



MARINE MAMMAL COMMISSION

17 October 2011

Mr. P. Michael Payne, Chief
Permits, Conservation, and Education Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

Dear Mr. Payne:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the application submitted by Cape Wind Associates seeking authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act to take small numbers of marine mammals by harassment. The taking would be incidental to geophysical and geotechnical surveys in Nantucket Sound off Massachusetts from fall 2011 through fall 2012. The Commission also has reviewed the National Marine Fisheries Service's 14 September 2011 *Federal Register* notice (76 Fed. Reg. 56735) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions. The Commission offers the following recommendations and rationale.

RECOMMENDATIONS

The Marine Mammal Commission recommends that the National Marine Fisheries Service—

- require Cape Wind Associates to provide further justification for the use of 17 log R to calculate harassment zones for both shallow- and medium-penetration sub-bottom profilers;
- require Cape Wind Associates to recalculate the buffer zone for the shallow-penetration sub-bottom profiler based on the 120-dB re 1 μ Pa threshold and, if two or more survey vessels are used simultaneously, account for overlap of the ensonified areas in the calculation of the revised buffer zones;
- require Cape Wind Associates to specify the zone of exposure used to estimate the number of takes for each species and ensure that the zone is used consistently for all species;
- require Cape Wind Associates to re-estimate the number of the takes for each species (1) using the revised harassment zone for the shallow-penetration sub-bottom profiler, (2) accounting for the possibility that buffer zones from two or more vessels would overlap, and (3) re-calculating density estimates based on haul-out counts;
- require Cape Wind Associates to re-estimate the number of takes for each species from medium penetration sub-bottom profilers (1) accounting for the sound that would be generated from multiple survey vessels and (2) re-calculating density estimates based on haul-out counts;
- require Cape Wind Associates to monitor the presence and behavior of marine mammals during all proposed geophysical and geotechnical survey activities (i.e., operation of sub-bottom profilers, drilling, and vibracore sampling);

- require observers to gather the data needed to assess the effectiveness of soft-starts as a mitigation measure;
- require Cape Wind Associates to cease all operations when the exclusion zone is obscured by fog or poor lighting conditions;
- provide additional justification for its preliminary determination that the proposed monitoring program will be sufficient to detect, with a high level of confidence, all marine mammals within or entering the identified exclusion and buffer zones; and
- condition the incidental harassment authorization to require Cape Wind Associates to (1) report immediately all injured or dead marine mammals to the Service and local stranding network and (2) suspend the construction activities if a marine mammal is seriously injured or killed and the injury or death could have been caused by those activities (e.g., a fresh carcass)—if supplemental measures are not likely to reduce the risk of additional serious injuries or deaths to a very low level, the Service should require Cape Wind Associates to obtain the necessary authorization for such takings under section 101(a)(5)(A) of the Marine Mammal Protection Act before resuming its survey activities.

RATIONALE

Cape Wind Associates proposes to conduct geophysical and geotechnical surveys in preparation for the planned installation of 130 wind turbine generators in Nantucket Sound. The surveys would cover 110 km², would begin in the fall of 2011, and would continue for up to five months. However, the incidental harassment authorization being proposed by the Service would be issued for a full year to accommodate possible schedule changes because of weather and other factors. The surveys are to identify any submerged cultural resources and obtain geological data.

For the geophysical survey, Cape Wind Associates would collect high-resolution data along 4,292 km of track lines using a singlebeam depth sounder, multibeam depth sounder, side scan sonar, magnetometer, shallow-penetration sub-bottom profiler, and medium-penetration sub-bottom profiler. The shallow-penetration sub-bottom profiler (i.e., “chirp”) is a non-impulsive intermittent sound source that operates between 2 and 16 kHz at a source level of 201 dB re 1 μPa at 1 m. The medium-penetration sub-bottom profiler (i.e., “boomer”) is an impulsive sound source that operates between 0.5 and 20 kHz at a source level of 205 dB re 1 μPa at 1 m. Sounds emitted from the side scan sonar and the depth sounders are outside the range of marine mammal hearing.

