MARINE MAMMAL COMMISSION

28 July 2014

Mr. Greg Sanders
Pacific Outer Continental Shelf Region
Bureau of Ocean Energy Management
770 Paseo Camarillo, Second Floor
Camarillo, CA 93010

Dear Mr. Sanders:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the Bureau of Ocean Energy Management's (BOEM) 29 May 2014 notice of intent to prepare an environmental assessment associated with the issuance of a lease and approval of a construction and operation plan proposed by Principle Power, Inc. Principle Power has proposed to install a wind energy demonstration facility comprised of five floating wind turbine units offshore of Coos Bay, Oregon.

The Commission commented previously on BOEM's notice of an unsolicited lease request from Principle Power (see enclosed letter of 30 October 2013). Those comments identified the marine mammal species/stocks known to occur off the Oregon coast, the risks to marine mammals from wind energy development, and information needed to assess the potential effects of the Principle Power project. The Commission made several recommendations in the letter which it believes are still relevant for consideration as BOEM moves forward on preparing an environmental assessment for the project.

In addition, the Commission is concerned that BOEM's environmental analyses for commercial leasing of wind energy areas to date have been limited to analyzing impacts associated with lease issuance and site assessment only, rather than the full life cycle of wind energy development from site assessment through construction, operation, and decommissioning. BOEM (at the time known as the Minerals Management Service) commissioned a synthesis document on the environmental effects of alternative energy development in 2007 (Michel et al. 2007), but that synthesis is no longer current regarding environmental effects, particularly given the information that has become available over the last decade on the environmental effects of construction and operation of numerous wind farms in northern Europe and China[1]. In light of the considerable efforts underway to develop wind energy resources in the Atlantic, and the current interest in developing wind energy off Oregon, an updated synthesis of the current state of knowledge regarding impacts of wind energy development is warranted. This synthesis should consider the full life cycle of development as well as the cumulative impact of wind energy development in the context of other human uses of the marine environment. Such a synthesis could help identify key data gaps and more fully guide future wind energy development, research, mitigation, and monitoring on both coasts.

[1] http://www.gwec.net/global-offshore-current-status-future-prospects/

The Commission understands that the Principle Power project is largely a demonstration project and will likely have minimal impacts as compared to a full-scale commercial wind farm. However, because the project is bypassing the initial site assessment stage and moving directly into construction and operation, a thorough review of the potential impacts of construction and operation should be undertaken. To facilitate that analysis, the Commission recommends that BOEM prepare an updated synthesis regarding the potential effects of the full life cycle of commercial wind energy development activities (leasing, site assessment, construction, operation, and decommissioning) on the U.S. Outer Continental Shelf, incorporating new information on the longer-term and cumulative effects of wind energy development on marine mammals, their habitats, and their prey species. A bibliography of scientific articles and reports published since Michel et al. (2007) is enclosed to help facilitate that analysis.

I trust these comments will be helpful. Please let me know if you or your staff have any questions with regard to this letter.

Sincerely,

Rebecca J. Lent, Ph.D.
Executive Director

Enclosures

cc: Ms. Maureen Bornholdt, BOEM Office of Renewable Energy Programs

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MARINE MAMMAL COMMISSION

30 October 2013

Ms. Jean Thurston
Renewable Energy Program Specialist
Pacific Region Office of Strategic Resources
Bureau of Ocean Energy Management
770 Paseo Camarillo, Second Floor
Camarillo, CA 93010

Dear Ms. Thurston:

The Marine Mammal Commission (MMC), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the Bureau of Ocean Energy Management's (BOEM's) 30 September 2013 notice of an unsolicited lease request from Principle Power, Inc. to acquire a commercial lease for wind energy development off Coos Bay, Oregon (78 Fed. Reg. 59968) and the associated application for a lease from Principle Power. The *Federal Register* notice includes a request for interest from other potential wind energy developers and public comments regarding the potential environmental consequences of wind energy development in the area. The MMC offers the following recommendations in response to that request.

