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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XA916

Takes of Marine Mammals Incidental to Specified Activities; Pile Placement for ORPC Maine's Cobscook Bay Tidal Energy Pilot Project

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; proposed incidental harassment authorization; request for comments.

SUMMARY: NMFS has received an application from Ocean Renewable Power Company Maine, LLC (ORPC) for an Incidental Harassment Authorization (IHA) to take marine mammals, by harassment, incidental to pile driving in Cobscook Bay, Maine. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is proposing to issue an IHA to incidentally harass, by Level B harassment, four species of marine mammals during the specified activity within a specific geographic region and is requesting comments on its proposal.

DATES: Comments and information must be received no later than [insert date 30 days after date of publication in the FEDERAL REGISTER].

ADDRESSES: Comments on the application and this proposal should be addressed to Michael Payne, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910. The mailbox address for providing email comments is ITP.Magliocca@noaa.gov. NMFS is not responsible

for e-mail comments sent to addresses other than the one provided here. Comments sent via e-mail, including all attachments, must not exceed a 10-megabyte file size.

Instructions: All comments received are a part of the public record and will generally be posted to http://www.nmfs.noaa.gov/pr/permits/incidental.htm without change. All Personal Identifying Information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information.

A copy of the application containing a list of the references used in this document may be obtained by writing to the address specified above, telephoning the contact listed below (see FOR FURTHER INFORMATION CONTACT), or visiting the internet at: http://www.nmfs.noaa.gov/pr/permits/incidental.htm. Documents cited in this notice may also be viewed, by appointment, during regular business hours, at the aforementioned address.

FOR FURTHER INFORMATION CONTACT: Michelle Magliocca, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 et seq.) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by United States citizens who engage in a specified activity (other than commercial fishing) within a specific geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth. NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Section 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the United States can apply for an authorization to incidentally take small numbers of marine mammals by harassment. Section 101(a)(5)(D) further established a 45-day time limit for NMFS' review of an application, followed by a 30-day public notice and comment period on any proposed authorizations for the incidental harassment of marine mammals. Within 45 days of the close of the comment period, NMFS must either issue or deny the authorization.

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as:

any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

Summary of Request

On November 2, 2011, NMFS received an application from ORPC requesting an IHA for the take, by Level B harassment, of small numbers of harbor seal (Phoca vitulina), gray seal (Halichoerus grypus), harbor porpoise (Phocoena phocoena), and Atlantic white-sided dolphin (Lagenorhynchus acutus) incidental to pile driving activities in Cobscook Bay, Maine. Upon receipt of additional information and a revised application, NMFS determined the application complete and adequate on January 7, 2011.

ORPC plans to build, deploy, monitor, and test a single-device tidal turbine as the first phase of a long-term project with the ultimate goal of generating and delivering electricity to an on-shore location in Lubec, Maine and connecting to the Bangor Hydro Electric Company power grid. The long-term project would be carried out in two separate phases over an expected 8-year pilot license term. Because elevated sound levels from pile driving during the first phase of the project have the potential to result in marine mammal harassment, NMFS is proposing to issue an IHA for take incidental to pile driving activities.

Description of the Specified Activity

ORPC proposes to install foundational piles to support an underwater tidal turbine unit. The turbine unit is approximately 98 feet (ft) long, 17 ft high, and 17 ft wide and is attached to a bottom support frame, which holds the unit in place about 15 ft above the sea floor. The turbine unit weighs about 69,000 pounds (lbs) and is coupled with the bottom support frame to comprise what is called a single-device TidGen^{TM} Power System. At the interface with the seabed, the bottom support frame requires a site-specific design based on the environmental conditions at the deployment area. The foundation design for the single-device TidGen^{TM} Power System is a pile bent arrangement consisting of ten steel pipe piles. Each foundation pile would have a 30-inch (in) diameter and a half-inch wall thickness and would rest on bedrock. Piles would vary in

length from 15-18 m (50-60 ft) due to bottom sediment depth, but each pile would be driven to the top of bedrock and would protrude 3-5 m (10-15 ft) above the seafloor.