For the geotechnical survey, Cape Wind Associates would acquire soil borings and/or conduct cone penetrometer tests using a truck-mounted drill rig and a pneumatic vibracorer or vibracore sampler. Soil borings and cone penetrometer tests would occur at multiple wind turbine generator locations. In addition, the applicant would collect one vibracore at the proposed locations of each wind turbine generator. The soil boring rig is considered a non-impulsive, continuous sound source that operates at 120 Hz at a source level of 118 to 145 dB re 1μPa at 1 m. The applicant does not provide a frequency range or source level for the vibracorer, indicating only that the device produces non-impulsive, continuous sound comparable to the frequency of sound generated by the

soil boring rig. The surveys would involve multiple vessels that would operate during daylight hours only. The applicant estimates that survey activities would take approximately 137 days.

The Service preliminarily has determined that the proposed activities could result in a temporary modification in the behavior of small numbers of up to five species of marine mammals, but that any impact on the affected species would be negligible. The Service does not anticipate any take of marine mammals by death or serious injury. It believes that the potential for temporary or permanent hearing impairment will be at the least practicable level because of Cape Wind Associates' proposed mitigation and monitoring measures, which include—

- using Service-approved observers to monitor a 500-m exclusion zone for 60 minutes prior to, during, and for 60 minutes after geophysical surveys;
- shutting down or delaying the use of the sound source if a marine mammal is sighted within or approaching the exclusion zone, until the animal moves outside the exclusion zone or is not re-sighted for 60 minutes;
- using a “soft-start” technique at the beginning of each geophysical survey;
- conducting behavioral monitoring from the survey vessel at least twice a week to estimate the number of takes and evaluate behavioral impacts outside the 500-m exclusion zone; and
- submitting a final report to the Service.

Safety zones and takes

Exclusion zones are intended to protect marine mammals that are close enough to a sound source that they potentially could be injured (i.e., taken by Level A harassment) or killed by exposure to the sound. Buffer zones are used to delineate the area in which Level B harassment may occur and to estimate the number of marine mammals that have been taken. Both zones are established based on the generation and propagation of sound from the source and general assumptions about the responses of marine mammals to sounds at specific sound pressure levels, the latter being based on limited observations of marine mammal responses under known conditions. The Service has concluded, and the Commission agrees, that the proposed surveys have the potential to take marine mammals by Level B harassment.

In the *Federal Register* notice, the Service stated that the calculation of harassment zones for the sub-bottom profilers was based on a practical spreading model. Practical spreading models typically use 15 log R (i.e., dissipation rate of 4.5 dB per doubling of distance) to estimate the received sound levels at varying distances. However, the applicant actually used 17 log R to calculate the harassment zones for the sub-bottom profilers. The application states that the use of 17 log R was based on the Service's direction and discussion provided in the Cape Wind Noise Report. When reviewing that report, the Commission found that it did not discuss the use of 17 log R, and no further justification for its use was provided elsewhere. To better understand why the proposed model was used, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Cape Wind Associates to provide further justification for the use of 17 log R to calculate harassment zones for both shallow- and medium-penetration sub-bottom profilers.

Cape Wind Associates proposed establishing Level A and Level B harassment zones based on the 180- and 160-dB re 1 μ Pa thresholds, respectively. However, the shallow-penetration sub-bottom profiler has a pulse repetition rate of 4 pulses per second, which the Service indicated is a “non-impulsive, intermittent sound source.” The Service recently clarified that for non-impulsive sound sources, whether continuous or intermittent, Level B harassment is presumed to begin at received levels of 120 dB re 1 μ Pa (76 Fed. Reg. 43639). Consistent with that guidance, the harassment zone should be calculated based on that threshold rather than 160 dB re 1 μ Pa.

Cape Wind Associates also notes that multiple survey vessels may be used for the high-resolution geophysical survey. If the sound generated by two or more of the survey vessels overlap, that overlap would change the received sound levels in at least some parts of the ensonified areas. The Service has indicated that if two survey vessels are used, they would work at least 24 km apart and the sound generated by them would not overlap. However, that assessment was based on the idea that the buffer zone for the shallow-penetration sub-bottom profiler was correctly calculated using a 160-dB re 1 μ Pa threshold rather than 120 dB re 1 μ Pa. Once the buffer zone around each survey vessel is recalculated to reflect the lower threshold, the ensonified areas would overlap.