RECOMMENDATIONS

The Marine Mammal Commission recommends that the Bureau of Ocean Energy Management—

- require Principle Power, as appropriate, to obtain authorization from the National Marine Fisheries Service under section 101(a)(5)(A) or (D) of the Marine Mammal Protection Act to take small numbers of marine mammals incidental to site characterization, construction, and maintenance activities; such authorization should stipulate minimum requirements for marine mammal mitigation, monitoring, and reporting;
- direct Principle Power to use the Bureau of Ocean Energy Management's recently issued guidelines for marine mammal biological surveys for the Atlantic Outer Continental Shelf to help guide the design and implementation of site characterization, mitigation, and post-installation monitoring for the WindFloat Pacific Offshore Wind Demonstration project;
- work with Principle Power to ensure information is also collected on marine mammal habitat use and foraging patterns in and adjacent to the proposed lease area and on physiological and behavioral responses of marine mammals to various activities at all stages of wind energy development;
- partner with other state and federal resource agencies, academic institutions, and private researchers, as well as with Principle Power, to support broad-scale, multi-year, seasonal wildlife surveys off the U.S. west coast and in all areas of established or proposed energy development; and
- work with Principle Power, the National Marine Fisheries Service, and marine mammal researchers as appropriate, to deploy an array of fixed passive acoustic recorders coast-wide

to measure the ambient sound field, detect the presence of marine mammals, and monitor changes that may occur as a result of wind energy development in the area.

BACKGROUND

Principle Power, Inc. has submitted an unsolicited request to BOEM for a commercial lease to install five semi-submersible floating wind energy turbines off the coast of Coos Bay, Oregon, as part of the WindFloat Pacific Offshore Wind Demonstration Project (WindFloat). The turbines would be sited in 300-400 m water approximately 24 km offshore. If the lease is granted, Principle Power would conduct some preliminary site characterization studies including sub-bottom profiling and wildlife (marine mammal and bird) surveys prior to submittal of a construction and operations plan (COP) in Fall 2014.

RATIONALE

The MMC supports BOEM's efforts to develop offshore wind energy as part of the Administration's goal of generating 80 percent of the nation's electricity from clean energy sources by 2035. Nevertheless, the development of wind energy sources should proceed in a thoughtful and deliberate manner with regard to its impact on the marine ecosystem, including marine mammals. Efforts to assess and reduce potential effects to marine mammals require a thorough understanding of potential risks associated with each stage of wind energy development; the collection of preliminary baseline information on marine mammal abundance, distribution, habitat use, behavior, and ecology; and monitoring of marine mammals and the marine environment throughout the life cycle of the project. The MMC offers the following rationale to support its recommendations.

Risks to marine mammals

There are 29 species and 31 stocks of marine mammals documented in waters off Oregon which could be found in or near the proposed lease area, nine of which are listed as endangered or threatened under the Endangered Species Act (ESA) (Caretta et al. 2013, Allen and Angliss 2013, see Table 1). The development of wind energy in marine areas may pose risks to some of those species and the ecosystems of which they are a part. Sound and vessel activity associated with site assessment, construction, operations, and decommissioning of wind generators can disturb marine mammals and may interfere with important activities, including foraging, resting, socializing, and migrating. Disturbance of the seafloor associated with mooring the floating turbines could affect benthic habitats and organisms. Support vessel activities pose the risk of collisions between ships and whales and also some risk of spills of fuel oil or other materials. Sound generated from wind turbine operations generally would be continuous, of low intensity, and at low frequencies (below a few kHz) (Tougaard et al. 2008), and would be transmitted directly to the water column from the turbine shaft. Playback experiments involving harbor porpoises and harbor seals prompted a distinct reaction by both species to wind-turbine sounds (Koschinski et al. 2003). Their measures, however, were of short-term effects and the extent to which these risks may reduce long-term reproduction and survival of marine mammal populations in the area has yet to be evaluated scientifically.