A total of 11 piles (10 for the foundation and one for mounting environmental monitoring equipment) would be driven from a moored barge for the first phase. Piles would be placed about six m (20 ft) apart in two rows of five and the rows would be separated by about 15 m (50 ft). Geotechnical data shows that the TidGen^{TM} device would be located in an area with up to 40 ft of marine clay and some thin layers of glacial till overlaying bedrock. Based on this data and extensive soil studies in the area, piles are expected to sink fairly deep into the mud line under their own weight. Piles would be driven the remaining depth using vibratory and impact pile driving procedures from barge-based pile driving equipment. A pile for mounting environmental monitoring equipment would also be installed with the same pile driving equipment. The monitoring pile would be two m (six ft) in diameter, or an array of three piles not greater than 30 in in diameter. The monitoring pile would protrude about six m (20 ft) above the seafloor. The two-m diameter pile would sit about two m below the mud line while the array of smaller diameter piles would be driven to bedrock.

ORPC would use an H&M model H-1700 vibratory hammer to drive piles to the extent possible. If additional energy is required to reach bedrock, a Berminghammer model B-3505 diesel impact hammer would be used, with maximum rated impact energy of 21,533 ft-lb. ORPC expects that the need for an impact hammer would be minimal and for very short durations. To lessen the amount and intensity of sound propagation, ORPC would evaluate the use of wooden sound absorption cushions and/or bubble curtains.

Date and Duration of Proposed Activity

ORPC plans to begin pile driving on March 1, 2012. Pile driving with a vibratory hammer would take up to 3 minutes per pile and pile driving with an impact hammer would take up to 5 minutes per pile. Due to strong currents during ebb and flood tides, pile driving would occur during slack tides only. ORPC expects that only one pile would be driven per slack tide period, for a total of 7-12 days of pile driving during daylight hours only. Pile driving could occur for up to 90 minutes per slack tide, with the potential for two slack tide pile driving sessions per day. NMFS Northeast Regional Office recommends that in-water construction involving pile driving be conducted between November 8 and April 9 to avoid impacts to fisheries resources. However, ORPC may be able to conduct pile driving activities after April 9 if they can demonstrate that noise levels caused by the impact hammer are below NMFS' guidelines. Although pile driving is only expected to last 7-12 days, NMFS would issue the IHA for a 1-year period to allow for permitting and weather delays. Pile driving would only occur in weather that provides adequate visibility for marine mammal monitoring activities.

Region of Proposed Activity

The proposed activity would occur in Cobscook Bay, in between Lubec and Eastport, Maine. Piles and other deployment materials would be transported by barge from a staging area at the Eastport Boat School or other local access point. Cobscook Bay has extremely strong tidal currents and notably high tides, creating an extensive intertidal habitat for marine and coastal species. Water depth at the proposed project location is 26 m (85 ft) at mean lower low water. The Bay is considered a relatively intact marine system, as the area has not experienced much industrialization.

Sound Propagation

Sound is a mechanical disturbance consisting of minute vibrations that travel through a medium, such as air or water, and is generally characterized by several variables. Frequency describes the sound's pitch and is measured in hertz (Hz) or kilohertz (kHz), while sound level describes the sound's loudness and is measured in decibels (dB). Sound level increases or decreases exponentially with each dB of change. For example, 10 dB yields a sound level 10 times more intense than 1 dB, while a 20 dB level equates to 100 times more intense, and a 30 dB level is 1,000 times more intense. Sound levels are compared to a reference sound pressure (micro-Pascal) to identify the medium. For air and water, these reference pressures are "re: 20 μPa" and "re: 1 μPa," respectively. Root mean square (RMS) is the quadratic mean sound pressure over the duration of an impulse. RMS is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick, 1975). RMS accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels (Hastings and Popper, 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units rather than by peak pressures.

Source levels for the vibratory and impact hammer are expected to be 175 dB and 190 dB, respectively. Assuming a practical spreading loss of 15 log R, OPRC estimates that the 180-dB (Level A) isopleth for the impact hammer could be as far as 100 m (328 ft). Based on similar estimates, the 160-dB (Level B) isopleth for the impact hammer could be about 1,800 m (5,906 ft) The 120-dB (Level B for continuous sound sources) isopleth for the vibratory hammer could be as far as 4,600 m (2.5 mi).

