



MARINE MAMMAL COMMISSION

5 March 2014

Ms. Jolie Harrison
Incidental Take Program Supervisor
Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

Dear Ms. Harrison:

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the application submitted by Cape Wind Associates (CWA) 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 a high-resolution geophysical survey in Nantucket Sound off Massachusetts from 1 April 2014 to 31 March 2015. The Commission also has reviewed the National Marine Fisheries Service's (NMFS) 3 February 2014 notice (79 Fed. Reg. 6167) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions. The Commission reviewed similar applications from Cape Wind Associates in 2011 and 2013 for incidental harassment authorizations associated with the proposed geotechnical and geophysical surveys.

RECOMMENDATIONS

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

- require CWA to estimate the numbers of marine mammals taken when the shallow-penetration sub-bottom profiler would be used based on the 120- rather than the 160-dB re 1 μ Pa threshold;
- consult with experts in the field of acoustics and marine mammal hearing to revise the Level B harassment thresholds for behavior to specify threshold levels that would be more appropriate for a wider range of sound sources, including the shallow-penetration sub-bottom profiler;
- in its guidance regarding revised Level B harassment thresholds for behavior, include thresholds and take estimates for all types of sources that might be used during site characterization surveys;
- require CWA to re-estimate the numbers of takes of gray and harbor seals based on (1) applying a more conservative correction factor to account for negative biases associated with CWA's at-sea aerial survey counts (e.g., a factor of ten), or (2) using density estimates from other proposed activities occurring in the same area (e.g., DON (2007)) that have been

adjusted by a haul-out correction factor (e.g., 2.6 for harbor seals, as used in Waring et al. 2007); and

- include in each proposed incidental harassment authorization that NMFS publishes in the *Federal Register* a sufficiently detailed description of the proposed activities and the potential impacts on marine mammals to allow the public to review and comment on the proposed authorization as a stand-alone document.

BACKGROUND

CWA proposes to conduct a high-resolution geophysical survey to identify submerged cultural resources and obtain geological data to prepare for installing 130 wind turbine generators on Horseshoe Shoal in Nantucket Sound. The survey would include 3,432 km of tracklines covering 110 km² and would take 109 days. If more than one survey vessel is used, the survey duration would be reduced.

CWA would collect high-resolution geophysical data using a multibeam depth sounder, side scan sonar, magnetometer, shallow-penetration sub-bottom profiler, and medium-penetration sub-bottom profiler. The multibeam depth sounder operates from 200–400 kHz and the side scan sonar operates at 120 and 410 kHz; the sounds from those two devices are considered to be outside the range of marine mammal hearing. The shallow-penetration sub-bottom profiler (i.e., “chirp”) is a non-impulsive, intermittent sound source (described in more detail in the next section) that operates from 2–16 kHz with a source level of 201 dB re 1 μ Pa at 1 m. The medium-penetration sub-bottom profiler (i.e., “boomer”) is an impulsive sound source that operates from 0.3–14 kHz with a source level of 205 dB re 1 μ Pa at 1 m.

NMFS preliminarily has determined that the proposed activities could result in temporary modification of the behavior of small numbers of up to five species of marine mammals, but that any impact on the affected species would be negligible. NMFS 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 CWA’s proposed mitigation and monitoring measures, which include—

- using NMFS-approved observers to monitor a 500-m exclusion zone for 60 minutes prior to, during, and for 60 minutes after geophysical surveys involving shallow- and medium-penetration sub-bottom profilers;
- using delay or shut-down procedures if a marine mammal is sighted within or approaching the exclusion zone and not initiating activities until the animal moves outside the exclusion zone or is not re-sighted for 60 minutes;
- using soft-start procedures at the beginning of each survey day and after a shutdown;
- conducting surveys only during daylight hours and not when the exclusion zone is obscured by fog or poor lighting conditions;
- conducting behavioral monitoring from the survey vessel for two days for every 14 days of survey activity to estimate the numbers of takes and evaluate behavioral impacts outside the 500-m exclusion zone;
- collecting data on species presence and behavior from a separate vessel before surveys begin and once a month during survey activities;

- reporting injured and dead marine mammals to NMFS and the northeast regional stranding network using NMFS's phased approach and suspending activities, if appropriate; and
- submitting a final report to NMFS.

RATIONALE

Thresholds and take estimates for use of the shallow-penetration sub-bottom profiler

NMFS has categorized sound sources as either impulsive or continuous when determining acoustic criteria and thresholds for Level B harassment (70 Fed. Reg. 1871). However, NMFS's guidance currently does not address the appropriate acoustic threshold for non-impulsive, intermittent sound sources such as the shallow-penetration sub-bottom profiler proposed for use by CWA. As discussed in previous letters to NMFS regarding non-impulsive intermittent sources, those sources have temporal and spectral characteristics which suggest that a lower Level B harassment threshold of 120 dB re 1 μ Pa would be more precautionary than the 160-dB re 1 μ Pa threshold. In addition, numerous researchers have observed various species of marine mammals, including harbor porpoises, respond to sound from sources (e.g., acoustic deterrent devices, acoustic harassment devices, pingers) with characteristics similar to a chirp and at received levels below 160 dB re 1 μ Pa (Watkins and Schevill 1975, Olesiuk et al. 1995, Kastelein et al. 1997, Kastelein et al. 2000, Culik et al. 2001, Johnston 2002, Morton and Symonds 2002, Kastelein et al. 2005, Kastelein et al. 2006a, b, Carretta et al. 2008).

