DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 217

[Docket No. 241018–0276]

RIN 0648–BM30

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Port of Alaska Modernization Program Phase 2B: Cargo Terminals Replacement Project in Anchorage, Alaska

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

ACTION: Proposed rule; request for comments.

SUMMARY: NMFS received a request from the Don Young Port of Alaska (POA) for authorization to take marine mammals incidental to the Cargo Terminals Replacement Project at the existing port facility in Anchorage, Alaska over the course of 5 construction seasons (2026 through 2030). Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is proposing regulations setting forth permissible methods of taking, other means of effecting the least practicable adverse impact on such marine mammal stocks (*i.e.,* mitigation measures), and requirements pertaining to monitoring and reporting such takes and requests comments on the proposed regulations. NMFS will consider public comments prior to making any final decision on the promulgation of the requested MMPA regulations, and NMFS's responses to public comments will be summarized in the final notification of our decision.

DATES: Comments and information must be received no later than November 27, 2024.

ADDRESSES: A plain language summary of this proposed rule is available at *https://www.regulations.gov/docket/NOAA-NMFS-2024-0030.* You may submit comments on this document, identified by NOAA–NMFS–2024–0030, by the following method:

- *Electronic Submission:* Submit all electronic public comments via the Federal e-Rulemaking Portal. Visit *https://www.regulations.gov* and type NOAA–NMFS–2024–0030 in the Search box. Click on the ''Comment'' icon, complete the required fields, and enter or attach your comments.

Instructions: Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered by NMFS. All comments received are a part of the public record and will generally be posted for public viewing on *https://www.regulations.gov* without change. All personal identifying information (*e.g.,* name, address, *etc.*), confidential business information, or otherwise sensitive information submitted voluntarily by the sender will be publicly accessible. NMFS will accept anonymous comments (enter ''N/A'' in the required fields if you wish to remain anonymous).

Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/action/incidental-take-authorization-port-alaskas-construction-activities-port-alaska-modernization.* In case of problems accessing these documents, please call the contact listed below.

FOR FURTHER INFORMATION CONTACT: Cara Hotchkin, Office of Protected Resources, NMFS, (301) 427–8401.

SUPPLEMENTARY INFORMATION:

Purpose of Regulatory Action

These proposed regulations, promulgated under the authority of the MMPA (16 U.S.C. 1361 *et seq.*), would provide a framework for authorizing the take of marine mammals incidental to construction activities associated with the POA's Modernization Program, including impact and vibratory pile driving.

NMFS received an application from the POA requesting 5-year regulations and a letter of authorization issued thereunder to take individuals of seven species, comprising nine stocks of marine mammals by Level A harassment and Level B harassment incidental to the POA's activities. No serious injury or mortality is anticipated or proposed for authorization. Please see Background below for definitions of harassment.

Legal Authority for the Proposed Action

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1371(a)(5)(A)) directs 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 for up to 5 years if, after notice and public comment, the agency makes certain findings and promulgates regulations that set forth permissible methods of taking pursuant to that activity and other means of effecting the ''least practicable adverse impact'' on the affected species or stocks and their habitat (see the discussion below in the Proposed Mitigation section), as well as monitoring and reporting requirements. Section 101(a)(5)(A) of the MMPA and the implementing regulations at 50 CFR part 216, subpart I provide the legal basis for issuing this proposed rule containing 5-year regulations and for any subsequent Letters of Authorization (LOAs).

Summary of Major Provisions Within the Proposed Rule

Following is a summary of the major provisions of this proposed rule regarding POA's activities. These measures include:

- Prescribing permissible methods of taking of small numbers of marine mammals by Level A harassment and/or Level B harassment incidental to the Cargo Terminals Replacement Project;
- Required monitoring of the construction areas to detect the presence of marine mammals before beginning construction activities;
- Establishment of shutdown zones equivalent to the estimated Level B harassment zone for beluga whales;
- Establishment of shutdown zones equivalent to or greater than the estimated Level A harassment zones for other species;
- Bubble curtains required for all impact and vibratory driving of permanent (72-inch (in) (1.83 meter (m))) piles in more than 3 m of water depth in all months and for vibratory driving of all temporary (24-in (0.61 m) or 36-in (0.91 m)) and permanent (72-in) piles between August and October;
- Soft start for impact pile driving to allow marine mammals the opportunity to leave the area prior to beginning impact pile driving at full power; and
- Submittal of monitoring reports including a summary of marine mammal species and behavioral observations, construction shutdowns or delays, and construction work completed.

Through adaptive management, the proposed regulations would allow NMFS Office of Protected Resources to modify (*e.g.,* remove, revise, or add to) the existing mitigation, monitoring, or reporting measures summarized above and required by the LOA.

Background

The MMPA prohibits the ''take'' of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (as delegated to NMFS) 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 promulgated or an incidental harassment authorization is issued.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). If such findings are made, NMFS must prescribe the permissible methods of taking and other ''means of effecting the least practicable adverse impact'' on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as ''mitigation''); and requirements pertaining to the monitoring and reporting of the takings are set forth. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*) and NOAA Administrative Order (NAO) 216–6A, NMFS must evaluate our proposed action's (*i.e.,* promulgation of regulations and subsequent issuance of a LOA thereunder) and alternatives to that action's potential impacts on the human environment.

Accordingly, NMFS has prepared an Environmental Assessment (EA) to evaluate the environmental impacts associated with the issuance of the proposed regulations and LOA. NMFS' EA is available at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-port-alaskas-construction-activities-port-alaska-modernization.* We will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on this request.

Summary of Request

On January 3, 2023, NMFS received a request from the POA for regulations and a subsequent LOA to take marine mammals incidental to construction activities related to the POA Modernization Program (PAMP) Phase 2B: Cargo Terminals Replacement (CTR) at the POA in Anchorage, Alaska. NMFS provided comments on the application on March 3, 2023, April 20, 2023, and May 18, 2023. After POA submitted a revised application on October 13, 2023, and responded to additional questions sent on December 20, 2023, we determined the application was adequate and complete on February 12, 2024.

On March 4, 2024, we published a notice of receipt (NOR) of application in the **Federal Register** (89 FR 15548), requesting comments and information during a 30-day public comment period related to the POA's request. We received one comment letter from the Center for Biological Diversity. NMFS has reviewed all submitted material and taken the information into consideration during the drafting of this proposed rule.

The POA's request is for take of seven species of marine mammals by Level B harassment and for a subset of these species, Level A harassment. Neither POA nor NMFS expect serious injury or mortality to result from the specified activities. If promulgated, the regulations would be effective for the first 5 construction seasons (2026–2030).

NMFS previously issued IHAs to the POA for similar work (85 FR 19294, April 6, 2020; 86 FR 50057, September 7, 2021; 89 FR 2832, January 14, 2024). The POA complied with all the requirements (*e.g.,* mitigation, monitoring, and reporting) of the previous IHAs and information regarding their monitoring results may be found in the Effects of the Specified Activity on Marine Mammals and their Habitat and Estimated Take of Marine Mammals sections of this proposed rule and online at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities.*

Description of the Specified Activities

Overview

The POA, located on Knik Arm in upper Cook Inlet, provides critical infrastructure for the citizens of Anchorage and a majority of the citizens of Alaska. The POA was constructed primarily in the 1960s and is currently in poor condition and substantially past its initial design life. The existing cargo terminals T1, T2, and T3 are deteriorating and in poor structural condition and present safety and security concerns for human health and the economic stability of the state of Alaska. The PAMP is designed to replace the existing facilities with new infrastructure incorporating modern seismic codes over a 75-year design life. PAMP Phase 2B includes the demolition and replacement of terminals T1 and T2 and the partial demolition of T3. This phase is expected to take approximately 6 years of in-water work to complete. If promulgated, the regulations would be effective for the first 5 construction seasons (2026–2030).

In-water pile installation will include both temporary (24-in (0.61 m) or 36-in (0.91 m)) and permanent (72-in (1.83 m)) steel pipe piles by impact and vibratory hammers. Removal of temporary piles (24- or 35-in) and existing structures (16-in (0.41 m) to 42-in (1.07 m) steel pipe piles) would be primarily by cutting; dead-pull and vibratory extraction methods may also be used. Existing piles may also be left standing in their current positions. In-water work associated with the project would include installation of approximately 275 permanent piles and 450 temporary piles and vibratory extraction of approximately 46 temporary piles over the 5-year period.

Dates and Duration

The POA anticipates that in-water construction activities associated with this proposed rule would begin on April 1, 2026 and extend through November 30, 2030. In-water pile installation and removal associated with the CTR project is anticipated to take place over approximately 689 hours on approximately 337 nonconsecutive days between the months of April and November over the 5 year period (see table 1 for estimated production rates and durations). While the exact sequence of demolition and construction is uncertain, an estimated schedule is shown in table 2. This schedule is based on best available information and is not intended to be a limitation on the number of pile installation or removal hours that may occur in any given month.

The POA has presented the schedule shown in table 2 using the best available information derived from what is known of the existing Cargo Terminals site and the POA's experience with similar construction and demolition projects. A typical construction season at the POA extends from approximately mid-April to mid-October (6 months) and may include November. Exact dates of ice-out in the spring and formation of new ice in the fall vary from year to year and cannot be predicted with accuracy. In-water pile installation and removal cannot occur during the winter months when ice is present because of the hazards associated with moving ice floes that change directions four times a day, preventing the use of tugs, barges, workboats, and other vessels. Ice movement also prevents accurate placement of piles.

While the POA plans to conduct as much work as possible between April and July, when there is lower Cook Inlet beluga whale (CIBW; *Delphinapterus leucas*) abundance (see the Description of Marine Mammals in the Area of Specified Activities section for details on CIBW presence at the POA), front-loading of work is dependent on construction sequencing. Construction sequencing requires that temporary piles are installed as a template, then larger permanent piles are installed, and then the temporary piles are removed. This required sequence plays out many times, in this order, during the open water construction season. It is not possible to install all of the larger permanent piles during the early season and install temporary piles later in the season; the larger and smaller piles must be alternated. Exact project sequencing and installation and extraction methods are at the discretion of the construction crew. Construction dates may change because of unexpected project delays, ongoing construction activities in other areas of the POA, timing of ice-out and spring breakup, and other factors. Therefore, the estimated schedule (table 2) reflects a realistic scenario for the proposed project, but conditions on the ground may result in slight changes to this estimated schedule.

TABLE 1—PILE INSTALLATION AND REMOVAL METHODS, ESTIMATED AMOUNTS, AND ESTIMATED DURATIONS FOR YEARS 1–5

Activity type	Pile size and type	Total estimated number of piles	Estimated number of piles in the water [1]	Average vibratory duration per pile (minutes)	Average impact duration per pile (minutes)	Estimated impact strikes per pile	Total duration of removal or installation in water (hours)	Average production rate, piles per day (range)	Estimated number of days over 5 years
Temporary pile installation	24- or 36-in (61- or 91-cm) Steel pipe	565	450	30	....	....	225 hours	2–4	144.
Temporary pile removal	24- or 36-in (61- or 91-cm) Steel pipe	161	46	45	....	....	35 hours	2–4	15.
Permanent pile installation	72-in (182-cm) Steel pipe	310	275	10	86	5,743	440 hours	0.5–3	159.
Total	....	1,036	771	....	....	....	700 hours	....	337 days.

Note: cm = centimeter(s); 1—Piles installed above the mean lower low water line are considered "in the dry" (*i.e.*, not in-water). It is anticipated that the permanent and temporary piles in the three bents nearest the shore for all five trestles would be installed in the dry at low tide levels. An additional bent would be installed in the dry for the northernmost trestle of T1 and for the three trestles of T2. These piles are not considered to have the potential for impact to marine mammals and are thus excluded from the following analyses.

TABLE 2—ESTIMATED TIMING AND DURATION (IN HOURS PER MONTH) OF PILE INSTALLATION AND REMOVAL ACTIVITIES [1]

Activity	Duration (hours of activity by month and year)															
	Apr		May		Jun		Jul		Aug		Sep		Oct		Nov	
	Imp [2]	Vib [3]	Imp	Vib	Imp	Vip	Imp	Vib	Imp	Vib	Imp	Vib	Imp	Vib	Imp	Vib
Year 1—2026																
24- or 36-in Temporary Pile Installation	....	2.5	....	6.0	....	6.0	....	6.0	....	6.0	....	6.0	....	3.0	....	2
24- or 36-in Temporary Pile Removal	....	0.8	....	0.8	....	0.8	....	0.8	....	0.8	....	0.8	....	0.8	....	0.8
72-in Permanent Pile Installation [4]	7.2	0.8	15.8	1.8	15.8	1.8	15.8	1.8	12.9	1.5	12.9	1.5	12.9	1.5	5.7	0.7
Year 1 total hours	*7.2*	*4.1*	*15.8*	*8.6*	*15.8*	*8.6*	*15.8*	*8.6*	*12.9*	*8.3*	*12.9*	*8.3*	*12.9*	*5.3*	*5.7*	*3.4*
Year 2—2027																
24- or 36-in Temporary Pile Installation	....	3.0	....	5.0	....	5.0	....	5.0	....	5.0	....	5.0	....	2.5	....	2
24- or 36-in Temporary Pile Removal	....	0.8	....	0.8	....	0.8	....	0.8	....	0.8	....	0.8	....	0.8	....	....
72-in Permanent Pile Installation [4]	7.2	0.8	12.9	1.5	12.9	1.5	12.9	1.5	12.9	1.5	11.5	1.3	11.5	1.3	5.7	0.7
Year 2 total hours	*7.2*	*4.6*	*12.9*	*7.3*	*12.9*	*7.3*	*12.9*	*7.3*	*12.9*	*7.3*	*11.5*	*7.1*	*11.5*	*4.6*	*5.7*	*2.7*
Year 3—2028																
24- or 36-in Temporary Pile Installation	....	6.5	....	13.0	....	13.0	....	13.0	....	13.0	....	13.0	....	6.5	....	2
24- or 36-in Temporary Pile Removal	....	0.8	....	2.3	....	2.3	....	2.3	....	1.5	....	1.5	....	0.8	....	0.8
72-in Permanent Pile Installation [4]	5.7	0.7	5.7	0.7	5.7	0.7	4.3	0.5	4.3	0.5	4.3	0.5	4.3	0.5	4.3	0.5
Year 3 total hours	*5.7*	*7.9*	*5.7*	*15.9*	*5.7*	*15.9*	*4.3*	*15.8*	*4.3*	*15.0*	*4.3*	*15.0*	*4.3*	*7.8*	*4.3*	*3.3*
Year 4—2029																
24- or 36-in Temporary Pile Installation	....	2.5	....	5.5	....	5.5	....	6.0	....	5.5	....	5.5	....	2.5	....	2
24- or 36-in Temporary Pile Removal	....	0.8	....	0.8	....	0.8	....	0.8	....	0.8	....	0.8	....	0.8	....	....
72-in Permanent Pile Installation [4]	7.2	0.8	12.9	1.5	12.9	1.5	12.9	1.5	12.9	1.5	11.5	1.3	11.5	1.3	5.7	0.7
Year 4 total hours	*7.2*	*4.1*	*12.9*	*7.8*	*12.9*	*7.8*	*12.9*	*8.3*	*12.9*	*7.8*	*11.5*	*7.6*	*11.5*	*4.6*	*5.7*	*2.7*
Year 5—2030																
24- or 36-in Temporary Pile Installation	....	2.5	....	6.0	....	6.0	....	6.0	....	6.0	....	5.5	....	5.5	....	2.5
24- or 36-in Temporary Pile Removal	....	0.8	....	0.8	....	1.5	....	1.5	....	0.8	....	0.8	....	0.8	....	0.8
72-in Permanent Pile Installation [4]	4.3	0.5	12.9	1.5	12.9	1.5	12.9	1.5	11.5	1.3	11.5	1.3	11.5	1.3	4.3	0.5
Year 5 total hours	*4.3*	*3.8*	*12.9*	*8.3*	*12.9*	*8.3*	*12.9*	*8.3*	*11.5*	*8.1*	*11.5*	*7.6*	*11.5*	*7.6*	*4.3*	*3.8*

[1] Duration estimates assume a single hammer active at any time and therefore likely overestimates of actual time needed due to simultaneous pile installation and removal;
[2] Impact pile installation;

[3] Vibratory pile installation or extraction;

[4] To account for piles driven in water less than 3m deep, NMFS has estimated approximately 0.5 unattenuated 72-in piles will be driven (approximately 43 minutes of impact driving and 5 minutes of vibratory driving) each month. Numbers may not add exactly due to rounding.

Specific Geographic Region

The specific geographic region for this action encompasses the land occupied by the POA, as well as the shoreline and waters extending from the POA across Knik Arm, northeast towards Wasilla, and southwest towards Fire Island and the Little Susitna River delta (figure 1).

Northern Cook Inlet bifurcates into Knik Arm to the north and Turnagain Arm to the east. Knik Arm is generally considered to begin at Point Woronzof, 7.4 km southwest of the POA. From Point Woronzof, Knik Arm extends about 48 km in a north-northeasterly direction to the mouths of the Matanuska and Knik rivers. At Cairn Point, just northeast of the POA, Knik Arm narrows to about 2.4 km before widening to as much as 8 km at the tidal flats northwest of Eagle Bay at the mouth of Eagle River.

Knik Arm comprises narrow channels flanked by large tidal flats composed of sand, mud, or gravel, depending upon location. Approximately 60 percent of Knik Arm is exposed at Mean Lower Low Water (MLLW). The intertidal (tidally influenced) areas of Knik Arm are mudflats, both vegetated and unvegetated, which consist primarily of fine, silt-sized glacial flour. Freshwater sources often are glacially born waters, which carry high suspended sediment loads as well as a variety of metals such as zinc, barium, mercury, and cadmium. Surface waters in Cook Inlet typically carry high silt and sediment loads, particularly during summer, making Knik Arm an extremely silty, turbid waterbody with low visibility through the water column. The Matanuska and Knik Rivers contribute the majority of freshwater and suspended sediment into Knik Arm during summer. Smaller rivers and creeks also enter along the sides of Knik Arm (U.S. Department of Transportation and Port of Anchorage, 2008). During winter, sea, beach, and river ice are dominant physical forces within Cook Inlet and Knik Arm. In upper Cook Inlet, sea ice generally forms in October to November and continues to develop through February or March (Moore *et al.,* 2000).

Tides in Cook Inlet are semidiurnal, with two unequal high and low tides per tidal day (tidal day = 24 hours, 50 minutes). Due to Knik Arm's predominantly shallow depths and narrow widths, tides near Anchorage are greater than those in the main body of Cook Inlet. The tides at the POA have a mean range of about 8 m, and the maximum water level has been measured at more than 12.5 m at the Anchorage station (NMFS, 2015). Currents throughout Cook Inlet are strong and tidally periodic, with average velocities ranging from 3 to 6 knots (5.6 to 11.1 kilometers (km)/hour (h)) (Sharma and Burrell, 1970). Maximum current speeds in Knik Arm, observed during spring ebb tide, exceed 7 knots (13 km/h). These tides result in strong currents in alternating directions through Knik Arm and a well-mixed water column. The navigation harbor at the POA is a dredged basin in the natural tidal flat. Sediment loads in upper Cook Inlet can be high; spring thaws occur, and accompanying river discharges introduce considerable amounts of sediment into the system (Ebersole and Raad, 2004). Natural sedimentation processes act to continuously infill the dredged basin each spring and summer.

The Municipality of Anchorage is located in the lower reaches of Knik Arm of upper Cook Inlet (see figure 2–1 in the POA's application). The POA sits on the industrial waterfront of Anchorage, just south of Cairn Point and north of Ship Creek (lat. 61°15′ N, long. 149°52′ W; Seward Meridian) (figure 1). The POA's boundaries currently occupy an area of approximately 0.52 km^2 (figure 2). Other commercial and industrial activities related to secured maritime operations are located near the POA on Alaska Railroad Corporation property immediately south of the POA, on approximately 0.45 km^2 at a similar elevation. The POA is located north of Ship Creek, an area that experiences concentrated marine mammal activity during seasonal runs of several salmon species. Ship Creek serves as an important recreational fishing resource and is stocked twice each summer. Ship Creek flows into Knik Arm through the Municipality of Anchorage industrial area. Joint Base Elmendorf-Richardson (JBER) is located east of the POA, approximately 30.5 m higher in elevation. The U.S. Army Defense Fuel Support Point-Anchorage site is located east of the POA, south of JBER, and north of Alaska Railroad Corporation property. The perpendicular distance to the west bank directly across Knik Arm from the POA is approximately 4.2 km. The distance from the POA (east side) to nearby Port MacKenzie (west side) is approximately 4.9 km.

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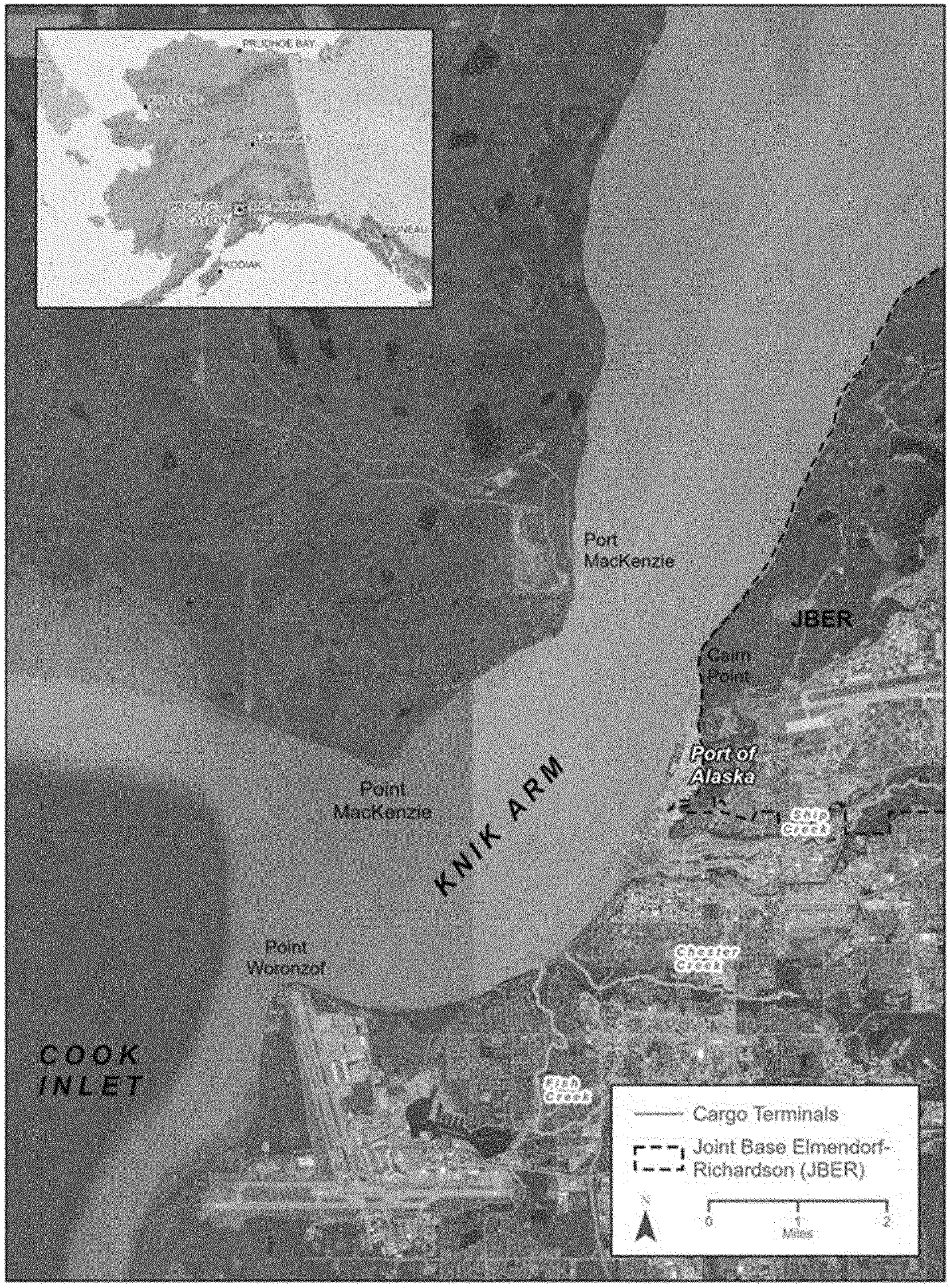

Figure 1 – Overview of POA Location in Knik Arm

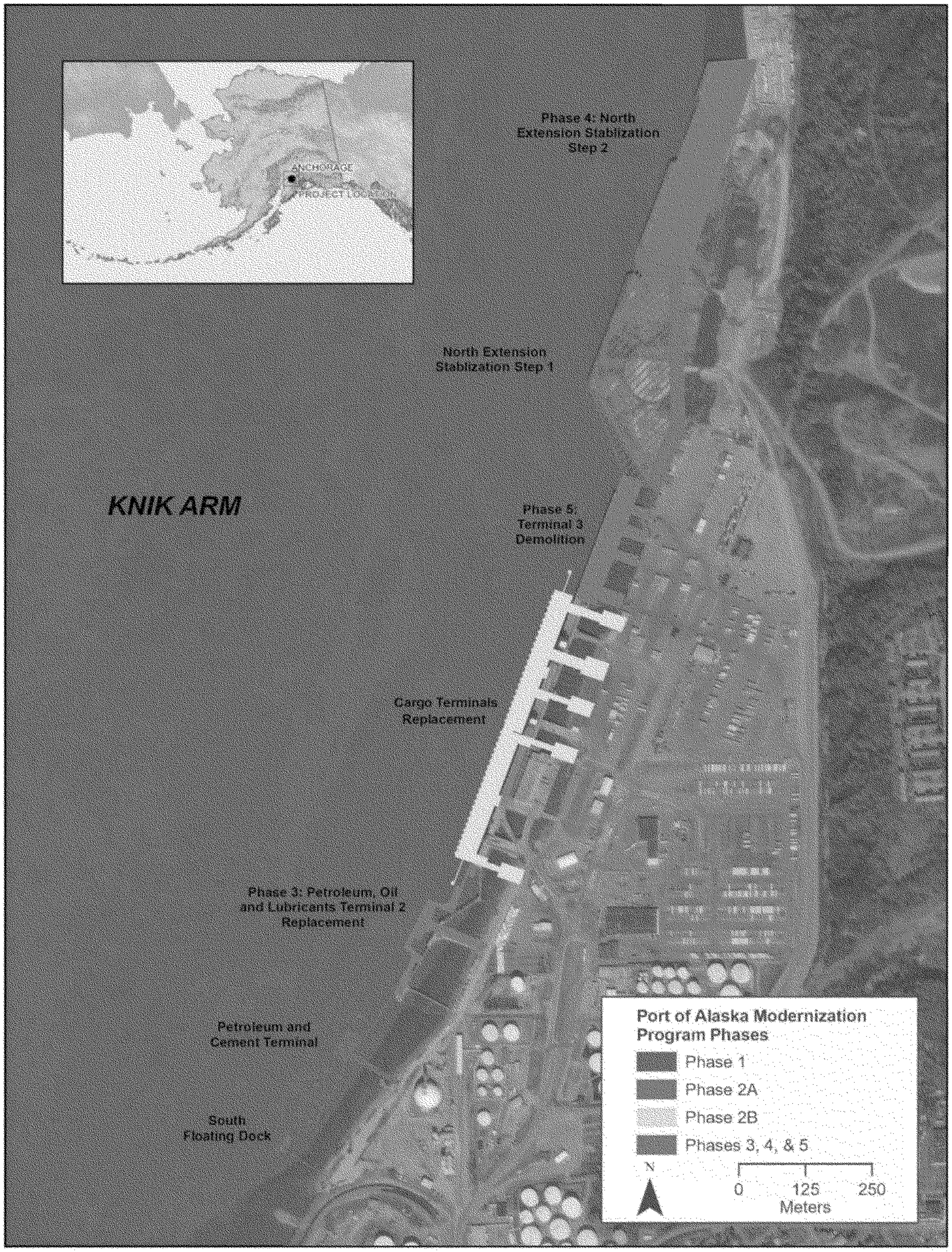

Figure 2 – Overview of Cargo Terminals Location at POA

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Detailed Description of the Specified Activities

As discussed previously, marine-side infrastructure and facilities at the POA are in need of replacement because they are substantially past their design life and in poor and deteriorating structural condition. Those facilities include three general cargo terminals, two petroleum terminals, a dry barge landing, and an upland sheet-pile-supported storage and work area. To address deficiencies, the POA is modernizing its marine terminals through the PAMP to enable safe, reliable, and cost-effective Port operations. The PAMP will support infrastructure resilience in the event of a catastrophic natural disaster over a 75-year design life.

The PAMP is critical to maintaining food and fuel security for the state. At the completion of the PAMP, the POA will have modern, safe, resilient, and efficient facilities through which more than 90 percent of Alaskans will continue to obtain food, supplies, tools, vehicles, and fuel. The PAMP is divided into five separate phases; these phases are designed to include projects that have independent utility yet streamline agency permitting. The projects associated with the PAMP include:

- *Phase 1:* Petroleum and Cement Terminal (PCT Phase 1 and 2) and South Floating Dock (SFD) replacement;
- *Phase 2A:* North Extension Stabilization Phase 1 (NES1);
- *Phase 2B:* CTR;
- *Phase 3:* Petroleum, Oil and Lubricants Terminal 2 Replacement;
- *Phase 4:* North Extension Stabilization part 2; and
- *Phase 5:* Demolition of Terminal 3.

Phase 1 of the PAMP was completed in 2022. NMFS issued IHAs for take incidental to the now completed PCT (Phase 1 and Phase 2; 85 FR 19294, April 6, 2020) and SFD projects (86 FR 50057, September 7, 2021). Phase 2A of the PAMP began in 2023; an IHA was issued for phase one of the NES project (89 FR 2832, January 14, 2024) and in-water construction associated with this project is planned for 2024. The project discussed herein, CTR, is Phase 2B of the PAMP and is proposed to begin onshore preparation in 2025 and in-water construction work in 2026.

The purpose of the CTR project is to replace the existing general cargo docks. It would address deteriorating conditions of the existing cargo facilities; improve operational safety and efficiency; accommodate modern (existing and future) shipping operations; and improve the resiliency of the POA to extreme seismic events, all while sustaining ongoing cargo operations. This project is urgently needed due to severe corrosion of the foundation piles and deteriorating structural conditions at Terminals 1, 2, and 3. The existing terminals are more than 50 years old and suffer from severe damage to the foundation piles caused by corrosion and seismic forces. The piles have exceeded their useful service life, and multiple engineering investigations have highlighted the probability of wharf and trestle structure failure during a future major seismic event. The remaining service life of the cargo terminals is unknown. These facilities must be replaced with new resilient terminals for the Port to continue to meet its critical role serving Alaska's general cargo needs as well as supporting national defense and military readiness capabilities.

The geographical isolation of Alaska and the POA's role as the containerized logistic hub and distribution center for much of the state make the cargo terminals a critical lifeline for the southcentral region and Alaska. There are no other ports with the cargo capacity, proximity to Alaska's population centers, and intermodal transportation capabilities that can support the logistic missions sustained by the POA, including commerce, national defense, and earthquake resiliency/disaster response and recovery.

CTR Project Activities

The CTR project includes construction of new terminals T1 and T2, which include planned wharves and access trestles. The two new terminals would be located 140 feet (ft) (42.7 meters (m)) seaward of the existing T1, T2, and T3. It is anticipated that this more seaward location of the new terminals will reduce sedimentation, improve room for handling of berthing ships, and allow construction of the new terminals while the existing terminals remain in use. CTR also includes demolition of the existing Petroleum, Oil, and Lubricants Terminal 1 (POL1) and general cargo terminals (T1, T2, and T3).

The southernmost end of the new T1 and T2 would be approximately 1.4 km (0.9 mile (mi)) north of Ship Creek. Construction of the Project will include completion of the following components:

- *Component 1.* Onshore ground improvement shoreline stabilization (2025)
- *Component 2.* Shoreline expansion and protection (2026)
- *Component 3.* General cargo terminals (new Terminals 1 and 2) construction (2026–2031)
- *Component 4.* Demolition of existing terminals (POL1 and general cargo terminals (existing Terminals 1, 2, and 3)) (2026–2031)
- *Component 5.* Onshore utilities and storm drain outfall replacement (2030–2031)

Of these activities, only Components 3 and 4 include construction work that would occur in the water, and therefore, these would be the only components of the project expected to potentially impact marine mammals.

Landside Activities

Landside activities include work which takes place ''in the dry,'' either above the high tide line or in the intertidal zone but de-watered. These activities include shoreline stabilization and protection as well as placement of onshore utilities and decking components.

Ground Improvement Shoreline Stabilization—A ground improvement technique, such as deep soil mixing (DSM), or a similar technique would be used to stabilize the shoreline. DSM and similar techniques mechanically mix weak soils with a cement binder causing the soils to behave more like soft rock. This process is used to create foundations for buildings and roads and is used in earthquake-prone areas to prevent soil liquefaction. Soil improvements at trestle abutments, and potentially between the abutments, will mitigate the potential for seismic-induced slope failure that could result in catastrophic structural failure.

The first stage of construction would include installation of soil improvements in the five locations where the access trestles meet the beach to provide geotechnical stability to the embankment. Centered at each of the five trestle abutments, the ground improvement technique would create approximately 200- by 96-ft (61- by 29-m) blocks of treated soil extending from the surface to the top of the clay layer approximately 85-ft (25.9-m) deep (see figure 1–2 of the POA's application). The size of the block is designed to create enough contact area with the clay layer to restrain and significantly reduce the overall ground movements of the liquefiable soils surrounding the trestle abutment. If deemed necessary for geotechnical stability, ground improvements would extend along the embankment in areas between the abutments.

During construction, a temporary soil work pad would be constructed at each of the five trestles to provide a level temporary work surface. The ground improvement panels/columns would extend approximately 100 feet (ft) (30.5-m) seaward and shoreward of the crest of the slope and approximately 30 ft (9-m) to either side of the trestle structure. Temporary armoring will protect the work pad from water forces while in use. After completion of the ground improvement work, the temporary construction work pads will be removed and the foreshore graded and armored.

Shoreline Expansion and Protection—The existing shoreline behind the existing Terminals 1, 2, and 3 is irregular, with two areas where the shoreline is located about 100 ft (30-m) to the east of the typical shoreline (see figure 1–3 of the POA's application). These areas would be excavated to remove deposited silts before the areas are then filled with more dense, stable materials such as clean gravel and rock. The filled area would provide a consistent shoreline and additional container storage area.

Excavation for the CTR project would be limited to removal of materials that are above the high-water line or below the high-water line in a dewatered state. Sea-based dredging of materials under water will not take place as part of this project.

After ground improvement work and shoreline expansion have been completed, the slope along the shore would be secured with armor stone placed over the clean gravel and rock fill. Placement of armor rock requires good visibility of the shore as each rock is placed carefully to interlock with surrounding armor rock. It is therefore anticipated that placement of most armor rock, filter rock, and granular fill will occur in the dry at low tide levels; however, some placement of armor rock, filter rock, and granular fill may occur in shallow water (*i.e.,* less than 3 m deep). After placement of armor rock, the top of the fill will be paved to match the existing backland pavements.

Onshore utilities and storm drain outfall replacement—The replacement of onshore utilities will involve construction on land and replacement of utilities above the high tide line, on land. Similarly, the storm drain outfall replacement will involve construction on land and replacement of four outfall pipes above the high tide line. No in-water work is proposed as a part of this component.

Ground improvement shoreline stabilization, shoreline expansion and protection, and onshore utilities and storm drain outfall replacement activities would take place on land or in the dry. While a minimal amount of fill and armor rock placement may occur in water, this activity would not be expected to impact marine mammals. Therefore, take of marine mammals related to these activities is not anticipated or proposed to be authorized, and it will not be considered further in this proposed rulemaking.

In-Water Construction

New terminals T1 and T2 would be constructed as seismically resilient adjoining terminals on a continuous berthline with mooring features and appurtenances as required to support safe ship mooring for lift-on/lift-off and roll-on/roll-off related cargo handling operations. The new T1 wharf would be 870 ft x 120 ft (265- x 37-m) with two 36-ft-wide (11-m) trestles of varying length. The new T2 wharf would be 932 ft x 120 ft (284- x 37-m) with two 259-ft- long x 54-ft-wide (79- x 16.5-m) trestles and one 259-ft-long x 76-ft-wide (79- x 23-m) trestle. Both T1 and T2 would be constructed using 48- and 72-in-diameter (121- and 183-centimeter (cm), respectively) steel piles. The 48-in-diameter piles will be installed in the dry.

Both new terminals would be designed to accommodate lift-on/lift-off container operations serviced by rail-mounted ship-to-shore cranes. Structural, in-deck, and surface features to support operational interface for three 100-gauge rail mounted gantry cranes, and associated appurtenances along with an on-terminal combination stevedore-operations building, would be included on the wharf. Additionally, T2 would be designed to support roll-on/roll-off container operations and other multi-purpose cargo functions. The reinforced concrete deck structure for both new terminals and all new access trestles would be designed to 1,000 pound per square foot load capacity. Construction would also include installation of power, lighting, communications, and signal infrastructure to terminal and onshore electrically powered features; potable water service including ship's water; and fire-flow water for terminal-related operations. The on-terminal stevedore-operations building would also be constructed with a connection to the onshore, existing public utility infrastructure.

In addition to these permanent structures, temporary work including temporary pile installation and removal would be required to support construction. Temporary piles would likely be 36-in-diameter (91-cm) steel; however, 24-in (61-cm) steel piles may be used in place of some of the larger temporary piles. Various work boats and barges would be utilized and would be moored at or in the immediate vicinity of the project, but these vessels are not expected to increase overall noise levels at the POA above existing operational levels. No thrusters or other dynamic positioning methods will be used during pile driving activities.