Description of Marine Mammals in the Area of the Specified Activity

Marine mammals with known presence in this region of Cobscook Bay are the harbor seal, grey seal, harbor porpoise, and Atlantic white-sided dolphin. ORPC has been conducting incidental visual observations of marine mammals in Cobscook Bay since 2007, for a total effort of 252 4-hr observational periods over 222 days. During this time, marine mammal observers have recorded 57 seals, 47 harbor porpoises, and two Atlantic white-sided dolphins (Table 2). No observations of any whale species have been made in Cobscook Bay by ORPC since monitoring began in 2007. In addition, a review of available databases does not indicate any recorded whale sightings in Cobscook Bay. Other species that may possibly occur in the vicinity of the proposed activity include North Atlantic right whale (Eubalaena glacialis), humpback whale (Megaptera novaengliae), fin whale (Balaenoptera borealis), minke whale (Balaenoptera acutorostrata), and sei whale (Balaenoptera borealis). However, these five species are not likely to occur in Cobscook Bay and are generally associated with open ocean habitats and offshore locations. NMFS has concluded that the specified activity will not impact these five species and they are not discussed further.

Month	Hours of effort	Harbor and grey seal	Harbor porpoise	Atlantic white-sided dolphin
January	16	0	0	0
February	36	0	1	0
March	56	1	0	0
April	160	4	3	0
May	56	1	3	0
June	84	8	1	0
July	84	4	10	0
August	120	16	24	2

Month	Hours of effort	Harbor and grey seal	Harbor porpoise	Atlantic white-sided dolphin
September	100	9	5	0
October	96	8	0	0
November	72	4	0	0
December	104	2	0	0
Total	1,008	57	47	2

Table 2. Marine mammal observations in the proposed project vicinity between December 2007, and December 2010.

Harbor Seals

Harbor seals are typically found in temperate coastal habitats and use rocks, reefs, beaches, and drifting glacial ice as haul outs and pupping sites. On the east coast, they range from the Canadian Arctic to southern New England, New York, and occasionally the Carolinas. There are an estimated 91,000 harbor seals in the western North Atlantic stock and the population is increasing. Harbor seals are not listed under the Endangered Species Act (ESA) nor considered depleted under the MMPA. More information, including stock assessment reports, can be found at: http://www.nmfs.noaa.gov/pr/species/mammals/pinnipeds/harborseal.htm. The only species-specific data for Cobscook Bay is from ORPC's 2007-2010 marine mammal observations.

Gray Seals

Gray seals reside in coastal waters and also inhabit islands, sandbars, ice shelves, and icebergs. The western North Atlantic stock ranges from eastern Canada to the northeastern United States. Current population numbers for the western North Atlantic stocks are unknown, but are estimated at over 250,000 animals. Most recent population estimates show increases in

abundance in Canada and the United States, although the population in the Gulf of St. Lawrence appears to be declining. Gray seals pup at two established colonies off the coast of Maine: Green Island and Seal Island. Both colonies are tens of miles away from the proposed project site. Gray seals are not listed under the ESA nor considered depleted under the MMPA. More information, including stock assessment reports, can be found at http://ww.nmfs.noaa.gov/pr/sepcies/mammals/pinnipeds/grayseal.htm. The only species-specific data for Cobscook Bay is from ORPC's 2007-2010 marine mammal observations.

Pinnipeds produce a wide range of social signals, most occurring at relatively low frequencies (Southall et al., 2007), suggesting that hearing is keenest at these frequencies. Pinnipeds communicate acoustically both on land and underwater, but have different hearing capabilities dependent upon the medium (air or water). Based on numerous studies, as summarized in Southall et al. (2007), pinnipeds are more sensitive to a broader range of sound frequencies underwater than in air. Underwater, pinnipeds can hear frequencies from 75 Hz to 75 kHz. In air, pinnipeds can hear frequencies from 75 Hz to 30 kHz (Southall et al., 2007).

Harbor Porpoises

Harbor porpoises reside in northern temperate and subarctic coastal and offshore waters. They are commonly found in bays, estuaries, harbors, and fjords less than 200 m (650 ft) deep. In the western North Atlantic, harbor porpoises range from west Greenland to Cape Hatteras, North Carolina. Harbor porpoises in United States waters are divided into 10 stocks, based on genetics, movement patterns, and management. Any harbor porpoises encountered during the proposed project would be part of the Gulf of Maine-Bay of Fundy stock, which has an estimated abundance of 89,054 animals. Population trends for all U.S. stocks of harbor porpoises are currently unknown. Gulf of Maine-Bay of Fundy harbor porpoises are not listed under the ESA

nor considered depleted under the MMPA. More information, including stock assessment reports, can be found at: http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/harborporpoise.htm. The only species-specific data for Cobscook Bay is from ORPC's 2007-2010 marine mammal observations.

Cetaceans are divided into three functional hearing groups: low-frequency, mid-frequency, and high-frequency. Harbor porpoises are considered high-frequency cetaceans and the estimated auditory bandwidth (lower to upper frequency hearing cut-off) for this group ranges from 200 Hz to 180 kHz.