Table 1. Marine mammal species/stocks found in U.S. Outer Continental Shelf (OCS) waters off Oregon, and their status under the ESA

Common name	Stock	Species name	ESA Status
Pinnipeds			
California sea lion	U.S.	*Zalophus californianus*	Not listed
Guadalupe fur seal	Mexico to California	*Arctocephalus townsendi*	Threatened
Harbor seal	Oregon/Washington coast	*Phoca vitulina richardsi*	Not listed
Northern elephant seal	California breeding	*Mirounga angustirostris*	Not listed
Northern fur seal	Eastern Pacific	*Callorhinus ursinus*	Not listed
Steller sea lion	Eastern U.S.	*Eumetopias jubatus*	Not listed
Cetaceans			
Baird's beaked whale	California/Oregon/Washington	*Berardius bairdii*	Not listed
Blue whale	Eastern North Pacific	*Balaenoptera musculus*	Endangered
Common bottlenose dolphin	California/Oregon/Washington offshore	*Tursiops truncatus*	Not listed
Common dolphin, short-beaked	California/Oregon/Washington	*Delphinus delphis*	Not listed
Cuvier's beaked whale	California/Oregon/Washington	*Ziphius cavirostris*	Not listed
Dall's porpoise	California/Oregon/Washington	*Phocoenoides dalli*	Not listed
Dwarf sperm whale	California/Oregon/Washington	*Kogia sima*	Not listed
Fin whale	California/Oregon/Washington	*Balaenoptera physalus*	Endangered
Gray whale	Eastern North Pacific	*Eschrichtius robustus*	Not listed
	Western North Pacific		Endangered
Harbor porpoise	Northern California/Southern Oregon	*Phocoena phocoena*	Not listed
	Northern Oregon/Washington Coast		
Humpback whale	California/Oregon/Washington	*Megaptera novaeangliae*	Endangered
Killer whale	Eastern North Pacific Southern resident	*Orcinus orca*	Endangered
Mesoplodont beaked whale	California/Oregon/Washington	*Mesoplodon* spp.	Not listed
Minke whale	California/Oregon/Washington	*Balaenoptera acutorostrata*	Not listed
North Pacific right whale	Eastern North Pacific	*Eubalaena japonica*	Endangered
Northern right whale dolphin	California/Oregon/Washington	*Lissodelphis borealis*	Not listed
Pacific white-sided dolphin	California/Oregon/Washington	*Lagenorhynchus obliquidens*	Not listed
Pilot whale, short-finned	California/Oregon/Washington	*Globicephala macrorhynchus*	Not listed
Pygmy sperm whale	California/Oregon/Washington	*Kogia breviceps*	Not listed
Risso's dolphin	California/Oregon/Washington	*Grampus griseus*	Not listed
Sei whale	Eastern North Pacific	*Balaenoptera borealis*	Endangered
Sperm whale	California/Oregon/Washington	*Physeter macrocephalus*	Endangered
Striped dolphin	California/Oregon/Washington	*Stenella coeruleoalba*	Not listed

The most immediate risk associated with the development of Principle Power's proposed wind energy site is from site assessment activities, which would involve the use of sound-producing technologies to evaluate the sea floor and search for possible hazards. The effects of those technologies are not well understood. Some have been studied to a certain degree but others have received much less attention. For example, the potential effects of sub-bottom profilers used for geophysical surveys and to guide sub-bottom sampling have received little attention despite the fact that they generate sound source levels (201–205 dB re 1µPa at 1 m) and frequencies (0.5–24 kHz) comparable to other sound sources that are considered to pose risks to marine mammal physiology (e.g., hearing) and behavior (e.g., habitat use) (Cox et al. 2006). Scientists have conducted some preliminary modeling exercises and studies with captive animals, which suggest that exposure to sub-

bottom profilers could cause a temporary threshold shift or behavioral response if animals are below the ship (Wood et al. 2012). Other sound sources used in site characterization surveys, such as echosounders, are not expected to result in a loss of hearing or other physiological response in marine mammals (Lurton and DeRuiter 2011); however, their use may result in disturbance and ultimately stranding under certain conditions (Southall et al. 2013).