Construction of each terminal would require installation and removal of temporary steel pipe piles, including template piles, and installation of permanent steel pipe piles. Pile installation would occur in water depths that range from a few feet or dry (dewatered) conditions nearest the shore to approximately 20 meters (70 ft) at the outer face of the wharves, depending on tidal stage; the mean diurnal tide range at the POA is approximately 8.0 meters (26 ft; NOAA 2015).

Concurrent Activities—In-water construction activities would occur at multiple locations across the project site simultaneously; the POA anticipates that two ''spreads'' (a construction crew with crane and pile driving hammer) would be on site and working throughout the construction season, with a third ''spread'' present on some days. Of the two regular spreads, one would be designated for permanent (72-in) piles and one for temporary (24-in or 36-in) piles. Each spread would operate a single hammer at a time (impact or vibratory), with no more than two vibratory hammers simultaneously active in-water at any given time. It is not expected that three piles would be driven concurrently, and this scenario is not addressed further in this analysis. The only combinations of vibratory hammers that could be used simultaneously would be for installation of an attenuated (through use of a bubble curtain; see Proposed Mitigation later in this notice) 72-in pile and an attenuated temporary pile, an attenuated 72-in pile and an unattenuated temporary pile, or two temporary piles. There would be no simultaneous driving of unattenuated 72-in piles in water. Simultaneous use of two hammers would increase production rates.

Duration of active hammer use is anticipated to be brief each day (see table 1), and it is, therefore, anticipated that overlap in use of hammers would be uncommon. Pile installation and removal would occur intermittently over the work period, for durations of minutes to hours at a time. Use of two simultaneous hammers would serve to reduce the overall duration of in-water pile installation and removal during each construction season. One construction crane would likely be based on a floating work barge, and one would likely be based on land or on an access trestle. Table 3 provides a summary of concurrent pile driving scenarios.

TABLE 3—POTENTIAL CONCURRENT DRIVING SCENARIOS THAT COULD OCCUR DURING CTR CONSTRUCTION

Equipment type and quantity	Pile type and size	Construction months
Vibratory × 2	2 x 36-in steel pipe[1]	April–July.
Vibratory, Impact	2 x 72-in steel pipe[2] OR 1 x 72-in steel pipe[2] (impact) and 1 x 36-in steel pipe (vibratory)	April–November.

[1] POA may elect to use either 36-in or 24-in temporary piles; as 36-in piles are more likely and estimated to have larger ensonified areas, we have used these piles in our analyses of concurrent activities;
[2] All 72-in piles driven concurrently will be attenuated.

Pile Installation and Removal—Vibratory and impact hammers would be used for the installation of 72-in (182-cm) permanent piles. Vibratory hammers would be used for installation and removal of 24- (61-cm) and or 36-in (91-cm) temporary piles; however, if obstructions are encountered during installation, impact driving may be necessary. Installation and removal of piles in the dry would be maximized as much as feasible, depending on construction sequencing and tide heights. However, the exact number of piles that may be installed and removed in the dry is unknown (see table 1 for estimates and numbers of piles analyzed for in-water construction activities). Impact and vibratory pile driving activities conducted in the dry are not expected to impact marine mammals and therefore, are not discussed further in this rule.

Pile Cutting—A majority of in-water temporary piles (approximately 90 percent) would be cut off at the mudline and remain in place, removed via direct pulling, or would remain in place intact (without cutting). Temporary piles that conflict with construction or operations or that can be removed in the dry would be removed. Leaving piles in place below the mudline supports stability of the soil. Also, many of the existing T1 and T2 piles are corroded and may break during removal, with the lower part remaining in place. The existing structure is closer to shore than new construction, and many piles can be cut or removed in the dry when their location is dewatered.

The number of piles that would be cut or remain in place would be maximized as feasible; however, the exact number of piles that may be cut or can remain in place is unknown (see table 1 for best estimates of piles to be removed). While the exact method of pile cutting is at the discretion of the construction contractor, any methodology considered for cutting and removing the piles would account for worker safety, constructability, and minimization of potential acoustic impacts that the operation may have on marine mammals. Potential methods of underwater cutting include ultrathermic cutting, pile clippers or wire-saws.

Underwater ultrathermic cutting is performed by commercial divers using hand-held equipment to cut or melt through ferrous and non-ferrous metals. These systems operate through a torch-like process, initiated by applying a melting amperage to a steel tube packed with alloy steel rods, sometimes mixed with aluminum rods to increase the heat output. In the hands of skilled commercial divers, underwater ultrathermic cutting is reputed to be relatively fast and efficient, cutting through approximately 2 to 4 inches (5 to 10 cm) per minute, depending upon the number of divers deployed. This efficacy may be constrained by the requirement to secure the severed piles from falling into the inlet to prevent an extreme hazard to the diver cutting the piles. Tidally driven currents in Cook Inlet may limit dive times to approximately 2 to 3 hours per high- and low-tide event, depending upon the tide cycle and the ability of divers to efficiently perform the cutting task while holding position during high current periods. This activity is not considered to produce sound.

Pile clipping and underwater sawing generate noise that is typically non-impulsive, low-level, and short duration (typically less than 15 seconds per pile) (NAVFAC SW, 2020). Potential pile cutting methodologies are not anticipated to result in incidental take of marine mammals because they are either above water, do not last for sufficient duration to present the reasonable potential for disruption of behavioral patterns, do not produce sound levels likely to result in marine mammal harassment, or some combination of the above. Impacts on marine mammals from pile cutting are therefore considered *de minimis* and NMFS is not proposing to authorize incidental take from this activity.

Demolition of Existing Terminals—Once the new T1, T2, and petroleum products transfer system are complete and operational, any remaining existing T1, T2, and POL1 platforms, wharves, and trestles would be dismantled (see figure 1–5 of the POA's application). Existing and most temporary piles would be cut and removed, removed via vibratory extraction or direct pull, or left in place. The selection of construction equipment by the contractor, including cranes and barges, would determine the plans and sequencing for demolition. Portions of the existing terminals may be used for construction phasing and as support platforms for ongoing new construction, as feasible.

T3 may be partially demolished during Phase 2B construction of T1 and T2, especially where the existing infrastructure may interfere with new construction. Elements of T3 that remain after Phase 2B is complete would remain in place until Phase 5, when they would be removed at that time.

Demolition would take place above the water, and demolished decking, pipes, and other superstructure materials would be contained before they fall into the water following best management practices. Demolished materials would be removed by barge or truck. Because work would take place out of water with best management practices in place to limit any release of material into Cook Inlet, in addition to cutting off or leaving existing piles in place, impacts on marine mammals from demolition of the existing terminals are considered *de minimis* and NMFS is not proposing to authorize incidental take from this activity.

Proposed mitigation, monitoring, and reporting measures are described in detail later in this document (please see Proposed Mitigation and Proposed Monitoring and Reporting).

Description of Marine Mammals in the Specified Geographical Region

There are seven species, comprising 9 stocks, of marine mammals that may be found in upper Cook Inlet during the proposed construction and demolition activities. Sections 3 and 4 of the POA's application and request for regulations summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the potentially affected species. NMFS fully considered all of this information, and we refer the reader to these descriptions, instead of reprinting the information. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.,* physical and behavioral descriptions) may be found on NMFS' website (*https://www.fisheries.noaa.gov/find-species*).

Table 4 lists all species or stocks for which take is likely and proposed to be authorized for the specified activities and summarizes information related to the population or stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. PBR is defined by the MMPA as ''the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population'' (16 U.S.C. 1362(20)). While no serious injury or mortality is anticipated or proposed to be authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species or stocks and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS' U.S. Alaska and Pacific SARs (*e.g.,* Carretta, *et al.,* 2023; Young *et al.,* 2023, 2024). Values presented in table 4 are the most recent available at the time of publication (including from the draft 2023 SARs) and are available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports.* The most recent abundance estimate for CIBWs is available from Goetz *et al.* (2023) and available online at *https://www.fisheries.noaa.gov/feature-story/new-abundance-estimate-endangered-cook-inlet-beluga-whales.*

TABLE 4—SPECIES LIKELY IMPACTED BY THE SPECIFIED ACTIVITIES

Common name	Scientific name	MMPA stock	ESA/MMPA status; strategic (Y/N) [1]	Stock abundance N_{best}, (CV, N_{min}, most recent abundance survey) [2]	PBR	Annual M/SI [3]
Order Cetartiodactyla—Cetacea—Superfamily Mysticeti (baleen whales)						
Family Eschrichtiidae:						
Gray whale	*Eschrichtius robustus*	Eastern N Pacific	-/-; N	26,960 (0.05, 25,849, 2016).	801	131
Family Balaenopteridae (rorquals):						
Humpback whale	*Megaptera novaeangliae*	Hawaii	-, -, N	11,278 (0.56, 7,265, 2020).	127	27.09
		Mexico-North Pacific	T, D, Y	N/A (N/A, N/A, 2006)	UND [5]	0.57
Order Cetartiodactyla—Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae:						
Killer whale	*Orcinus orca*	Eastern North Pacific Alaska Resident.	-/-; N	1,920 (N/A, 1,920, 2019).	19	1.3
		Eastern North Pacific Gulf of Alaska, Aleutian Islands and Bering Sea Transient.	-/-; N	587 (N/A, 587, 2012)	5.9	0.8
Family Monodontidae:						
Beluga whale	*Delphinapterus leucas*	Cook Inlet	E/D; Y	331 (0.076, 290, 2022) [4]	0.53	0
Family Phocoenidae (porpoises):						
Harbor porpoise	*Phocoena phocoena*	Gulf of Alaska	-/-; Y	31,046 (0.214, N/A, 1998).	UND [5]	72
Order Carnivora—Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions):						
Steller sea lion	*Eumetopias jubatus*	Western	E/D; Y	49,837 (N/A, 49,837 2022).	299	267
Family Phocidae (earless seals):						
Harbor seal	*Phoca vitulina*	Cook Inlet/Shelikof Strait	-/-; N	28,411 (N/A, 26,907, 2018).	807	107

[1] Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

[2] NMFS marine mammal stock assessment reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments.* CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable (N.A.).

[3] These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.,* commercial fisheries, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value or range.

[4] This abundance estimate is from Goetz *et al.* (2023); which was published after the most recent CIBW SAR (Young et al., 2023).

[5] UND means undetermined.

As indicated above, all seven species (nine managed stocks) in table 4 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur. Minke whales (*Balaenoptera acutorostrata*) and Dall's porpoises (*Phocoenoides dalli*) also occur in Cook Inlet; however, the spatial occurrence of these species is such that take is not likely to occur, and they are not discussed further beyond the explanation provided here. Data from the Alaska Marine Mammal Stranding Network database (NMFS, unpublished data) provide additional support for these determinations. From 2011 to 2020, only one minke whale and one Dall's porpoise were documented as stranded in the portion of Cook Inlet north of Point Possession. Both were dead upon discovery; it is unknown if they were alive upon their entry into upper Cook Inlet or drifted into the area with the tides. With very few exceptions, minke whales and Dall's porpoises do not occur in upper Cook Inlet, and therefore, take of these species is considered unlikely.

In addition to what is included in sections 3 and 4 of the POA's application (*https://www.fisheries.noaa.gov/action/incidental-take-authorization-port-alaskas-construction-activities-port-alaska-modernization*), the SARs (*https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*), and NMFS' website, we provide further detail below informing the baseline for species likely to be found in the project area (*e.g.,* information regarding current UMEs and known important habitat areas, such as Biologically Important Areas (BIAs; *https://oceannoise.noaa.gov/biologically-important-areas*) (Van Parijs et al., 2015)).

Gray Whale

Gray whales are infrequent visitors to Cook Inlet but can be seasonally present during spring and fall in the lower inlet (Bureau of Ocean Energy Management (BOEM), 2021). Migrating gray whales pass through the lower inlet during their spring and fall migrations to and from their primary summer feeding areas in the Bering, Chukchi, and Beaufort seas (Swartz, 2018; Silber *et al.,* 2021; BOEM, 2021). There are no BIAs for gray whales in Cook Inlet.

Gray whales are rarely documented in upper Cook Inlet and in the project area. Gray whales were not documented during POA construction or scientific monitoring from 2005 to 2011 or during 2016 (Prevel-Ramos *et al.,* 2006; Markowitz and McGuire, 2007; Cornick and Saxon-Kendall, 2008, 2009; Cornick *et al.,* 2010, 2011; Integrated Concepts and Research Corporation (ICRC), 2009, 2010, 2011, 2012; Cornick and Pinney, 2011; Cornick and Seagars, 2016); however, one gray whale was observed near Port MacKenzie during 2020 PCT construction (61 North (61N) Environmental, 2021) and a second whale was observed off of Ship Creek during 2021 PCT construction monitoring (61N Environmental, 2022a, Easley-Appleyard and Leonard, 2022). The whale observed in 2020 is believed to be the same whale that later stranded in the Twentymile River, at the eastern end of Turnagain Arm, approximately 80 km southeast of Knik Arm. There was no indication that work at the PCT had any effect on the animal, which was reported to be in ''fair to poor'' condition during evaluation (see *https://www.fisheries.noaa.gov/feature-story/alaska-gray-whale-ume-update-twentymile-river-whale-likely-one-twelve-dead-gray-whales* for more information). No gray whales were observed during POA's transitional dredging or SFD construction monitoring from May to August, 2022 (61N Environmental, 2022b, 2022c).

Under the MMPA, a UME is defined as ''a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response'' (16 U.S.C. 1421h(6)). A recently closed UME for gray whales along the West Coast and in Alaska occurred from December 17, 2018 through November 9, 2023. During that time, 146 gray whales stranded off the coast of Alaska. The investigative team concluded that the preliminary cause of the UME was localized ecosystem changes in the whale's Subarctic and Arctic feeding areas that led to changes in food, malnutrition, decreased birth rates, and increased mortality (see *https://www.fisheries.noaa.gov/national/marine-life-distress/2019-2023-gray-whale-unusual-mortality-event-along-west-coast-and* for more information). Given the changing environment in the polar regions due to climate change, there is potential for changes to gray whale behavior and distribution in the near future.

Humpback Whale

The 2022 Alaska and Pacific SARs described a revised stock structure for humpback whales, which modifies the previous stocks designated under the MMPA to align more closely with the ESA-designated distinct population segments (DPSs) (Carretta *et al.,* 2023; Young *et al.,* 2023). Specifically, the three previous North Pacific humpback whale stocks (Central and Western North Pacific stocks and a CA/OR/WA stock) were replaced by five stocks, largely corresponding with the ESA-designated DPSs. These include Western North Pacific and Hawaii stocks and a Central America/Southern Mexico-CA/OR/WA stock (which corresponds with the Central America DPS). The remaining two stocks, corresponding with the Mexico DPS, are the Mainland Mexico-CA/OR/WA and Mexico-North Pacific stocks (Carretta *et al.,* 2023; Young *et al.,* 2023). The former stock is expected to occur along the west coast from California to southern British Columbia, while the latter stock may occur across the Pacific, from northern British Columbia through the Gulf of Alaska and Aleutian Islands/Bering Sea region to Russia.

The Hawaii stock consists of one demographically independent population (DIP) (Hawaii—Southeast Alaska/Northern British Columbia DIP) and the Hawaii—North Pacific unit, which may or may not be composed of multiple DIPs (Wade *et al.,* 2021). The DIP and unit are managed as a single stock at this time, due to the lack of data available to separately assess them and lack of compelling conservation benefit to managing them separately (NMFS, 2019, 2022b, 2023). The DIP is delineated based on two strong lines of evidence: genetics and movement data (Wade *et al.,* 2021). Whales in the Hawaii—Southeast Alaska/Northern British Columbia DIP winter off Hawaii and largely summer in Southeast Alaska and Northern British Columbia (Wade *et al.,* 2021). The group of whales that migrate from Russia, western Alaska (Bering Sea and Aleutian Islands), and central Alaska (Gulf of Alaska excluding Southeast Alaska) to Hawaii have been delineated as the Hawaii-North Pacific unit (Wade *et al.,* 2021). There are a small number of whales that migrate between Hawaii and southern British Columbia/Washington, but current data and analyses do not provide a clear understanding of which unit these whales belong to (Wade *et al.,* 2021; Carretta *et al.,* 2023; Young *et al.,* 2023).

The Mexico-North Pacific stock is likely composed of multiple DIPs, based on movement data (Martien *et al.,* 2021; Wade, 2021; Wade *et al.,* 2021). However, because currently available data and analyses are not sufficient to delineate or assess DIPs within the unit, it was designated as a single stock (NMFS, 2019, 2022c, 2023). Whales in this stock winter off Mexico and the Revillagigedo Archipelago and summer primarily in Alaska waters (Martien *et al.,* 2021; Carretta *et al.,* 2023; Young *et al.,* 2023).

The most comprehensive photo-identification data available suggest that approximately 89 percent of all humpback whales in the Gulf of Alaska are members of the Hawaii stock, 11 percent are from the Mexico-North Pacific stock, and less than 1 percent are from the Western North Pacific stock (Wade, 2021). Members of different stocks are known to intermix in feeding grounds.

On October 9, 2019, NMFS proposed to designate critical habitat for the Western North Pacific, Mexico, and Central America DPSs of humpback whales (84 FR 54354). NMFS issued a final rule on April 21, 2021 to designate critical habitat for ESA-listed humpback whales pursuant to section 4 of the ESA (86 FR 21082). There is no designated critical habitat for humpback whales in or near the Project area (86 FR 21082, April 21, 2021), nor does the project overlap with any known BIAs.

Humpback whales are encountered regularly in lower Cook Inlet and occasionally in mid-Cook Inlet; however, sightings are rare in upper Cook Inlet (*e.g.,* Witteveen *et al.,* 2011). During aerial surveys conducted in summers between 2005 and 2012, Shelden *et al.* (2013) reported dozens of sightings in lower Cook Inlet, a handful of sightings in the vicinity of Anchor Point and in lower Cook Inlet, and no sightings north of 60° N latitude. NMFS changed to a biennial survey schedule starting in 2014 after analysis showed there would be little reduction in the ability to detect a trend given the current growth rate of the population (Hobbs, 2013). No survey took place in 2020. Instead, consecutive surveys took place in 2021 and 2022 (Shelden *et al.,* 2022). During the 2014–2022 aerial surveys, sightings of humpback whales were recorded in lower Cook Inlet and mid-Cook Inlet, but none were observed in upper Cook Inlet (Shelden *et al.,* 2015b, 2017, 2019, 2022). Vessel-based observers participating in the Apache Corporation's 2014 survey operations recorded three humpback whale sightings near Moose Point in upper Cook Inlet and two sightings near Anchor Point, while aerial and land-based observers recorded no humpback whale sightings, including in the upper inlet (Lomac-MacNair *et al.,* 2014). Observers monitoring waters between Point Campbell and Fire Island during summer and fall 2011 and spring and summer 2012 recorded no humpback whale sightings (Brueggeman *et al.,* 2013). Monitoring of Turnagain Arm during ice-free months between 2006 and 2014 yielded one humpback whale sighting (McGuire, unpublished data, cited in LGL Alaska Research Associates, Inc., and DOWL, 2015).

There have been few sightings of humpback whales in the vicinity of the proposed project area. Humpback whales were not documented during POA construction or scientific monitoring from 2005 to 2011, in 2016, or during 2020 (Prevel-Ramos *et al.,* 2006; Markowitz and McGuire, 2007; Cornick and Saxon-Kendall, 2008, 2009; Cornick *et al.,* 2010, 2011; ICRC, 2009, 2010, 2011, 2012; Cornick and Pinney, 2011; Cornick and Seagars, 2016; 61N Environmental, 2021). Observers monitoring the Ship Creek Small Boat Launch from August 23 to September 11, 2017 recorded two sightings, each of a single humpback whale, which was presumed to be the same individual (POA, 2017). One other humpback whale sighting has been recorded for the immediate vicinity of the project area. This event involved a stranded whale that was sighted near a number of locations in upper Cook Inlet before washing ashore at Kincaid Park in 2017; it is unclear as to whether the humpback whale was alive or deceased upon entering Cook Inlet waters. Another juvenile humpback stranded in Turnagain Arm in April 2019 near mile 86 of the Seward Highway. One additional humpback whale was observed in July during 2022 transitional dredging monitoring (61N Environmental, 2022c). No humpback whales were observed during the 2020 to 2021 PCT construction monitoring, the NMFS marine mammal monitoring, or the 2022 SFD construction monitoring from April to June (61N Environmental, 2021, 2022a, 2022b, 2022c; Easley-Appleyard and Leonard, 2022).

Killer Whale

Killer whales are rare in Cook Inlet, and there are no known BIAs for this species in Cook Inlet. Most sightings of killer whales in the area are in lower Cook Inlet (Shelden *et al.,* 2013). The infrequent sightings of killer whales that are reported in upper Cook Inlet tend to occur when their primary prey (anadromous fish for resident killer whales and beluga whales for transient killer whales) are also in the area (Shelden *et al.,* 2003). During CIBW aerial surveys between 1993 and 2012, killer whales were sighted in lower Cook Inlet 17 times, with a total of 70 animals (Shelden *et al.,* 2013); no killer whales were observed in upper Cook Inlet during this time. Surveys over 20 years by Shelden *et al.* (2003) documented an increase in CIBW sightings and strandings in upper Cook Inlet beginning in the early 1990s. Several of these sightings and strandings reported evidence of killer whale predation on CIBWs. The pod sizes of killer whales preying on CIBWs ranged from one to six individuals (Shelden *et al.,* 2003). Passive acoustic monitoring efforts throughout Cook Inlet documented killer whales at the Beluga River, Kenai River, and Homer Spit, although they were not encountered within Knik Arm (Castellote *et al.,* 2016). These detections were likely resident killer whales. Transient killer whales likely have not been acoustically detected due to their propensity to move quietly through waters to track prey (Small, 2010; Lammers *et al.,* 2013).

Few killer whales, if any, are expected to approach or be in the vicinity of the proposed project area. No killer whales were spotted in the vicinity of the POA during surveys by Funk *et al.* (2005), Ireland *et al.* (2005), or Brueggeman *et al.* (2007, 2008a, 2008b). Killer whales have also not been documented during any POA construction or scientific monitoring from 2005 to 2011, in 2016, or in 2020 (Prevel-Ramos *et al.,* 2006; Markowitz and McGuire, 2007; Cornick and Saxon-Kendall, 2008; ICRC, 2009, 2010, 2011, 2012; Cornick *et al.,* 2010, 2011; Cornick and Pinney, 2011; Cornick and Seagars, 2016; 61N Environmental, 2021). Two killer whales, one male and one juvenile of unknown sex, were sighted offshore of Point Woronzof in September 2021 during PCT Phase 2 construction monitoring (61N Environmental, 2022a). The pair of killer whales moved up Knik Arm, reversed direction near Cairn Point, and moved southwest out of Knik Arm toward the open water of Upper Cook Inlet. No killer whales were sighted during the 2021 NMFS marine mammal monitoring or the 2022 transitional dredging and SFD construction monitoring that occurred between May and June 2022 (61N Environmental, 2022b, 2022c; Easley-Appleyard and Leonard, 2022).

Beluga Whale

Five stocks of beluga whales are recognized in Alaska: the Beaufort Sea stock, eastern Chukchi Sea stock, eastern Bering Sea stock, Bristol Bay stock, and Cook Inlet stock (Young *et al.,* 2023). The Cook Inlet stock is geographically and genetically isolated from the other stocks (O'Corry-Crowe *et al.,* 1997; Laidre *et al.,* 2000) and resides year-round in Cook Inlet (Laidre *et al.,* 2000; Castellote *et al.,* 2020). Only the CIBW stock inhabits the proposed project area. CIBWs were designated as a DPS and listed as endangered under the ESA in October 2008 (73 FR 62919, October 10, 2008).

On June 15, 2023, NMFS released an updated abundance estimate for CIBWs (Goetz *et al.,* 2023) that incorporates aerial survey data from June 2021 and 2022, which represents an update from the most recent SAR (Young *et al.,* 2023) and suggest that the CIBW population is stable or may be slightly increasing. The methodology in the 2023 report is the same as that used for NMFS's SARs (Young *et al.* 2023) and incorporates the same time-series of data from previous years. The only change was the inclusion of more recent data from 2021 and 2022 surveys; the 2021 data collection efforts were delayed from 2020 due to COVID–19. Goetz *et al.* (2023) estimated that the population size is currently between 290 and 386, with a median best estimate of 331. We have determined that Goetz *et al.* (2023) represents the most recent and best available science.

Goetz *et al.* (2023) also present an analysis of population trends for the most recent 10-year period (2012–2022). The addition of data from the 2021 and 2022 survey years in the analysis resulted in a 65.1 percent probability that the CIBW population is now increasing at 0.9 percent per year (95 percent prediction interval of −3 to 5.7 percent). This increase drops slightly to 0.2 percent per year (95 percent prediction interval of −1.8 to 2.6 percent) with a 60 percent probability that the CIBW population is increasing more than 1 percent per year when data from 2021, which had limited survey coverage due to poor weather, are excluded from the analysis. Median group size estimates in 2021 and 2022 were 34 and 15, respectively (Goetz *et al.,* 2023). NMFS has determined that the carrying capacity of Cook Inlet is 1,300 CIBWs (65 FR 34590, May 31, 2000) based on historical CIBW abundance estimated by Calkins (1989). Additional information may be found in NMFS' 2023 report on the abundance and trend of CIBWs in Cook Inlet in June 2021 and June 2022, available online at *https://www.fisheries.noaa.gov/resource/document/abundance-and-trend-belugas-delphinapterus-leucas-cook-inlet-alaska-june-2021-and.*

Live stranding events of CIBWs have been regularly observed in upper Cook Inlet. This can occur when an individual or group of individuals strands as the tide recedes. Most live strandings have occurred in Knik Arm and Turnagain Arm, which are shallow and have large tidal ranges, strong currents, and extensive mudflats. Most whales involved in a live stranding event survive, although some associated deaths may not be observed if the whales die later from live-stranding-related injuries (Vos and Shelden, 2005; Burek-Huntington *et al.,* 2015). Between 2014 and 2018, there were reports of approximately 79 CIBWs involved in 3 known live stranding events plus 1 suspected live stranding event with two associated deaths reported (NMFS, 2016b; NMFS, unpublished data; Muto *et al.,* 2020). In 2014, necropsy results from two whales found in Turnagain Arm suggested that a live stranding event contributed to their deaths as both had aspirated mud and water. No live stranding events were reported prior to the discovery of these dead whales suggesting that not all live stranding events are observed.

Another source of CIBW mortality in Cook Inlet is predation by transient-type (mammal-eating) killer whales (NMFS, 2016b; Shelden *et al.,* 2003). No human-caused mortality or serious injury of CIBWs through interactions with commercial, recreational, and subsistence fisheries or because of other human-caused events (*e.g.,* entanglement in marine debris, ship strikes) has been recently documented, and subsistence harvesting of CIBWs has not occurred since 2008 (NMFS, 2008b).

Recovery Plan. The Final Recovery Plan for CIBW was published in the **Federal Register** on January 5, 2017 (82 FR 1325), available online at *https://www.fisheries.noaa.gov/resource/document/recovery-plan-cook-inlet-beluga-whale-delphinapterus-leucas.*

In its Recovery Plan (82 FR 1325, January 5, 2017), NMFS identified several potential threats to CIBWs, including: (1) high concern: catastrophic events (*e.g.,* natural disasters, spills, mass strandings), cumulative effects of multiple stressors, and noise; (2) medium concern: disease agents (*e.g.,* pathogens, parasites, and harmful algal blooms), habitat loss or degradation, reduction in prey, and prohibited take (*e.g.,* entanglements, strikes, poaching or intentional harassment, and close approaches by private vessels); and (3) low concern: pollution, predation, and subsistence harvest. The recovery plan did not treat climate change as a distinct threat but rather as a consideration in the threats of high and medium concern. Other potential threats most likely to result in direct human-caused mortality or serious injury of this stock include vessel strikes.

Critical Habitat. On April 11, 2011, NMFS designated two areas of critical habitat for CIBW (76 FR 20179). The designation includes 7,800 km² of marine and estuarine habitat within Cook Inlet, encompassing approximately 1,909 km² in Area 1 and 5,891 km² in Area 2 (see figure 1 in 76 FR 20179). Area 1 of the CIBW critical habitat encompasses all marine waters of Cook Inlet north of a line connecting Point Possession (lat. 61.04° N, long. 150.37° W) and the mouth of Three Mile Creek (lat. 61.08.55° N, long. 151.04.40° W), including waters of the Susitna, Little Susitna, and Chickaloon Rivers below mean higher high water. From spring through fall, Area 1 critical habitat has the highest concentration of CIBWs due to its important foraging and calving habitat. Area 2 critical habitat has a lower concentration of CIBWs in spring and summer but is used by CIBWs in fall and winter. Critical habitat does not include two areas of military usage: the Eagle River Flats Range on Fort Richardson and military lands of JBER between Mean Higher High Water and MHW. Additionally, the POA, adjacent navigation channel, and turning basin (approximately 6.84 km²) were excluded from the critical habitat designation due to national security reasons (76 FR 20180, April 11, 2011). The POA exclusion area is within Area 1, however, marine mammal monitoring results from the POA suggest that this exclusion area is not a particularly important feeding or calving area. CIBWs have been occasionally documented to forage around Ship Creek (south of the POA) but are typically transiting through the area to other, potentially richer, foraging areas to the north (*e.g.,* Six Mile Creek, Eagle River, Eklutna River) (*e.g.,* 61N Environmental, 2021, 2022a, 2022b, 2022c, Easley-Appleyard and Leonard, 2022). These locations contain predictable salmon runs, an important food source for CIBWs, and the timing of these runs has been correlated with CIBW movements into the upper reaches of Knik Arm (Ezer *et al.,* 2013). More information on CIBW critical habitat can be found at *https://www.fisheries.noaa.gov/action/critical-habitat-cook-inlet-beluga-whale.*

The designation identified the following Primary Constituent Elements (PCE), essential features important to the conservation of the CIBW:

(1) Intertidal and subtidal waters of Cook Inlet with depths of less than 9 m (MLLW) and within 8 km of high- and medium-flow anadromous fish streams;

(2) Primary prey species, including four of the five species of Pacific salmon (chum (*Oncorhynchus keta*), sockeye (*Oncorhynchus nerka*), Chinook (*Oncorhynchus tshawytscha*), and coho (*Oncorhynchus kisutch*)), Pacific eulachon (*Thaleichthys pacificus*), Pacific cod (*Gadus macrocephalus*), walleye pollock (*Gadus chalcogrammus*), saffron cod (*Eleginus*

gracilis), and yellowfin sole (*Limanda aspera*);

(3) The absence of toxins or other agents of a type or amount harmful to CIBWs;

(4) Unrestricted passage within or between the critical habitat areas; and

(5) The absence of in-water noise at levels resulting in the abandonment of habitat by CIBWs.

The area around the POA, while exempted from the Critical Habitat designation due to national security issues, does contain the requisite bathymetric features in the first PCE, as well as the presence of primary prey species. However, given the industrialized nature of the POA and the historical use of the site from the early 1900s, the other physical features are more difficult to confirm. Sediment contamination was examined during a 2008 U.S. Army Corps of Engineers dredging project near the Port, and contaminant levels of volatile and semi-volatile organic compounds, total recoverable petroleum hydrocarbons, PCBs, pesticides, cadmium, mercury, selenium, silver, arsenic, barium, chromium, and lead were found to be suitable for in-water discharge (USACE 2008). Ambient and background noise levels at the POA have been measured and are addressed quantitatively later in this document; briefly, noise levels are elevated due to both anthropogenic activities (*i.e.,* commercial shipping, dredging, and construction) and normal environmental factors (*e.g.,* high current velocity, ice movement, seismic activity). While neither contaminants nor noise have been shown to approach the ''harmful'' and ''habitat abandonment'' thresholds described in the PCEs, the concentration of both stressors is highest closer to the POA facilities, within the exemption area, ultimately degrading the habitat at POA relative to the surrounding areas. In total, the exempted area surrounding the POA represents approximately 0.35 percent of the designated Critical Habitat Area 1.

Biologically Important Areas. Wild *et al.* (2023) delineated portions of Cook Inlet, including near the proposed project area, as a BIA for the small and resident population of CIBWs based on scoring methods outlined by Harrison *et al.* (2023) (see *https://oceannoise.noaa.gov/biologically-important-areas* for more information). The BIA is used year-round by CIBWs for feeding and breeding, and there are limits on food supply such as salmon runs and seasonal movement of other fish species (Wild *et al.,* 2023). The boundary of the CIBW BIA is consistent with NMFS' critical habitat designation and does not include the aforementioned exclusion areas (*e.g.,* the POA and surrounding waters) (Wild *et al.,* 2023).

Foraging Ecology. CIBWs feed on a wide variety of prey species, particularly those that are seasonally abundant. From late spring through summer, most CIBW stomachs sampled contained salmon, which corresponded to the timing of fish runs in the area. Anadromous smolt and adult fish aggregate at river mouths and adjacent intertidal mudflats (Calkins, 1989). All five Pacific salmon species (*i.e.,* Chinook, pink (*Oncorhynchus gorbuscha*), coho, sockeye, and chum) spawn in rivers throughout Cook Inlet (Moulton, 1997; Moore *et al.,* 2000). Overall, Pacific salmon represent the highest percent frequency of occurrence of prey species in CIBW stomachs. This suggests that their spring feeding in upper Cook Inlet, principally on fat-rich fish, such as salmon and eulachon, is important to the energetics of these animals (NMFS, 2016b).

The nutritional quality of Chinook salmon in particular is unparalleled, with an energy content four times greater than that of a Coho salmon. It is suggested the decline of the Chinook salmon population has left a nutritional void in the diet of the CIBWs that no other prey species can fill in terms of quality or quantity (Norman *et al.,* 2020, 2022).

In fall, as anadromous fish runs begin to decline, CIBWs consume fish species (cod and bottom fish) found in nearshore bays and estuaries. Stomach samples from CIBWs are not available for winter (December through March), although dive data from CIBWs tagged with satellite transmitters suggest that they feed in deeper waters during winter (Hobbs *et al.,* 2005), possibly on such prey species as flatfish, cod, sculpin, and pollock.

Fish runs in the Anchorage and Matanuska-Susitna area include Chinook (May–August), sockeye (June–September), coho (July–September), pin (July–August), and chum (July–September) salmon, as well as dolly varden, rainbow and lake trout, northern pike, burbot, grayling, smelt, and whitefish. In proximity to the POA, anadromous fish runs occur at Ship Creek, which is heavily used by recreational anglers. On June 26, 2024, the Alaska Department of Fish and Game (ADF&G) issued an emergency closure of recreational fishing on Ship Creek until July 13, 2024, and limited Chinook catching to catch-and-release for the remainder of the season due to low returns of Chinook in the creek. ADF&G anticipates a poor return of this species throughout Knik Arm for 2024, in keeping with a trend of declining Chinook Runs throughout Cook Inlet since 2008 (ADF&G 2019). The Gulf of Alaska Chinook salmon is currently under review for listing under the ESA (89 FR 45815, May 24, 2024).

Distribution in Cook Inlet. The CIBW stock remains within Cook Inlet throughout the year, showing only small seasonal shifts in distribution (Goetz *et al.,* 2012a; Lammers *et al.,* 2013; Castallotte *et al.,* 2015; Shelden *et al.,* 2015a, 2018; Lowery *et al.,* 2019). During spring and summer, CIBWs generally aggregate near the warmer waters of river mouths where prey availability is high and predator occurrence is low (Moore *et al.,* 2000; Shelden and Wade, 2019; McGuire *et al.,* 2020). In particular, CIBW groups are seen in the Susitna River Delta approximately 36 km (23 mi) to the west of the POA across the mouth of Knik arm in Upper Cook Inlet, the Beluga River (approximately 55 km (34 mi) west) and along the shore to the Little Susitna River (21 km (13 mi) west), within all of Knik Arm, and along the shores of Chickaloon Bay to the south of Anchorage, across Turnagain Arm (figure 3). Small groups were recorded farther south in Kachemak Bay, Redoubt Bay (Big River), and Trading Bay (McArthur River) prior to 1996 but rarely thereafter. Since the mid-1990s, most CIBWs (96 to 100 percent) aggregate in shallow areas near river mouths in upper Cook Inlet, and they are only occasionally sighted in the central or southern portions of Cook Inlet during summer (Hobbs *et al.,* 2008). Almost the entire population can be found in northern Cook Inlet from late spring through the summer and into the fall (Muto *et al.,* 2020).

