E 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XC824]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the U.S. Army Corps of Engineers Unalaska (Dutch Harbor) Channel Deepening Project

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

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

SUMMARY: NMFS has received a request from the United States Army Corps of Engineers (Alaska District) (USACE) for authorization to take marine mammals incidental to Unalaska (Dutch Harbor) Channel Deepening in Iliuliuk Bay, Unalaska, Alaska. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an incidental harassment authorization (IHA) to incidentally take marine mammals during the specified activities. NMFS is also requesting comments on a possible one-time, 1-year renewal that could be issued under certain circumstances and if all requirements are met, as described in **Request for Public Comments** at the end of this notice. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorization and agency responses will be summarized in the final notice of our decision.

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

ADDRESSES: Comments should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service and should be submitted via email to *ITP.hotchkin@noaa.gov*.

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments, including all attachments, must not exceed a 25-megabyte file size. All comments received are a part of the public record and will generally be posted online at *www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act* without change. All personal identifying information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Cara Hotchkin, Office of Protected Resources, NMFS, (301) 427-8401. 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/national/marine-mammal-protection/incidental-take-authorizations-construction-activities*. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

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 proposed or, if the taking is limited to harassment, a notice of a proposed IHA is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence

uses (where relevant). Further, 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 mitigation, 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 review our proposed action (*i.e.*, the issuance of an IHA) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (IHAs with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHA qualifies to be categorically excluded from further NEPA review.

We will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on the IHA request.

Summary of Request

On October 31, 2022, NMFS received a request from the United States Army Corps of Engineers – Alaska District (USACE) for an IHA to take marine mammals

incidental to deepening the entrance to Iliuliuk Bay, adjacent to Dutch Harbor, Alaska. Following NMFS' review of the application, USACE submitted supplemental information on November 28, 2022 and January 5, 2023. The application was deemed adequate and complete on March 2, 2023. USACE's request is for take of harbor seals (*Phoca vitulina richardsi*), Steller sea lions (*Eumetopias jubatus*), harbor porpoise (*Phocoena phocoena*) and humpback whales (*Megaptera novaengliae*) by Level A harassment and Level B Harassment. Neither USACE nor NMFS expect serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Proposed Activity

Overview

The USACE is proposing to deepen the entrance channel of Iliuliuk Bay by means of dredging and (if necessary) confined blasting of a 42-foot (ft) (12.8 meter (m)) deep "bar" which currently restricts access to the port of Dutch Harbor, Alaska. Dutch Harbor is the only deep draft, year-round ice-free port along the 1,200-mile (1,931 km) Aleutian Island chain, providing vital services to vessels operating in both the North Pacific and the Bering Sea, and the depth of the bar currently restricts access for large vessels that may need to enter the port, particularly during extreme weather. The purpose of the project is to increase navigational safety and improve economic efficiencies into and out of Dutch Harbor via Iliuliuk Bay. As shown in Figure 1-1 of the IHA application, the depth of the bar and entrance is approximately 42 ft (12.8 m) below mean lower low water (MLLW), which is shallower than the surrounding bathymetry (approximately 100 ft (33.3 m) below MLLW). The bar is the only constraint preventing safe and efficient access for the delivery of fuel, durable goods, and exports to and from Dutch Harbor. Deeper draft vessels are unable to safely cross the bar to seek refuge in Dutch Harbor, and if they have to conduct personnel evacuations, it must be done outside the bar in open waters. This presents risks to rescuers and vessel personnel. The need for the project is to

reduce inefficiencies in cargo transportation and provide safer options in protected waters for vessel repairs and medical evacuations than currently exist due to draft restrictions at the bar.

Sounds resulting from confined blasting may result in the incidental take of marine mammals by Level A and Level B harassment in the form of slight injury (auditory and non-auditory) and behavioral harassment. Dredging and disposal of dredged material are not expected to result in either Level A or Level B harassment due to the low source level and mid-channel location of the dredging activities. If dredging is sufficient to deepen the channel to the required depth, reduced or no blasting may be necessary. USACE proposes a conservative scenario requiring blasting approximately 50 percent of the bar area, resulting in approximately 1,800 drilled boreholes and up to 24 total blasting events.