Atlantic White-sided Dolphins

Atlantic white-sided dolphins are only found in temperate waters of the North Atlantic Ocean and typically reside along the continental shelf and slope. They range from Greenland to North Carolina and exhibit seasonal movements between inshore northern waters and southern offshore waters. The western North Atlantic stock has an estimated 63,000 animals, but there is insufficient information to determine population trends. Atlantic white-sided dolphins are not listed under the ESA nor considered depleted under the MMPA. More information, including stock assessment reports, can be found at: http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/whitesideddolphin_atlantic.htm. The only species-specific data for Cobscook Bay is from ORPC's 2007-2010 marine mammal observations.

Atlantic white-sided dolphins, like harbor porpoises, are considered mid-frequency cetaceans and their estimated auditory bandwidth ranges from 150 Hz to 160 kHz.

Potential Effects on Marine Mammals

Elevated in-water sound levels from pile driving in the proposed project area may temporarily impact marine mammal behavior. Elevated in-air sound levels are not a concern because the nearest significant pinniped haul-out is more than six nautical miles (NM) away. Marine mammals are continually exposed to many sources of sound. For example, lightning, rain, sub-sea earthquakes, and animals are natural sound sources throughout the marine environment. Marine mammals produce sounds in various contexts and use sound for various biological functions including, but not limited to, (1) social interactions; (2) foraging; (3) orientation; and (4) predator detection. Interference with producing or receiving these sounds may result in adverse impacts. Audible distance or received levels will depend on the sound source, ambient noise, and the sensitivity of the receptor (Richardson et al., 1995). Marine mammal reactions to sound may depend on sound frequency, ambient sound, what the animal is doing, and the animal's distance from the sound source (Southall et al., 2007).

Hearing Impairment

Marine mammals may experience temporary or permanent hearing impairment when exposed to loud sounds. Hearing impairment is classified either as temporary threshold shift (TTS) or permanent threshold shift (PTS). There are no empirical data for at what received level PTS occurs in marine mammals; therefore, it must be estimated from at what received levels the onset of TTS occurs and the rate of TTS growth with increasing exposure levels. PTS is likely if the animal's hearing threshold is reduced by $\geq$ 40 dB of TTS. PTS is considered auditory injury (Southall et al., 2007) and occurs in a specific frequency range and amount. Irreparable damage to the inner or outer cochlear hair cells may cause PTS; however, other mechanisms are also involved, such as exceeding the elastic limits of certain tissues and membranes in the middle and inner ears and resultant changes in the chemical composition of the inner ear fluids (Southall et

al., 2007). Due to proposed mitigation measures and source levels in the proposed project area, NMFS does not expect marine mammals to be exposed to received sound levels associated with PTS.

Temporary Threshold Shift (TTS)

TTS is the mildest form of hearing impairment that can occur during exposure to a loud sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises and a sound must be louder in order to be heard. TTS can last from minutes or hours to days, but is recoverable. TTS also occurs in specific frequency ranges; therefore, an animal might experience a temporary loss of hearing sensitivity only between the frequencies of 1 and 10 kHz, for example. The amount of change in hearing sensitivity is also variable and could be reduced by 6 dB or 30 dB, for example. Recent literature highlights the inherent complexity of predicting TTS onset in marine mammals, as well as the importance of considering exposure duration when assessing potential impacts (Mooney et al., 2009a, 2009b; Kastak et al., 2007). Generally, with sound exposures of equal energy, quieter sounds (lower SPL) of longer duration were found to induce TTS onset more than louder sounds (higher SPL) of shorter duration (more similar to subbotom profilers). For sound exposures at or somewhat above the TTS-onset threshold, hearing sensitivity recovers rapidly after exposure to the sound ends. Southall et al. (2007) considers a 6 dB TTS (i.e., baseline thresholds are elevated by 6 dB) to be a sufficient definition of TTS-onset. NMFS considers TTS Level B harassment that is mediated by physiological effects on the auditory system; however, NMFS does not consider onset TTS to be the lowest level at which Level B harassment may occur. Southall et al. (2007) summarizes underwater pinniped data from Kastak et al. (2005), indicating that a tested harbor seal showed a TTS of around 6 dB when exposed to a nonpulse noise at sound pressure level 152 dB re: 1 μPa for 25 minutes. Some studies suggest

that harbor porpoises may be more sensitive to sound than other odontocetes (Lucket et al., 2009; Kastelein et al., 2011). However, while TTS onset may occur in harbor porpoises at lower received levels (when compared to other odontocetes), NMFS' 160-dB threshold criteria are based on the onset of behavioral harassment, not the onset of TTS. There is no information on TTS for Atlantic white-sided dolphins or gray seals specifically; published data on the onset of TTS are limited to the captive bottlenose dolphin and beluga (Finneran et al., 2000, 2002b, 2005a; Schlundt et al., 2000; Nachtigall et al., 2003, 2004).