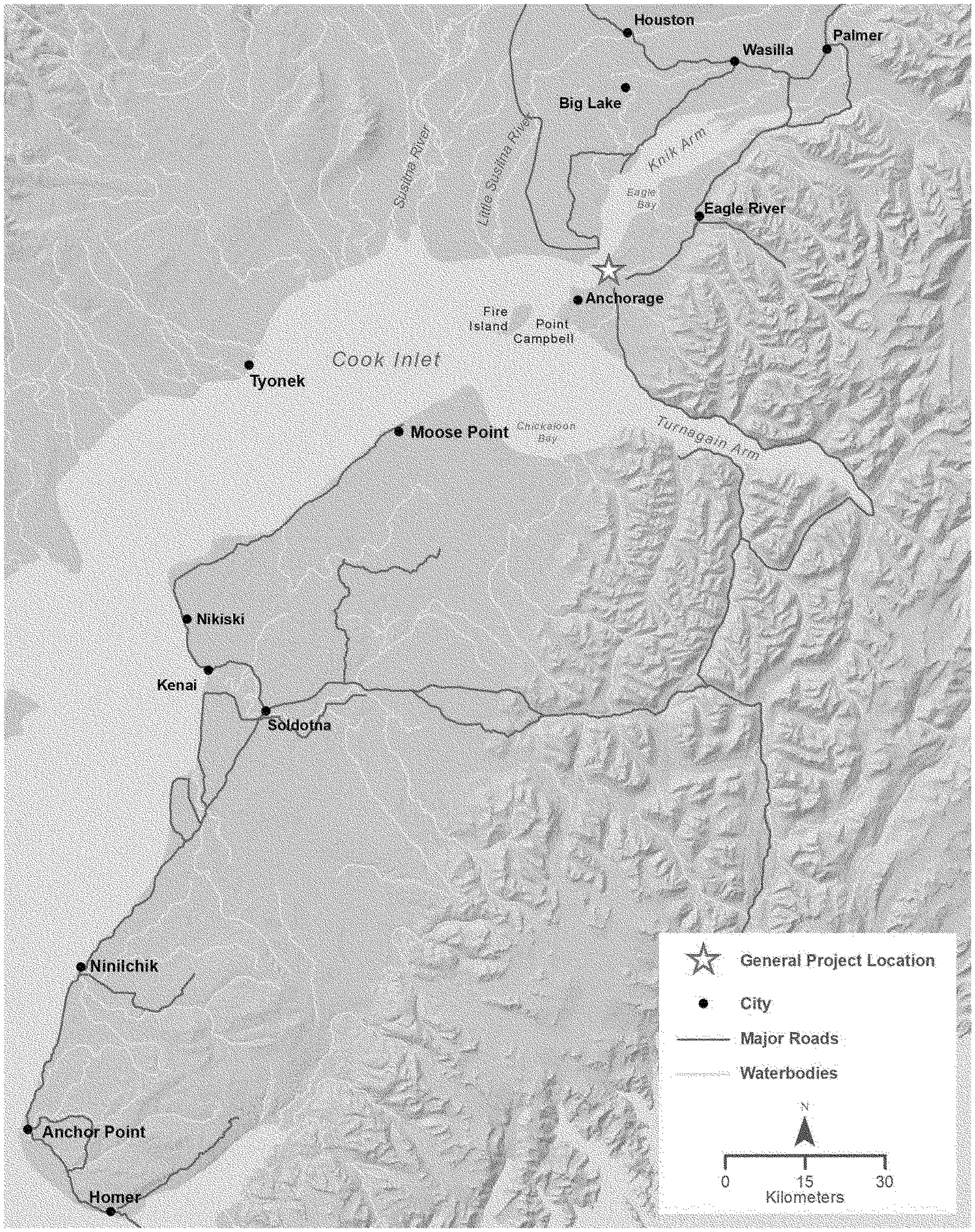

Figure 3 – Overview of Cook Inlet Geography.

Data from tagged whales (14 tags deployed July 2000 through March 2003) show that CIBWs use upper Cook Inlet intensively between summer and late autumn (Hobbs *et al.,* 2005). CIBWs tagged with satellite transmitters continue to use Knik Arm, Turnagain Arm, and Chickaloon Bay as late as October, but some range into lower Cook Inlet to Chinitna Bay, Tuxedni Bay, and Trading Bay (McArthur River) in fall (Hobbs *et al.,* 2005, 2012). From September through November, CIBWs move between Knik Arm, Turnagain Arm, and Chickaloon Bay (Hobbs *et al.,* 2005; Goetz *et al.,* 2012b). By December, CIBWs are distributed throughout the upper to mid-inlet. From January into March, they move as far south as Kalgin Island and slightly beyond in central offshore waters. CIBWs make occasional excursions into Knik Arm and Turnagain Arm in February and March in spite of ice cover (Hobbs *et al.,* 2005). Although tagged CIBWs move widely around Cook Inlet throughout the year, there is no indication of seasonal migration in and out of Cook Inlet (Hobbs *et al.,* 2005). Data from NMFS aerial surveys, opportunistic sighting reports, and corrected satellite-tagged CIBWs confirm that they are more widely dispersed throughout Cook Inlet during winter (November–April), with animals found between Kalgin Island and Point Possession. Generally fewer observations of CIBWs are reported from the Anchorage and Knik Arm area from November through April as documented in the designation of Critical Habitat (76 FR 20179, April 11, 2011; Rugh *et al.,* 2000, 2004).

The NMFS Marine Mammal Lab has conducted long-term passive acoustic monitoring demonstrating seasonal shifts in CIBW concentrations throughout Cook Inlet. Castellote *et al.* (2015) conducted long-term acoustic monitoring at 13 locations throughout Cook Inlet between 2008 and 2015: North Eagle Bay, Eagle River Mouth, South Eagle Bay, Six Mile, Point MacKenzie, Cairn Point, Fire Island, Little Susitna, Beluga River, Trading Bay, Kenai River, Tuxedni Bay, and Homer Spit; the former 6 stations being located within Knik Arm. In general, the observed seasonal distribution is in accordance with descriptions based on aerial surveys and satellite telemetry: CIBW detections are higher in the upper inlet during summer, peaking at Little Susitna, Beluga River, and Eagle Bay, followed by fewer detections at those locations during winter. Higher detections in winter at Trading Bay, Kenai River, and Tuxedni Bay suggest a broader CIBW distribution in the lower inlet during winter, particularly in Tuxedni Bay in the months of September through March (Castellote *et al.,* 2015, 2018, 2024; Castellote *et al.* 2024).

Goetz *et al.* (2012b) modeled habitat preferences using NMFS' 1994–2008 June abundance survey data. In large areas, such as the Susitna Delta (Beluga to Little Susitna Rivers) and Knik Arm, there was a high probability that CIBWs were in larger groups. CIBW presence and acoustic foraging behavior also increased closer to rivers with Chinook salmon runs, such as the Susitna River (*e.g.,* Castellote *et al.,* 2021). Movement has been correlated with the peak discharge of seven major rivers emptying into Cook Inlet. Boat-based surveys from 2005 to the present (McGuire and Stephens, 2017) and results from passive acoustic monitoring across the entire inlet (Castellote *et al.,* 2015) also support seasonal patterns observed with other methods. Based on long-term passive acoustic monitoring, seasonally, foraging behavior was more prevalent during summer, particularly at upper inlet rivers, than during winter. Foraging index was highest at Little Susitna, with a peak in July-August and a secondary peak in May, followed by Beluga River and then Eagle Bay; monthly variation in the foraging index indicates CIBWs shift their foraging behavior among these three locations from April through September.

CIBWs are believed to mostly calve in the summer and concurrently breed between late spring and early summer (NMFS, 2016b), primarily in upper Cook Inlet. McGuire *et al.* (2020) documented three suspected calving events between July and September with no neonates observed during surveys conducted from April to June. The first neonates encountered during each field season from 2005 through 2015 were always seen in the Susitna River Delta in July. Important calving grounds are thought to be located near the river mouths of upper Cook Inlet—both potential births documented in July were at the Susitna River Delta; the third was in Turnagain Arm in September (McGuire *et al.,* 2020). The photographic identification team's documentation of the dates of the first neonate of each year indicate that calving begins in mid-late July/early August, generally coinciding with the observed timing of annual maximum group size. Probable mating behavior of CIBWs was observed during all months of the aerial surveys (McGuire *et al.,* 2020). Young CIBWs are nursed for 2 years and may continue to associate with their mothers for a considerable time thereafter (Colbeck *et al.,* 2013). Demographic rates were modeled for this population, indicating that low survival of non-breeding (*i.e.,* subadult, male, and non-breeding adult female) CIBWs and general low reproductive rates are likely contributing to the non-recovery of the population (Himes Boor *et al.,* 2022).

Presence in Project Area. Knik Arm is one of three areas in upper Cook Inlet where CIBWs are concentrated during spring, summer, and early fall. Most CIBWs observed in or near the POA are transiting between upper Knik Arm and other portions of Cook Inlet, and the POA itself is not considered high-quality foraging habitat. CIBWs tend to follow their anadromous prey and travel in and out of Knik Arm with the tides. The predictive habitat model derived by Goetz *et al.* (2012a) indicated that the highest predicted densities of CIBWs are in Knik Arm near the mouth of the Susitna River and in Chickaloon Bay. The model suggests that the density of CIBWs ranges from 0 to 1.12 whales per km^2 in Cook Inlet but is lower at the mouth of Knik Arm, near the POA, ranging between approximately 0.013 and 0.062 whales per km^2. The distribution presented by Goetz *et al.* (2012a) is generally consistent with CIBW distribution documented in upper Cook Inlet throughout ice-free months (NMFS, 2016b).

Several marine mammal monitoring programs and studies have been conducted at or near the POA during the last 17 years. These studies offer some of the best available information on the presence of CIBWs in the proposed project area. Studies that occurred prior to 2020 are summarized in Section 4.5.5 of the POA's application. More recent programs, which most accurately portray current information regarding CIBW presence in the proposed project area, are summarized here.

PCT Construction Monitoring (2020–2021). A marine mammal monitoring program was implemented during construction of the PCT in 2020 (Phase 1) and 2021 (Phase 2), as required by the NMFS IHAs (85 FR 19294, April 6, 2020). PCT Phase 1 construction included impact installation of 48-in (122-cm) attenuated piles; impact installation of 36-in (91-cm) and 48-in (122-cm) unattenuated piles; vibratory installation of 24-in (61-cm), 36-in (91-cm), and 48-in (122 cm) attenuated and unattenuated piles; and vibratory installation of an unattenuated 72-in (183-cm) casing for a confined bubble curtain across 95 days. PCT Phase 2 construction included vibratory installation of 36-in (91-cm) attenuated piles and impact and vibratory installation of 144-in (366-cm) attenuated breasting and mooring dolphins across 38 days. Marine mammal monitoring in 2020 occurred during 128 non-consecutive days with a total of 1,238.7 hours of monitoring from April 27 to November 24, 2020 (61N Environmental, 2021). Marine mammal monitoring in 2021 occurred during 74 non-consecutive days with a total of 734.9 hours of monitoring from April 26 to June 24 and September 7 to 29, 2021 (61N Environmental, 2022a). A total of 1,504 individual CIBWs across 377 groups were sighted during PCT construction monitoring. Sixty-five and 67 percent of CIBW observations occurred on non-pile driving days or before pile driving occurred on a given day during PCT Phase 1 and PCT Phase 2 construction, respectively.

The monitoring effort and data collection were conducted before, during, and after pile driving activities from four locations as stipulated by the PCT IHAs (85 FR 19294, April 6, 2020): (1) the Anchorage Public Boat Dock by Ship Creek, (2) the Anchorage Downtown Viewpoint near Point Woronzof, (3) the PCT construction site, and (4) the North End (North Extension) at the north end of the POA, near Cairn Point. Marine mammal sighting data from April to September both before, during, and after pile driving indicate that CIBWs swam near the POA and lingered there for periods of time ranging from a few minutes to a few hours. CIBWs were most often seen traveling at a slow or moderate pace, either from the north near Cairn Point or from the south or milling at the mouth of Ship Creek. Groups of CIBWs were also observed swimming north and south in front of the PCT construction and did not appear to exhibit avoidance behaviors either before, during, or after pile driving activities (61N Environmental, 2021, 2022a). CIBW sightings in June were concentrated on the west side of Knik Arm from the Little Susitna River Delta to Port MacKenzie. From July through September, CIBWs were most often seen milling and traveling on the east side of Knik Arm from Point Woronzof to Cairn Point (61N Environmental, 2021, 2022a).

SFD Construction Monitoring and Transitional Dredging (2022). In 2022, a marine mammal monitoring program almost identical to that used during PCT construction was implemented during construction of the SFD, as required by the NMFS IHA (86 FR 50057, September 7, 2021). SFD construction included the vibratory installation of ten 36-in (91-cm) attenuated plumb piles and two unattenuated battered piles (61N Environmental, 2022b). Marine mammal monitoring was conducted during 13 non-consecutive days with a total of 108.2 hours of monitoring observation from May 20 through June 11, 2022 (61N Environmental, 2022b). Forty-one individual CIBWs across 9 groups were sighted (61N Environmental, 2022b). One group was observed on a day with no pile-driving, three groups were seen on days before pile driving activities started, and five groups were seen during vibratory pile driving activities (61N Environmental, 2022b).

During SFD construction, the position of the Ship Creek monitoring station was adjusted to allow monitoring of a portion of the shoreline north of Cairn Point that could not be seen by the station at the northern end of the POA (61N Environmental, 2022b). Eleven protected species observers (PSOs) worked from four monitoring stations located along a 9-km (6-mi) stretch of coastline surrounding the POA. The monitoring effort and data collection were conducted at the following four locations: (1) Point Woronzof approximately 6.5 km (4 mi) southwest of the SFD, (2) the promontory near the boat launch at Ship Creek, (3) the SFD project site, and (4) the northern end of the POA (61N Environmental, 2022b).

Ninety groups comprised of 529 CIBWs were also sighted during the transitional dredging monitoring that occurred from May 3 to 15, 2022 and June 27 to August 24, 2022 (61N Environmental, 2022b). Of the nine groups of CIBWs sighted during SFD construction, traveling was recorded as the primary behavior for each group (61N Environmental, 2022b). CIBWs traveled and milled between the SFD construction area, Ship Creek, and areas to the south of the POA for more than an hour at a time, delaying some construction activities.

Harbor Porpoise

Harbor porpoises occur throughout Cook Inlet with passive acoustic detections being more prevalent in lower Cook Inlet. Although harbor porpoises have been frequently observed during aerial surveys in Cook Inlet (Shelden *et al.,* 2014), most sightings are of single animals and are concentrated at Chinitna and Tuxedni bays on the west side of lower Cook Inlet (Rugh *et al.,* 2005). The occurrence of larger numbers of porpoise in the lower Cook Inlet may be driven by greater availability of preferred prey and possibly less competition with CIBWs as CIBWs move into upper inlet waters to forage on Pacific salmon during the summer months (Shelden *et al.,* 2014). There are no known BIAs for harbor porpoise in Cook Inlet.

An increase in harbor porpoise sightings in upper Cook Inlet has been observed over recent decades (*e.g.,* 61N Environmental, 2021, 2022a; Shelden *et al.,* 2014). Small numbers of harbor porpoises have been consistently reported in upper Cook Inlet between April and October (Prevel-Ramos *et al.,* 2008). The overall increase in the number of harbor porpoise sightings in upper Cook Inlet is unknown, although it may be an artifact from increased studies and marine mammal monitoring programs in upper Cook Inlet. It is also possible that the apparent contraction in the CIBW's range has opened up previously occupied CIBW range to harbor porpoises (Shelden *et al.,* 2014).

Harbor porpoises have been observed within Knik Arm during monitoring efforts from 2005 to 2016. Between April 27 and November 24, 2020, 18 harbor porpoises were observed near the POA during the PCT Phase 1 construction monitoring (61N Environmental, 2021). Twenty-seven harbor porpoises were observed near the POA during the PCT Phase 2 construction monitoring conducted between April 26 and September 29, 2021 (61N Environmental, 2022a). During NMFS marine mammal monitoring conducted in 2021, one harbor porpoise was observed in August and six harbor porpoises were observed in October (Easley-Appleyard and Leonard, 2022). During 2022, five harbor porpoises were sighted during transitional dredging monitoring (61N Environmental, 2022c). No harbor porpoises were sighted at the POA during the 2022 SFD construction monitoring that occurred between May and June 2022 (61N Environmental, 2022b).

Steller Sea Lion

Two DPSs of Steller sea lion occur in Alaska: the western DPS and the eastern DPS. The western DPS includes animals that occur west of Cape Suckling, Alaska and therefore, includes individuals within the Project area. The western DPS was listed under the ESA as threatened in 1990 (55 FR 49204, November 26, 1990), and its continued population decline resulted in a change in listing status to endangered in 1997 (62 FR 24345, May 5, 1997). Since 2000, studies indicate that the population east of Samalga Pass (*i.e.,* east of the Aleutian Islands) has increased and is potentially stable (Young *et al.,* 2023).

NMFS designated critical habitat for Steller sea lions on August 27, 1993 (58 FR 45269). The critical habitat designation for the Western DPS of was determined to include a 37-km (20-nautical mile) buffer around all major haul-outs and rookeries, and associated terrestrial, atmospheric, and aquatic zones, plus three large offshore foraging areas, none of which occurs in the project area. There are no known BIAs for Steller sea lions in Cook Inlet.

Within Cook Inlet, Steller sea lions primarily inhabit lower Cook Inlet. However, they occasionally venture to upper Cook Inlet and Knik Arm and may be attracted to salmon runs in the region. Steller sea lions have not been documented in upper Cook Inlet during CIBW aerial surveys conducted annually in June from 1994 through 2012 and in 2014 (Shelden *et al.,* 2013, 2015b, 2017; Shelden and Wade, 2019); however, there has been an increase in individual Steller sea lion sightings near the POA in recent years.

Steller sea lions were observed near the POA in 2009, 2016, and 2019 through 2022 (ICRC, 2009; Cornick and Seagars, 2016; POA, 2019; 61N Environmental, 2021, 2022a, 2022b, 2022c). In 2009, there were three Steller sea lion sightings that were believed to be the same individual (ICRC, 2009). In 2016, Steller sea lions were observed on 2 separate days. On May 2, 2016, one individual was sighted, while on May 25, 2016, there were five Steller Sea lion sightings within a 50-minute period, and these sightings occurred in areas relatively close to one another (Cornick and Seagars, 2016). Given the proximity in time and space, it is believed these five sightings were of the same individual sea lion. In 2019, one Steller sea lion was observed in June at the POA during transitional dredging (POA, 2019). There were six sightings of individual Steller sea lions near the POA during PCT Phase 1 construction monitoring (61N Environmental, 2021). At least two of these sightings may have been re-sights on the same individual. An additional seven unidentified pinnipeds were observed that could have been Steller sea lions or harbor seals (61N Environmental, 2021). In 2021, there were a total of eight sightings of individual Steller sea lions observed near the POA during PCT Phase 2 construction monitoring (61N Environmental, 2022a). During NMFS marine mammal monitoring, one Steller sea lion was observed in August 2021 in the middle of the inlet (Easley-Appleyard and Leonard, 2022). In 2022, there were three Steller sea lion sightings during the transitional dredging monitoring and three during SFD construction monitoring (61N Environmental, 2022b, 2022c). All sightings occurred during summer, when the sea lions were likely attracted to ongoing salmon runs. Sea lion observations near the POA may be increasing due to more consistent observation effort or due to increased presence; observations continue to be occasional.

Harbor Seal

Harbor seals inhabit the coastal and estuarine waters of Cook Inlet and are observed in both upper and lower Cook Inlet throughout most of the year (Boveng *et al.,* 2012; Shelden *et al.,* 2013), though there are no known BIAs for this species in this area. Recent research on satellite-tagged harbor seals observed several movement patterns within Cook Inlet (Boveng *et al.,* 2012), including a strong seasonal pattern of more coastal and restricted spatial use during the spring and summer (breeding, pupping, molting) and more wide-ranging movements within and outside of Cook Inlet during the winter months, with some seals ranging as far as Shumagin Islands. During summer months, movements and distribution were mostly confined to the west side of Cook Inlet and Kachemak Bay, and seals captured in lower Cook Inlet generally exhibited site fidelity by remaining south of the Forelands in lower Cook Inlet after release (Boveng *et al.,* 2012). In the fall, a portion of the harbor seals appeared to move out of Cook Inlet and into Shelikof Strait, northern Kodiak Island, and coastal habitats of the Alaska Peninsula. The western coast of Cook Inlet had higher usage by harbor seals than eastern coast habitats, and seals captured in lower Cook Inlet generally exhibited site fidelity by remaining south of the Forelands in lower Cook Inlet after release (south of Nikiski; Boveng *et al.,* 2012).

The presence of harbor seals in upper Cook Inlet is seasonal. Harbor seals are commonly observed along the Susitna River and other tributaries within upper Cook Inlet during eulachon and salmon migrations (NMFS, 2003). The major haulout sites for harbor seals are in lower Cook Inlet; however, there are a few haulout sites in upper Cook Inlet, including near the Little and Big Susitna rivers, Beluga River, Theodore River, and Ivan River (Barbara Mahoney, personal communication, November 16, 2020; Montgomery *et al.,* 2007). During CIBW aerial surveys of upper Cook Inlet from 1993 to 2012, harbor seals were observed 24 to 96 km south-southwest of Anchorage at the Chickaloon, Little Susitna, Susitna, Ivan, McArthur, and Beluga rivers (Shelden *et al.,* 2013). Harbor seals have been observed in Knik Arm and in the vicinity of the POA (Shelden *et al.,* 2013), but they are not known to haul out within the proposed project area.

Harbor seals were observed during construction monitoring at the POA from 2005 through 2011 and in 2016, in groups of one to seven individuals (Prevel-Ramos *et al.,* 2006; Markowitz and McGuire, 2007; Cornick and Saxon-Kendall, 2008, 2009; Cornick *et al.,* 2010, 2011; Cornick and Seagars, 2016). Harbor seals were also observed near the POA during construction monitoring for PCT Phase 1 in 2020 and PCT Phase 2 in 2021, NMFS marine mammal monitoring in 2021, and transitional dredging monitoring and SFD construction monitoring in 2022 (61N Environmental, 2021, 2022a, 2022b, 2022c, Easley-Appleyard and Leonard, 2022). During the 2020 PCT Phase 1 and 2021 PCT Phase 2 construction monitoring, harbor seals were regularly observed in the vicinity of the POA with frequent observations near the mouth of Ship Creek, located approximately 1,500 m southeast of the CTR location. Harbor seals were observed almost daily during 2020 PCT Phase 1 construction, with 54 individuals documented in July, 66 documented in August, and 44 sighted in September (61N Environmental, 2021). During the 2021 PCT Phase 2 construction, harbor seals were observed with the highest numbers of sightings in June (87 individuals) and in September (124 individuals) (61 N Environmental, 2022a). Over the 13 days of SFD construction monitoring in May and June 2022, 27 harbor seals were observed (61N Environmental, 2022b). Seventy-two groups of 75 total harbor seals (3 groups of 2 individuals) were observed during transitional dredging monitoring in 2022 (61N Environmental, 2022c). Sighting rates of harbor seals have been highly variable and may have increased since 2005. It is unknown whether any potential increase was due to local population increases or habituation to ongoing construction activities. It is possible that increased sighting rates are correlated with more intensive monitoring efforts in 2020 and 2021, when the POA used 11 PSOs spread among four monitoring stations.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Not all marine mammal species have equal hearing capabilities (*e.g.,* Richardson *et al.,* 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007, 2019) recommended that marine mammals be divided into hearing groups based on directly measured (behavioral or auditory evoked potential techniques) or estimated hearing ranges (behavioral response data, anatomical modeling, *etc.*). Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.,* low-frequency cetaceans). Subsequently, NMFS (2018, 2024) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained.

On May 3, 2024, NMFS published and solicited public comment on its draft Updated Technical Guidance (89 FR 36762), which includes updated hearing ranges and names for the marine mammal hearing groups and is intended to replace the 2018 Technical Guidance once finalized. The public comment period ended on June 17th, 2024. Because NMFS may finalize the Guidance prior to taking a final agency action on this proposed rulemaking, we considered both the 2018 and 2024 Technical Guidance in our effects and estimated take analysis below. Marine mammal hearing groups and their associated hearing ranges from NMFS (2018) and NMFS (2024) are provided in tables 5 and 6. In the draft Updated

Technical Guidance, mid-frequency cetaceans have been re-classified as high-frequency cetaceans, and high-frequency cetaceans have been updated to very-high-frequency (VHF) cetaceans. Additionally, the draft Updated Technical Guidance includes in-air data for phocid (PA) and otariid (OA) pinnipeds.

TABLE 5—MARINE MAMMAL HEARING GROUPS

[NMFS, 2018]

Hearing group	Generalized hearing range *
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz.
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz.
High-frequency (HF) cetaceans (true porpoises, *Kogia,* river dolphins, Cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*).	275 Hz to 160 kHz.
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz.
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz.

* Represents the generalized hearing range for the entire group as a composite (*i.e.,* all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall *et al.* 2007) and PW pinniped (approximation).

TABLE 6—MARINE MAMMAL HEARING GROUPS

[NMFS 2024]

Hearing group	Generalized hearing range *
Underwater:	
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 36 kHz.
High-frequency (HF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz.
Very High-frequency (VHF) cetaceans (true porpoises, *Kogia,* river dolphins, Cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*).	200 Hz to 165 kHz.
Phocid pinnipeds (PW) (underwater) (true seals)	40 Hz to 90 kHz.
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 68 kHz.
In-air:	
Phocid pinnipeds (PA) (true seals)	42 Hz to 52 kHz.
Otariid pinnipeds (OA) (sea lions and fur seals)	90 Hz to 40 kHz.

* Represents the generalized hearing range for the entire group as a composite (*i.e.,* all species within the group), where individual species' hearing ranges may not be as broad. Generalized hearing range chosen based on ~65 dB threshold from composite audiogram, previous analysis in NMFS 2018, and/or data from Southall et al. 2007; Southall et al. 2019. Additionally, animals are able to detect very loud sounds above and below that "generalized" hearing range

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018, 2024) for a review of available information.

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

This section provides a discussion of the ways in which components of the specified activity may impact marine mammals and their habitat. The Estimated Take of Marine Mammals section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The Negligible Impact Analysis and Determination section considers the content of this section, the Estimated Take of Marine Mammals section, and the Proposed Mitigation section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and whether those impacts are reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

Acoustic effects on marine mammals during the specified activities are expected to potentially occur from vibratory pile installation and removal and impact pile installation. The effects of underwater noise from the POA's proposed activities have the potential to result in Level B harassment of marine mammals in the project area and, for some species as a result of certain activities, Level A harassment.

Background on Sound

This section contains a brief technical background on sound, on the characteristics of certain sound types and on metrics used relevant to the specified activity and to a discussion of the potential effects of the specified activities on marine mammals found later in this document. For general information on sound and its interaction with the marine environment, please see: Erbe and Thomas (2022); Au and Hastings (2008); Richardson *et al.* (1995); Urick (1983); as well as the Discovery of Sound in the Sea website at *https://dosits.org/.*

Sound is a vibration that travels as an acoustic wave through a medium such as a gas, liquid or solid. Sound waves alternately compress and decompress the medium as the wave travels. In water, sound waves radiate in a manner similar to ripples on the surface of a pond and may be either directed in a beam (narrow beam or directional sources) or sound may radiate in all directions (omnidirectional sources), as is the case for sound produced by the construction activities considered here. The compressions and decompressions associated with sound waves are detected as changes in pressure by marine mammals and human-made sound receptors such as hydrophones.

Sound travels more efficiently in water than almost any other form of energy, making the use of sound as a primary sensory modality ideal for inhabitants of the aquatic environment. In seawater, sound travels at roughly 1,500 meters per second (m/s). In air, sound waves travel much more slowly at about 340 m/s. However, the speed of sound in water can vary by a small amount based on characteristics of the transmission medium such as temperature and salinity.

The basic characteristics of a sound wave 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 or corresponding points of a sound wave (length of one cycle). Higher frequency sounds have shorter wavelengths than lower frequency sounds, and typically attenuate (decrease) more rapidly with distance. The amplitude of a sound pressure wave is related to the subjective ''loudness'' of a sound and is typically expressed in dB, which are a relative unit of measurement that is used to express the ratio of one value of a power or pressure to another. A sound pressure level (SPL) in dB is described as the ratio between a measured pressure and a reference pressure, and is a logarithmic unit that accounts for large variations in amplitude; therefore, a relatively small change in dB corresponds to large changes in sound pressure. For example, a 10-dB increase is a ten-fold increase in acoustic power. A 20-dB increase is then a 100-fold increase in power and a 30-dB increase is a 1,000-fold increase in power. However, a ten-fold increase in acoustic power does not mean that the sound is perceived as being 10 times louder due to the anatomy of mammalian ears. A 10-dB increase in sound is perceived as a doubling of loudness to the human ear, and marine mammal studies of loudness perception are ongoing (Houser *et al.* 2017).

The dB is a relative unit comparing two pressures; therefore, a reference pressure must always be indicated. For underwater sound, this is 1 microPascal (μPa). For in-air sound, the reference pressure is 20 microPascal (μPa). The amplitude of a sound can be presented in various ways; however, NMFS typically considers three metrics: sound exposure level (SEL), root-mean-square (RMS) SPL, and peak SPL (defined below). The source level represents the SPL referenced at a standard distance from the source, typically 1 m (Richardson *et al.,* 1995; American National Standards Institute (ANSI, 2013), while the received level is the SPL at the receiver's position. For pile driving activities, the SPL is typically referenced at 10 m.

SEL (represented as dB referenced to 1 micropascal squared second (re 1 μPa^2-s)) represents the total energy in a stated frequency band over a stated time interval or event, and considers both intensity and duration of exposure. The per-pulse SEL (*e.g.,* single strike or single shot SEL) is calculated over the time window containing the entire pulse (*i.e.,* 100 percent of the acoustic energy). SEL can also be a cumulative metric; it can be accumulated over a single pulse (for pile driving this is the same as single-strike SEL, above; SEL_{ss}), or calculated over periods containing multiple pulses (SEL_{cum}). Cumulative SEL (SEL_{cum}) represents the total energy accumulated by a receiver over a defined time window or during an event. The SEL metric is useful because it allows sound exposures of different durations to be related to one another in terms of total acoustic energy. The duration of a sound event and the number of pulses, however, should be specified as there is no accepted standard duration over which the summation of energy is measured.

RMS SPL is equal to 10 times the logarithm (base 10) of the ratio of the mean-square sound pressure to the specified reference value, and given in units of dB (International Organization for Standardization (ISO), 2017). 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 SPL. For impulsive sounds, RMS is calculated by the portion of the waveform containing 90 percent of the sound energy from the impulsive event (Madsen, 2005).

Peak SPL (also referred to as zero-to-peak sound pressure or 0-pk) is the maximum instantaneous sound pressure measurable in the water, which can arise from a positive or negative sound pressure, during a specified time, for a specific frequency range at a specified distance from the source, and is represented in the same units as the RMS sound pressure (ISO, 2017). Along with SEL, this metric is used in evaluating the potential for permanent threshold shift (PTS) and temporary threshold shift (TTS) associated with impulsive sound sources.

Sounds are also characterized by their temporal components. Continuous sounds are those whose sound pressure level remains above that of the ambient or background sound with negligibly small fluctuations in level (ANSI, 2005) while intermittent sounds are defined as sounds with interrupted levels of low or no sound (National Institute for Occupational Safety and Health (NIOSH), 1998). A key distinction between continuous and intermittent sound sources is that intermittent sounds have a more regular (predictable) pattern of bursts of sounds and silent periods (*i.e.,* duty cycle), which continuous sounds do not.

Sounds may be either impulsive or non-impulsive (defined below). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to noise-induced hearing loss (*e.g.,* Ward, 1997 in Southall *et al.,* 2007). Please see NMFS (2018) and Southall *et al.* (2007, 2019) for an in-depth discussion of these concepts.

Impulsive sound sources (*e.g.,* explosions, gunshots, sonic booms, seismic airgun shots, impact pile driving) produce signals that are brief (typically considered to be less than 1 second), broadband, atonal transients (ANSI, 1986, 2005; NIOSH, 1998) and occur either as isolated events or repeated in some succession. Impulsive 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. Impulsive sounds are intermittent in nature. The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

Non-impulsive sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or non-continuous (*i.e.,* intermittent) (ANSI, 1995; NIOSH, 1998). Some of these non-impulsive sounds can be transient signals of short duration but without the essential properties of impulses (*e.g.,* rapid rise time). Examples of non-impulsive sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems.

Even in the absence of sound from the specified activity, the underwater environment is characterized by sounds from both natural and anthropogenic sound sources. Ambient sound is defined as a composite of naturally-occurring (*i.e.,* non-anthropogenic) sound from many sources both near and far (ANSI, 1995). Background sound is similar but includes all sounds, including anthropogenic sounds minus the sound produced by the proposed activities (NMFS, 2012, 2016a). 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.,* wind and waves, earthquakes, ice, atmospheric sound), biological (*e.g.,* sounds produced by marine mammals, fish, and invertebrates), and anthropogenic (*e.g.,* vessels, dredging, construction) sound. A number of sources contribute to background and ambient sound, including wind and waves, which are a main source of naturally occurring ambient sound for frequencies between 200 Hz and 50 kilohertz (kHz) (Mitson, 1995). In general, background and ambient sound levels tend to increase with increasing wind speed and wave height. Precipitation can become an important component of total sound at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times. Marine mammals can contribute significantly to background and ambient sound levels, as can some fish and snapping shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz. Sources of background sound related to human activity include transportation (surface vessels), dredging and construction, oil and gas drilling and production, geophysical surveys, sonar, and explosions. Vessel noise typically dominates the total background sound for frequencies between 20 and 300 Hz. In general, the frequencies of many anthropogenic sounds, particularly those produced by construction activities, are below 1 kHz (Richardson *et al.,* 1995). When sounds at frequencies greater than 1 kHz are produced, they generally attenuate relatively rapidly (Richardson *et al.,* 1995), particularly above 20 kHz due to propagation losses and absorption (Urick, 1983).

Transmission loss (*TL*) defines the degree to which underwater sound has spread in space and lost energy after having moved through the environment and reached a receiver. It is defined by the ISO as the reduction in a specified level between two specified points that are within an underwater acoustic field (ISO, 2017). Careful consideration of transmission loss and appropriate propagation modeling is a crucial step in determining the impacts of underwater sound, as it helps to define the ranges (isopleths) to which impacts are expected and depends significantly on local environmental parameters such as seabed type, water depth (bathymetry), and the local speed of sound. Geometric spreading laws are powerful tools which provide a simple means of estimating *TL,* based on the shape of the sound wave front in the water column. For a sound source that is equally loud in all directions and in deep water, the sound field takes the form of a sphere, as the sound extends in every direction uniformly. In this case, the intensity of the sound is spread across the surface of the sphere, and thus we can relate intensity loss to the square of the range (as area = $4*pi*r^2$). This can be expressed logarithmically, where $TL = 20*Log_{10}(range)$. This situation is known as spherical spreading. In shallow water, the sea surface and seafloor will bound the shape of the sound wave, leading to a more cylindrical shape, as the top and bottom of the sphere is truncated by the largely reflective boundaries. This situation is termed cylindrical spreading, and is given by $TL = 10*Log_{10}(range)$ (Urick, 1983). An intermediate scenario may be defined by the equation $TL = 15*Log_{10}(range)$, and is referred to as practical spreading. Though these geometric spreading scenarios do not capture many often important details (scattering, absorption, *etc.*), they offer a reasonable and simple approximation of how sound decreases in intensity as it is transmitted. In the absence of measured data indicating the level of transmission loss at a given site for a specific activity, NMFS recommends practical spreading (*i.e.,* $TL = 15*Log_{10}(range)$) to model acoustic propagation for construction activities in most nearshore environments.

The sum of the various natural and anthropogenic sound sources at any given location and time depends not only on the source levels, but also on the propagation of sound through the environment. 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, background and 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 to 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.

Background underwater noise levels in the CTR Project area are both variable and relatively high, primarily because of extreme tidal activity, elevated sediment loads in the water column, periodic high winds, the seasonal presence of ice, and anthropogenic activities. Sources of anthropogenic noise in the CTR Project area consist of dredging operations, boats, ships, oil and gas operations, construction noise, and aircraft overflights from JBER and Ted Stevens International Airport, all of which contribute to high underwater noise levels in upper Cook Inlet (*e.g.,* Blackwell and Greene, 2002; (Knik Arm Bridge and Toll Authority (KABATA), 2011; Castellote *et al.,* 2018).

Background sound levels were measured at the POA during the PAMP 2016 Test Pile Program (TPP) in the absence of pile driving at two locations during a 3-day break in pile installation. Median background noise levels, measured at a location just offshore of the POA SFD and at a second location about 1 km offshore, were 117 and 122.2 dB RMS, respectively (Austin *et al.,* 2016). NMFS considers the median sound levels to be most appropriate when considering background noise levels for purposes of evaluating the potential impacts of the proposed project on marine mammals (NMFS, 2012). By using the median value, which is the 50th percentile of the measurements, for background noise levels, one will be able to eliminate the few transient loud identifiable events that do not represent the true ambient condition of the area. This is relevant because during 2 of the 4 days (50 percent) when background measurement data were being collected, the USACE was dredging Terminal 3 (located just north of the Ambient-Offshore hydrophone) for 24 hours per day with two 1-hour breaks for crew change. On the last 2 days of data collection, no dredging occurred. Therefore, the median provides a better representation of background noise levels when the CTR project would be occurring. During the measurements, some typical sound signals were noted, such as noise from current flow and the passage of vessels.

With regard to spatial considerations of the measurements, the offshore location is most applicable to assessing background sound during the CTR project (NMFS, 2012). The median background noise level measured at the offshore hydrophone was 122.2 dB RMS. The measurement location closer to the POA was quieter, with a median of 117 dB; however, that hydrophone was placed very close to a dock. During PCT acoustic monitoring, noise levels in Knik Arm absent pile driving were also collected (Illingworth & Rodkin (I&R), 2021a, 2022b)); however, the PCT IHAs did not require background noise measurements to be collected in adherence with NMFS (2012) methodological recommendations. Despite this, the noise levels measured during the PCT project were not significantly different from 122.2 dB (I&R, 2021a, 2022b). If additional background data are collected in the future in this region, NMFS may re-evaluate the data to appropriately characterize background sound levels in Knik Arm.

Description of Sound Sources for the Specified Activities

In-water construction activities associated with the project that have the potential to incidentally take marine mammals through exposure to sound would include impact pile installation and vibratory pile installation and removal. Impact hammers typically operate by repeatedly dropping and/or pushing a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is impulsive, characterized by rapid rise times and high peak levels, a potentially injurious combination (Hastings and Popper, 2005). Vibratory hammers install piles by vibrating them and allowing the weight of the hammer to push them into the sediment. Vibratory hammers typically produce less sound (*i.e.,* lower levels) than impact hammers. Peak SPLs may be 180 dB or greater but are generally 10 to 20 dB lower than SPLs generated during impact pile driving of the same-sized pile (Oestman *et al.,* 2009; California Department of Transportation (CALTRANS), 2015, 2020). Sounds produced by vibratory hammers are non-impulsive; the rise time is slower, reducing the probability and severity of injury, and the sound energy is distributed over a greater amount of time (Nedwell and Edwards, 2002; Carlson *et al.,* 2005).

