BILLING CODE 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XD977

Taking of Marine Mammals Incidental to Specified Activities: Mukilteo Multimodal Project Tank Farm Pier Removal

AGENCY: National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Commerce.

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

SUMMARY: Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an authorization to WSF to incidentally take, by harassment, small numbers of marine mammals for a period of 1 year.

DATES: Comments and information must be received no later than [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Comments on the application should be addressed to Robert Pauline, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910. The mailbox address for providing email comments is *itp.pauline@noaa.gov*. NMFS is not responsible for e-mail comments sent to addresses other than the one provided here. Comments sent via e-mail, including all attachments, must not exceed a 25-megabyte file size.

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

A copy of the application may be obtained by writing to the address specified above or visiting the internet at: *http://www.nmfs.noaa.gov/pr/permits/incidental/construction.htm*. Documents cited in this notice may also be viewed, by appointment, during regular business hours, at the aforementioned address.

FOR FURTHER INFORMATION CONTACT: Robert Pauline, 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.

An 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 a one-year authorization to incidentally take small numbers of marine mammals by harassment, provided that there is no potential for serious injury or mortality to result from the activity. 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.

Summary of Request

On November 6, 2014, Washington State Department of Transportation Ferries System (WSF) submitted a request to NOAA requesting an IHA for the possible harassment of small numbers of eight marine mammal species incidental to construction work associated with the Mukilteo Ferry Terminal replacement project in Mukilteo, Snohomish County, Washington. The new terminal will be located to the east of the existing location at the site of the former U.S. Department of Defense Fuel Supply Point facility, known as the Tank Farm property, which includes a large pier extending into Possession Sound (Figure 1-2 and 1-3 of the WSF IHA application which may be found

at URL: *http://www.nmfs.noaa.gov/pr/permits/incidental/construction.htm*). Completion of the entire project will occur over 4 consecutive years. WSF plans to submit an IHA request for each consecutive year of construction. WSF previously received an IHA on July 25, 2014 (79 FR 43424) which was active from September 1, 2014 through August 31, 2015. However, the project was delayed for one year. The IHA application currently under review would cover work from September 1, 2015 through August 31, 2016. All existing pile work will be done under these two successive permits. Due to NMFS, U.S. Fish and Wildlife Service (USFWS), and Washington State Department of Fish and Wildlife (WDFW) in-water work timing restrictions to protect salmonids listed under the Endangered Species Act (ESA), planned WSF in-water construction is limited each year to August 1 through February 15. For removal of the Tank Farm Pier, in-water construction is planned to take place between August 1, 2015 and February 15, 2016; and continue in August 1, 2016 to February 15, 2017 if pier removal and dredging is not completed during the 2015/16 work window. A new MMPA IHA application will be submitted for subsequent construction years for this project.

The action discussed in this document is based on WSF's November 6, 2014 IHA application. NMFS is proposing to authorize the Level B harassment of the following marine mammal species: Pacific harbor seal (*Phoca vitulina richardsi*), California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), killer whale (*Orcinus orca*), gray whale (*Eschrichtius robustus*), and humpback whale (*Megaptera novaeangliae*)

Specific Geographic Region

The Mukilteo Tank Farm is located within the city limits of Mukilteo and Everett, Snohomish County, Washington. The property is located on the shore of Possession Sound, an embayment of the inland marine waters of Puget Sound (see Figures 1-1 and 1-2 in the Application).

Description of the Specified Activity

The Mukilteo Tank Farm Pier, which has not been used for fuel transfers since the late 1970s, covers approximately 138,080 ft^2 (3.17 acres) over-water and contains approximately 3,900 12-inch diameter creosote-treated piles. Demolition of the pier will remove approximately 7,300 tons of creosote-treated timber from the aquatic environment. Demolition will take approximately ten months over two in-water work windows. Removal of the pier will occur from land and from a barge containing a derrick, crane and other necessary equipment.

Piles will be removed with a vibratory hammer or by direct pull using a chain wrapped around the pile. The crane operator will take measures to reduce turbidity, such as vibrating the pile slightly to break the bond between the pile and surrounding soil, and removing the pile slowly; or if using direct pull, keep the rate at which piles are removed low enough to meet regulatory turbidity limit requirements. If piles are so deteriorated they cannot be removed using either the vibratory or direct pull method, the operator will use a clamshell to pull the piles from below the mudline, or cut at or just below the mudline (up to one foot) using a hydraulic saw.

Pile removal and demolition of creosote-treated timber elements of the Tank Farm Pier will take place between August 1 and February 15. All work will occur in water depths between 0 and -30 feet mean lower-low water.

The first year of construction activities for the Mukilteo Multimodal Project is limited to removing the Tank Farm Pier. The noise produced by the proposed vibratory pile extraction may impact marine mammals. Direct pull and clamshell removal are not expected to exceed noise levels that would injure or harass marine mammals. These extraction methods are described below.

Vibratory Hammer Removal

Vibratory hammer extraction is a common method for removing timber piling. A vibratory hammer is suspended by cable from a crane and derrick, and positioned on the top of a pile. The pile is then unseated from the sediments by engaging the hammer, creating a vibration that loosens the sediments binding the pile, and then slowly lifting up on the hammer with the aid of the crane. Once unseated, the crane continues to raise the hammer and pulls the pile from the sediment.

When the pile is released from the sediment, the vibratory hammer is disengaged and the pile is pulled from the water and placed on a barge for transfer upland. Vibratory removal will take approximately 10 to 15 minutes per pile, depending on sediment conditions.

Direct Pull and Clamshell Removal

Older timber pilings are particularly prone to breaking at the mudline because of damage from marine borers and vessel impacts. In some cases, removal with a vibratory hammer is not possible if the pile is too fragile to withstand the hammer force. Broken or

damaged piles may be removed by wrapping the piles with a cable and pulling them directly from the sediment with a crane. If the piles break below the waterline, the pile stubs will be removed with a clamshell bucket, a hinged steel apparatus that operates like a set of steel jaws. The bucket will be lowered from a crane and the jaws will grasp the pile stub as the crane pulled up. The broken piling and stubs will be loaded onto the barge for off-site disposal. Clamshell removal will be used only if necessary, as it will produce temporary, localized turbidity impacts. Turbidity will be kept within required regulatory limits. Direct pull and clamshell removal do not produce noise that could impact marine mammals.

Dates and Duration

The subject IHA application addresses Year One and a first month of Year Two. The first month of the project is covered by the existing IHA permit (expiring in August 2015). The new IHA would be active from September 1, 2015 through August 31, 2016, which allows for one month of pier removal if necessary in Year Two. If the rate of pier removal in Year One is slow enough to suggest that pier removal will continue beyond the first month (August) of Year Two, an additional IHA request will be submitted to ensure that pier removal can be completed.

The daily construction window for pile removal will begin no sooner than 30 minutes after sunrise to allow for initial marine mammal monitoring, and will end at sunset (or soon after), when visibility decreases to the point that effective marine mammal monitoring is not possible.

Vibratory pile removal will take approximately 10 to 15 minutes per pile. Assuming the worst case of 15 minutes per pile (with no direct pull or clamshell removal),

removal of 3,900 piles will take and estimated 675-975 hours over 140-180 days of pile removal (Table 2-2 in the Application). The estimate of 180 days provides for some shorter pile pulling days during winter, transition time to dig out broken piles, and removal of decking. The actual number of days may be closer to 140 for pile work.

It is likely that the actual hours of vibratory pile removal will be less, as the duration conservatively assumes that every pile will be removed with a vibratory hammer. It is likely that many will be require direct pull or clamshell removal if necessary, both of which are quicker than vibratory extraction.

Description of Marine Mammals in the Area of the Specified Activity

The marine mammal species under NMFS jurisdiction most likely to occur in the proposed construction area include Pacific harbor seal (*Phoca vitulina richardsi*), California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*P. dalli*), killer whale (*Orcinus orca*), gray whale (*Eschrichtius robustus*), and humpback whale (*Megaptera novaeangliae*).

General information on the marine mammal species found in California waters can be found in Carretta *et al.* (2013), which is available at the following URL: *http://www.nmfs.noaa.gov/pr/sars/pdf/pacific2013_final.pdf* and in Table 1 below. Refer to that document for information on these species. Specific information concerning these species in the vicinity of the proposed action area is provided below.

Table 1: List of Marine Species under NMFS Jurisdiction that Occur in the Vicinity of the Mukilteo Tank Farm Pier Project.

Species	ESA Status	MMPA Status	Timing of Occurrence	Frequency of Occurrence
Harbor Seal	Unlisted	Non-depleted	Year-round	Common
California Sea Lion	Unlisted	Non-depleted	August-April	Common
Steller Sea Lion	Delisted	Strategic/Depleted	October-May	Rare
Harbor Porpoise	Unlisted	Non-depleted	Year-round	Occasional
Dall's Porpoise	Unlisted	Non-depleted	Year-round (more common in winter)	Occasional
Killer Whale (Southern Resident)	Endangered	Strategic/Depleted	October-March	Occasional
Killer Whale (Transient)	Unlisted	Strategic/Depleted	March- May (intermittently year-round)	Occasional
Gray Whale	Delisted	Non-depleted	January-May	Occasional
Humpback Whale	Endangered	Strategic/Depleted	April-June	Occasional

Harbor Seal

Harbor seals are members of the true seal family (Phocidae). For management purposes, differences in mean pupping date (Temte 1986), movement patterns (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 State (including Hood Canal, Puget Sound, Georgia Basin and the Strait of Juan de Fuca out to Cape Flattery), (2) outer coast of Oregon and Washington, and (3) California (Carretta *et al.* 2011).

The Washington Inland Waters stock (which includes Hood Canal, Puget Sound, Georgia Basin and the Strait of Juan de Fuca out to Cape Flattery) may be present near

the project site. Pupping seasons vary by geographic region. For the northern Puget Sound region, pups are born from late June through August (WDFW 2012a). After October 1 all pups in the inland waters of Washington are weaned. Of the three pinniped species that commonly occur within the region of activity, harbor seals are the most numerous and the only one that breeds in the inland marine waters of Washington (Calambokidis and Baird, 1994).

In 1999, Jeffries *et al.* (2003) recorded a mean count of 9,550 harbor seals in Washington's inland marine waters, and estimated the total population to be approximately 14,612 animals (including the Strait of Juan de Fuca). According to the 2014 Stock Assessment Report (SAR), the most recent estimate for the Washington Northern Inland Waters Stock is 11,036 (Carretta et al. 2014). No minimum population estimate is available. However, there are an estimated 32,000 harbor seals in Washington today, and their population appears to have stabilized (Jeffries 2013), so the estimate of 11,036 may be low.