Behavioral Disturbance

Behavioral responses to sound are highly variable and context-specific. An animal's perception of and response to (in both nature and magnitude) an acoustic event can be influenced by prior experience, perceived proximity, bearing of the sound, familiarity of the sound, etc. (Southall et al., 2007). If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the stock or populations. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (e.g., Lusseau and Bejder, 2007; Weilgart, 2007). In order to estimate the number of takes by Level B harassment, as defined by the MMPA, it is common practice to estimate how many mammals would be present within a particular distance of activities and/or exposed to a particular level of sound. Additional analyses that include a consideration of the context of the exposures and other factors are then employed to determine what subset of the takes would likely affect a marine mammal in some biologically-important manner.

Non-pulse Sounds

The studies that address responses of mid-frequency cetaceans (such as Atlantic white-sided dolphins) to non-pulse sounds (like vibratory pile driving) include data gathered both in the field and the laboratory and related to several different sound sources (of varying similarity to chirps) including: pingers, drilling playbacks, ship and ice-breaking noise, vessel noise, acoustic harassment devices (AHDs), acoustic deterrent devices (ADDs), mid-frequency active sonar, and non-pulse bands and tones. Southall et al. (2007) conclude that the results of these studies do not clearly indicate at what received levels marine mammals are likely to be disturbed by these types of sources. In some cases animals in the field showed significant responses to received levels between 90 and 120 dB, while in other cases these responses were not seen in the 120 to 150 dB range. The disparity in results was likely due to contextual variation and the differences between the results in the field and laboratory data (animals typically responded at lower levels in the field).

The studies that address responses of high-frequency cetaceans (such as the harbor porpoise) to non-pulse sounds include data gathered both in the field and the laboratory and related to several different sound sources (of varying similarity to chirps), including: pingers, AHDs, and various laboratory non-pulse sounds. All of these data were collected from harbor porpoises. Southall et al. (2007) concluded that the existing data indicate that harbor porpoises are likely sensitive to a wide range of anthropogenic sounds at low received levels (around 90 to 120 dB), at least for initial exposures. All recorded exposures above 140 dB induced profound and sustained avoidance behavior in wild harbor porpoises (Southall et al., 2007). Rapid habituation was noted in some but not all studies.

There are limited data available on the behavioral effects of non-pulse noise on pinnipeds while underwater; however, field and captive studies to date collectively suggest that pinnipeds

do not react strongly to exposures between 90 and 140 dB re: 1 μPa; no data exist from exposures at higher levels. Jacobs and Terhune (2002) observed wild harbor seal reactions to high-frequency acoustic harassment devices around nine sites. Seals came within 44 m of the active acoustic harassment devices and failed to demonstrate any behavioral response when received SPLs were estimated at 120-130 dB. In a captive study (Kastelein, 2006), scientists subjected a group of seals to non-pulse sounds between 8 and 16 kHz. Exposures between 80 and 107 dB did not induce strong behavioral responses; however, a single observation from 100 to 110 dB indicated an avoidance response. The seals returned to baseline conditions shortly following exposure. Southall et al. (2007) notes contextual differences between these two studies; the captive animals were not reinforced with food for remaining in the noise fields, whereas free-ranging animals may have been more tolerant of exposures because of motivation to return to a safe location or approach enclosures holding prey items.

Impulse Sounds

Southall et al. (2007) also addressed behavioral responses of marine mammals to impulse sounds (like impact pile driving). The studies that address the responses of mid-frequency cetaceans to impulse sounds include data gathered both in the field and the laboratory and related to several different sound sources (of varying similarity to boomers), including: small explosives, airgun arrays, pulse sequences, and natural and artificial pulses. The data show no clear indication of increasing probability and severity of response with increasing received level. Behavioral responses seem to vary depending on species and stimuli. Data on behavioral responses of high-frequency cetaceans to multiple pulses is not available. Although individual elements of some non-pulse sources (such as pingers) could be considered pulses, it is believed

that some mammalian auditory systems perceive them as non-pulse sounds (Southall et al., 2007).

