



DEPARTMENT OF THE ARMY
ALASKA DISTRICT, U.S. ARMY CORPS OF ENGINEERS
REGULATORY DIVISION
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March 23, 2020

Regulatory Division
POA- 2020-00149

Mr. Jon Kurland
Assistant Regional Administrator for Protected Resources
National Marine Fisheries Service, Alaska Region
Post Office Box 21668
Juneau, Alaska 99802

Dear Mr. Kurland,

The U.S. Army Corps of Engineers, Regulatory Division (Corps) is evaluating a Department of the Army (DA) pre-construction notification from Alyeska Pipeline Service Company for the proposed project as described below. The Corps requests initiation of expedited informal consultation under section 7(a)(2) of the Endangered Species Act (ESA) for the proposed project. We have determined that the proposed activity may affect, but is not likely to adversely affect: endangered western distinct population segment (DPS) Steller sea lion (*Eumetopias jubatus*), endangered fin whale (*Balaenoptera physalus*), and endangered western North Pacific DPS and threatened Mexico DPS humpback whale (*Megaptera novaeangliae*) or designated critical habitat for these species. Our supporting analysis is provided below. We request your written concurrence if you agree with our determinations.

Project Description

The proposed project would remove and replace a support pile within the Valdez Marine Terminal Small Boat Harbor in Valdez, Alaska. The project site is located on the south end of Port Valdez near Jackson Point and the Trans Alaska Pipeline System's southern terminus at the Valdez Marine Terminal. Pile #26 was loosened during an extreme low tide and is suspected to be damaged. The pile needs to be inspected and/or replaced to maintain the stability and functionality of the section of float dock that it supports. The existing 18-inch-diameter pile would be removed using vibratory extraction, inspected, and then either repaired and re-driven or replaced with a new pile of the same dimensions. The pile would be driven into the existing socket using the vibratory hammer. In-water work for the proposed project includes repairing and re-installing the damaged float dock and welded installation of wear plate extensions to all of the small boat harbor's existing piles.

Pile extraction and driving would be completed using an ICE 416 (maximum frequency 1,500 vibrations per minute). Pile #26 is located in approximately 17 feet of water and was driven 21 feet into ground consisting of a shallow mud layer on top of a firm sand/gravel layer, however the pile would be re-driven into the existing concrete pile hole. Work is expected to last approximately one week starting as early as April 1, 2020 through December 15, 2020, with pile driving activities taking place on one day only. If permitted, the project proponent would mobilize by early April, and have five years to complete the proposed work.

The project site is located at Section 13, T. #9 S., R. #7 W., Copper River Meridian; USGS Quad Map Valdez A-7 SE; Latitude 61.086° N., Longitude 146.3902° W.; in Valdez, Alaska (Figures 1-3).

Figure 1. Valdez Marine Terminal Small Boat Harbor Project Location Map
(Source: Google Maps 2020)