Harbor seals are the most numerous marine mammal species in Puget Sound. Harbor seals are non-migratory; their local movements are associated with such factors as tides, weather, season, food availability and reproduction (Scheffer and Slipp 1944; Fisher 1952; Bigg 1969, 1981). They are not known to make extensive pelagic migrations, although some long-distance movements of tagged animals in Alaska (174 km) and along the U.S. west coast (up to 550 km) have been recorded (Pitcher and McAllister 1981; Brown and Mate 1983; Herder 1983).

Harbor seals haul out on rocks, reefs and beaches, and feed in marine, estuarine and occasionally fresh waters. Harbor seals display strong fidelity for haul-out sites

(Pitcher and Calkins 1979; Pitcher and McAllister 1981). The closest documented harbor seal haul-out sites to the Tank Farm Pier are the Naval Station Everett floating security fence, and the Port Gardner log booms, both approximately 4.5 miles northeast of the project site. Harbor seals may also haul-out on undocumented sites in the area, such as beaches.

Since June 2012, Naval Station Everett personnel have been conducting counts of the number of harbor seals that use the in-water security fence floats as haul-outs. As of April 18, 2013, the highest count was 343 seals observed during one day in October 2012 (U.S. Navy 2013). The average number of seals hauled out for the 8 days of monitoring falling within the Tank Farm Pier removal work window (July 15 - February 15) was 117 (U.S. Navy 2013). However, given the distance from the haul-out to the Tank Farm Pier, the number of affected seals would be less.

Since 2007, the Everett Community College Ocean Research College Academy (ORCA) has conducted quarterly cruises that include monitoring stations within the ZOI. Marine mammal sightings data were collected during these cruises. During 24 cruises within the ZOI falling within the Tank Farm Pier removal window (July 15 - February 15), the highest count was 13 seals observed during one day in November of 2012. The average number of seals observed during these cruises was 2.4 (ORCA 2013).

According to the NMFS National Stranding Database (2007-2013), there were 7 confirmed harbor seal strandings within 0.5 miles of Tank Farm Pier (NMFS 2013b).

California Sea Lion

Washington California sea lions are part of the U.S. stock, which begins at the U.S./Mexico border and extends northward into Canada. The U.S. stock was estimated at

296,750 in the 2012 Stock Assessment Report (SAR) and may be at carrying capacity, although more data are needed to verify that determination (Carretta *et al.* 2013). Some 3,000 to 5,000 animals are estimated to move into northwest waters (both Washington and British Columbia) during the fall (September) and remain until the late spring (May) when most return to breeding rookeries in California and Mexico (Jeffries *et al.* 2000). Peak counts of over 1,000 animals have been made in Puget Sound (Jeffries *et al.* 2000).

California sea lions breed on islands off Baja Mexico and southern California with primarily males migrating to feed in the northern waters (Everitt *et al.* 1980). Females remain in the waters near their breeding rookeries off California and Mexico. All age classes of males are seasonally present in Washington waters (WDFW 2000).

California sea lions do not avoid areas with heavy or frequent human activity, but rather may approach certain areas to investigate. This species typically does not flush from a buoy or haulout if approached.

California sea lions were unknown in Puget Sound until approximately 1979 (Steiger and Calambokidis 1986). Everitt *et al.* (1980) reported the initial occurrence of large numbers at Port Gardner, Everett (northern Puget Sound) in the spring of 1979. The number of California sea lions using the Everett haul-out at that time numbered around 1,000. Similar sightings and increases in numbers were documented throughout the region after the initial sighting in 1979 (Steiger and Calambokidis 1986), including urbanized areas such as Elliot Bay near Seattle and heavily used areas of central Puget Sound (Gearin *et al.* 1986). In Washington, California sea lions use haul-out sites within all inland water regions (WDFW 2000). The movement of California sea lions into Puget

Sound could be an expansion in range of a growing population (Steiger and Calambokidis 1986).

The closest documented California sea lion haul-out sites to the Tank Farm Pier are the Everett Harbor navigation buoys (3.0/3.5 miles NE), and the Naval Station Everett floating security fence and Port Gardner log booms (both 4.5 miles NE).

Since June 2012, Naval Station Everett personnel have been conducting counts of the number of sea lions that use the in-water security fence floats as haul-outs. As of April 18, 2013, the highest count has been 123 California sea lions observed during one day in November 2012. The average number of California sea lions hauled out for the 8 days of monitoring falling within the Tank Farm Pier removal work window (July 15 - February 15) is 61 (U.S. Navy 2013). However, given the distance from the haul-out to the Tank Farm Pier, it is not expected that the same numbers would be present in the ZOI.

Since 2007, the Everett Community College ORCA has conducted quarterly cruises that include monitoring stations within the ZOI. Marine mammal sightings data were collected during these cruises. During 10 cruises within the ZOI falling within the Tank Farm Pier removal window (July 15 - February 15), the highest count was 6 California sea lions observed during one day in October of 2008. The average number of sea lions observed during these cruises was 2.8 (ORCA 2013).

According to the NMFS National Stranding Database (2007-2013), there was one confirmed California sea lion stranding within 0.5 miles of the Tank Farm Pier (NMFS 2013b).

Steller Sea Lion

The Eastern stock of Steller sea lion may be present near the project site. The eastern stock of Steller sea lions is estimated at 63,160 with a Washington minimum population estimate of 1,749 (Carretta *et al*., 2013). For Washington inland waters, Steller sea lion abundances vary seasonally with a minimum estimate of 1,000 to 2000 individuals present or passing through the Strait of Juan de Fuca in fall and winter months.

Steller sea lion numbers in Washington State decline during the summer months, which correspond to the breeding season at Oregon and British Columbia rookeries (approximately late May to early June) and peak during the fall and winter months (WDFW 2000). A few Steller sea lions can be observed year-round in Puget Sound although most of the breeding age animals return to rookeries in the spring and summer.

The eastern stock of Steller sea lions are "depleted/strategic" under the MMPA and were "delisted" as a distinct population segment under the ESA on November 4, 2013 (78 FR 66140). On August 27, 1993, NMFS published a final rule designating critical habitat for the Steller sea lion associated with breeding and haul-out areas in Alaska, California, and Oregon (58 FR 45269). That critical habitat remains in effect for the western DPS of Steller sea lions, which remain listed under the ESA. No critical habitat has been designated in Washington.

Breeding rookeries for the eastern stock are located along the California, Oregon, British Columbia, and southeast Alaska coasts, but not along the Washington coast or in inland Washington waters (Angliss and Outlaw 2007). Adult Steller sea lions congregate at rookeries in Oregon, California, and British Columbia for pupping and breeding from late May to early June (Gisiner 1985).

Steller sea lions primarily use haul-out sites on the outer coast of Washington and in the Strait of Juan de Fuca along Vancouver Island in British Columbia. Only sub-adults or non-breeding adults may be found in the inland waters of Washington (Pitcher *et al*. 2007). However, the number of inland waters haul-out sites has increased in recent years.

Since June 2012, Naval Station Everett personnel have been conducting counts of the number of sea lions that use the in-water security fence floats as haul-outs. No Steller sea lions have been observed using the security barrier floats haul-out to date (U.S Navy. 2013).

Since 2007, the Everett Community College ORCA has conducted quarterly cruises that include monitoring stations within the ZOI. No Steller sea lions have been observed in the ZOI during these cruises (ORCA 2013).

The closest documented Steller Sea lion haul-outs to the Tank Farm Pier are the Orchard Rocks and Rich Passage buoys near S. Bainbridge Island (19 miles SW), and Craven Rock near Marrowstone Island (23 miles NW). Haul-outs are generally occupied from October through May, which overlaps with the in-water work window. Any Steller sea lions near the Tank Farm Pier would be transiting through the area.

There is no data available on the number of Steller sea lions that use the Orchard Rocks. Up to 12 Steller sea lions have been observed using the Craven Rock haul-out off of Marrowstone Island in northern Puget Sound (WSF 2010). However, given the distance from this haul-out to the Tank Farm Pier, it is not expected that the same numbers would be present in the ZOI.

Harbor Porpoise

The Washington Inland Waters Stock of harbor porpoise may be found near the project site. The Washington Inland Waters Stock occurs in waters east of Cape Flattery (Strait of Juan de Fuca, San Juan Island Region, and Puget Sound).

The Washington Inland Waters Stock mean abundance estimate based on 2002 and 2003 aerial surveys conducted in the Strait of Juan de Fuca, San Juan Islands, Gulf Islands, and Strait of Georgia is 10,682 harbor porpoises (Carretta *et al*. 2011). No minimum population estimate is available.

No harbor porpoise were observed within Puget Sound proper during comprehensive harbor porpoise surveys (Osmek *et al*. 1994) or Puget Sound Ambient Monitoring Program (PSAMP) surveys conducted in the 1990s (WDFW 2008). Declines were attributed to gill-net fishing, increased vessel activity, contaminants, and competition with Dall's porpoise.

However, populations appear to be rebounding with increased sightings in central Puget Sound (Carretta *et al.* 2007b) and southern Puget Sound (D. Nysewander pers. comm. 2008; WDFW 2008). Recent systematic boat surveys of the main basin indicate that at least several hundred and possibly as many as low thousands of harbor porpoise are now present. While the reasons for this recolonization are unclear, it is possible that changing conditions outside of Puget Sound, as evidenced by a tripling of the population in the adjacent waters of the Strait of Juan de Fuca and San Juan Islands since the early 1990s, and the recent higher number of harbor porpoise mortalities in coastal waters of Oregon and Washington, may have played a role in encouraging harbor porpoise to explore and shift into areas like Puget Sound (Hanson, *et. al.* 2011).

The Washington Inland Waters Stock of harbor porpoise is "non-depleted" under MMPA, and "unlisted" under the ESA.

Harbor porpoises are common in the Strait of Juan de Fuca and south into Admiralty Inlet, especially during the winter, and are becoming more common south of Admiralty Inlet. Little information exists on harbor porpoise movements and stock structure near the Mukilteo area, although it is suspected that in some areas harbor porpoises migrate (based on seasonal shifts in distribution). For instance Hall (2004; pers. comm. 2008) found harbor porpoises off Canada's southern Vancouver Island to peak during late summer, while the Washington State Department of Fish and Wildlife's (WDFW) Puget Sound Ambient Monitoring Program (PSAMP) data show peaks in Washington waters to occur during the winter.

Hall (2004) found that the frequency of sighting of harbor porpoises decreased with increasing depth beyond 150 m with the highest numbers observed at water depths ranging from 61 to 100 m. Although harbor porpoises have been spotted in deep water, they tend to remain in shallower shelf waters (<150 m) where they are most often observed in small groups of one to eight animals (Baird 2003). Water depths within the Tank Farm Pier ZOI range from 0 to 192 m.

