marine Mammal and Sea Turtle Stranding and Entanglement Hotline (866-755-6622) or the NOAA's Dolphin and Whale 911 App. In addition, Vineyard Wind must report the observation to NMFS Office of Protected Resources (OPR) within 24 hours (301-427-8401). If the death or injury was clearly

caused by the specified activity, the Holder must immediately cease the activities until NMFS OPR is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of this IHA. The report must include the following information:

1. Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
 2. Species identification (if known) or description of the animal(s) involved;
 3. Condition of the animal(s) (including carcass condition if the animal is dead);
 4. Observed behaviors of the animal(s), if alive;
 5. If available, photographs or video footage of the animal(s); and
 6. General circumstances under which the animal was discovered.
- (ii) In the event of a vessel strike of a marine mammal by any vessel involved in the activities covered by the authorization, Vineyard Wind must immediately report the incident to the NOAA Fisheries Marine Mammal and Sea Turtle Stranding and Entanglement Hotline (866-755-6622) or the NOAA's Dolphin and Whale App as well as the U.S. Coast Guard via Channel 16. The incident must also be immediately reported to NMFS Office of Protected Resources (301-427-8401). Vineyard Wind must immediately cease the activities until NMFS OPR is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of this IHA. The report must include the following information:
1. Time, date, and location (latitude/longitude) of the incident;
 2. Species identification (if known) or description of the animal(s) involved;
 3. Vessel's speed during and leading up to the incident;
 4. Vessel's course/heading and what operations were being conducted (if applicable);
 5. Status of all sound sources in use;
 6. Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any,

to avoid strike;

7. Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;
 8. Estimated size and length of animal that was struck;
 9. Description of the behavior of the marine mammal immediately preceding and following the strike;
 10. If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;
 11. Estimated fate of the animal (e.g., dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and
 12. To the extent practicable, photographs or video footage of the animal(s).
7. This Authorization may be modified, suspended or revoked if the holder fails to abide by the conditions prescribed herein (including, but not limited to, failure to comply with monitoring or reporting requirements), or if NMFS determines: (1) the authorized taking is likely to have or is having more than a negligible impact on the species or stocks of affected marine mammals or (2) the prescribed measures are likely not or are not effecting the least practicable adverse impact on the affected species or stocks and their habitat.

Catherine Marzin, Acting Director
Office of Protected Resources
National Marine Fisheries Service

Date



Table 1. Authorized Numbers of Take, by Species, by Harassment Level.

Species	Stock	Level A harassment	Level B harassment
Fin whale	W. North Atlantic	5 ¹	33 ¹
Humpback whale	Gulf of Maine	10	56
Minke whale	Canadian East Coast	2	98
North Atlantic Right whale	W. North Atlantic	0	20 ¹
Sei Whale	Nova Scotia	2 ¹	4 ¹
Sperm whale	W. North Atlantic	0	5 ¹
Atlantic White-Sided dolphin	W. North Atlantic	28	1107
Bottlenose dolphin	W. North Atlantic, offshore	8	96
Long-finned pilot whale	W. North Atlantic	9	91
Risso's dolphin	W. North Atlantic	6	12
Common dolphin	W. North Atlantic	35	4646
Harbor porpoise	Gulf of Maine/Bay of Fundy	4	150
Gray seal	W. North Atlantic	2	414
Harbor seal	W. North Atlantic	2	214
Harp seal	W. North Atlantic	2	217

¹ For ESA-listed marine mammals, the amount of take authorized may not exceed the amount of take authorized in the corresponding Incidental Take Statement issued pursuant to the ESA. Therefore, if the ITS authorizes less take than provided here, actual take may not exceed the amount of take in the ITS.

Table 2. Radial Distances to NARW Clearance Zones and PAM Monitoring Zones.