To address these concerns, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Cape Wind Associates to recalculate the buffer zone for the shallow-penetration sub-bottom profiler based on the 120-dB re 1 μ Pa threshold and, if two or more survey vessels are used simultaneously, account for overlap of the ensonified areas in the calculation of the revised buffer zones.

Cape Wind Associates has not specified in its application the actual ensonified area or zone of exposure that was used to estimate the number of takes that could occur incidental to the proposed surveys. If one attempts to determine this area through back-calculations using the information provided, the zone of exposure does not appear to be consistent from species to species. As noted above, the applicant stated that the zone of exposure was based on 160 dB re 1 μ Pa for both types of sub-bottom profilers, rather than 120 dB re 1 μ Pa for the shallow-penetration sub-bottom profiler. To enable the Service, the Commission, and others to evaluate the accuracy of the take estimates, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Cape Wind Associates to specify the zone of exposure used to estimate the number of takes for each species and ensure that the zone is used consistently for all species.

Density estimates for pinnipeds (i.e., grey and harbor seals) in the project area were based on at-sea sightings from an aerial survey flown by Cape Wind Associates. Such surveys are known to be negatively biased. Cape Wind Associates noted that no harbor seals were sighted during those aerial surveys but haul-out counts were available for both pinniped species. It is not clear why the haul-out counts were not used in the density estimates because all pinnipeds at the haul-out sites have the potential to be in the survey area at some time. This is especially true if the buffer zone is recalculated at the 120-dB re 1 μ Pa threshold (e.g., approximately 58 km, based on 17 log R), as this would encompass areas adjacent to the haul-out sites.

Also, the fact that the surveyors did not detect any harbor seals in the area, despite the seals using haulout sites nearby, could be explained in several ways: (1) they do not use the waters where the project is proposed; (2) they were present in the survey area but were not observed by the surveyors, were misidentified as grey seals, or were considered “unidentified” seals; (3) the surveyors did not survey the entire area that will be ensonified at 120 dB re 1 μ Pa or greater; or (4) seals use the area, but only seasonally. One way to discriminate between these would be to check with the National Marine Fisheries Service or other organizations or scientists who may have conducted surveys in that area to determine if their surveys produced the same results. In any case, the prudent course of action would be to ensure that observers on board the survey vessels collect information on harbor seal sightings to provide a better basis for estimating the number of takes during the surveys.

To ensure a more accurate estimate of the number of takes that may occur, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Cape Wind Associates to re-estimate the number of takes for each species (1) using the revised harassment zone for the shallow-penetration sub-bottom profiler, (2) accounting for the possibility that buffer zones from two or more vessels would overlap, and (3) re-calculating density estimates based on haul-out counts. If, however, the applicant intends to use multiple survey vessels but the buffer zones do not overlap (i.e., only medium penetration sub-bottom profilers would be used), the applicant still has underestimated the number of takes for all species because the model method accounted for only one survey vessel. Therefore, the Marine Mammal Commission further recommends that the National Marine Fisheries Service require Cape Wind Associates to re-estimate the number of takes for each species from medium penetration sub-bottom profilers (1) accounting for the sound that would be generated from multiple survey vessels and (2) re-calculating density estimates based on haul-out counts.

Mitigation and monitoring measures

Under the proposed incidental harassment authorization, Cape Wind Associates must designate at least one on-site, Service-approved observer to monitor the 500-m exclusion zone for marine mammals for 60 minutes before, during, and for 60 minutes after any geophysical survey activity. In addition, at least one Service-approved observer would conduct behavioral monitoring from the survey vessel at least twice a week to estimate the number of takes and evaluate behavioral impacts to marine mammals from geophysical survey activities beyond the 500-m exclusion zone. The Service does not indicate whether it would require observers during the geotechnical survey (i.e., drilling or vibracore sampling), although the applicant stated that a 500-m exclusion zone would be established around the drilling rig. By obtaining an incidental harassment authorization, the applicant would be required to report the number of marine mammals harassed incidental to all proposed activities.