Since 2007, the Everett Community College Ocean Research College Academy (ORCA) has conducted quarterly cruises that include monitoring stations within the ZOI. No harbor porpoise have been observed within the ZOI during these cruises (ORCA 2013). According to the NMFS National Stranding Database, there was one confirmed harbor porpoise stranding within 0.5 miles of the Tank Farm Pier from 2007 to 2013 (NMFS 2013b).

Dall's Porpoise

The California, Oregon, and Washington Stock of Dall's porpoise may be found near the project site. Dall's porpoise are high-frequency hearing range cetaceans (Southall *et. al*. 2007).

The most recent estimate of Dall's porpoise stock abundance is 42,000, based on 2005 and 2008 summer/autumn vessel-based line transect surveys of California, Oregon, and Washington waters (Carretta *et al*. 2011). Within the inland waters of Washington and British Columbia, this species is most abundant in the Strait of Juan de Fuca east to the San Juan Islands. The most recent Washington's inland waters estimate is 900 animals (Calambokidis *et al*. 1997). Prior to the 1940s, Dall's porpoises were not reported in Puget Sound.

The California, Oregon, and Washington Stock of Dall's porpoise is "non-depleted" under the MMPA, and "unlisted" under the ESA. Dall's porpoises are migratory and appear to have predictable seasonal movements driven by changes in oceanographic conditions (Green *et al*. 1992, 1993), and are most abundant in Puget Sound during the winter (Nysewander *et al*. 2005; WDFW 2008). Despite their migrations, Dall's porpoises occur in all areas of inland Washington at all times of year (Calambokidis pers. comm. 2006), but with different distributions throughout Puget Sound from winter to summer. The average winter group size is three animals (WDFW 2008).

Since 2007, the Everett Community College Ocean Research College Academy (ORCA) has conducted quarterly cruises that include monitoring stations within the ZOI. No Dall's porpoise have been observed within the ZOI during these cruises (ORCA

2013). According to the NMFS National Stranding Database (2007-2013), there were no Dall's porpoise strandings in the area of the Tank Farm Pier (NMFS 2013b).

Killer Whale

The Eastern North Pacific Southern Resident and West Coast Transient stocks of killer whale may be found near the project site.

A. Southern Resident Stock

The Southern Residents live in three family groups known as the J, K and L pods. As of July 15, 2014, the stock collectively numbers 82 individuals (Carretta *et al*. 2014).

Southern Residents are documented in coastal waters ranging from central California to the Queen Charlotte Islands, British Columbia (NMFS 2008). They occur in all inland marine waters. SR killer whales generally spend more time in deeper water and only occasionally enter water less than 15 feet deep (Baird 2000). Distribution is strongly associated with areas of greatest salmon abundance, with heaviest foraging activity occurring over deep open water and in areas characterized by high-relief underwater topography, such as subsurface canyons, seamounts, ridges, and steep slopes (Wiles 2004).

Sightings compiled by the Orca Network from 1990-2013 show that SR killer whale occurs most frequently in the general area of the Tank Farm Pier in the fall and winter, and are far less common from April through September (Osborne 2008; Orca Network 2013). Since 2007, the Everett Community College ORCA has conducted quarterly cruises that include monitoring stations within the ZOI. No killer whales have been observed within the ZOI during these cruises (ORCA 2013).

Records from 1976 through 2013 document Southern Residents in the inland waters of Washington during the months of March through June and October through December, with the primary area of occurrence in inland waters north of Admiralty Inlet, located in north Puget Sound (Osborne 2008; Orca Network 2013).

Beginning in May or June and through the summer months, all three pods (J, K, and L) of Southern Residents are most often located in the protected inshore waters of Haro Strait (west of San Juan Island), in the Strait of Juan de Fuca, and Georgia Strait near the Fraser River.

Historically, the J pod also occurred intermittently during this time in Puget Sound; however, records from 1997-2007 show that J pod did not enter Puget Sound south of the Strait of Juan de Fuca from approximately June through August (Osborne 2008).

In fall, all three pods occur in areas where migrating salmon are concentrated such as the mouth of the Fraser River. They may also enter areas in Puget Sound where migrating chum and Chinook salmon are concentrated (Osborne 1999). In the winter months, the K and L pods spend progressively less time in inland marine waters and depart for coastal waters in January or February. The J pod is most likely to appear year-round near the San Juan Islands, and in the fall/winter, in the lower Puget Sound and in Georgia Strait at the mouth of the Fraser River.

According to the NMFS National Stranding Database (2007-2013), there were no killer whale strandings in the area of the Tank Farm Pier (NMFS 2013b).

The SR killer whale stock was declared "depleted/strategic" under the MMPA in May 2003 (68 FR 31980). On November 18, 2005, the SR stock was listed as

"endangered" under the ESA (70 FR 69903). On November 29, 2006, NMFS published a final rule designating critical habitat for the SR killer whale DPS. Both Puget Sound and the San Juan Islands are designated as core areas of critical habitat under the ESA, excluding areas less than 20 feet deep relative to extreme high water are not designated as critical habitat (71 FR 69054). A final recovery plan for Southern Residents was published in January of 2008 (NMFS 2008).

B. West Coast Transient Stock

Transient killer whales generally occur in smaller (1-5 individuals), less structured pods (Allen and Angliss. 2013). According to the Center for Whale Research (CWR 2014), they tend to travel in small groups of one to five individuals, staying close to shorelines, often near seal rookeries when pups are being weaned.

The West Coast Transient stock, which includes individuals from California to southeastern Alaska, is estimated to have a minimum number of 243 (Allen and Angliss, 2013).

The West Coast Transient stock occurs in California, Oregon, Washington, British Columbia, and southeastern Alaskan waters. Within the inland waters, they may frequent areas near seal rookeries when pups are weaned (Baird and Dill 1995).

Sightings compiled by the Orca Network from 1990-2013 show that transient killer whale occurs most frequently in the general area of the Mukilteo Tank Farm Pier in the spring and summer, and are far less common from September through February (Orca Network 2013). However, transient killer whale occurrence is less predictable than SR killer whale occurrence, and they may be present at any time of the year. Since 2007, the Everett Community College ORCA has conducted quarterly cruises that include

monitoring stations within the ZOI. No killer whales have been observed within the ZOI during these cruises (ORCA 2013).

Gray Whale

Gray whales are recorded in Washington waters during feeding migrations between late spring and autumn with occasional sightings during winter months (Calambokidis *et al.* 1994, 2002; Orca Network 2013). The Eastern North Pacific stock of gray whale may be found near the project site. Gray whales are low-frequency hearing range cetaceans (Southall *et al*. 2007).

The Eastern North Pacific stock of gray whales is "non-depleted" under the MMPA, and was "delisted" under the ESA in 1994 after a 5-year review by NOAA Fisheries. In 2001 NOAA Fisheries received a petition to relist the stock under the ESA, but it was determined that there was not sufficient information to warrant the petition (Angliss and Outlaw 2007).

Although typically seen during their annual migrations on the outer coast, a regular group of gray whales annually comes into the inland waters at Saratoga Passage and Port Susan (7.5 miles north) from March through May to feed on ghost shrimp (Weitkamp *et al.* 1992; Calambokidis pers. comm. 2006). During this time frame they are also seen in the Strait of Juan de Fuca, the San Juan Islands, and areas of Puget Sound, although the observations in Puget Sound are highly variable between years (Calambokidis *et al.* 1994). The average tenure within Washington inland waters is 47 days and the longest stay was 112 days (J. Calambokidis pers. comm. 2007).

Sightings compiled by the Orca Network from 1990-2013 show that gray whales are most frequently in the general area of the Mukilteo Tank Farm Pier from January through May, and are far less common from June through September (Orca Network 2013). Table 3-6 in the Application presents total gray whale sightings (individual) per month in the area between 1990 and 2013. Sightings in Puget Sound are usually of a single individual, so Table 3-6 sightings are likely of the same individual or low number of individuals over a number of days that month.

Since 2007, the Everett Community College Ocean Research College Academy (ORCA) has conducted quarterly cruises that include monitoring stations within the ZOI. No gray whales have been observed within the ZOI during these cruises (ORCA 2013).

Humpback Whale

The California-Oregon-Washington (CA-OR-WA) stock of humpback whale may be found near the project site. Humpback whales are low-frequency hearing range cetaceans (Southall *et. al*. 2007). The SAR abundance estimate is 1,918 individuals. (Carretta *et al*. 2014).

The humpback whale was listed as "endangered" throughout its range under the Endangered Species Conservation Act of 1969. This protection was transferred to the ESA in 1973. A recovery plan was adopted in 1991 (NMFS 1991). The humpback whale is also listed as "depleted/strategic" under the MMPA.

Historically, humpback whales were common in inland waters of Puget Sound and the San Juan Islands (Calambokidis *et al*. 2004b). In the early part of this century, there was a productive commercial hunt for humpbacks in Georgia Strait that was

probably responsible for their long disappearance from local waters (Osborne *et al*. 1988). Commercial hunts ended in the 1960's. Since the mid-1990s, sightings in Puget Sound have increased.

This stock calves and mates in coastal Central America and Mexico and migrates up the coast from California to southern British Columbia in the summer and fall to feed (NMFS 1991; Marine Mammal Commission 2003; Carretta et al. 2007b). Few humpback whales are seen in Puget Sound, but more frequent sightings occur in the Strait of Juan de Fuca and near the San Juan Islands. Most sightings are in spring and summer. Sightings compiled by the Orca Network from 1990-2013 show that humpback whales are most frequently in the general area of the Tank Farm Pier from April through June, and are far less common from July to March (Orca Network 2013). Table 3-7 presents total humpback whale sightings (individual) per month in the area between 1990 and 2013. Sightings in Puget Sound are usually of a single individual.

Since 2007, the Everett Community College Ocean Research College Academy (ORCA) has conducted quarterly cruises that include monitoring stations within the ZOI. No humpback whales have been observed within the ZOI during these cruises (ORCA 2013).

Potential Effects of the Specified Activity on Marine Mammals and Their Habitat

This section includes a summary and discussion of the ways that stressors, (*e.g.* vibratory hammer pile extraction) and potential mitigation activities, associated with the Mukilteo Tank Farm Pier Removal project may impact marine mammals and their habitat. The "Estimated Take by Incidental Harassment" section later in this document will include a quantitative analysis of the number of individuals that are expected to be taken

by this activity. The “Negligible Impact Analysis” section will include the analysis of how this specific activity will impact marine mammals and will consider the content of this section, the “Estimated Take by Incidental Harassment” section, and the “Proposed Mitigation” section to draw conclusions regarding the likely impacts of this activity on the reproductive success or survivorship of individuals and from that on the affected marine mammal populations or stocks. In the following discussion, we provide general background information on sound and marine mammal hearing before considering potential effects to marine mammals from sound produced by vibratory pile driving.