Clearance and PAM Monitoring Zones				
Time of Year	Pile Type	Minimum Visual Clearance Zone^{1,2}	PAM Clearance Zone⁵	PAM Monitoring Zone
May 1 - May 14	All	10 km	10 km ⁶	10 km
May 15 - May 31	monopile/jacket	2 km / 1.6 km ^{3,4}	5 km / 3.2 km ³	10 km
June 1 - Oct 31	monopile/jacket	2 km / 1.6 km ^{3,4}	5 km / 3.2 km ³	5 km
Nov 1 - Dec 31	monopile/jacket	2 km / 1.6 km ³	10 km ⁶	10 km

¹ At any time of year, a visual detection of a NARW by a PSO on the pile driving vessel triggers a delay in pile driving.
² At all times of year, any large whale sighted by a PSO within 1,000 m of the pile that cannot be identified to species must be treated as if it were a NARW.
³ Upon receipt of an interim SFV report, NMFS may adjust the clearance zones to reflect SFV measurements such that the minimum visual clearance zones represent the Level A (SELCum) zones and the PAM clearance zones represent the Level B harassment zones. However, zone sizes will not be decreased less than 1km from June 1- Oct 1 and not less than 2 km during May 15-May 31 or if a DMA or Slow Zone is established that overlaps with the Level B harassment zone.
⁴ If a DMA or Slow Zone overlaps the Level B harassment zone, Vineyard Wind will employ a third PSO at the pile driving platform such that 3 PSOs will be on duty. The primary duty of the 3rd PSO is to observe for NARWs.
⁵ At any time of year, a PAM detection (75% confidence) of a NARW within the PAM clearance zone must be treated as a visual detection, triggering a delay in pile driving.
⁶ From May 1-14 and Nov 1- Dec 31, the PAM system must be operated 24/7 if pile driving will occur and must not be less than 10km.
⁷ If a DMA or Slow Zone overlaps the Level B zone, the PAM system must be extended to the largest practicable detection zone to increase situational awareness but must not be smaller than the Level B zone.

Table 3. Radial Distances to NARW Shutdown Zone.

NARW Shutdown Zone (Visual and PAM)	
Pile Type	Shutdown Zone ^{1,2}
Monopile/ Jacket	3.2 km

¹ If a marine mammal is observed entering or within the respective clearance zone after pile driving has commenced, a shutdown of pile driving must be implemented when technically feasible as described under Condition 4(f)(ii) of this IHA.
² Upon receipt of an interim SSV report, NMFS may adjust the shutdown zone.



Table 4. Radial Distances to Non-NARW Clearance and Shutdown Zones.

Species Group	Clearance and Shutdown Zones
Non-NARW mysticete whales (including humpback, sei, fin and minke) and sperm whale	500 m
Harbor porpoise	120 m
All other marine mammals (including dolphins and pinnipeds)	50 m

Table 5. Radial distances (m) to Level A Harassment Thresholds for Each Foundation Type with 0, 6, and 12 dB Sound Attenuation Incorporated.

Foundation type	Hearing group	Level A harassment (peak) ¹			Level A harassment (SEL) ¹		
		No attenuation	6 dB attenuation	12 dB attenuation	No attenuation	6 dB attenuation	12 dB attenuation
10.3 m (33.8 ft) monopile	LFC	34	17	8.5	5,443	3,191	1,599
	MFC	10	5	2.5	56	43	0
	HFC	235	119	49	101	71	71
	PPW	38	19	10	450	153	71
Four, 3 m (9.8 ft) jacket piles	LFC	7.5	4	2.5	12,975	7,253	3,796
	MFC	2.5	1	0.5	71	71	56
	HFC	51	26	13.5	1,389	564	121
	PPW	9	5	2.5	2,423	977	269

¹ NMFS may adjust these isopleths based on review of an interim SSV report.



Table 6. Radial Distances (m) to the Level B Harassment Threshold (160 dB_{rms}) for Each Foundation Type with 0, 6, and 12 dB Sound Attenuation Incorporated.

Foundation type	Level B Harassment Isopleths ¹		
	No attenuation	6 dB attenuation	12 dB attenuation
10.3 m (33.8 ft) monopile	6,316	4,121	2,739
Four, 3 m (9.8 ft) jacket piles	4,104	3,220	2,177

¹ NMFS may adjust these distances based on review of an interim SSV report.

