preliminary review, NMFS intends to issue an EFP. Possible conditions the agency may impose on this permit, if it is granted, include but are not limited to, a prohibition of collection of specimens within marine protected areas, marine sanctuaries, special management zones, or artificial reefs without additional authorization. Additionally, NMFS prohibits the possession of Nassau grouper, goliath grouper, red snapper, speckled hind or warsaw grouper, and requires any sea turtles taken incidentally during the course of fishing or scientific research activities to be handled with due care to prevent injury to live specimens, observed for activity, and returned to the water.

A final decision on issuance of the EFP will depend on NMFS' review of public comments received on the application, consultations with the affected states, the Council, and the U.S. Coast Guard, as well as a determination that the EFP is consistent with all applicable laws.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: April 25, 2012.

Emily H. Menashes,

Acting Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. 2012–10372 Filed 4–27–12; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XB150

International Whaling Commission; 64th Annual Meeting; Announcement of Public Meetings

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

ACTION: Notice of public meeting.

SUMMARY: This notice announces the date, time, and location of the public meeting being held prior to the 64th annual International Whaling Commission (IWC) meeting.

DATES: The public meeting will be held June 5, 2012, at 2 p.m.

ADDRESSES: The meeting will be held in the NOAA Science Center Room, 1301 East-West Highway, Silver Spring, MD 20910.

FOR FURTHER INFORMATION CONTACT: Melissa Andersen, 301–427–8385.

SUPPLEMENTARY INFORMATION: The Secretary of Commerce is responsible for discharging the domestic obligations of the United States under the International Convention for the Regulation of Whaling, 1946. The U.S. IWC Commissioner has responsibility for the preparation and negotiation of U.S. positions on international issues concerning whaling and for all matters involving the IWC. The U.S. IWC Commissioner is staffed by the Department of Commerce and assisted by the Department of State, the Department of the Interior, the Marine Mammal Commission, and other U.S. Government agencies.

A draft agenda for the annual IWC meeting should be posted on the IWC Secretariat's Web site at *http://www.iwcoffice.org* by late May.

NOAA will a hold public meeting to discuss the tentative U.S. positions for the upcoming IWC meeting. Because the meeting will address U.S. positions, the substance of the meeting must be kept confidential. Any U.S. citizen with an identifiable interest in U.S. whale conservation policy may participate, but NOAA reserves the authority to inquire about the interests of any person who appears at the meeting and to determine the appropriateness of that person's participation. In particular, persons who represent foreign interests may not attend. These stringent measures are necessary to protect the confidentiality of U.S. negotiating positions.

The June 5, 2012, meeting will be held in the NOAA Science Center Room, 1301 East-West Highway, Silver Spring, MD 20910. Photo identification is required to enter the building.

Special Accommodations

The meeting is physically accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to Melissa Andersen, *Melissa.Andersen@noaa.gov* or 301–427–8385, by May 23, 2012.

Dated: April 24, 2012.

Rebecca J. Lent,

Director, Office of International Affairs, National Marine Fisheries Service.

[FR Doc. 2012–10374 Filed 4–27–12; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XB146

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to a Pile Replacement 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 the U.S. Navy (Navy) for an Incidental Harassment Authorization (IHA) to take marine mammals, by harassment, incidental to construction activities as part of a pile replacement project. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an IHA to the Navy to take, by Level B Harassment only, six species of marine mammals during the specified activity.

DATES: Comments and information must be received no later than May 30, 2012.

ADDRESSES: Comments on the application should be addressed to Tammy C. Adams, Acting Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910–3225. The mailbox address for providing email comments is *ITP.Laws@noaa.gov.* NMFS is not responsible for email comments sent to addresses other than the one provided here. Comments sent via email, 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 (e.g., name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information.

An electronic 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: Ben Laws, 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 U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified 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 U.S. can apply for an authorization to incidentally take small numbers of marine mammals by harassment. Section 101(a)(5)(D) establishes 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

NMFS received an application on March 8, 2012 from the Navy for the taking of marine mammals incidental to pile removal and removal in association with a pile replacement project in the Hood Canal at Naval Base Kitsap at Bangor, WA (NBKB). This pile replacement project is proposed to occur between July 16, 2012 and July 15, 2013. This IHA would cover the second and final year of this project; NMFS previously issued an IHA for the first year of work associated with this project (76 FR 30130; May 24, 2011). In-water work, including all pile removal activities, would occur only within an approved window from July 16–February 15. Seven species of marine mammals are known from the waters surrounding NBKB: Steller sea lions (*Eumetopias jubatus*), California sea lions (*Zalophus californianus*), harbor seals (*Phoca vitulina*), killer whales (*Orcinus orca;* transient type only), Dall's porpoises (*Phocoenoides dalli*), harbor porpoises (*Phocoena phocoena*), and the humpback whale (*Megaptera novaeangliae*). These species may occur year-round in the Hood Canal, with the exception of the Steller sea lion, which is present only from fall to late spring (October to mid-April), and the California sea lion, which is not present during part of summer (late June through July). Additionally, while the Southern resident killer whale (listed as endangered under the Endangered Species Act [ESA]) is resident to the inland waters of Washington and British Columbia, it has not been observed in the Hood Canal in over 15 years and was therefore excluded from further analysis.

NBKB provides berthing and support services for OHIO Class ballistic missile submarines (SSBN), also known as TRIDENT submarines. The Navy proposes to complete necessary repairs and maintenance at the Explosive Handling Wharf #1 (EHW–1) facility at NBKB as part of a pile replacement project to restore and maintain the structural integrity of the wharf and ensure its continued functionality to support necessary operational requirements. The EHW–1 facility, constructed in 1977, has become compromised due to the deterioration of the wharf's existing piling sub-structure. Under the proposed action, ninety-six 24-in (0.6-m) diameter concrete piles, twenty-one 12-in (0.3-m) diameter steel fender piles, eight 16-in (0.4-m) diameter steel falsework piles, and one 24-in diameter steel fender pile will be removed. The proposed action represents the remainder of work planned for the initial 2-year rehabilitation plan, following the work that was completed in 2011. The Navy may continue rehabilitation work at EHW–1 in the long-term, but has no immediate plans to do so. All concrete piles would be removed via pneumatic chipping or similar method. All steel piles would be removed via vibratory hammer or direct pull; however, the analysis in this document assumes that all piles would be removed via vibratory hammer. No pile installation—and therefore no impact pile removal—is proposed for this action.

For pile removal activities, the Navy used NMFS-promulgated thresholds for assessing impacts (NMFS, 2005b, 2009), outlined later in this document. The Navy used recommended spreading loss formulas (the practical spreading loss equation for underwater sounds and the spherical spreading loss equation for airborne sounds) and empirically-measured source levels from 18- to 30-in (0.5- to 0.8-m) diameter steel pile removal events, or concrete pile removal events using similar methodology, to estimate potential marine mammal exposures. Predicted exposures are outlined later in this document. The calculations predict that no Level A harassments would occur associated with pile removal activities, and that as many as 1,416 Level B harassments may occur during the pile replacement project from generation of underwater sound. No incidents of harassment were predicted from airborne sounds associated with pile removal.

Description of the Specified Activity

NBKB is located on the Hood Canal approximately 20 miles (32 km) west of Seattle, Washington (see Figures 2–1 through 2–3 in the Navy's application). NBKB provides berthing and support services for OHIO Class ballistic missile submarines (SSBN), also known as TRIDENT submarines. The Navy proposes a pile replacement project to maintain the structural integrity of EHW–1 and ensure its continued functionality to support operational requirements of the TRIDENT submarine program. The proposed actions with the potential to cause harassment of marine mammals within the waterways adjacent to NBKB, under the MMPA, are vibratory and pneumatic chipping pile removal operations associated with the pile replacement project. The proposed activities that would be authorized by this IHA would occur between July 16, 2012 and February 15, 2013. All in-water construction activities within the Hood

Canal are only permitted during July 16–February 15 in order to protect spawning fish populations.

As part of the Navy's sea-based strategic deterrence mission, the Navy Strategic Systems Programs directs research, development, manufacturing, test, evaluation, and operational support for the TRIDENT Fleet Ballistic Missile program. Maintenance and development of necessary facilities for handling of explosive materials is part of these duties. The proposed action includes the removal of 126 steel and concrete piles at EHW–1. Please see Figures 1–1 through 1–3 of the Navy's application for conceptual and schematic representations of the work proposed for EHW–1. Of the piles requiring removal, 96 are 24-in (0.6-m) diameter hollow pre-cast concrete piles which will be excised down to the mud line. One additional 24-in steel fender pile, twenty-one 12-in (0.3-m) steel fender piles, and eight 16-in (0.4-m) steel falsework piles will be extracted using a vibratory hammer or direct pull. Also included in the repair work is removal of the fragmentation barrier and walkway, construction of new cast-in-place pile caps (concrete formwork may be located below Mean Higher High Water [MHHW]), installation of the pre-stressed superstructure, installation of four sled-mounted cathodic protection (CP) systems, and installation or re-installation of related appurtenances.

During the first year of work, conducted under an IHA issued by NMFS (76 FR 30130; May 24, 2011), the Navy completed the following work:

• Removal of ten steel fender piles (eight 12-in diameter piles and two 24-in diameter piles) and associated fender system components. A fender pile, typically set beside slips or wharves, guides approaching vessels and is driven so as to yield slightly when struck in order to lessen the shock of contact. The fender system components attach the fender piles to the structure, and are above the water line.

• Installation of twenty-eight 30-in diameter steel piles and eight 16-in diameter steel falsework piles. These eight falsework piles would be removed in 2012.

In addition, the Navy plans to complete construction of six cast-in-place concrete pile caps in early 2012. Pile caps are situated on the tops of the steel piles located directly beneath the structure, and function as a load transfer mechanism between the superstructure and the piles. This work is above-water, and does not have the potential to impact marine mammals.

During the 2012–13 in-water work season, the Navy proposes to complete the 2-year rehabilitation project, including the following work:

• Removal of 126 steel and concrete piles, as described previously.

• Removal of the concrete fragmentation barrier and walkway, used to get from the Wharf Apron to the Outboard Support. These structures will likely be removed by cutting the concrete into sections (potentially three or four in total) using a saw, or other equipment, and removed using a crane. The crane will lift the sections from the existing piles and place them on a barge.

• Installation of a pre-stressed concrete superstructure. The superstructure is the concrete deck of the wharf found above, or supported by, the caps or sills, including the deck, girders, and stringers.

• Installation of three sled-mounted passive CP systems. The passive CP system is a metallic rod or anode that is attached to a metal object to protect it from corrosion. The anode is composed of a more active metal than that on which it is mounted and is more easily oxidized, thus corroding first and acting as a barrier against corrosion for the object to which it is attached. This system would be banded to the steel piles to prevent metallic surfaces of the wharf from corroding due to the saline conditions in Hood Canal.

• Installation or re-installation of related appurtenances, the associated parts of the superstructure that connect the superstructure to the piles. These pieces include components such as bolts, welded metal hangers and fittings, brackets, etc.

Concrete piles would be removed with a pneumatic chipping hammer or another tool capable of cutting through concrete. A pneumatic chipping hammer is similar to a jackhammer or other similar electric power tool, but uses compressed air instead of electricity, and consists of a steel piston that is reciprocated in a steel barrel. On its forward stroke the piston strikes the end of the chisel, reciprocating at a rate such that the chisel edge vibrates against the concrete with enough force to fragment or splinter the pile. When possible, piles will be first scored by a diver using a smaller pneumatic hammer, with the pile then moved slightly back and forth to break at the score. Remaining parts of the pile will be chipped away with the larger pneumatic hammer. If the scoring/breaking technique is not feasible, the entire base of the pile will be chipped away with a pneumatic hammer such that the pile may be removed. Concrete debris will be captured as practicable using debris curtains/sheeting and removed from the project area.

The installation of the concrete pile caps, the concrete superstructure, and sled-mounted passive CP systems will occur out of the water and on the tops of the piles or attached to the wharf's superstructure. The removal of the fragmentation barrier and walkway will occur above the water with best management practices in place to prevent material from entering the water. While sound transmission from these activities could occur and enter the water, this is expected to be minimal, and above-water work is not considered to have the potential to impact marine mammals. However, these activities will occur during the in-water work window of July 16 to February 15 to minimize the potential for impacts to other listed species, particularly fish. The Navy will conduct acoustic monitoring for pneumatic chipping only—acoustic monitoring was conducted in 2011 for vibratory pile installation at NBKB—and will monitor the presence and behavior of marine mammals during vibratory pile removal and pneumatic chipping activities.

The Navy estimates that steel pile removal will occur at an average rate of two piles per day, and is expected to require no more than 1 hour per pile. It is estimated that concrete pile removal will occur at a rate of three piles per day, and is expected to take approximately 2 hours per pile. This results in an estimated maximum of 2 hours per day of steel pile removal, and potentially 6 hours per day of pneumatic chipping. These two activities would likely not occur on the same day, however. On the basis of these estimates, the Navy states that steel pile removal would require 15 days and concrete pile removal would require an additional 32 days. The analysis contained herein is thus based upon these numbers, and assumes that (1) all marine mammals available to be incidentally taken within the relevant area would be; and (2) individual marine mammals may only be incidentally taken once in a 24-hour period—for purposes of authorizing specified numbers of take—regardless of actual number of exposures in that period.

The number of construction barges (derrick and material) on site at any one time would vary depending on the type of construction taking place. Tug boats would tow barges to and from the construction site and position the barges for construction activity. Tug boats would leave the site once these tasks were completed and so would not be on site for extended periods. Smaller skiff-type boats would be on site performing various functions in support of construction and monitoring requirements.

Description of Sound Sources

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in Hz or cycles per second. Wavelength is the distance between two peaks of a sound wave; lower frequency sounds have longer wavelengths than higher frequency sounds and attenuate more rapidly in shallower water. Amplitude is the height of the sound pressure wave or the 'loudness' of a sound and is typically measured using the decibel (dB) scale. A dB is the ratio between a measured pressure (with sound) and a reference pressure (sound at a constant pressure, established by scientific standards). It is a logarithmic unit that accounts for large variations in amplitude; therefore, relatively small changes in dB ratings correspond to large changes in sound pressure. When referring to SPLs (SPLs; the sound force per unit area), sound is referenced in the context of underwater sound pressure to 1 microPascal (μPa). One pascal is the pressure resulting from a force of one newton exerted over an area of one square meter. The source level represents the sound level at a distance of 1 m from the source (referenced to 1 μPa). The received level is the sound level at the listener's position.

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 than by peak pressures.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in all directions away from the source (similar to ripples on the surface of a pond), except in cases where the source is directional. The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones. Underwater sound levels ('ambient sound') are comprised of multiple sources, including physical (e.g., waves, earthquakes, ice, atmospheric sound), biological (e.g., sounds produced by marine mammals, fish, and invertebrates), and anthropogenic sound (e.g., vessels, dredging, aircraft, construction). Even in the absence of anthropogenic sound, the sea is typically a loud environment. A number of sources of sound are likely to occur within Hood Canal, including the following (Richardson *et al.,* 1995):

- *Wind and waves:* The complex interactions between wind and water surface, including processes such as breaking waves and wave-induced bubble oscillations and cavitation, are a main source of naturally occurring ambient noise for frequencies between 200 Hz and 50 kHz (Mitson, 1995). In general, ambient noise levels tend to increase with increasing wind speed and wave height. Surf noise becomes important near shore, with measurements collected at a distance of 8.5 km (5.3 mi) from shore showing an increase of 10 dB in the 100 to 700 Hz band during heavy surf conditions.
- *Precipitation noise:* Noise from rain and hail impacting the water surface can become an important component of total noise at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times.
- *Biological noise:* Marine mammals can contribute significantly to ambient noise levels, as can some fish and shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz.
- *Anthropogenic noise:* Sources of ambient noise related to human activity include transportation (surface vessels and aircraft), dredging and construction, oil and gas drilling and production, seismic surveys, sonar, explosions, and ocean acoustic studies (Richardson *et al.,* 1995). Shipping noise typically dominates the total ambient noise for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they will attenuate (decrease) rapidly (Richardson *et al.,* 1995).

In-water construction activities associated with the project would include vibratory pile removal and pneumatic chipping of concrete piles. The sounds produced by these activities are considered non-pulsed (defined in next paragraph) as opposed to pulsed sounds. The distinction between these two general sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (e.g., Ward, 1997 in Southall *et al.,* 2007). Please see Southall *et al.,* (2007) for an in-depth discussion of these concepts.

Pulsed sounds (e.g., explosions, gunshots, sonic booms, and impact pile removal) are brief, broadband, atonal transients (ANSI, 1986; Harris, 1998) and occur either as isolated events or repeated in some succession. Pulsed sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a decay period that may include a period of diminishing, oscillating maximal and minimal pressures. Pulsed sounds generally have an increased capacity to induce physical injury as compared with sounds that lack these features.

Non-pulse (intermittent or continuous sounds) can be tonal, broadband, or both. Some of these non-pulse sounds can be transient signals of short duration but without the essential properties of pulses (e.g., rapid rise time). Examples of non-pulse sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile removal, and active sonar systems. The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

Vibratory hammers install or remove piles by vibrating them—thus causing liquefaction of the surrounding substrate—which then allows the piles to be more easily pushed or pulled. Vibratory hammers produce significantly less sound than impact hammers. Peak SPLs during vibratory installation may be 180 dB or greater, but are generally 10 to 20 dB lower than SPLs generated during impact pile removal of the same-sized pile (Caltrans, 2009). Rise time is slower, reducing the probability and severity of injury (USFWS, 2009), and sound energy is distributed over a greater amount of time (Nedwell and Edwards, 2002; Carlson *et al.,* 2001).

Ambient Sound

The underwater acoustic environment consists of ambient sound, defined as environmental background sound levels lacking a single source or point (Richardson *et al.,* 1995). The ambient underwater sound level of a region is defined by the total acoustical energy being generated by known and unknown sources, including sounds from both natural and anthropogenic sources. The sum of the various natural and anthropogenic sound sources at any given location and time depends not only on the source levels (as determined by current weather conditions and levels of biological and shipping activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, the ambient sound levels at a given frequency and location can vary by 10–20 dB from day to day (Richardson *et al.,* 1995).

In the vicinity of the project area, the average broadband ambient underwater sound levels were measured at 114 dB re 1μPa between 100 Hz and 20 kHz (Slater, 2009). Peak spectral sound from industrial activity was noted below the 300 Hz frequency, with maximum levels of 110 dB re 1μPa noted in the 125 Hz band. In the 300 Hz to 5 kHz range, average levels ranged between 83–99 dB re 1μPa. Wind-driven wave sound dominated the background sound environment at approximately 5 kHz and above, and ambient sound levels flattened above 10 kHz.