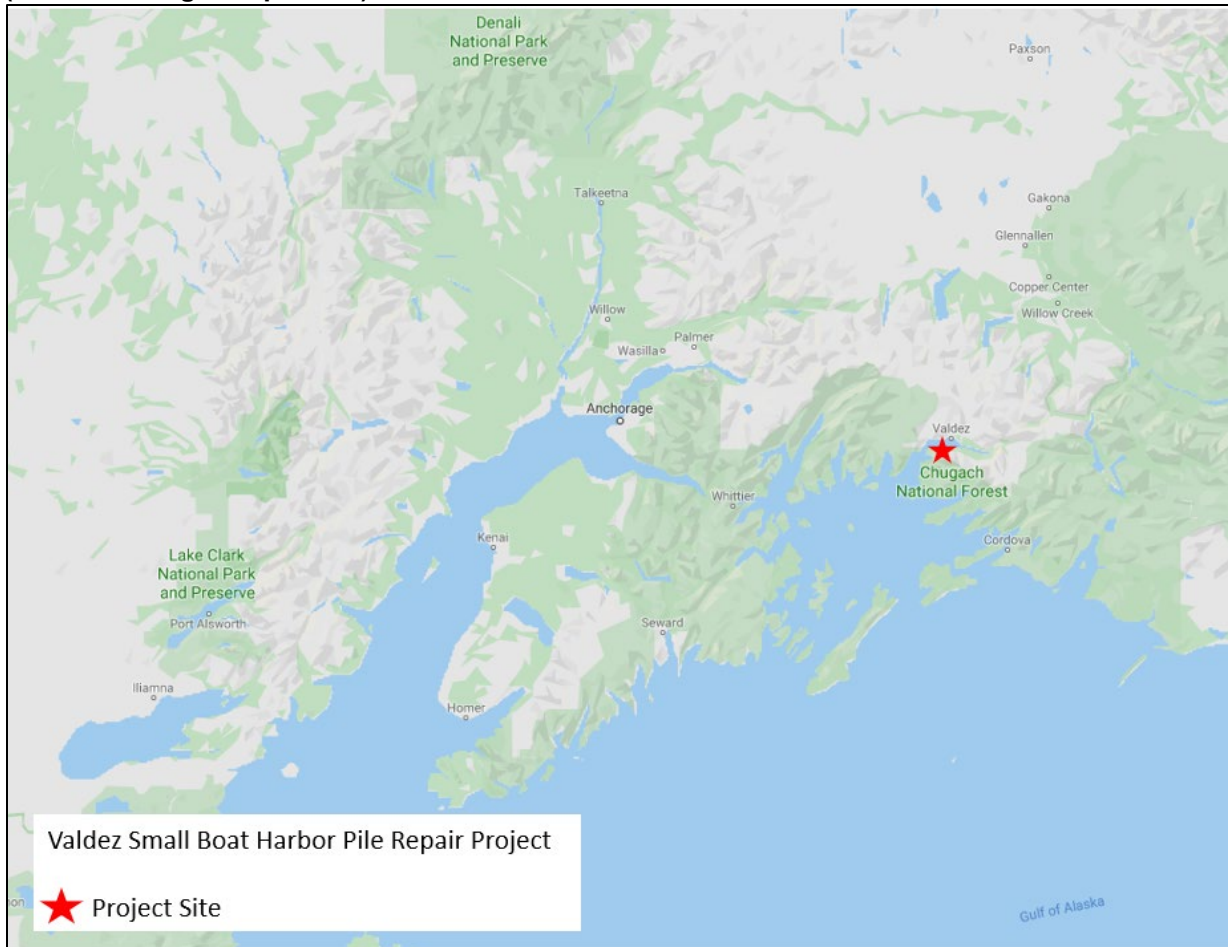
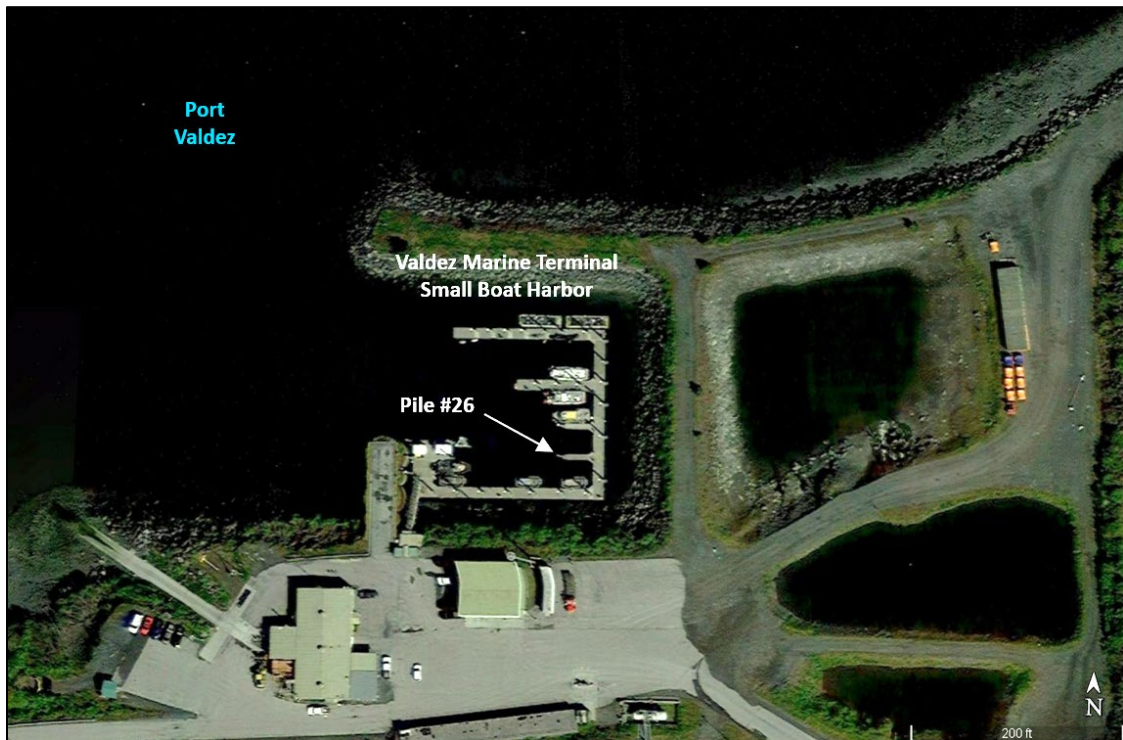