The likely or possible impacts of the POA's proposed activities 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; however, given there are no known pinniped haul-out sites in the vicinity of the CTR project site, visual and other non-acoustic stressors would be limited, and any impacts to marine mammals are expected to primarily be acoustic in nature.

Acoustic Impacts

The introduction of anthropogenic noise into the aquatic environment from pile driving is the primary means by which marine mammals may be harassed from the POA's specified activity. In general, animals exposed to natural or anthropogenic sound may experience physical and psychological effects, ranging in magnitude from none to severe (Southall *et al.,* 2007, 2019). Exposure to pile driving noise has the potential to result in auditory threshold shifts and behavioral reactions (*e.g.,* avoidance, temporary cessation of foraging and vocalizing, changes in dive behavior). Exposure to anthropogenic noise can also lead to non-observable physiological responses, such as an increase in stress hormones. Additional noise in a marine mammal's habitat can mask acoustic cues used by marine mammals to carry out daily functions, such as communication and predator and prey detection. The effects of pile driving noise on marine mammals are dependent on several factors, including, but not limited to, sound type (*e.g.,* impulsive vs. non-impulsive), the species, age and sex class (*e.g.,* adult male vs. mom with calf), duration of exposure, the distance between the pile and the animal, received levels, behavior at time of exposure, and previous history with exposure (Wartzok *et al.,* 2004; Southall *et al.,* 2007). Here, we discuss physical auditory effects (threshold shifts) followed by behavioral effects and potential impacts on habitat.

NMFS defines a noise-induced threshold shift (TS) as a change, usually an increase, in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2018). The amount of threshold shift is customarily expressed in dB. A TS can be permanent or temporary. As described in NMFS (2018, 2024) there are numerous factors to consider when examining the consequence of TS, including, but not limited to, the signal temporal pattern (*e.g.,* impulsive or non-impulsive), likelihood an individual would be exposed for a long enough duration or to a high enough level to induce a TS, the magnitude of the TS, time to recovery (seconds to minutes or hours to days), the frequency range of the exposure (*i.e.,* spectral content), the hearing frequency range of the exposed species relative to the signal's frequency spectrum (*i.e.,* how animal uses sound within the frequency band of the signal; *e.g.,* Kastelein *et al.,* 2014), and the overlap between the animal and the source (*e.g.,* spatial, temporal, and spectral).

Auditory Injury and Permanent Threshold Shift (PTS). NMFS defines auditory injury as ''damage to the inner ear that can result in destruction of tissue . . . which may or may not result in PTS'' (NMFS, 2024). NMFS defines PTS as a permanent, irreversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2024). PTS does not generally affect more than a limited frequency range, and an animal that has incurred PTS has incurred some level of hearing loss at the relevant frequencies; typically, animals with PTS are not functionally deaf (Au and Hastings, 2008; Finneran, 2016). Available data from humans and other terrestrial mammals indicate that a 40–dB threshold shift approximates PTS onset (see Ward *et al.,* 1958, 1959, 1960; Kryter *et al.,* 1966; Miller, 1974; Ahroon *et al.,* 1996; Henderson *et al.,* 2008). PTS levels for marine mammals are estimates, as with the exception of a single study unintentionally inducing PTS in a harbor seal (Kastak *et al.,* 2008), there are no empirical data measuring PTS in marine mammals largely due to the fact that, for various ethical reasons, experiments involving anthropogenic noise exposure at levels inducing PTS are not typically pursued or authorized (NMFS, 2018).

Temporary Threshold Shift (TTS). A temporary, reversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2018). Based on data from marine mammal TTS measurements (see Southall *et al.,* 2007, 2019), a TTS of 6 dB is considered the minimum threshold shift clearly larger than any day-to-day or session-to-session variation in a subject's normal hearing ability (Finneran *et al.,* 2000, 2002; Schlundt *et al.,* 2000). As described in Finneran (2015), marine mammal studies have shown the amount of TTS increases with SEL_{cum} in an accelerating fashion: at low exposures with lower SEL_{cum}, the amount of TTS is typically small and the growth curves have shallow slopes. At exposures with higher SEL_{cum}, the growth curves become steeper and approach linear relationships with the noise SEL.

Depending on the degree (elevation of threshold in dB), duration (*i.e.,* recovery time), and frequency range of TTS, and the context in which it is experienced, TTS can have effects on marine mammals ranging from discountable to serious (similar to those discussed in auditory masking, below). For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that takes place during a time when the animal is traveling through the open ocean, where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during time when communication is critical for successful mother/calf interactions could have more serious impacts. We note that reduced hearing sensitivity as a simple function of aging has been observed in marine mammals, as well as humans and other taxa (Southall *et al.,* 2007), so we can infer that strategies exist for coping with this condition to some degree, though likely not without cost.

Many studies have examined noise-induced hearing loss in marine mammals (see Finneran (2015) and Southall *et al.* (2019) for summaries). TTS is the mildest form of hearing impairment that can occur during exposure to sound (Kryter, 2013). While experiencing TTS, the hearing threshold rises, and a sound must be at a higher level in order to be heard. In terrestrial and marine mammals, TTS can last from minutes or hours to days (in cases of strong TTS). In many cases, hearing sensitivity recovers rapidly after exposure to the sound ends. For cetaceans, published data on the onset of TTS are limited to captive bottlenose dolphin (*Tursiops truncatus*), beluga whale, harbor porpoise, and Yangtze finless porpoise (*Neophocoena asiaeorientalis*) (Southall *et al.,* 2019). For pinnipeds in water, measurements of TTS are limited to harbor seals, elephant seals (*Mirounga angustirostris*), bearded seals (*Erignathus barbatus*) and California sea lions (*Zalophus californianus*) (Kastak *et al.,* 1999, 2007; Kastelein *et al.,* 2019b, 2019c, 2021, 2022a, 2022b; Reichmuth *et al.,* 2019; Sills *et al.,* 2020). TTS was not observed in spotted (*Phoca largha*) and ringed (*Pusa hispida*) seals exposed to single airgun impulse sounds at levels matching previous predictions of TTS onset (Reichmuth *et al.,* 2016). These studies examine hearing thresholds measured in marine mammals before and after exposure to intense or long-duration sound exposures. The difference between the pre-exposure and post-exposure thresholds can be used to determine the amount of threshold shift at various post-exposure times.

The amount and onset of TTS depends on the exposure frequency. Sounds at low frequencies, well below the region of best sensitivity for a species or hearing group, are less hazardous than those at higher frequencies, near the region of best sensitivity (Finneran and Schlundt, 2013). At low frequencies, onset-TTS exposure levels are higher compared to those in the region of best sensitivity (*i.e.,* a low frequency noise would need to be louder to cause TTS onset when TTS exposure level is higher), as shown for harbor porpoises and harbor seals (Kastelein *et al.,* 2019a, 2019c). Note that in general, harbor seals and harbor porpoises have a lower TTS onset than other measured pinniped or cetacean species (Finneran, 2015). In addition, TTS can accumulate across multiple exposures, but the resulting TTS will be less than the TTS from a single, continuous exposure with the same SEL (Mooney *et al.,* 2009; Finneran *et al.,* 2010; Kastelein *et al.,* 2014, 2015). This means that TTS predictions based on the total, cumulative SEL will overestimate the amount of TTS from intermittent exposures, such as sonars and impulsive sources. Nachtigall *et al.* (2018) describe measurements of hearing sensitivity of multiple odontocete species (bottlenose dolphin, harbor porpoise, beluga, and false killer whale (*Pseudorca crassidens*)) when a relatively loud sound was preceded by a warning sound. These captive animals were shown to reduce hearing sensitivity when warned of an impending intense sound. Based on these experimental observations of captive animals, the authors suggest that wild animals may dampen their hearing during prolonged exposures or if conditioned to anticipate intense sounds. Another study showed that echolocating animals (including odontocetes) might have anatomical specializations that might allow for conditioned hearing reduction and filtering of low-frequency ambient noise, including increased stiffness and control of middle ear structures and placement of inner ear structures (Ketten *et al.,* 2021). Data available on noise-induced hearing loss for mysticetes are currently lacking (NMFS, 2018). Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species.

Relationships between TTS and PTS thresholds have not been studied in marine mammals, and there is no PTS data for cetaceans. However, such relationships are assumed to be similar to those in humans and other terrestrial mammals. PTS typically occurs at exposure levels at least several dB above that inducing mild TTS (*e.g.,* a 40-dB threshold shift approximates PTS onset (Kryter *et al.,* 1966; Miller, 1974), while a 6-dB threshold shift approximates TTS onset (Southall *et al.,* 2007, 2019). Based on data from terrestrial mammals, a precautionary assumption is that the PTS thresholds for impulsive sounds (such as impact pile driving pulses as received close to the source) are at least 6 dB higher than the TTS threshold on a peak-pressure basis, and PTS cumulative sound exposure level thresholds are 15 to 20 dB higher than TTS cumulative sound exposure level thresholds (Southall *et al.,* 2007, 2019). Given the higher level of sound or longer exposure duration necessary to cause PTS as compared with TTS, it is considerably less likely that PTS could occur.

Behavioral Harassment. Exposure to noise also has the potential to behaviorally disturb marine mammals to a level that rises to the definition of harassment under the MMPA. Generally speaking, NMFS considers a behavioral disturbance that rises to the level of harassment under the MMPA a non-minor response—in other words, not every response qualifies as behavioral disturbance, and for responses that do, those of a higher level, or accrued across a longer duration, have the potential to affect foraging, reproduction, or survival. Behavioral disturbance may include a variety of effects, including subtle changes in behavior (*e.g.,* minor or brief avoidance of an area or changes in vocalizations), more conspicuous changes in similar behavioral activities, and more sustained and/or potentially severe reactions, such as displacement from or abandonment of high-quality habitat. Behavioral responses may include changing durations of surfacing and dives; changing direction and/or speed; reducing/increasing vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); eliciting a visible startle response or aggressive behavior (such as tail/fin slapping or jaw clapping); avoidance of areas where sound sources are located. Pinnipeds may increase their haul out time, possibly to avoid in-water disturbance (Thorson and Reyff, 2006).

Behavioral responses to sound are highly variable and context-specific and any reactions depend on numerous intrinsic and extrinsic factors (*e.g.,* species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day), as well as the interplay between factors (*e.g.,* Richardson *et al.,* 1995; Wartzok *et al.,* 2004; Southall *et al.,* 2007, 2019; Weilgart, 2007; Archer *et al.,* 2010, Erbe *et al.,* 2019). Behavioral reactions can vary not only among individuals but also within an individual, depending on previous experience with a sound source, context, and numerous other factors (Ellison *et al.,* 2012), and can vary depending on characteristics associated with the sound source (*e.g.,* whether it is moving or stationary, number of sources, distance from the source). In general, pinnipeds seem more tolerant of, or at least habituate more quickly to, potentially disturbing underwater sound than do cetaceans and generally seem to be less responsive to exposure to industrial sound than most cetaceans. Please see appendices B and C of Southall *et al.* (2007) and Gomez *et al.* (2016) for reviews of studies involving marine mammal behavioral responses to sound.

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.,* 2004). Animals are most likely to habituate to sounds that are predictable and unvarying. It is important to note that habituation is appropriately considered as a ''progressive reduction in response to stimuli that are perceived as neither aversive nor beneficial,'' rather than as, more generally, moderation in response to human disturbance (Bejder *et al.,* 2009). 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.

As noted above, behavioral state may affect the type of response. 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; Wartzok *et al.,* 2004; National Research Council (NRC), 2005). Controlled experiments with captive marine mammals have 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 (*e.g.,* seismic airguns) have been varied but often consist of avoidance behavior or other behavioral changes (Richardson *et al.,* 1995; Morton and Symonds, 2002; Nowacek *et al.,* 2007).

Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal (*e.g.,* Erbe *et al.,* 2019). If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the stock or population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (*e.g.,* Lusseau and Bejder, 2007; Weilgart, 2007; NRC, 2005). However, there are broad categories of potential response, which we describe in greater detail here, that include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight.

Changes in dive behavior can vary widely and may consist of increased or decreased dive times and surface intervals as well as changes in the rates of ascent and descent during a dive (*e.g.,* Frankel and Clark, 2000; Costa *et al.,* 2003; Ng and Leung, 2003; Nowacek *et al.,* 2004; Goldbogen *et al.,* 2013a, 2013b, Blair *et al.,* 2016). Variations in dive behavior may reflect interruptions in biologically significant activities (*e.g.,* foraging) or they may be of little biological significance. The impact of an alteration to dive behavior resulting from an acoustic exposure depends on what the animal is doing at the time of the exposure and the type and magnitude of the response.

Disruption of feeding behavior can be difficult to correlate with anthropogenic sound exposure, so it is usually inferred by observed displacement from known foraging areas, the appearance of secondary indicators (*e.g.,* bubble nets or sediment plumes) or changes in dive behavior. However, acoustic and movement bio-logging tools have been used in some cases, to infer responses of feeding to anthropogenic noise. For example, Blair *et al.* (2016) reported significant effects on humpback whale foraging behavior in Stellwagen Bank in response to ship noise including slower descent rates, and fewer side-rolling events per dive with increasing ship nose. In addition, Wisniewska *et al.* (2018) reported that tagged harbor porpoises demonstrated fewer prey capture attempts when encountering occasional high-noise levels resulting from vessel noise as well as more vigorous fluking, interrupted foraging, and cessation of echolocation signals observed in response to some high-noise vessel passes.

In response to playbacks of vibratory pile driving sounds, captive bottlenose dolphins showed changes in target detection and number of clicks used for a trained echolocation task (Branstetter *et al.* 2018). Similarly, harbor porpoises trained to collect fish during playback of impact pile driving sounds also showed potential changes in behavior and task success, though individual differences were prevalent (Kastelein *et al.* 2019d). As for other types of behavioral response, the frequency, duration, and temporal pattern of signal presentation, as well as differences in species sensitivity, are likely contributing factors to differences in response in any given circumstance (*e.g.,* Croll *et al.,* 2001; Nowacek *et al.,* 2004; Madsen *et al.,* 2006; Yazvenko *et al.,* 2007). A determination of whether foraging disruptions incur fitness consequences would require information on or estimates of the energetic requirements of the affected individuals and the relationships among prey availability, foraging effort and success, and the life history stage(s) of the animal.

Variations in respiration naturally vary with different behaviors and alterations to breathing rate as a function of acoustic exposure can be expected to co-occur with other behavioral reactions, such as a flight response or an alteration in diving. However, respiration rates in and of themselves may be representative of annoyance or an acute stress response. Various studies have shown that respiration rates may either be unaffected or could increase, depending on the species and signal characteristics, again highlighting the importance in understanding species differences in the tolerance of underwater noise when determining the potential for impacts resulting from anthropogenic sound exposure (*e.g.,* Kastelein *et al.,* 2001, 2005, 2006; Gailey *et al.,* 2007). For example, harbor porpoise' respiration rate increased in response to pile driving sounds at and above a received broadband SPL of 136 dB (zero-peak SPL: 151 dB re 1 µPa; SEL of a single strike: 127 dB re 1 μPa^2-s) (Kastelein *et al.,* 2013).

Avoidance is the displacement of an individual from an area or migration path as a result of the presence of a sound or other stressors, and is one of the most obvious manifestations of disturbance in marine mammals (Richardson *et al.,* 1995). For example, gray whales are known to change direction—deflecting from customary migratory paths—in order to avoid noise from seismic surveys (Malme *et al.,* 1984). In response to construction noise from offshore wind farms, harbor porpoises and harbor seals have demonstrated avoidance on the scale of hours to weeks (Brandt et al., 2018; Russell et al., 2016). Avoidance may be short-term, with animals returning to the area once the noise has ceased (*e.g.,* Bowles *et al.,* 1994; Goold, 1996; Stone et al., 2000; Morton and Symonds, 2002; Gailey *et al.,* 2007). Longer-term displacement is possible, however, which may lead to changes in abundance or distribution patterns of the affected species in the affected region if habituation to the presence of the sound does not occur (*e.g.,* Blackwell *et al.,* 2004; Bejder *et al.,* 2006; Teilmann *et al.,* 2006).

A flight response is a dramatic change in normal movement to a directed and rapid movement away from the perceived location of a sound source. The flight response differs from other avoidance responses in the intensity of the response (*e.g.,* directed movement, rate of travel). Relatively little information on flight responses of marine mammals to anthropogenic signals exist, although observations of flight responses to the presence of predators have occurred (Connor and Heithaus, 1996; Bowers *et al.,* 2018). The result of a flight response could range from brief, temporary exertion and displacement from the area where the signal provokes flight to, in extreme cases, marine mammal strandings (England *et al.,* 2001). However, it should be noted that response to a perceived predator does not necessarily invoke flight (Ford and Reeves, 2008), and whether individuals are solitary or in groups may influence the response.

Behavioral disturbance can also impact marine mammals in more subtle ways. Increased vigilance may result in costs related to diversion of focus and attention (*i.e.,* when a response consists of increased vigilance, it may come at the cost of decreased attention to other critical behaviors such as foraging or resting). These effects have generally not been demonstrated for marine mammals, but studies involving fishes and terrestrial animals have shown that increased vigilance may substantially reduce feeding rates (*e.g.,* Beauchamp and Livoreil, 1997; Fritz *et al.,* 2002; Purser and Radford, 2011). In addition, chronic disturbance can cause population declines through reduction of fitness (*e.g.,* decline in body condition) and subsequent reduction in reproductive success, survival, or both (*e.g.,* Harrington and Veitch, 1992; Daan *et al.,* 1996; Bradshaw *et al.,* 1998). However, Ridgway *et al.* (2006) reported that increased vigilance in bottlenose dolphins exposed to sound over a 5-day period did not cause any sleep deprivation or stress effects.

Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (24-hour cycle). Disruption of such functions resulting from reactions to stressors such as sound exposure are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall *et al.,* 2007). Consequently, a behavioral response lasting less than 1 day and not recurring on subsequent days is not considered particularly severe unless it could directly affect reproduction or survival (Southall *et al.,* 2007). Note that there is a difference between multi-day substantive (*i.e.,* meaningful) behavioral reactions and multi-day anthropogenic activities. For example, just because an activity lasts for multiple days does not necessarily mean that individual animals are either exposed to activity-related stressors for multiple days or, further, exposed in a manner resulting in sustained multi-day substantive behavioral responses.

Behavioral Reactions Observed at the POA. Specific to recent construction at the POA, behavioral reactions to pile driving have not been reported in non-CIBW species. During POA's PCT construction, 81 harbor seals were observed within estimated Level B harassment zones associated with vibratory and impact installation and removal of 36-in (61-cm) and 144-in (366-cm) piles, and 5 harbor seals were observed within estimated Level A harassment zones during the installation of 144-in (366-cm) piles. No observable behavioral reactions were observed in any of these seals (61N Environmental, 2021, 2022a). One harbor porpoise was observed within the estimated Level B harassment zone during vibratory driving of a 36-in (61-cm) pile in May 2021. The animal was traveling at a moderate pace. No observable reactions to pile driving were noted by the PSOs. Another harbor porpoise near the border of (and may have been within) the estimated Level B harassment zone during the impact installation of 36-in (61-cm) piles in June 2021, but PSOs did not record any behavioral responses of this individual to the pile driving activities. Similarly 13 harbor seals observed within estimated Level B harassment zones associated with pile driving 36-in (61-cm) piles during POA's SFD construction did not exhibit observable behavioral reactions (61N Environmental, 2022b).

Specific to CIBWs, several years of marine mammal monitoring data demonstrate behavioral responses to pile driving at the POA. Previous pile driving activities at the POA include the installation and removal of sheet piles, the vibratory and impact installation of 24-in (61-cm), 36-in (91-cm), 48-in (122-cm), and 144-in (366-cm) pipe piles, and the vibratory installation of 72-in (182-cm) air bubble casings.

Kendall and Cornick (2015) provide a comprehensive overview of 4 years of scientific marine mammal monitoring conducted before (2005–2006) and during the POA's MTRP (2008–2009). These were observations made by biologists at Alaska Pacific University, funded by the POA and other groups but independent of the POA's required monitoring for pile driving activities (*i.e.,* not construction based PSOs). The authors investigated CIBW behavior before and during pile driving activity at the POA. Sighting rates, mean sighting duration, behavior, mean group size, group composition, and group formation were compared between the two periods. A total of about 2,329 hours of sampling effort was completed across 349 days from 2005 to 2009. Overall, 687 whales in 177 groups were documented during the 69 days that whales were sighted. A total of 353 and 1,663 hours of pile driving took place in 2008 and 2009, respectively. There was no relationship between monthly CIBW sighting rates and monthly pile driving rates ($r = 0.19$, $p = 0.37$). Sighting rates before ($n = 12$; 0.06 ± 0.01) and during ($n = 13$; 0.01 ± 0.03) pile driving were not significantly different. However, sighting duration of CIBWs decreased significantly during pile driving (39 ± 6 min before and 18 ± 3 min during). There were also significant differences in behavior before versus during pile driving. CIBWs primarily traveled through the study area both before and during pile driving; however, traveling increased relative to other behaviors during pile driving. Documentation of milling was observed on 21 occasions during pile driving. Mean group size decreased during pile driving; however, this difference was not statistically significant. In addition, group composition was significantly different before and during pile driving, with more white (*i.e.,* likely older) animals being present during pile driving (Kendall and Cornick, 2015). CIBWs were primarily observed densely packed before and during pile driving; however, the number of densely packed groups increased by approximately 67 percent during pile driving. There were also significant increases in the number of dispersed groups (approximately 81 percent) and lone white whales (approximately 60 percent) present during pile driving than before pile driving (Kendall and Cornick, 2015).

During PCT and SFD construction monitoring, behaviors of CIBWs groups were compared by month and by construction activity (61N Environmental, 2021, 2022a, 2022b). Little variability was evident in the behaviors recorded from month to month or among sightings that coincided with in-water pile installation and removal and those that did not (61N Environmental, 2021, 2022a). Definitive behavioral reactions to in-water pile driving or avoidance behaviors were not documented; however, potential reactions (where a group reversed its trajectory shortly after the start of in-water pile driving occurred; a group reversed its trajectory as it got closer to the sound source during active in-water pile driving; or upon an initial sighting, a group was already moving away from in-water pile driving, raising the possibility that it had been moving towards, but was only sighted after they turned away) and instances where CIBWs moved toward active in-water pile driving were recorded. During these instances, impact driving appeared to cause potential behavioral reactions more readily than vibratory hammering (61N Environmental, 2021, 2022a, 2022b). One minor difference documented during PCT construction was a slightly higher incidence of milling behavior and diving during the periods of no pile driving and slightly higher rates of traveling behavior during periods when potential CIBW behavioral reactions to pile driving, as described above, were recorded (61N Environmental, 2021, 2022a). Note, narratives of each CIBW reaction can be found in the appendices of the POA's final monitoring reports (61N Environmental, 2021, 2022a, 2022b).

Acoustically, Saxon-Kendall *et al.* (2013) recorded echolocation clicks (which can be indicative of feeding behavior) during the MTR Project at the POA both while pile driving was occurring and when it was not. This indicates that while feeding is not a predominant behavior that PSOs visually observed in CIBWs sighted near the POA (61N Environmental, 2021, 2022a, 2022b, 2022c; Easley-Appleyard and Leonard, 2022) CIBWs can and still exhibit feeding behaviors during pile driving activities. In addition, Castellote *et al.* (2020) found low echolocation detection rates in lower Knik Arm (*i.e.,* Six Mile, Port MacKenzie, and Cairn Point) and suggested that CIBWs moved through that area relatively quickly when entering or exiting the Arm. No whistles or noisy vocalizations were recorded during the MTRP construction activities; however, it is possible that persistent noise associated with construction activity at the MTR project masked beluga vocalizations and or that CIBWs did not use these communicative signals when they were near the MTR Project (Saxon-Kendall *et al.,* 2013).

Recently, McHuron *et al.* (2023) developed a model to predict general patterns related to the movement and foraging decisions of pregnant CIBWs in Cook Inlet. They found that the effects of disturbance from human activities, such as pile driving activities occurring at the POA assuming no mitigation measures, are inextricably linked with prey availability. If prey are abundant during the summer and early fall and prey during winter is above some critical threshold, pregnant CIBWs can likely cope with intermittent disruptions, such as those produced by pile driving at the POA (McHuron *et al.,* 2023). However, they stress that more information needs to be acquired regarding CIBW prey and CIBW body condition, specifically in their critical habitat, to better understand possible behavioral responses to disturbance.

Stress responses. An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (*e.g.,* Selye, 1950; Moberg, 2000). In many cases, an animal's first and sometimes most economical (in terms of energetic costs) response is behavioral avoidance of the potential stressor. Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal's fitness.

Neuroendocrine stress responses often involve the hypothalamus-pituitary-adrenal system. Virtually all neuroendocrine functions that are affected by stress—including immune competence, reproduction, metabolism, and behavior—are regulated by pituitary hormones. Stress-induced changes in the secretion of pituitary hormones have been implicated in failed reproduction, altered metabolism, reduced immune competence, and behavioral disturbance (*e.g.,* Moberg, 1987; Blecha, 2000). Increases in the circulation of glucocorticoids are also equated with stress (Romano *et al.,* 2004).

The primary distinction between stress (which is adaptive and does not normally place an animal at risk) and ''distress'' is the cost of the response. During a stress response, an animal uses glycogen stores that can be quickly replenished once the stress is alleviated. In such circumstances, the cost of the stress response would not pose serious fitness consequences. However, when an animal does not have sufficient energy reserves to satisfy the energetic costs of a stress response, energy resources must be diverted from other functions. This state of distress will last until the animal replenishes its energetic reserves sufficient to restore normal function.

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses are well-studied through controlled experiments and for both laboratory and free-ranging animals (*e.g.,* Holberton *et al.,* 1996; Hood *et al.,* 1998; Jessop *et al.,* 2003; Krausman *et al.,* 2004; Lankford *et al.,* 2005). Stress responses due to exposure to anthropogenic sounds or other stressors and their effects on marine mammals have also been reviewed (Fair and Becker, 2000; Romano *et al.,* 2002b) and, more rarely, studied in wild populations (*e.g.,* Romano *et al.,* 2002a). For example, Rolland *et al.* (2012) found that noise reduction from reduced ship traffic in the Bay of Fundy was associated with decreased stress in North Atlantic right whales. In addition, Lemos *et al.* (2022) observed a correlation between higher levels of fecal glucocorticoid metabolite concentrations (indicative of a stress response) and vessel traffic in gray whales. These and other studies lead to a reasonable expectation that some marine mammals will experience physiological stress responses upon exposure to acoustic stressors and that it is possible that some of these would be classified as ''distress.'' In addition, any animal experiencing TTS would likely also experience stress responses (NRC, 2005), however distress is an unlikely result of this project based on observations of marine mammals during previous, similar construction projects.

Norman (2011) reviewed environmental and anthropogenic stressors for CIBWs. Lyamin *et al.* (2011) determined that the heart rate of a beluga whale increases in response to noise, depending on the frequency and intensity. Acceleration of heart rate in the beluga whale is the first component of the ''acoustic startle response.'' Romano *et al.* (2004) demonstrated that captive beluga whales exposed to high-level impulsive sounds (*i.e.,* seismic airgun and/or single pure tones up to 201 dB RMS) resembling sonar pings showed increased stress hormone levels of norepinephrine, epinephrine, and dopamine when TTS was reached. Thomas *et al.* (1990) exposed beluga whales to playbacks of an oil-drilling platform in operation (''Sedco 708,'' 40 Hz–20 kHz; source level 153 dB). Ambient SPL at ambient conditions in the pool before playbacks was 106 dB and 134 to 137 dB RMS during playbacks at the monitoring hydrophone across the pool. All cell and platelet counts and 21 different blood chemicals, including epinephrine and norepinephrine, were within normal limits throughout baseline and playback periods, and stress response hormone levels did not increase immediately after playbacks. The difference between the Romano *et al.* (2004) and Thomas *et al.* (1990) studies could be the differences in the type of sound (seismic airgun and/or tone versus oil drilling), the intensity and duration of the sound, the individual's response, and the surrounding circumstances of the individual's environment. The construction sounds in the Thomas *et al.* (1990) study would be more similar to those of pile installation than those in the study investigating stress response to water guns and pure tones. Therefore, no more than short-term, low-level hormonal stress responses, if any, of beluga whales or other marine mammals are expected as a result of exposure to in-water pile installation and removal during the CTR project.

Auditory Masking. Since many marine mammals rely on sound to find prey, moderate social interactions, and facilitate mating (Tyack, 2008), noise from anthropogenic sound sources can interfere with these functions but only if the noise spectrum overlaps with the hearing sensitivity of the receiving marine mammal (Southall *et al.,* 2007; Clark *et al.,* 2009; Hatch *et al.,* 2012). Chronic exposure to excessive, though not high-intensity, noise could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions (Clark *et al.,* 2009). Acoustic masking is when other noises such as from human sources interfere with an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (*e.g.,* those used for intraspecific communication and social interactions, prey detection, predator avoidance, navigation) (Richardson *et al.,* 1995; Erbe *et al.,* 2016). 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. The ability of a noise source to mask biologically important sounds depends on the characteristics of both the noise source and the signal of interest (*e.g.,* signal-to-noise ratio, temporal variability, direction), in relation to each other and to an animal's hearing abilities (*e.g.,* sensitivity, frequency range, critical ratios, frequency discrimination, directional discrimination, age or TTS hearing loss), and existing ambient noise and propagation conditions (Hotchkin and Parks, 2013).

Marine mammals vocalize for different purposes and across multiple modes, such as whistling, echolocation click production, calling, and singing. Changes in vocalization behavior in response to anthropogenic noise can occur for any of these modes and may result from a need to compete with an increase in background noise or may reflect increased vigilance or a startle response. For example, in the presence of potentially masking signals, humpback whales and killer whales have been observed to increase the length of their songs (Miller *et al.,* 2000; Fristrup *et al.,* 2003) or vocalizations (Foote *et al.,* 2004), respectively, while North Atlantic right whales (*Eubalaena glacialis*) have been observed to shift the frequency content of their calls upward while reducing the rate of calling in areas of increased anthropogenic noise (Parks *et al.,* 2007). Fin whales have also been documented lowering the bandwidth, peak frequency, and center frequency of their vocalizations under increased levels of background noise from large vessels (Castellote *et al.* 2012). Other alterations to communication signals have also been observed. For example, gray whales, in response to playback experiments exposing them to vessel noise, have been observed increasing their vocalization rate and producing louder signals at times of increased outboard engine noise (Dahlheim and Castellote, 2016). Alternatively, animals may cease sound production during production of aversive signals (Bowles *et al.,* 1994).

Under certain circumstances, marine mammals experiencing significant masking could also be impaired from maximizing their performance fitness in survival and reproduction. Therefore, when the coincident (masking) sound is human-made, it may be considered harassment when disrupting or altering critical behaviors. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs during the sound exposure. Because masking (without resulting in TS) is not associated with abnormal physiological function, it is not considered a physiological effect but rather, a potential behavioral effect (though not necessarily one that would be associated with harassment).

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. For example, low-frequency signals may have less effect on high-frequency echolocation sounds produced by odontocetes but are more likely to affect detection of mysticete communication calls and other potentially important natural sounds such as those produced by surf and some prey species. The masking of communication signals by anthropogenic noise may be considered as a reduction in the communication space of animals (*e.g.,* Clark *et al.,* 2009) and may result in energetic or other costs as animals change their vocalization behavior (*e.g.,* Miller *et al.,* 2000; Foote *et al.,* 2004; Parks *et al.,* 2007; Di Iorio and Clark, 2010; Holt *et al.,* 2009). Masking can be reduced in situations where the signal and noise come from different directions (Richardson *et al.,* 1995), through amplitude modulation of the signal, or through other compensatory behaviors (Hotchkin and Parks, 2013). Masking can be tested directly in captive species (*e.g.,* Erbe, 2008), but in wild populations, it must be either modeled or inferred from evidence of masking compensation. There are few studies addressing real-world masking sounds likely to be experienced by marine mammals in the wild (*e.g.,* Branstetter *et al.,* 2013).

Marine mammals at or near the proposed CTR project site may be exposed to anthropogenic noise, which may be a source of masking. Vocalization changes may result from a need to compete with an increase in background noise and include increasing the source level, modifying the frequency, increasing the call repetition rate of vocalizations, or ceasing to vocalize in the presence of increased noise (Hotchkin and Parks, 2013). For example, in response to loud noise, beluga whales may shift the frequency of their echolocation clicks and communication signals, reduce their overall calling rates, and or increase the emission of certain call signals to prevent masking by anthropogenic noise (Lessage *et al.,* 1999; Tyack, 2000; Eickmeier and Vallarta, 2022).

Masking occurs in the frequency band or bands that animals utilize and is more likely to occur in the presence of broadband, relatively continuous noise sources such as vibratory pile driving. Energy distribution of pile driving covers a broad frequency spectrum, and sound from pile driving would be within the audible range of pinnipeds and cetaceans present in the proposed action area. While some construction during the POA's activities may mask some acoustic signals that are relevant to the daily behavior of marine mammals, the short-term duration and limited areas affected make it very unlikely that the fitness of individual marine mammals would be impacted.

Airborne Acoustic Effects. Pinnipeds that occur near the project site could be exposed to airborne sounds associated with construction activities that have the potential to cause behavioral harassment, depending on their distance from these activities. Airborne noise would primarily be an issue for pinnipeds that are swimming or hauled out near the project site within the range of noise levels elevated above airborne acoustic harassment criteria. Although pinnipeds are known to haul-out regularly on man-made objects, we believe that incidents of take resulting solely from airborne sound are unlikely given there are no known pinniped haulout or pupping sites within the vicinity of the proposed project area; the nearest known pinniped haulout is located a minimum of 24 km south-southwest of Anchorage for harbor seals. Cetaceans are not expected to be exposed to airborne sounds that would result in harassment as defined under the MMPA.

We recognize that pinnipeds in the water could be exposed to airborne sound that may result in behavioral harassment when looking with their heads above water. 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 the area and move further from the source. However, these animals would previously have been 'taken' because of exposure to underwater sound above the behavioral harassment thresholds, which are in all cases larger than those associated with airborne sound. Thus, the behavioral harassment of these animals is already accounted for in these estimates of potential take. Therefore, we do not believe that authorization of incidental take resulting from airborne sound for pinnipeds is warranted, and airborne sound is not discussed further here.

Potential Effects on Marine Mammal Habitat

The proposed project would occur mostly within the same footprint as existing marine infrastructure; the new T1 and T2 would extend approximately 140 ft (47-m) seaward of the existing terminals. The nearshore and intertidal habitat where the proposed project will occur is an area of relatively high marine vessel traffic. Temporary, intermittent habitat alteration may result from increased noise levels during the proposed construction activities. Noise from impact and vibratory pile driving may extend across Knik Arm, and affect areas outside of the area around POA excluded from designated CIBW Critical Habitat. However, increased noise levels will only be present during construction activities and will cease when pile driving ends. Pile driving is not expected on all days during the construction season (April–November) and is not expected at all during the months of December–March. Noise exposure is, therefore, expected to be temporary and intermittent with long periods of typical background noise levels on a daily and seasonal scale. Effects to CIBW critical habitat are, therefore, considered to be non-significant. Effects on prey species will be limited in time and space. The long-term impact on marine mammal habitat associated with CTR would be a small permanent decrease in low-quality potential habitat because of the expanded footprint of the new cargo terminals T1 and T2. Installation and removal of in-water piles would be temporary and intermittent, and the increased footprint of the facilities would destroy only a small amount of low-quality habitat, which currently experiences high levels of anthropogenic activity.

Water quality—Temporary and localized reduction in water quality would occur as a result of in-water construction activities. Most of this effect would occur during the installation and removal of piles when bottom sediments are disturbed. The installation and removal of piles would disturb bottom sediments and may cause a temporary increase in suspended sediment in the project area. During pile removal, sediment attached to the pile moves vertically through the water column until gravitational forces cause it to slough off under its own weight. The small resulting sediment plume is expected to settle out of the water column within a few hours. Studies of the effects of turbid water on fish (marine mammal prey) suggest that concentrations of suspended sediment can reach thousands of milligrams per liter before an acute toxic reaction is expected (Burton, 1993).

Effects to turbidity and sedimentation are expected to be short-term, minor, and localized. Since the currents are so strong in the area, following the completion of sediment-disturbing activities, suspended sediments in the water column should dissipate and quickly return to background levels in all construction scenarios. Turbidity within the water column has the potential to reduce the level of oxygen in the water and irritate the gills of prey fish species in the proposed project area. However, turbidity plumes associated with the project would be temporary and localized, and fish in the proposed project area would be able to move away from and avoid the areas where plumes may occur. Thus, it is expected that the impacts on prey fish species from turbidity and therefore, on marine mammals, would be minimal and temporary. In general, the area likely impacted by the proposed construction activities is relatively small compared to the available marine mammal habitat in Knik Arm, and does not include any areas of particular importance.

Potential Effects on Prey. Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.,* crustaceans, cephalopods, fishes, zooplankton). Marine mammal prey varies by species, season, and location and, for some, is not well documented. Studies regarding the effects of noise on known marine mammal prey are described here.

Fishes utilize the soundscape and components of sound in their environment to perform important functions such as foraging, predator avoidance, mating, and spawning (*e.g.,* Zelick *et al.,* 1999; Fay, 2009). Depending on their hearing anatomy and peripheral sensory structures, which vary among species, fishes hear sounds using pressure and particle motion sensitivity capabilities and detect the motion of surrounding water (Fay *et al.,* 2008). The potential effects of noise on fishes depends on the overlapping frequency range, distance from the sound source, water depth of exposure, and species-specific hearing sensitivity, anatomy, and physiology. Key impacts to fishes may include behavioral responses, hearing damage, barotrauma (pressure-related injuries), and mortality.