The Commission believes it would be prudent to require monitoring of marine mammal behavior during all proposed activities, including drilling and vibracore sampling as well as geophysical surveys. The impacts of vibracore sampling are not well studied. Because marine mammals react to disturbance in a number of different ways, continuous monitoring is necessary to

ensure that unexpected reactions are detected, documented, and evaluated. In contrast, intermittent and infrequent observations may not provide the data needed to evaluate accurately the full impacts of the proposed activities. For example, if monitoring does not occur when marine mammals are most likely to be present, then the resulting observations may not be indicative of actual impacts and the number of takes may be under-reported. Finally, monitoring during all project activities is the only way for the applicant and the Service to be confident that they are causing the least practicable impact on marine mammal species and stocks. For all of these reasons, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Cape Wind Associates to monitor the presence and behavior of marine mammals during all proposed geophysical and geotechnical survey activities (i.e., operation of sub-bottom profilers, drilling, and vibracore sampling).

The Commission has noted in previous correspondence that the effectiveness of soft-start as a mitigation measure has yet to be empirically verified. As with the ramp-up of airguns, the Service should not assume, absent empirical verification, that using soft-starts when conducting high-resolution geophysical surveys constitutes an effective mitigation method. Such verification may require not only collecting opportunistic data but also designing and conducting studies to test specific hypotheses regarding the utility of soft-starts and analysis of responses of the various species encountered. Because the surveys have the potential to harass marine mammals, and the efficacy of soft-starts has yet to be determined, the Marine Mammal Commission repeats its recommendation that the National Marine Fisheries Service require observers to gather the necessary data and work with Cape Wind Associates and other applicants to assess the effectiveness of soft-starts as a mitigation measure.

The Commission also has commented previously that visual monitoring is not effective during periods of bad weather. Although the application specifies that when the 500-m exclusion zone is being monitored it “may not be obscured by fog or poor lighting conditions,” the Service has not proposed prohibiting operations at times with poor lighting or reduced visibility and has not identified alternative mitigation and monitoring measures that would be effective under these conditions. The Marine Mammal Commission recommends that the National Marine Fisheries Service correct this oversight and require Cape Wind Associates to cease all operations when the exclusion zone is obscured by fog or poor lighting conditions.

In addition, it is not clear what criteria and process will be used to determine whether lighting or weather conditions are obscuring the exclusion zone to the degree that operations must cease. This is another concern that the Commission has raised previously. As such, the Marine Mammal Commission recommends that the National Marine Fisheries Service provide additional justification for its preliminary determination that the proposed monitoring program will be sufficient to detect, with a high level of confidence, all marine mammals within or entering the identified exclusion and buffer zones. At a minimum, such justification should (1) identify those species that it believes can be detected with a high degree of confidence using visual monitoring only, (2) describe detection probability as a function of distance from the vessel, and (3) describe changes in detection probability under various sea state and weather conditions and light levels. If such information is not available, the Service and the applicant should conduct the studies needed to

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describe the efficacy of existing monitoring methods and develop alternative or supplemental methods to address current shortcomings.

Level A harassment and mortality

Cape Wind Associates is not seeking authorization to take marine mammals by serious injury or mortality, but unanticipated injuries or deaths of marine mammals could occur. The *Federal Register* notice does not indicate if the applicant would be required to report any injured or dead marine mammals to the Service—a standard monitoring and reporting measure. The Marine Mammal Commission therefore recommends that the National Marine Fisheries Service condition the incidental harassment authorization to require Cape Wind Associates to (1) report immediately all injured or dead marine mammals to the Service and local stranding network and (2) suspend survey activities if a marine mammal is seriously injured or killed and the injury or death could have been caused by those activities (e.g., a fresh carcass). The Service should investigate the incident to assess the cause and full impact (e.g., the types of injuries, the number of animals involved) and to determine what modifications in survey activities may be needed to avoid additional injuries or deaths. Full investigation of such incidents is essential to provide information regarding the potential impact of geophysical and geotechnical surveys on marine mammals. If supplemental measures are not likely to reduce the risk of additional serious injuries or deaths to a very low level, the Service should require Cape Wind Associates to obtain the necessary authorization for such takings under section 101(a)(5)(A) of the Marine Mammal Protection Act before resuming its survey activities.

Please contact me if you have questions about the Commission's recommendations or rationale.

Sincerely,

A handwritten signature in black ink, appearing to read "Timothy J. Ragen" followed by a flourish and the word "for".

Timothy J. Ragen, Ph.D.
Executive Director

cc: Mary Colligan, National Marine Fisheries Service Northeast Regional Office