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 hertz (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 (decrease) 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 sound pressure levels (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

(SL) 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. Note that all underwater sound levels in this document are referenced to a pressure of 1 μPa and all airborne sound levels in this document are referenced to a pressure of 20 μPa.

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, 1983). 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.

Even in the absence of sound from the specified activity, the underwater environment is typically loud due to ambient sound. Ambient sound is defined as environmental background sound levels lacking a single source or point (Richardson *et al.,* 1995), and the sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. These sources may include 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). A number of sources contribute to ambient sound, 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 sound 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 from shore showing an increase of 10 dB in the 100 to 700 Hz band during heavy surf conditions.
- Precipitation: Sound 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: 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: 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. 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 attenuate rapidly (Richardson *et al.,* 1995). Sound from identifiable anthropogenic sources other than the activity of interest (*e.g.*, a passing vessel) is sometimes termed background sound, as opposed to ambient sound.

The sum of the various natural and anthropogenic sound sources at any given location and time—which comprise "ambient" or "background" sound—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, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10-20 dB from day to day (Richardson *et al.,* 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals.

Table 2 —Representative Sound Levels of Anthropogenic Sources

Sound source	Frequency range (Hz)	Underwater sound level	References
Small vessels	250-1,000	151 dB rms at 1 m	Richardson *et al.,* 1995.
Tug docking gravel barge	200, 1,000	149 dB rms at 100 m	Blackwell and Greene, 2002.
Vibratory driving of 72-in steel pipe pile	10-1,500	180 dB rms at 10	Reyff, 2007.

		m	
Impact driving of 36-in steel pipe pile	10-1,500	195 dB rms at 10 m	Laughlin, 2007.
Impact driving of 66-in cast-in-steel-shell (CISS) pile	10-1,500	195 dB at rms 10 m	Reviewed in Hastings and Popper, 2005.

In-water construction activities associated with the project would consist mainly of vibratory pile extraction and direct pull of piles using a chain wrapped around the pile. The latter activity is not expected to produce sound that would approach Level B harassment. There are two general categories of sound types: Impulse and non-pulse (defined in the following). Vibratory pile driving is considered to be continuous or non-pulsed while impact pile driving is considered to be an impulse or pulsed sound type. The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (Southall *et al.*, 2007). Please see Southall *et al.,* (2007) for an in-depth discussion of these concepts.

Pulsed sound sources (*e.g.*, explosions, gunshots, sonic booms, impact pile driving) produce signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI, 1986; Harris, 1998; NIOSH, 1998; ISO, 2003; ANSI, 2005) 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 rapid decay period that may include a period of diminishing, oscillating maximal and minimal pressures, and generally have an increased capacity to induce physical injury as compared with sounds that lack these features. Note that there is no impact driving planned as part of this project.

Non-pulsed sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or non-continuous (ANSI, 1995; NIOSH, 1998). Some of these non-pulsed sounds can be transient signals of short duration but without the essential properties of pulses (*e.g.*, rapid rise time). Examples of non-pulsed sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving and removal, and active sonar systems (such as those used by the U.S. Navy). The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

The likely or possible impacts of the proposed vibratory hammer pile extraction at the MukilteoTank Farm Pier on marine mammals could involve both non-acoustic and acoustic stressors. Potential non-acoustic stressors could result from the physical presence of the equipment and personnel. Any impacts to marine mammals, however, are expected to primarily be acoustic in nature.

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 have been derived using auditory evoked potentials, 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 30 kHz;
- Mid-frequency cetaceans (32 species of dolphins, six species of larger toothed whales, and 19 species of beaked and bottlenose whales): Functional hearing is estimated to occur between approximately 150 Hz and 160 kHz;
- High frequency cetaceans (eight species of true porpoises, six species of river dolphins, Kogia, the franciscana, and four species of cephalorhynchids): Functional hearing is estimated to occur between approximately 200 Hz and 180 kHz;
- Phocid pinnipeds in Water: Functional hearing is estimated to occur between approximately 75 Hz and 100 kHz; and
- Otariid pinnipeds in Water: Functional hearing is estimated to occur between approximately 100 Hz and 40 kHz.

As mentioned previously in this document, eight marine mammal species (seven cetacean and two pinniped) may occur in the Icy Strait project area. Of the five cetacean species likely to occur in the proposed project area and for which take is requested, two are classified as low-frequency cetaceans (*i.e.*, humpback and gray whales), one is classified as a mid-frequency cetacean (*i.e.*, killer whale), and two are classified as high-frequency cetaceans (*i.e.*, harbor and Dall's porpoises) (Southall *et al.*, 2007). Additionally, harbor seals are classified as members of the phocid pinnipeds in water functional hearing group while California and Stellar sea lions are grouped under the

Otariid pinnipeds in water functional hearing group. A species' functional hearing group is a consideration when we analyze the effects of exposure to sound on marine mammals.

Acoustic Impacts

Potential Effects of Pile Driving and Removal Sound—The effects of sounds from pile driving might 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 and removal on marine mammals are dependent on several factors, including the size, type, and depth of the animal; the depth, intensity, and duration of the pile driving 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 pile driving and removal 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 drive the pile, and possibly less forceful equipment, 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 impulse sounds on marine mammals. Potential effects from impulse sound sources can range in severity from effects such as behavioral disturbance or tactile perception to physical discomfort, slight injury of the internal organs and the auditory system, or mortality (Yelverton *et al.,* 1973).

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. 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. The following subsections discuss in somewhat more detail the possibilities of TTS, PTS, and non-auditory physical effects.

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, and none of the published data concern TTS elicited by exposure to multiple pulses of sound. Available data on TTS in marine mammals are summarized in Southall *et al.* (2007). TTS is not currently classified as an injury (Southall *et al.,* 2007).

Given the available data, the received level of a single pulse (with no frequency weighting) might need to be approximately 186 dB re 1 μPa^2-s (*i.e.,* 186 dB sound exposure level [SEL] or approximately 221-226 dB p-p [peak]) in order to produce brief, mild TTS. Exposure to several strong pulses that each have received levels near 190 dB rms (175-180 dB SEL) might result in cumulative exposure of approximately 186 dB SEL and thus slight TTS in a small odontocete, assuming the TTS threshold is (to a first approximation) a function of the total received pulse energy.

The above TTS information for odontocetes is derived from studies on the bottlenose dolphin (*Tursiops truncatus*) and beluga whale (*Delphinapterus leucas*). There is no published TTS information for other species of cetaceans. However, preliminary evidence from a harbor porpoise exposed to pulsed sound suggests that its TTS threshold may have been lower (Lucke *et al.,* 2009). As summarized above, data that are now

available imply that TTS is unlikely to occur unless odontocetes are exposed to pile driving pulses stronger than 180 dB re 1 µPa rms.

Permanent Threshold Shift—When PTS occurs, there is physical damage (injury) to the sound receptors in the ear. In severe cases, there can be total or partial deafness, while in other cases the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter, 1985). There is no specific evidence that exposure to pulses of sound can cause PTS in any marine mammal. However, given the possibility that mammals close to a sound source can incur TTS, it is possible that some individuals might incur PTS. Single or occasional occurrences of mild TTS are not indicative of permanent auditory damage, but repeated or (in some cases) single exposures to a level well above that causing TTS onset might elicit PTS.

Relationships between TTS and PTS thresholds have not been studied in marine mammals but are assumed to be similar to those in humans and other terrestrial mammals, based on anatomical similarities. PTS might occur at a received sound level at least several decibels above that inducing mild TTS if the animal were exposed to strong sound pulses with rapid rise time. Based on data from terrestrial mammals, a precautionary assumption is that the PTS threshold for impulse sounds (such as pile driving pulses as received close to the source) is at least 6 dB higher than the TTS threshold on a peak-pressure basis and probably greater than 6 dB (Southall *et al.*, 2007). On an SEL basis, Southall *et al.* (2007) estimated that received levels would need to exceed the TTS threshold by at least 15 dB for there to be risk of PTS. Thus, for cetaceans, Southall *et al.* (2007) estimate that the PTS threshold might be an M-weighted SEL (for the sequence of received pulses) of approximately 198 dB re 1 μPa^2-s (15 dB

higher than the TTS threshold for an impulse). Given the higher level of sound necessary to cause PTS as compared with TTS, it is considerably less likely that PTS could occur.

Measured source levels from impact pile driving can be as high as 214 dB rms. Although no marine mammals have been shown to experience TTS or PTS as a result of being exposed to pile driving activities, captive bottlenose dolphins and beluga whales exhibited changes in behavior when exposed to strong pulsed sounds (Finneran *et al.*, 2000, 2002, 2005). The animals tolerated high received levels of sound before exhibiting aversive behaviors. Experiments on a beluga whale showed that exposure to a single watergun impulse at a received level of 207 kPa (30 psi) p-p, which is equivalent to 228 dB p-p, resulted in a 7 and 6 dB TTS in the beluga whale at 0.4 and 30 kHz, respectively. Thresholds returned to within 2 dB of the pre-exposure level within four minutes of the exposure (Finneran *et al.*, 2002). Although the source level of pile driving from one hammer strike is expected to be much lower than the single watergun impulse cited here, animals being exposed for a prolonged period to repeated hammer strikes could receive more sound exposure in terms of SEL than from the single watergun impulse (estimated at 188 dB re 1 μPa^2-s) in the aforementioned experiment (Finneran *et al.*, 2002). However, in order for marine mammals to experience TTS or PTS, the animals have to be close enough to be exposed to high intensity sound levels for a prolonged period of time. Based on the best scientific information available, these SPLs are far below the thresholds that could cause TTS or the onset of PTS.

Non-auditory Physiological Effects—Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to strong underwater sound include stress, neurological effects, bubble formation, resonance effects, and other

types of organ or tissue damage (Cox *et al.*, 2006; Southall *et al.*, 2007). Studies examining such effects are limited. In general, little is known about the potential for pile driving to cause auditory impairment or other physical effects in marine mammals. Available data suggest that such effects, if they occur at all, would presumably be limited to short distances from the sound source and to activities that extend over a prolonged period. The available data do not allow identification of a specific exposure level above which non-auditory effects can be expected (Southall *et al.*, 2007) or any meaningful quantitative predictions of the numbers (if any) of marine mammals that might be affected in those ways. Marine mammals that show behavioral avoidance of pile driving, including some odontocetes and some pinnipeds, are especially unlikely to incur auditory impairment or non-auditory physical effects.

Disturbance Reactions

Disturbance includes a variety of effects, including subtle changes in behavior, more conspicuous changes in activities, and displacement. Behavioral responses to sound are highly variable and context-specific and reactions, if any, depend on species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day, and many other factors (Richardson *et al.*, 1995; Wartzok *et al.*, 2003; Southall *et al.*, 2007).