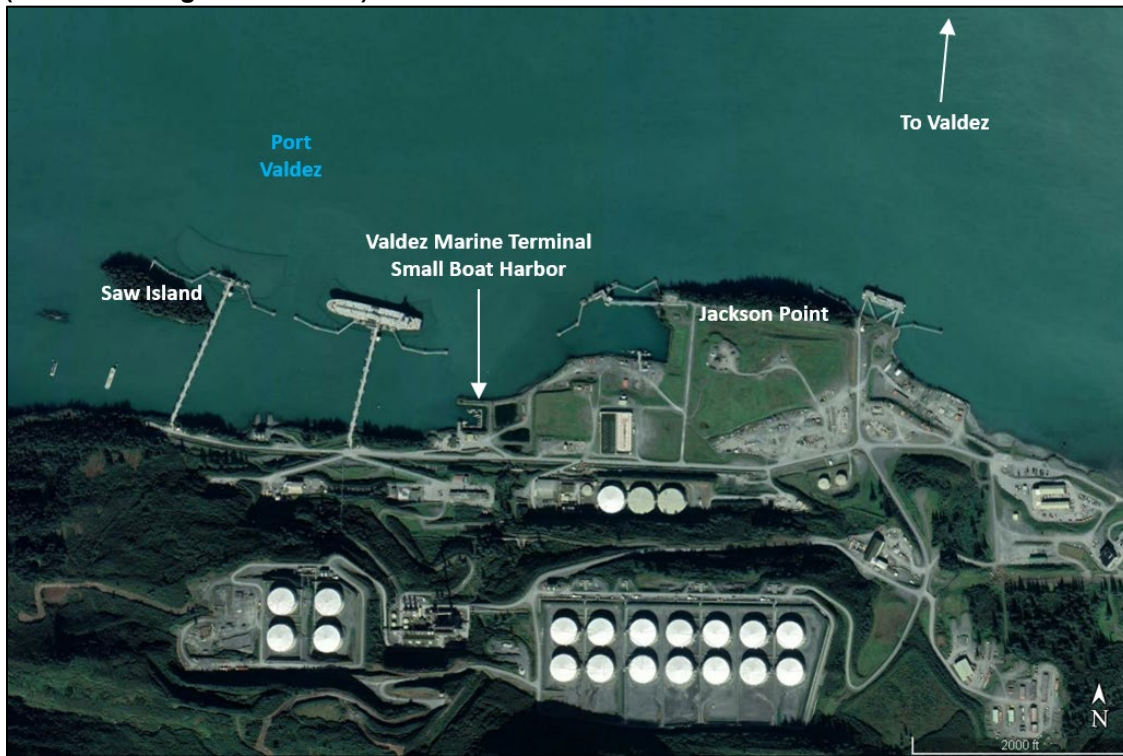