Fish react to sounds that are especially high amplitude and/or intermittent at low frequencies. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. The reaction of fish to noise depends on the physiological state of the fish, past exposures, motivation (*e.g.,* feeding, spawning, migration), and other environmental factors. Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile driving on fishes (*e.g.* Scholik and Yan, 2001, 2002; Popper and Hastings, 2009). Several studies have demonstrated that impulsive sounds might affect the distribution and behavior of some fishes, potentially impacting foraging opportunities or increasing energetic costs (*e.g.,* Fewtrell and McCauley, 2012; Pearson *et al.,* 1992; Skalski *et al.,* 1992; Santulli *et al.,* 1999; Paxton *et al.,* 2017). However, some studies have shown no or slight reaction to impulse sounds (*e.g.,* Peña *et al.,* 2013; Wardle *et al.,* 2001; Jorgenson and Gyselman, 2009; Cott *et al.,* 2012). More commonly, though, the impacts of noise on fishes are temporary.

During the POA's MTRP, the effects of impact and vibratory installation of 30-in (76-cm) steel sheet piles at the POA on 133 caged juvenile coho salmon in Knik Arm were studied (Hart Crowser Incorporated *et al.,* 2009; Houghton *et al.,* 2010). Acute or delayed mortalities or behavioral abnormalities were not observed in any of the coho salmon. Furthermore, results indicated that the pile driving had no adverse effect on feeding ability or the ability of the fish to respond normally to threatening stimuli (Hart Crowser Incorporated *et al.,* 2009; Houghton *et al.,* 2010).

SPLs of sufficient strength have been known to cause injury to fishes and fish mortality (summarized in Popper *et al.,* 2014). However, in most fish species, hair cells in the ear continuously regenerate and loss of auditory function likely is restored when damaged cells are replaced with new cells. Halvorsen *et al.* (2012b) showed that a TTS of 4 to 6 dB was recoverable within 24 hours for one species. Impacts would be most severe when the individual fish is close to the source and when the duration of exposure is long. Injury caused by barotrauma can range from slight to severe, can cause death, and is most likely for fish with swim bladders. Barotrauma injuries have been documented during controlled exposure to impact pile driving (Halvorsen *et al.,* 2012a; Casper *et al.,* 2013, 2017).

Fish populations in the proposed project area that serve as marine mammal prey could be temporarily affected by noise from pile installation and removal. The frequency range in which fishes generally perceive underwater sounds is 50 to 2,000 Hz, with peak sensitivities below 800 Hz (Popper and Hastings, 2009). Fish behavior or distribution may change, especially with strong and/or intermittent sounds that could harm fishes. High underwater SPLs have been documented to alter behavior, cause hearing loss, and injure or kill individual fish by causing serious internal injury (Hastings and Popper, 2005).

Essential Fish Habitat (EFH) has been designated in the estuarine and marine waters in the vicinity of the proposed project area for all five species of salmon (*i.e.,* chum salmon, pink salmon, coho salmon, sockeye salmon, and Chinook salmon; North Pacific Fishery Management Council (NPFMC), 2020, 2021), which are common prey of marine mammals, as well as for other species. (NPFMC, 2020). However, there are no designated habitat areas of particular concern in the vicinity of the Port, and therefore, adverse effects on EFH in this area are not expected.

The greatest potential impact to fishes during construction would occur during impact pile installation. Impact piling would occur over 1 to 3 hours on any given day across the construction season, with significant breaks between piles due to repositioning of the crane, installation and removal of temporary piles, and other construction sequencing. Additionally, impact driving of 72-in permanent piles would be mitigated with the use of a bubble curtain (see Proposed Mitigation section for full details) in all months of construction for piles driven in water greater than 3-m deep. Unattenuated impact driving in shallow water would be minimized as much as feasible by timing installation to occur during periods of low tide, when the pilings are out of water (''in the dry''). In-water construction activities would only occur during daylight hours, allowing fish to forage and transit the project area in the evening. Vibratory pile driving would possibly elicit behavioral reactions from fishes, such as temporary avoidance of the area, but is unlikely to cause injuries to fishes or have persistent effects on local fish populations. Construction also would have minimal permanent and temporary impacts on benthic invertebrate species, a marine mammal prey source. In addition, it should be noted that the area in question is low-quality habitat since it is already highly developed and experiences a high level of anthropogenic noise from normal operations and other vessel traffic at the POA. In general, any negative impacts on marine mammal prey species are expected to be minor and temporary.

In-Water Construction Effects on Potential Foraging Habitat

The CTR project area is not considered to be high-quality habitat for marine mammals or marine mammal prey, such as fish, and it is anticipated that the long-term impact on marine mammals associated with CTR would be a small permanent decrease in low-quality potential habitat because of the expanded footprint of the new cargo terminals T1 and T2. The CTR project is not expected to result in any habitat related effects that could cause significant negative consequences for individual marine mammals or their populations since installation and removal of in-water piles would be temporary and intermittent and the increased footprint of the facilities would destroy only a small amount of low-quality habitat, which currently experiences high levels of anthropogenic activity. Therefore, impacts of the project are not likely to have adverse effects on marine mammal foraging habitat in the proposed project area.

Estimated Take of Marine Mammals

This section provides an estimate of the number of incidental takes proposed for authorization through promulgation of regulations and issuance of a LOA, which will inform NMFS' consideration of ''small numbers,'' the negligible impact determinations, and impacts on subsistence uses.

Harassment is the only type of take expected to result from these activities. 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).

Authorized takes would primarily be by Level B harassment, as use of the acoustic sources (*i.e.,* vibratory and impact pile driving) has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (Level A harassment) to result, primarily for high frequency cetaceans and phocids because predicted auditory injury zones are larger than for mid-frequency cetaceans and otariids. Auditory injury is unlikely to occur for mysticetes, mid-frequency cetaceans, and otariids due to measures described in the Proposed Mitigation section. The proposed mitigation and monitoring measures are expected to minimize the severity of the taking to the extent practicable. As described previously, no serious injury or mortality is anticipated or proposed to be authorized for this activity. Below, we describe how the proposed take numbers are estimated.

For acoustic impacts, generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) the number of days of activities. We note that while these factors can contribute to a basic calculation to provide an initial prediction of potential takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.,* previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the proposed take estimates.

Acoustic Thresholds

NMFS recommends the use of acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably likely to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment—Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source or exposure context (*e.g.,* frequency, predictability, duty cycle, duration of the exposure, signal-to-noise ratio, distance to the source), the environment (*e.g.,* bathymetry, other noises in the area, predators in the area), and the receiving animals (hearing, motivation, experience, demography, life stage, depth) and can be difficult to predict (*e.g.,* Southall *et al.,* 2007, 2021; Ellison *et al.,* 2012). Based on the best scientific information available and the practical need to use a threshold based on a metric that is both predictable and measurable for most activities, NMFS typically uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS generally predicts that marine mammals are likely to be behaviorally harassed in a manner considered to be Level B harassment when exposed to underwater anthropogenic noise above root-mean-squared pressure received levels (RMS SPL) of 120 dB re 1 μPa for continuous (*e.g.,* vibratory pile driving, drilling) and above RMS SPL 160 dB re 1 μPa for non-explosive impulsive (*e.g.,* seismic airguns) or intermittent (*e.g.,* scientific sonar) sources. Generally speaking, Level B harassment estimates based on these behavioral harassment thresholds are expected to include any likely takes by TTS as, in most cases, the likelihood of TTS occurs at distances from the source less than those at which behavioral harassment is likely. TTS of a sufficient degree can manifest as behavioral harassment, as reduced hearing sensitivity and the potential reduced opportunities to detect important signals (conspecific communication, predators, prey) may result in changes in behavior patterns that would not otherwise occur.

The POA's proposed activity includes the use of continuous (vibratory pile driving) and intermittent (impact pile driving) noise sources, and therefore, the RMS SPL thresholds of 120 and 160 dB re 1 μPa are applicable.

Level A harassment. NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0; NMFS, 2018) and the draft Updated Technical Guidance (NMFS, 2024) identify dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). This proposed rule estimates Level A harassment using the existing Technical Guidance (NMFS, 2018) as well as the draft Updated Technical Guidance (NMFS, 2024) because at the time of the final agency decision on this request for incidental take, it's possible NMFS may have made a final agency decision on the draft Guidance.

These thresholds are provided in the tables below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS' 2018 Technical Guidance and NMFS' 2024 draft Updated Technical Guidance, both of which may be accessed at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance.*

The POA's proposed activity includes the use of impulsive (impact pile driving) and non-impulsive (vibratory driving) sources.

TABLE 7—NMFS' 2018 THRESHOLDS IDENTIFYING THE ONSET OF PERMANENT THRESHOLD SHIFT (PTS)

Hearing group	PTS onset acoustic thresholds* (received level)	
	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	*Cell 1:* $L_{pk,flat}$: 219 dB; $L_{E,LF,24h}$: 183 dB	*Cell 2:* $L_{E,LF,24h}$: 199 dB.
Mid-Frequency (MF) Cetaceans	*Cell 3:* $L_{pk,flat}$: 230 dB; $L_{E,MF,24h}$: 185 dB	*Cell 4:* $L_{E,MF,24h}$: 198 dB.
High-Frequency (HF) Cetaceans	*Cell 5:* $L_{pk,flat}$: 202 dB; $L_{E,HF,24h}$: 155 dB	*Cell 6:* $L_{E,HF,24h}$: 173 dB.
Phocid Pinnipeds (PW)(Underwater)	*Cell 7:* $L_{pk,flat}$: 218 dB; $L_{E,PW,24h}$: 185 dB	*Cell 8:* $L_{E,PW,24h}$: 201 dB.
Otariid Pinnipeds (OW)(Underwater)	*Cell 9:* $L_{pk,flat}$: 232 dB; $L_{E,OW,24h}$: 203 dB	*Cell 10:* $L_{E,OW,24h}$: 219 dB.

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 μPa, and cumulative sound exposure level (L_E) has a reference value of 1μPa²s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI, 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for NMFS' 2018 Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.,* varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

TABLE 8—NMFS' 2024 THRESHOLDS IDENTIFYING THE ONSET OF AUDITORY INJURY (AUD INJ)

Hearing group	AUD INJ acoustic thresholds * (received level)	
	Impulsive	Non-impulsive
Underwater:		
Low-Frequency (LF) Cetaceans	*Cell 1:* $L_{p,0\text{-}pk,flat}$: 222 dB; $L_{E,p,LF,24h}$: 183 dB	*Cell 2:* $L_{E,p,LF,24h}$: 197 dB.
High-Frequency (HF) Cetaceans	*Cell 3:* $L_{p,0\text{-}pk,flat}$: 230 dB; $L_{E,p,HF,24h}$: 193 dB	*Cell 4:* $L_{E,p,HF,24h}$: 201 dB.
Very High-Frequency (VHF) Cetaceans	*Cell 5:* $L_{p,0\text{-}pk,flat}$: 202 dB; $L_{E,p,VHF,24h}$: 159 dB	*Cell 6:* $L_{E,p,VHF,24h}$: 181 dB.
Phocid Pinnipeds (PW) (Underwater)	*Cell 7:* $L_{p,0\text{-}pk,flat}$: 223 dB; $L_{E,p,PW,24h}$: 183 dB	*Cell 8:* $L_{E,p,PW,24h}$: 195 dB.
Otariid Pinnipeds (OW) (Underwater)	*Cell 9:* $L_{p,0\text{-}pk,flat}$: 230 dB; $L_{E,p,OW,24h}$: 185 dB	*Cell 10:* $L_{E,p,OW,24h}$: 199 dB.
In-air:		
Phocid Pinnipeds (PA) (In-Air)	*Cell 11:* $L_{p,0\text{-}pk.flat}$: 162 dB; $L_{E,p,PA,24h}$: 140 dB	*Cell 12:* $L_{E,p,PA,24h}$: 154 dB.
Otariid Pinnipeds (OA) (In-Air)	*Cell 13:* $L_{p,0\text{-}pk,flat}$: 177 dB; $L_{E,p,OA,24h}$: 163 dB	*Cell 14:* $L_{E,p,OA,24h}$: 177 dB.

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating AUD INJ onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 μPa, and cumulative sound exposure level (L_E) has a reference value of 1μPa^{2}s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI, 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for NMFS' 2018 Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.,* varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that are used in estimating the area ensonified above the acoustic thresholds, including source levels and transmission loss coefficient.

The sound field in the project area is the existing background noise plus additional construction noise from the proposed project. Marine mammals are expected to be affected via sound generated by the primary components of the project (*i.e.,* impact pile removal and vibratory pile installation and removal). Calculation of the area ensonified by the proposed action is dependent on the background sound levels at the project site, the source levels of the proposed activities, and the estimated transmission loss coefficients for the proposed activities at the site. These factors are addressed in order, below.

Background Sound Levels at the Port of Alaska—As noted in the Potential Effects of Specified Activities on Marine Mammals and Their Habitat section of this proposed rule, the POA is an industrial facility in a location with high levels of commercial vessel traffic, port operations (including dredging), and extreme tidal flow. Previous measurements of background noise at the POA have recorded a background SPL of 122.2 dB RMS (Austin *et al.,* 2016). NMFS concurs that this SPL reasonably represents background noise near the proposed project area, and therefore, we have used 122.2 dB RMS as the threshold for Level B harassment (instead of 120 dB RMS).

Sound Source Levels of Proposed Activities—The intensity of pile driving sounds is greatly influenced by factors such as the type of piles (material and diameter), hammer type, and the physical environment (*e.g.,* sediment type) in which the activity takes place. In order to calculate the distances to the Level A harassment and the Level B harassment sound thresholds for the methods and piles being used in this project, we used acoustic monitoring data from sound source verification studies (both at the POA and elsewhere) to develop proxy source levels for the various pile types, sizes and methods (tables 9 and 10).

The POA collected sound measurements during pile installation and removal for 3 seasons (Austin *et al.* 2016; Illingworth & Rodkin [I&R] 2021a, 2021b); a summary of these data and findings can be found in appendix A of the POA's application.

Vibratory Driving—NMFS concurs that the source levels proposed by the POA for vibratory installation and removal of all pile types are appropriate to use for calculating harassment isopleths for the POA's proposed CTR activities (tables 9 and 10). The proposed sound levels for vibratory removal are based on an analysis done for the POA's NES1 IHA (89 FR 2832, January 14, 2024) and are partially based on sound source verification data measured at the POA during the PCT project (Illingworth and Rodkin, 2021a). Interestingly, the analyzed RMS SPL for the unattenuated vibratory removal of 24-in (61-cm) piles was much louder than the unattenuated vibratory removal of 36-in piles (91-cm), and even louder than the unattenuated vibratory installation of 24-in piles. Illingworth and Rodkin (2023) suggest that at least for data recorded at the POA, the higher 24-in (61-cm) removal levels are likely due to the piles being removed at rates of 1,600 to 1,700 revolutions per minute (rpm), while 36-in (91-cm) piles, which are significantly heavier than 24-in (61-cm) piles), were removed at a rate of 1,900 rpm. The slower rates combined with the lighter piles would cause the hammer to easily "jerk" or excite the 24-in (61-cm) piles as they were extracted, resulting in a louder rattling sound and louder sound levels. This did not occur for the 36-in (91-cm) piles, which were considerably heavier due to increased diameter, longer length, and greater thickness.

The TPP found that for vibratory installation of 48-in piles, an air bubble curtain provided about a 9-dB reduction at 10 meters. An 8-dB reduction at close-in positions was estimated for vibratory pile driving that occurred during the PCT project in 2021 (I&R 2021b). The PCT 2020 measurements indicated 2 to 8 dB reduction for the 48-in piles at 10 meters, but no apparent broadband reduction was found in the far-field at about 2,800 meters (I&R 2021a). Far-field sound levels were characterized by very low frequency sound at or below 100 Hz, causing broadband measurements to remain above the ambient RMS level at approximately 2.8km from the source. However, levels at frequencies above 100 Hz were effectively reduced by the bubble curtain system. Because CIBW are most sensitive to frequencies over 100 Hz, NMFS considers the use of bubble curtains during vibratory driving to be an effective and important mitigation measure for CIBW.

Based on the aforementioned measurements conducted at POA, for vibratory driving during the CTR Project, it is assumed that a well-designed and robust bubble curtain system will achieve a mean reduction of 7 dB at the source and will also reduce sound levels at frequencies over 100 Hz at longer ranges. The POA proposes to use a bubble curtain when water depth is greater than 3 meters during vibratory installation of all permanent (72-in) piles and during vibratory driving of temporary (24-in or 36-in) piles during the months of August through October when CIBWs are most likely to be present.

Impact Driving—NMFS concurs that the source levels proposed by the POA for impact installation of all pile types are appropriate to use for calculating harassment isopleths for the POA's proposed CTR activities (tables 9 and 10). Impact driving of temporary piles (24-in and 36-in piles) is not currently proposed; however, in the unlikely event that vibratory driving is insufficient to stabilize a temporary pile, impact driving may be necessary. Sound source verification studies at the POA during the PCT project did not measure unattenuated impact driving of 24-in or 36-in piles; therefore, proxy sound levels from Navy (2015) are proposed.

The TPP measured reductions of 9 to 12 dB for a 48-in pile installed with an impact hammer using a confined air bubble curtain. The PCT 2020 measurements (I&R 2021a) found reductions of about 10 dB when comparing the attenuated conditions that occurred with that project to unattenuated conditions for the TPP. The TPP did not report the reduction in sound levels in the acoustic far field; however, the computed distances to 125 dB RMS isopleths were essentially reduced by half with the bubble curtain (from 1,291 to 698 meters).

It is currently unclear whether the POA's proposed bubble curtain system for the CTR project will be confined or unconfined; confined systems are typically more effective, especially in sites like Knik Arm, with high current velocity. Therefore, for impact pile installation for the CTR Project, it is assumed that a well-designed and robust bubble curtain system will achieve a mean reduction of 7 dB from the source. The POA proposes to use a bubble curtain system on all permanent piles in all months, which will be installed with both vibratory and impact hammers. The bubble curtain by necessity will be installed around each permanent pile as it is moved into position, and therefore, the bubble curtain will be available as a mitigation measure to reduce sound levels throughout each driving event for permanent 72-in piles when water depth is greater than 3 meters. To account for piles driven in water less than 3m deep, NMFS has estimated approximately 0.5 unattenuated 72-in piles will be driven (approximately 43 minutes of impact driving and 5 minutes of vibratory driving) each month.

Concurrent activities—The POA proposes to concurrently operate up to two hammers to install or extract piles at different parts of the project site, in order to reduce the need for pile driving during months of high beluga presence. When two noise sources have overlapping sound fields, the sources are considered additive and combined using the rules of dB addition. For addition of two simultaneous sources, the difference between the two sound source levels is calculated, and if that difference is between 0 and 1 dB, 3 dB are added to the higher sound source levels; if the difference is between 2 and 3 dB, 2 dB are added to the highest sound source levels; if the difference is between 4 and 9 dB, 1 dB is added to the highest sound source levels; and with differences of 10 or more dB, there is no addition. For two simultaneous sources of different type (*i.e.,* impact and vibratory driving), there is no sound source addition.

Possible concurrent scenarios are shown in table 3; the predicted source values and transmission loss coefficients for these combinations are shown in table 11.

Transmission Loss. For all piles driven with an active bubble curtain (''attenuated'' impact and vibratory driving), and for unattenuated impact installation, the POA proposed to use 15 as the *TL* coefficient, meaning they assume practical spreading loss (*i.e.,* the POA assumes $TL = 15*Log_{10}(range)$); NMFS concurs with this value and has assumed practical spreading loss for all (attenuated impact and vibratory) driving and unattenuated impact driving.

The *TL* coefficient that the POA proposed for unattenuated vibratory installation and removal of piles is 16.5 (*i.e.,* $TL = 16.5*Log_{10}(range)$). This value is an average of measurements obtained from two 48-in (122-cm) piles installed via an unattenuated vibratory hammer in 2016 (Austin *et al.,* 2016). To assess the appropriateness of this *TL* coefficient to be used for the proposed project, NMFS examined and analyzed additional *TL* measurements recorded at the POA. This includes a *TL* coefficient of 22 (deep hydrophone measurement) from the 2004 unattenuated vibratory installation of one 36-in (91-cm) pile at Port MacKenzie, across Knik Arm from the POA (Blackwell, 2004), as well as *TL* coefficients ranging from 10.3 to 18.2 from the unattenuated vibratory removal of 24-in (61 cm) and 36-in (91-cm) piles and the unattenuated vibratory installation of one 48-in (122-cm) pile at the POA in 2021 (I&R 2021, 2023). To account for statistical interdependence due to temporal correlations and equipment issues across projects, values were averaged first within each individual project, and then across projects. The mean and median value of the measured *TL* coefficients for unattenuated vibratory piles in Knik Arm by project are equal to 18.9 and 16.5, respectively. NMFS proposes to use the project median *TL* coefficient of 16.5 during unattenuated vibratory installation and removal of all piles during the CTR project. This value is representative of all unattenuated vibratory measurements in the Knik Arm, *i.e.,* including data from POA and Port MacKenzie. Further, 16.5 is the mean of the 2016 measurements, which were made closer to the CTR proposed project area than other measurements and were composed of measurements from multiple directions (both north and south/southwest).

In certain scenarios, the POA may perform concurrent vibratory driving of two piles. The POA proposed, and NMFS concurs, that in the event that both piles are unattenuated, the *TL* coefficient would be 16.5; if both piles are attenuated, the *TL* coefficient would be 15. In the event that one pile is attenuated and one is unattenuated, the POA proposed a *TL* coefficient of 15.75 to be used in the acoustic modeling. NMFS evaluated the contributions of one attenuated and one unattenuated vibratory-driven pile to the sound field (assuming a 7-dB reduction in source level due to the bubble curtain for the attenuated source), and determined that the unattenuated source would likely dominate the received sound field. Therefore, the POA's proposed *TL* coefficient is conservative, and NMFS concurs with this value.

TABLE 9—SUMMARY OF UNATTENUATED IN-WATER PILE DRIVING PROXY LEVELS

[at 10 m]

Method and pile type	dB rms	dB SEL	dB peak	TL coefficient	Data source for source levels
Vibratory hammer					
24-in steel installation	161			16.5	U.S. Navy 2015.
24-in steel removal	169				NMFS average 2023; see 89 FR 2832.
36-in steel installation	166				U.S. Navy 2015.
36-in steel removal	159				NMFS average 2023; see 89 FR 2832.
72-in steel	171				I&R 2003, unpublished data for Castrol Oil berthing dolphin in Richmond, CA.
Impact hammer					
24-in steel	193	181	210	15.0	U.S. Navy 2015.
36-in steel	193	184	211		U.S. Navy 2015.
72-in steel	203	191	217		I&R model. Estimate based on interpolation of data for piles 24 to 144 inches in diameter.

TABLE 10—SUMMARY OF ATTENUATED IN-WATER PILE DRIVING PROXY LEVELS

[at 10 m]

Method and pile type	dB rms	dB SEL	dB peak	TL coefficient	Reference for proxy levels
Vibratory hammer					
24-in steel installation	158.5			15.0	I&R 2021a (measured).
24-in steel removal	157				I&R 2021a (measured).
36-in steel installation	160.5				I&R 2021a, 2021b (measured).
36-in steel removal	154				I&R 2021a (measured).
72-in steel	164				Assumed 7–dB reduction supported by I&R 2021a.
Impact hammer					
24-in steel	186	174	203	15.0	Assumed 7–dB reduction supported by I&R 2021a.
36-in steel	186	177	204		Assumed 7–dB reduction supported by I&R 2021a.
72-in steel	196	184	210		Assumed 7–dB reduction supported by Caltrans Compendium (2020).

TABLE 11—SOURCE VALUES FOR POTENTIAL CONCURRENT DRIVING SCENARIOS [1]

Activity	Method	Pile type/size [2]	Attenuated or unattenuated	Proxy source value			TL coefficient	# Piles per day [3]
				dB RMS	dB SEL	dB peak		
Concurrent Driving (2 sources)	Vibratory/Vibratory	36-in and 36-in	Attenuated/Attenuated	163.5			15	8
			Attenuated/Unattenuated	169			15.75	8
			Unattenuated/Unattenuated	171			16.5	8
		36-in and 72-in	Attenuated/Attenuated	166			15	7
			Unattenuated/Attenuated	169			15.75	7
	Vibratory/Impact [1]	36-in and 72-in	Attenuated/Attenuated	160.5/196	—/184	—/210	15/15	8
			Unattenuated/Attenuated	166/196	—/184	—/210	16.5/15	7

[1] Concurrent vibratory and impact driving source values and TL coefficients are the same as for the piles driven individually (shown in tables 7 and 8), with no adjustments for concurrent driving. The Level A harassment isopleths would be determined by the calculated impact pile driving isopleths, and Level B harassment isopleth would be generated by vibratory pile driving.

[2] POA may elect to use either 36-in or 24-in temporary piles; as 36-in piles are more likely and estimated to have larger ensonified areas, we have used these piles in our analyses of concurrent activities.

[3] Piles per day were calculated as the maximum daily number of each type of pile (24-in and 36-in = 4 piles per hammer per day; 72-in piles = 3 piles per day) with complete overlap for 45 minutes of driving with the largest possible combined source value, a scenario that would over-estimate duration of noise production given the estimated time required to drive 72-in piles with a vibratory hammer (10 minutes).

Estimated Harassment Isopleths. All estimated Level B harassment isopleths are reported in tables 15 and 16. At POA, Level B harassment isopleths from the proposed project will be limited in some cases to less than the estimated value by the coastline along Knik Arm along and across from the project site. The maximum predicted isopleth distance for a single pile is 9,069 m during vibratory installation of unattenuated 72-in (182-cm) steel pipe piles. For concurrent driving the maximum isopleth distance is 9,363 m during vibratory driving of two unattenuated 24- or 36-in piles or during vibratory driving of one attenuated (24-, 36-, or 72-in) and one unattenuated (24- or 36-in) pile (tables 15 and 16).

The ensonified area associated with Level A harassment is more technically challenging to predict due to the need to account for a duration component. Therefore, NMFS developed an optional User Spreadsheet tool to accompany the Technical Guidance that can be used to relatively simply predict an isopleth distance for use in conjunction with marine mammal density or occurrence to help predict potential takes. We note that because of some of the assumptions included in the methods underlying this optional tool, we anticipate that the resulting isopleth estimates are typically going to be overestimates of some degree, which may result in an overestimate of potential take by Level A harassment. However, this optional tool offers the best way to estimate isopleth distances when more sophisticated modeling methods are not available or practical. For stationary sources, such as pile driving, the optional User Spreadsheet tool predicts the distance at which, if a marine mammal remained at that distance for the duration of the activity, it would be expected to incur auditory injury. Inputs used in the optional User Spreadsheet tool and the resulting estimated isopleths are reported in tables 12 through 14, below.

TABLE 12—NMFS USER SPREADSHEET INPUTS FOR 72-IN PERMANENT PILES

	Impact pile driving		Vibratory pile driving	
	Attenuated	Unattenuated [1]	Attenuated	Unattenuated [1]
Spreadsheet tab used	(E.1) Impact pile driving		(A.1) Non-Impul, Stat, Cont.	
Source Level	184 dB SEL	191 dB SEL	164 dB RMS	171 dB RMS
Transmission Loss Coefficient	15	15	15	16.5
Weighting Factor Adjustment (kHz)	2		2.5	
Time to install single pile (minutes)	—		10	
Number of strikes per pile	5,743		—	
Piles per day	1—3	1	3	
Distance of sound pressure level measurement (m)	10			

[1] To account for piles driven in water less than 3m deep, NMFS has estimated approximately 0.5 unattenuated 72-in piles will be driven (approximately 43 minutes of impact driving and 5 minutes of vibratory driving) each month.

TABLE 13—NMFS USER SPREADSHEET INPUTS FOR TEMPORARY (24- OR 36-in) PILES

	Vibratory pile driving							
	24-in (61-cm) steel pipe				36-in (91-cm) steel pipe			
	Installation		Removal		Installation		Removal	
	Atten.	Unatten.	Atten.	Unatten.	Atten.	Unatten.	Atten.	Unatten.
Spreadsheet Tab Used	(A.1) Non-Impul, Stat, Cont.							
Source Level (dB RMS)	158.5	161	157	169	160.5	166	154	159
Transmission Loss Coefficient	15	16.5	15	16.5	15	16.5	15	16.5
Weighting Factor Adjustment (kHz)	2.5							
Time to install or remove single pile (minutes)	30		45		30		45	
Number of strikes per pile	—							
Piles per day	4							
Distance of sound pressure level measurement (m)	10							

	Impact Pile Driving			
	24-in (61-cm) steel pipe		36-in (91-cm) steel pipe	
	Attenuated	Unattenuated	Attenuated	Unattenuated
Spreadsheet Tab Used	(E.1) Impact pile driving			
Source Level (dB RMS)	174 dB SEL	181 dB SEL	177 dB SEL	184 dB SEL
Transmission Loss Coefficient	15			
Weighting Factor Adjustment (kHz)	2			
Time to install or remove single pile (minutes)	—			

TABLE 13—NMFS USER SPREADSHEET INPUTS FOR TEMPORARY (24- OR 36-in) PILES—Continued

	Vibratory pile driving							
	24-in (61-cm) steel pipe				36-in (91-cm) steel pipe			
	Installation		Removal		Installation		Removal	
	Atten.	Unatten.	Atten.	Unatten.	Atten.	Unatten.	Atten.	Unatten.
Number of strikes per pile	1,000							
Piles per day	1							
Distance of sound pressure level measurement (m)	10							

TABLE 14—NMFS USER SPREADSHEET INPUTS FOR CONCURRENT VIBRATORY DRIVING

	24- or 36-in AND 24-in or 36-in			24- or 36-in AND 72-in	
	Attenuated/ attenuated	Attenuated/ unattenuated	Unattenuated/ unattenuated	Attenuated/ attenuated	Unattenuated/ attenuated
Spreadsheet Tab Used	(A.1) Non-Impul, Stat, Cont.				
Source Level (dB RMS)	163.5	170	172	166	170
Transmission Loss Coefficient	15	15.75	16.5	15	15.75
Weighting Factor Adjustment (kHz)	2.5				
Time to install or remove a single pile (minutes)	45				
Number of strikes per pile	—				
Piles per day	8			7	
Distance of sound pressure level measurement (m)	10				

TABLE 15—CALCULATED DISTANCE OF LEVEL A (BASED ON NMFS' 2018 TECHNICAL GUIDANCE) AND LEVEL B HARASSMENT ISOPLETHS BY PILE TYPE AND PILE DRIVING METHOD

Activity	Pile type/size	Attenuated or unattenuated	Level A harassment distance (m)					Level B harassment distance (m) all hearing groups [1]
			LF	MF	HF	PW	OW	
Impact	24-in (61-cm)	Unattenuated	735	27	876	394	29	1,585
		Attenuated	251	9	299	135	10	541
	36-in (91-cm)	Unattenuated	1,165	42	1,387	624	46	1,585
		Attenuated	398	15	474	213	16	541
	72-in (182-cm)	Unattenuated	10,936	389	13,026	5,853	427	7,356
		Attenuated (1 pile per day)	3,734	133	4,448	1,999	146	2,512
		Attenuated (2 piles per day)	5,928	211	7,061	3,173	231	
		Attenuated (3 piles per day)	7,767	277	9,252	4,157	303	
Vibratory Installation	24-in (61-cm)	Unattenuated	11	2	16	7	1	2,247
		Attenuated	8	1	11	5	1	2,630
	36-in (91-cm)	Unattenuated	22	3	31	14	2	4,514
		Attenuated	11	1	15	7	1	3,575
	72-in (182-cm)	Unattenuated	19	3	27	12	2	9,069
		Attenuated	7	1	11	5	1	6,119
Vibratory Removal	24-in (61-cm)	Unattenuated	42	4.6	60	27	2.4	6,861
		Attenuated	16	1.7	23	11	1	2,583
	36-in (91-cm)	Unattenuated	11	2	15	7	1	1,699
		Attenuated	5	1	8	3	1	1,318
Concurrent Vibratory	36-in AND 36-in	Attenuated/Attenuated	33	2.9	49	20	1.4	5,667
		Attenuated/Unattenuated	81	8.0	118	51	4.0	9,363
		Unattenuated/Unattenuated	98	11	139	62	5.5	9,069
	36-in AND 72-in	Attenuated/Attenuated	45	3.9	66	27	1.9	8,318
		Unattenuated/Attenuated	75	7.4	108	47	3.7	9,363
Concurrent Vibratory/Impact	36-in AND 72-in	Attenuated/Attenuated (1 pile per day).	3,734	133	4,448	1,999	146	3,575
		Attenuated/Attenuated (2 piles per day).	5,928	211	7,061	3,173	231	
		Attenuated/Attenuated (3 piles per day).	7,767	277	9,252	4,157	303	
		Unattenuated/Attenuated (1 pile per day).	3,734	133	4,448	1,999	146	4,514
		Unattenuated/Unattenuated (2 piles per day).	5,928	211	7,061	3,173	231	
		Unattenuated/Attenuated (3 piles per day).	7,767	277	9,252	4,157	303	

[1] Distances to thresholds are as modeled; however, interaction with shorelines would truncate zones. See figures 6–1 thorough 6–10 in the POA's application for further details.

TABLE 16—CALCULATED DISTANCE AND AREAS OF LEVEL A (BASED ON NMFS' PROPOSED 2024 UPDATE TO THE 2018 TECHNICAL GUIDANCE) AND LEVEL B HARASSMENT ISOPLETHS BY PILE TYPE AND PILE DRIVING METHOD

Activity	Pile type/size	Attenuated or unattenuated	Level A harassment distance (m)					Level B harassment distance (m) all hearing groups [1]
			LF	HF	VHF	PW	OW	
Impact	24-in (61-cm)	Unattenuated	732	94	1,133	651	243	1,585
		Attenuated	250	32	387	222	83	541
	36-in (91-cm)	Unattenuated	1,160	148	1,796	1,031	385	1,585
		Attenuated	397	51	613	352	132	541
	72-in (182-cm)	Unattenuated	10,896	1,390	16,861	9,679	3,608	7,356
		Attenuated (1 pile per day)	3,720	474.7	5,757	3,305	1,232	2,512
		Attenuated (2 piles per day)	5,906	753.5	9,139	5,246	1,956	
		Attenuated (3 piles per day)	7,739	987.4	11,976	6,875	2,563	
Vibratory Installation	24-in (61-cm)	Unattenuated	14.1	5.9	11.8	17.8	6.6	2,247
		Attenuated	10	3.8	8.1	12.8	4.3	2,630
	36-in (91-cm)	Unattenuated	28.4	11.9	23.6	35.7	13.3	4,514
		Attenuated	13.6	5.2	11.1	17.5	5.9	3,575
	72-in (182-cm)	Unattenuated	24.6	10.3	20.5	31	11.5	9,069
		Attenuated	9.2	3.5	7.5	11.9	4	6,119
Vibratory Removal	24-in (61-cm)	Unattenuated	55.2	23.1	45.9	69.5	25.8	6,861
		Attenuated	10.4	4	8.5	13.4	4.5	2,583
	36-in (91-cm)	Unattenuated	13.7	5.7	11.4	17.2	6.4	1,699
		Attenuated	6.6	2.5	5.4	8.4	2.8	1,318
Concurrent Vibratory/Vibratory.	36-in AND 36-in	Attenuated/Attenuated	44.7	17.2	36.5	57.5	19.4	5,667
		Attenuated/Unattenuated	107.6	43.3	88.8	136.9	48.5	9,363
		Unattenuated/Unattenuated	127.7	53.5	106.3	160.7	59.7	9,069
	36-in AND 72-in	Attenuated/Attenuated	60	23.1	49	77.3	26	8,318
		Unattenuated/Attenuated	98.9	39.8	81.6	125.8	44.6	9,363
Concurrent Vibratory/Impact		Attenuated/Attenuated (1 pile per day).	3,720	474.7	5,757	3,305	1,232	3,575
		Attenuated/Attenuated (2 piles per day).	5,906	753.5	9,139	5,246	1,956	
		Attenuated/Attenuated (3 piles per day).	7,739	987.4	11,976	6,875	2,563	
	36-in AND 72-in	Unattenuated/Attenuated (1 pile per day).	3,720	474.7	5,757	3,305	1,232	4,514
		Unattenuated/Attenuated (2 piles per day).	5,906	753.5	9,139	5,246	1,956	
		Unattenuated/Attenuated (3 piles per day).	7,739	987.4	11,976	6,875	2,563	

[1] Distances to thresholds are as modeled; however, interaction with shorelines would truncate zones. See figures 6–1 thorough 6–10 in the POA's application for further details.

Marine Mammal Occurrence

In this section, we provide information about the occurrence of marine mammals, including density or other relevant information, which will inform the take calculations. Available information regarding marine mammal occurrence and abundance in the vicinity of the POA includes monitoring data from the PCT and SFD projects. These programs produced a unique and comprehensive data set of marine mammal sightings and for CIBWs, locations and movements near the POA (61N Environmental, 2021, 2022a, 2022b; Easley-Appleyard and Leonard, 2022). This is the most current data set available for Knik Arm. During the PCT and SFD projects, the POA's marine mammal monitoring programs included 11 PSOs working from four elevated, specially designed monitoring stations located along a 9-km stretch of coastline surrounding the POA. The number of days data was collected varied among years and projects, with 128 days during PCT Phase 1 in 2020, 74 days during PCT Phase 2 in 2021, and 13 days during SFD in 2022 (see table 6–15 in the POA's application for additional information regarding CIBW monitoring data). PSOs during these projects used 25-power ''big-eye'' and hand-held binoculars to detect and identify marine mammals and theodolites to track movements of CIBW groups over time and collect location data while they remained in view.