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). 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).

Controlled experiments with captive marine mammals showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al.,* 1997; Finneran *et al.,* 2003). Observed responses of wild marine mammals to loud pulsed sound sources (typically seismic guns or acoustic harassment devices, but also including pile driving) have been varied but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds, 2002; Thorson and Reyff, 2006; see also Gordon *et al.,* 2004; Wartzok *et al.,* 2003; Nowacek *et al.,* 2007). Responses to continuous sound, such as vibratory pile installation and removal, have not been documented as well as responses to pulsed sounds.

With both types of pile driving, it is likely that the onset of pile driving 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 (Thorson and Reyff, 2006).

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 include effects on 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;
- 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 anthropogenic, 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 only 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.

Masking occurs at the frequency band which the animals utilize so the frequency range of the potentially masking sound is important in determining any potential behavioral impacts. Because sound generated from in-water vibratory pile driving and 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 the population or community 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 driving, and dredging activities, contribute to the elevated ambient sound levels, thus intensifying masking.

Vibratory pile driving and removal is relatively short-term, with rapid oscillations occurring for 10 to 30 minutes per installed or removed pile. It is possible that vibratory driving and removal resulting from this proposed action may mask acoustic signals important to the behavior and survival of marine mammal species, but the short-term duration and limited affected area would result in insignificant impacts from masking. 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 vibratory pile driving, and which have already been taken into account in the exposure analysis.

Acoustic Effects, Airborne— 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 driving 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 either hauled-out or looking with 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 112 dB peak and 96 dB rm.

Vessel Interaction

Besides being susceptible to vessel strikes, cetacean and pinniped responses to vessels may result in behavioral changes, including greater variability in the dive, surfacing, and respiration patterns; changes in vocalizations; and changes in swimming speed or direction (NRC 2003). There will be a temporary and localized increase in vessel traffic during construction. At least one work barge will be present at any time during the in-water and over water work.

Potential Effects on Marine Mammal Habitat

The primary potential impacts to marine mammal habitat are associated with elevated sound levels produced by vibratory pile removal. However, other potential impacts to the surrounding habitat from physical disturbance are also possible.

Potential Pile Driving and Removal Effects on Prey— With regard to fish as a prey source for cetaceans and pinnipeds, fish are known to hear and react to sounds and to use sound to communicate (Tavolga *et al.* 1981) and possibly avoid predators (Wilson and Dill 2002). Experiments have shown that fish can sense both the strength and direction of sound (Hawkins 1981). Primary factors determining whether a fish can sense a sound signal, and potentially react to it, are the frequency of the signal and the strength of the signal in relation to the natural background noise level.

The level of sound at which a fish will react or alter its behavior is usually well above the detection level. Fish have been found to react to sounds when the sound level increased to about 20 dB above the detection level of 120 dB; however, the response

threshold can depend on the time of year and the fish's physiological condition (Engas *et al.* 1996). In general, fish react more strongly to pulses of sound rather than non-pulse signals (such as noise from vessels) (Blaxter *et al.* 1981), and a quicker alarm response is elicited when the sound signal intensity rises rapidly compared to sound rising more slowly to the same level.

Further, during the coastal construction only a small fraction of the available habitat would be ensonified at any given time. Disturbance to fish species would be short-term and fish would return to their pre-disturbance behavior once the pile driving activity ceases. Thus, the proposed construction would have little, if any, impact on the abilities of marine mammals to feed in the area where construction work is planned.

Finally, the time of the proposed construction activity would avoid the spawning season of the ESA-listed salmonid species.

Effects to Foraging Habitat— Short-term turbidity is a water quality effect of most in-water work, including pile removal. WSF must comply with state water quality standards during these operations by limiting the extent of turbidity to the immediate project area. Roni and Weitkamp (1996) monitored water quality parameters during a pier replacement project in Manchester, Washington. The study measured water quality before, during and after pile removal and driving. The study found that construction activity at the site had "little or no effect on dissolved oxygen, water temperature and salinity", and turbidity (measured in nephelometric turbidity units [NTU]) at all depths nearest the construction activity was typically less than 1 NTU higher than stations farther from the project area throughout construction.

Similar results were recorded during pile removal operations at two WSF ferry facilities. At the Friday Harbor terminal, localized turbidity levels within the regulatory compliance radius of 150 feet (from three timber pile removal events) were generally less than 0.5 NTU higher than background levels and never exceeded 1 NTU. At the Eagle Harbor maintenance facility, within 150 feet, local turbidity levels (from removal of timber and steel piles) did not exceed 0.2 NTU above background levels (WSF 2012). In general, turbidity associated with pile installation is localized to about a 25-foot radius around the pile (Everitt *et al.* 1980).

Cetaceans are not expected to be close enough to the Tank Farm Pier to experience turbidity, and any pinnipeds will be transiting the area and could avoid localized turbidity. Therefore, the impact from increased turbidity levels is expected to be discountable to marine mammals.

Removal of the Tank Farm Pier will result in 3,900 creosote-treated piles (~7,300 tons) removed from the marine environment. This will result in temporary and localized sediment re-suspension of some of the contaminants associated with creosote, such as polycyclic aromatic hydrocarbons.

However, the removal of the creosote-treated wood piles from the marine environment will result in a long-term improvement in water and sediment quality, meeting the goals of WSF's Creosote Removal Initiative started in 2000. The net impact is a benefit to marine organisms, especially toothed whales and pinnipeds that are high on the food chain and bioaccumulate these toxins. This is especially a concern for long-lived species that spend much of their life in Puget Sound, such as Southern Resident killer whales (NMFS 2008).

Proposed Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, "and other means of effecting the least practicable 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.

For the proposed project, WSF worked with NMFS and proposed the following mitigation measures to minimize the potential impacts to marine mammals in the project vicinity. The primary purposes of these mitigation measures are to minimize sound levels from the activities, and to monitor marine mammals within designated zones of influence corresponding to NMFS' current Level A and B harassment thresholds which are depicted in Table 3 found later in the Estimated Take by Incidental Harassment section.

Monitoring and Shutdown for Pile Driving

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

Shutdown Zone—For all pile driving activities, WSF will establish a shutdown zone. Shutdown zones are typically used to contain the area in which SPLs equal or exceed the 180/190 dB rms acoustic injury criteria for cetaceans and pinnipeds, respectively, with the purpose being 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 of marine mammals. For vibratory driving, WSF's activities are not expected to produce sound at or above the 180 dB rms injury criterion (see

"Estimated Take by Incidental Harassment"). WSF would, however, implement a minimum shutdown zone of 10 m radius for all marine mammals around all vibratory extraction activity. This precautionary measure is intended to further reduce the unlikely possibility of injury from direct physical interaction with construction operations.

Disturbance Zone Monitoring—WSF will establish disturbance zones corresponding to the areas in which SPLs equal or exceed 122 dB rms (Level B harassment threshold for continuous sound) for pile driving installation and removal. The disturbance zones will 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 will enable observers 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 will be to document incidents of Level B harassment; disturbance zone monitoring is discussed in greater detail later (see "Proposed Monitoring and Reporting

Ramp Up (Soft Start) - Vibratory hammer use for pile removal and pile driving shall be initiated at reduced power for 15 seconds with a 1 minute interval, and be repeated with this procedure for an additional two times. This will allow marine mammals to move away from the sound source.

Time Restrictions— Work would occur only during daylight hours, when visual monitoring of marine mammals can be conducted. In addition, all in-water construction will be limited to the period between August 1, 2015 and February 15, 2016; and continue in August 1, 2016 until IHA expires on August 31, 2016.

Southern Resident Killer Whale - The following steps will be implemented for southern resident killer whales to avoid or minimize take (see Appendix B of the application – Monitoring Plan):

- If Southern Residents approach the zone of influence (ZOI) during vibratory pile removal, work will be paused until the Southern Residents exit the ZOI. The ZOI is the area co-extensive with the Level A and Level B harassment zones.
- If killer whales approach the ZOI during vibratory pile removal, and it is unknown whether they are Southern Resident killer whales or transients, it shall be assumed they are Southern Residents and work will be paused until the whales exit the ZOI.
- If Southern Residents enter the ZOI before they are detected, work will be paused until the Southern Residents exit the ZOI to avoid further Level B harassment take.

Mitigation Conclusions

NMFS has carefully evaluated the applicant's proposed mitigation 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:

- The manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals.

- The proven or likely efficacy of the specific measure to minimize adverse impacts as planned.
- The practicability of the measure for applicant implementation.

Any mitigation measure(s) prescribed by NMFS should be able to accomplish, have a reasonable likelihood of accomplishing (based on current science), or contribute to the accomplishment of one or more of the general goals listed below:

1. Avoidance or minimization of injury or death of marine mammals wherever possible (goals 2, 3, and 4 may contribute to this goal).

2. A reduction in the numbers of marine mammals (total number or number at biologically important time or location) exposed to received levels of pile driving, or other activities expected to result in the take of marine mammals (this goal may contribute to 1, above, or to reducing harassment takes only).

3. A reduction in the number of times (total number or number at biologically important time or location) individuals would be exposed to received levels of pile removal, or other activities expected to result in the take of marine mammals (this goal may contribute to 1, above, or to reducing harassment takes only).

4. A reduction in the intensity of exposures (either total number or number at biologically important time or location) to received levels of pile driving, or other activities expected to result in the take of marine mammals (this goal may contribute to a, above, or to reducing the severity of harassment takes only).

5. Avoidance or minimization of adverse effects to marine mammal habitat, paying special attention to the food base, activities that block or limit passage to or from

biologically important areas, permanent destruction of habitat, or temporary destruction/disturbance of habitat during a biologically important time.

6. For monitoring directly related to mitigation—an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

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 mammals 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 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 will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area.

Proposed Monitoring Measures

The monitoring plan proposed by WSF can be found in its IHA application. The plan may be modified or supplemented based on comments or new information received from the public during the public comment period. A summary of the primary components of the plan follows.

(1) Marine Mammal Monitoring Coordination

WSF would conduct briefings between the construction supervisors and the crew and protected species observers (PSOs) prior to the start of pile-driving activity, marine mammal monitoring protocol and operational procedures.

Prior to the start of pile driving, the Orca Network and/or Center for Whale Research would be contacted to find out the location of the nearest marine mammal sightings. The Orca Sightings Network consists of a list of over 600 (and growing) residents, scientists, and government agency personnel in the U.S. and Canada. Sightings are called or emailed into the Orca Network and immediately distributed to other sighting networks including: the NMFS Northwest Fisheries Science Center, the Center for Whale Research, Cascadia Research, the Whale Museum Hotline and the British Columbia Sightings Network.