The use of active sound sources during site assessment activities and increased vessel activities at each stage of wind energy development have the potential to take marine mammals by Level A or Level B harassment, as defined under the Marine Mammal Protection Act (MMPA). Operators conducting those surveys are therefore required to seek authorization under section 101(a)(5)(A) or (D) of the MMPA to take small numbers of marine mammals incidental to those activities. For the taxa in the region of activities (see Table 1), authorization should be sought from the National Marine Fisheries Service (NMFS). Take authorizations for sound-producing activities typically include a suite of mitigation, monitoring and reporting measures with which operators must comply to prevent or reduce the adverse effects of such activities. Such measures may include ramping up the sound source to alert marine mammals that may be in the area, shutting down or powering down the sound source if marine mammals approach the source close enough to be injured, and prohibiting operations during nighttime or low-visibility conditions. To minimize the probability of vessel strikes, take authorizations may also include requirements for vessels to slow down or avoid multiple changes in direction within a certain distance from marine mammals. Activities of particular concern for marine mammals may be prohibited in sensitive areas at sensitive times, as informed by baseline monitoring and available survey information on seasonal movements.

Because activities associated with site characterization, construction, and operation of the proposed wind farm have the potential to take marine mammals by Level A or Level B harassment, the MMC recommends that BOEM require Principle Power, as appropriate, to obtain authorization from NMFS under section 101(a)(5)(A) or (D) of the MMPA to take small numbers of marine mammals incidental to site characterization, construction, and maintenance activities. Such authorization should stipulate minimum requirements for marine mammal mitigation, monitoring, and reporting.

Data needed to assess potential effects of wind energy development

As noted above, the potential long-term effects of site assessment, construction, and operation of wind farms on marine mammal reproduction and survival are not yet well understood. A thorough evaluation of the effects of wind energy development will depend on the availability of biological and environmental information collected prior to leasing activities (i.e., baseline information), during construction and operation, and through decommissioning. Research and information is also needed regarding physiological and behavioral responses of marine mammals and their prey to wind energy development. At a minimum, the information should be sufficient to demonstrate that the proposed activities are not likely to harm or damage natural resources, including marine mammals, ESA-listed species, and ESA-designated critical habitat (30 C.F.R. § 585.801). Ideally, it should be collected at temporal and spatial scales sufficient to characterize the inherent variability in potentially affected ecosystems and to distinguish the effects of energy development from that variability.

Biological information needed to assess status and vulnerability of marine mammals to short- and long-term effects includes stock structure, distribution and seasonal movements, abundance and trends, and vital rates (e.g., survival, reproduction, emigration, immigration). It would also require additional information on marine mammal habitat-use and foraging patterns. The collection of such information requires both a near and long-term commitment of effort and resources to provide the knowledge needed to detect adverse effects associated with energy development and provide a strong foundation for responsible management of marine ecosystems.

Information is also needed regarding the physiological and behavioral responses of marine mammals to wind energy development activities. To date such research has focused primarily on short-term effects of construction activities due to the relatively recent expansion of this emerging technology into offshore waters. Mitigation measures to protect marine mammals from injury and disturbance have been developed and implemented for many projects, but the effectiveness of those measures has yet to be determined. Additional research and monitoring is needed to determine short- and long-term effects of various types of wind energy development activities and the effectiveness of mitigation measures, especially when those activities employ new technologies such as the floating platforms proposed for the WindFloat project.

The responsibility for data collection to assess baseline conditions and the potential effects of renewable energy development projects on marine mammals and the marine environment lies primarily with the regulated industry, with supplementary financial support and technical guidance from BOEM to ensure that the data collected are of sufficient quality, duration, and scale to assess adverse effects. Principle Power has acknowledged its responsibility to conduct baseline wildlife surveys and post-installation monitoring, with a focus on key environmental issues identified in a report by Pacific Energy Ventures (2012) as likely to drive the permitting process for wind energy projects off the U.S. west coast. These include the potential for wind platforms to affect the near-field habitat and sediments, to create a collision risk for marine mammals, and to affect whale migration; also of concern is the potential for vessel interactions with marine mammals during platform installation and maintenance. The MMC supports Principle Power's plan to conduct pre-installation wildlife surveys in order to collect baseline information on marine mammal abundance and distribution and to conduct post-installation monitoring. However, it is important also to collect, or support collection by others, of habitat use and foraging data, and to also collect information on responses of marine mammals to various activities at all stages of development.