The studies that address the responses of pinnipeds in water to impulse sounds include data gathered in the field and related to several different sources, including: small explosives, impact pile driving, and airgun arrays. Quantitative data on reactions of pinnipeds to impulse sounds is limited, but a general finding is that exposures in the 150 to 180 dB range generally have limited potential to induce avoidance behavior (Southall et al., 2007).

No impacts to marine mammal reproduction are anticipated because there are no known pinniped rookeries within the proposed project area and Cobscook Bay is not a known breeding ground for cetaceans. NMFS expects any impacts to marine mammal behavior to be temporary, Level B harassment (for example, avoidance or alteration of behavior). ORPC conservatively assumes 12 pile driving days may occur over the validity of the IHA. Marine mammal injury or mortality is not likely, as the 180 dB isopleth (NMFS' Level A harassment threshold for cetaceans) for the impact hammer is expected to be no more than a 100-m (328 ft) radius. ORPC proposes to continuously monitor a 152-m (500-ft) area around the sound source and cease all pile driving if a marine mammal is observed nearing or within this 152-m (500-ft) isopleth.

Anticipated Effects on Habitat

No permanent detrimental impacts to marine mammal habitat are expected to result from the proposed project. Disturbance in the water column would be limited to the area of each pile. Turbidity resulting from pile driving activity would be limited because pile driving would only occur at slack tide and the seafloor geology in the proposed action area is predominantly gravel and cobbles. Pile driving (resulting in temporary ensonification) may impact prey species and marine mammals by causing avoidance or abandonment of the area; however these impacts are

expected to be local and temporary. The benthic impact of the foundation for this phase of the proposed project would be about 113 ft^2 during pile placement, including disturbance from pile driving equipment. While the foundation frame will take up a limited amount of space on the seafloor, there are no expected adverse impacts to marine mammal habitat.

Proposed Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses.

ORPC proposed the following mitigation measures to minimize adverse impacts to marine mammals:

Sound Attenuation Device

When using a diesel impact hammer to "proof" piles, ORPC would use wooden sound absorption cushions and/or a bubble curtain to reduce hydroacoustic sound levels and avoid the potential for marine mammal injury. Based on previous studies, sound attenuation devices are expected to reduce sound levels by at least 5 dB.

Exclusion Zone

The purpose of the proposed exclusion zone is to prevent Level A harassment (injury) of any marine mammal species. During all in-water impact pile driving, ORPC would establish a preliminary marine mammal exclusion zone around each pile to avoid exposure to sounds at or above 180 dB. The preliminary exclusion zone would have a radius of 152 m (500 ft). This encompasses the initial estimate of the 180 dB isopleth, where injury could occur, plus a 52-m

(171-ft) buffer zone. The buffer zone would be established to account for the initial lack of in-water acoustic measurements. Once hydroacoustic monitoring is conducted, the exclusion zone may be adjusted upward accordingly to ensure that marine mammals are not exposed to Level A harassment sound pressure levels. The exclusion zone would be monitored continuously during impact pile driving to ensure that no marine mammals enter the area. Protected species observers (PSOs) would be stationed on two observer boats, one 152 m (500 ft) upstream and one 500 ft downstream of the installation site. One observer on each vessel would survey the exclusion zone, while the second observer would conduct behavioral monitoring outwards to a distance of 1 nm. Several floats anchored at 152 m (500 ft) and 305 m (1,000 ft) would be located around the installation site to help identify when marine mammals are entering or within the exclusion zone. An exclusion zone for vibratory pile driving or installation of concrete piles is unnecessary as source levels would not exceed the Level A harassment threshold.

Pile Driving Shut Down and Delay Procedures

If a PSO sees a marine mammal within or approaching the exclusion zone prior to start of impact pile driving, the observer would notify the on-site project lead (or other authorized individual) who would then be required to delay pile driving until the marine mammal has moved 305 m (1,000 ft) from the sound source or if the animal has not been resighted within 30 minutes. If a marine mammal is sighted within or on a path toward the 152-m (500-ft) exclusion zone during pile driving, pile driving would cease until that animal has moved 305 m (1,000 ft) and is on a path away from the exclusion zone or 30 minutes has lapsed since the last sighting.