Sighting information collected by the Orca Network includes detection by hydrophone. The SeaSound Remote Sensing Network is a system of interconnected hydrophones installed in the marine environment of Haro Strait (west side of San Juan Island) to study killer whale communication, in-water noise, bottom fish ecology and local climatic conditions. A hydrophone at the Port Townsend Marine Science Center measures average in-water sound levels and automatically detects unusual sounds. These passive acoustic devices allow researchers to hear when different marine mammals come into the region. This acoustic network, combined with the volunteer (incidental) visual sighting network allows researchers to document presence and location of various marine mammal species.

With this level of coordination in the region of activity, WSF will be able to get real-time information on the presence or absence of whales before starting any pile removal or driving.

(2) Protected Species Observers (PSOs)

WSF will employ qualified PSOs to monitor the 122 dB_{rms} re 1 µPa for marine mammals. Qualifications for marine mammal observers include:

- 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 will be necessary to correctly identify the target.
- Advanced education in biological science, wildlife management, mammalogy or related fields (Bachelor's degree or higher is preferred), but not required.
- Experience or training in the field identification of marine mammals (cetaceans and pinnipeds).
- Sufficient training, orientation or experience with the construction operation to provide for personal safety during observations.
- 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.
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).

- Writing skills sufficient to prepare a report of observations that would include such information as the number and type of marine mammals observed; the behavior of marine mammals in the project area during construction, dates and times when observations were conducted; dates and times when in-water construction activities were conducted; and dates and times when marine mammals were present at or within the defined ZOI.

(3) Monitoring Protocols

PSOs would be present on site at all times during pile removal and driving. Marine mammal behavior, overall numbers of individuals observed, frequency of observation, and the time corresponding to the daily tidal cycle would be recorded.

WSF proposes the following methodology to estimate marine mammals that were taken as a result of the proposed Mukilteo Multimodal Tank Farm Pier removal project:

- During vibratory pile removal, two land-based biologists will monitor the area from the best observation points available. If weather conditions prevent adequate land-based observations, boat-based monitoring may be implemented.
- To verify the required monitoring distance, the vibratory Level B behavioral harassment ZOI will be determined by using a range finder or hand-held global positioning system device.
- The vibratory Level B acoustical harassment ZOI will be monitored for the presence of marine mammals 30 minutes before, during, and 30 minutes after any pile removal activity.

- Monitoring will be continuous unless the contractor takes a significant break, in which case, monitoring will be required 30 minutes prior to restarting pile removal.
- If marine mammals are observed, their location within the ZOI, and their reaction (if any) to pile-driving activities will be documented.

NMFS has reviewed the WSF's proposed marine mammal monitoring protocol, and has preliminarily determined the applicant's monitoring program is adequate, particularly as it relates to assessing the level of taking or impacts to affected species. The land-based PSO is expected to be positioned in a location that will maximize his/her ability to detect marine mammals and will also utilize binoculars to improve detection rates.

NMFS has reviewed the WSF's proposed marine mammal monitoring protocol, and has determined the applicant's monitoring program is adequate, particularly as it relates to assessing the level of taking or impacts to affected species. The land-based PSO is expected to be positioned in a location that will maximize his/her ability to detect marine mammals and will also utilize binoculars to improve detection rates.

Proposed Reporting Measures

WSF would provide NMFS with a draft monitoring report within 90 days of the conclusion of the proposed construction work. This report will detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed.

If comments are received from the NMFS Northwest Regional Administrator or NMFS Office of Protected Resources on the draft report, a final report will be submitted to

NMFS within 30 days thereafter. If no comments are received from NMFS, the draft report will be considered to be the final report.

Estimated Take by Incidental Harassment

Except with respect to certain activities not pertinent here, section 3(18) of 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 resulting from vibratory pile removal and are likely to involve temporary changes in behavior. Injurious or lethal takes are not expected due to the expected source levels and sound source characteristics associated with the activity, and the proposed mitigation and monitoring measures are expected to further minimize the possibility of such take.

If a marine mammal responds to a stimulus 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 (*e.g.,* 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.

WSF has requested authorization for the incidental taking of small numbers of humpback whale, Steller sea lion, California sea lion, Dall's porpoise, gray whale, harbor porpoise and killer whale near the Mukilteo Tank Farm Pier that may result from vibratory pile extraction activities.

In order to estimate the potential incidents of take that may occur incidental to the specified activity, we must first estimate the extent of the sound field that may be produced by the activity and then consider in combination with information about marine mammal density or abundance in the project area. We first provide information on applicable sound thresholds for determining effects to marine mammals before describing the information used in estimating the sound fields, the available marine mammal density or abundance information, and the method of estimating potential incidences of take.

Sound Thresholds

We use generic sound exposure thresholds to determine when an activity that produces sound might result in impacts to a marine mammal such that a take by harassment might occur. To date, no studies have been conducted that explicitly examine impacts to marine mammals from pile driving sounds or from which empirical sound thresholds have been established. These thresholds (Table 3) are used to estimate when harassment may occur (*i.e.*, when an animal is exposed to levels equal to or exceeding the relevant criterion) in specific contexts; however, useful contextual information that may inform our assessment of behavioral effects is typically lacking and we consider these thresholds as step functions. NMFS is working to revise these acoustic guidelines; for

more information on that process, please visit

www.nmfs.noaa.gov/pr/acoustics/guidelines.htm.

Table 3—Underwater Injury and Disturbance Threshold Decibel Levels for Marine Mammals

Criterion	Criterion Definition	Threshold
Level A harassment	PTS (injury) conservatively based on TTS	190 dB RMS for pinnipeds. 180 dB RMS for cetaceans.
Level B harassment	Behavioral disruption for impulse noise (e.g., impact pile driving)	160 dB RMS.
Level B harassment	Behavioral disruption for non-pulse noise (e.g., vibratory pile driving, drilling)	120 dB RMS.

Distance to Sound Thresholds

WSF and NMFS have determined that open-water vibratory pile extraction during the Mukilteo Tank Farm Pier Removal project has the potential to result in behavioral harassment of marine mammal species and stocks in the vicinity of the proposed activity.

As Table 3 shows, under current NMFS guidelines, the received exposure level for Level A harassment is defined at ⩾180 dB (rms) re 1 μ Pa for cetaceans and ⩾190 dB (rms) re 1 μ Pa for pinnipeds. The measured source levels from vibratory removal of 12-inch timber piles are between 149 and 152 dB (rms) re 1 μPa at 16 m from the hammer (Laughlin 2011a). Therefore, the proposed Mukilteo Tank Farm Pier Removal construction project is not expected to cause Level A harassment or TTS to marine mammals.

Masking affects both senders and receivers of the signals and therefore can have consequences at the population level. Recent science suggests that low frequency ambient sound levels have increased by as much as 20 dB (more than 3 times in terms of

SPL) in the world's ocean from pre-industrial periods, and most of these increases are from distant shipping (Hildebrand 2009). All anthropogenic noise sources, such as those from vessel traffic, pile driving, dredging, and dismantling existing bridge by mechanic means, contribute to the elevated ambient noise levels, thus intensify masking.

Nevertheless, the levels of noise from the proposed WSF construction activities are relatively low and are blocked by landmass southward. Therefore, the noise generated is not expected to contribute to increased ocean ambient noise in a manner that will notably increase the ability of marine mammals in the vicinity to detect critical acoustic cues. Due to shallow water depths near the ferry terminals, underwater sound propagation for low-frequency sound (which is the major noise source from pile driving) is expected to be poor.

Currently NMFS uses 120 dB_{rms} re 1 μPa received level for non-impulse noises (such as vibratory pile driving, saw cutting, drilling, and dredging) for the onset of marine mammal Level B behavioral harassment. However, since the ambient noise level at the vicinity of the proposed project area is between 122 to 124 dB re 1 μPa, depending on marine mammal functional hearing groups (Laughlin 2011b), the received level of 120 dB re 1 μPa would be below the ambient level. Therefore, for this proposed project, 122 dB re 1 μPa is used as the threshold for Level B behavioral harassment. The distance to the 122 dB contour Level B acoustical harassment threshold due to vibratory pile removal extends a maximum of 1.6 km as is shown in Figure 1-5 in the Application.

As far as airborne noise is concerned, the estimated in-air source level from vibratory pile driving a 30-in steel pile is estimated at 97.8 dB re 1 μPa at 15 m (50 feet) from the pile (Laughlin 2010b). Using the spreading loss of 6 dB per doubling of

distance, it is estimated that the distances to the 90 dB and 100 dB thresholds were estimated at 37 m and 12 m, respectively.

The closest documented harbor seal haul-out is the Naval Station Everett floating security fence , and the Port Gardner log booms, both approximately 4.5 miles to the northeast of the project site). The closest documented California sea lion haul out site are the Everett Harbor navigation buoys, located approximately 3 miles to the northeast of the project site (Figure 3-1). In-air disturbance will be limited to those animals moving on the surface through the immediate pier area, within approximately 37 meters (123 feet) for harbor seals and within 12 meters (39 feet) for other pinnipeds of vibratory pile removal (Figure 1-6 in Application).

Incidental take is estimated for each species by estimating the likelihood of a marine mammal being present within a ZOI during active pile removal or driving. Expected marine mammal presence is determined by past observations and general abundance near the Tank Farm Pier during the construction window. Typically, potential take is estimated by multiplying the area of the ZOI by the local animal density. This provides an estimate of the number of animals that might occupy the ZOI at any given moment. However, in some cases take requests were estimated using local marine mammal data sets (e.g., Orca Network, state and federal agencies), opinions from state and federal agencies, and observations from Navy biologists.

Harbor seal

Based on the ORCA monitoring, NMFS' analysis uses a conservative estimate of 13 harbor seals per day potentially within the ZOI. For Year One pile removal, the duration estimate is 975 hours over 140 days. For the exposure estimate, it will be

conservatively assumed that 13 harbor seals may be present within the ZOI and be exposed multiple times during the project. The calculation for marine mammal exposures is estimated by:

Exposure estimate = N * 140 days of vibratory pile removal activity, where:

N = # of animals (13)

Exposure estimate = 13 * 140 days = 1,820

NMFS is proposing the authorization for Level B acoustical harassment of 1,820 harbor seals. However, many of these takes are likely to be repeated exposures of individual animals.

California Sea Lion

Based on the ORCA monitoring this analysis uses a conservative estimate of 6 California sea lions per day potentially within the ZOI.

Exposure estimate = 6 * 140 days = 840

NMFS is proposing the authorization for Level B acoustical harassment take of 840 California sea lions. Many of these takes are likely to be repeated exposures of individual animals.