These POA monitoring programs were supplemented in 2021 with a NMFS-funded visual marine mammal monitoring project that collected data during non-pile driving days during PCT Phase 2 (Easley-Appleyard and Leonard, 2022). NMFS replicated the POA monitoring efforts, as feasible, including use of 2 of the POA's monitoring platforms, equipment (Big Eye binoculars, theodolite, 7x50 reticle binoculars), data collection software, monitoring and data collection protocol, and observers; however, the NMFS-funded program utilized only 4 PSOs and 2 observation stations along with shorter (4- to 8-hour) observation periods compared to PCT or SFD data collection, which included 11 PSOs, 4 observation stations, and most observation days lasting close to 10 hours. Despite the differences in effort, the NMFS dataset fills in gaps during the 2021 season and is thus valuable in this analysis. NMFS' PSOs monitored for 231.6 hours on 47 non-consecutive days in July, August, September, and October.

Density data are not available for any of the relevant species in this area; therefore, we have used reasonable yearly, monthly, or hourly occurrence estimates based on the previous POA monitoring datasets for all species. Table 17 shows the estimated occurrence rates for non-CIBW species at the POA; descriptions are provided in the text below.

TABLE 17—ESTIMATED OCCURRENCE FOR NON-CIBW SPECIES AT THE POA

Species	Timeframe	Estimated occurrence rates	Estimated annual occurrence	Estimated 5-year occurrence
Gray whale	Yearly	6/year	6	30
Humpback whale		4/year	4	20
Killer whale		6/year	6	30
Steller sea lion		9/year	9	45
Harbor porpoise	Hourly	0.15/hour	1,314	6,570
Harbor seal		1/hour	8,760	43,800

Gray Whale

Sightings of gray whales in the proposed project area are rare. Few, if any, gray whales are expected to approach the proposed project area. However, based on three separate sightings of single gray whales near the POA in 2020 and 2021 (61N Environmental, 2021, 2022a; Easley-Appleyard and Leonard, 2022), the POA anticipates that up to six individuals could occur within estimated harassment zones each year during CTR project activities.

Humpback Whale

Sightings of humpback whales in the proposed project area are rare, and few, if any, humpback whales are expected to approach the proposed project area. However, there have been a few observations of humpback whales near the POA. Based on the two sightings in 2017 of what was likely a single individual at the Anchorage Public Boat Dock at Ship Creek (ABR, Inc., 2017) south of the Project area, the POA requested authorization of six takes of humpback whales per year of the CTR project. However, given the maximum number of humpback whales observed within a single construction season was two (in 2017), NMFS instead anticipates that only up to four humpback whales could be exposed to project-related underwater noise per year during the CTR project.

Killer Whale

Few, if any, killer whales are expected to approach the CTR project area. No killer whales were sighted during previous monitoring programs for POA construction projects, including the 2016 TPP, 2020 PCT, and 2022 SFD projects (Prevel-Ramos *et al.,* 2006; Markowitz and McGuire, 2007; Cornick and Saxon-Kendall, 2008, 2009; Cornick *et al.,* 2010, 2011; ICRC, 2009, 2010, 2011, 2012; Cornick and Pinney, 2011; Cornick and Seagars, 2016; 61N Environmental, 2021, 2022b), except during PCT construction in 2021, when two killer whales were sighted (61N Environmental, 2022a). Previous sightings of transient killer whales have documented pod sizes in upper Cook Inlet between one and six individuals (Shelden *et al.,* 2003). While unlikely, it is possible that killer whales could approach the POA from the northern portion of Knik Arm, and immediately enter into a Level A harassment zone before PSOs are able to shut down pile driving activities. The POA estimates, and NMFS concurs, that one pod (assumed to be six individuals) could be taken by Level A harassment over the 5 years of the CTR project. NMFS also concurs that no more than one pod (assumed to be six individuals) could occur within the Level B harassment zones during CTR project activities per year.

Harbor Porpoise

Monitoring data recorded from 2005 through 2022 were used to evaluate hourly sighting rates for harbor porpoises in the proposed CTR area (see table 4–3 in the POA's application). During most years of monitoring, no harbor porpoises were observed. However, there has been an increase in harbor porpoise sightings in upper Cook Inlet in recent decades (*e.g.,* 61N Environmental, 2021, 2022a; Shelden *et al.,* 2014). The highest sighting rate for any recorded year during in-water pile installation and removal was an average of 0.037 harbor porpoises per hour during PCT construction in 2021, when observations occurred across most months. Given the uncertainty around harbor porpoise occurrence at the POA and potential that occurrence is increasing, the POA calculated requested takes using a sighting rate of 0.5 harbor porpoises per hour. For the recent NES1 project (88 FR 76576, November 6, 2023), NMFS estimated that a more realistic sighting rate would be closer to approximately 0.07 harbor porpoises per hour (the 2021 rate of 0.037 harbor porpoises per hour doubled). However, the sizes of the ensonified areas for the NES1 project are much smaller than those predicted for the proposed CTR project. Based on the larger ensonified areas, which more closely resemble the observable area from the PCT project, the cryptic nature of the species, and the potential for increased occurrence of harbor porpoise in and around upper Cook Inlet, NMFS estimates that approximately 0.15 harbor porpoises per hour (four times the maximum observed 2021 rate of 0.037 per hour) may be observed near the proposed CTR area during the 5 years covered under this proposed rulemaking.

Steller Sea Lion

Steller sea lions are anticipated to occur in low numbers within the proposed CTR project area as summarized in the Description of Marine Mammals in the Area of Specified Activities section. Similar to the approach used above for harbor porpoises, the POA used previously recorded sighting rates of Steller sea lions near the POA to estimate requested take for this species. During SFD construction in May and June of 2022, the hourly sighting rate for Steller sea lions was 0.028. The hourly sighting rate for Steller sea lions in 2021, the most recent year with observations across most months, was approximately 0.01. The highest number of Steller sea lions that have been observed during the 2020–2022 monitoring efforts at the POA was nine individuals (eight during PCT Phase 1 monitoring and one during NMFS' 2021 monitoring).

Recent counts of sightings of Steller sea lions around the POA may include multiple re-sights of single individuals. For instance, in 2016, Steller sea lions were observed on 2 separate days. On May 2, 2016, one individual was sighted, while on May 25, 2016, there were five Steller sea lion sightings within a 50-minute period, and these sightings occurred in areas relatively close to one another (Cornick and Seagars, 2016). Given the proximity in time and space, it is believed these five sightings were of the same individual sea lion. The POA is concerned that multiple re-sights of a single individual within a day may overestimate the true number of individuals exposed to sound levels at or above harassment thresholds over the course of the proposed project. Therefore, given the uncertainty around Steller sea lion occurrence at the POA and potential that occurrence is increasing, the POA estimated that approximately 0.14 Steller sea lions per hour (the May and June 2022 rate of 0.028 Steller sea lions per hour multiplied by a factor of 5) may be observed near the proposed CTR project areas per hour of hammer use. However, the highest number of Steller sea lion sightings during the 2020–2022 monitoring efforts at the POA was nine (eight during PCT Phase 1 monitoring and one during NMFS' 2021 monitoring).

Given the POA's estimate assumes a higher Steller sea lion sighting rate (0.14) than has been observed at the POA and results in an estimate that is more than double the maximum number of Steller sea lions observed in a year, NMFS believes that the sighting rate proposed by the POA overestimates potential exposures of this species. Based on the ensonified areas, which closely resemble the observable area from the PCT project, the potential for re-sightings of individual animals, and the uncertainty around increased occurrence of Steller sea lions in and around upper Cook Inlet, NMFS instead proposes that nine Steller sea lions (the maximum number observed in a single year between 2020 and 2022 during projects with similar sized harassment isopleths) may be taken each year during the 5 years covered under this proposed rulemaking, up to a total of 45 individuals over the course of the project.

Harbor Seal

No known harbor seal haulout or pupping sites occur in the vicinity of the POA. In addition, harbor seals are not known to reside in the proposed CTR project area, but they are seen regularly near the mouth of Ship Creek when salmon are running, from July through September. With the exception of newborn pups, all ages and sexes of harbor seals could occur in the CTR project area. Harbor seals often appear curious about onshore activities and may approach closely. The mouth of Ship Creek, where harbor seals linger, is about 1,500 m from the southern end of the CTR.

The POA evaluated marine mammal monitoring data to calculate hourly sighting rates for harbor seals in the CTR project area (see table 4–1 in the POA's application). Of the 524 harbor seal sightings in 2020 and 2021, 93.7 percent of the sightings were of single individuals; only 5.7 percent of sightings were of two individual harbor seals, and only 0.6 percent of sightings reported three harbor seals. Sighting rates of harbor seals were highly variable and appeared to have increased during monitoring between 2005 and 2022. It is unknown whether any potential increase was due to local population increases or habituation to ongoing construction activities. The highest individual hourly sighting rate recorded for a previous year was used to quantify take of harbor seals for in-water pile installation and removal associated with CTR. This occurred in 2021 during PCT Phase 2 construction, when harbor seals were observed from May through September. A total of 220 harbor seal sightings were observed over 734.9 hours of monitoring, at an average rate of 0.30 harbor seal sightings per hour. The maximum monthly sighting rate occurred in September 2020 and was 0.51 harbor seal sightings per hour. Based on these data, the POA estimated, and NMFS concurs, that approximately one harbor seal (the maximum monthly sighting rate (0.51) rounded up) may be observed near the CTR project per hour of hammer use.

Beluga Whale

CIBWs are regular and frequent visitors to Knik Arm, sometimes passing by the POA multiple times a day, as documented by the previous PAMP monitoring projects (61N Environmental, 2021, 2022a, 2022b). Distances from CIBW sightings to the CTR project site from the POA and NMFS-funded monitoring programs ranged from less than 10 m up to nearly 15 km. The robust marine mammal monitoring programs in place at the POA from 2020 through 2022 located, identified, and tracked CIBWs at greater distances from the proposed project site than previous monitoring programs (*i.e.,* Kendall and Cornick, 2015) and has contributed to a better understanding of CIBW movements in upper Cook Inlet (*e.g.,* Easley-Appleyard and Leonard, 2022).

For the NES1 project, NMFS and the POA collaboratively developed a new sighting rate methodology that incorporates a spatial component for CIBW observations, which allows for more accurate estimation of potential take of CIBWs (89 FR 2832, January 14, 2024). We have used this same methodology in the analysis of estimated CIBW incidental take during the CTR project. A detailed description of the differences from the sighting-rate methods used in the PCT and SFD projects can be found in the notice of proposed IHA for the NES1 project (88 FR 76576, November 6, 2023).

During the POA's and NMFS' marine mammal monitoring programs for the PCT and SFD projects (table 18), PSOs had an increased ability to detect, identify, and track CIBWs groups at greater distances from the project work site when compared with previous years because of the POA's expanded monitoring program as described above. This meant that observations of CIBWs in the 2020–2022 dataset (table 18) include sightings of individuals at distances far outside some of the ensonified areas estimated for the CTR project and at ranges close to the extent of the larger ensonified areas (tables 15 and 16). Therefore, it would not be appropriate to group all CIBW observations from these datasets into a single sighting rate as was done for the PCT and SFD projects. Rather, we propose that CIBW observations should be considered in relation to their distance to the CTR project site when determining appropriate sighting rates to use when estimating take for this project. This would help to ensure that the sighting rates used to estimate take are representative of CIBW presence in the proposed ensonified areas.

TABLE 18—MARINE MAMMAL MONITORING DATA USED FOR CIBW SIGHTING RATE CALCULATIONS

Year	Monitoring type and data source	Number of CIBW group fixes	Number of CIBW groups	Number of CIBWs
2020	PCT: POA Construction Monitoring 61N Environmental, 2021	2,653	245	987
2021	PCT: NMFS Monitoring Easley-Appleyard and Leonard, 2022	694	[1] 109	575
2021	PCT: POA Construction Monitoring 61N Environmental, 2021, 2022a	1,339	132	517
2022	SFD: POA Construction Monitoring 61N Environmental, 2022b	151	9	41

[1] This number differs slightly from Table 6–8 in the POA's application due to our removal of a few duplicate data points in the NMFS data set.

To incorporate a spatial component into the sighting rate methodology, the POA calculated each CIBW group's closest point of approach (CPOA) relative to the CTR proposed project site. The 2020–2022 marine mammal monitoring programs (table 18) enabled the collection, in many cases, of multiple locations of CIBW groups as they transited through Knik Arm, which allowed for track lines to be interpolated for many groups. The POA used these track lines, or single recorded locations in instances where only one sighting location was available, to calculate each group's CPOA. CPOAs were calculated in ArcGIS software using the Geographic Positioning System (GPS) coordinates provided for documented sightings of each group (for details on data collection methods, see 61N Environmental, 2021, 2022a, 2022b; Easley-Appleyard and Leonard, 2022) and the CTR location midpoint, centered on the proposed project site. A CIBW group was defined as a sighting of one or more CIBWs as determined during data collection. The most distant CPOA location to CTR was 11,138 m and the closest CPOA location was 6 m.

The cumulative density distribution of CPOA values represents the percentage of CIBW observations that were within various distances to the CTR action site (figure 4). This distribution shows how CIBW observations differed with distances to the CTR site and was used to infer appropriate distances within which to estimate spatially-derived CIBW sighting rates (figure 4). The POA implemented a piecewise regression model that detected breakpoints (*i.e.,* points within the CPOA data at which statistical properties of the sequence of observational distances changed) in the cumulative density distribution of the CPOA locations, which they proposed to represent spatially-based sighting rate bins for use in calculating CIBW sighting rates. The POA used the ''Segmented'' package (Muggeo, 2020) in the R Statistical Software Package (R Core Team, 2022) to determine statistically significant breakpoints in the linear distances of the CIBW data using this regression method (see section 6.5.5.3 of the POA's application for more details regarding this statistical analysis). This analysis identified breakpoints in the CPOA locations at 195.7, 2,337.0, 3,154.7, and 6,973.9 m (figure 4).

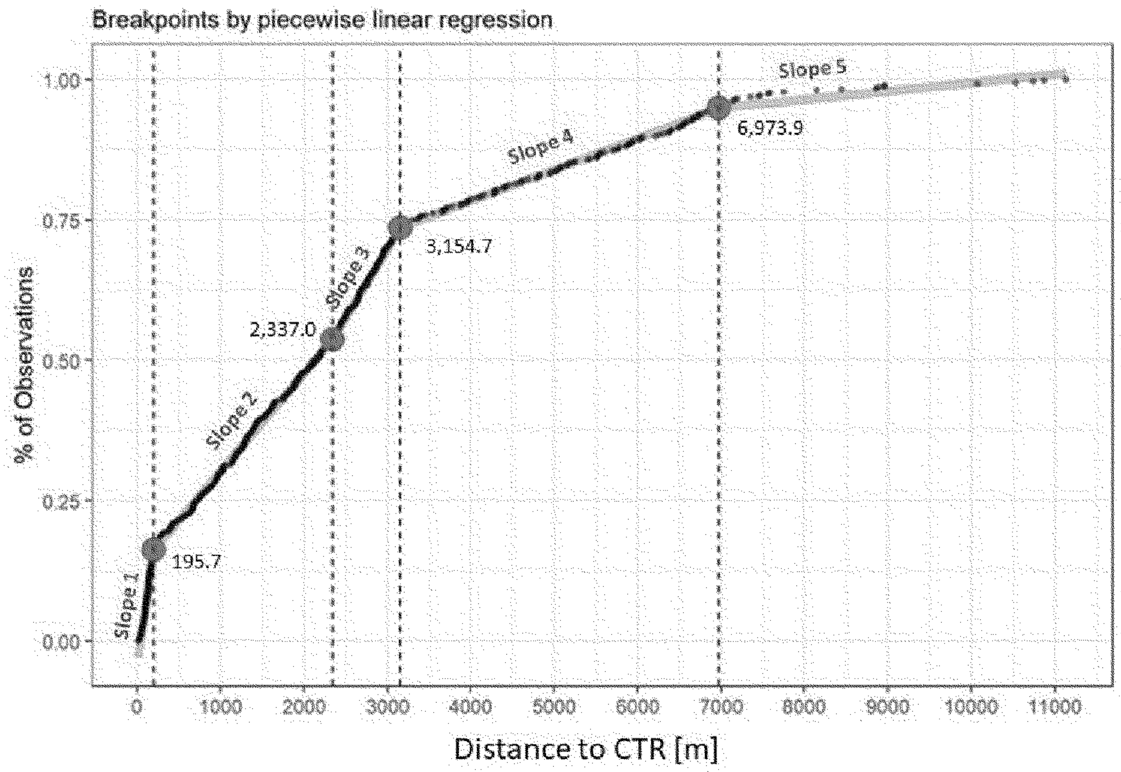

Figure 4 -- Percent of CIBW CPOA Observations in Relation to Distance from the CTR Project Site and Associated Breakpoints Determined by Piecewise Linear Regression

Piecewise regression is a common tool for modeling ecological thresholds (Lopez *et al.,* 2020; Whitehead *et al.,* 2016; Atwood *et al.,* 2016). In a similar scenario to the one outlined above, Mayette *et al.* (2022) used piecewise regression methods to model the distances between two individual CIBWs in a group in a nearshore and a far shore environment. For the POA's analysis, the breakpoints (*i.e.,* 195.7, 2,337.0, 3,154.7, and 6,973.9 m) detect a change in the frequency of CIBW groups sighted and the slope of the line between two points indicates the magnitude of change. A greater positive slope indicates a greater accumulation of sightings over the linear distance (x-axis) between the defining breakpoints, whereas a more level slope (*i.e.,* closer to zero) indicates a lower accumulation of sightings over that linear distance (x-axis) between those defining breakpoints (figure 4; see table 6–16 in the POA's application for the slope estimates for the empirical cumulative distribution function).

The breakpoints identified by the piecewise regression analysis are in agreement with what is known about CIBW behavior in Knik Arm based on recent monitoring efforts (61N Environmental, 2021, 2022a, 2022b;

Easley-Appleyard and Leonard, 2022). Observation location data collected during POA monitoring programs indicate that CIBWs were consistently found in higher numbers in the nearshore areas, along both shorelines, and were found in lower numbers in the center of the Arm. Tracklines of CIBW group movements collected from 2020 to 2022 show that CIBWs displayed a variety of movement patterns that included swimming close to shore past the POA on the east side of Knik Arm (defined by breakpoint 1 at 195.7 m), with fewer CIBWs swimming in the center of Knik Arm (breakpoints 1 to 2, at 195.7 to 2,337 m). CIBWs commonly swam past the POA close to shore on the west side of Knik Arm, with no CIBWs able to swim farther from the POA in that area than the far shore (breakpoints 2 to 3, at 2,337 to 3,154.7 m). Behaviors and locations beyond breakpoint 4 (6,973.9 m) include swimming past the mouth of Knik Arm between the Susitna River area and Turnagain Arm; milling at the mouth of Knik Arm but not entering the Arm; and milling to the northwest of the POA without exiting Knik Arm. The shallowness of slope 5, at distances greater than 6,973.9 m, could be due to detection falloff from a proximity (distance) bias, which would occur when PSOs are less likely to detect CIBW groups that are farther away than groups that are closer.

The POA, in collaboration with NMFS, used the distances detected by the breakpoint analysis to define five sighting rate distance bins for CIBWs in the NES1 project area. Each breakpoint (196, 2,337, 3,155, and 6,974 m, and the complete data set of observations [>6,974 m]) was rounded up to the nearest meter and considered the outermost limit of each sighting rate bin, resulting in five identified bins (table 19). All CIBW observations less than each bin's breakpoint distance were used to calculated that bin's respective monthly sighting rates (*e.g.,* all sightings from 0 to 196 m are included in the sighting rates calculated for bin number 1, all sightings from 0 to 2,337 m are included in the sighting rates calculated for bin number 2, and so on). CTR construction is anticipated to take place in the months of April through November over the 5-year timeframe of the proposed rulemaking; therefore, monthly sighting rates were only derived for these months (table 19).

TABLE 19—CIBW MONTHLY SIGHTING RATES FOR DIFFERENT SPATIALLY-BASED BIN SIZES

Bin number	Distance (m)	CIBW/Hour [1]							
		April	May	June	July	August	September	October	November
1	196	0.05	0.06	0.10	0.04	0.82	0.59	0.51	0.10
2	2,338	0.34	0.16	0.15	0.09	1.55	1.42	1.09	0.65
3	3,155	0.36	0.22	0.21	0.09	2.02	1.89	1.98	0.72
4	6,974	0.67	0.33	0.29	0.13	2.24	2.18	2.42	0.73
5	>6,974	0.71	0.39	0.30	0.13	2.29	2.23	2.56	0.73

[1] Observation hours have been totaled from the PCT 2020 and 2021 programs, the NMFS 2021 data collection effort, and the SFD 2022 program (61N Environmental 2021, 2022a, 2022b; Easley-Appleyard and Leonard, 2022).

Take Estimation

In this section, we describe how the information provided above is synthesized to produce a quantitative estimate of the take that is reasonably likely to occur and proposed for authorization.

To quantitatively assess exposure of marine mammals to noise from pile driving activities, we used the occurrence estimate (number/unit of time; tables 17 and 19) and the estimated work hours per year (table 20) to determine the number of animals potentially exposed to an activity. Because the size of the Level A harassment zones may exceed the shutdown zones (see the Proposed Mitigation section) and the limits of PSO visibility during impact driving activities, the number of takes by Level A harassment was estimated based on the proportion of work hours allocated to impact pile driving (table 20) for all species except killer whales, which have smaller predicted Level A harassment zones, and CIBWs, which have larger proposed shutdown zones, described in further detail below.

TABLE 20—ESTIMATED PREDICTED NUMBER OF HOURS OF IMPACT AND VIBRATORY HAMMER USE FOR EACH CONSTRUCTION YEAR

Year	Impact duration (hrs)	Vibratory duration (hrs)	Total duration (hrs)	Proportion of impact hammer use
1	98.90	55.00	153.90	0.64
2	87.43	47.92	135.35	0.65
3	38.70	96.50	135.20	0.29
4	87.43	50.42	137.85	0.63
5	81.70	55.50	137.20	0.60

The equation used to calculate estimated take by Level A harassment for species with yearly occurrence estimates is:

Level A harassment estimate = occurrence × proportion of impact hammer use

where occurrence per year is taken from table 17, and proportion of impact hammer use per year from table 20. For species with hourly occurrence estimates, the equation is:

Level A harassment estimate = (hourly occurrence × total duration in hours) × proportion of impact hammer use

Estimates of take by Level A and Level B harassment for all species are based on the best available data. NMFS proposes to authorize total takes for each species by Level A and Level B harassment over the 5-year period of the proposed ITR as calculated and shown in the relevant tables, with annual take by Level A and Level B harassment for each species not to exceed the maximum annual values shown in tables 21, 22, and 24.

TABLE 21—ESTIMATED TAKE BY LEVEL A HARASSMENT IN EACH OF THE 5 YEARS AND IN TOTAL FOR NON-CIBW MARINE MAMMAL SPECIES IN THE PROPOSED CTR PROJECT AREA [1]

Species	Potential level A harassment by year					
	1	2	3	4	5	Total
Gray whale	4	4	2	4	4	18
Humpback whale	3	3	1	3	2	12
Killer whale			6			6
Harbor porpoise	15	13	6	13	12	59
Steller sea lion	6	6	3	6	5	26
Harbor seal	98	88	39	87	82	394

[1] Annual take may not be distributed exactly as shown; NMFS proposes to authorize total take over the 5 year construction period, with annual take by Level A harassment for each species not to exceed the maximum annual value shown in years 1–5.

Proposed estimates of take by Level B harassment for non-CIBW species were calculated as the difference between the estimated Level A harassment exposures and total estimated yearly occurrence (either the estimated yearly occurrence from table 17 or calculated as the hourly occurrence from table 17 multiplied by the total yearly duration in table 20) for each stock.

TABLE 22—ESTIMATED TAKE BY LEVEL B HARASSMENT IN EACH OF THE 5 YEARS AND IN TOTAL FOR NON-CIBW MARINE MAMMAL SPECIES IN THE PROPOSED CTR PROJECT AREA [1]

Stock	Potential level B harassment by year					
	1	2	3	4	5	Total
Gray whale	2	2	4	2	2	12
Humpback whale	1	1	3	1	2	8
Killer whale	6	6	6	6	6	30
Harbor porpoise	8	7	14	8	8	45
Steller sea lion	3	3	6	3	4	20
Harbor seal	55	47	96	51	55	304

[1] Annual take may not be distributed exactly as shown; NMFS proposes to authorize total take over the 5 year construction period, not to exceed the sum of the maximum annual values shown in years 1–5 in Tables 21 and 22.

Beluga Whale

Potential exposures above harassment thresholds of CIBWs, which we equate with takes, were calculated by multiplying the total number of vibratory installation or removal hours per month for each sized/shaped pile based on the anticipated construction schedule (table 2) with the corresponding sighting rate month and sighting rate distance bin (table 19). For example, the Level B harassment isopleth distance for the vibratory installation of 36-in (91-cm) piles is 4,514 m, which falls within bin number 4 (table 19). Therefore, take for this activity is calculated by multiplying the total number of hours estimated each month to install 36-in piles via a vibratory hammer by the monthly CIBW sighting rates calculated for bin number 4 (table 19). The resulting estimated CIBW exposures were totaled for all activities in each month (table 23).

In their calculation of CIBW take, the POA assumed that only 36-in template piles would be installed (rather than 24-in) and removed during the project. If 24-in piles are used for temporary stability template piles, it would be assumed that the potential impacts of this alternate construction scenario and method on marine mammals are fungible (*i.e.,* that potential impacts of installation and removal of 24-in steel pipe piles would be similar to the potential impacts of installation and removal of 36-in steel pipe piles). While removal of 24-in piles may be louder than removal of 36-in piles (tables 9 and 10), installation would be significantly quieter. Given the number of piles to be installed and extracted using vibratory methods, overall impacts from 36-in piles are expected to be greater than those from 24-in piles. Using the monthly activity estimates in hours (table 2) and monthly calculated sighting rates (CIBWs/hour) for the spatially derived distance bins (table 23), we estimated take by Level B harassment for each of the 5 years of the CTR project (table 24).

TABLE 23—ALLOCATION OF EACH LEVEL B HARASSMENT ISOPLETH TO A SIGHTING RATE BIN AND CIBW MONTHLY SIGHTING RATES FOR DIFFERENT PILE SIZES AND HAMMER TYPES

Activity	Level B isopleth distance (m)	Sighting rate bin number and distance	Belugas/Hour							
			Apr	May	Jun	Jul	Aug [1]	Sep [1]	Oct [1]	Nov
Unattenuated Values (without the use of a bubble curtain)										
36-in Vibratory Removal [1 2]	1,699	2 (2,338 m)	0.34	0.16	0.15	0.09	1.55	1.42	1.09	0.65
36-in Vibratory Installation [1 2]	4,514	4 (6,974 m)	0.67	0.33	0.29	0.13	2.24	2.18	2.42	0.73
72-in Vibratory Installation [3]	9,069	5 (>6,974)	0.71	0.39	0.30	0.13	2.29	2.23	2.56	0.73
Concurrent 36-in AND 36-in Vibratory Installation	9,069									
Concurrent 36-in AND 36-in OR 72-in Vibratory Installation [4].	9,363									
36-in Impact Installation [1 2]	1,585	2 (2,338 m)	0.34	0.16	0.15	0.09	1.55	1.42	1.09	0.65
72-in Impact Installation [3]	7,356	5 (>6,974)	0.71	0.39	0.30	0.13	2.29	2.23	2.56	0.73
Attenuated Values (with the use of a bubble curtain)										
36-in Vibratory Removal [2]	1,318	2 (2,338)	0.34	0.16	0.15	0.09	1.55	1.42	1.09	0.65
36-in Vibratory Installation [2]	3,575	4 (6,974 m)	0.67	0.33	0.29	0.13	2.24	2.18	2.42	0.73
72-in Vibratory Installation [3]	6,119									
Concurrent 36-in AND 36-in Vibratory Installation	5,667									
Concurrent 36-in AND 72-in Vibratory Installation	8,318	5 (>6,974)	0.71	0.39	0.30	0.13	2.29	2.23	2.56	0.73
36-in Impact Installation [1 2]	541	2 (2,338)	0.34	0.16	0.15	0.09	1.55	1.42	1.09	0.65
72-in Impact Installation	2,512	3 (3,155 m)	0.36	0.22	0.21	0.09	2.02	1.89	1.98	0.72

[1] Unattenuated vibratory and impact driving of temporary and permanent piles during the months of August through October would be limited to the minimum possible number of piles that must be driven in-water in depths <3 m.

[2] Unattenuated and attenuated vibratory installation of 36-in temporary piles both result in bin 4; vibratory removal of this pile type results in bin 2 in both attenuated and unattenuated conditions. Unattenuated and attenuated impact pile driving of 36-in piles results in bin 2 in both conditions.

[3] Unattenuated vibratory and impact installation of permanent (72-in) piles will be minimized to the extent possible by driving as many piles as possible in the dry for all months of the construction seasons. To account for piles driven in water less than 3 m deep, NMFS has estimated approximately 0.5 unattenuated 72-in piles will be driven (approximately 43 minutes of impact driving and 5 minutes of vibratory driving) each month. Impact driving (attenuated and unattenuated) results in Bin 2; vibratory driving (attenuated and unattenuated) results in Bin 5.

[4] Both concurrent driving of 2 temporary piles (1 attenuated, 1 unattenuated) and 1 temporary (unattenuated) and 1 permanent (attenuated) piles result in a Level B harassment isopleth of 9,363 m.

For the PCT (85 FR 19294, April 6, 2020), SFD (86 FR 50057, September 7, 2021), and NES1 (89 FR 2832, January 14, 2024) projects, NMFS accounted for the implementation of mitigation measures (*e.g.,* shutdown procedures implemented when CIBWs entered or approached the estimated Level B harassment zone) by applying an adjustment factor to CIBW take estimates. This was based on the assumption that some Level B harassment takes would likely be avoided based on required shutdowns for CIBWs at the Level B harassment zone isopleths (see the Proposed Mitigation section for more information). For the PCT project, NMFS compared the number of observations of CIBW within estimated harassment zones at the POA to the number of authorized takes for previous projects from 2008 to 2017 and found the percentage ranged from 12 to 59 percent with an average of 36 percent (85 FR 19294, April 6, 2020). NMFS then applied the highest percentage of previous potentially realized takes (*i.e.,* number of CIBWs observed within estimated Level B harassment zones; 59 percent during the 2009–2010 season) to ensure potential takes of CIBWs were fully evaluated. In doing so, NMFS assumed that approximately 59 percent of the takes calculated could be realized during PCT and SFD construction (85 FR 19294, April 6, 2020; 86 FR 50057, September 7, 2021) and that 41 percent of the calculated CIBW Level B harassment takes would be avoided by successful implementation of required mitigation measures.

The POA calculated the adjustment for successful implementation of mitigation measures for CTR using the percentage of realized takes for the PCT project (see table 6–20 in the POA's application). The data from PCT Phase 1 and PCT Phase 2 most accurately reflect the current marine mammal monitoring program, the current program's effectiveness, and CIBW occurrence in the proposed project area. Between the two phases of the PCT project, 90 total Level B harassment takes were authorized and 53 were potentially realized, equating to an overall percentage of 59 percent. The SFD Project, during which only 7 percent of authorized take was potentially realized, represents installation of only 12 piles during a limited time period and does not represent the much higher number of piles and longer construction timeframe anticipated for CTR.

NMFS proposes that the 59-percent adjustment accurately accounts for the efficacy of the POA's marine mammal monitoring program and required shutdown protocols, based on past performance. NMFS, therefore, assumes that approximately 59 percent of the takes calculated for CTR may actually be realized (table 24). Take by Level A harassment is not anticipated or proposed to be authorized for CIBWs because the POA will be required to shut down activities when CIBWs approach and or enter the Level B harassment zone, which in all cases is larger than the estimated Level A harassment zones (see the Proposed Mitigation section for more information).

TABLE 24—CALCULATED LEVEL B HARASSMENT TAKES OF CIBWS BY MONTH, YEAR, AND ACTIVITY [1]

	Apr	May	Jun	Jul	Aug [2]	Sep [2]	Oct [2]	Nov
Year 1 [1]								
36″ vibratory installation [3]	1.68	2.01	1.76	0.78	13.44	13.10	7.26	1.47
36″ vibratory removal [3]	0.26	0.12	0.11	0.07	1.16	1.06	0.82	0.49

TABLE 24—CALCULATED LEVEL B HARASSMENT TAKES OF CIBWS BY MONTH, YEAR, AND ACTIVITY [1]—Continued

	Apr	May	Jun	Jul	Aug [2]	Sep [2]	Oct [2]	Nov
72″ vibratory installation (attenuated)	0.50	0.59	0.51	0.23	3.17	3.09	3.43	0.06
72″ vibratory installation (unattenuated) [4]	0.06	0.03	0.03	0.01	0.19	0.19	0.21	0.06
72″ impact installation (attenuated)	2.35	3.36	3.19	1.40	24.67	23.08	24.18	3.62
72″ impact installation (unattenuated) [4]	0.49	0.27	0.21	0.09	1.60	1.56	1.79	0.51
Year 1 total								151
With 59% Correction Factor [5]								90
Year 2 [1]								
36″ vibratory installation [3]	2.01	1.67	1.47	0.65	11.20	10.91	6.05	1.47
36″ vibratory removal [3]	0.26	0.12	0.11	0.07	1.16	1.06	0.82	0.00
72″ vibratory installation (attenuated)	0.50	0.47	0.42	0.18	3.17	2.73	3.03	0.43
72″ vibratory installation (unattenuated) [4]	0.06	0.03	0.03	0.01	0.19	0.19	0.21	0.06
72″ impact installation (attenuated)	2.35	2.72	2.58	1.14	24.67	20.36	21.34	3.62
72″ impact installation (unattenuated) [4]	0.49	0.27	0.21	0.09	1.60	1.56	1.79	0.51
Year 2 total								137
With 59% Correction Factor [5]								81
Year 3 [1]								
36″ vibratory installation [3]	4.36	4.35	3.82	1.68	29.13	28.38	15.73	1.47
36″ vibratory removal [3]	0.26	0.37	0.34	0.21	2.33	2.12	0.82	0.49
72″ vibratory installation (attenuated)	0.39	0.20	0.17	0.05	0.93	0.91	1.01	0.31
72″ vibratory installation (unattenuated) [4]	0.06	0.03	0.03	0.01	0.19	0.19	0.21	0.06
72″ impact installation (attenuated)	1.83	1.12	1.07	0.34	7.28	6.81	7.13	2.59
72″ impact installation (unattenuated) [4]	0.49	0.27	0.21	0.09	1.60	1.56	1.79	0.51
Year 3 total								136
With 59% Correction Factor [5]								81
Year 4 [1]								
36″ vibratory installation [3]	4.36	4.35	3.82	1.68	29.13	28.38	15.73	1.47
36″ vibratory removal [3]	0.26	0.37	0.34	0.21	2.33	2.12	0.82	0.49
72″ vibratory installation (attenuated)	0.39	0.20	0.17	0.05	0.93	0.91	1.01	0.31
72″ vibratory installation (unattenuated) [4]	0.06	0.03	0.03	0.01	0.19	0.19	0.21	0.06
72″ impact installation (attenuated)	1.83	1.12	1.07	0.34	7.28	6.81	7.13	2.59
72″ impact installation (unattenuated) [4]	0.49	0.27	0.21	0.09	1.60	1.56	1.79	0.51
Year 4 total								138
With 59% Correction Factor [5]								82
Year 5 [1]								
36″ vibratory installation [3]	1.68	2.01	1.76	0.78	13.44	12.00	13.31	1.84
36″ vibratory removal [3]	0.26	0.12	0.11	0.07	1.16	1.06	0.82	0.49
72″ vibratory installation (attenuated)	0.28	0.47	0.42	0.18	2.80	2.73	3.03	0.31
72″ vibratory installation (unattenuated) [4]	0.06	0.03	0.03	0.01	0.19	0.19	0.21	0.06
72″ impact installation (attenuated)	1.31	2.72	2.58	1.14	21.77	20.36	21.34	2.59
72″ impact installation (unattenuated) [4]	0.49	0.27	0.21	0.09	1.60	1.56	1.79	0.51
Year 5 total								143
With 59% Correction Factor [5]								85
Years 1–5 Total								
Project Total Estimated Exposures								705
With 59% Correction Factor [5]								419

[1] Concurrent driving scenarios that would improve the production efficiency in the months of April through July have been conservatively excluded from this analysis.
[2] Unattenuated vibratory driving of temporary and permanent piles during the months of August through October would be limited to the minimum possible number of piles that must be driven in-water in depths <3m.
[3] Attenuated and unattenuated bins for this activity are the same.
[4] Unattenuated vibratory and impact installation of permanent (72-in) piles will be minimized to the extent possible by driving as many piles as possible in the dry for all months of the construction seasons. This calculation assumes 0.5 72-in piles per month may be driven in water depths <3m and thus be unattenuated.
[5] Corrected exposure estimates have been rounded up for each year (*e.g.,* Year 1 = 0.59 * 151 = 89.1, which has been rounded up to 90).

In summary, the maximum annual amount of Level A harassment and Level B harassment proposed to be authorized for each marine mammal stock is presented in table 25.