NMFS has indicated that it is evaluating the broader use of those types of sources (e.g., sub-bottom profilers, echosounders, side scan sonar, and fish-finding sonar) to determine under what specific circumstances requests for incidental taking would be advisable (or not) and also is working on guidance that would outline a consistent approach for addressing potential impacts from those types of sources (78 Fed. Reg. 57354). The Commission would welcome the opportunity to meet with NMFS to discuss the guidance before it is finalized.

Further, NMFS presumably would include non-impulsive, intermittent sources in its guidance that would address applicable Level B harassment thresholds for behavior. Until such time that NMFS includes non-impulsive, intermittent sounds in its revised Level B harassment thresholds for behavior, the Commission recommends that NMFS require CWA to estimate the numbers of marine mammals taken when the shallow-penetration sub-bottom profiler would be used based on the 120- rather than the 160-dB re 1 μ Pa threshold. The Commission further recommends that NMFS consult with experts in the field of acoustics and marine mammal hearing to revise the Level B harassment thresholds for behavior to specify threshold levels that would be more appropriate for a wider range of sound sources, including the shallow-penetration sub-bottom profiler. The Commission is aware that NMFS is revising its Level B harassment thresholds for behavior and recommends that NMFS include thresholds and take estimates for all types of sources that might be used during site characterization surveys.

Densities and take estimates for pinnipeds

CWA derived density estimates for pinnipeds (i.e., gray and harbor seals) in the survey area based on incidental at-sea sightings from avian aerial surveys that it flew from 2002–2004. CWA

derived its density estimates by multiplying the at-sea counts of gray seals by five¹ to account for animals that could not be seen, even though it acknowledged studies indicating that seals spend up to 90 percent of their time underwater (Thompson and Fedak 1993, Beck et al. 2000), which would suggest that ten is a more appropriate adjustment factor than five. CWA used its resulting adjusted count divided by the area surveyed to obtain a density estimate of 0.13–0.28 gray seals per km² for the project area. Harbor seals were not identified during CWA’s aerial surveys, so densities for that species were calculated based on the presumed ratio of four gray seals to every one harbor seal at the nearby haul-out sites, resulting in density estimates of 0.03–0.07 harbor seals per km². CWA’s requested takes were based on the maximum estimated density for both species.

As noted in previous Commission letters regarding CWA activities, aerial at-sea surveys are not an appropriate indicator of abundance or density for pinnipeds. At-sea surveys are known to be negatively biased because of the limited amount of time seals spend at the surface (i.e., availability bias) and difficulties in detecting them from a moving aircraft when they are at the surface (i.e., perception or detection bias). Instead, applicants typically use maximum or average counts to estimate abundance, adjusted by a correction factor to account for animals not hauled out. Density estimates then are derived from those haul-out abundance estimates.

For gray and harbor seals, the Navy calculated density estimates for a project area that included Nantucket Sound (identified as “Georges West” in DON (2007)) based on aerial surveys of hauled out pinnipeds at nearby Monomoy, Muskeget, and Tuckernuck Islands. For the Georges West strata, a correction factor was not applied to account for animals not hauled out, so the abundance estimates likely underestimated actual density. For gray seals, the DON (2007) density estimate of 0.1412 seals per km² was in the range used by CWA. However, for harbor seals, the density estimate of 0.09743 seals per km² was greater than the density estimate used by CWA. Using CWA’s density estimate for harbor seals would therefore result in an underestimate of potential takes. Ideally, CWA should apply haul-out correction factors to the best available abundance estimates for gray and harbor seals to derive more representative density estimates for the project area, as was done in DON (2007) for harbor seals in Maine coastal waters.²

Unless NMFS requires CWA to apply a more conservative adjustment factor to account for widely-recognized sources of negative bias in at-sea aerial survey observations of seals or to use other best available density estimates to which a haul-out correction factor is then applied, it is, again, estimating potential takes in a non-precautionary manner. The Commission does not believe this approach is consistent with NMFS’s responsibility to ensure that the impact of the proposed activities is negligible. Therefore, to ensure a more accurate estimate of the numbers of takes that could occur, the Commission recommends that NMFS require CWA to re-estimate the numbers of takes of gray and harbor seals based on (1) applying a more conservative correction factor to account for negative biases associated with CWA’s at-sea aerial survey counts (e.g., a factor of ten), or (2) using density estimates from other proposed activities occurring in the same area (e.g., DON (2007)) that have been adjusted by a haul-out correction factor (e.g., 2.6 for harbor seals, as used in Waring et al. 2007).

¹ A correction factor of five is comparable to adjustments made for some cetacean surveys, not at-sea pinniped surveys.
² DON (2007) applied a correction factor of 2.6, based on information in Waring et al. (2007).