Steller Sea Lion

Based on the observation data from Craven Rock, this analysis uses a conservative estimate of 12 Steller sea lions per day potentially near the ZOI. However, given the distance from this haul-out to the Tank Farm Pier, it is not expected that the same numbers would be present in the ZOI. For the exposure estimate, it will be conservatively assumed that $1/6^{th}$ of the Steller sea lions observed at Craven Rock (2

animals) may be present within the ZOI and be exposed multiple times during the project for total of 2 animals

Exposure estimate = 2 * 140 days = 280

NMFS is proposing the authorization for Level B acoustical harassment take of 280 Steller sea lions. It is likely that many of these takes are likely to be repeated exposures of individual animals..

Harbor Porpoise

Based on the water depth within the ZOI and group size, this analysis uses a conservative estimate of 8 harbor porpoises per day potentially near the ZOI.

Exposure estimate = 8 * 140 days = 1,120

WSF is requesting authorization for Level B acoustical harassment take of 1,120 Harbor porpoise. Note that many of these takes are likely to be repeated exposures of individual animals.

Dall's Porpoise

Based on the average winter group size, as described in Section 3.0 of the Application, this analysis uses a conservative estimate of 3 Dall's porpoises per day potentially near the ZOI.

Exposure estimate = 3 * 140 days = 420

NMFS is proposing authorization for Level B acoustical harassment take of 420 Dall's porpoise. A number of these anticipated takes are likely to be repeated exposures of individual animals.

Killer Whale

Southern Resident Killer Whale-In order to estimate anticipated take, NMFS used Southern Resident killer whale density data from the Pacific Marine Species Density Database (US Navy 2014) that measured density per km^2 per season in the waters in the vicinity of the Mukilteo Tank Farm Pier. Data was provided as a range by the Navy. NMFS took the high end of the range for the summer, fall, and winter seasons to estimate density and multiplied that figure by the ensonified area (~ 5 km^2.)

Exposure estimate = (0.00090 [summer] + 0.000482 [fall] + 0.000250 [winter]) * 5 km^2 =

0.0258 Southern Resident killer whales.

Note that pod size of Southern Resident killer whales can range from 3-50. NMFS will assume that one pod of 15 whales will be sighted during this authorization period and proposes to authorize that amount. However, it is possible that a larger group may be observed. In order to limit the take of southern resident killer whales NMFS proposes to require additional steps applicable to killer whales. These steps are described below and in Appendix B of the Application.

Transient Killer Whale- NMFS estimated the take of transient killer whales by applying the same methodology used to estimate Southern Resident killer whale.

Exposure estimate = (0.001582 [summer] + 0.002373 [fall] + 0.002373 [winter]) * 5 km^2 = 0.03163 transient killer whales.

Note that pod size of transients can range from 1-5. NMFS will assume that two pods of 5 whales will be sighted during this authorization period. Therefore, NMFS is proposing 10 takes of transient killer whales.

Gray Whale

Based on the frequency of sightings during the in-water work window, this analysis uses a conservative estimate of 3 gray whales per day potentially near the ZOI.

It is assumed that Gray whales will not enter the ZOI each day of the project, but may be present in the ZOI for 5 days per month as they forage in the area, for a total of 30 days. For the exposure estimate, it will be conservatively assumed that up to 3 animals may be present within the ZOI and be exposed multiple times during the project.

Exposure estimate = 3 * 30 days = 90

NMFS is proposing authorization for Level B acoustical harassment take of 90 Gray whales. It is assumed that this number will include multiple harassments of a single individual animal.

Humpback Whale

Based on the frequency of sightings during the in-water work window, this analysis uses a conservative estimate of 2 humpback whales potentially near the ZOI.

It is assumed that humpback whales will not enter the ZOI each day of the project, but may be present in the ZOI for 3 days per month as they forage in the area, for a total of 18 days. For the exposure estimate, it will be conservatively assumed that up to 2 animals may be present within the ZOI and be exposed multiple times during the project.

Exposure estimate = 2 * 18 days = 36

NMFS is proposing authorization for Level B acoustical harassment take of 36 humpback whales. It is assumed that this number will include multiple harassments of the same individuals.

Based on the estimates, approximately 1,820 Pacific harbor seals, 840 California sea lions, 280 Steller sea lions, 1,120 Harbor porpoise, 420 Dall's porpoise, 94 killer

whales (10 transient, 15 Southern Resident killer whales), 90 gray whales, and 36 humpback whales could be exposed to received sound levels above 122 dB re 1 μPa (rms) from the proposed Mukilteo Tank Farm Pier Removal project. A summary of the estimated takes is presented in Table 4.

Table 4. Estimated numbers of marine mammals that may be exposed to vibratory hammer sound levels above 122 dB re 1 μPa (rms)

Species	Estimated marine mammal takes*	Percentage of species or stock
Pacific harbor seal	1,820	16.5%
California sea lion	840	0.3%
Steller sea lion	280	0.4%
Harbor porpoise	1,120	10.5%
Dall's porpoise	420	1.0%
Killer whale, transient	10	4.1%
Killer whale, Southern Resident	15	18.2%
Gray whale	90	0.5%
Humpback whale	36	2.0%

***Represents maximum estimate of animals due to likelihood that some individuals will be taken more than once**

Analysis and Preliminary Determinations

Negligible Impact Analysis

Negligible impact is "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" (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.,* population-level effects). An estimate of the number of Level B harassment takes, alone, is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals

that might be "taken" through behavioral harassment, NMFS must consider other factors, such as the likely nature of any responses (their intensity, duration, etc.), the context of any responses (critical reproductive time or location, migration, etc.), as well as the number and nature of estimated Level A harassment takes, the number of estimated mortalities, effects on habitat, and the status of the species.

To avoid repetition, the following discussion applies to the affected stocks of harbor seals, California sea lions, Steller sea lions, harbor porpoises, Dall's porpoises, gray whales and humpback whales, except where a separate discussion is provided for killer whales, as the best available information indicates that effects of the specified activity on individuals of those stocks will be similar, and there is no information about the population size, status, structure, or habitat use of the areas to warrant separate discussion.

Pile removal activities associated with the Mukilteo Tank Farm removal project, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment (behavioral disturbance) only, from underwater sounds generated from pile extraction. Potential takes could occur if individuals of these species are present in the ensonified zone when pile driving is happening.

No injury, serious injury, or mortality is anticipated given the nature of the activity and measures designed to minimize the possibility of injury to marine mammals. The potential for these outcomes is minimized through the construction method and the implementation of the planned mitigation measures. Specifically, vibratory hammers will be the primary method of extraction and no impact driving will occurs. Vibratory driving

and removal does not have significant potential to cause injury to marine mammals due to the relatively low source levels produced (site-specific acoustic monitoring data show no source level measurements above 180 dB rms) and the lack of potentially injurious source characteristics. Given sufficient "notice" through use of soft start, marine mammals are expected to move away from a sound source. The likelihood that marine mammal detection ability by trained observers is high under the environmental conditions described for waters around the Mukilteo Tank Farm further enables the implementation of shutdowns if animals come within 10 meters of operational activity to avoid injury, serious injury, or mortality.

WSF proposed activities are localized and of relatively short duration. The entire project area is limited to water in close proximity to the tank farm. The project will require the extraction of 3,900 piles and will require 675-975 hours over 140-180 days. These localized and short-term noise exposures may cause brief startle reactions or short-term behavioral modification by the animals. These reactions and behavioral changes are expected to subside quickly when the exposures cease. Moreover, the proposed mitigation and monitoring measures are expected to reduce potential exposures and behavioral modifications even further.

Southern Resident Killer Whale

Critical habitat for Southern Resident killer whales has been identified in the area and may be impacted. The proposed action will have short-term adverse effects on Chinook salmon, the primary prey of Southern Resident killer whales. However, the Puget Sound Chinook salmon ESU comprises a small percentage of the Southern Resident killer whale diet. Hanson et al. (2010) found only six to 14 percent of Chinook

salmon eaten in the summer were from Puget Sound. Therefore, NMFS concludes that both the short-term adverse effects and the long-term beneficial effects on Southern Resident killer whale prey quantity and quality will be insignificant. Also, the sound from vibratory pile driving and removal may interfere with whale passage. For example, exposed killer whales are likely to redirect around the sound instead of passing through the area. However, the effect of the additional distance traveled is unlikely to cause a measureable increase in an individual's energy budget, and the effects would therefore be temporary and insignificant. Additionally, WSF will employ additional mitigation measures to avoid or minimize impacts to Southern Residents. These measures were described previously in the section *Monitoring and Shutdown for Pile Driving.*

The project also is not expected to have significant adverse effects on affected marine mammals' habitat, as analyzed in detail in the "Anticipated Effects on Marine Mammal Habitat" section. The project activities would not modify existing marine mammal habitat. The activities may cause some fish to leave the area of disturbance, thus temporarily impacting marine mammals' foraging opportunities in a limited portion of the foraging range; but, because of the short duration of the activities and the relatively small area of the habitat that may be affected, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences. Furthermore, no important feeding and/or reproductive areas for other marine mammals are known to be near the proposed action area.

Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from other similar activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or

decreased foraging (if such activity were occurring) (*e.g.*, Thorson and Reyff, 2006; Lerma, 2014). Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving, although even this reaction has been observed primarily only in association with impact pile driving. In response to vibratory driving and removal, pinnipeds (which may become somewhat habituated to human activity in industrial or urban waterways) have been observed to orient towards and sometimes move towards the sound. The pile removal activities analyzed here are similar to, or less impactful than, numerous construction activities conducted in other similar locations, which have taken place with no reported injuries or mortality to marine mammals, and no known long-term adverse consequences from behavioral harassment. 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 fitness for the affected individuals, and thus would not result in any adverse impact to the stock as a whole. Level B harassment will be reduced to the level of least practicable impact through use of mitigation measures described herein and, if sound produced by project activities is sufficiently disturbing, animals are likely to simply avoid the project area while the activity is occurring.

In summary, we considered the following factors: (1) The possibility of injury, serious injury, or mortality may reasonably be considered discountable; (2) the anticipated incidents of Level B harassment consist of, at worst, temporary modifications in behavior; (3) the absence of any significant habitat, other than identified critical habitat

for Southern Resident killer whales within the project area, including rookeries, significant haul-outs, or known areas or features of special significance for foraging or reproduction; (4) the expected efficacy of the proposed mitigation measures in minimizing the effects of the specified activity on the affected species or stocks and their habitat to the level of least practicable impact. In combination, we believe that these factors, as well as the available body of evidence from other similar activities, demonstrate that the potential effects of the specified activity will have only short-term effects on individuals. The take resulting from the proposed WSF Mukilteo Multimodal Project Tank Farm Pier Removal project is not reasonably expected to and is not reasonably likely to adversely affect the marine mammal species or stocks through effects on annual rates of recruitment or survival.

Therefore, 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 proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from WSF's Mukilteo Multimodal Project Tank Farm Pier Removal project will have a negligible impact on the affected marine mammal species or stocks.