Figure 2. Valdez Marine Terminal Small Boat Harbor Location
(Source: Google Earth 2018)



▪ **Figure 3. Valdez Marine Terminal Small Boat Harbor Pile #26**
▪ (Source: Google Earth 2017)

Description of the Action Area

The action area is defined in the ESA regulations (50 CFR 402.02) as the area within which all direct and indirect effects of the project will occur. The action area is distinct from and larger than the project footprint because some elements of the project may affect listed species some distance from the project footprint. The action area, therefore, extends out to a point where no measurable effects from the project are expected to occur.

For the proposed project, the action area includes a defined area within Valdez Marine Terminal Small Boat Harbor during pile driving activities only (Figure 4). Indirect effects of the action would be non-existent, as the purpose of the project is to maintain existing facilities at the Valdez Small Boat Harbor. The proposed project would not cause increased boat traffic in Port Valdez.

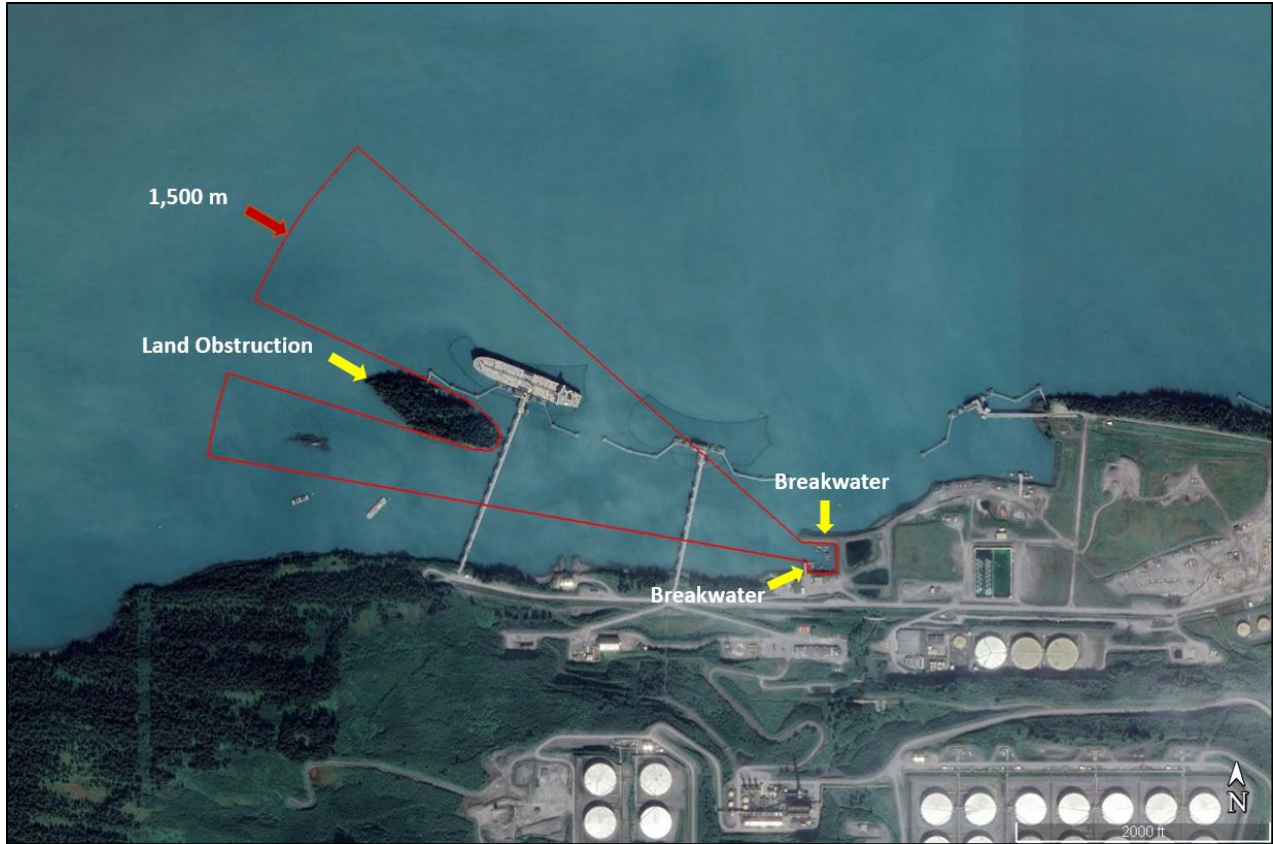
For this project, the action area includes the ensonified area within which project-related noise levels are greater than or equal to 120 dB_{rms} re1μPa or approaching ambient noise levels (i.e., the point where no measurable effect from the project would occur). The ensonified area was determined based on the practical spreading loss model using a proxy sound source level, expressed in sound pressure level (SPL). The Corps has determined that the action area extends out from the proposed project's sound source to 1,500 meters, using a sound source level of 152.3 SPL.¹ NOTE: The Valdez Marine Terminal Small Boat Harbor breakwater and Saw Island stop underwater noise transmission before it reaches these calculated distances, thus, the action area is truncated where these landforms stop underwater noise transmission. See Figure 4.

In addition to in-water noise, pinnipeds such as Steller sea lions can be adversely affected by in-air noise. Loud noises can cause hauled-out pinnipeds to flush back into the water, leading to disturbance and possible injury. National Marine Fisheries Service (NMFS) has established an in-air noise disturbance threshold of 100 dB_{rms} re20μPa for Steller sea lions (NMFS 2020). Pile driving and removal associated with this project will generate in-air noise above ambient levels within Port Valdez. However, the predicted distances to the in-air noise disturbance threshold for hauled-out sea lions (100 dB_{rms}) will not extend more than 69 meters from vibratory pile driving activities.²

¹ The source level of 152.3 SPL is proxy from median received levels at 10 meters for vibratory pile driving of 24-inch-diameter piles to construct the Kodiak Ferry Terminal (Denes et al. 2016, Table 72).

² Predicted distances for in-air threshold distances. The Washington State Department of Transportation has documented un-weighted rms levels for a vibratory hammer (30-inch pile) to an average 96.5 dB and a maximum of 103.2 dB at 15 meters (Laughlin 2010).

Figure 4. Valdez Marine Terminal Small Boat Harbor Pile Replacement Action Area (Source: Google Earth 2019)



National Marine Fisheries Service (NMFS) Listed Species and Critical Habitat in the Action Area

Within the action area, endangered western DPS Steller sea lion, endangered fin whale, and endangered western North Pacific DPS and threatened Mexico DPS humpback whale occur (NMFS 2019). The proposed project is not within designated critical habitat for Steller sea lion, and critical habitat has not been designated for fin whale. Critical habitat has been proposed by NMFS for the endangered population segments of humpback whale but the ruling has not been finalized as of the date of this letter (84 FR 54354).

Western DPS Steller Sea Lion

The western DPS of Steller sea lions is generally distributed west of Cape Suckling, Alaska (144°W) and may occur in the vicinity of Port Valdez year-round. Generally speaking, Steller sea lions occupy exposed rookeries and haulouts during the summer (late-May to early-July) and move towards protected areas in the winter (Alaska Department of Fish and Game 2019). There are no known haulouts or rookeries in Port Valdez, but concentrations of these animals have been documented in the Valdez Arm (Bishop et al. 2018).