Dates and Duration

The proposed IHA would be effective from November 1, 2023 to October 31, 2024. The in-water work period for the proposed action will occur over approximately 150 to 200 days over 12 months, including a maximum of 24 non-consecutive days with confined blasting events. Dredging could occur for up to 10 hours per day; dredge disposal could occur for up to 1 hour per day. USACE proposes to conduct all work during daylight hours.

Specific Geographic Region

This project is located at the entrance to Iliuliuk Bay on Amaknak Island in the Aleutian Islands of Alaska. Dutch Harbor is a port facility with the City of Unalaska, and is located on the northern side of Amaknak Island, some 800 air miles (1,288 km) from Anchorage. The port of Dutch Harbor opens onto Iliuliuk Bay, and from there into Unalaska Bay and the Pacific Ocean (Figure 1). This project would occur at the mouth of Iliuliuk Bay out to a distance of approximately 3.1 miles (5 kilometers (km)).

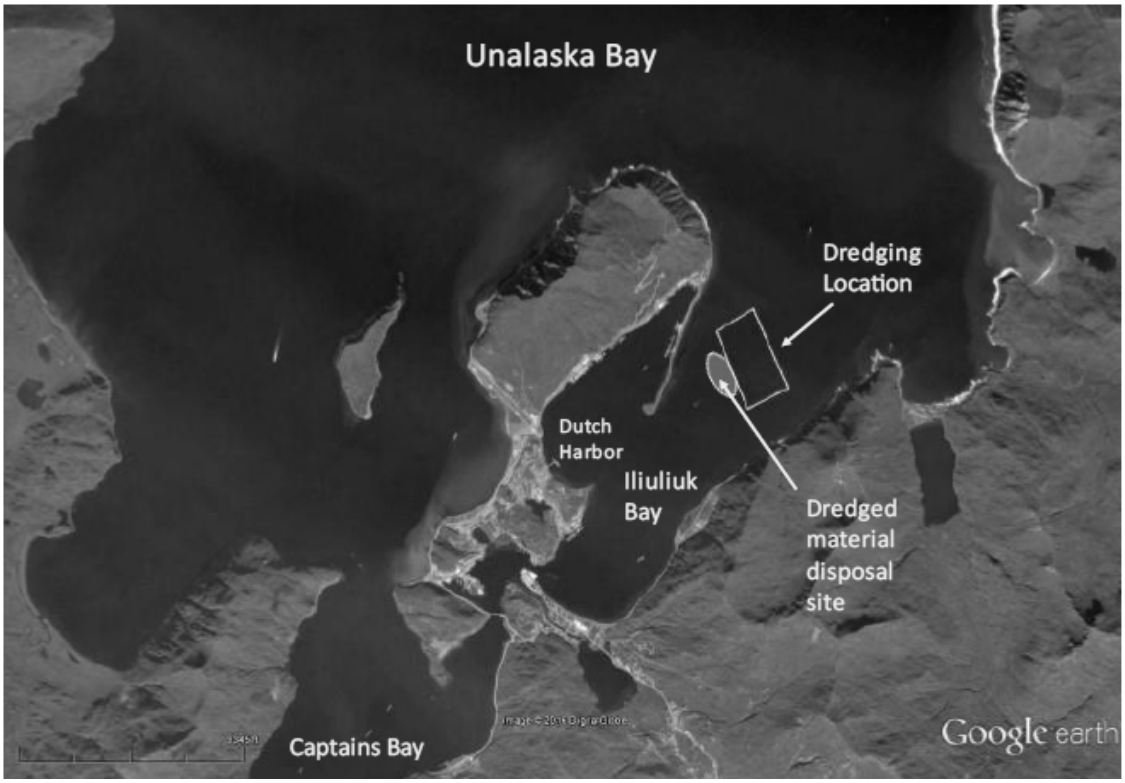

Figure 1-- Map of Proposed Project Area Amaknack Island, Alaska

Detailed Description of the Specified Activity

The USACE is proposing to deepen the entrance channel of Iliuliuk Bay by means of dredging and (if necessary) confined blasting of a 42-foot (ft) (12.8 meter (m)) deep "bar" which currently restricts access to the port of Dutch Harbor, Alaska. The bar is likely a terminal moraine from when the area around Iliuliuk Bay was glaciated; such moraines are typically made up of a heterogeneous mixture of everything from sand to large boulders. Geophysical surveys of the site indicate that the sediment is highly compacted and may require the use of explosives to effectively remove the sediment down to the desired depth of 58 ft (17.7 m) below MLLW. Removal of the bar would involve dredging (via clamshell dredge or long-reach excavator) an area approximately 600 ft (182.9 m) by 600 ft (182.9 m), moving approximately 182,000 cubic yards (139,150 cubic meters) of sediment. Dredged material would be placed in the water immediately adjacent to the inside of the bar in approximately 100 ft (33.3 m) of water. If required to enable dredging, confined blasting (hereafter "blasting") involving drilled boreholes and multiple charges with microdelays between blasts will be used to break up the sediment. If dredging is sufficient to deepen the channel to the required depth, reduced or no blasting may be necessary. USACE proposes a conservative scenario requiring blasting approximately 50 percent of the bar area, resulting in approximately 1,800 drilled boreholes and up to 24 total blasting events.

The proposed project may result in take of marine mammals by Level A and Level B harassment caused by sounds produced from underwater blasting activities. No Level A or Level B harassment is expected from the proposed dredging, dredged material disposal, or borehole drilling due to the low source levels, similarity to sound from passing vessels, and mid-channel location of the activities, and therefore none is proposed for authorization. Acoustic impacts from dredging and borehole drilling are not addressed further in this document.