Airborne sound levels at NBKB vary based on location but are estimated to average around 65 dBA (A-weighted decibels) in the residential and office park areas, with traffic sound ranging from 60–80 dBA during daytime hours (Cavanaugh and Tocci, 1998). The highest levels of airborne sound are produced along the waterfront and at the ordnance handling areas, where estimated sound levels range from 70–90 dBA and may peak at 99 dBA for short durations. These higher sound levels are produced by a combination of sound sources including heavy trucks, forklifts, cranes, marine vessels, mechanized tools and equipment, and other sound-generating industrial or military activities.

Sound Thresholds

Since 1997, NMFS has used generic sound exposure thresholds to determine when an activity in the ocean that produces sound might result in impacts to a marine mammal such that a take by harassment might occur (NMFS, 2005b). To date, no studies have been conducted that examine impacts to marine mammals from pile removal sounds from which empirical sound thresholds have been established. Current NMFS practice regarding exposure of marine mammals to sound is that cetaceans and pinnipeds exposed to sound levels of 180 and 190 dB rms or above, respectively, are considered to have been taken by Level A (i.e., injurious) harassment. Behavioral harassment (Level B) is considered to have occurred when marine mammals are exposed to sounds at or above 120 dB rms for continuous sound (such as would be produced by the proposed activities), but below injurious thresholds. For airborne sound, pinniped disturbance from haul-outs has been documented at 100 dB (unweighted) for pinnipeds in general, and at 90 dB (unweighted) for harbor seals. NMFS uses these levels as guidelines to estimate when harassment may occur.

Distance to Sound Thresholds

Underwater Sound Propagation Formula—Pile removal would generate underwater noise that potentially could result in disturbance to marine mammals in the project area. Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. A practical sound propagation modeling technique was used by the Navy to estimate the range from the activity to various SPL thresholds in water. This model follows a geometric propagation loss based on the distance from the pile, resulting in a 4.5 dB reduction in level for each doubling of distance from the source. In this model, the SPL at some distance away from the source (e.g., driven pile) is governed by a measured source level, minus the transmission loss of the energy as it dissipates with distance. The formula for underwater TL is:

$TL = 15 * \log_{10}(R_1/R_2)$, where

R_1 = the distance of the modeled SPL from the pile, and

R_2 = the distance from the pile of the initial measurement.

The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, most notably the water bathymetry and presence or absence of reflective or absorptive conditions including in-water structures and sediments. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6 dB reduction in sound level for each doubling of distance from the source (20*log[range]). Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source (10*log[range]). The propagation environment along the NBKB waterfront conforms to neither spherical nor cylindrical spreading; as the receiver moves away from the shoreline, the water increases in depth, resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions. Since there is no available data regarding propagation loss along the NBKB waterfront, a practical spreading loss model was adopted as the most likely approximation of the sound propagation environment. Hydroacoustic monitoring results from the Navy's Test Pile Project (see 76 FR 38361; July 30, 2011) and from the first year of EHW–1 construction will be used, when available, to confirm the validity of the practical spreading model for estimating acoustic propagation in the project area.

Underwater Sound from Pile Removal—The intensity of pile removal sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment in which the activity takes place. Despite a large quantity of literature regarding SPLs recorded from pile removal projects, there is a general lack of empirical data regarding vibratory pile removal and the acoustic output of chipping hammers. In order to determine reasonable SPLs and their associated affects on marine mammals that are likely to result from pile removal at NBKB, studies with similar properties to the proposed action were evaluated. Overall, studies which met the following parameters were considered: (1) *Pile size and materials:* Steel pipe pile removal (12- to 24-in diameter) and concrete pile removal with chipping hammer or similar method (because these tools are used to chip portions of concrete from the pile, sound output is not tied to pile size); (2) *Hammer machinery:* Vibratory hammer for steel piles and pneumatic chipping hammer or similar tool for concrete piles; and (3) *Physical environment:* Shallow depth (less than 100 ft [30 m]). Table 1 details representative SPLs that have been recorded from similar construction activities in recent years. Due to the similarity of these actions and the Navy's proposed action, these values represent reasonable SPLs which could be anticipated, and which were used in the acoustic modeling and analysis.

TABLE 1—REPRESENTATIVE UNDERWATER SPLs FOR PILE REMOVAL

Project and location	Pile size and type	Removal method	Water depth	Measured SPLs
California (location not specified).	24-in steel pipe pile	Vibratory hammer	~15 m (49 ft)	165 dB re: 1 µPa (rms) at 10 m (33 ft)
United Kingdom (location not specified).	Concrete (size not specified).	Jackhammer	Unknown	161 dB re: 1 µPa (rms) at 1 m (3.3 ft)

Sources: Caltrans, 2007; Nedwell and Howell, 2004.

Based on these representative SPLs, the source levels used in this analysis are 180 dB re: 1 µPa (rms) for vibratory removal and 161 dB re: 1 µPa (rms) for pneumatic chipping, which is considered analogous to the jackhammer. Therefore, vibratory removal would produce SPLs that are below the injury threshold for pinnipeds, while SPLs resulting from pneumatic chipping are well below levels that may cause injury to any marine mammal. All calculated distances to and the total area encompassed by the marine mammal underwater sound thresholds are provided in Table 2.

TABLE 2—CALCULATED DISTANCE(S) TO AND AREA ENCOMPASSED BY UNDERWATER MARINE MAMMAL SOUND THRESHOLDS

Threshold	Distance	Area, km² (mi²)
Vibratory removal, cetacean injury (180 dB)	1 m (3.3 ft)	0.000003 (0.000001)
Vibratory removal, disturbance (120 dB)	10,000 m (32,808 ft)	314 (121)
Pneumatic chipping, disturbance (120 dB)	542 m (1,778 ft)	0.9 (0.4)

The values presented in Tables 2 assume a field free of obstruction, which is unrealistic, because Hood Canal does not represent open water conditions (free field). Therefore, sounds would attenuate as they encounter land masses or bends in the canal. As a result, some of the distances and areas of impact calculated cannot actually be attained at the project area. The actual distances to the behavioral disturbance thresholds for vibratory pile removal and pneumatic chipping may be shorter than those calculated due to the irregular contour of the waterfront, the narrowness of the canal, and the maximum fetch (furthest distance sound waves travel without obstruction [i.e., line of sight]) at the project area. The actual areas encompassed by sound exceeding or reaching the 120 dB threshold are 35.9 km² and 0.6 km² for vibratory removal and pneumatic chipping, respectively. See Figures 6–1 and 6–2 of the Navy's application for a depiction of the size of areas in which each underwater sound threshold is predicted to occur at the project area due to pile removal.

Airborne Sound Propagation Formula—Pile removal can generate airborne sound that could potentially result in disturbance to marine mammals (specifically, pinnipeds) which are hauled out or at the water's surface. As a result, the Navy analyzed the potential for pinnipeds hauled out or swimming at the surface near NBKB to be exposed to airborne SPLs that could result in Level B behavioral harassment. The appropriate airborne sound threshold for behavioral disturbance for all pinnipeds, except harbor seals, is 100 dB re: 20 µPa rms (unweighted). For harbor seals, the threshold is 90 dB re: 20 µPa rms (unweighted). A spherical spreading loss model, assuming average atmospheric conditions, was used to estimate the distance to the airborne thresholds. The formula for calculating spherical spreading loss is:

$TL = 20\log(R_1/R_2)$

TL = Transmission loss

R_1 = the distance of the modeled SPL from the pile, and

R_2 = the distance from the pile of the initial measurement.

Airborne Sound from Pile Installation—As was discussed for underwater sound from pile removal, the intensity of pile removal sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment in which the activity takes place. In order to determine reasonable airborne SPLs and their associated effects on marine mammals that are likely to result from pile removal at NBKB, studies with similar properties to the proposed action, as described previously, were evaluated. Table 3 details representative pile removal activities that have occurred in recent years. Due to the similarity of these actions and the Navy's proposed action, they represent reasonable SPLs which could be anticipated. Given these data, representative source levels are approximately 116.5 dB re: 20 µPa rms (unweighted) for vibratory removal and 112 dB re: 20 µPa rms (unweighted) for chipping.

TABLE 3—REPRESENTATIVE AIRBORNE SPLs

Project and location	Pile size and type	Method	Water depth	Measured SPLs
Wahkiakum Ferry Terminal, WA.	18-in (0.5 m) steel pipe pile.	Vibratory	~ 3–4 m (10–12 ft)	87.5 dB re: 20 µPa (rms) at 50 ft (15.2 m)
Keystone Ferry Terminal, WA.	30-in (0.8 m) steel pipe pile.	Vibratory	~ 9 m (30 ft)	98 dB re: 20 µPa (rms) at 36 ft (10.9 m)

TABLE 3—REPRESENTATIVE AIRBORNE SPLs—Continued

Project and location	Pile size and type	Method	Water depth	Measured SPLs
Not specified	Concrete, size not specified.	Chipping hammer	Unknown	92 dB re: 20 μPa (rms) at 10 m (33 ft)

Sources: WSDOT, 2010; Cheremisinoff, 1996.

The distances to the airborne thresholds were calculated with the airborne transmission loss formula presented previously. All calculated distances to and the total area encompassed by the marine mammal underwater sound thresholds are provided in Table 4.

TABLE 4—CALCULATED DISTANCE(S) TO AND AREA ENCOMPASSED BY AIRBORNE MARINE MAMMAL SOUND THRESHOLDS

Threshold	Distance	Area, km² (mi²)
Vibratory removal, pinniped disturbance (100 dB)	7 m (23 ft)	0.0002 (0.0001)
Vibratory removal, harbor seal disturbance (90 dB)	20 m (66 ft)	0.001 (0.0005)
Pneumatic chipping, pinniped disturbance (100 dB)	4 m (13 ft)	0.00005 (0.00002)
Pneumatic chipping, harbor seal disturbance (90 dB)	13 m (43 ft)	0.0005 (0.0002)

All airborne distances are less than those calculated for underwater sound thresholds for disturbance. Protective measures would be in place out to the distances calculated for the underwater thresholds, and the distances for the airborne thresholds would be covered fully by mitigation and monitoring measures in place for underwater sound thresholds. Construction sound associated with the project would not extend beyond the disturbance zone for underwater sound that would be established to protect pinnipeds. No haul-outs or rookeries are located within the airborne harassment radii. See Figures 6–3 through 6–6 of the Navy's application for a depiction of the size of areas in which each airborne sound threshold is predicted to occur at the project area due to pile removal.

Description of Marine Mammals in the Area of the Specified Activity

There are seven marine mammal species, four cetaceans and three pinnipeds, which may inhabit or transit through the waters nearby NBKB in the Hood Canal. These include the transient killer whale, harbor porpoise, Dall's porpoise, Steller sea lion, California sea lion, harbor seal, and humpback whale. While the Southern Resident killer whale is resident to the inland waters of Washington and British Columbia, it has not been observed in the Hood Canal in over 15 years, and therefore was excluded from further analysis. The Steller sea lion and humpback whale are the only marine mammals that may occur within the Hood Canal that are listed under the ESA; the humpback whale is listed as endangered and the eastern distinct population segment (DPS) of Steller sea lion is listed as threatened. All marine mammal species are protected under the MMPA. This section summarizes the population status and abundance of these species, followed by detailed life history information. Table 5 lists the marine mammal species that occur in the vicinity of NBKB and their estimated densities within the project area during the proposed timeframe. Daily maximum abundance data only is presented for sea lions because sightings data have no defined survey area.

TABLE 5—MARINE MAMMALS THAT MAY BE PRESENT IN THE HOOD CANAL

Species	Stock abundance [1]	Relative occurrence in Hood Canal [2]	Season of occurrence	Density during in-water work season (individuals/km²)
Steller sea lion—Eastern U.S. DPS.	58,334–72,223 [3]	Common	Fall to late spring (Oct to mid-April).	[4] 1.2
California sea lion—U.S. stock	238,000	Common	Fall to late spring (Aug to early June).	[4] 26.2
Harbor seal—WA inland waters stock.	14,612 (CV = 0.15)	Common	Year-round; resident species in Hood Canal.	[5] 1.31
Humpback whale—CA/OR/WA stock.	2,043 (CV = 0.10)	Extremely rare	Year-round in Puget Sound	[6] 0.003
Killer whale—West Coast transient stock.	354	Rare	Year-round	[7] 0.038
Dall's porpoise—CA/OR/WA stock.	42,000 (CV = 0.33)	Rare	Year-round	[7] 0.014
Harbor porpoise—WA inland waters stock.	10,682 (CV = 0.38)	Possible common to occasional presence.	Year-round	[9] 0.250

[1] NMFS marine mammal stock assessment reports at: *http://www.nmfs.noaa.gov/pr/sars/species.htm.*

[2] Common: Consistently present either year-round or during non-breeding season; Occasional: Documented at irregular intervals; Rare: Sporadic sightings not occurring on a yearly basis; Extremely rare: Generally not observed over multiple years.

[3] Range calculated on basis of total pup counts 2006–2009 and extrapolation factors derived from vital rate parameters estimated for an increasing population.

[4] Density for sea lions is not calculated due to the lack of a defined survey area for sightings data. Abundance calculated as the average of the maximum number of individuals present during shore-based surveys at NBKB waterfront during the in-water construction season.
[5] Jeffries *et al.,* 2003; Huber *et al.,* 2001.
[6] Density calculated on the basis of one individual observed in Hood Canal.
[7] Density calculated as the maximum number of individuals present at a given time during occurrences of killer whales at Hood Canal in 2003 and 2005 (London, 2006) divided by the area of Hood Canal.
[8] Density calculated from number of individuals observed in 18 vessel-based surveys of NBKB waterfront area (Tannenbaum *et al.,* 2009, 2011).
[9] Density calculated from number of individuals observed during vessel-based surveys conducted during Test Pile Program and corrected for detectability (Navy, in prep.).

Steller Sea Lion

Species Description—Steller sea lions are the largest members of the Otariid (eared seal) family. Steller sea lions show marked sexual dimorphism, in which adult males are noticeably larger and have distinct coloration patterns from females. Males average approximately 1,500 lb (680 kg) and 10 ft (3 m) in length; females average about 700 lb (318 kg) and 8 ft (2.4 m) in length. Adult females have a tawny to silver-colored pelt. Males are characterized by dark, dense fur around their necks, giving a mane-like appearance, and light tawny coloring over the rest of their body (NMFS, 2008a). Steller sea lions are distributed mainly around the coasts to the outer continental shelf along the North Pacific Ocean rim from northern Hokkaido, Japan through the Kuril Islands and Okhotsk Sea, Aleutian Islands and central Bering Sea, southern coast of Alaska and south to California. The population is divided into the Western and the Eastern Distinct Population Segments (DPSs) at 144° W (Cape Suckling, Alaska). The Western DPS includes Steller sea lions that reside in the central and western Gulf of Alaska, Aleutian Islands, as well as those that inhabit coastal waters and breed in Asia (e.g., Japan and Russia). The Eastern DPS extends from California to Alaska, including the Gulf of Alaska.

Status—Steller sea lions were listed as threatened range-wide under the ESA in 1990. After division into two DPSs, the western DPS was listed as endangered under the ESA in 1997, while the eastern DPS remained classified as threatened. Animals found in the Region of Activity are from the eastern DPS (NMFS, 1997a; Loughlin, 2002; Angliss and Outlaw, 2005). The eastern DPS breeds in rookeries located in southeast Alaska, British Columbia, Oregon, and California. While some pupping has been reported recently along the coast of Washington, there are no active rookeries in Washington. A final revised species recovery plan addresses both DPSs (NMFS, 2008a).

NMFS designated critical habitat for Steller sea lions in 1993. Critical habitat is associated with breeding and haul-out sites in Alaska, California, and Oregon, and includes so-called 'aquatic zones' that extend 3,000 ft (900 m) seaward in state and federally managed waters from the baseline or basepoint of each major rookery in Oregon and California (NMFS, 2008a). Three major rookery sites in Oregon (Rogue Reef, Pyramid Rock, and Long Brown Rock and Seal Rock on Orford Reef at Cape Blanco) and three rookery sites in California (Ano Nuevo I, Southeast Farallon I, and Sugarloaf Island and Cape Mendocino) are designated critical habitat (NMFS, 1993). There is no designated critical habitat within the Region of Activity.

Factors that have previously been identified as threats to Steller sea lions include reduced food availability, possibly resulting from competition with commercial fisheries; incidental take and intentional kills during commercial fish harvests; subsistence take; entanglement in marine debris; disease; pollution; and harassment. Steller sea lions are also sensitive to disturbance at rookeries (during pupping and breeding) and haul-out sites.

The Recovery Plan for the Steller Sea Lion (NMFS, 2008a) states that the overall abundance of Steller sea lions in the eastern DPS has increased for a sustained period of at least three decades, and that pup production has increased significantly, especially since the mid-1990s. Between 1977 and 2002, researchers estimated that overall abundance of the eastern DPS had increased at an average rate of 3.1 percent per year (NMFS, 2008a; Pitcher *et al.,* 2007). NMFS' most recent stock assessment report estimates that population for the eastern DPS is a minimum of 52,847 individuals; this estimate is not corrected for animals at sea, and actual population is estimated to be within the range 58,334 to 72,223 (Allen and Angliss, 2010). The minimum count for Steller sea lions in Oregon and Washington was 5,813 in 2002 (Pitcher *et al.,* 2007; Allen and Angliss, 2010).

The abundance of the eastern DPS of Steller sea lions is increasing throughout the northern portion of its range (southeast Alaska and British Columbia), and stable or increasing in the central portion (Oregon through central California). Surveys indicate that pup production in Oregon increased at 3 percent per year from 1990–2009, while pup production in California increased at 5 percent per year between 1996 and 2009, with the number of non-pups reported as stable. The best available information indicates that, overall, the eastern DPS has increased from an estimated 18,040 animals in 1979 to an estimated 63,488 animals in 2009; therefore the overall estimated rate of increase for this period is 4.3 percent per year (NMML, 2012).