Presence of this species could overlap with the time the proposed project is scheduled to take place. Steller sea lions do not migrate, but follow seasonal concentrations of prey and may return to this region in the fall for overwintering and foraging; individuals will remain in these protected areas for days at a time (NMFS 2019a).

Local information from the Solomon Gulch Hatchery (approximately three miles east along the shoreline from the project area) and NMFS representatives indicates that Steller sea lions may be drawn into Port Valdez in the summer through the fall, following the spawning salmon back to the hatchery (Raum-Suryan and Malek 2020). While the hatchery is not within the action area, Steller sea lions would pass by the action area on their way to the concentrated food supply during spawning periods.

Steller Sea Lion Critical Habitat

NMFS designated critical habitat for Steller sea lions on August 27, 1993 (58 FR 45269). In Alaska, designated critical habitat includes: 1) a 37-km (23-mi) seaward buffer around all major haulouts and rookeries west of 144° W longitude; 2) 0.9-km (0.6-mi) terrestrial, air, and aquatic zones around major haulouts and rookeries east of 144° W longitude, and 3) three special aquatic foraging areas: the Shelikof Strait, Bogoslof, and Seguam Pass areas.

The proposed project is not located within critical habitat for Steller sea lions. The nearest major Steller sea lion haulouts are on Point Eleanor and Hook Point, located in southern Prince William Sound approximately 50 miles away (50 CFR 226.202). Although not identified as critical habitat, Steller sea lions may be found overwintering, foraging, or milling in Port Valdez.

Fin Whale

Fin whales occur rarely within the vicinity of the action area, Port Valdez, typically during the summer but can occur as early as April. Usually fin whales do not migrate as far north as the Gulf of Alaska until May (NMFS 2010). It is likely that the presence of this species will not overlap with the time the proposed project is scheduled to take place, preferring to travel in deep waters away from the coast rather than the shallow waters near the project area (Consiglieri et al. 1982). During the time in which fin whales are in this region they would be foraging, moving into and out of feeding areas and would only be seen intermittently (NMFS 2019b).

Fin Whale Critical Habitat

Due to the fact that fin whales are widely-distributed pelagic species, they are difficult to track and little is known about their stock distribution within Pacific Ocean (Muto et al. 2019). Critical habitat has not been designated for fin whales (NMFS 2010). Fin whales are generally a deep-water species but could be present in Port Valdez to feed on concentrations of prey species (herring, small schooling fish, invertebrates) that are present year-round in Port Valdez (Carls et al. 2016, Schaefer 2016).

Humpback Whale

NMFS completed a global status review of humpback whales and on September 8, 2016 (81 FR 62260) published a final rule that changed the status of humpback whales under the ESA (81 FR 62259). The decision recognizes 14 DPSs and designates four of these as endangered and one as threatened under ESA, with the remaining 9 not warranting ESA listing status.

Based on an analysis of migration between winter mating/calving areas and summer feeding areas using photo-identification, Wade et al. (2016) concluded that whales feeding in Prince William Sound waters belong primarily to the Hawaii DPS (now recovered), with small contributions of Mexico DPS (threatened) and Western North Pacific DPS (endangered). The proposed project is located within what Wade et al. classifies as the summer feeding area for these DPS. Humpback whales usually do not return from their more temperate breeding grounds until May, but may be seen intermittently in Port Valdez year-round. Humpback whales generally visit this region to feed on the abundant crustacean and small fish species present in Port Valdez in the summer, and they typically would stay in this region only intermittently. Anecdotal reports from the Solomon Gulch Hatchery indicate that these whales may appear in nearshore areas around Valdez in late April, to intercept salmon fry leaving the hatchery.

Humpback Whale Critical Habitat

NMFS proposed a critical habitat designation for humpback whale on October 9, 2019 (84 CFR 54354), including areas off the coast of Alaska. As a final determination has not yet been made, critical habitat for humpback whales will not be considered further in this consultation.

Mitigation Measures

The applicant has agreed to implement the following standard mitigation measures for pile driving projects in order to minimize the risk of harm to listed species for their proposed project:

1. One or more protected species observers (PSOs), able to accurately identify and distinguish species of Alaska marine mammals, will be present before and during all in-water construction and demolition activities.
2. Prior to in-water construction activities, an exclusion (i.e., shut-down) zone will be established. For this project, the exclusion zone includes all marine waters within 1,500 meters of the sound source.
3. Pile-driving will not be conducted when weather conditions or darkness restrict clear, visible observation of all waters within and surrounding the exclusion zone.
4. The PSO(s) will be positioned such that the entire exclusion zone is visible to them (e.g., situated on a platform, elevated promontory, boat or aircraft).