Soft-start Procedures

A “soft-start” technique would be used at the beginning of each pile installation to allow any marine mammal that may be in the immediate area to leave before the pile hammer reaches

full energy. For vibratory pile driving, the soft-start procedure requires contractors to initiate noise from the vibratory hammer for 15 seconds at 40-60 percent reduced energy followed by a 1-minute waiting period. The procedure would be repeated two additional times before full energy may be achieved. For impact hammering, contractors would be required to provide an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 1-minute waiting period, then two subsequent three-strike sets. Soft-start procedures would be conducted any time hammering ceases for more than 30 minutes.

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth "requirements pertaining to the monitoring and reporting of such taking". The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for IHAs must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present.

Hydroacoustic monitoring would be performed at the initial installation of each pile driving method to ensure that the harassment isopleths are not extending past the calculated distances described in this notice and to assess the efficiency of the sound attenuation devices. ORPC would designate two biologically-trained, on-site PSOs, approved in advance by NMFS, to monitor the exclusion zone (preliminarily set at 152 m [500 ft]) for marine mammals 30 minutes before, during, and 30 minutes after all impact pile driving activities and call for shut down if any marine mammal is observed within or approaching the exclusion zone. These PSOs would be positioned on two vessels, one anchored upstream and one anchored downstream at 152 m (500 ft) on the edge of the exclusion zone. One observer on each vessel would survey

inwards toward the pile driving site and the second observer would conduct behavioral monitoring outwards to a distance of 1 nm during all impact pile driving. In addition, PSOs would be stationed at the Level B harassment isopleth 4,600 m (2.5 mi) during at least three events of vibratory pile driving to conduct behavioral monitoring. Additional PSOs would be stationed at the Level B harassment isopleth (preliminarily set at 4,600 m [2.5 mi]) on at least three days of vibratory pile driving to validate take estimates and evaluate the behavioral impacts pile driving has on marine mammals out to the Level B harassment isopleth.

Protected species observers would be provided with the equipment necessary to effectively monitor for marine mammals (for example, high-quality binoculars, compass, and range-finder as well as a digital SLR camera with telephoto lens and video capability) in order to determine if animals have entered into the exclusion zone or Level B harassment isopleth and to record species, behaviors, and responses to pile driving. If hydroacoustic monitoring indicates that threshold isopleths are greater than originally calculated, ORPC would contact NMFS within 48 hours and make the necessary adjustments. Likewise, if threshold isopleths are actually less than originally calculated, downward adjustments may be made to the exclusion zone. Protected species observers would be required to submit a report to NMFS within 90 days of completion of pile driving. The report would include data from marine mammal sightings (such as date, time, location, species, group size, and behavior), any observed reactions to construction, distance to operating pile hammer, and construction activities occurring at time of sighting and environmental data for the period (wind speed and direction, Beaufort sea state, cloud cover, and visibility).

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as an injury (Level A harassment),

serious injury, or mortality, ORPC would immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Michael.Payne@noaa.gov and Michelle.Magliocca@noaa.gov and the Northeast Regional Stranding Coordinator (Mendy.Garron@noaa.gov). The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hrs preceding the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hrs preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with ORPC to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. ORPC may not resume their activities until notified by NMFS via letter, email, or telephone.

In the event that ORPC discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e.,

in less than a moderate state of decomposition as described in the next paragraph), ORPC would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401, and/or by email to Michael.Payne@noaa.gov and Michelle.Magliocca@noaa.gov and the Northeast Regional Stranding Coordinator at 978-281-9300 (Mendy.Garron@noaa.gov). The report must include the same information identified in the paragraph above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS would work with ORPC to determine whether modifications in the activities are appropriate.

In the event that ORPC discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), ORPC would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401, and/or by email to Michael.Payne@noaa.gov and Michelle.Magliocca@noaa.gov and the NMFS Northeast Stranding Hotline (866-755-6622) and/or by email to the Northeast Regional Stranding Coordinator (Mendy.Garron@noaa.gov), within 24 hrs of the discovery. ORPC would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. Activities may continue while NMFS reviews the circumstances of the incident.

Estimated Take by Incidental Harassment

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as:

any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

Current NMFS practice regarding exposure of marine mammals to anthropogenic noise is that in order to avoid the potential for injury (PTS), cetaceans and pinnipeds should not be exposed to impulsive sounds of 180 and 190 dB or above, respectively. This level is considered precautionary as it is likely that more intense sounds would be required before injury would actually occur (Southall et al., 2007). Potential for behavioral Level B harassment is considered to have occurred when marine mammals are exposed to sounds at or above 160 dB for impulse sounds (such as impact pile driving) and 120 dB for non-pulse noise (such as vibratory pile driving). These levels are also considered precautionary.