TABLE 25—NUMBER OF PROPOSED TAKES AS A PERCENTAGE OF STOCK ABUNDANCE, BY STOCK AND HARASSMENT TYPE FOR THE MAXIMUM ANNUAL ESTIMATED TAKES OF THE PROJECT

Species	Proposed take			Stock	Percent of stock
	Level A	Level B	Total		
Gray whale	4	2	6	Eastern North Pacific	0.02
Humpback whale [1]	3	1	4	Hawai'i	0.04
				Mexico-North Pacific	[2] UNK
Beluga whale	0	90	90	Cook Inlet [3]	27.2
Killer whale [1]	6	6	12	Eastern North Pacific Alaska Resident	0.6
				Eastern North Pacific Gulf of Alaska, Aleutian Islands and Bering Sea Transient.	2.04
Harbor porpoise	16	8	24	Gulf of Alaska	0.08
Steller sea lion	6	3	9	Western	0.015
Harbor seal	99	55	154	Cook Inlet/Shelikof Strait	0.54

[1] NMFS conservatively assumes that all takes occur to each stock

[2] NMFS does not have an official abundance estimate for this stock and the minimum population estimate is considered to be unknown (Young *et al.,* 2023). See Small Numbers for additional discussion.

[3] This abundance estimate is from Goetz *et al.* (2023); which was published after the most recent CIBW SAR (Young *et al.,* 2023).

Proposed Mitigation

In order to promulgate a rulemaking under section 101(a)(5)(A) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity and other means of effecting the least practicable adverse impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance and on the availability of the species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, NMFS considers two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned), and;

(2) The practicability of the measures for applicant implementation, which may consider factors such as cost and impact on operations.

The POA presented mitigation measures in section 11 of their application that were modeled after the requirements included in the IHAs issued for Phase 1 and Phase 2 PCT construction (85 FR 19294, April 6, 2020) and for SFD construction (86 FR 50057, September 7, 2021), which were designed to minimize the total number, intensity, and duration of harassment events for CIBWs and other marine mammal species during those projects (61N Environmental, 2021, 2022a, 2022b). NMFS concurs that these proposed measures reduce the potential for CIBWs and other marine mammals to be adversely impacted by the proposed activity.

Noise Mitigation for Pile Installation and Removal—The POA has previously utilized and assessed the effectiveness of bubble curtains for noise mitigation at the project site (Austin *et al.* 2016; Illingworth and Rodkin, LLC (I&R) 2021a, 2021b, 2023). In all previous years of the PAMP, bubble curtains were not used on piles installed or removed in shallow water less than 3 meters deep or piles installed or removed "in the dry" (*e.g.,* at times when the tide is low and the pile's location is dewatered) because low water levels prevent proper deployment and function of a bubble curtain system. When a pile was installed or removed in the dry, it was assumed that no exposure to received sound levels equated with potential incidental harassment occurred and, therefore, that no take of marine mammals occurred. The same assumptions and approach to mitigation associated with use of a bubble curtain have been used in the analyses for this project.

NMFS is proposing that the POA must employ the following mitigation measures:

• Ensure that construction supervisors and crews, the monitoring team and relevant POA staff are trained prior to the start of all pile driving, so that responsibilities, communication procedures, monitoring protocols, and operational procedures are clearly understood. New personnel joining during the project must be trained prior to commencing work;

• Employ PSOs and establish monitoring locations as described in the POA's Marine Mammal Monitoring and Mitigation Plan (see appendix B of the POA's application). The POA must monitor the project area to the maximum extent possible based on the required number of PSOs, required monitoring locations, and environmental conditions;

• Monitoring must take place from 30 minutes prior to initiation of pile driving (*i.e.,* pre-clearance monitoring) through 30 minutes post-completion of pile driving;

• Pre-start clearance monitoring must be conducted during periods of visibility sufficient for the lead PSO to determine that the shutdown zones indicated in table 26 are clear of marine mammals. Pile driving may commence following 30 minutes of observation when the determination is made that the shutdown zones are clear of marine mammals or when the mitigation measures proposed specifically for CIBWs (below) are satisfied;

• If work ceases for more than 30 minutes, PSOs must observe a 30-minute pre-start clearance period (*i.e.,* the shutdown zones must be observed for 30 minutes and confirmed clear of marine mammals) prior to reinitiating pile driving. A determination that the shutdown zone is clear must be made during a period of good visibility.

• For all construction activities, shutdown zones must be established following table 26. The purpose of a shutdown zone is generally to define an area within which shutdown of activity would occur upon sighting of a marine mammal entering or within the defined area. The shutdown zones (table 26) were calculated based on the minimum 100-m shutdown zone proposed by the POA for all pile installation and vibratory extraction activities, as well as the calculated Level A (non-CIBW species) and Level B (CIBWs) harassment isopleths shown in table 16. In most cases, the shutdown zones exceed the calculated Level A isopleths; exceptions occur during impact pile driving, when the calculated Level A harassment isopleths exceed practicable shutdown zones for non-CIBW species, and during concurrent vibratory driving (the largest Level A isopleth is 161 m during this activity). For CIBWs, the shutdown zones exceed the calculated Level B harassment isopleths in all scenarios.

TABLE 26—PROPOSED SHUTDOWN ZONES DURING SPECIFIED ACTIVITIES

Activity	Pile type/size	Attenuated or unattenuated	Shutdown zone (m)					
			LF cetaceans	Non-CIBW MF [1] cetaceans	CIBWs	HF [1] cetaceans	PW	OW
Vibratory Installation	24-in	Unattenuated	100	100	2,250	100	100	100
	36-in				4,520			
	72-in	.						
	72-in				9,100			
	24-in	Attenuated			2,630			
	36-in				3,580			
	72-in				6,120			
Vibratory Removal	24-in	Unattenuated			5,970			
	36-in				1,700			
	24-in	Attenuated			2,100			
	36-in				1,320			
Impact Installation—1 pile per day.	24-in	Unattenuated	500	500	1,600	500	100	100
	36-in							
	24-in	Attenuated	100	100	550	100	100	100
	36-in							
Impact Installation—1 pile per day.	72-in	Unattenuated	500	500	7,360	500	100	100
		Attenuated			2,520			
Impact Installation—2 piles per day.								
Impact Installation—3 piles per day.								
Concurrent—2 Vibratory sources.	36-in	Attenuated/Attenuated	100	100	5,670	100	100	100
	AND	Attenuated/Unattenuated			9,370			
	36-in	Unattenuated/Unattenuated.			9,070			
	36-in	Attenuated/Attenuated			8,320			
	AND	Unattenuated/Attenuated			9,370			
	72-in							
Concurrent Vibratory/Impact.	36-in	Attenuated/Attenuated (1 pile per day).	500	500	3,580	500	100	100
	AND	Attenuated/Attenuated (2 piles per day).						
	72-in	Attenuated/Attenuated (3 piles per day).						
		Unattenuated/Attenuated (1 pile per day).			4,520			
		Unattenuated/Attenuated (2 piles per day).						
		Unattenuated/Attenuated (3 piles per day).						

Notes: cm = centimeter(s), m = meter(s); POA may elect to use either 36-in or 24-in temporary piles; as 36-in piles are more likely and estimated to have larger ensonified areas, we have used these piles in our analyses of concurrent activities.

[1] In the Updated Technical Guidance (NMFS, 2024), the MF Cetacean hearing group has been re-named the HF Cetacean group; HF Cetaceans from the 2018 Technical Guidance have been re-named VHF Cetaceans.

• Marine mammals observed anywhere within visual range of the PSO must be tracked relative to construction activities. If a marine mammal is observed entering or within the shutdown zones indicated in table 26, pile driving must be delayed or halted. If pile driving is delayed or halted due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zone (table 26), or 15 minutes (non-CIBWs) or 30 minutes (CIBWs) have passed without re-detection of the animal;

• The POA must use bubble curtains for all piles during both vibratory and impact pile driving in water depths greater than 3 m during the months of August through October. No bubble curtain is required for vibratory pile driving of temporary (24-in or 36-in) piles in the months of April–July (see discussion below). Bubble curtains must be used for all permanent (72-in) piles during both vibratory and impact pile driving in waters deeper than 3 m in the months of April–November. The bubble curtain must be operated as necessary to achieve optimal performance. At a minimum, the bubble curtain must distribute air bubbles around 100 percent of the piling circumference for the full depth of the water column; the lowest bubble ring must be in contact with the substrate for the full circumference of the ring; and air flow to the bubblers must be balanced around the circumference of the pile.

- The POA must use soft start techniques when impact pile driving. Soft start requires contractors to provide an initial set of three strikes at reduced energy, followed by a 30-second waiting period, then two subsequent reduced energy strike sets. A soft start must be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of 30 minutes or longer. PSOs shall begin observing for marine mammals 30 minutes before ''soft start'' or in-water pile installation or removal begins;
- Pile driving activity must be halted upon observation of either a species for which incidental take is not authorized or a species for which incidental take has been authorized but the authorized number of takes has been met, entering or within the harassment zone; and
- The POA must avoid direct physical interaction with marine mammals during non-pile-driving construction activities, including barge positioning and pile cutting. If a marine mammal comes within 10 m of such activity, operations shall cease. Should a marine mammal come within 10 m of a vessel in transit, the boat operator will reduce vessel speed to the minimum level required to maintain steerage and safe working conditions. If human safety is at risk, based on the best judgment of the vessel captain or project engineer, the in-water activity is allowed to continue until it is safe to stop.

The following additional mitigation measures are proposed by NMFS for CIBWs:

- Prior to the onset of pile driving, should a CIBW be observed approaching the estimated shutdown zone (table 26) (*i.e.* the CIBWs Level B harassment zone column in tables 15 and 16), pile driving must not commence until the whale(s) moves at least 100 m past the estimated shutdown zone and on a path away from the zone, or the whale has not been re-sighted within 30 minutes;
- If pile installation or removal has commenced and a CIBW(s) is observed within or likely to enter the shutdown zone, pile installation or removal must shut down and not re-commence until the whale has traveled at least 100 m beyond the shutdown zone and is on a path away from such zone or until no CIBW has been observed in the shutdown zone for 30 minutes; and
- If during installation and removal of piles, PSOs can no longer effectively monitor the entirety of the CIBW shutdown zone due to environmental conditions (*e.g.,* fog, rain, wind), pile driving may continue only until the current segment of the pile is driven; no additional sections of pile or additional piles may be driven until conditions improve such that the shutdown zone can be effectively monitored. If the shutdown zone cannot be monitored for more than 15 minutes, the entire shutdown zone will be cleared again for 30 minutes prior to pile driving.

In addition to these mitigation measures being proposed by NMFS, NMFS requested that the POA restrict all pile driving and removal work to April to July, when CIBWs are typically found in lower numbers. However, the POA stated that given the scale of the project, construction sequencing requirements, critical nature of the CTR infrastructure and overall PAMP, and vulnerability of the existing cargo terminals to seismic events, it cannot commit to restricting pile driving and removal to April to July. Instead, the POA would complete as much work as is practicable in April to July to reduce the amount of pile driving and removal activities in August through November. The POA is aware that August through October are months with high CIBW abundance and plans to complete in-water work as early in the construction season as possible. The POA also recognizes that more work shutdowns for CIBW are likely to take place in high abundance months, which provides incentive to complete work earlier in the season.

Due to the deterioration of the current facilities and complexity of the PAMP, it is important that the POA attempt to complete the CTR project as currently proposed (6 years in total), which requires the POA to make full use of the available annual construction window (August through October/November). Potential consequences of pausing the construction season (*e.g.,* stopping work from August through October) include de-rating of the structural capacity of the existing cargo terminals, a shutdown of dock operations due to deteriorated conditions, or an actual collapse of one or more dock structures. The potential for collapse increases with schedule delays due to both worsening deterioration and the higher probability of a significant seismic event occurring before T1 and T2 replacement.

For previous IHAs issued to the POA (PCT: 85 FR 19294, April 6, 2020; SFD: 86 FR 50057, September 7, 2021), the use of a bubble curtain to reduce noise has been required as a mitigation measure for certain pile driving scenarios. The POA has concerns about effectiveness of bubble curtains in the far-field during vibratory pile driving (see Appendix A of the POA's application for further details). NMFS disagrees with the POA's assertion of effectiveness but acknowledges the use of bubble curtains on all piles has the potential to drive the in-water construction schedule further into the late summer months, which are known for higher CIBW abundance in the project area, thus lengthening the duration of potential interactions between CIBW and in-water work. Therefore, NMFS is concerned that use of a bubble curtain for all piles in all months may ultimately result in increased impacts to CIBW. Given the extensive proposed visual monitoring and mitigation measures in place, and in order to facilitate increased production when CIBW abundance at POA is expected to be lowest, NMFS concurs that the POA's proposal to use vibratory hammers to install and extract temporary piles with no bubble curtain during the months of April through July affects the least practicable adverse impact on marine mammals. A bubble curtain would be required during all installation of permanent piles in all months, and for vibratory driving of temporary piles in August through October.

NMFS considered additional mitigation and monitoring requirements for the CTR project, including sound-source verification measurements and passive acoustic monitoring of marine mammals near the POA. Sound source verification is time-intensive and expensive, and the POA has previously collected data on most of the pile types proposed for the CTR project (Illingworth and Rodkin, 2021a, b). Following discussion with the POA, NMFS determined that conducting additional sound source verification measurements would not be practicable or provide support for additional mitigation value due to schedule concerns and the volume of data already collected and, therefore, this measure was eliminated from the suite of proposed mitigation requirements. However, depending on future project conditions, the POA may choose to conduct sound source verification measurements and work with NMFS to revise the estimated harassment zones as indicated by the data collected.

With respect to passive acoustic monitoring, available technologies to detect marine mammals in near real-time require a surface buoy for the device, and mooring locations would be limited by ongoing port operations, construction activities, and dredging. The high noise environment at the POA (from both anthropogenic and natural sources) would add additional limitations to the detection range of such devices. Therefore, NMFS believes that the POA's extensive and successful visual monitoring program represents the best possible method of minimizing effects to marine mammals, including CIBWs to pile driving noise, and that passive acoustic monitoring would not provide additional benefits to marine mammals in this case.

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 affecting the least practicable impact on the affected 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 promulgate a rulemaking for an activity, section 101(a)(5)(A) 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 authorizations 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 specified geographical region. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.,* presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.,* source characterization, propagation, ambient noise); (2) affected species (*e.g.,* life history, dive patterns); (3) co-occurrence of marine mammal species with the activity; or (4) biological or behavioral context of exposure (*e.g.,* age, calving or feeding areas);
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.,* marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and,
- Mitigation and monitoring effectiveness.

The POA's draft Marine Mammal Monitoring and Mitigation Plan is Appendix B of the LOA application, and is available on *regulations.gov* and at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-port-alaskas-construction-activities-port-alaska-modernization*. The POA proposes to implement a marine mammal monitoring and mitigation strategy intended to avoid and minimize impacts to marine mammals. Marine mammal monitoring would be conducted at all times when in-water pile installation and removal is taking place. Prior to the beginning of construction, POA would submit a revised Marine Mammal Mitigation and Monitoring Plan containing additional details of monitoring locations and methodology for NMFS concurrence.

The marine mammal monitoring and mitigation program that is planned for CTR construction would be modeled after the successful monitoring and mitigation programs outlined in the IHAs for Phase 1 and Phase 2 PCT construction (85 FR 19294, April 6, 2020) and the IHAs for SFD (86 FR 50057, September 7, 2021) and NES1 (89 FR 2832, January 14, 2024) construction. These monitoring programs have provided the best available data on CIBW and other marine mammal presence at the POA and continue to be used successfully as of July 2024 at the NES1 project.

Visual Monitoring

Monitoring must be conducted by qualified, NMFS-approved PSOs, in accordance with the following:

- PSOs must be independent of the activity contractor (*e.g.,* employed by a subcontractor) and have no other assigned tasks during monitoring periods. At least one PSO at each monitoring station must have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued ITA or Letter of Concurrence. Other PSOs may substitute other relevant experience (including relevant Alaska Native traditional knowledge), education (degree in biological science or related field), or training for prior experience performing the duties of a PSO. PSOs must be approved by NMFS prior to beginning any activity subject to this ITA;
- The POA must employ PSO stations at a minimum of four locations from which PSOs can effectively monitor the shutdown zones (table 24). PSO stations must be positioned at the best practical vantage points that are determined to be safe. Likely locations include the Anchorage Downtown Viewpoint near Point Woronzof, the Anchorage Public Boat Dock at Ship Creek, the CTR Project site, and the North End of POA property (see figure 13–1 in the POA's application for potential locations of PSO stations). Areas near Cairn Point or Port MacKenzie have safety, security, and logistical issues, which would need to be considered. Cairn Point proper is located on military land and has bear presence, and restricted access does not allow for the location of an observation station at this site. Tidelands along Cairn Point are accessible only during low tide conditions and have inherent safety concerns of being trapped by rising tides. Port MacKenzie is a secure port that is relatively remote, creating safety, logistical, and physical staffing limitations due to lack of nearby lodging and other facilities. The roadway travel time between port sites is approximately 2–3 hours. An additional possible monitoring location is proposed north of the proposed project site, pending selection of the Construction Contractor and more detailed discussions before the start of construction. Temporary staffing of a northerly monitoring station during peak marine mammal presence time periods and/or when shutdown zones are large would be considered by the POA, NMFS, and the construction contractor based on evaluation of CIBW occurrence reported in the required weekly monitoring reports. At least one PSO station must be able to fully observe the non-CIBW shutdown zones; multiple PSO stations will be necessary to fully observe the CIBW shutdown zones (table 24);
- PSO stations must be elevated platforms constructed on top of shipping containers or a similar base

that is at least 8′6″ high (*i.e.,* the standard height of a shipping container) that can support at least three PSOs and their equipment. The platforms must be stable enough to support use of a theodolite and must be located to optimize the PSO's ability to observe marine mammals and the harassment zones;

- Each PSO station must have at least two PSOs on watch at any given time; one PSO must be observing and one PSO would be recording data (and observing when there are no data to record). Teams of three PSOs would include one PSO who would be observing, and one PSO who would be recording data (and observing when there are no data to record). The third PSO may help to observe, record data, or rest. In addition, if POA is conducting in-water work on other projects that includes PSOs, the CTR PSOs must be in real-time contact with those PSOs, and both sets of PSOs must share all information regarding marine mammal sightings with each other;
- A designated lead PSO must always be on site. The lead observer must have prior experience performing the duties of a PSO during in-water construction activities pursuant to a NMFS-issued ITA or Letter of Concurrence. Each PSO station must also have a designated Station Lead PSO specific to that station and shift. These Station Lead PSOs must have prior experience working as a PSO during in-water construction activities;
- PSOs would use a combination of equipment to perform marine mammal observations and to verify the required monitoring distance from the project site, which may include 7 by 50 binoculars, 20x/40x tripod mounted binoculars, 25 by 150 ''big eye'' tripod mounted binoculars, and theodolites;
- PSOs must record all observations of marine mammals, regardless of distance from the pile being driven. PSOs shall document any behavioral reactions in concert with distance from piles being driven or removed;

PSOs must have the following additional qualifications:

- Ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to record required information including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); and marine mammal behavior; and
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

Reporting

NMFS would require the POA to submit interim weekly monitoring reports within 14 calendar days after the conclusion of each calendar week (that include raw electronic data sheets) during the CTR construction seasons, including for weeks during which no in-water work occurred (an email notification for weeks with no in-water work would be sufficient). These reports must include a summary of marine mammal species observed and behavioral observations, mitigation actions implemented, construction delays, and construction work completed. They also must include an assessment of the amount of construction remaining to be completed (*i.e.,* the number of estimated hours of work remaining), in addition to the number of CIBWs observed within estimated harassment zones to date for the current construction year.

NMFS would also require the POA to submit annual reports after the end of each construction season and a comprehensive final report following the conclusion of year 5 construction activities. Draft annual marine mammal monitoring reports must be submitted to NMFS within 90 days after the completion of each construction season or 60 days prior to a requested date of issuance of any future incidental take authorization for projects at the same location, whichever comes first. Annual reports must detail the monitoring protocol and summarize the data recorded during monitoring, and associated PSO data sheets in electronic tabular format. Specifically, the reports must include:

- Dates and times (begin and end) of all marine mammal monitoring;
- Construction activities occurring during each daily observation period, including the number and type of piles driven or removed and by what method (*i.e.,* impact or vibratory, the total equipment duration for vibratory installation and removal, and the total number of strikes for each pile during impact driving);
- PSO locations during marine mammal monitoring;
- Environmental conditions during monitoring periods (at beginning and end of PSO shift and whenever conditions change significantly), including Beaufort sea state and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon, and estimated observable distance;
- Upon observation of a marine mammal, the following information: name of PSO who sighted the animal(s) and PSO location and activity at time of sighting; time of sighting; identification of the animal(s) (*e.g.,* genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species; distance and bearing of each marine mammal observed relative to the pile being driven for each sighting (if pile driving was occurring at time of sighting); estimated number of animals (minimum, maximum, and best estimate); estimated number of animals by cohort (adults, juveniles, neonates, group composition, sex class, *etc.*); animal's closest point of approach and estimated time spent within the harassment zone; group spread and formation (for CIBWs only; see ethogram in Appendix B of the POA's application); description of any marine mammal behavioral observations (*e.g.,* observed behaviors such as feeding or traveling), including an assessment of behavioral responses that may have resulted from the activity (*e.g.,* no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching);
- Number of marine mammals detected within the harassment zones, by species;
- Detailed information about any implementation of mitigation action (*e.g.,* shutdowns and delays), a description of specific actions that ensued, and resulting changes in behavior of the animal(s), if any;

If no comments are received from NMFS within 30 days, the draft annual or comprehensive reports would constitute the final reports. If comments are received, a final report addressing NMFS comments must be submitted within 30 days after receipt of comments.

Reporting Injured or Dead Marine Mammals

In the event that personnel involved in the construction activities discover an injured or dead marine mammal, the POA must immediately cease the specified activities and report the incident to the Office of Protected Resources, NMFS

(*PR.ITP.MonitoringReports@noaa.gov, ITP.hotchkin@noaa.gov*) and to the Alaska Regional Stranding Coordinator as soon as feasible. If the death or injury was clearly caused by the specified activity, the POA must immediately cease the specified activities until NMFS is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of the IHA. The POA must not resume their activities until notified by NMFS. The report must include the following information:

- Time, date, and location (latitude and longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);
- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal was discovered.

Adaptive Management

These proposed regulations governing the take of marine mammals incidental to POA's CTR construction activities contain an adaptive management component. Our understanding of the effects of pile driving and other coastal construction activities (*e.g.,* acoustic stressors) on marine mammals continues to evolve, which makes the inclusion of an adaptive management component both valuable and necessary within the context of 5-year regulations.

The monitoring and reporting requirements are associated with information that helps us to better understand the impacts of the project's activities on marine mammals and informs our consideration of whether any changes to mitigation and monitoring are appropriate. The use of adaptive management allows NMFS to consider new information from different sources to determine (with input from the POA regarding practicability) if such modifications will have a reasonable likelihood of more effectively accomplishing the goals of the measures.

The following are some of the possible sources of applicable data to be considered through the adaptive management process: (1) results from monitoring reports, including the weekly, situational, and annual reports required; (2) results from research on marine mammals, noise impacts, or other related topics; and (3) any information which reveals that marine mammals may have been taken in a manner, extent, or number not authorized by these regulations or LOAs issued pursuant to these regulations. Adaptive management decisions may be made at any time, as new information warrants it.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact 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 (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 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 harassment, NMFS considers other factors, such as the likely nature of any impacts or responses (*e.g.,* intensity, duration), the context of any impacts or responses (*e.g.,* critical reproductive time or location, foraging impacts affecting energetics), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338, September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the baseline (*e.g.,* as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, this introductory discussion of our analysis applies to all the species listed in table 25 except CIBWs given that many of the anticipated effects of this project on different marine mammal stocks are expected to be relatively similar in nature. For CIBWs, there are meaningful differences in anticipated individual responses to activities, impact of expected take on the population, or impacts on habitat; therefore, we provide a separate detailed analysis for CIBWs following the analysis for other species for which we propose to authorize incidental take.

NMFS has identified key factors which may be employed to assess the level of analysis necessary to conclude whether potential impacts associated with a specified activity should be considered negligible. These include, but are not limited to, the type and magnitude of taking, the amount and importance of the available habitat for the species or stock that is affected, the duration of the anticipated effect to the species or stock, and the status of the species or stock. The potential effects of the specified activities on gray whales, humpback whales, killer whales, harbor porpoises, Steller sea lions, and harbor seals are discussed below. Some of these factors also apply to CIBWs; however, a more detailed analysis for CIBWs is provided in a separate subsection below.

Species Other than CIBW. Pile driving associated with the project, as outlined previously, has the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment and, for some species, Level A harassment, from underwater sounds generated by pile driving. Potential takes could occur if marine mammals are present in zones ensonified above the thresholds for Level B harassment or Level A harassment, identified above, while activities are underway.

The POA's proposed activities and associated impacts would occur within a limited, confined area of the stocks' range (other than CIBW). The work would occur in the vicinity of the CTR site, and sound from the proposed activities would be blocked by the coastline along Knik Arm along the eastern boundaries of the site and for those harassment isopleths that extend more than 3,000 m, directly across the Arm along the western shoreline (see figures 6–10 and 6–11 in the POA's application)). The intensity and duration of take by Level A and Level B harassment would be minimized through use of mitigation measures described herein. Further, the number of takes proposed to be authorized is small when compared to stock abundance (see table 25). In addition, NMFS does not anticipate that serious injury or mortality will occur as a result of the POA's planned activity given the nature of the activity, even in the absence of required mitigation.

Exposures to elevated sound levels produced during pile driving may cause behavioral disturbance of some individuals. Behavioral responses of marine mammals to pile driving at the proposed project site are expected to be mild, short term, and temporary. Effects on individuals that are taken by Level

B harassment, as enumerated in the Estimated Take section, on the basis of reports in the literature as well as monitoring from other similar activities at the POA and elsewhere, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging if such activity were occurring (*e.g.,* Ridgway *et al.,* 1997; Nowacek *et al.,* 2007; Thorson and Reyff, 2006; Kendall and Cornick, 2015; Goldbogen *et al.,* 2013b; Blair *et al.,* 2016; Wisniewska *et al.,* 2018; Piwetz *et al.,* 2021). Marine mammals within the Level B harassment zones may not show any visual cues they are disturbed by activities or they could become alert, avoid the area, leave the area, or display other mild responses that are not visually observable such as exhibiting increased stress levels (*e.g.,* Rolland *et al.* 2012; Lusseau, 2005; Bejder *et al.,* 2006; Rako *et al.,* 2013; Pirotta *et al.,* 2015b; Pérez-Jorge *et al.,* 2016). They may also exhibit increased vocalization rates, louder vocalizations, alterations in the spectral features of vocalizations, or a cessation of communication signals (Hotchkin and Parks 2013). However, as described in the Potential Effects of Specified Activities on Marine Mammals and Their Habitat section of this proposed rule, marine mammals, except CIBWs, observed within Level A and Level B harassment zones related to recent POA construction activities have not shown any acute, visually observable reactions to pile driving activities that have occurred during the PCT and SFD projects (61N Environmental, 2021, 2022a, 2022b).

Some of the species present in the region will only be present temporarily based on seasonal patterns or during transit between other habitats. These temporarily present species will be exposed to even smaller periods of noise-generating activity, further decreasing the impacts. Most likely, individual animals will simply move away from the sound source and be temporarily displaced from the area. Takes may also occur during important feeding times. The project area though represents a small portion of available foraging habitat and impacts on marine mammal feeding for all species is expected to be minimal.

The activities analyzed here are similar to numerous other construction activities conducted in Southern Alaska (*e.g.,* 86 FR 43190, August 6, 2021; 87 FR 15387, March 18, 2022), including the PCT and SFD projects within Upper Knik Arm (85 FR 19294, April 6, 2020; 86 FR 50057, September 7, 2021, respectively) which have taken place with no known long-term adverse consequences from behavioral harassment. Any potential reactions and behavioral changes are expected to subside quickly when the exposures cease, and therefore, no long-term adverse consequences are expected (*e.g.,* Graham *et al.,* 2017). While there are no long-term peer-reviewed studies of marine mammal habitat use at the POA, studies from other areas indicate that most marine mammals would be expected to have responses on the order of hours to days. For example, harbor porpoises returned to a construction area between pile-driving events within several days during the construction of offshore wind turbines near Denmark (Carstensen *et al.,* 2006). The intensity of Level B harassment events would be minimized through use of mitigation measures described herein, which were not quantitatively factored into the take estimates. The POA would use PSOs stationed strategically to increase detectability of marine mammals during in-water construction activities, enabling a high rate of success in implementation of shutdowns to avoid or minimize injury for most species. Further, given the absence of any major rookeries and haulouts within the estimated harassment zones, we assume that potential takes by Level B harassment would have an inconsequential short-term effect on individuals and would not result in population-level impacts.

As stated in the mitigation section, the POA will implement shutdown zones (table 26) that equal or exceed the Level A harassment isopleths (table 16) for most vibratory pile driving and maximize practicability for shutdowns during impact pile driving. Take by Level A harassment is proposed for authorization for some species (gray whales, humpback whales, killer whales, harbor seals, Steller sea lions, and harbor porpoises) to account for the large Level A harassment zones from impact driving and the potential that an animal could enter and remain unobserved within the estimated Level A harassment zone for a duration long enough to incur auditory injury. Any take by Level A harassment is expected to arise from, at most, a small degree of auditory injury because animals would need to be exposed to higher levels and/or longer duration than are expected to occur here in order to incur any more than a small degree of auditory injury.

Due to the levels and durations of likely exposure, animals that experience auditory injury will likely only receive slight injury (*i.e.,* minor degradation of hearing capabilities within regions of hearing that align most completely with the frequency range of the energy produced by POA's proposed in-water construction activities (*i.e.,* the low-frequency region below 2 kHz)), not severe hearing impairment or impairment in the ranges of greatest hearing sensitivity. If hearing impairment does occur, it is most likely that the affected animal will lose a few dBs in its hearing sensitivity, which, in most cases, is not likely to meaningfully affect its ability to forage and communicate with conspecifics. There are no data to suggest that a single instance in which an animal incurs auditory injury (or TTS) would result in impacts to reproduction or survival. If auditory injury were to occur, it would be minor and unlikely to affect more than a few individuals. Additionally, and as noted previously, some subset of the individuals that are behaviorally harassed could also simultaneously incur some small degree of TTS for a short duration of time. Because of the small degree anticipated, though, any auditory injury or TTS potentially incurred here is not expected to adversely impact individual fitness, let alone annual rates of recruitment or survival for the affected species or stocks.

Repeated, sequential exposure to pile driving noise over a long duration could result in more severe impacts to individuals that could affect a population (via sustained or repeated disruption of important behaviors such as feeding, resting, traveling, and socializing; Southall *et al.,* 2007). Alternatively, marine mammals exposed to repetitious construction sounds may become habituated, desensitized, or tolerant after initial exposure to these sounds (reviewed by Richardson *et al.,* 1995; Southall *et al.,* 2007). However, given the relatively low abundance of marine mammals other than CIBWs in Knik Arm compared to the stock sizes (table 25), population-level impacts are not anticipated. The absence of any pinniped haulouts or other known non-CIBW home-ranges in the proposed action area further decreases the likelihood of population-level impacts.

The CTR project is also not expected to have significant adverse effects on any marine mammal habitat. The project activities would occur mostly within the same footprint as existing marine infrastructure; the new T1 and T2 would extend approximately 140 ft (47-m) seaward of the existing terminals. The long-term impact on marine mammals associated with CTR would be a small permanent decrease in low-quality potential habitat because of the expanded footprint of the new cargo terminals T1 and T2. Installation and removal of in-water piles would be temporary and intermittent, and the increased footprint of the facilities would destroy only a small amount of low-quality habitat, which currently experiences high levels of anthropogenic activity. Impacts to the immediate substrate are anticipated, but these would be limited to minor, temporary suspension of sediments, which could impact water quality and visibility for a short amount of time but which would not be expected to have any effects on individual marine mammals. Further, there are no known BIAs near the project zone, except for CIBWs, that will be impacted by the POA's planned activities.

Impacts to marine mammal prey species are also expected to be minor and temporary and to have, at most, short-term effects on foraging of individual marine mammals and likely no effect on the populations of marine mammals as a whole. Overall, the area impacted by the CTR project is very small compared to the available surrounding habitat and does not include habitat of particular importance. The most likely impact to prey would be temporary behavioral avoidance of the immediate area. During construction activities, it is expected that some fish and marine mammals would temporarily leave the area of disturbance, thus impacting marine mammals' foraging opportunities in a limited portion of their foraging range. But, because of the relatively small area of the habitat that may be affected and lack of any habitat of particular importance, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

In summary, the following factors primarily support our preliminary negligible impact determinations for the affected stocks of gray whales, humpback whales, killer whales, harbor porpoises, Steller sea lions, and harbor seals:

- No takes by mortality or serious injury are anticipated or proposed for authorization;
- Any acoustic impacts to marine mammal habitat from pile driving are expected to be temporary and minimal;
- Take would not occur in places and/or times where take would be more likely to accrue to impacts on reproduction or survival, such as within ESA-designated or proposed critical habitat, BIAs, or other habitats critical to recruitment or survival (*e.g.,* rookery);
- The project area represents a very small portion of the available foraging area for all potentially impacted marine mammal species and does not contain any habitat of particular importance;
- Take will only occur within upper Cook Inlet—a limited, confined area of any given stock's home range;
- Monitoring reports from similar work in Knik Arm have documented little to no observable effect on individuals of the same species impacted by the specified activities;
- The required mitigation measures (*i.e.,* soft starts, pre-clearance monitoring, shutdown zones, bubble curtains) are expected to be effective in reducing the effects of the specified activity by minimizing the numbers of marine mammals exposed to injurious levels of sound and by ensuring that any take by Level A harassment is, at most, a small degree of AUD INJ and of a lower degree that would not impact the fitness of any animals; and
- The intensity of anticipated takes by Level B harassment is low for all stocks consisting of, at worst, temporary modifications in behavior, and would not be of a duration or intensity expected to result in impacts on reproduction or survival.

Cook Inlet Beluga Whales. For CIBWs, we further discuss our negligible impact findings in the context of potential impacts to this endangered stock based on our evaluation of the take proposed for authorization (table 25).

As described in the Recovery Plan for the CIBW (NMFS, 2016b), NMFS determined the following physical or biological features are essential to the conservation of this species: (1) Intertidal and subtidal waters of Cook Inlet with depths less than 9 m mean lower low water and within 8 km of high and medium flow anadromous fish streams; (2) Primary prey species consisting of four species of Pacific salmon (Chinook, sockeye, chum, and coho), Pacific eulachon, Pacific cod, walleye pollock, saffron cod, and yellowfin sole, (3) Waters free of toxins or other agents of a type and amount harmful to CIBWs, (4) Unrestricted passage within or between the critical habitat areas, and (5) Waters with in-water noise below levels resulting in the abandonment of critical habitat areas by CIBWs. The CTR project will not impact essential features 1–3 listed above. All construction will be done in a manner implementing best management practices to preserve water quality, and no work will occur around creek mouths or river systems leading to prey abundance reductions. In addition, no physical structures will restrict passage; however, impacts to the acoustic habitat are relevant and discussed here.

Monitoring data from the POA suggest pile driving does not discourage CIBWs from entering Knik Arm and traveling to critical foraging grounds such as those around Eagle Bay (*e.g.,* 61N Environmental, 2021, 2022a, 2022b; Easley-Appleyard and Leonard, 2022). As described in greater detail in the Potential Effects of Specified Activities on Marine Mammals and Their Habitat section of this notice, sighting rates were not different in the presence or absence of pile driving (Kendall and Cornick, 2015). In addition, large numbers of CIBWs have continued to forage in portions of Knik Arm and pass through the area near the POA during pile driving projects over the past two decades (Funk *et al.,* 2005; Prevel-Ramos *et al.,* 2006; Markowitz and McGuire, 2007; Cornick and Saxon-Kendall, 2008, 2009; ICRC, 2009, 2010, 2011, 2012; Cornick *et al.,* 2010, 2011; Cornick and Pinney, 2011; Cornick and Seagars, 2016; POA, 2019), including during the recent PCT and SFD construction projects (61N Environmental, 2021, 2022a, 2022b; Easley-Appleyard and Leonard, 2022). These findings are not surprising as food is a strong motivation for marine mammals, and preying on seasonal anadromous fish runs in Eagle and Knik Rivers necessitates CIBWs passing the POA. As described in Forney *et al.* (2017), animals typically favor particular areas because of their importance for survival (*e.g.,* feeding or breeding) and leaving may have significant costs to fitness (reduced foraging success, increased predation risk, increased exposure to other anthropogenic threats). Consequently, animals may be highly motivated to maintain foraging behavior in historical foraging areas despite negative impacts (*e.g.,* Rolland *et al.,* 2012).

Previous monitoring data indicates CIBWs may be responding to pile driving noise but not through abandonment of primary foraging areas north of the port. Instead, they may travel faster past the POA, more quietly, and in smaller, tighter groups (Kendall and Cornick, 2015; 61N Environmental, 2021, 2022a, 2022b). CIBW presence at the POA has been extensively monitored during pile driving projects over the last several years, with data gathered during active driving activities and during periods of no construction noise. CIBWs are regularly observed at the POA even during active pile driving as discussed below.

During PCT and SFD construction monitoring, little variability was evident in the behaviors recorded from month to month or between sightings that coincided with in-water pile installation and removal and those that did not (61N Environmental, 2021, 2022a, 2022b; Easley-Appleyard and Leonard, 2022). Of the 386 CIBWs groups sighted during

PCT and SFD construction monitoring, 10 groups were observed during or within minutes of in-water impact pile installation and 56 groups were observed during or within minutes of vibratory pile installation or removal (61N Environmental, 2021, 2022a, 2022b). In general, CIBWs were more likely to display no reaction or to continue to move towards the PCT or SFD during pile installation and removal. In the situations during which CIBWs showed a possible reaction (6 groups during impact driving and 13 groups during vibratory driving), CIBWs were observed either moving away immediately after the pile driving activities started or were observed increasing their rate of travel.