5. The PSO(s) will have the following to aid in determining the location of observed listed species, to take action if listed species enter the exclusion zone, and to record these events:
 - a. Binoculars;
 - b. Range finder;
 - c. GPS;
 - d. Compass;
 - e. Two-way radio communication with construction foreman/superintendent; and
 - f. A log book of all activities which will be made available to NMFS upon request.
6. The PSO(s) will have no other primary duty than watching for and reporting on events related to listed species.
7. The PSO(s) will have the ability to communicate orally, by radio or in person, with project personnel to provide real-time information on listed species observed in the area as necessary, and will have the authority to order a shutdown of noise-producing operations in the event that a listed species is observed within or is judged likely to enter the exclusion zone.
8. The PSO(s) will work in shifts lasting no longer than four hours with at least a one hour break between shifts, and will not perform duties as a PSO for more than 12 hours in a 24-hour period (to reduce PSO fatigue).
9. The PSO(s) will scan the exclusion zone for the presence of listed species for 30 minutes before any pile-driving or removal activities take place.
 - a. If any listed species are present within the exclusion zone, pile-driving and removal activities will not begin until the animal(s) has left the exclusion zone or no listed species have been observed in the exclusion zone for 15 minutes (for pinnipeds) or 30 minutes (for cetaceans).
10. Throughout all pile-driving activity, the PSO(s) will continuously scan the exclusion zone to ensure that listed species do not enter it.
 - a. If any listed species enter, or appear likely to enter, the exclusion zone during pile-driving or removal activities, all pile-driving activity will cease immediately. Pile-driving activities may resume when the animal(s) has been observed leaving the area on its own accord. If the animal(s) is not observed leaving the area but is no longer visible, pile-driving activity may begin 15 minutes (for pinnipeds) or 30 minutes (for cetaceans) after the animal is last observed in the area. Note: If a listed species is observed within the exclusion zone during construction operations, the PSO will notify NMFS immediately after ordering a shut-down of operations.
11. Ramp-up (soft start) procedures will be applied prior to beginning pile-driving activities each day and/or when pile-driving hammers have been idle for more than 30 minutes:
 - a. For impact pile-driving, contractors will be required to provide an initial set of three strikes from the hammer at 40 percent energy, followed by a 30 second waiting period. This procedure shall be repeated two additional times prior to operational impact pile driving.

12. Monthly PSO reports and a final PSO report will be provided to NMFS.
 - a. The reporting period for each monthly PSO report will be the entire calendar month, and reports will be submitted by close of business on the fifth day of the month following the end of the reporting period (e.g., the monthly report covering April 1 to 30, will be submitted to the NMFS by close of business on May 5).
 - b. PSO report data will also include the following for each listed species observation or “sighting event” if repeated sightings are made of the same animal(s)
 - i. Species, date, and time for each sighting event.
 - ii. Number of animals per sighting event; and number of adults/juveniles/calves per sighting event.
 - iii. Primary, and, if observed, secondary behaviors of the marine mammals in each sighting event.
 - iv. Geographic coordinates for the observed animals, with the position recorded by using the most precise coordinates practicable (coordinates must be recorded in decimal degrees, or similar standard, and defined coordinate system).
 - v. Time of the most recent pile-driving or other project activity prior to listed species observation.
 - vi. Environmental conditions as they existed during each sighting event, including Beaufort sea state, weather conditions, visibility (km/mi), lighting conditions, and percent ice cover.
 - c. A final report will be submitted to the NMFS within 90 days after the final pile has been driven for the project. The report will summarize the results of listed species monitoring conducted during the in-water project activities. The report will include items from the list above, as well as the following:
 - i. Summaries of monitoring efforts including total hours, total distances, and listed species distribution through the study period, accounting for sea state and other factors that affect visibility and detectability of listed species.
 - ii. A description of any factors that may have influenced detectability of listed species (e.g., sea state, number of observers, fog, glare, etc.).
 - iii. Species composition, occurrence, and distribution of listed species sightings, including date, water depth, numbers, age/size/gender categories (if determinable), group sizes, and ice cover.
 - iv. Number of listed species observed (by species) during periods with and without project activities (and other variables that could affect detectability), such as:
 1. Initial listed species sighting distances versus project activity at time of sighting.
 2. Observed listed species behaviors and movement types versus project activity at time of sighting.
 3. Numbers of listed species sightings/individuals seen versus project activity at time of sighting.

4. Distribution of listed species around the action area versus project activity at time of sighting.
13. Though take is not authorized, if a listed species is taken (i.e., a listed species is observed entering the 1,500 meter exclusion zone before pile-driving operations can be shut down), reinitiation of consultation is required, and the take must be reported to NMFS within one business day (contact listed at item 15 below). PSO records for listed species taken by project activities must include:
 - a. All the information that must be listed in the PSO report.
 - b. Number of listed species taken.
 - c. The date and time of each take.
 - d. The cause of the take (e.g., vibratory hammer operating at maximum energy).
 - e. The time the listed species entered the exclusion zone, and, if known, the time it exited the zone.
 - f. Mitigation measures implemented prior to and after the animal entered the exclusion zone.
14. All reports will be submitted to:
NMFS Protected Resources Division, Anchorage Office NMFS POC. The NMFS point of contact and their information will be determined at time of the informal consultation request, and will be provided to the applicant.