Blasting Plan – The blasting plan for this project would be based on initial dredging activity, but a reasonable scenario involves drilling boreholes for confined underwater blasting in a 10-ft (3 m) by 10-ft (3 m) grid pattern over the dredge prism. While it is possible that dredging would be accomplished without any blasting at all, it is conservative to assume that up to 50 percent of the dredged area would need to be blasted to break up the hard crust and possibly large boulders encountered in the dredge prism. This would result in up to 1,800 boreholes drilled up to 60 ft (18.3 m) below MLLW. Drilling to 60 ft (18.3 m) below MLLW would ensure that everything down to the design depth of 58 ft (17.7 m) below MLLW is completely fractured. However, if just the crust needs to be broken up by blasting it is possible that charges will not need to be placed as deep as 60 ft (18.3 m) below MLLW. Drilling would likely take place from a jack-up barge with a drilling template. It is expected that after 75 holes are drilled they would be shot in a single blasting event (with delays between charges). Shooting 75 holes per event would lead to a maximum total of 24 blasting events to blast all 1,800 holes. Each of these 24 blasting events, lasting just over 1 second, may induce take by Level A and Level B harassment.

Although the desired outcome is to avoid all or at least a large portion of the blasting, USACE conservatively assumes blasting would be necessary for up to 50 percent of the entire area. The 600 ft (182.9 m) by 600 ft (182.9 m) dredged area is 360,000 sq. ft (33,445 square meters (m^2)). Borehole spacing of 10 ft (3 m) would require a total of 3,600 boreholes, so 50 percent would be a maximum of 1,800 boreholes. Boreholes would likely be blasted in groups of 75 holes with delays between charges in each hole. It is estimated that there could be up to 24 days of blasting with one blasting event lasting just over 1 second each of those 24 days. These blasting days will not occur every day, but will occur as needed and be separated by the time it takes to drill the necessary holes. It is possible that drilling might occur on the 1st and 2nd of a given

month and then charges are placed and shot on the third day of that month and then dredging might proceed for a week or two before drilling and blasting are needed again. The proposed IHA would authorize a maximum of 24 blasting events.

All underwater blasting would incorporate stemmed charges (*i.e.*, crushed rock packed at the top of the hole above the explosive charge). Stemming helps to reduce the impact from blasting above the surface and maximizes the ability of the charge to fracture rock without wasting energy. Charge sizes would be limited to no more than 93.5 pounds (lbs) (42.4 kilograms (kg)) placed in lined boreholes that would be about 3.5-4.0 inches (in) (8.9 – 10.2 centimeters (cm)) in diameter. Smaller charge sizes could be used at the contractor's discretion. The charge detonation in subsequent boreholes would be separated by at least 15 milliseconds (ms) to reduce the overall charge at one time while still retaining the effectiveness of the charges in the borehole.