NMFS funded a visual marine mammal monitoring project in 2021 (described in the Potential Effects of Specified Activities on Marine Mammals and Their Habitat) to supplement sighting data collected by the POA monitoring program during non-pile driving days in order to further evaluate the impacts of anthropogenic activities on CIBWs (Easley-Appleyard and Leonard, 2022). Preliminary results suggest that group size ranged from 1 to 34 whales, with an average of 3 to 5.6, depending on the month. September had the highest sighting rate with 4.08 whales per hour, followed by October and August (3.46 and 3.41, respectively). Traveling was recorded as the primary behavior for 80 percent of the group sightings and milling was the secondary behavior most often recorded. Sighting duration varied from a single surfacing lasting less than 1 minute to 380 minutes. Preliminary findings suggest these results are consistent with the results from the POA's PCT and SFD monitoring efforts. For example, group sizes ranged from 2.38 to 4.32 depending on the month and the highest sighting rate was observed in September (1.75). In addition, traveling was the predominant behavior observed for all months and categories of construction activity (*i.e.,* no pile driving, before pile driving, during pile driving, between pile driving, or after pile driving), being recorded as the primary behavior for 86 percent of all sightings, and either the primary or secondary behavior for 95 percent of sightings.

Easley-Appleyard and Leonard (2022) also asked PSOs to complete a questionnaire post-monitoring that provided NMFS with qualitative data regarding CIBW behavior during observations. Specifically during pile driving events, the PSOs noted that CIBW behaviors varied; however, multiple PSOs noted seeing behavioral changes specifically during impact pile driving and not during vibratory pile driving. CIBWs were observed sometimes changing direction, turning around, or changing speed during impact pile driving, whereas there were numerous instances where CIBWs were seen traveling directly towards the POA during vibratory pile driving before entering the Level B harassment zone (61N Environmental, 2021, 2022a, 2022b). The PSOs also reported that it seemed more likely for CIBWs to show more cryptic behavior during active impact and vibratory pile driving (*e.g.,* surfacing infrequently and without clear direction), though this seemed to vary across months (Easley-Appleyard and Leonard, 2022).

We anticipate that disturbance to CIBWs will manifest in the same manner when they are exposed to noise during the CTR project: whales would move quickly and silently through the area in more cohesive groups. Exposure to elevated noise levels during transit past the POA is not expected to have adverse effects on reproduction or survival as the whales continue to access critical foraging grounds north of the POA. Potential behavioral reactions that have been observed, including changes in group distribution and speed, may help to mitigate the potential for any contraction of communication space for a group. CIBWs are not expected to abandon entering or exiting Knik Arm as this is not evident based on monitoring data from the past two decades of work at POA (*e.g.,* Funk *et al.,* 2005; Prevel-Ramos *et al.,* 2006; Markowitz and McGuire, 2007; Cornick and Saxon-Kendall, 2008, 2009; ICRC, 2009, 2010, 2011, 2012; Cornick *et al.,* 2010, 2011; Cornick and Pinney, 2011; Cornick and Seagars, 2016; POA, 2019; Kendall and Cornick, 2015; 61N Environmental, 2021, 2022a, 2022b; Easley-Appleyard and Leonard, 2022). Finally, as described previously, both telemetry (tagging) and acoustic data suggest CIBWs likely stay in upper Knik Arm (*i.e.,* north of the CTR project site) for several days or weeks before exiting Knik Arm. Specifically, a CIBW instrumented with a satellite link time/depth recorder entered Knik Arm on August 18, 1999 and remained in Eagle Bay until September 12, 1999 (Ferrero *et al.,* 2000). Further, a recent detailed re-analysis of the satellite telemetry data confirms how several tagged whales exhibited this same movement pattern: whales entered Knik Arm and remained there for several days before exiting through lower Knik Arm (Shelden *et al.,* 2018). This longer-term use of upper Knik Arm will avoid repetitive exposures from pile driving noise.

It is possible that exposure to pile driving at the POA could result in CIBWs avoiding Knik Arm and thereby not accessing the productive foraging grounds north of POA such as Eagle River flats thus, impacting essential feature number five of the designated Critical Habitat. The data previously presented demonstrate CIBWs are not abandoning the area (*i.e.,* continue to access the waters of northern Knik Arm during construction activities). Additionally, results of an expert elicitation (EE) at a 2016 workshop, which predicted the impacts of noise on CIBW survival and reproduction given lost foraging opportunities, helped to inform our assessment of impacts on this stock. The 2016 EE workshop used conceptual models of an interim population consequences of disturbance (PCoD) for marine mammals (NRC, 2005; New *et al.,* 2014; Tollit *et al.,* 2016) to help in understanding how noise-related stressors might affect vital rates (survival, birth rate and growth) for CIBW (King *et al.,* 2015). NMFS (2016b) suggests that the main direct effects of noise on CIBW are likely to be through masking of vocalizations used for communication and prey location and habitat degradation. The 2016 workshop on CIBWs was specifically designed to provide regulators with a tool to help understand whether chronic and acute anthropogenic noise from various sources and projects are likely to be limiting recovery of the CIBW population. The full report can be found at *https://www.smruconsulting.com/publications/*with a summary of the expert elicitation portion of the workshop below.

For each of the noise effect mechanisms chosen for EE, the experts provided a set of parameters and values that determined the forms of a relationship between the number of ''days of disturbance'' (defined as any day on which an animal loses the ability to forage for at least one tidal cycle (*i.e.,* it forgoes 50–100 percent of its energy intake on that day)) a female CIBW experiences in a particular period and the effect of that disturbance on her energy reserves. Examples included the number of disturbed days during the months of April, May, and June that would be predicted to reduce the energy reserves of a pregnant CIBW to such a level that she is certain to terminate the pregnancy or abandon the calf soon after birth; the number of disturbed days of from April to September required to reduce the energy reserves of a lactating CIBW to a level where she is certain to abandon her calf; and the threshold disturbed days where a female fails to gain sufficient energy by the end of summer to maintain themselves and their calves during the subsequent winter.

Overall, median values ranged from 16 to 69 days of disturbance depending on the question. However, a ''day of disturbance'' considered in the context of the report is notably more severe than the Level B harassment expected to result from these activities, which as described is expected to be comprised predominantly of temporary modifications in the behavior of individual CIBWs (*e.g.,* faster swim speeds, more cohesive group structure, decreased sighting durations, cessation of vocalizations) based on the large body of observational data available from previous monitoring efforts at the Port. Also, NMFS proposes to authorize an annual maximum of 90 instances of takes, with the instances representing disturbance events within a day. This means that either 90 different individual CIBWs are disturbed on no more than 1 day each per year or some lesser number of individuals may be disturbed on more than 1 day but with the product of individuals and days not exceeding 90. Given the overall estimated take, it is unlikely that any one CIBW will be disturbed on more than a few days. Further, the mitigation measures NMFS has proposed for the CTR project are designed to avoid the potential that any animal will lose the ability to forage for one or more tidal cycles should they be foraging in the proposed action area, which is not known to be a particularly important feeding area for CIBWs.

While Level B harassment (behavioral disturbance) is proposed to be authorized, the POA's mitigation measures will limit the severity of the effects of that Level B harassment to behavioral changes such as increased swim speeds, tighter group formations, and cessation of vocalizations, not the loss of foraging capabilities. Regardless, this elicitation recognized that pregnant or lactating females and calves are inherently more at risk than other animals, such as males. Given that individuals in potentially vulnerable life stages, such as pregnancy, cannot be identified by visual observers, pile driving would be shut down for all CIBWs to be protective of potentially vulnerable individuals, and to avoid more severe behavioral reactions.

NMFS proposes required mitigation measures to minimize exposure to CIBWs, specifically, shutting down pile driving should a CIBW approach or enter the Level B harassment zone. These measures are designed to reduce the intensity and duration of potential harassment CIBWs experience during the POA's construction activities. Additionally, the proposed mitigation measures would help to ensure CIBWs will not experience degradation of acoustic habitat approaching the threshold set in the Critical Habitat designation (*i.e.,* in-water noise at levels resulting in the abandonment of habitat by CIBWs). The location of the PSOs would allow for detection of CIBWs and behavioral observations prior to CIBWs entering the Level B harassment zone.

Additionally, NMFS proposes to require use of a bubble curtain for all permanent piles in waters deeper than 3 m in all months and for all piles (permanent or temporary) installed or extracted in waters deeper than 3 m during the months of August–October when CIBWs are present in higher numbers in Knik Arm. This measure is designed to reduce the amount of noise exposure at frequencies to which CIBWs are more sensitive (<100 Hz) during vibratory pile driving and to reduce overall sound levels during impact driving. During impact driving, the POA must implement soft starts, which ideally allows animals to leave a disturbed area before the full-power driving commences (Tougaard *et al.,* 2012). Although NMFS does not anticipate CIBWs will abandon entering Knik Arm in the presence of pile driving, PSOs will be integral to identifying if CIBWs are potentially altering pathways they would otherwise take in the absence of pile driving. Finally, take by mortality, serious injury, or Level A harassment of CIBWs is not anticipated or proposed to be authorized.

In summary, the following factors primarily support our preliminary determination that the impacts resulting from this activity are not expected to adversely affect the CIBWs through effects on annual rates of recruitment or survival:

- No mortality, serious injury, or Level A harassment is anticipated or proposed to be authorized;
- Any acoustic impacts to marine mammal habitat from pile driving are expected to be temporary and minimal;
- The required mitigation measures (*i.e.,* soft starts, pre-clearance monitoring, shutdown zones, bubble curtains) are expected to be effective in reducing the effects of the specified activity by ensuring that no CIBWs are exposed to noise at injurious levels (*i.e.,* Level A harassment);
- The intensity of anticipated takes by Level B harassment is low, consisting of, at worst, temporary modifications in behavior, and would not be of a duration or intensity expected to result in impacts on reproduction or survival.
- The area of exposure would be limited to habitat primarily used as a travel corridor. Data demonstrates Level B harassment of CIBWs typically manifests as increased swim speeds past the POA, tighter group formations, and cessation of vocalizations, rather than through habitat abandonment;
- No critical foraging grounds (*e.g.,* Eagle Bay, Eagle River, Susitna Delta) would be affected by pile driving; and
- While animals could be harassed more than once, exposures are not likely to exceed more than a few per year for any given individual and are not expected to occur on sequential days; thereby decreasing the potential severity and interaction between harassment events for affected individuals.

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 required monitoring and mitigation measures, NMFS preliminarily finds that the proposed marine mammal take from the specified activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted previously, only incidental take of small numbers of marine mammals may be authorized under sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the maximum estimated number of individuals annually taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted maximum annual number of individuals to be taken is fewer than one-third of the species or stock abundance, the take is considered to be of small numbers. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

For all stocks, except for the Mexico-North Pacific stock of humpback whales whose abundance estimate is unknown, the proposed number of takes is less than one-third of the best available population abundance estimate (*i.e.,* less than 1 percent for 6 stocks; less than 2 percent for 1 stock; and less than 27.2 percent for CIBWs; *see* table 25). The maximum annual number of animals proposed for authorization to be taken from these stocks would be considered small relative to the relevant stock's abundances even if each estimated take occurred to a new individual. The number of takes authorized likely represents smaller numbers of individual harbor seals and Steller sea lions. Harbor seals tend to concentrate near Ship Creek and have small home ranges. It is possible that a single individual harbor seal may linger near the POA, especially near Ship Creek and be counted multiple times each day as it moves around and resurfaces in different locations. Previous Steller sea lion sightings identified that if a Steller sea lion is within Knik Arm, it is likely lingering to forage on salmon or eulachon runs and may be present for several days. Therefore, the number of takes authorized likely represents repeat exposures to the same animals in certain circumstances. For all species, PSOs would count individuals as separate unless they can be individually identified.

Abundance estimates for the Mexico-North Pacific stock of humpback whales are based upon data collected more than 8 years ago, and therefore, current estimates are considered unknown (Young *et al.,* 2023). The most recent minimum population estimates (N_{MIN}) for this population include an estimate of 2,241 individuals between 2003 and 2006 (Martinez-Aguilar, 2011) and 766 individuals between 2004 and 2006 (Wade, 2021). NMFS' Guidelines for Assessing Marine Mammal Stocks suggest that the N_{MIN} estimate of the stock should be adjusted to account for potential abundance changes that may have occurred since the last survey and provide reasonable assurance that the stock size is at least as large as the estimate (NMFS, 2023). The abundance trend for this stock is unclear; therefore, there is no basis for adjusting these estimates (Young *et al.,* 2023). Assuming the population has been stable, the maximum annual 4 takes of this stock proposed for authorization represents small numbers of this stock (0.18 percent of the stock assuming a N_{MIN} of 2,241 individuals and 0.52 percent of the stock assuming an N_{MIN} of 766 individuals).

Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the estimated take of marine mammals, NMFS preliminarily finds that small numbers of marine mammals would be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

In order to promulgate regulations, NMFS must find that the takings authorized will not have an ''unmitigable adverse impact'' on the subsistence uses of the affected marine mammal species or stocks by Alaskan Natives. NMFS has defined ''unmitigable adverse impact'' in 50 CFR 216.103 as an impact resulting from the specified activity: (1) That is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by: (i) Causing the marine mammals to abandon or avoid hunting areas; (ii) Directly displacing subsistence users; or (iii) Placing physical barriers between the marine mammals and the subsistence hunters; and (2) That cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

While no significant subsistence activity currently occurs within or near the POA, Alaska Natives have traditionally harvested subsistence resources, including marine mammals, in upper Cook Inlet for millennia. CIBWs are more than a food source; they are important to the cultural and spiritual practices of Cook Inlet Native communities (NMFS, 2008b). Dena'ina Athabascans, currently living in the communities of Eklutna, Knik, Tyonek, and elsewhere, occupied settlements in Cook Inlet for the last 1,500 years and have been the primary traditional users of this area into the present.

NMFS estimated that 65 CIBWs per year (range 21–123) were killed between 1994 and 1998, including those successfully harvested and those struck and lost. NMFS concluded that this number was high enough to account for the estimated 14 percent annual decline in population during this time (Hobbs *et al.,* 2008); however, given the difficulty of estimating the number of whales struck and lost during the hunts, actual mortality may have been higher. During this same period, population abundance surveys indicated a population decline of 47 percent, although the reason for this decline should not be associated solely with subsistence hunting and likely began well before 1994 (Rugh *et al.,* 2000).

In 1999, a moratorium was enacted (Pub. L. 106–31) prohibiting the subsistence harvest of CIBWs except through a cooperative agreement between NMFS and the affected Alaska Native organizations. NMFS began working cooperatively with the Cook Inlet Marine Mammal Council (CIMMC), a group of tribes that traditionally hunted CIBWs, to establish sustainable harvests. CIMMC voluntarily curtailed its harvests in 1999. In 2000, NMFS designated the Cook Inlet stock of beluga whales as depleted under the MMPA (65 FR 34590, May 31, 2000). NMFS and CIMMC signed Co-Management of the Cook Inlet Stock of Beluga Whales agreements in 2000, 2001, 2002, 2003, 2005, and 2006. CIBW harvests between 1999 and 2006 resulted in the strike and harvest of five whales, including one whale each in 2001, 2002, and 2003, and two whales in 2005 (NMFS, 2008b). No hunt occurred in 2004 due to higher-than-normal mortality of CIBWs in 2003, and the Native Village of Tyonek agreed to not hunt in 2007. Since 2008, NMFS has examined how many CIBWs could be harvested during 5-year intervals based on estimates of population size and growth rate and determined that no harvests would occur between 2008 and 2012 and between 2013 and 2017 (NMFS, 2008b). The CIMMC was disbanded by unanimous vote of the CIMMC member Tribes' representatives in June 2012, and a replacement group of Tribal members has not been formed to date. There has been no subsistence harvest of CIBWs since 2005 (NMFS, 2022d).

Subsistence harvest of other marine mammals in upper Cook Inlet is limited to harbor seals. Steller sea lions are rare in upper Cook Inlet; therefore, subsistence use of this species is not common. However, Steller sea lions are taken for subsistence use in lower Cook Inlet. Residents of the Native Village of Tyonek are the primary subsistence users in the upper Cook Inlet area. While harbor seals are hunted for subsistence purposes, harvests of this species for traditional and subsistence uses by Native peoples have been low in upper Cook Inlet (*e.g.,* 33 harbor seals were harvested in Tyonek between 1983 and 2013; see table 8–1 in the POA's application), although these data are not currently being collected and summarized. As the POA's proposed project activities will take place within the immediate vicinity of the POA, no activities will occur in or near Tyonek's identified traditional subsistence hunting areas. As the harvest of marine mammals in upper Cook Inlet is historically a small portion of the total subsistence harvest and the number of marine mammals using upper Cook Inlet is proportionately small, the number of marine mammals harvested in upper Cook Inlet is expected to remain low.

The potential impacts from harassment on stocks that are harvested in Cook Inlet would be limited to minor behavioral changes (*e.g.,* increased swim speeds, changes in dive time, temporary avoidance near the POA) within the vicinity of the POA. Some PTS may occur; however, the shift is likely to be slight due to the implementation of mitigation measures (*e.g.,* shutdown zones, pre-clearance monitoring, bubble curtains, soft starts) and the shift would be limited to lower pile driving frequencies which are on the lower end of phocid and otariid hearing ranges. In summary, any impacts to harbor seals would be limited to those seals within Knik Arm (outside of any hunting area) and the very few takes of Steller sea lions in Knik Arm would be far removed in time and space from any hunting in lower Cook Inlet.

The POA will communicate with representative Alaska Native subsistence users and Tribal members to identify and explain the measures that have been taken or will be taken to minimize any adverse effects of CTR on the availability of marine mammals for subsistence uses. In addition, the POA will adhere to the following communication procedures regarding marine mammal subsistence use within the Project area:

(1) Send letters to the Kenaitze, Tyonek, Knik, Eklutna, Ninilchik, Salamatof, and Chickaloon Tribes informing them of the proposed project (*i.e.,* timing, location, and features). Include a map of the proposed project area; identify potential impacts to marine mammals and mitigation efforts, if needed, to avoid or minimize impacts; and inquire about possible marine mammal subsistence concerns they have.

(2) Follow up with a phone call to the environmental departments of the seven Tribal entities to ensure that they received the letter, understand the proposed project, and have a chance to ask questions. Inquire about any concerns they might have about potential impacts to subsistence hunting of marine mammals.

(3) Document all communication between the POA and Tribes.

(4) If any Tribes express concerns regarding proposed project impacts to subsistence hunting of marine mammals, propose a Plan of Cooperation between the POA and the concerned Tribe(s).

The proposed project features and activities, in combination with a number of actions to be taken by the POA during project implementation, should avoid or mitigate any potential adverse effects on the availability of marine mammals for subsistence uses. Furthermore, although construction will occur within the traditional area for hunting marine mammals, the proposed project area is not currently used for subsistence activities. In-water pile installation and removal will follow mitigation procedures to minimize effects on the behavior of marine mammals and impacts will be temporary.

For the NES1 project, the POA expressed that, if desired, regional subsistence representatives may support project marine mammal biologists during the monitoring program by assisting with collection of marine mammal observations and may request copies of marine mammal monitoring reports. The POA proposes the same option for the CTR project.

Based on the description of the specified activity, the measures described to minimize adverse effects on the availability of marine mammals for subsistence purposes, and the proposed mitigation and monitoring measures, NMFS has preliminarily determined that there will not be an unmitigable adverse impact on subsistence uses from the POA's proposed activities.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 *et seq.*) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the promulgation of regulations, NMFS consults internally whenever we propose to authorize take for endangered or threatened species, in this case with the NMFS Alaska Regional Office.

NMFS Office of Protected Resources (OPR) is proposing to authorize take of Mexico-North Pacific humpback whales (including individuals from the Mexico DPS), CIBWs, and western DPS Steller sea lions, which are listed under the ESA. NMFS OPR has requested initiation of section 7 consultation on the promulgation of regulations and issuance of a subsequent LOA. NMFS will conclude the ESA consultation prior to reaching a determination regarding the proposed issuance of the authorization.

Proposed Promulgation

As a result of these preliminary determinations, NMFS proposes to promulgate regulations that allow for the authorization of take, by Level A harassment and Level B harassment, incidental to construction activities associated with the Cargo Terminals Replacement Project at the Don Young Port of Alaska in Anchorage, Alaska for a 5-year period from March 1, 2026, through February 28, 2031, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Request for Information

NMFS requests interested persons to submit comments, information, and suggestions concerning the POA's request and the proposed regulations (see **ADDRESSES**). All comments will be reviewed and evaluated as we prepare a final rule and make final determinations on whether to issue the requested authorization. This proposed rule and referenced documents provide all environmental information relating to our proposed action for public review.

Classification

The Office of Management and Budget has determined that this proposed rule is not significant for purposes of Executive Order 12866.

Pursuant to section 605(b) of the Regulatory Flexibility Act (RFA) (5 U.S.C. 601 *et seq.*), the Chief Counsel for Regulation of the Department of Commerce has certified to the Chief Counsel for Advocacy of the Small Business Administration that this proposed rule, if adopted, would not have a significant economic impact on a substantial number of small entities. The POA is an enterprise activity of the Municipality of Anchorage, Alaska, meaning that it is a department of the Municipality which generates adequate revenue to support its operational costs and annual payments to the Municipality. The POA is the sole entity that would be subject to the requirements in these proposed regulations, and the POA is not a small governmental jurisdiction, small organization, or small business, as defined by the RFA, because it is a department of the local government. Because of this certification, a regulatory flexibility analysis is not required and none has been prepared.

This proposed rule contains a collection-of-information requirement subject to the provisions of the Paperwork Reduction Act (PRA). Notwithstanding any other provision of law, no person is required to respond to nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the PRA unless that collection of information displays a currently valid OMB control number. These requirements have been approved by OMB under control number 0648–

0151 and include applications for regulations, subsequent LOAs, and reports.

List of Subjects in 50 CFR Part 217

Acoustics, Administrative practice and procedure, Construction, Endangered and threatened species, Marine mammals, Mitigation and monitoring requirements, Reporting requirements, Wildlife.

Dated: October 18, 2024.

Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

For reasons set forth in the preamble, NMFS proposes to amend 50 CFR part 217 to read as follows:

PART 217—REGULATIONS GOVERNING THE TAKING AND IMPORTING OF MARINE MAMMALS

■ 1. The authority citation for part 217 continues to read as follows:

Authority: 16 U.S.C. 1361 *et seq.*

■ 2. Add subpart B, consisting of §§ 217.11 through 217.19, to read as follows:

Subpart B—Taking Marine Mammals Incidental to the Port of Alaska Modernization Program Phase 2B: Cargo Terminals Replacement Project in Anchorage, Alaska

Sec.

Subpart B—Taking Marine Mammals Incidental to the Port of Alaska Modernization Program Phase 2B: Cargo Terminals Replacement Project in Anchorage, Alaska

§ 217.11 Specified activity and specified geographical region.

(a) The incidental taking of marine mammals by the Port of Alaska (POA) may be authorized in a Letter of Authorization (LOA) only if it occurs at or around the Port of Alaska, including waters of Knik Arm and Upper Cook Inlet near Anchorage, Alaska incidental to the specified activities outlined in paragraph (b) of this section.

(b) The specified activities are construction and demolition activities associated with the Cargo Terminals Replacement Project under the Port of Alaska Modernization Program at the Don Young Port of Alaska in Anchorage, Alaska.

§ 217.12 Effective dates.

Regulations in this subpart are effective from March 1, 2026, until February 28, 2031.

§ 217.13 Permissible methods of taking.

Under a LOA issued pursuant to § 216.106 of this chapter and § 217.17, the POA and those persons it authorizes or funds to conduct activities on its behalf may incidentally, but not intentionally, take marine mammals within the specified geographical region by harassment associated with the specified activities provided they are in compliance with all terms, conditions, and requirements of the regulations in this subpart and the applicable LOA.

§ 217.14 Prohibitions.

(a) Except for the takings permitted in § 217.13 and authorized by a LOA issued under § 216.106 of this chapter and § 217.17, it is unlawful for any person to do any of the following in connection with the specified activities:

(1) Violate or fail to comply with the terms, conditions, and requirements of this subpart or a LOA issued under this subpart;

(2) Take any marine mammal not specified in such LOA;

(3) Take any marine mammal specified in such LOA in any manner other than specified;

(4) Take a marine mammal specified in such LOA if NMFS determines such taking results in more than a negligible impact on the species or stocks of such marine mammal; or

(5) Take a marine mammal specified in such LOA after NMFS determines such taking results in an unmitigable adverse impact on the species or stock of such marine mammal for taking for subsistence uses.

(b) [Reserved]

§ 217.15 Mitigation requirements.

(a) When conducting the specified activities identified in § 217.11(b), POA must implement the mitigation measures contained in this section and any LOA issued under §§ 216.106 of this chapter and 217.17. These mitigation measures include, but are not limited to:

(1) A copy of any issued LOA must be in the possession of the POA, its designees, and work crew personnel operating under the authority of the issued LOA.

(2) The POA must ensure that construction supervisors and crews, the monitoring team and relevant POA staff are trained prior to the start of all pile driving so that responsibilities, communication procedures, monitoring protocols, and operational procedures are clearly understood. New personnel joining during the project must be trained prior to commencing work.

(3) The POA must employ Protected Species Observers (PSOs) and establish monitoring locations pursuant to § 217.16 and as described in a NMFS-approved Marine Mammal Monitoring and Mitigation Plan.

(i) For all pile driving activities, land-based PSOs must be stationed at the best vantage points practicable to monitor for marine mammals and implement shutdown/delay procedures. A minimum of 4 locations must be used to monitor the designated harassment zones to the maximum extent possible based on daily visibility conditions. Additional PSOs must be added if warranted by site conditions and/or the level of marine mammal activity in the area. PSOs must be able implement shutdown or delay procedures when applicable through communication with the equipment operator.

(ii) If during pile driving activities, PSOs can no longer effectively monitor the entirety of the Cook Inlet beluga whale (CIBW) shutdown zone due to environmental conditions (*e.g.,* fog, rain, wind), pile driving may continue only until the current segment of the pile is driven; no additional sections of pile or additional piles may be driven until conditions improve such that the shutdown zone can be effectively monitored. If the shutdown zone cannot be monitored for more than 15 minutes, the entire zone must be cleared again for 30 minutes prior to reinitiating pile driving.

(4) Pre-start Clearance Monitoring must take place from 30 minutes prior to initiation of pile driving activity (*i.e.,* pre-start clearance monitoring) through 30 minutes post-completion of pile driving activity.

(i) Pre-start clearance monitoring must be conducted during periods of visibility sufficient for the Lead PSO to determine that the shutdown zones are clear of marine mammals.

(ii) Pile driving may commence if, following 30 minutes of observation, it is determined by the Lead PSO that the shutdown zones are clear of marine mammals and for CIBW, any observed whale(s) is at least 100 meters past the shutdown zone and on a path away from the zone or the whale has not been re-sighted for 30 minutes.

(5) For all pile driving activity, the POA must implement shutdown zones with radial distances as identified in a

LOA issued under § 216.106 of this chapter and § 217.17.

(i) If a marine mammal is observed entering or within the shutdown zone, all pile driving activities, including soft starts, at that location must be halted. If pile driving is halted or delayed due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily left and is been visually confirmed beyond the shutdown zone or 15 minutes (non-CIBWs) or 30 minutes (CIBWs) have passed without re-detection of the animal. Specific to CIBW, if a CIBW(s) is observed within or on a path towards the shutdown zone, pile driving activities, including soft starts, must shut down and not re-commence until the whale has traveled at least 100 m beyond the shutdown zone and is on a path away from such zone or until no CIBW has been observed in the shutdown zone for 30 minutes.

(ii) In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone, animal behavior must be monitored and documented.

(iii) If work ceases for more than 30 minutes, the shutdown zones must be cleared again for 30 minutes prior to reinitiating pile driving. A determination that the shutdown zone is clear must be made during a period of good visibility.

(iv) If a shutdown procedure should be initiated but human safety is at risk, as determined by the best professional judgment of the vessel operator or project engineer, the in-water activity, including pile driving, is allowed to continue until the risk to human safety has dissipated. In this scenario, pile driving may continue only until the current segment of the pile is driven; no additional sections of pile or additional piles may be driven until the Lead PSO has determined that the shutdown zones are clear of marine mammals and for Cook Inlet beluga whales (CIBW), any observed whale(s) is at least 100 meters past the shutdown zone and on a path away from the zone.

(v) For in-water construction activities other than pile driving (*e.g.,* barge positioning; use of barge-mounted excavators; dredging), if a marine mammal comes within 10 m, POA must cease operations and reduce vessel speed to the minimum level required to maintain steerage and safe working conditions. If human safety is at risk, as determined by the best professional judgment of the vessel operator or project engineer, the in-water activity is allowed to continue until the risk to human safety has dissipated.

(6) The POA must use soft start techniques when impact pile driving. Soft start requires contractors to conduct three sets of strikes (three strikes per set) at reduced hammer energy with a 30-second waiting period between each set. A soft start must be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of 30 minutes or longer.

(7) The POA must use bubble curtains for all temporary (36- or 24-in diameter) piles during both vibratory and impact pile driving in water depths greater than 3 meters (9.8 ft) between August 1 and October 31. Bubble curtains must be used for all permanent piles (72-in diameter) during both vibratory and impact pile driving in waters deeper than 3 meters (9.8 feet). The bubble curtain must be operated to achieve optimal performance. At a minimum, the bubble curtain must:

(i) The bubble curtain must distribute air bubbles around 100 percent of the piling perimeter for the full depth of the water column.

(ii) The lowest bubble ring must be in contact with the mudline and/or rock bottom for the full circumference of the ring, and the weights attached to the bottom ring shall ensure 100 percent mudline and/or rock bottom contact. No parts of the ring or other objects shall prevent full mudline and/or rock bottom contact.

(iii) Air flow to the bubblers must be balanced around the circumference of the pile.

(8) Pile driving activity must be halted upon observation of a species entering or within the harassment zone for either a species for which incidental take is not authorized or a species for which incidental take has been authorized but the authorized number of takes has been met.

(b) [Reserved]

§ 217.16 Requirements for monitoring and reporting.

(a) The POA must submit a Marine Mammal Monitoring and Mitigation Plan to NMFS for approval at least 90 days before the start of construction and abide by the Plan, if approved.

(b) Monitoring must be conducted by qualified, NMFS-approved PSOs, in accordance with the following conditions:

(1) PSOs must be independent of the activity contractor (*e.g.,* employed by a subcontractor) and have no other assigned tasks during monitoring duties.

(2) PSOs must be approved by NMFS prior to beginning work on the specified activities.

(3) PSOs must be trained in marine mammal identification and behavior.

(i) A designated Project Lead PSO must always be on site. The Project Lead PSO must have prior experience performing the duties of a PSO during in-water construction activities pursuant to a NMFS-issued ITA or Letter of Concurrence.

(ii) Each PSO station must also have a designated Station Lead PSO specific to that station and shift. These Station Lead PSOs must have prior experience working as a PSO during in-water construction activities;

(iii) Other PSOs may substitute other relevant experience (including relevant Alaska Native traditional knowledge), education (degree in biological science or related field), or training for prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization.

(4) PSO stations must be elevated platforms constructed on top of shipping containers or a similar base that is at least 8′6″ high (*i.e.,* the standard height of a shipping container) that can support at least three PSOs and their equipment. The platforms must be stable enough to support use of a theodolite and must be located to optimize the PSO's ability to observe marine mammals and the shutdown zones. Each PSO station must have at least two PSOs on watch at any given time, including the Station Lead PSO.

(5) If the POA is conducting in-water work for other projects that includes PSOs, the PSOs for the Cargo Terminals Replacement Project must be in real-time contact with those PSOs, and both sets of PSOs must share all information regarding marine mammal sightings with each other.

(c) The POA must submit weekly monitoring reports within 14 days after the conclusion of each calendar week during each Cargo Terminals Replacement Project construction season. These reports must include a summary of marine mammal species and behavioral observations, construction shutdowns or delays, and construction work completed during the reporting period. The weekly reports also must include an assessment of the amount of construction remaining to be completed (*i.e.,* the number of estimated hours of work remaining), in addition to the number of beluga whales observed within estimated harassment zones to date.

(d) The POA must submit a draft annual summary monitoring report on all monitoring conducted during each construction season which includes final electronic data sheets within 90 calendar days after the completion of each construction season or 60 days prior to a requested date of issuance of any future incidental take authorization for projects at the same location, whichever comes first. A draft comprehensive 5-year summary report must also be submitted to NMFS within 90 days of the end of year 5 of the project. The reports must detail the monitoring protocol and summarize the data recorded during monitoring. If no comments are received from NMFS within 30 days of receipt of the draft report, the report may be considered final. If comments are received, a final report addressing NMFS comments must be submitted within 30 days after receipt of comments. At a minimum, the reports must contain:

(1) Dates and times (begin and end) of all marine mammal monitoring;

(2) Construction activities occurring during each daily observation period, including how many and what type of piles were driven or removed, by what method (*i.e.,* impact or vibratory), the total duration of driving time for each pile (vibratory driving), and number of strikes for each pile (impact driving);

(3) Environmental conditions during monitoring periods (at beginning and end of PSO shift and whenever conditions change significantly), Beaufort sea state, and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon, and estimated observable distance (if less than the harassment zone distance);

(4) Upon observation of a marine mammal, the following information should be collected:

(i) Name of the PSO who sighted the animal, observer location, and activity at time of sighting;

(ii) Time of sighting;

(iii) Identification of the animal (*e.g.,* genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species;

(iv) Distances and bearings of each marine mammal observed in relation to the pile being driven for each sighting (if pile driving was occurring at time of sighting);

(v) Estimated number of animals (min/max/best);

(vi) Estimated number of animals by cohort (adults, juveniles, neonates, group composition, *etc.*);

(vii) Animal's closest point of approach and estimated time spent within the harassment zone;

(viii) Description of any marine mammal behavioral observations (*e.g.,* observed behaviors such as feeding or traveling), including an assessment of behavioral responses to the activity (*e.g.,* no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching);

(ix) Detailed information about any implementation of any mitigation (*e.g.,* shutdowns and delays), a description of specific actions that ensued, and resulting changes in the behavior of the animal, if any; and

(x) All PSO datasheets and raw sightings data in electronic spreadsheet format.

(e) In the event that personnel involved in the construction activities discover an injured or dead marine mammal, the POA must report the incident to NMFS Office of Protected Resources (OPR) and to the Alaska Regional Stranding Coordinator no later than 24 hours after the initial observation. If the death or injury was caused by the specified activity, the POA must immediately cease the specified activities until NMFS OPR is able to review the circumstances of the incident. The POA must not resume their activities until notified by NMFS. The report must include the following information:

(1) Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);

(2) Species identification (if known) or description of the animal(s) involved;

(3) Condition of the animal(s) (including carcass condition if the animal is dead);

(4) Observed behaviors of the animal(s), if alive;

(5) If available, photographs or video footage of the animal(s); and

(6) General circumstances under which the animal was discovered.

§ 217.17 Letters of Authorization.

(a) To incidentally take marine mammals pursuant to these regulations, the POA must apply for and obtain an LOA.

(b) An LOA, unless suspended or revoked, may be effective for a period of time not to exceed the effective dates of this subpart.

(c) If an LOA expires prior to the end of the effective dates of this subpart, the POA may apply for and obtain a renewal of the LOA.

(d) In the event of projected changes to the activity or to mitigation and monitoring measures required by an LOA, the POA must apply for and obtain a modification of the LOA as described in § 217.18.

(e) The LOA must set forth the following information:

(1) Permissible methods of incidental taking;

(2) Means of effecting the least practicable adverse impact (*i.e.,* mitigation) on the species, its habitat, and on the availability of the species for subsistence uses; and

(3) Requirements for monitoring and reporting.

(f) Issuance of the LOA must be based on a determination that the level of taking will be consistent with the findings made for the total taking allowable under this subpart.

(g) Notice of issuance or denial of an LOA must be published in the **Federal Register** within 30 days of a determination.

§ 217.18 Modifications of Letters of Authorization.

(a) A LOA issued under §§ 216.106 of this chapter and 217.17 for the specified activities may be modified upon request by the POA, provided that:

(1) The specified activity and mitigation, monitoring, and reporting measures, as well as the anticipated impacts, are the same as those described and analyzed for this subpart; and

(2) NMFS determines that the mitigation, monitoring, and reporting measures required by the previous LOA were implemented.

(b) For LOA modification by the POA that includes changes to the specified activity or the mitigation, monitoring, or reporting measures that do not change the findings made for the regulations in this subpart or result in no more than a minor change in the total estimated number of takes (or distribution by species or years), NMFS may publish a notice of proposed LOA in the **Federal Register**, including the associated analysis of the change and solicit public comment before issuing the LOA.

(c) A LOA issued under § 216.106 of this chapter and § 217.17 for the specified activity may be modified by NMFS under the following circumstances:

(1) NMFS may modify the existing mitigation, monitoring, or reporting measures, after consulting with the POA regarding the practicability of the modifications, if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring measures;

(i) Possible sources of data that could contribute to the decision to modify the mitigation, monitoring, or reporting measures in an LOA include, but are not limited to:

(A) Results from the POA's monitoring;

(B) Results from other marine mammal and/or sound research or studies; and

(C) Any information that reveals marine mammals may have been taken in a manner, extent or number not authorized by this subpart or subsequent LOAs; and

(ii) If, through adaptive management, the modifications to the mitigation, monitoring, or reporting measures are substantial, NMFS shall publish a notice of proposed LOA in the **Federal Register** and solicit public comment;

(2) If NMFS determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals specified in a LOA issued pursuant to § 216.106 of this chapter and § 217.17, a LOA may be modified without prior notice or opportunity for public comment. Notification will be published in the **Federal Register** within 30 days of the action.

§ 217.19 [Reserved]

[FR Doc. 2024–24580 Filed 10–25–24; 8:45 am]

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