Inclusion of all relevant information in the *Federal Register* notice

In its *Federal Register* notice, NMFS did not include information on all sound sources and their associated characteristics, marine mammal hearing, or the potential impacts on marine mammals from the specified activity. Rather, NMFS referred the reader to previous *Federal Register* notices pertaining to CWA activities. Although the proposed activities have not changed, the Commission notes that each authorization under section 101(a)(5)(D) is a separate undertaking and should contain sufficient information to allow for meaningful public review and comment. Accordingly, the notice should include a more detailed description of the proposed activities (including sound source-specific information) and potential impacts on marine mammals (including a review of marine mammal hearing and the potential impacts on marine mammals from the specified activities), such that the public is not required to locate and refer to previous documents to obtain the information necessary to comment on the proposed authorization. To ensure the transparency of the process, the Commission recommends that NMFS include in each proposed incidental harassment authorization that NMFS publishes in the *Federal Register* a sufficiently detailed description of the proposed activities and the potential impacts on marine mammals to allow the public to review and comment on the proposed authorization as a stand-alone document.

The Commission is grateful for the opportunity to provide comments on CWA's application. Please contact me if you have questions concerning the Commission's recommendations.

Sincerely,



Rebecca J. Lent, Ph.D.
Executive Director

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

References

- Beck, C.A., W.D. Bowen, and S.J. Iverson. 2000. Seasonal changes in buoyancy and diving behavior of adult grey seals. *The Journal of Experimental Biology* 203:2323-2330.
- Carretta, J.V., J. Barlow, and L. Enriquez. 2008. Acoustic pingers eliminate beaked whale bycatch in a gill net fishery. *Marine Mammal Science* 24(4):956-961.
- Culik, B.M., S. Koschinski, M. Tregenza, M., and G. Ellis. 2001. Reactions of harbor porpoise (*Phocoena phocoena*) and herring (*Clupea harengus*) to acoustic alarms. *Marine Ecology Progress Series* 211:255-260.
- DON. 2007. Navy OPAREA Density Estimate (NODE) for the Northeast OPAREAs. Prepared for the Department of the Navy, U.S. Fleet Forces Command, Norfolk, Virginia. Contract #N62470-02-D-9997, CTO 0030. Prepared by Geo-Marine, Inc., Hampton, Virginia.
- Johnston, D.W. 2002. The effect of acoustic harassment devices on harbor porpoises (*Phocoena phocoena*) in the Bay of Fundy, Canada. *Biological Conservation* 108:113-118.

- Kastelein, R.A., D. de Haan, A.D. Goodson, C. Staal, and N. Vaughan. 1997. The effects of various sounds on harbor porpoise. Pages 367–383 in A.J. Read, P.R. Wiepkema, and P.E. Nachtigall (eds.), *The Biology of the Harbor Porpoise*. De Spil Publishers, Woerden, The Netherlands.
- Kastelein, R.A., H.T. Rippe, N. Vaughan, N.M. Schooneman, W.C. Verboom, and D. de Haan. 2000. The effects of acoustic alarms on the behavior of harbor porpoises in a floating pen. *Marine Mammal Science* 16(1):46–64.
- Kastelein, R.A., W.C. Verboom, M. Muijsers, N.V. Jennings, and S. van der Heul. 2005. The influence of acoustic emissions for underwater data transmission on the behaviour of harbor porpoises (*Phocoena phocoena*) in a floating pen. *Marine Environmental Research* 59:287–307.
- Kastelein, R.A., N.V. Jennings, W.C. Verboom, D. de Haan, D., and N.M. Schooneman. 2006a. Differences in the response of a striped dolphin (*Stenella coeruleoalba*) and a harbor porpoise (*Phocoena phocoena*) to an acoustic alarm. *Marine Environmental Research* 61:363–378.
- Kastelein, R.A., S. van der Heul, W.C. Verboom, R.V.J. Triesscheijn, and N.V. Jennings. 2006b. The influence of underwater data transmission sounds on the displacement behaviour of captive harbor seals (*Phoca vitulina*). *Marine Environmental Research* 61:19–39.
- Morton, A.B., and H.K. Symonds. 2002. Displacement of *Orcinus orca* (Linnaeus) by high amplitude sound in British Columbia, Canada. *ICES Journal of Marine Science* 59:71–80.
- Olesiuk, P.F., L.M. Nichol, P.J. Swoden, and J.K B. Ford. 1995. Effect of sound generated by an acoustic deterrent device on the abundance and distribution of harbour porpoise (*Phocoena phocoena*) in Retreat Passage, British Columbia. Department of Fisheries and Oceans, British Columbia, Canada, 47 pages.
- Thompson, D., and M.A. Fedak. 1993. Cardiac responses of grey seals during diving at sea. *The Journal of Experimental Biology* 174:139-164.
- Waring, G.T., E. Josephson, C.P. Fairfield, and K. Maze-Foley (eds.). 2007. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments – 2006. NOAA Technical Memorandum NMFS-NE-201, 378 pages.
- Watkins, W.A., and W.E. Schevill. 1975. Sperm whales (*Physeter catodon*) react to pingers. *Deep Sea Research I* 22:123–129.