In the far southern end of Steller sea lion range (Channel Islands in southern California), population declined significantly after the 1930s—probably due to hunting and harassment (Bartholomew and Boolootian, 1960; Bartholomew, 1967)—and several rookeries and haul-outs have been abandoned. The lack of recolonization at the southernmost portion of the range (e.g., San Miguel Island rookery), despite stability in the non-pup portion of the overall California population, is likely a response to a suite of factors, including changes in ocean conditions (e.g., warmer temperatures) that may be contributing to habitat changes that favor California sea lions over Steller sea lions (NMFS, 2007) and competition for space on land, and possibly prey, with species that have experienced explosive growth over the past three decades (California sea lions and northern elephant seals [*Mirounga angustirostris*]). Although recovery in California has lagged behind the rest of the DPS, this portion of the DPS' range has recently shown a positive growth rate (NMML, 2012). While non-pup counts in California in the 2000s are only 34 percent of pre-decline counts (1927–47), the population has increased significantly since 1990.

Despite the abandonment of certain rookeries in California, pup production at other rookeries in California has increased over the last 20 years and, overall, the eastern DPS has increased at an average annual growth rate of 4.3 percent per year for 30 years. Even though these rookeries might not be recolonized, their loss has not prevented the increasing abundance of Steller sea lions in California or in the eastern DPS overall.

Because the eastern DPS of Steller sea lion is currently listed as threatened under the ESA, it is therefore designated as depleted and classified as a strategic stock under the MMPA. However, the eastern DPS has been considered a potential candidate for removal from listing under the ESA by the Steller sea lion recovery team and NMFS (NMFS, 2008), based on observed annual rates of increase. Although the stock size has increased, the status of this stock relative to its Optimum Sustainable Population (OSP) size is unknown. The overall annual rate of increase of the eastern stock has been consistent and long-term, and may indicate that this stock is reaching OSP.

Behavior and Ecology—Steller sea lions forage near shore and in pelagic waters. They are capable of traveling long distances in a season and can dive to approximately 1,300 ft (400 m) in depth. They also use terrestrial habitat as haul-out sites for periods of rest, molting, and as rookeries for mating and pupping during the breeding season. At sea, they are often seen alone or in small groups, but may gather in large rafts at the surface near rookeries and haul-outs. Steller sea lions prefer the colder temperate to sub-arctic waters of the North Pacific Ocean. Haul-outs and rookeries usually consist of beaches (gravel, rocky or sand), ledges, and rocky reefs. In the Bering and Okhotsk Seas, sea lions may also haul-out on sea ice, but this is considered atypical behavior (NOAA, 2010a).

Steller sea lions are gregarious animals that often travel or haul out in large groups of up to 45 individuals (Keple, 2002). At sea, groups usually consist of female and subadult males; adult males are usually solitary while at sea (Loughlin, 2002). In the Pacific Northwest, breeding rookeries are located in British Columbia, Oregon, and northern California. Steller sea lions form large rookeries during late spring when adult males arrive and establish territories (Pitcher and Calkins, 1981). Large males aggressively defend territories while non-breeding males remain at peripheral sites or haul-outs. Females arrive soon after and give birth. Most births occur from mid-May through mid-July, and breeding takes place shortly thereafter. Most pups are weaned within a year. Non-breeding individuals may not return to rookeries during the breeding season but remain at other coastal haul-outs (Scordino, 2006).

Steller sea lions are opportunistic predators, feeding primarily on fish and cephalopods, and their diet varies geographically and seasonally (Bigg, 1985; Merrick *et al.,* 1997; Bredesen *et al.,* 2006; Guenette *et al.,* 2006). Foraging habitat is primarily shallow, nearshore and continental shelf waters; freshwater rivers; and also deep waters (Reeves *et al.,* 2008; Scordino, 2010). Steller sea lions occupy major winter haul-out sites on the coast of Vancouver Island in the Strait of Juan de Fuca and the Georgia Basin (Bigg, 1985; Olesiuk, 2008); the closest breeding rookery to the project area is at Carmanah Point near the western entrance to the Strait of Juan de Fuca. There are no known breeding rookeries in Washington (NMFS, 1992; Angliss and Outlaw, 2005) but Eastern stock Steller sea lions are present year-round along the outer coast of Washington at four major haul-out sites (NMFS, 2008a). Both sexes are present in Washington waters; these animals are likely immature or non-breeding adults from rookeries in other areas (NMFS, 2008a). In Washington, Steller sea lions primarily occur at haul-out sites along the outer coast from the Columbia River to Cape Flattery. In inland waters, Steller sea lions use haul-out sites along the Vancouver Island coastline of the Strait of Juan de Fuca (Jeffries *et al.,* 2000; COSEWIC, 2003; Olesiuk, 2008). Numbers vary seasonally in Washington waters with peak numbers present during the fall and winter months (Jeffries *et al.,* 2000). The highest breeding season Steller sea lion count at Washington haul-out sites was 847 individuals during the period from 1978 to 2001 (Pitcher *et al.,* 2007). Non-breeding season surveys of Washington haul-out sites reported as many as 1,458 individuals between 1980 and 2001 (NMFS, 2008a).

Steller sea lions are occasionally present at the Toliva Shoals haul-out site in south Puget Sound (Jeffries *et al.,* 2000) and a rock three miles south of Marrowstone Island (NMFS, 2010). Fifteen Steller sea lions have been observed using this haul-out site. At NBKB, Steller sea lions have been observed hauled out on submarines at Delta Pier on several occasions from 2008 through 2011 during fall through spring months (October to April) (Navy 2010). Other potential haul-out sites may include isolated islands, rocky shorelines, jetties, buoys, rafts, and floats (Jeffries *et al.,* 2000). Steller sea lions likely utilize foraging habitats in Hood Canal similar to those of the California sea lion and harbor seal, which include marine nearshore and deeper water habitats.

Acoustics—Like all pinnipeds, the Steller sea lion is amphibious; while all foraging activity takes place in the water, breeding behavior is carried out on land in coastal rookeries (Mulsow and Reichmuth 2008). On land, territorial male Steller sea lions regularly use loud, relatively low-frequency calls/roars to establish breeding territories (Schusterman *et al.,* 1970; Loughlin *et al.,* 1987). The calls of females range from 0.03 to 3 kHz, with peak frequencies from 0.15 to 1 kHz; typical duration is 1.0 to 1.5 sec (Campbell *et al.,* 2002). Pups also produce bleating sounds. Individually distinct vocalizations exchanged between mothers and pups are thought to be the main modality by which reunion occurs when mothers return to crowded rookeries following foraging at sea (Mulsow and Reichmuth, 2008).

Mulsow and Reichmuth (2008) measured the unmasked airborne hearing sensitivity of one male Steller sea lion. The range of best hearing sensitivity was between 5 and 14 kHz. Maximum sensitivity was found at 10 kHz, where the subject had a mean threshold of 7 dB. The underwater hearing threshold of a male Steller sea lion was significantly different from that of a female. The peak sensitivity range for the male was from 1 to 16 kHz, with maximum sensitivity (77 dB re: 1μPa-m) at 1 kHz. The range of best hearing for the female was from 16 to above 25 kHz, with maximum sensitivity (73 dB re: 1μPa-m) at 25 kHz. However, because of the small number of animals tested, the findings could not be attributed to either individual differences in sensitivity or sexual dimorphism (Kastelein *et al.,* 2005).

California Sea Lion

Species Description—California sea lions are members of the Otariid family (eared seals). The species, *Zalophus californianus,* includes three subspecies: *Z. c. wollebaeki* (in the Galapagos Islands), *Z. c. japonicus* (in Japan, but now thought to be extinct), and *Z. c. californianus* (found from southern Mexico to southwestern Canada; referred to here as the California sea lion) (Carretta *et al.,* 2007). The California sea lion is sexually dimorphic. Males may reach 1,000 lb (454 kg) and 8 ft (2.4 m) in length; females grow to 300 lb (136 kg) and 6 ft (1.8 m) in length. Their color ranges from chocolate brown in males to a lighter, golden brown in females. At around five years of age, males develop a bony bump on top of the skull called a sagittal crest. The crest is visible in the dog-like profile of male sea lion heads, and hair around the crest gets lighter with age.

Status—The U.S. stock of California sea lions is estimated at 238,000 and the minimum population size of this stock is 141,842 individuals (Carretta *et al.,* 2007). These numbers are from counts during the 2001 breeding season of animals that were ashore at the four major rookeries in southern California and at haul-out sites north to the Oregon/California border. Sea lions that were at-sea or hauled-out at other locations were not counted (Carretta *et al.,* 2007). The stock has likely reached its carrying capacity and, even though current total human-caused mortality is unknown (due to a lack of observer coverage in the California set gillnet fishery that historically has been the largest source of human-caused mortalities), California sea lions are not considered a strategic stock under the MMPA because total human-caused mortality is still likely to be less than the potential biological removal (PBR). An estimated 3,000 to 5,000 California sea lions migrate to waters of Washington and British Columbia during the non-breeding season from September to May (Jeffries *et al.,* 2000). Peak numbers of up to 1,000 California sea lions occur in Puget Sound (including Hood Canal) during this time period (Jeffries *et al.,* 2000).

Distribution—The geographic distribution of California sea lions includes a breeding range from Baja California, Mexico to southern California. During the summer, California sea lions breed on islands from the Gulf of California to the Channel Islands and seldom travel more than about 31 mi (50 km) from the islands (Bonnell *et al.,* 1983). The primary rookeries are located on the California Channel Islands of San Miguel, San Nicolas, Santa Barbara, and San Clemente (Le Boeuf and Bonnell, 1980; Bonnell and Dailey, 1993). Their distribution shifts to the northwest in fall and to the southeast during winter and spring, probably in response to changes in prey availability (Bonnell and Ford, 1987).

The non-breeding distribution extends from Baja California north to Alaska for males, and encompasses the waters of California and Baja California for females (Reeves *et al.,* 2008; Maniscalco *et al.,* 2004). In the non-breeding season, an estimated 3,000–5,000 adult and sub-adult males migrate northward along the coast to central and northern California, Oregon, Washington, and Vancouver Island from September to May (Jeffries *et al.,* 2000) and return south the following spring (Mate, 1975; Bonnell *et al.,* 1983). Along their migration, they are occasionally sighted hundreds of miles offshore (Jefferson *et al.,* 1993). Females and juveniles tend to stay closer to the rookeries (Bonnell *et al.,* 1983).

California sea lions are present in Hood Canal during much of the year with the exception of mid-June through August, and occur regularly in the vicinity of the project site, as observed during Navy waterfront surveys conducted at NBKB from April 2008 through June 2010 (Navy, 2010). They are known to utilize man-made structures such as piers, jetties, offshore buoys, log booms, and oil platforms (Riedman, 1990), and are often seen rafted off of river mouths (Jeffries *et al.,* 2000). Although there are no regular California sea lion haul-outs known within the Hood Canal (Jeffries *et al.,* 2000), they are frequently observed hauled out at several opportune areas at NBKB (e.g., submarines, floating security fence, barges). As many as 58 California sea lions have been observed hauled out together at NBKB (Agness and Tannenbaum, 2009a; Tannenbaum *et al.,* 2009a; Walters, 2009). California sea lions have also been observed swimming in the Hood Canal in the vicinity of the project area on several occasions and likely forage in both nearshore marine and inland marine deeper waters (DoN, 2001a).

Behavior and Ecology—California sea lions feed on a wide variety of prey, including many species of fish and squid (Everitt *et al.,* 1981; Roffe and Mate, 1984; Antonelis *et al.,* 1990; Lowry *et al.,* 1991). In the Puget Sound region, they feed primarily on fish such as Pacific hake (*Merluccius productus*), walleye pollock (*Theragra chalcogramma*), Pacific herring (*Clupea pallasii*), and spiny dogfish (*Squalus acanthias*) (Calambokidis and Baird, 1994). In some locations where salmon runs exist, California sea lions also feed on returning adult and out-migrating juvenile salmonids (London, 2006). Sexual maturity occurs at around four to five years of age for California sea lions (Heath, 2002). California sea lions are gregarious during the breeding season and social on land during other times.

Acoustics—On land, California sea lions make incessant, raucous barking sounds; these have most of their energy at less than 2 kHz (Schusterman *et al.,* 1967). Males vary both the number and rhythm of their barks depending on the social context; the barks appear to control the movements and other behavior patterns of nearby conspecifics (Schusterman, 1977). Females produce barks, squeals, belches, and growls in the frequency range of 0.25–5 kHz, while pups make bleating sounds at 0.25–6 kHz. California sea lions produce two types of underwater sounds: clicks (or short-duration sound pulses) and barks (Schusterman *et al.,* 1966, 1967; Schusterman and Baillet, 1969). All underwater sounds have most of their energy below 4 kHz (Schusterman *et al.,* 1967).

The range of maximal hearing sensitivity underwater is between 1–28 kHz (Schusterman *et al.,* 1972). Functional underwater high frequency hearing limits are between 35–40 kHz, with peak sensitivities from 15–30 kHz (Schusterman *et al.,* 1972). The California sea lion shows relatively poor hearing at frequencies below 1 kHz (Kastak and Schusterman, 1998). Peak hearing sensitivities in air are shifted to lower frequencies; the effective upper hearing limit is approximately 36 kHz (Schusterman, 1974). The best range of sound detection is from 2–16 kHz (Schusterman, 1974). Kastak and Schusterman (2002) determined that hearing sensitivity generally worsens with depth—hearing thresholds were lower in shallow water, except at the highest frequency tested (35 kHz), where this trend was reversed. Octave band sound levels of 65–70 dB above the animal's threshold produced an average temporary threshold shift (TTS; discussed later in ''Potential Effects of the Specified Activity on Marine Mammals'') of 4.9 dB in the California sea lion (Kastak *et al.,* 1999).

Harbor Seal

Species Description—Harbor seals, which are members of the Phocid family (true seals), inhabit coastal and estuarine waters and shoreline areas from Baja California, Mexico to western Alaska. For management purposes, differences in mean pupping date (i.e., birthing) (Temte, 1986), movement patterns (Jeffries, 1985; Brown, 1988), pollutant loads (Calambokidis *et al.,* 1985) and fishery interactions have led to the recognition of three separate harbor seal stocks along the west coast of the continental U.S. (Boveng, 1988). The three distinct stocks are: (1) Inland waters of Washington (including Hood Canal, Puget Sound, and the Strait of Juan de Fuca out to Cape Flattery), (2) outer coast of Oregon and Washington, and (3) California (Carretta *et al.,* 2007). The inland waters of Washington stock is the only stock that is expected to occur within the project area.

The average weight for adult seals is about 180 lb (82 kg) and males are slightly larger than females. Male harbor seals weigh up to 245 lb (111 kg) and measure approximately 5 ft (1.5 m) in length. The basic color of harbor seals' coat is gray and mottled but highly variable, from dark with light color rings or spots to light with dark markings (NMFS, 2008c).

Status—Estimated population numbers for the inland waters of Washington, including the Hood Canal, Puget Sound, and the Strait of Juan de Fuca out to Cape Flattery, are 14,612 individuals (Carretta *et al.,* 2007). The minimum population is 12,844 individuals. The harbor seal is the only species of marine mammal that is consistently abundant and considered resident in the Hood Canal (Jeffries *et al.,* 2003). The population of harbor seals in Hood Canal is a closed population, meaning that they do not have much movement outside of Hood Canal (London, 2006). The abundance of harbor seals in Hood canal has stabilized, and the population may have reached its carrying capacity in the mid-1990s with an approximate abundance of 1,000 harbor seals (Jeffries *et al.,* 2003).

Harbor seals are not considered to be depleted under the MMPA or listed under the ESA. Human-caused mortality relative to PBR is unknown, but it is considered to be small relative to the stock size. Therefore, the Washington Inland Waters stock of harbor seals is not classified as a strategic stock.

Distribution—Harbor seals are coastal species, rarely found more than 12 mi (20 km) from shore, and frequently occupy bays, estuaries, and inlets (Baird 2001). Individual seals have been observed several miles upstream in coastal rivers. Ideal harbor seal habitat includes haul-out sites, shelter during the breeding periods, and sufficient food (Bjorge, 2002). Haul-out areas can include intertidal and subtidal rock outcrops, sandbars, sandy beaches, peat banks in salt marshes, and man-made structures such as log booms, docks, and recreational floats (Wilson, 1978; Prescott, 1982; Schneider and Payne, 1983; Gilber and Guldager, 1998; Jeffries *et al.,* 2000). Human disturbance can affect haul-out choice (Harris *et al.,* 2003).

Harbor seals occur throughout Hood Canal and are seen relatively commonly in the area. They are year-round, non-migratory residents, and pup (i.e., give birth) in Hood Canal. Surveys in the Hood Canal from the mid-1970s to 2000 show a fairly stable population between 600–1,200 seals (Jeffries *et al.,* 2003). Harbor seals have been observed swimming in the waters along NBKB in every month of surveys conducted from 2007–2010 (Agness and Tannenbaum, 2009b; Tannenbaum *et al.,* 2009b). On the NBKB waterfront, harbor seals have not been observed hauling out in the intertidal zone, but have been observed hauled-out on man-made structures such as the floating security fence, buoys, barges, marine vessels, and logs (Agness and Tannebaum, 2009a; Tannenbaum *et al.,* 2009a). The main haul-out locations for harbor seals in Hood Canal are located on river delta and tidal exposed areas at Quilcene, Dosewallips, Duckabush, Hamma Hamma, and Skokomish River mouths (see Figure 4–1 of the Navy's application), with the closest haul-out area to the project area being ten miles (16 km) southwest of NBKB at Dosewallips River mouth, outside the potential area of effect for this project (London, 2006).

Behavior and Ecology—Harbor seals are typically seen in small groups resting on tidal reefs, boulders, mudflats, man-made structures, and sandbars. Harbor seals are opportunistic feeders that adjust their patterns to take advantage of locally and seasonally abundant prey (Payne and Selzer 1989; Baird 2001; Bjørge 2002). The harbor seal diet consists of fish and invertebrates (Bigg, 1981; Roffe and Mate, 1984; Orr *et al.,* 2004). Although harbor seals in the Pacific Northwest are common in inshore and estuarine waters, they primarily feed at sea (Orr *et al.,* 2004) during high tide. Researchers have found that they complete both shallow and deep dives during hunting depending on the availability of prey (Tollit *et al.,* 1997). Their diet in Puget Sound consists of many of the prey resources that are present in the nearshore and deeper waters of NBKB, including hake, herring and adult and out-migrating juvenile salmonids. Harbor seals in Hood Canal are known to feed on returning adult salmon, including ESA-threatened summer-run chum (*Oncorhynchus keta*). Over a 5-year study of harbor seal predation in the Hood Canal, the average percent escapement of summer-run chum consumed was eight percent (London, 2006).