BOEM has issued various sets of guidelines specifying information requirements for submittal of site assessment plans (SAPs) and COPs for renewable energy projects.[1] The marine mammal and sea turtle guidelines outline basic data collection requirements and procedures for planning and conducting marine mammal biological surveys.[2] Those guidelines were originally written for renewable energy development on the Atlantic OCS, but are relevant to site characterization surveys on the Pacific OCS, as well as mitigation and post-installation monitoring. As such, the MMC recommends that BOEM direct Principle Power to use BOEM's recently issued guidelines for marine mammal biological surveys for the Atlantic OCS to help guide the design and

[1] http://www.boem.gov/Regulatory-Development-Policy-and-Guidelines/
[2] http://www.boem.gov/uploadedFiles/BOEM/Renewable_Energy_Program/Regulatory_Information/BOEM_Renewable_MMandST_Guidelines.pdf

implementation of site characterization, mitigation, and post-installation monitoring of the WindFloat project.

In addition to collecting data in the specific areas of focus laid out in the 2012 Pacific Energy Ventures report, the MMC recommends that BOEM work with Principle Power to ensure information is also collected on marine mammal habitat use and foraging patterns in and adjacent to the proposed lease area and on physiological and behavioral responses of marine mammals to various activities at all stages of wind energy development.

The MMC recognizes that for small-scale demonstration projects, such as the one proposed by Principle Power, the extent of information required to conduct a thorough evaluation of potential effects may exceed available resources and capabilities, especially for species or populations whose distribution extends beyond the area of potential effects. State and federal resource agencies (such as the Oregon Department of Fish and Wildlife, NMFS, and the Department of Energy) as well as university and private research entities (such as Oregon State University and Cascadia Research Collective) are also collecting or could contribute to the collection of information that would be useful in assessing marine mammal populations off the west coast. To facilitate a thorough collection of information both within the area of potential effect and in adjacent waters, the MMC recommends that BOEM partner with other state and federal resource agencies, academic institutions, and private researchers, as well as with Principle Power, to support broad-scale, multi-year, seasonal wildlife surveys off the U.S. west coast and in all areas of established or proposed energy development.

To complement aerial and ship surveys, BOEM should also consider supporting coast-wide acoustic monitoring of marine mammals and ambient sound levels. Fixed acoustic recorders deployed year-round would supplement data from periodic visual surveys. Fixed passive acoustic recorders can detect vocalizing marine mammals by species in all hours, seasons and sea states, and can be deployed over longer time frames and at lower costs than visual surveys or mobile, towed acoustic arrays (Clark 1995, Mellinger et al. 2007). Acoustic recordings have been used to estimate the abundance and, in some cases, the density of marine mammals (Van Parijs et al. 2002, Marques et al. 2009, Marques et al. 2013). Fixed recorders also can be used to measure underwater ambient sound levels (Roth et al. 2012), which is critical for establishing baseline sound levels prior to the introduction of additional sound sources. For all these reasons, the MMC recommends that BOEM work with Principle Power, NMFS, and marine mammal researchers as appropriate, to deploy an array of fixed passive acoustic recorders coast-wide to measure the ambient sound field, detect the presence of marine mammals, and monitor changes that may occur as a result of wind energy development in the area.

The MMC hopes that you find these recommendations and comments helpful. Please contact me if you have questions or if the MMC can be of assistance as you consider these matters.

Sincerely,

Rebecca J. Lent, Ph.D.
Executive Director

cc: Ms. Donna Wieting, NMFS Office of Protected Resources, Silver Spring, MD
Mr. Chris Yates, NMFS West Coast Regional Office, Long Beach, CA

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