Distances to NMFS' harassment thresholds were calculated based on the expected sound levels at each source and the expected attenuation rate of sound (Table 3). The 152-m (500-ft) distance to the exclusion zone provides protected species observers plenty of time and adequate visibility to prevent marine mammals from entering the area during impact pile driving. This would prevent marine mammals from being exposed to sound levels that reach the Level A harassment threshold.

The estimated number of marine mammals potentially taken is based on ORPC's marine mammal monitoring observations between 2007 and 2010. NMFS is unaware of any other species-specific data for Cobscook Bay. Based on marine mammal sightings during that period, and the estimated number of pile driving days, ORPC requested authorization for the incidental

take of four harbor and grey seals and two harbor porpoises. Based on further consultation with NMFS and further evaluation of ORPC's monitoring records between 2007 and 2010, NMFS is proposing to authorize the take of 72 total seals (because they cannot always be identified to the species-level), 72 harbor porpoises, and 12 Atlantic white-sided dolphins. The increase in proposed take is based on the maximum group size of animals observed during ORPC's marine mammal observations (i.e., six seals, five to six harbor porpoises, and one Atlantic white-sided dolphin) multiplied by the maximum expected number of pile driving days (i.e., 12). NMFS recognizes that ORPC's 2007-2010 marine mammal observations may not have accounted for every animal in the area; however, NMFS believes that the above take estimates are extremely conservative considering the short duration of proposed pile driving and indicate the maximum number of animals expected to occur within the largest Level B harassment isopleth 4,600 m (2.5 mi).

Negligible Impact and Small Numbers Analysis and Determination

NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival." In making a negligible impact determination, NMFS considers a number of factors which include, but are not limited to, the number of anticipated injuries or mortalities (none of which would be authorized here), number, nature, intensity, and duration of Level B harassment, and the context in which takes occur.

As described above, marine mammals would not be exposed to activities or sound levels which would result in injury (PTS), serious injury, or mortality. Pile driving would occur in relatively shallow coastal waters of Cobscook Bay. The proposed project area is not considered

significant habitat for marine mammals. The closest regular pinniped haul out is more than six NM away, which is well outside the project area's largest harassment zone. Pinnipeds may occasionally haul out in areas closer to the proposed project, but not with any regularity. Marine mammals approaching the action area would likely be traveling or opportunistically foraging. The amount of take NMFS proposes to authorize, is considered small (less than one percent) relative to the estimated populations of 91,000 harbor seals, 250,000 gray seals, 89,054 harbor porpoises, and 63,000 Atlantic white-sided dolphins. Marine mammals may be temporarily adversely impacted by pile driving noise. However, some marine mammals are expected to avoid the area when pile driving is occurring, thereby reducing exposure and impacts, and mitigation will further ensure that injury is unlikely to occur (although it would not be expected even in the absence of mitigation given the source levels, density of animals in the area, and short duration of the activities). Pile driving activities are expected to occur for about 7-12 days total (up to 180 minutes per day). There is no anticipated effect on annual rates of recruitment or survival of affected marine mammals. Based on the application and subsequent analysis, the impact of the described pile driving operations may result in, at most, short-term modification of behavior by small numbers of marine mammals within the action area. Marine mammals may avoid the area or temporarily alter their behavior at time of exposure.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the mitigation and monitoring measures, NMFS preliminarily determines that ORPC's proposed pile driving activities will result in the incidental take of small numbers of marine mammals, by Level B harassment only, and that the total taking will have a negligible impact on the affected species or stocks.

Impact on Availability of Affected Species for Taking for Subsistence Uses

There are no relevant subsistence uses of marine mammals implicated by this action.

Endangered Species Act (ESA)

No marine mammal species listed under the ESA are anticipated to occur within the action area. Therefore, no effects to listed species are expected and section 7 consultation under the ESA is not required.

National Environmental Policy Act (NEPA)

In compliance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.), as implemented by the regulations published by the Council on Environmental Quality (40 CFR parts 1500-1508), and NOAA Administrative Order 216-6, NMFS is preparing an Environmental Assessment (EA) to consider the environmental impacts of issuance of a one-year IHA. Upon completion, this EA will be available on the NMFS website listed in the beginning of this document (see ADDRESSES).

Dated: January 13, 2012

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James H. Lecky,
Director,
Office of Protected Resources,
National Marine Fisheries Service.

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