Harbor seals mate at sea and females give birth during the spring and summer, although the pupping season varies by latitude. In coastal and inland regions of Washington, pups are born from April through January. Pups are generally born earlier in the coastal areas and later in the Puget Sound/Hood Canal region (Calambokidis and Jeffries, 1991; Jeffries *et al.,* 2000). Suckling harbor seal pups spend as much as forty percent of their time in the water (Bowen *et al.,* 1999).

Acoustics—In air, harbor seal males produce a variety of low-frequency (less than 4 kHz) vocalizations, including snorts, grunts, and growls. Male harbor seals produce communication sounds in the frequency range of 100–1,000 Hz (Richardson *et al.,* 1995). Pups make individually unique calls for mother recognition that contain multiple harmonics with main energy below 0.35 kHz (Bigg, 1981; Thomson and Richardson, 1995). Harbor seals hear nearly as well in air as underwater and had lower thresholds than California sea lions (Kastak and Schusterman, 1998). Kastak and Schusterman (1998) reported airborne low frequency (100 Hz) sound detection thresholds at 65.4 dB re 20 μPa for harbor seals. In air, they hear frequencies from 0.25–30 kHz and are most sensitive from 6–16 kHz (Richardson, 1995; Terhune and Turnbull, 1995; Wolski *et al.,* 2003).

Adult males also produce underwater sounds during the breeding season that typically range from 0.25–4 kHz (duration range: 0.1 s to multiple seconds; Hanggi and Schusterman 1994). Hanggi and Schusteman (1994) found that there is individual variation in the dominant frequency range of sounds between different males, and Van Parijs *et al.* (2003) reported oceanic, regional, population, and site-specific variation that could be vocal dialects. In water, they hear frequencies from 1–75 kHz (Southall *et al.,* 2007) and can detect sound levels as weak as 60–85 dB re 1 μPa within that band. They are most sensitive at frequencies below 50 kHz; above 60 kHz sensitivity rapidly decreases.

Humpback Whale

Species Description—The humpback whale is a baleen whale, and a member of the Balaenopterid family (rorquals), with a worldwide distribution in all ocean basins. Similar to all baleen whales, adult females are larger than adult males, reaching lengths of up to 60 ft (18 m). Their body coloration is primarily dark grey, but individuals have a variable amount of white on their pectoral fins and belly. This variation is so distinctive that the pigmentation pattern on the undersides of their flukes is used to identify individual whales. Humpback whales are known for their long pectoral fins, which can be up to 15 ft (4.6 m) in length and provide significant maneuverability. In the summer, most humpback whales are found in high latitude or highly biologically productive feeding grounds. In the winter, they congregate in subtropical or tropical waters for mating.

In the North Pacific, there are at least three separate populations: (1) CA/OR/WA stock, which winters in coastal Central America and Mexico and migrates to areas ranging from the coast of California to southern British Columbia in summer/fall; (2) Central North Pacific stock, which winters in the Hawaiian Islands and migrates to northern British Columbia/Southeast Alaska and Prince William Sound west to Kodiak; and (3) Western North Pacific stock, which winters near Japan and probably migrates to waters west of the Kodiak Archipelago (the Bering Sea and Aleutian Islands) in summer/fall. Though there is some mixing between these populations, they are considered distinct stocks. The stock structure of humpback whales is defined based on feeding areas, as distinct populations have a high degree of fidelity to specific feeding areas. Humpback whales found in inland Washington waters are members of the CA/OR/WA stock. Carretta *et al.* (2011) described distinct feeding populations in the eastern Pacific, and the waters off northern Washington may be an area of mixing between the CA/OR/WA stock and British Columbia/Alaska whales, or whales in northern Washington and southern British Columbia may be a distinct feeding population and a separate stock.

Status—Humpback whales were listed as endangered under the Endangered Species Preservation Act of 1966 because of declines due to commercial whaling. This protection was transferred to the ESA in 1973. Because of this listing, it is therefore designated as depleted and classified as a strategic stock under the MMPA. The recovery plan for humpback whales was finalized in November 1991 (NMFS, 1991). Critical habitat has not been designated for this species.

Humpback whales are increasing in abundance through much of their range, including the CA/OR/WA stock. In the North Pacific, humpback abundance was estimated at fewer than 1,400 whales in 1966, after heavy commercial exploitation. The current abundance estimate for the North Pacific is about 20,000 whales in total. Carretta *et al.* (2011) reported the best estimate for the CA/OR/WA stock as 2,043 individuals, based on mark-recapture estimates by Calambokidis *et al.* (2009). However, this estimate excludes some whales in Washington. Population trends from mark-recapture estimates have shown an overall long-term increase of approximately 7.5 percent per year for the CA/OR/WA stock (Calambokidis, 2009).

Distribution—The worldwide population of humpback whales is divided into various northern and southern ocean populations (Mackintosh, 1965). Geographical overlap of these populations has been documented only off Central America (Acevedo and Smultea, 1995; Rasmussen *et al.,* 2004, 2007). The humpback whale is one of the most abundant cetaceans off the Pacific coast of Costa Rica during the winter breeding season of northern hemisphere humpbacks.

Humpback whales were one of the most common large cetaceans in the inland waters of Washington prior to the early 1900s (Scheffer and Slipp, 1948). However, sightings became infrequent in Puget Sound and the Georgia Basin through the late 1990s, and prior to 2003 the presence of only three individual humpback whales was confirmed (Falcone *et al.,* 2005). However, in 2003 and 2004, thirteen individuals were sighted in the inland waters of Washington, mainly during the fall (Falcone *et al.,* 2005). Records available for 2001 to 2012 include observations in the Strait of Juan de Fuca; the Gulf Islands and the vicinity of Victoria, British Columbia; Admiralty Inlet; the San Juan Islands; Hood Canal; and Puget Sound (Orca Network, 2012).

In Hood Canal, several humpback whale sightings were recorded beginning on January 27, 2012 (Orca Network, 2012). Review of the sightings information indicates the sightings are of a single individual. The most recent sighting reported was on February 17, 2012. It is currently unknown if this individual has left Hood Canal. Prior to these sightings, there have been no confirmed reports of humpback whales entering Hood Canal (Calambokidis, 2012). No other reports of humpback whales in the Hood Canal were found in the Orca Network database, the scientific literature, or agency reports. Construction of the Hood Canal Bridge occurred in 1961 and could have contributed to the lack of historical sightings (Calambokidis, 2010). Only a few records of humpback whales near Hood Canal are in the Orca Network database, but these are north of the Hood Canal Bridge.

Behavior and Ecology—Humpback whales travel great distances during their seasonal migrations from high latitude feeding grounds to tropical and subtropical breeding grounds. One of the more closely studied routes is between Alaska and Hawaii, where humpbacks have been observed making the 3,000 mi (4,830 km) trip in as few as 36 days. During the summer months, humpbacks spend the majority of their time feeding and building up fat reserves (blubber) that they will live off of during the winter breeding season. Humpbacks filter feed on tiny crustaceans (mostly krill), plankton, and small fish and are known to consume up to 3,000 lb (1,360 kg) of food per day. Several hunting methods involve using air bubbles to herd, corral, or disorient fish. One highly complex variant, called bubble netting, is unique to humpbacks and is often performed in groups with defined roles for distracting, scaring, and herding before whales lunge at prey corralled near the surface. While on their winter breeding grounds, humpback whales congregate and engage in mating activities. Humpbacks are generally polygynous, with males exhibiting competitive behavior including aggressive and antagonistic displays. Breeding usually occurs once every 2 years, but sometimes occurs twice in 3 years.

Although the humpback whale is considered a primarily coastal species, it often traverses deep pelagic areas while migrating (Clapham and Mattila, 1990; Norris *et al.,* 1999; Calambokidis *et al.,* 2001). During migration, humpbacks stay near the surface of the ocean, and tend to generally prefer shallow waters. During calving, humpbacks are usually found in the warmest waters available at that latitude. Calving grounds are commonly near offshore reef systems, islands, or continental shores. Humpback feeding grounds are in cold, productive coastal waters.

Humpback whales are often sighted singly or in groups of two or three, but while on breeding and feeding grounds they may occur in groups larger than twenty (Leatherwood and Reeves, 1983; Jefferson *et al.,* 2008). The diving behavior of humpback whales is related to time of year and whale activity (Clapham and Mead, 1999). In summer feeding areas, humpbacks typically forage in the upper 120 m of the water column, with a maximum recorded dive depth of 500 m (Dolphin, 1987; Dietz *et al.,* 2002). On winter breeding grounds, humpback dives have been recorded at depths greater than 100 m (Baird *et al.,* 2000). The CA/OR/WA stock winters in coastal Central America and Mexico, and the stock migrates to areas ranging from the coast of California to southern British Columbia in summer and fall.

Acoustics—Humpback whales, like all baleen whales, are considered low-frequency cetaceans. Functional hearing for low-frequency cetaceans is estimated to range from 7 Hz to 22 kHz (Southall *et al.,* 2007). During the winter breeding season, males sing complex songs that can last up to 20 minutes and be heard at great distance, and may sing for hours, repeating the song several times. All males in a population sing the same song, but that song continually evolves over time.

Killer Whale

Species Description—Killer whales are members of the Delphinid family and are the most widely distributed cetacean species in the world. Killer whales have a distinctive color pattern, with black dorsal and white ventral portions. They also have a conspicuous white patch above and behind the eye and a highly variable gray or white saddle area behind the dorsal fin. The species shows considerable sexual dimorphism. Adult males develop larger pectoral flippers, dorsal fins, tail flukes, and girths than females. Male adult killer whales can reach up to 32 ft (9.8 m) in length and weigh nearly 22,000 lb (10,000 kg); females reach 28 ft (8.5 m) in length and weigh up to 16,500 lb (7,500 kg).

Based on appearance, feeding habits, vocalizations, social structure, and distribution and movement patterns there are three types of populations of killer whales (Wiles, 2004; NMFS, 2005). The three distinct forms or types of killer whales recognized in the North Pacific Ocean are: (1) Resident, (2) Transient, and (3) Offshore. The resident and transient populations have been divided further into different subpopulations based mainly on genetic analyses and distribution; not enough is known about the offshore whales to divide them into subpopulations (Wiles, 2004). Only transient killer whales are known from the project area.

Transient killer whales occur throughout the eastern North Pacific, and have primarily been studied in coastal waters. Their geographical range overlaps that of the resident and offshore killer whales. The dorsal fin of transient whales tends to be more erect (straighter at the tip) than those of resident and offshore whales (Ford and Ellis, 1999; Ford *et al.,* 2000). Saddle patch pigmentation of transient killer whales is restricted to two patterns, and never has the large areas of black pigmentation intruding into the white of the saddle patch that is seen in resident and offshore types. Transient type whales are often found in long-term stable social units that tend to be smaller than resident social groups (e.g., fewer than ten whales); these social units do not seem as permanent as matrilines are in resident type whales. Transient killer whales feed nearly exclusively on marine mammals (Ford and Ellis, 1999), whereas resident whales primarily eat fish. Offshore whales are presumed to feed primarily on fish, and have been documented feeding on sharks.

Within the transient type, association data (Ford *et al.,* 1994; Ford and Ellis, 1999; Matkin *et al.,* 1999), acoustic data (Saulitis, 1993; Ford and Ellis, 1999) and genetic data (Hoelzel *et al.,* 1998, 2002; Barrett-Lennard, 2000) confirms that three communities of transient whales exist and represent three discrete populations: (1) Gulf of Alaska, Aleutian Islands, and Bering Sea transients, (2) AT1 transients (Prince William Sound, AK; listed as depleted under the MMPA), and (3) West Coast transients. Among the genetically distinct assemblages of transient killer whales in the northeastern Pacific, only the West Coast transient stock, which occurs from southern California to southeastern Alaska, may occur in the project area.

Status—The West Coast transient stock is a trans-boundary stock, with minimum counts for the population of transient killer whales coming from various photographic datasets. Combining these counts of cataloged transient whales gives a minimum number of 354 individuals for the West Coast transient stock (Allen and Angliss, 2010). However, the number in Washington waters at any one time is probably fewer than 20 individuals (Wiles, 2004). The West Coast transient killer whale stock is not designated as depleted under the MMPA or listed under the ESA. The estimated annual level of human-caused mortality and serious injury does not exceed the PBR. Therefore, the West Coast Transient stock of killer whales is not classified as a strategic stock. Population trends and status of this stock relative to its Optimum Sustainable Population (OSP) level are currently unknown.

Distribution—The geographical range of transient killer whales includes the northeast Pacific, with preference for coastal waters of southern Alaska and British Columbia (Krahn *et al.,* 2002). Transient killer whales in the eastern North Pacific spend most of their time along the outer coast, but visit Hood Canal and the Puget Sound in search of harbor seals, sea lions, and other prey. Transient occurrence in inland waters appears to peak during August and September (Morton, 1990; Baird and Dill, 1995; Ford and Ellis, 1999) which is the peak time for harbor seal pupping, weaning, and post-weaning (Baird and Dill, 1995). In 2003 and 2005, small groups of transient killer whales (eleven and six individuals, respectively) visited Hood Canal to feed on harbor seals and remained in the area for significant periods of time (59 and 172 days, respectively) between the months of January and July.

Behavior and Ecology—Transient killer whales show greater variability in habitat use, with some groups spending most of their time foraging in shallow waters close to shore while others hunt almost entirely in open water (Felleman *et al.,* 1991; Baird and Dill, 1995; Matkin and Saulitis, 1997). Transient killer whales feed on marine mammals and some seabirds, but apparently no fish (Morton, 1990; Baird and Dill, 1996; Ford *et al.,* 1998; Ford and Ellis, 1999; Ford *et al.,* 2005). While present in Hood Canal in 2003 and 2005, transient killer whales preyed on harbor seals in the subtidal zone of the nearshore marine and inland marine deeper water habitats (London, 2006). Other observations of foraging transient killer whales indicate they prefer to forage on pinnipeds in shallow, protected waters (Heimlich-Boran, 1988; Saulitis *et al.,* 2000). Transient killer whales travel in small, matrilineal groups, but they typically contain fewer than ten animals and their social organization generally is more flexible than that of resident killer whales (Morton, 1990, Ford and Ellis, 1999). These differences in social organization probably relate to differences in foraging (Baird and Whitehead, 2000). There is no information on the reproductive behavior of killer whales in this area.

Acoustics—Killer whales produce a wide variety of clicks and whistles, but most of their sounds are pulsed, with frequencies ranging from 0.5–25 kHz (dominant frequency range: 1–6 kHz) (Thomson and Richardson, 1995; Richardson *et al.,* 1995). Source levels of echolocation signals range between 195–224 dB re 1 µPa-m peak-to-peak (p-p), dominant frequencies range from 20–60 kHz, with durations of about 0.1 s (Au *et al.,* 2004). Source levels associated with social sounds have been calculated to range between 131–168 dB re 1 µPa-m and vary with vocalization type (Veirs, 2004).

Both behavioral and auditory brainstem response techniques indicate killer whales can hear in a frequency range of 1–100 kHz and are most sensitive at 20 kHz. This is one of the lowest maximum-sensitivity frequencies known among toothed whales (Szymanski *et al.,* 1999).

Dall's Porpoise

Species Description—Dall's porpoises are members of the Phocoenid (porpoise) family and are common in the North Pacific Ocean. They can reach a maximum length of just under 8 ft (2.4 m) and weigh up to 480 lb (218 kg). Males are slightly larger and thicker than females, which reach lengths of just under 7 ft (2.1 m) long. The body of Dall's porpoises is a very dark gray or black in coloration with variable contrasting white thoracic panels and white 'frosting' on the dorsal fin and tail that distinguish them from other cetacean species. These markings and colorations vary with geographic region and life stage, with adults having more distinct patterns.

Based on NMFS stock assessment reports, Dall's porpoises within the Pacific U.S. Exclusive Economic Zone are divided into two discrete, noncontiguous areas: (1) Waters off California, Oregon, and Washington, and (2) Alaskan waters (Carretta *et al.,* 2008). Only individuals from the CA/OR/WA stock may occur within the project area.

Status—The NMFS population estimate, recently updated in 2010 for the CA/OR/WA stock, is 42,000 (CV = 0.33) which is based on vessel line transect surveys by Barlow (2010) and Forney (2007). The minimum population is considered to be 32,106. Additional numbers of Dall's porpoises occur in the inland waters of Washington, but the most recent estimate was obtained in 1996 (900 animals; CV = 0.40; Calambokidis *et al.,* 1997) and is not included in the overall estimate of abundance for this stock due to the need for more up-to-date information. Dall's porpoise are not listed as depleted under the MMPA or listed under the ESA. The average annual human-caused mortality is estimated to be less than the PBR, and therefore the stock is not classified as a strategic stock under the MMPA. The status of Dall's porpoises in California, Oregon and Washington relative to OSP is not known, and there are insufficient data to evaluate potential trends in abundance.

Distribution—The Dall's porpoise is found from northern Baja California, Mexico, north to the northern Bering Sea and south to southern Japan (Jefferson *et al.,* 1993). The species is only common between 32–62° N in the eastern North Pacific (Morejohn, 1979; Houck and Jefferson, 1999). North-south movements in California, Oregon, and Washington have been suggested. Dall's porpoises shift their distribution southward during cooler-water periods (Forney and Barlow, 1998). Norris and Prescott (1961) reported finding Dall's porpoises in southern California waters only in the winter, generally when the water temperature was less than 15°C (59 °F). Seasonal movements have also been noted off Oregon and Washington, where higher densities of Dall's porpoises were sighted offshore in winter and spring and inshore in summer and fall (Green *et al.,* 1992).

In Washington, they are most abundant in offshore waters. They are year-round residents in Washington (Green *et al.,* 1992), but their distribution is highly variable between years, likely due to changes in oceanographic conditions (Forney and Barlow, 1998). Dall's porpoises are observed throughout the year in the Puget Sound north of Seattle (Osborne *et al.,* 1998) and are seen occasionally in southern Puget Sound. Dall's porpoises may also occasionally occur in Hood Canal (Jeffries 2006, personal communication). Nearshore habitats used by Dall's porpoises could include the marine habitats found in the inland marine waters of the Hood Canal. A Dall's porpoise was observed in the deeper water at NBKB in summer 2008 (Tannenbaum *et al.,* 2009a).