Small Numbers Analysis

Based on long-term marine mammal monitoring and studies in the vicinity of the proposed construction areas, it is estimated that approximately 1,820 Pacific harbor seals, 840 California sea lions, 280 Steller sea lions, 1,120 harbor porpoises, 420 Dall's porpoises, 10 transient killer whales, 15 Southern Resident killer whales, 90 gray whales, and 36 humpback whales could be exposed to received noise levels above 122 dBrms re

1 μPa from the proposed construction work at the Mukilteo Multimodal Ferry Terminal. These numbers represent approximately 0.3% - 18.2% of the stocks and populations of these species that could be affected by Level B behavioral harassment

The numbers of animals authorized to be taken for all species 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. 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, we find that small numbers of marine mammals will be taken relative to the population sizes of the affected species or stocks.

Impact on Availability of Affected Species for Taking for Subsistence Uses

There are no subsistence uses of marine mammals in Puget Sound or the San Juan Islands relevant to section 101(a)(5)(D).

Endangered Species Act (ESA)

The humpback whale and Southern Resident stock of killer whale are the only marine mammal species currently listed under the ESA that could occur in the vicinity of WSF's proposed construction projects. NMFS issued a Biological Opinion that covers the proposed action on July 31, 2013, and concluded that the proposed action is not likely to jeopardize the continued existence of Southern Resident killer whales or humpback whales, and is not likely to destroy or adversely modify Southern Resident killer whales critical habitat.

National Environmental Policy Act (NEPA)

NMFS re-affirms the document titled *Final Environmental Assessment Issuance of Marine Mammal Incidental Take Authorizations to the Washington State Department of Transportation to Take Marine Mammals* which was issued in February 2014. A Finding of No Significant Impact (FONSI) was signed on February 28, 2014. In the FONSI NMFS determined that the issuance of IHAs for the take, by harassment, of small numbers of marine mammals incidental to the WSF's Mukilteo Ferry Terminal replacement project in Washington State, will not significantly impact the quality of the human environment, as described in this document and in the Mukilteo EA. These documents are found at *http://www.nmfs.noaa.gov/pr/permits/incidental/construction.htm.*

Proposed Authorization

For the reasons discussed in this document, NMFS has preliminarily determined that the vibratory pile removal associated with the Mukilteo Tank Farm Pier Removal Project would result, at worst, in the Level B harassment of small numbers of eight marine mammal species that inhabit or visit the area. While behavioral modifications, including temporarily vacating the area around the project site, may be made by these species to avoid the resultant visual and acoustic disturbance, the availability of alternate areas within Washington coastal waters and haul-out sites has led NMFS to preliminarily determine that this action will have a negligible impact on these species in the vicinity of the proposed project area.

In addition, no take by TTS, Level A harassment (injury) or death is anticipated and harassment takes should be at the lowest level practicable due to incorporation of the mitigation and monitoring measures mentioned previously in this document.

As a result of these preliminary determinations, NMFS proposes to issue an IHA to WSF for conducting the Mukilteo Tank Farm removal project, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. The proposed IHA language is provided next.

This section contains a draft of the IHA itself. The wording contained in this section is proposed for inclusion in the IHA (if issued).

1. This Authorization is valid from September 1, 2015, through August 31, 2016.

2. This Authorization is valid only for activities associated with in-water construction work at the Mukilteo Multimodal Ferry Terminals in the State of Washington.

3. (a) The species authorized for incidental harassment takings, Level B harassment only, are: Pacific harbor seal (*Phoca vitulina richardsi*), California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), transient and Southern Resident killer whales (*Orcinus orca*), gray whale (*Eschrichtius robustus*), and humpback whale (*Megaptera novaeangliae*).

(b) The authorization for taking by harassment is limited to the following acoustic sources and from the following activities:

(i) Vibratory pile removal; and

(ii) Work associated with pile removal activities.

(c) The taking of any marine mammal in a manner prohibited under this Authorization must be reported within 24 hours of the taking to the Northwest Regional Administrator

(206-526-6150), National Marine Fisheries Service (NMFS) and the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at (301) 427-8401

4. The holder of this Authorization must notify Monica DeAngelis of the West Coast Regional Office (phone: (562) 980-3232) at least 24 hours prior to starting activities.

5. Prohibitions

(a) The taking, by incidental harassment only, is limited to the species listed under condition 3(a) above and by the numbers listed in Table 3 of this *Federal Register* notice. The taking by Level A harassment, injury or death of these species or the taking by harassment, injury or death of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this Authorization.

(b) The taking of any marine mammal is prohibited whenever the required protected species observers (PSOs), required by condition 7(a), are not present in conformance with condition 7(a) of this Authorization.

6. Mitigation

(a) Ramp Up (Soft Start):

Vibratory hammer for pile removal and pile driving shall be initiated at reduced power for 15 seconds with a 1 minute interval, and be repeated with this procedure for an additional two times.

(b) Marine Mammal Monitoring:

Monitoring for marine mammal presence shall take place 30 minutes before, during and 30 minutes after pile driving.

(c) Power Down and Shutdown Measures:

(i) A shutdown zone of 10 m radius for all marine mammals will be established around all vibratory extraction activity.

(ii) WSF shall implement shutdown measures if Southern Resident killer whales (SRKWs) are sighted within the vicinity of the project area and are approaching the Level B harassment zone (zone of influence, or ZOI) during in-water construction activities.

(iii) If a killer whale approaches the ZOI during pile driving or removal, and it is unknown whether it is a SRKW or a transient killer whale, it shall be assumed to be a SRKW and WSF shall implement the shutdown measure identified in 6(c)(i).

(iv) If a SRKW enters the ZOI undetected, in-water pile driving or pile removal shall be suspended until the SRKW exits the ZOI to avoid further level B harassment.

(d) Time Restrictions — Work would occur only during daylight hours, when visual monitoring of marine mammals can be conducted. In addition, all in-water construction will be limited to the period between August 1, 2015 and February 15, 2016; and August 1, 2016 until IHA expires on August 31, 2016.

7. Monitoring:

(a) Protected Species Observers: WSF shall employ qualified protected species observers (PSOs) to monitor the 122 dBrms re 1 μPa (nominal ambient level) zone of influence (ZOI) for marine mammals. Qualifications for marine mammal observers include:

(i) 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 will be required to correctly identify the target.

(ii) Experience or training in the field identification of marine mammals (cetaceans and pinnipeds).

(iii) Sufficient training, orientation or experience with the construction operation to provide for personal safety during observations.

(iv) 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.

(v) Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).

(vi) Writing skills sufficient to prepare a report of observations that would include such information as the number and type of marine mammals observed; the behavior of marine mammals in the project area during construction, dates and times when observations were conducted; dates and times when in-water construction activities were conducted; and dates and times when marine mammals were present at or within the defined ZOI.

(b) Monitoring Protocols: PSOs shall be present on site at all times during pile removal.

(i) During vibratory pile removal, two land-based biologists will monitor the area from the best observation points available. If weather conditions prevent adequate land-based observations, boat-based monitoring shall be implemented.

(ii) The vibratory Level B acoustical harassment ZOI shall be monitored for the presence of marine mammals 30 minutes before, during, and 30 minutes after any pile removal activity.

(iii) Monitoring shall be continuous unless the contractor takes a significant break, in which case, monitoring shall be required 30 minutes prior to restarting pile removal.

(iv) A range finder or hand-held global positioning system device shall be used to ensure that the 122 dBrms re 1 μPa Level B behavioral harassment ZOI is monitored.

(v) If marine mammals are observed, the following information will be documented:

(A) Species of observed marine mammals;

(B) Number of observed marine mammal individuals;

(C) Behavioral of observed marine mammals;

(D) Location within the ZOI; and

(E) Animals' reaction (if any) to pile-driving activities

8. Reporting:

(a) WSDOT shall provide NMFS with a draft monitoring report within 90 days of the conclusion of the construction work. This report shall detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed.

(b) If comments are received from the NMFS Northwest Regional Administrator or NMFS Office of Protected Resources on the draft report, a final report shall be submitted to NMFS within 30 days thereafter. If no comments are received from NMFS, the draft report will be considered to be the final report.

(c) In the unanticipated event that the construction activities clearly cause the take of a marine mammal in a manner prohibited by this Authorization (if issued), such as an injury, serious injury or mortality (e.g., ship-strike, gear interaction, and/or entanglement), WSF shall immediately cease all operations and immediately report the incident to the Chief Incidental Take Program, Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401and/or be email to *Jolie.Harrison@noaa.gov* and

Robert.pauline@noaa.gov and the West Coast Regional Stranding Coordinator Brent Norberg (*Brent.Norbert@noaa.gov*). The report must include the following information:

(i) Time, date, and location (latitude/longitude) of the incident;

(ii) Description of the incident;

(iii) Status of all sound source use in the 24 hours preceding the incident;

(iv) Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, visibility, and water depth);

(v) Description of marine mammal observations in the 24 hours preceding the incident;

(vi) Species identification or description of the animal(s) involved;

(vii) The fate of the animal(s); and

(viii) Photographs or video footage of the animal (if equipment is available).

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

(d) In the event that WSF discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), WSF will immediately report the incident to the Chief Incidental Take Program, Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or be email to *Jolie.Harrison@noaa.gov* and *Robert.pauline@noaa.gov* and the West Coast Regional Stranding Coordinator Brent Norberg (*Brent.Norbert@noaa.gov*).

The report must include the same information identified above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with WSF to determine whether modifications in the activities are appropriate.

(e) In the event that WSF discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), WSF shall report the incident to the Chief, Incidental Take Program, Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401and/or be email to *Jolie.Harrison@noaa.gov* and *Robert.pauline@noaa.gov* and the West Coast Regional Stranding Coordinator Brent Norberg (*Brent.Norbert@noaa.gov*) within 24 hours of the discovery. WSF shall provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. WSF can continue its operations under such a case.

9. This Authorization may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed herein or if the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals, or if there is an unmitigable adverse impact on the availability of such species or stocks for subsistence uses.

10. A copy of this Authorization and the Incidental Take Statement must be in the possession of each contractor who performs the construction work at Mukilteo Multimodal Ferry Terminals.

11. WSF is required to comply with the Terms and Conditions of the Incidental Take Statement corresponding to NMFS' Biological Opinion.

Request for Public Comments

NMFS requests comment on our analysis, the draft authorization, and any other aspect of the Notice of Proposed IHA for WSF's Mukilteo Tank Farm removal project. Please include with your comments any supporting data or literature citations to help inform our final decision on WSF's request for an MMPA authorization.

Dated: July 16, 2015.

Perry Gayaldo,
Deputy Director,
Office of Protected Resources,
National Marine Fisheries Service.

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