Effects of the Action

Acoustic Disturbance – The proposed project would involve acoustic disturbance from pile driving of one 18-inch-diameter pile. Possible impacts to marine mammals exposed to loud noise include mortality (directly from the noise, or indirectly from a reaction to the noise), injury, and disturbance ranging from severe (e.g., abandonment of vital habitat) to mild (e.g., startle response), if pile driving is not shut down when individuals are within the action area.

It is unlikely that fin whales or humpback whales would be near the action area during pile driving as they are only intermittently seen in Port Valdez. Adult and juvenile Steller sea lions may be in the area during proposed project activities and exposed to increased noise from pile driving. It is unlikely that Steller sea lion pups would be in the area during proposed project activities because there are no open-water rookeries near the project area (NMFS 2019).

Hearing loss, Discomfort, or Injury – Project-related noise related to pile driving could cause a localized, temporary disturbance in the area. Permanent, partial, or full hearing loss may occur if marine mammals are exposed to noise above tolerated thresholds. Marine mammals exposed to high received sound levels may experience non-auditory physiological effect such as increased stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage. Permanent, partial, or full hearing loss may occur if marine mammals are exposed to underwater sounds exceeding the injury threshold of 180 or 190 dB re1 μ Pa for fin and humpback whales and Steller sea lions, respectively (NMFS 2016).

Although proposed vibratory hammer will introduce continuous sounds into the water, the activities are not expected to cause hearing loss, discomfort, or injury due to the implementation of previously discussed mitigation measures, including the maintenance of an exclusion zone.

Behavioral Changes – Marine mammals exposed to increased anthropogenic noise caused by vibratory pile driving could potentially cause behavior modifications such as increased swimming speed, increased surfacing time, or decreased foraging. Additional responses of marine mammals to pile driving activity might include a reduction of acoustic activity, a reduction in the number of individuals in the area, and avoidance of the area. Of these, temporary avoidance of the noise-impacted area is anticipated to be the most likely response on this project. Pinniped responses to increased in-air noise from pile driving can cause hauled-out pinnipeds to flush back into the water abruptly, leading to possible injury, especially of smaller or weaker animals. Individuals likely will return after completion of pile installation, as demonstrated by a variety of studies about temporary displacement of marine mammals by industrial activity (Richardson et al. 1995).

Masking – Marine mammal auditory signals may be masked by increased noise levels or overlapping frequencies. Marine mammals inhabiting Port Valdez already experience increased anthropogenic noise levels above that of an undisturbed harbor or bay. The project area is within an existing navigation channel, and therefore marine mammals that come into the area may already be habituated to increased noise levels. Sound levels from existing traffic near Valdez have likely resulted in the habituation of whales and sea lions to noise in the area, since they are sometimes seen in the area when vessels are nearby.

Habitat Alteration, Including Critical Habitat – Vibratory pile driving will cause a temporary, local increase in turbidity around the pile site. Increased sediment disturbance can affect smaller prey species by altering light availability, temperature, and dissolved oxygen in the water. However, since the pile will be re-driven into an existing socket, sediment disturbance would be minor. These effects would be unlikely to be detected by listed species due to the temporary nature of the activity.

The proposed project would not involve the loss or degradation of designated critical habitat for Steller sea lions, as critical habitat for Steller sea lions does not exist in the project action area. Critical habitat for fin and humpback whales has not been designated. Regardless, since the work would occur in the same location as a pile currently exists, no long-term alternation in habitat would occur.

Conclusions

We do not anticipate that the repair of pile #26 in the Valdez Marine Terminal Small Boat Harbor will expose any ESA-listed species to sound pressure levels that reach NMFS-defined acoustic harassment thresholds because: 1) the project incorporates monitoring and mitigation measures that includes an 1,500 meter exclusion zone which minimizes the risk of exposure for any individual that enters it; 2) sound vibrations associated with the project will be very short in duration (approximately two hours over one day), thereby reducing the likelihood of exposure to listed species; 3) pile removal and replacement would occur in a pre-existing pile socket; and 4) sound levels from existing vessel traffic has resulted in habituation to noise among whales (particularly humpback whales) and sea lions occurring near the area. The project's anticipated effects to listed species or critical habitat would be expected to be discountable, or extremely unlikely to occur, due to the listed minimization measures above, and consequently, incidental take is not anticipated to occur. We have used the best scientific and commercial data available to complete this analysis. We request your concurrence with this determination.

Please contact me via email at: Jason.R.Berkner@usace.army.mil, by mail at the address above, by phone at (907) 753-5778, or toll free from within Alaska at (800) 478-2712.