Behavior and Ecology—Dall's porpoises can be opportunistic feeders but primarily consume schooling forage fish. They are known to eat squid, crustaceans, and fishes such as blackbelly eelpout (*Lycodopsis pacifica*), herring, pollock, hake, and Pacific sandlance (*Ammodytes hexapterus*) (Walker *et al.,* 1998). Groups of Dall's porpoises generally include fewer than ten individuals and are fluid, probably aggregating for feeding (Jefferson, 1990, 1991; Houck and Jefferson, 1999). Dall's porpoises become sexually mature at three and a half to eight years of age (Houck and Jefferson, 1999) and give birth to a single calf after ten to twelve months. Breeding and calving typically occurs in the spring and summer (Angell and Balcomb, 1982). In the North Pacific, there is a strong summer calving peak from early June through August (Ferrero and Walker, 1999), and a smaller peak in March (Jefferson, 1989). Resident Dall's porpoises breed in Puget Sound from August to September.

Acoustics—Only short duration pulsed sounds have been recorded for Dall's porpoises (Houck and Jefferson, 1999); this species apparently does not whistle often (Richardson *et al.,* 1995). Dall's porpoises produce short duration (50–1,500 μs), high-frequency, narrow band clicks, with peak energies between 120–160 kHz (Jefferson, 1988). There is no published data on the hearing abilities of this species.

Harbor Porpoise

Species Description—Harbor porpoises belong to the Phocoenid (porpoise) family and are found extensively along the Pacific U.S. coast. Harbor porpoises are small, with males reaching average lengths of approximately 5 ft (1.5 m); Females are slightly larger with an average length of 5.5 ft (1.7 m). The average adult harbor porpoise weighs between 135–170 lb (61–77 kg). Harbor porpoises have a dark grey coloration on their backs, with their belly and throats white. They have a dark grey chin patch and intermediate shades of grey along their sides.

Recent preliminary genetic analyses of samples ranging from Monterey, CA to Vancouver Island, BC indicate that there is small-scale subdivision within the U.S. portion of this range (Chivers *et al.,* 2002). Although geographic structure exists along an almost continuous distribution of harbor porpoises from California to Alaska, stock boundaries are difficult to draw because any rigid line is generally arbitrary from a biological perspective. Nevertheless, based on genetic data and density discontinuities identified from aerial surveys, NMFS identifies eight stocks in the Northeast Pacific Ocean. Pacific coast harbor porpoise stocks include: (1) Monterey Bay, (2) San Francisco-Russian River, (3) northern California/southern Oregon, (4) Oregon/Washington coastal, (5) inland Washington, (6) Southeast Alaska, (7) Gulf of Alaska, and (8) Bering Sea. Only individuals from the Washington Inland Waters stock may occur in the project area.

Status—Aerial surveys of the inland waters of Washington and southern British Columbia were conducted during August of 2002 and 2003 (J. Laake, unpubl. data). These aerial surveys included the Strait of Juan de Fuca, San Juan Islands, Gulf Islands, and Strait of Georgia, which includes waters inhabited by the Washington Inland Waters stock of harbor porpoises as well as harbor porpoises from British Columbia. An average of the 2002 and 2003 estimates of abundance in U.S. waters resulted in an uncorrected abundance of 3,123 (CV = 0.10) harbor porpoises in Washington inland waters (J. Laake, unpubl. data). When corrected for availability and perception bias, the estimated abundance for the Washington Inland Waters stock of harbor porpoise is 10,682 (CV = 0.38) animals (Carretta *et al.,* 2008). The minimum population estimate is 7,841. Harbor porpoise are not listed as depleted under the MMPA or listed under the ESA. Based on currently available data, the total level of human-caused mortality is not known to exceed the PBR. Therefore, the Washington Inland Waters harbor porpoise stock is not classified as strategic. The status of this stock relative to its OSP level and population trends is unknown. Although long-term harbor porpoise sightings in southern Puget Sound have declined since the 1940s, sightings have increased in Puget Sound and northern Hood Canal in recent years and are now considered to regularly occur year-round in these waters (Calambokidis, 2010). This may represent a return to historical conditions, when harbor porpoises were considered one of the most common cetaceans in Puget Sound (Scheffer and Slipp, 1948).

Distribution—Harbor porpoises are generally found in cool temperate to subarctic waters over the continental shelf in both the North Atlantic and North Pacific (Read, 1999). This species is seldom found in waters warmer than 17 °C (63 °F; Read, 1999) or south of Point Conception (Hubbs, 1960; Barlow and Hanan, 1995). Harbor porpoises can be found year-round primarily in the shallow coastal waters of harbors, bays, and river mouths (Green *et al.,* 1992). Along the Pacific coast, harbor porpoises occur from Monterey Bay, California to the Aleutian Islands and west to Japan (Reeves *et al.,* 2002). Harbor porpoises are known to occur in Puget Sound year round (Osmek *et al.,* 1996, 1998; Carretta *et al.,* 2007), and harbor porpoise observations in northern Hood Canal have increased in recent years (Calambokidis, 2010). Prior to recent construction projects conducted by the Navy at NBKB, harbor porpoises were considered as likely occurring only occasionally in the project area. A single harbor porpoise had been sighted in deeper water at NBKB during 2010 field observations (SAIC, 2010). However, while implementing monitoring plans for work conducted from July-October, 2011, the Navy recorded multiple sightings of harbor porpoise in the deeper waters of the project area. Following these sightings, the Navy conducted dedicated line transect surveys, recording multiple additional sightings of harbor porpoise, and have revised local density estimates accordingly. The current density estimates are based upon a small sample size of transect surveys, and may be further revised as more information becomes available from ongoing Navy survey efforts.

Behavior and Ecology—Harbor porpoises are non-social animals usually seen in small groups of two to five animals. Little is known about their social behavior. Harbor porpoises can be opportunistic foragers but primarily consume schooling forage fish (Osmek *et al.,* 1996; Bowen and Siniff, 1999; Reeves *et al.,* 2002). Along the coast of Washington, harbor porpoises primarily feed on herring, market squid (*Loligo opalescens*) and eulachon (*Thaleichthys pacificus*) (Gearin *et al.,* 1994). Females reach sexual maturity at three to four years of age and may give birth every year for several years in a row. Calves are born in late spring (Read, 1990; Read and Hohn, 1995). Dall's and harbor porpoises appear to hybridize relatively frequently in the Puget Sound area (Willis *et al.,* 2004).

Acoustics—Harbor porpoise vocalizations include clicks and pulses (Ketten, 1998), as well as whistle-like signals (Verboom and Kastelein, 1995). The dominant frequency range is 110–150 kHz, with source levels of 135–177 dB re 1 μPa-m (Ketten, 1998). Echolocation signals include one or two low-frequency components in the 1.4–2.5 kHz range (Verboom and Kastelein, 1995).

A behavioral audiogram of a harbor porpoise indicated the range of best sensitivity is 8–32 kHz at levels between 45–50 dB re 1 μPa-m (Andersen, 1970); however, auditory-evoked potential studies showed a much higher frequency of approximately 125–130 kHz (Bibikov, 1992). The auditory-evoked potential method suggests that the harbor porpoise actually has two frequency ranges of best sensitivity. More recent psycho-acoustic studies found the range of best hearing to be 16–140 kHz, with a reduced sensitivity around 64 kHz (Kastelein *et al.,* 2002). Maximum sensitivity occurs between 100–140 kHz (Kastelein *et al.,* 2002).

Potential Effects of the Specified Activity on Marine Mammals

NMFS has determined that pile removal, as outlined in the project description, has the potential to result in behavioral harassment of marine mammals that may be swimming, foraging, or resting in the project vicinity while pile removal is being conducted. Pile removal could potentially harass those pinnipeds that are in the water close to the project site, whether their heads are above or below the surface.

Marine Mammal Hearing

The primary effect on marine mammals anticipated from the specified activities would result from exposure of animals to underwater sound. Exposure to sound can affect marine mammal hearing. When considering the influence of various kinds of sound on the marine environment, it is necessary to understand that different kinds of marine life are sensitive to different frequencies of sound. Based on available behavioral data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data, Southall *et al.* (2007) designate functional hearing groups for marine mammals and estimate the lower and upper frequencies of functional hearing of the groups. The functional groups and the associated frequencies are indicated below (though animals are less sensitive to sounds at the outer edge of their functional range and most sensitive to sounds of frequencies within a smaller range somewhere in the middle of their functional hearing range):

- Low frequency cetaceans (13 species of mysticetes): functional hearing is estimated to occur between approximately 7 Hz and 22 kHz;
- Mid-frequency cetaceans (32 species of dolphins, six species of larger toothed whales, and nineteen species of beaked and bottlenose whales): Functional hearing is estimated to occur between approximately 150 Hz and 160 kHz;
- High frequency cetaceans (six species of true porpoises, four species of river dolphins, two members of the genus *Kogia,* and four dolphin species of the genus *Cephalorhynchus*): Functional hearing is estimated to occur between approximately 200 Hz and 180 kHz; and
- Pinnipeds in water: Functional hearing is estimated to occur between approximately 75 Hz and 75 kHz, with the greatest sensitivity between approximately 700 Hz and 20 kHz.

As mentioned previously in this document, three pinniped and four cetacean species are likely to occur in the proposed project area. Of the four cetacean species likely to occur in the project area, two are classified as high frequency cetaceans (Dall's and harbor porpoises), one is classified as a mid-frequency cetacean (killer whales), and one is classified as a low-frequency cetacean (humpback whales) (Southall *et al.,* 2007).

Underwater Sound Effects

Potential Effects of Construction Sound—The effects of sounds from pile removal might—in theory, at least—result in one or more of the following: Temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, and masking (Richardson *et al.,* 1995; Gordon *et al.,* 2004; Nowacek *et al.,* 2007; Southall *et al.,* 2007). The effects of pile driving or removal on marine mammals are generally dependent on several factors, including the size, type, and depth of the animal; the depth, intensity, and duration of the pile removal sound; the depth of the water column; the substrate of the habitat; the standoff distance between the pile and the animal; and the sound propagation properties of the environment. Impacts to marine mammals from the proposed activities are expected to result primarily from acoustic pathways. As such, the degree of effect is intrinsically related to the received level and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The further away from the source, the less intense the exposure should be. The substrate and depth of the habitat affect the sound propagation properties of the environment. Shallow environments are typically more structurally complex, which leads to rapid sound attenuation. In addition, substrates that are soft (e.g., sand) would absorb or attenuate the sound more readily than hard substrates (e.g., rock) which may reflect the acoustic wave. Soft porous substrates would also likely require less time to remove the pile, which would ultimately decrease the intensity of the acoustic source.

In the absence of mitigation, impacts to marine species would be expected to result from physiological and behavioral responses to both the type and strength of the acoustic signature (Viada *et al.,* 2008). The type and severity of behavioral impacts are more difficult to define due to limited studies addressing the behavioral effects of underwater sounds on marine mammals. Potential effects from sound sources can range in severity, ranging from effects such as behavioral disturbance, tactile perception, physical discomfort, slight injury of the internal organs and the auditory system, to mortality (Yelverton *et al.,* 1973; O'Keefe and Young, 1984; DoN, 2001b).

Hearing Impairment and Other Physical Effects—Marine mammals exposed to high intensity sound repeatedly or for prolonged periods can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Kastak *et al.,* 1999; Schlundt *et al.,* 2000; Finneran *et al.,* 2002, 2005). TS can be permanent (PTS), in which case the loss of hearing sensitivity is not recoverable, or temporary (TTS), in which case the animal's hearing threshold would recover over time (Southall *et al.,* 2007). Marine mammals depend on acoustic cues for vital biological functions, (e.g., orientation, communication, finding prey, avoiding predators); thus, TTS may result in reduced fitness in survival and reproduction, either permanently or temporarily. However, this depends on the frequency and duration of TTS, as well as the biological context in which it occurs. TTS of limited duration, occurring in a frequency range that does not coincide with that used for recognition of important acoustic cues, would have little to no effect on an animal's fitness. Repeated sound exposure that leads to TTS could cause PTS. PTS is considered to constitute injury, but TTS is not considered injury (Southall *et al.,* 2007). It is unlikely that the project would result in any cases of temporary or especially permanent hearing impairment or any significant non-auditory physical or physiological effects; these effects are most frequently associated with pulsed sound, which would not occur during the proposed action. Some behavioral disturbance is expected, but it is likely that this would be localized and short-term because of the short project duration.

In addition, given the low source levels expected in association with the non-pulsed sounds proposed for this activity, it is highly unlikely that any marine mammals could experience physiological effects or even TTS. All source levels for the proposed action would be less than 190 dB re: 1 μPa rms; therefore, there is no possibility of injury for pinnipeds. While vibratory pile removal is expected to produce sound equaling the 180 dB threshold for potential cetacean injury, that sound is expected to be restricted to a radius no more than 1 m (3.3 ft) from the pile removal, therefore essentially eliminating the possibility for cetacean injury, as it is extremely unlikely that any cetacean would approach so closely. Nevertheless, several aspects of the planned monitoring and mitigation measures for this project (see the ''Proposed Mitigation'' and ''Proposed Monitoring and Reporting'' sections later in this document) are designed to detect marine mammals occurring near the pile removal to avoid exposing them to sound that might, in theory, cause injury. The following subsection discusses TTS in somewhat more detail.

Temporary Threshold Shift—TTS is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises, and a sound must be stronger in order to be heard. In terrestrial mammals, TTS can last from minutes or hours to days (in cases of strong TTS). For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the sound ends. Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals. Available data on TTS in marine mammals are summarized in Southall *et al.* (2007).

Disturbance Reactions

Disturbance includes a variety of effects, including subtle changes in behavior, more conspicuous changes in activities, and displacement. Reactions to sound, if any, depend on species, state of maturity, experience, current activity, reproductive state, time of day, and many other factors (Richardson *et al.,* 1995; Wartzok *et al.,* 2004; Southall *et al.,* 2007; Weilgart, 2007). Behavioral responses to sound are highly variable and context specific. For each potential behavioral change, the magnitude of the change ultimately determines the severity of the response. A number of factors may influence an animal's response to sound, including its previous experience, its auditory sensitivity, its biological and social status (including age and sex), and its behavioral state and activity at the time of exposure.

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok *et al.,* 2003/04). Animals are most likely to habituate to sounds that are predictable and unvarying. The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. Behavioral state may affect the type of response as well. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson *et al.,* 1995; NRC, 2003; Wartzok *et al.,* 2003/04). Controlled experiments with captive marine mammals showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al.,* 1997; Finneran *et al.,* 2003). However, responses to non-pulsed sound, such as vibratory pile installation, have not been documented as well as responses to pulsed sounds.

With both types of pile removal, it is likely that the onset of pile removal could result in temporary, short term changes in an animal's typical behavior and/or avoidance of the affected area. These behavioral changes may include (Richardson *et al.,* 1995): Changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where sound sources are located; and/or flight responses (e.g., pinnipeds flushing into water from haul-outs or rookeries). Pinnipeds may increase their haul-out time, possibly to avoid in-water disturbance (Caltrans 2001, 2006). Since pile removal would likely only occur for a few hours a day, over a short period of time, it is unlikely to result in permanent displacement. Any potential impacts from pile removal activities could be experienced by individual marine mammals, but would not be likely to cause population level impacts, or affect the long-term fitness of the species.

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be expected to be biologically significant if the change affects growth, survival, or reproduction. Significant behavioral modifications that could potentially lead to effects on growth, survival, or reproduction include:

- Drastic changes in diving/surfacing patterns (such as those thought to be causing beaked whale stranding due to exposure to military mid-frequency tactical sonar);
- Habitat abandonment due to loss of desirable acoustic environment; and
- Cessation of feeding or social interaction.

The onset of behavioral disturbance from anthropogenic sound depends on both external factors (characteristics of sound sources and their paths) and the specific characteristics of the receiving animals (hearing, motivation, experience, demography) and is difficult to predict (Southall *et al.,* 2007).

Auditory Masking

Natural and artificial sounds can disrupt behavior by masking, or interfering with, a marine mammal's ability to hear other sounds. Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher levels. Chronic exposure to excessive, though not high-intensity, sound could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions. Masking can interfere with detection of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their performance fitness in survival and reproduction. If the coincident (masking) sound were man-made, it could be potentially harassing if it disrupted hearing-related behavior. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs during the sound exposure. Because masking (without resulting in TS) is not associated with abnormal physiological function, it is not considered a physiological effect, but rather a potential behavioral effect.

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. Because sound generated from in-water pile removal is mostly concentrated at low frequency ranges, it may have less effect on high frequency echolocation sounds made by porpoises. However, lower frequency man-made sounds are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey sound. It may also affect communication signals when they occur near the sound band and thus reduce the communication space of animals (e.g., Clark *et al.,* 2009) and cause increased stress levels (e.g., Foote *et al.,* 2004; Holt *et al.,* 2009).

Masking has the potential to impact species at population, community, or even ecosystem levels, as well as at individual levels. Masking affects both senders and receivers of the signals and can potentially have long-term chronic effects on marine mammal species and populations. Recent research suggests that low frequency ambient sound levels have increased by as much as 20 dB (more than three times in terms of SPL) in the world's ocean from pre-industrial periods, and that most of these increases are from distant shipping (Hildebrand, 2009). All anthropogenic sound sources, such as those from vessel traffic, pile removal, and dredging activities, contribute to the elevated ambient sound levels, thus intensifying masking. However, the sum of sound from the proposed activities is confined in an area of inland waters (Hood Canal) that is bounded by landmass; therefore, the sound generated is not expected to contribute to increased ocean ambient sound.

Typically, the most intense underwater sounds associated with marine construction are those produced by impact pile removal, which is not proposed for this action. However, the energy distribution of pile removal covers a broad frequency spectrum, and sound from these sources would likely be within the audible range of the marine mammals found in the Hood Canal. Vibratory pile removal is relatively short-term, with rapid oscillations occurring for approximately 1 hour per pile, with the total vibratory pile removal occurring for 15 days. The probability for vibratory pile removal masking acoustic signals important to the behavior and survival of marine mammal species is likely to be negligible. Any masking event that could possibly rise to Level B harassment under the MMPA would occur concurrently within the zones of behavioral harassment already estimated for pile removal, and which have already been taken into account in the exposure analysis.

Airborne Sound Effects

Marine mammals that occur in the project area could be exposed to airborne sounds associated with pile removal that have the potential to cause harassment, depending on their distance from pile removal activities. Airborne pile removal sound would have less impact on cetaceans than pinnipeds because sound from atmospheric sources does not transmit well underwater (Richardson *et al.,* 1995); thus, airborne sound would only be an issue for pinnipeds that are hauled-out or have their heads above water in the project area. Most likely, airborne sound would cause behavioral responses similar to those discussed above in relation to underwater sound. For instance, anthropogenic sound could cause hauled-out pinnipeds to exhibit changes in their normal behavior, such as reduction in vocalizations, or cause them to temporarily abandon their habitat and move further from the source. Studies by Blackwell *et al.* (2004) and Moulton *et al.* (2005) indicate a tolerance or lack of response to unweighted airborne sounds as high as 96 dB rms.

Anticipated Effects on Habitat

The proposed activities at NBKB would not result in permanent impacts to habitats used directly by marine mammals, such as haul-out sites, but may have potential short-term impacts to food sources such as forage fish and salmonids. There are no rookeries or major haul-out sites within 10 km (6.2 mi), foraging hotspots, or other ocean bottom structures of significant biological importance to marine mammals that may be present in the marine waters in the vicinity of the project area. Therefore, the main impact issue associated with the proposed activity would be temporarily elevated sound levels and the associated direct effects on marine mammals, as discussed previously in this document. The most likely impact to marine mammal habitat occurs from pile removal effects on likely marine mammal prey (i.e., fish) near NBKB and minor impacts to the immediate substrate during removal of piles during the wharf rehabilitation project.

Pile Removal Effects on Potential Prey (Fish)

Construction activities would produce non-pulsed sounds. Fish react to sounds which are especially strong and/or intermittent low-frequency sounds which are generally unlike the sounds that would be produced by the proposed action. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. Hastings and Popper (2005, 2009) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. SPLs of 180 dB may cause noticeable changes in behavior (Chapman and Hawkins, 1969; Pearson *et al.,* 1992; Skalski *et al.,* 1992). SPLs of sufficient strength have been known to cause injury to fish and fish mortality (Caltrans, 2001; Longmuir and Lively, 2001). The most likely impact to fish from pile removal activities at the project area would be temporary behavioral avoidance of the area. The duration of fish avoidance of this area after pile removal stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. In general, impacts to marine mammal prey species are expected to be minor and temporary due to the short timeframe and nature of sound produced for the project. Impacts could also result from potential impacts to fish eggs and larvae.

Pile Removal Effects on Potential Foraging Habitat

The area likely impacted by the project is relatively small compared to the available habitat in the Hood Canal. Avoidance by potential prey (i.e., fish) of the immediate area due to the temporary loss of this foraging habitat is also possible. The duration of fish avoidance of this area after pile removal stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the Hood Canal and nearby vicinity.

Given the short daily duration of sound associated with individual pile removal events and the relatively small areas being affected, pile removal activities associated with the proposed action are not likely to have a permanent, adverse effect on any fish habitat, or populations of fish species. Therefore, pile removal is not likely to have a permanent, adverse effect on marine mammal foraging habitat at the project area.

Previous Activity

The proposed action for this IHA request represents the second year of a 2-year project. NMFS issued an IHA for the first year of work on May 24, 2011 (76 FR 30130). The Navy complied with the mitigation and monitoring required under the previous authorization. In accordance with the 2011 IHA, the Navy submitted a monitoring report, and the information contained therein was considered in this analysis. During the course of activities conducted under the previous authorization, the Navy did not exceed the take levels authorized under that IHA. Additional information regarding harbor porpoise, Steller sea lion, and humpback whale occurrence in the Hood Canal has been considered in this analysis.

Proposed Mitigation

In order to issue an incidental take authorization (ITA) under section 101(a)(5)(D) of the MMPA, NMFS must, where applicable, set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable 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 (where relevant).

The modeling results for zones of influence (ZOIs; see ''Estimated Take by Incidental Harassment'') were used to develop mitigation measures for pile removal activities at NBKB. ZOIs are often used to effectively represent the mitigation zone that would be established around each pile to prevent Level A harassment of marine mammals, and also establish zones within which Level B harassment of marine mammals may occur. In addition to the measures described later in this section, the Navy would employ the following standard mitigation measures:

(a) Conduct briefings between construction supervisors and crews, marine mammal monitoring team, acoustical monitoring team, and Navy staff prior to the start of all pile removal activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

(b) Comply with applicable equipment sound standards and ensure that all construction equipment has sound control devices no less effective than those provided on the original equipment.

(c) For in-water heavy machinery work other than pile removal, if a marine mammal comes within 10 m (33 ft), operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions. This type of work could include, for example, movement of the barge to the pile location or removal of the pile from the water column/substrate via a crane (i.e., direct pull). For these activities, monitoring would take place from 15 minutes prior to initiation until the action is complete.

Monitoring and Shutdown

The following measures would apply to the Navy's mitigation through shutdown and disturbance zones:

Shutdown Zone—For all pile removal activities, the Navy would establish a shutdown zone (defined as, at minimum, the area in which SPLs equal or exceed the 180/190 dB rms acoustic injury criteria). The purpose of a shutdown zone is to define an area within which shutdown of activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area), thus preventing injury, serious injury, or death of marine mammals. Although predictions indicate that radial distances to the 180/190-dB threshold would be less than 10 m—or would not exist because source levels are lower than the threshold—shutdown zones would conservatively be set at a minimum 10 m. This precautionary measure is intended to further reduce any possibility of injury to marine mammals by incorporating a buffer to the 180/190-dB threshold within the shutdown area.

Disturbance Zone—For all pile removal activities, the Navy would establish a disturbance zone. Disturbance zones are typically defined as the area in which SPLs equal or exceed 120 dB rms (for non-pulsed sound). However, when the size of a disturbance zone is sufficiently large as to make monitoring of the entire area impracticable (as in the case of the vibratory removal zone here, predicted to encompass an area of 35.9 km^2), the disturbance zone may be defined as some area that may reasonably be monitored. The Navy would establish an observation position within the Waterfront Restricted Area (WRA), maximally distant from the pile removal operations. The additional position would be able to monitor an effective area of at least 542 m distance (corresponding to the predicted radial distance to the 120-dB threshold for chipping) from the pile removal activity. In addition, the Navy would place a protected species observer (PSO) aboard any vessel used outside the WRA for hydroacoustic monitoring, for the duration of any such monitoring. Disturbance zones provide utility for monitoring conducted for mitigation purposes (i.e., shutdown zone monitoring) by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring of disturbance zones enables PSOs to be aware of and communicate the presence of marine mammals in the project area but outside the shutdown zone and thus prepare for potential shutdowns of activity. However, the primary purpose of disturbance zone monitoring is for documenting incidents of Level B harassment; disturbance zone monitoring is discussed in greater detail later (see Proposed Monitoring and Reporting). As with any such large action area, it is impossible to guarantee that all animals would be observed or to make comprehensive observations of fine-scale behavioral reactions to sound.

All disturbance and shutdown zones would initially be based on the distances from the source that are predicted for each threshold level. However, should data from previously conducted acoustic monitoring (i.e., from monitoring of test pile or previous EHW–1 work), which is still in preparation, or from in-situ acoustic monitoring indicate that actual distances to these threshold zones are different, the size of the shutdown and disturbance zones would be adjusted accordingly.

Monitoring Protocols—Monitoring would be conducted for a minimum 10 m shutdown zone and a minimum approximate 600 m disturbance zone (although this may be larger for the duration of hydroacoustic monitoring) surrounding each pile for the presence of marine mammals before, during, and after pile removal activities. If a marine mammal is observed within the disturbance zone, a take would be recorded and behaviors documented. However, that pile segment would be completed without cessation, unless the animal approaches or enters the shutdown zone, at which point all pile removal activities would be halted.

The disturbance zone was set at the largest area practicable for the Navy to maintain a monitoring presence over the duration of the activity. Sightings occurring outside this area (within the predicted 35.9 km^2 disturbance zone predicted for the vibratory removal 120-dB isopleths) would still be recorded and noted as a take, but detailed observations outside this zone would not be possible, and it would be impossible for the Navy to account for all individuals occurring in such a zone with any degree of certainty. Monitoring would take place from 15 minutes prior to initiation through 30 minutes post-completion of pile removal activities. Pile removal activities include the time to remove a single pile or series of piles, as long as the time elapsed between uses of the pile removal equipment is no more than 30 minutes.

The following additional measures would apply to visual monitoring:

(a) Monitoring would be conducted by qualified observers. Qualified observers are trained biologists, with the following minimum qualifications:

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance; use of binoculars may be necessary to correctly identify the target;
- Advanced education in biological science, wildlife management, mammalogy, or related fields (bachelor's degree or higher is required);
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience);
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental injury from construction sound of marine mammals observed within a defined shutdown zone; and marine mammal behavior; and
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

A trained observer would be placed from the best vantage point(s) practicable (e.g., from a small boat, the pile removal barge, on shore, or any other suitable location) to monitor for marine mammals and implement shutdown or delay procedures when applicable by calling for the shutdown to the equipment operator.

(b) Prior to the start of pile removal activity, the shutdown zone would be monitored for 15 minutes to ensure that it is clear of marine mammals. Pile removal would only commence once observers have declared the shutdown zone clear of marine mammals; animals would be allowed to remain in the disturbance zone (i.e., must leave of their own volition) and their behavior would be monitored and documented.

(c) If a marine mammal approaches or enters the shutdown zone during the course of pile removal operations, pile removal would be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal.

Acoustic Measurements

Acoustic measurements would be used to empirically verify the predicted shutdown and disturbance zones for pneumatic chipping. For further detail regarding the Navy's acoustic monitoring plan see ''Proposed Monitoring and Reporting''.

Timing Restrictions

The Navy has set timing restrictions for pile removal activities to avoid in-water work when ESA-listed fish populations are most likely to be present. The in-water work window for avoiding negative impacts to fish species is July 16–February 15.

Soft Start

The use of a soft-start procedure is believed to provide additional protection to marine mammals by warning, or providing marine mammals a chance to leave the area prior to the hammer operating at full capacity. The wharf rehabilitation project would utilize soft-start techniques for vibratory pile removal. The soft-start requires contractors to initiate sound from vibratory hammers for fifteen seconds at reduced energy followed by a 30-second waiting period. This procedure would be repeated two additional times.

Daylight Construction

Pile removal and other in-water work would occur only during daylight hours (i.e., civil dawn to civil dusk).

Mitigation Effectiveness

It should be recognized that although marine mammals would be protected through the use of measures described here, the efficacy of visual detection depends on several factors including the observer's ability to detect the animal, the environmental conditions (visibility and sea state), and monitoring platforms. All observers utilized for mitigation activities would be experienced biologists with training in marine mammal detection and behavior.

Trained observers have specific knowledge of marine mammal physiology, behavior, and life history, which may improve their ability to detect individuals or help determine if observed animals are exhibiting behavioral reactions to construction activities.

The Puget Sound region, including the Hood Canal, only infrequently experiences winds with velocities in excess of 25 kn (Morris *et al.,* 2008). The typically light winds afforded by the surrounding highlands coupled with the fetch-limited environment of the Hood Canal result in relatively calm wind and sea conditions throughout most of the year. The wharf rehabilitation project site has a maximum fetch of 8.4 mi (13.5 km) to the north, and 4.2 mi (6.8 km) to the south, resulting in maximum wave heights of from 2.85–5.1 ft (0.9–1.6 m) (Beaufort Sea State (BSS) between two and four), even in extreme conditions (30 kt winds) (CERC, 1984). Visual detection conditions are considered optimal in BSS conditions of three or less, which align with the conditions that should be expected for the wharf rehabilitation project at NBKB.

NMFS has carefully evaluated the applicant's proposed mitigation measures and considered a range of other measures in the context of ensuring that NMFS prescribes the means of effecting the least practicable impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another: (1) The manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals; (2) the proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and (3) the practicability of the measure for applicant implementation, including consideration of personnel safety, and practicality of implementation.

Based on our evaluation of the applicant's proposed measures, as well as other measures considered by NMFS, NMFS has preliminarily determined that the proposed mitigation measures provide the means of effecting the least practicable impact on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an ITA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must, where applicable, 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 ITAs must include the suggested means of accomplishing the necessary monitoring and reporting that would 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 in the proposed action area.

Acoustic Monitoring

The Navy would conduct acoustic monitoring for pneumatic chipping of concrete piles to determine the actual distances to the 120 dB re 1 μPa rms isopleths for behavioral harassment relative to background levels. Underwater sound levels were measured at the project site in 2011 in the absence of construction activities to determine background sound levels and, therefore, will not be recorded again during this work window. Airborne acoustic monitoring would be conducted during pile removal through chipping to identify the actual distance to the 90 dB re 20 μPa rms and 100 dB re 20 μPa rms airborne isopleths.

At a minimum, the methodology would include:

- Acoustic monitoring will be conducted on a minimum of five concrete piles.
- For underwater recordings, a stationary hydrophone system with the ability to measure SPLs will be placed in accordance with NMFS' most recent guidance for collection of source levels.
- For airborne recordings, reference recordings will be attempted at approximately 50 ft (15.2 meters) from the source via a stationary hydrophone. However, other distances may be utilized to obtain better data if the signal cannot be isolated clearly due to other sound sources (i.e., barges or generators).
- Each hydrophone (underwater) and microphone (airborne) will be calibrated prior to the start of the action and will be checked at the beginning of each day of monitoring activity. Other hydrophones will be placed at other distances and/or depths as necessary to determine the distance to the thresholds for marine mammals.
- Environmental data will be collected including but not limited to: Wind speed and direction, wave height, water depth, precipitation, and type and location of in-water construction activities, as well as other factors that could contribute to influencing the airborne and underwater sound levels (e.g. aircraft, boats);
- The construction contractor will supply the Navy and other relevant monitoring personnel with the substrate composition, hammer model and size, hammer energy settings and any changes to those settings during the piles being monitored.
- For acoustically monitored piles, post-analysis of the sound level signals will include the average, minimum, and maximum rms value for each pile monitored during removal. A frequency spectrum will also be provided for the pneumatic chipping signal.
- Airborne levels would be recorded as an unweighted time series. The distance to marine mammal airborne sound disturbance thresholds would be determined.

Visual Monitoring

The Navy would collect sighting data and behavioral responses to construction for marine mammal species observed in the region of activity during the period of activity. All observers would be trained in marine mammal identification and behaviors. NMFS requires that the observers have no other construction-related tasks while conducting monitoring.

Methods of Monitoring—The Navy would monitor the shutdown zone and disturbance zone before, during, and after pile removal. There would, at all times, be at least one observer stationed at an appropriate vantage point to observe the shutdown zones associated with each operating hammer. There would also at all times be at least one vessel-based observer stationed within the WRA. In addition, at least one marine mammal observer would be stationed on any vessel conducting acoustic monitoring outside the WRA, for as long as such monitoring is conducted. Based on NMFS requirements, the Marine Mammal Monitoring Plan would include the following procedures for pile removal:

(1) MMOs would be located at the best vantage point(s) in order to properly see the entire shutdown zone and as much of the disturbance zone as possible. This may require the use of a small boat to monitor certain areas while also monitoring from one or more land based vantage points.

(2) During all observation periods, observers would use binoculars and the naked eye to search continuously for marine mammals.

(3) If the shutdown or disturbance zones are obscured by fog or poor lighting conditions, pile removal at that location would not be initiated until that zone is visible.

(4) The shutdown and disturbance zones around the pile would be

monitored for the presence of marine mammals before, during, and after any pile removal activity.

Pre-Activity Monitoring—The shutdown and disturbance zones would be monitored for 15 minutes prior to initiating pile removal. If marine mammal(s) are present within the shutdown zone prior to pile removal, or during the soft start, the start of pile removal would be delayed until the animal(s) leave the shutdown zone. Pile removal would resume only after the PSO has determined, through observation or by waiting 15 minutes, that the animal(s) has moved outside the shutdown zone.

During Activity Monitoring—The shutdown and disturbance zones would also be monitored throughout the time required to remove a pile. If a marine mammal is observed entering the disturbance zone, a take would be recorded and behaviors documented. However, that pile segment would be completed without cessation, unless the animal enters or approaches the shutdown zone, at which point all pile removal activities would be halted. Pile removal can only resume once the animal has left the shutdown zone of its own volition or has not been resighted for a period of 15 minutes.

Post-Activity Monitoring—Monitoring of the shutdown and disturbance zones would continue for 30 minutes following the completion of pile removal.

Individuals implementing the monitoring protocol would assess its effectiveness using an adaptive approach. Monitoring biologists would use their best professional judgment throughout implementation and would seek improvements to these methods when deemed appropriate. Any modifications to protocol would be coordinated between the Navy and NMFS.

Data Collection

NMFS requires that the PSOs use NMFS-approved sighting forms. In addition to the following requirements, the Navy would note in their behavioral observations whether an animal remains in the project area following a Level B taking (which would not require cessation of activity). This information would ideally make it possible to determine whether individuals are taken (within the same day) by one or more types of pile removal. NMFS requires that, at a minimum, the following information be collected on the sighting forms:

(1) Date and time that pile removal begins or ends;

(2) Construction activities occurring during each observation period;

(3) Weather parameters identified in the acoustic monitoring (e.g., percent cover, visibility);

(4) Water conditions (e.g., sea state, tide state);

(5) Species, numbers, and, if possible, sex and age class of marine mammals;

(6) Marine mammal behavior patterns observed, including bearing and direction of travel, and if possible, the correlation to SPLs;

(7) Distance from pile removal activities to marine mammals and distance from the marine mammals to the observation point;

(8) Locations of all marine mammal observations; and

(9) Other human activity in the area.

Reporting

A draft acoustic monitoring report would be submitted to NMFS within 90 calendar days of the completion of the acoustic measurements. Separately, a draft marine mammal monitoring report would be submitted within 90 calendar days of the completion of construction activity. The report would include marine mammal observations pre-activity, during-activity, and post-activity during pile removal days. Final reports would be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS. At a minimum, the reports would include:

- Date and time of activity;
- Water and weather conditions (e.g., sea state, tide state, percent cover, visibility);
- Description of the pile removal activity (e.g., size and type of piles, machinery used);
- The vibratory hammer force or chipping hammer setting used to extract the piles;
- A description of the monitoring equipment;
- The distance between hydrophone(s) and pile;
- The depth of the hydrophone(s);
- The physical characteristics of the bottom substrate from which the pile was extracted (if possible);
- The rms range and mean for each monitored pile;
- The results of the acoustic measurements, including the frequency spectrum, peak and rms SPLs for each monitored pile;
- The results of the airborne sound measurements (unweighted levels);
- Date and time observation is initiated and terminated;
- A description of any observable marine mammal behavior in the immediate area and, if possible, the correlation to underwater sound levels occurring at that time;
- Actions performed to minimize impacts to marine mammals;
- Times when pile removal is stopped due to presence of marine mammals within shutdown zones and time when pile removal resumes;
- Results, including the detectability of marine mammals, species and numbers observed, sighting rates and distances, behavioral reactions within and outside of shutdown zones; and
- A refined take estimate based on the number of marine mammals observed in the shutdown and disturbance zones.