Sincerely,

Jason Berkner
Project Manager

Enclosures:

1. Marine Mammal Monitoring and Mitigation Plan

Literature Cited

Alaska Department of Fish and Game. 2019. Steller Sea Lion (*Eumetopias jubatus*) Species Profile. Accessed at <http://www.adfg.alaska.gov/index.cfm?adfg=stellersealion.main>

Bishop A., C. Brown, M. Rehberg, L. Torres, M. Horning. 2018. Juvenile Steller sea lion (*Eumetopias jubatus*) utilization distributions in the Gulf of Alaska. *Mov Ecol.* 2018;6:6. doi:10.1186/s40462-018-0124-6.

Carls, M. G., L. Holland, E. Pihl, M. A. Zaleski, J. Moran, & S.D. Rice. 2016. Polynuclear Aromatic Hydrocarbons in Port Valdez Shrimp and Sediment. *Archives of environmental contamination and toxicology*, 71(1), 48–59. doi:10.1007/s00244-016-0279-3.

Consiglieri, L.D., H.W. Braham, M.E. Dahlheim, C. Fiscus, P.D. McGuire, C.E. Peterson, and D.A. Pippenger. 1982. Seasonal Distribution and Relative Abundance of Marine Mammals in the Gulf of Alaska. NMFS Research Unit 68.

Denes, S.L., G.J. Warner, M.E. Austin and A.O. MacGillivray. 2016. Hydroacoustic Pile Driving Noise Study - Comprehensive Report. Document 001285, Version 2.0. Technical report by JASCO Applied Sciences for Alaska Department of Transportation and Public Facilities.

Laughlin, J. 2010. Airborne Noise Measurements (A-Weighted and Un-Weighted) During Vibratory Pile Installation - Technical Memorandum. Washington State Department of Transportation Memo from Jim Laughlin to Sharon Rainsberry.

Muto M. M., V. T. Helker, B. J. Delean, R. P. Angliss, B. P. L. Boveng, J. M. Breiwick, B. M. Brost, M. F. Cameron, P. J. Clapham, S. P. Dahle, M. E. Dahlheim, B. S. Fadely, M. C. Ferguson, L. W. Fritz, R. C. Hobbs, Y. V. Ivashchenko, A. S. Kennedy, J. M. London, S. A. Mizroch, R. R. Ream, E. L. Richmond, K. E. W. Sheldon, K. L. Sweeney, R. G. Towell, P. R. Wade, J. M. Waite, and A. N. Zerbini. 2019. Draft Alaska marine mammal stock assessments, 2019. U.S. Dep. Commerce, 212 p. Accessed at <https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports>

National Marine Fisheries Service (NMFS). 2020. NOAA Fisheries current in-air acoustic thresholds. Accessed at https://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/threshold_guidance.html

NMFS. 2019. Alaska Protected Resources Division: Species Distribution Mapper. Accessed at <https://alaskafisheries.noaa.gov/portal/apps/webappviewer/index.html?id=0c4a81f75310491d9010c17b6c081c81>

NMFS. 2019a. Fisheries Home » Species » Steller sea lion (*Eumetopias jubatus*). Accessed at <https://www.fisheries.noaa.gov/species/steller-sea-lion>

NMFS. 2019b. Fisheries Home » Species » Fin whale (*Balaenoptera physalus*). Accessed at <https://www.fisheries.noaa.gov/species/fin-whale>

NMFS. 2016. Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing: Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-55, 178 p. Accessed at <https://repository.library.noaa.gov/view/noaa/15850>.

NMFS. 2010. Recovery plan for the fin whale (*Balaenoptera physalus*). National Marine Fisheries Service, Silver Spring, MD. 121 pp.

Richardson, W.J., C.R. Greene, C.I. Malme, and D.H. Thomson. 1995. Marine Mammals and Noise. Academic Press, Inc. San Diego, California.

Robert Miner Dynamic Testing of Alaska, Inc. 2018. Biorka Island Sound Source Verification, August 13 & 15, 2018.

Schaefer, A. 2016. Winter species in Prince William Sound, Alaska, 1989-2016. Prince William Sound Regional Citizens' Advisory Council. Document number: 900.431.160901.

Raum-Suryan, K. and Malek, J. 2020. Telephone and email correspondence between Kim Raum-Suryan and Jenna Malek, NMFS, and Carrie Connaker, Solstice Alaska Consulting, Inc. on February 25 and 26, 2020.

Wade, P.R., T. J. Quinn II, J. Barlow, C. S. Baker, A. M. Burdin, J. Calambokidis, P. J. Clapham, E. Falcone, J. K. B. Ford, C. M. Gabriele, R. Leduc, D. K. Mattila, L. Rojas-Bracho, J. Straley, B. L. Taylor, R. Urbán, D. Weller, B. H. Witteveen, and M. Yamaguchi. 2016. Estimates of abundance and migratory destination for North Pacific humpback whales in both summer feeding areas and winter mating and calving areas. Paper SC/66b/IA21 submitted to the Scientific Committee of the International Whaling Commission, June 2016, Bled, Slovenia.