Estimated Take by Incidental Harassment

With respect to the activities described 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].''

All anticipated takes would be by Level B harassment, involving temporary changes in behavior. The proposed mitigation and monitoring measures are expected to minimize the possibility of injurious or lethal takes such that take by Level A harassment, serious injury or mortality is considered remote. However, it is unlikely that injurious or lethal takes would occur even in the absence of the planned mitigation and monitoring measures.

If a marine mammal responds to an underwater sound by changing its behavior (e.g., through relatively minor changes in locomotion direction/speed or vocalization behavior), the response may or may not constitute taking at the individual level, and is unlikely to affect the stock or the species as a whole. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on animals or on the stock or species could potentially be significant (Lusseau and Bejder, 2007; Weilgart, 2007). Given the many uncertainties in predicting the quantity and types of impacts of sound on marine mammals, it is common practice to estimate how many animals are likely to be present within a particular distance of a given activity, or exposed to a particular level of sound. This practice potentially overestimates the numbers of marine mammals taken. For example, during the past 10 years, killer whales have been observed within the project area twice. On the basis of that information, an estimated amount of potential takes for killer whales is presented here. However, while a pod of killer whales could potentially visit again during the project timeframe, and thus be taken, it is more likely that they would not.

The proposed project area is not believed to be particularly important habitat for marine mammals, although harbor seals are year-round residents of Hood Canal and sea lions are known to haul-out on submarines and other man-made objects at the NBKB waterfront (although typically at a distance of a mile or greater from the project site). Therefore, behavioral disturbances that could result from anthropogenic sound associated with the proposed activities are expected to affect only a relatively small number of individual marine mammals, although those effects could be recurring if the same individuals remain in the project vicinity.

The Navy is requesting authorization for the potential taking of small numbers of Steller sea lions, California sea lions, harbor seals, transient killer whales, Dall's porpoises, and harbor porpoises in the Hood Canal that may result from pile removal during construction activities associated with the wharf rehabilitation project described previously in this document. No incidental take of humpback whale is predicted. The takes requested are expected to have no more than a minor effect on individual animals and no effect at the population level for these species. Any effects experienced by individual marine mammals are anticipated to be limited to short-term disturbance of normal behavior or temporary displacement of animals near the source of the sound.

Marine Mammal Densities

For all species, the best scientific information available was used to construct density estimates or estimate local abundance. Of available information deemed suitable for use, the data that produced the most conservative (i.e., highest) density or abundance estimate for each species was used. For harbor seals, this involved published literature describing harbor seal research conducted in Washington and Oregon as well as more specific counts conducted in Hood Canal (Huber *et al.,* 2001; Jeffries *et al.,* 2003). Killer whales are known from two periods of occurrence (2003 and 2005) and are not known to preferentially use any specific portion of the Hood Canal. Therefore, density was calculated as the maximum number of individuals present at a given time during those occurrences (London, 2006), divided by the area of Hood Canal. The best information available for the remaining species in Hood Canal came from surveys conducted by the Navy at the NBKB waterfront or in the vicinity of the project area. These consist of three discrete sets of survey effort, and are described here in greater detail.

Beginning in April 2008, Navy personnel have recorded sightings of marine mammals occurring at known haul-outs along the NBKB waterfront, including docked submarines or other structures associated with NBKB docks and piers and the nearshore pontoons of the floating security fence. Sightings of marine mammals within the waters adjoining these locations were also recorded. Sightings were attempted whenever possible during a typical work week (i.e., Monday through Friday), but inclement weather, holidays, or security constraints often precluded surveys. These sightings took place frequently (average fourteen per month) although without a formal survey protocol. During the surveys, staff visited each of the above-mentioned locations and recorded observations of marine mammals. Surveys were conducted using binoculars and the naked eye from shoreline locations or the piers/wharves themselves. Because these surveys consist of opportunistic sighting data from shore-based observers, largely of hauled-out animals, there is no associated survey area appropriate for use in calculating a density from the abundance data. Thus, NMFS has not used these data to derive a density but rather has used the absolute abundance to estimate take. For analysis in this proposed IHA, data were compiled for the period from April 2008 through June 2010—with the additional inclusion of twelve surveys from October 2011 in which only Steller sea lion observations were recorded, as this was the first record of Steller sea lion presence during the month of October—and these data provided the basis for take estimation for Steller and California sea lions. Other information, including sightings data from other Navy survey efforts at NBKB, is available for these two species, but these data provide the most conservative (i.e., highest) local abundance estimates (and thus the highest estimates of potential take). For all other species, the data source that provided the most conservative density estimate was used.

Vessel-based marine wildlife surveys were conducted according to established survey protocols during July through September 2008 and November through May 2009–10 (Tannenbaum *et al.,* 2009, 2011). Eighteen complete surveys of the nearshore area resulted in observations of four marine mammal species (harbor seal, California sea lion, harbor porpoise, and Dall's porpoise). These surveys operated along pre-determined transects parallel to the shoreline from the nearshore out to approximately 1,800 ft (549 m) from shoreline, at a spacing of 100 yd (91 m), and covered the entire NBKB waterfront (approximately 3.9 km^2 per survey) at a speed of 5 kn or less. Two observers recorded sightings of marine mammals both in the water and hauled out, including date, time, species, number of individuals, age (juvenile, adult), behavior (swimming, diving, hauled out, avoidance dive), and haul-out location. Positions of marine mammals were obtained by recording distance and bearing to the animal with a rangefinder and compass, noting the concurrent location of the boat with GPS, and, subsequently, analyzing these data to produce coordinates of the locations of all animals detected. These surveys produced the information used to estimate take for Dall's porpoise.

During 2011 construction activities, marine mammal monitoring was conducted on construction days for mitigation purposes. During those efforts, the Navy observed that harbor porpoises were more common in deeper waters of Hood Canal than the previously described, nearshore vessel-based surveys indicated. For that reason, the Navy conducted vessel-based line transect surveys in Hood Canal on days when no construction activities occurred in order to collect additional density data for species present in Hood Canal. These surveys were primarily conducted in September and detected three marine mammal species (harbor seal, California sea lion, and harbor porpoise), and included surveys conducted in both the main body of Hood Canal, near the project area, and baseline surveys conducted for comparison in Dabob Bay, an area of Hood Canal that is not affected by sound from Navy actions at the NBKB waterfront (see Figures 2–1 and 4–1 in the Navy's application). The surveys operated along pre-determined transects that followed a double saw-tooth pattern to achieve uniform coverage of the entire NBKB waterfront. The vessel traveled at a speed of approximately 5 kn when transiting along the transect lines. Two observers recorded sightings of marine mammals both in the water and hauled out, including the date, time, species, number of individuals, and behavior (swimming, diving, etc.). Positions of marine mammals were obtained by recording the distance and bearing to the animal(s), noting the concurrent location of the boat with GPS, and subsequently analyzing these data to produce coordinates of the locations of all animals detected. Sighting information for harbor porpoises was corrected for detectability (g(0) = 0.54; Barlow, 1988; Calambokidis *et al.,* 1993; Carretta *et al.,* 2001). Distance sampling methodologies were used to estimate densities of animals for these data. Due to the recent execution of these surveys, not all data have been processed. Due to the unexpected abundance of harbor porpoises encountered, data for this species were processed first and are available for use in this proposed IHA. All other species data may be included in subsequent environmental compliance documents once all post-processing is complete, but preliminary analysis indicates that use of the previously described data would still provide the most conservative take estimates for the other species.

The cetaceans, as well as the harbor seal, appear to range throughout Hood Canal; therefore, the analysis in this proposed IHA assumes that harbor seal, humpback whale, transient killer whale, harbor porpoise, and Dall's porpoise are uniformly distributed in the project area. However, it should be noted that there have been no observations of cetaceans within the WRA security barrier; the barrier thus appears to effectively prevent cetaceans from approaching the shutdown zones (please see Figure 6–2 of the Navy's application; the WRA security barrier, which is not denoted in the figure legend, is represented by a thin gray line). Although source levels associated with the proposed actions are so low that no Level A harassments would likely occur even in the absence of any mitigation measures, it appears that cetaceans at least are not at risk of Level A harassment at NBKB even from louder activities (e.g., impact pile driving). The remaining species that occur in the project area, Steller sea lion and California sea lion, do not appear to utilize most of Hood Canal. The sea lions appear to be attracted to the man-made haul-out opportunities along the NBKB waterfront while dispersing for foraging opportunities elsewhere in Hood Canal. California sea lions were not reported during aerial surveys of Hood Canal (Jeffries *et al.,* 2000), and Steller sea lions have only been documented at the NBKB waterfront.

Description of Take Calculation

The take calculations presented here rely on the best data currently available for marine mammal populations in the Hood Canal, as discussed in preceding sections. The formula was developed for calculating take due to pile removal activity and applied to each group-specific sound impact threshold. The formula is founded on the following assumptions:

- All pilings to be installed would have a sound disturbance distance equal to that of the piling that causes the greatest sound disturbance (i.e., the piling furthest from shore);
- All marine mammal individuals potentially available are assumed to be present within the relevant area, and thus incidentally taken; and,
- An individual can only be taken once during a 24-hour period.

The calculation for marine mammal takes is estimated by:

Take estimate = (n * ZOI) * days of total activity

Where:

n = density estimate used for each species/season

ZOI = sound threshold zone of influence (ZOI) impact area; the area encompassed by all locations where the SPLs equal or exceed the threshold being evaluated

n * ZOI produces an estimate of the abundance of animals that could be present in the area for exposure, and is rounded to the nearest whole number before multiplying by days of total activity.

The ZOI impact area is the estimated range of impact to the sound criteria. The distances specified in Tables 2 and 4 (actual distances rather than modeled) were used to calculate ZOI around each pile. The ZOI impact area took into consideration the possible affected area of the Hood Canal from the pile removal site furthest from shore with attenuation due to land shadowing from bends in the canal. Because of the close proximity of some of the piles to the shore, the narrowness of the canal at the project area, and the maximum fetch, the ZOIs for each threshold are not necessarily spherical and may be truncated.

For sea lions, as described previously, the surveys offering the most conservative estimates of abundance do not have a defined survey area and so are not suitable for deriving a density construct. Instead, abundance is estimated on the basis of previously described opportunistic sighting information at the NBKB waterfront, and it is assumed that the total amount of animals known from NBKB haul-outs would be ''available'' to be taken in a given pile removal day. Thus, for these two species, take is estimated by multiplying abundance by days of activity.

The total number of days spent removing piles is expected to be a maximum of 15 for vibratory removal and 32 for chipping. While pile removal can occur any day throughout the in-water work window, and the analysis is conducted on a per day basis, only a fraction of that time is actually spent in pile removal. For each pile, vibratory pile removal is expected to be no more than 1 hour. Pneumatic chipping is expected to take approximately 2 hours per pile.

The exposure assessment methodology is an estimate of the numbers of individuals exposed to the effects of pile removal activities exceeding NMFS-established thresholds. Of note in these exposure estimates, mitigation methods (i.e., visual monitoring and the use of shutdown zones) were not quantified within the assessment and successful implementation of this mitigation is not reflected in exposure estimates. Results from acoustic impact exposure assessments should be regarded as conservative estimates.

Airborne Sound—No incidents of incidental take are predicted as a result of exposure to airborne sound, using the formula given in this section and the information from Table 4. This is primarily due to the low source levels associated with the specified activities. However, it is NMFS' view that authorization for incidental take resulting from exposure to airborne sound, in the absence of any haul-outs or opportunities for an animal to haul out within the ZOI, would effectively result in double counting. Such exposure results when pinnipeds raise their heads above water; thus, those individuals are within the larger ZOI corresponding to Level B harassment resulting from underwater sound produced by the same source, and are already exposed and considered as an incidental take. As noted previously, NMFS considers an individual as able to be incidentally taken once per 24-hour period. Multiple incidents of exposure to sound above NMFS' thresholds for behavioral harassment are not believed to result in increased behavioral disturbance, in either nature or intensity of disturbance reaction.

California Sea Lion

California sea lions are present in Hood Canal during much of the year with the exception of mid-June through August. California sea lions occur regularly in the vicinity of the project site from September through mid-June, as determined by Navy waterfront surveys conducted from April 2008 through June 2010 (Navy, 2010; Table 6). With regard to the range of this species in Hood Canal and the project area, it is assumed on the basis of waterfront observations (Agness and Tannenbaum, 2009; Tannenbaum *et al.,* 2009, 2011) that the opportunity to haul out on submarines docked at Delta Pier is a primary attractant for California sea lions in Hood Canal, as they have rarely been reported, either hauled out or swimming, elsewhere in Hood Canal (Jeffries, 2007). Abundance is calculated as the monthly average of the maximum number observed in a given month, as opposed to the overall average (Table 6). For example, in the month of May, the maximum number of animals observed on any one day was 25 in 2008, 33 in 2009, and 17 in 2010, providing a monthly average of the maximum daily number observed of 25. This provides a conservative overall daily abundance of 26.2 for the in-water work window, as compared with an actual per survey abundance of 11.4 during the same period.

TABLE 6—CALIFORNIA SEA LION SIGHTING INFORMATION FROM NBKB, APRIL 2008–JUNE 2010

Month	Number of surveys	Number of surveys with animals present	Frequency of presence [1]	Abundance [2]
January	25	15	0.60	24.0
February	28	24	0.86	31.0
March	28	26	0.93	38.5
April	38	27	0.71	36.3
May	44	34	0.77	25.0
June	44	7	0.16	5.3
July	31	0	0	0
August	29	1	0.03	0.5
September	26	9	0.35	22.0
October	26	22	0.85	45.5
November	22	22	1	54.0
December	24	14	0.58	32.5
Total or average (in-water work season only)	211	107	0.53	26.2

Totals (number of surveys) and averages (frequency and abundance) presented for in-water work season (July–February) only. Information from March–June presented for reference.

[1] Frequency is the number of surveys with California sea lions present/number of surveys conducted.

[2] Abundance is calculated as the monthly average of the maximum daily number observed in a given month.

The largest observed number of California sea lions hauled out along the NBKB waterfront was 58 in a November survey. During the in-water construction period (mid-July to mid-February) the largest daily attendance average for each month ranged from 24 individuals to 54 individuals. The likelihood of California sea lions being present at NBKB is greatest from October through May, when the frequency of attendance in surveys was at least 0.58. Attendance along the NBKB waterfront in November surveys (2008–09) was 100 percent. Additionally, five navigational buoys near the entrance to Hood Canal were documented as potential haul-outs, each capable of supporting three adult California sea lions (Jeffries *et al.,* 2000). Breeding rookeries are in California; therefore, pups are not expected to be present in Hood Canal (NMFS 2008b). Female California sea lions are rarely observed north of the California/Oregon border; therefore, only adult and sub-adult males are expected to be exposed to project impacts.

The ZOI for vibratory removal encompasses areas where California sea lions are known to haul-out; assuming that 26 individuals could be taken per day of vibratory removal provides an estimate of 390 takes for that activity. The ZOI for pneumatic chipping does not encompass areas where California sea lions are known to occur; nevertheless, it is likely that some individuals would transit this area in route to haul out or forage. Therefore, and in order to ensure that the Navy is adequately authorized for incidental take, NMFS predicts that at least one individual California sea lion could be exposed to sound levels indicating Level B harassment per day of pneumatic chipping. Table 8 depicts the estimated number of behavioral harassments.

Steller Sea Lion

Steller sea lions were first documented at the NBKB waterfront in November 2008, while hauled out on submarines at Delta Pier (Bhuthimethee, 2008; Navy, 2010) and have been periodically observed since that time. Steller sea lions typically occur at NBKB from November through April; however, the first October sightings of Steller sea lions at NBKB occurred in 2011. Based on waterfront observations, Steller sea lions appear to use available haul-outs (typically in the vicinity of Delta Pier, approximately one mile south of the project area) and habitat similarly to California sea lions, although in lesser numbers. On occasions when Steller sea lions are observed, they typically occur in mixed groups with California sea lions also present, allowing observers to confirm their identifications based on discrepancies in size and other physical characteristics. During October 2011, up to four individuals were sighted either hauled out at the submarines docked at Delta Pier or swimming in the waters just adjacent to those haul-outs.

Vessel-based survey effort in NBKB nearshore waters have not detected any Steller sea lions (Agness and Tannenbaum, 2009; Tannenbaum *et al.,* 2009, 2011). Opportunistic sightings data provided by Navy personnel since April 2008 have continued to document sightings of Steller sea lions at Delta Pier from November through April (Table 7). Steller sea lions have only been observed hauled out on submarines docked at Delta Pier. Delta Pier and other docks at NBKB are not accessible to pinnipeds due to the height above water, although the smaller California sea lions and harbor seals are able to haul out on pontoons that support the floating security barrier. One to two animals are typically seen hauled out with California sea lions; the maximum Steller sea lion group size seen at any given time was six individuals in November 2009.

TABLE 9—STELLER SEA LION SIGHTING INFORMATION FROM NBKB, APRIL 2008–JUNE 2010; OCTOBER 2011

Month	Number of surveys	Number of surveys with animals present	Frequency of presence [1]	Abundance [2]
January	25	4	0.16	1.0
February	28	1	0.04	0.5
March	28	4	0.14	1.0
April	38	5	0.13	1.3
May	44	0	0	0
June	44	0	0	0
July	31	0	0	0
August	29	0	0	0
September	26	0	0	0
October	38	12	0.32	1.3
November	22	3	0.14	5.0
December	24	5	0.21	1.5
Total or average (in-water work season only)	223	25	0.11	1.2

Totals (number of surveys) and averages (frequency and abundance) presented for in-water work season (July–February) only. Information from March–June presented for reference.

[1] Frequency is the number of surveys with Steller sea lions present/number of surveys conducted.

[2] Abundance is calculated as the monthly average of the maximum daily number observed in a given month.

Their frequency of occurrence by month typically has not exceeded 0.21 (in December 2009), i.e., they were present in only 21 percent of surveys that month. However, all 12 surveys conducted in October 2011 resulted in Steller sea lion sightings, raising the frequency of occurrence for that month to 0.32. The time period from November through April coincides with the time when Steller sea lions are frequently observed in Puget Sound. Only adult and sub-adult males are likely to be present in the project area during this time; female Steller sea lions have not been observed in the project area. Since there are no known breeding rookeries in the vicinity of the project site, Steller sea lion pups are not expected to be present. By May, most Steller sea lions have left inland waters and returned to their rookeries to mate. Although sub-adult individuals (immature or pre-breeding animals) will occasionally remain in Puget Sound over the summer, observational data (Table 7) have indicated that Steller sea lions are present only from October through April and not during the summer months.

Local abundance information, rather than density, was used in estimating take for Steller sea lions. Please see the discussion provided previously for California sea lions. Steller sea lions are known only from haul-outs over one mile from the project area, and would not be subject to harassment from airborne sound. The ZOI for vibratory removal encompasses areas where Steller sea lions are known to haul-out; assuming that one individual could be taken per day of vibratory removal provides an estimate of fifteen takes for that activity. However, the available abundance information does not reflect the nature of Steller sea lion occurrence at NBKB. According to the most recent observational information, if Steller sea lions are present at NBKB, it is possible that as many as four individuals could be present on submarines docked at Delta Pier or in waters adjacent to these haul-outs. Thus, NMFS conservatively assumes that up to four individuals could be exposed to sound levels indicating Level B harassment per day of vibratory pile removal. Similar to California sea lions, the ZOI for pneumatic chipping does not encompass areas where Steller sea lions are known to occur; nevertheless, it is possible that some individuals could transit this area in route to haul out or forage. Therefore, and in order to ensure that the Navy is adequately authorized for incidental take, NMFS predicts that at least one individual Steller sea lion could be exposed to sound levels indicating Level B harassment per day of pneumatic chipping. Table 8 depicts the number of estimated behavioral harassments.

Harbor Seal

Harbor seals are the most abundant marine mammal in Hood Canal, where they can occur anywhere in Hood Canal waters year-round. The Navy detected harbor seals during marine mammal boat surveys of the waterfront area from July to September 2008 (Tannenbaum *et al.,* 2009) and November to May 2010 (Tannenbaum *et al.,* 2011), as described previously. Harbor seals were sighted during every survey and were found in all marine habitats including nearshore waters and deeper water, and hauled out on certain manmade objects, such as the pontoons of the floating security barrier. During most of the year, all age and sex classes could occur in the project area throughout the period of construction activity. As there are no known regular pupping sites in the vicinity of the project area, harbor seal neonates are not expected to be present during pile removal. However, the first documented birth of a harbor seal at NBKB occurred in August 2011 at Carderock Pier (several miles south of the project site), so the presence of neonates is possible, if unlikely. Otherwise, during most of the year, all age and sex classes could occur in the project area throughout the period of construction activity. Harbor seal numbers increase from January through April and then decrease from May through August as the harbor seals move to adjacent bays on the outer coast of Washington for the pupping season. From April through mid-July, female harbor seals haul out on the outer coast of Washington at pupping sites to give birth. The main haul-out locations for harbor seals in Hood Canal are located on river delta and tidal exposed areas at various river mouths, with the closest haul-out area to the project area being 10 mi (16 km) southwest of NBKB (London, 2006). Please see Figure 4–1 of the Navy's application for a map of haul-out locations in relation to the project area.

Jeffries *et al.* (2003) conducted aerial surveys of the harbor seal population in Hood Canal in 1999 for the Washington Department of Fish and Wildlife and reported 711 harbor seals hauled out. The authors adjusted this abundance with a correction factor of 1.53 to account for seals in the water, which were not counted, and estimated that there were 1,088 harbor seals in Hood Canal. The correction factor (1.53) was based on the proportion of time seals spend on land versus in the water over the course of a day, and was derived by dividing one by the percentage of time harbor seals spent on land. These data came from tags (VHF transmitters) applied to harbor seals at six areas (Grays Harbor, Tillamook Bay, Umpqua River, Gertrude Island, Protection/Smith Islands, and Boundary Bay, BC) within two different harbor seal stocks (the coastal stock and the inland waters of WA stock) over four survey years. The Hood Canal population is part of the inland waters stock, and while not specifically sampled, Jeffries *et al.* (2003) found the VHF data to be broadly applicable to the entire stock. The tagging research in 1991 and 1992 conducted by Huber *et al.* (2001) and Jeffries *et al.* (2003) used the same methods for the 1999 and 2000 survey years. These surveys indicated that approximately 35 percent of harbor seals are in the water versus hauled out on a daily basis (Huber *et al.,* 2001; Jeffries *et al.,* 2003). Exposures were calculated using a density derived from the number of harbor seals that are present in the water at any one time (35 percent of 1,088, or approximately 381 individuals), divided by the area of the Hood Canal (291 km^2 [112 mi^2]) and the formula presented previously.

NMFS recognizes that over the course of the day, while the proportion of animals in the water may not vary significantly, different individuals may enter and exit the water. However, fine-scale data on harbor seal movements within the project area on time durations of less than a day are not available. Previous monitoring experience from Navy actions conducted from July-October 2011 in the same project area has indicated that this density provides an appropriate estimate of potential exposures. Data from those monitoring efforts are currently in post-processing and are not available in report form at this time. However, the density of harbor seals calculated in this manner (1.3 animals/km^2) is corroborated by results of the Navy's vessel-based marine mammal surveys at NBKB in 2008 and 2009–10, in which an average of five individual harbor seals per survey was observed in the 3.9 km^2 survey area (density = 1.3 animals/km^2) (Tannenbaum *et al.,* 2009, 2011). Table 8 depicts the number of estimated behavioral harassments.

Humpback Whales

One humpback whale has recently been documented in Hood Canal. This individual was originally sighted on January 27, 2012 and, while potentially still present, was last reported on February 23, 2012. Although known to be historically abundant in the inland waters of Washington, no other confirmed documentation of humpback whales in Hood Canal is available. Their presence has likely not occurred in several decades, with the last known reports being anecdotal accounts of three humpback sightings from 1972–82. Although it cannot be confirmed that this individual has departed the Hood Canal, with the absence of sighting records since February 23 (following regular sightings between January 27–February 23) and the lack of any historical regular occurrence in the Hood Canal it is likely that this individual has departed and that no humpback whales would be present in the proposed action area. In addition, the proposed action is estimated to occur for only 15 days, with short pile removal durations per day. As described before, cetaceans are not known from within the WRA and it's virtually impossible that an animal as large as a humpback whale could occur within the WRA; therefore, sound from pneumatic chipping, which is not expected to extend beyond the floating security barrier, would not have the potential to affect humpback whales. NMFS believes that the possibility for incidental take of humpback whales is discountable. In addition to the preceding rationale given in support of this belief, a density was derived from the available information: One humpback whale ranging through the Hood Canal (291 km^2), or 0.003 animals/km^2. Using this density and the formula given previously, no takes are predicted.

Killer Whales

Transient killer whales are uncommon visitors to Hood Canal. Transients may be present in the Hood Canal anytime during the year and traverse as far as the project site. Resident killer whales have not been observed in Hood Canal, but transient pods (six to eleven individuals per event) were observed in Hood Canal for lengthy periods of time (59–172 days) in 2003 (January–March) and 2005 (February–June), feeding on harbor seals (London, 2006).

These whales used the entire expanse of Hood Canal for feeding. Subsequent aerial surveys suggest that there has not been a sharp decline in the local seal population from these sustained feeding events (London, 2006). Based on this data, the density for transient killer whales in the Hood Canal for January to June is 0.038/km^2 (eleven individuals divided by the area of the Hood Canal [291 km^2]). Table 8 depicts the number of estimated behavioral harassments.

Dall's Porpoise

Dall's porpoises may be present in the Hood Canal year-round and could occur as far south as the project site. Their use of inland Washington waters, however, is mostly limited to the Strait of Juan de Fuca. The Navy conducted vessel-based surveys of the waterfront area in 2008–10 (Tannenbaum *et al.,* 2009, 2011). During one of the surveys a Dall's porpoise was sighted in August in the deeper waters off Carlson Spit.

In the absence of an abundance estimate for the entire Hood Canal, a density was derived from the waterfront survey by the number of individuals seen divided by total number of kilometers of survey effort (18 surveys with approximately 3.9 km^2 [1.5 mi^2] of effort each), assuming strip transect surveys. In the absence of any other survey data for the Hood Canal, this density is assumed to be throughout the project area. Exposures were calculated using the formula presented previously. Table 8 depicts the number of estimated behavioral harassments.

Harbor Porpoise

Harbor porpoises may be present in the Hood Canal year-round; their presence had previously been considered rare. During waterfront surveys of NBKB nearshore waters from 2008–10 only one harbor porpoise had been seen in 18 surveys of 3.9 km^2 each. However, during monitoring of recent Navy actions at NBKB, several sightings indicated that their presence may be more frequent in deeper waters of Hood Canal than had been believed on the basis of existing survey data and anecdotal evidence. Subsequently, the Navy conducted dedicated vessel-based line transect surveys on days when no construction activity occurred (due to security, weather, etc.), described previously in this document, with regular observations of harbor porpoise groups. Sightings in the deeper waters of Hood Canal ranged up to eleven individuals, with an average of approximately six animals sighted per survey day (Navy, in prep.).

Sightings of harbor porpoises during these surveys were used to generate a density for Hood Canal. Based on guidance from other line transect surveys conducted for harbor porpoises using similar monitoring parameters (e.g., boat speed, number of observers) (Barlow, 1988; Calambokidis *et al.,* 1993; Caretta *et al.,* 2001), the Navy determined the effective strip width for the surveys to be 1 km, or a perpendicular distance of 500 m from the transect to the left or right of the vessel. The effective strip width was set at the distance at which the detection probability for harbor porpoises was equivalent to one, which assumes that all individuals on a transect are detected. Only sightings occurring within the effective strip width were used in the density calculation. By multiplying the trackline length of the surveys by the effective strip width, the total area surveyed during the surveys was 259.01 km². Thirty-five individual harbor porpoises were sighted within this area, resulting in a density of 0.135 animals per km². To account for availability bias, or the animals which are unavailable to be detected because they are submerged, the Navy utilized a g(0) value of 0.54, derived from other similar line transect surveys (Barlow, 1988; Calambokidis *et al.,* 1993; Carretta *et al.,* 2001). This resulted in a density of 0.250 harbor porpoises per km². For comparison, 274.27 km² of trackline survey effort in nearby Dabob Bay produced a corrected density estimate of 0.203 harbor porpoises per km². Exposures were calculated using the formula described previously. Table 8 depicts the number of estimated behavioral harassments.

Potential takes could occur if individuals of these species move through the area on foraging trips when pile removal is occurring. Individuals that are taken could exhibit behavioral changes such as increased swimming speeds, increased surfacing time, or decreased foraging. Most likely, individuals may move away from the sound source and be temporarily displaced from the areas of pile removal. Potential takes by disturbance would likely have a negligible short-term effect on individuals and not result in population-level impacts.

TABLE 8—NUMBER OF POTENTIAL INCIDENTAL TAKES OF MARINE MAMMALS WITHIN VARIOUS ACOUSTIC THRESHOLD ZONES

Species	Density/ abundance	Underwater			Airborne	Total proposed authorized takes
		Injury threshold [1]	Disturbance threshold—vibratory removal (120 dB)	Disturbance threshold—pneumatic chipping (120 dB)	Disturbance threshold [2]	
California sea lion	[3] 26.2	0	* 390	* 32	0	422
Steller sea lion	[3] 1.2	0	* 60	* 32	0	92
Harbor seal	1.31	0	705	32	0	737
Humpback whale	0.003	0	0	0	N/A	0
Killer whale	0.038	0	15	0	N/A	15
Dall's porpoise	0.014	0	15	0	N/A	15
Harbor porpoise	0.250	0	135	0	N/A	135
Total	....	0	1,320	96	0	1,416

* See preceding species-specific discussions for description of take estimate.

[1] Acoustic injury threshold is 190 dB for pinnipeds and 180 dB for cetaceans. No activity would produce source levels equal to 190 dB, while only vibratory removal would produce a source level of 180 dB.

[2] Acoustic disturbance threshold is 100 dB for sea lions and 90 dB for harbor seals. NMFS does not believe that pinnipeds would be available for airborne acoustic harassment because they are known to haul-out only at locations well outside the zone in which airborne acoustic harassment could occur; nevertheless, calculations predict that no incidental take would occur as a result of airborne sound.

[3] Figures presented are abundance numbers, not density, and are calculated as the average of average daily maximum numbers per month. Abundance numbers are rounded to the nearest whole number for take estimation.

Negligible Impact and Small Numbers Analysis and Preliminary 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 variety of factors, including but not limited to: (1) The number of anticipated mortalities; (2) the number and nature of anticipated injuries; (3) the number, nature, intensity, and duration of Level B harassment; and (4) the context in which the take occurs.

Pile removal activities associated with the wharf rehabilitation project, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the proposed activities may result in take, in the form of Level B harassment (behavioral disturbance) only, from underwater sounds generated through pile removal. No mortality, serious injury, or Level A harassment is anticipated given the nature of the activity (i.e., non-pulsed sound with low source levels) and measures designed to minimize the possibility of injury to marine mammals, while Level B harassment would be reduced to the level of least practicable adverse impact for the same reasons. Specifically, these removal methods would produce lower source levels than would pile installation with a vibratory hammer, which does not have significant potential to cause injury to marine mammals due to its sound source characteristics and relatively low source levels. Pile removal would either not start or be halted if marine mammals approach the shutdown zone (described previously in this document). The pile removal activities analyzed here carry significantly less risk of impact to marine mammals than did other construction activities analyzed and monitored within the Hood Canal, including two recent projects conducted by the Navy at the same location (test pile project and the first year of EHW–1 pile replacement work) as well as work conducted in 2005 for the Hood Canal Bridge (SR–104) by the Washington Department of Transportation. These activities have taken place with no reported injuries or mortality to marine mammals.

The proposed numbers of authorized take for marine mammals would be considered small relative to the relevant stocks or populations even if each estimated taking occurred to a new individual—an extremely unlikely scenario. The proposed numbers of authorized take represent 5 percent of the relevant stock for harbor seals, 4.2

percent for transient killer whales, and 1.3 percent for harbor porpoises; the proposed numbers are less than 1 percent for the remaining species. However, even these low numbers represent potential instances of take, not the number of individuals taken. That is, it is likely that a relatively small subset of Hood Canal harbor seals, which is itself a small subset of the regional stock, would be harassed by project activities.

For example, while the available information and formula estimate that as many as 737 exposures of harbor seals to stimuli constituting Level B harassment could occur, that number represents some portion of the approximately 1,088 harbor seals resident in Hood Canal (approximately 7 percent of the regional stock) that could potentially be exposed to sound produced by pile removal activities on multiple days during the project. No rookeries are present in the project area, there are no haul-outs other than those provided opportunistically by man-made objects, and the project area is not known to provide foraging habitat of any special importance. Repeated exposures of individuals to levels of sound that may cause Level B harassment are unlikely to result in hearing impairment or to significantly disrupt foraging behavior. Thus, even repeated Level B harassment of some small subset of the overall stock is unlikely to result in any significant realized decrease in viability for Hood Canal harbor seals, and thus would not result in any adverse impact to the stock as a whole.

NMFS has preliminarily determined that the impact of the previously described wharf rehabilitation project may result, at worst, in a temporary modification in behavior (Level B harassment) of small numbers of marine mammals. No injury, serious injury, or mortality is anticipated as a result of the specified activity, and none is proposed to be authorized. Additionally, animals in the area are not expected to incur hearing impairment (i.e., TTS or PTS) or non-auditory physiological effects. For pinnipeds, the absence of any major rookeries and only a few isolated and opportunistic haul-out areas near or adjacent to the project site means that potential takes by disturbance would have an insignificant short-term effect on individuals and would not result in population-level impacts. Similarly, for cetacean species the absence of any known regular occurrence adjacent to the project site means that potential takes by disturbance would have an insignificant short-term effect on individuals and would not result in population-level impacts. Due to the nature, degree, and context of behavioral harassment anticipated, the activity is not expected to impact rates of recruitment or survival.

While the number of marine mammals potentially incidentally harassed would depend on the distribution and abundance of marine mammals in the vicinity of the survey activity, the number of potential harassment takings is estimated to be small relative to regional stock or population number, and has been mitigated to the lowest level practicable through incorporation of the proposed mitigation and monitoring measures mentioned previously in this document. This activity is expected to result in a negligible impact on the affected species or stocks. The eastern DPS of the Steller sea lion is listed as threatened under the ESA; no other species for which take authorization is requested are either ESA-listed or considered depleted under the MMPA.

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 finds that the proposed wharf construction project would result in the incidental take of small numbers of marine mammals, by Level B harassment only, and that the total taking from the activity would have a negligible impact on the affected species or stocks.

Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses

No tribal subsistence hunts are held in the vicinity of the project area; thus, temporary behavioral impacts to individual animals would not affect any subsistence activity. Further, no population or stock level impacts to marine mammals are anticipated or authorized. As a result, no impacts to the availability of the species or stock to the Pacific Northwest treaty tribes are expected as a result of the proposed activities. Therefore, no relevant subsistence uses of marine mammals are implicated by this action.

Endangered Species Act (ESA)

There are two ESA-listed marine mammal species with known occurrence in the project area: The eastern DPS of the Steller sea lion, listed as threatened, and the humpback whale, listed as endangered. Because of the potential presence of these species, the Navy has requested a formal consultation with the NMFS Northwest Regional Office under section 7 of the ESA. NMFS' Office of Protected Resources has also initiated formal consultation on its authorization of incidental take of Steller sea lions. These consultations are in progress. These species do not have critical habitat in the action area.

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, the Navy prepared an Environmental Assessment (EA) to consider the direct, indirect and cumulative effects to the human environment resulting from the pile replacement project. NMFS adopted that EA in order to assess the impacts to the human environment of issuance of an IHA to the Navy. NMFS signed a Finding of No Significant Impact (FONSI) on May 17, 2011. On the basis of new information related to the occurrence of marine mammals in the Hood Canal, the Navy is preparing a supplement to that EA. NMFS will review that document and, if appropriate, issue a new FONSI.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to authorize the take of marine mammals incidental to the Navy's wharf rehabilitation project, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: April 24, 2012.

Helen M. Golde,

Acting Director, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. 2012–10370 Filed 4–27–12; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XB109

Taking and Importing Marine Mammals; Naval Explosive Ordnance Disposal School Training Operations at Eglin Air Force Base, Florida

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