Safety restrictions impose some limits on blasting activity and potential mitigations available to protect marine mammals. The explosives cannot "sleep" after being placed for longer than 24 hours without becoming a risk to private property and human health, and they cannot be detonated in the dark. If a marine mammal enters the blast area following the emplacement of charges, detonation will be delayed as long as possible. All other legal measures to avoid injury will be utilized; however, the charges will be detonated when delay is no longer feasible. As discussed in the mitigation section, in order to minimize the chances the charges need to be detonated while animals are present in the vicinity, the IHA includes a mitigation measure requiring explosives to be set as early in the day as possible, and detonated as soon as the pre-clearance zone is clear for 30 minutes.

In summary, the project period includes up to 24 days of confined underwater blasting activities for which incidental take authorization is requested, and up to 180 days

of dredging activity for which no take of any marine mammal species is expected or proposed for authorization.

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 Area of Specified Activities

Sections 3 and 4 of the application 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, incorporated here by reference, instead of reprinting the information. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; *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 1 lists all species or stocks for which take is expected and proposed to be authorized for this activity, 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 (as described in NMFS' SARs). 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 Ocean SARs. All values presented in Table 1 are the most recent available at the time of publication (including from the draft 2022 SARs) and are available online at: *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*.

On January 24, 2023, NMFS published the draft 2022 SARs (*https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region*). The Alaska and Pacific Ocean SARs include a proposed update to the humpback whale stock structure. The new structure, if finalized, would modify the MMPA-designated stocks to align more closely with the ESA-designated DPSs. Please refer to the draft 2022 Alaska and Pacific Ocean SARs for additional information.

NMFS Office of Protected Resources, Permits and Conservation Division has generally considered peer-reviewed data in draft SARs (relative to data provided in the most recent final SARs), when available, as the best available science, and has done so in this IHA for all species and stocks, with the exception of a new proposal to revise humpback whale stock structure. Given that the proposed changes to the humpback whale stock structure involve application of NMFS's Guidance for Assessing Marine Mammal Stocks and could be revised following consideration of public comments, it is more appropriate to conduct our analysis in this notice based on the status quo stock

structure identified in the most recent final SARs (2021; Carretta *et al.*, 2022; Muto *et al*., 2022).

Table 1 -- Species Likely Impacted by the Specified Activities[1]

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[2]	Stock abundance (CV, N_{min}, most recent abundance survey)[3]	PBR	Annual M/SI[4]
Order Artiodactyla – Infraorder Cetacea – Mysticeti (baleen whales)						
Family Balaenopteridae (rorquals)						
Humpback Whale[5]	*Megaptera novaeangliae*	Central N Pacific	-, -, Y	10,103 (0.3, 7,890, 2006)	83	26
		Western N Pacific	E, D, Y	1,107 (0.3, 865, 2006)	3	2.8
		CA/OR/WA	-, -, Y	4,973 (0.05, 4,776, 2018)	28.7	≥ 48.6
Odontoceti (toothed whales, dolphins, and porpoises)						
Family Phocoenidae (porpoises)						
Harbor porpoise	*Phocoena phocoena*	Bering Sea[6]	-, -, Y	UNK (UNK, N/A, 2008)	UND	0.4
		Gulf of Alaska	-, -, Y	31,046 (0.21, N/A, 1998)	UND	72
Order Carnivora – Pinnipedia						
Family Otariidae (eared seals and sea lions)						
Steller Sea Lion	*Eumetopias jubatus*	Western	E, D, Y	52,932 (N/A, 52,932, 2019)	318	254
		Eastern	-, -, N	43,201 (N/A, 43,201, 2017)	2592	112
Family Phocidae (earless seals)						
Harbor Seal	*Phoca vitulina*	Aleutian Islands	-, -, N	5,588 (N/A, 5,366, 2018)	97	90

[1] Information on the classification of marine mammal species can be found on the web page for The Society for Marine Mammalogy's Committee on Taxonomy (*https://marinemammalscience.org/science-and-publications/list-marine-mammal-species-subspecies/*; Committee on Taxonomy (2022)).

[2] 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.

[3] NMFS marine mammal stock assessment reports online at: *www.nmfs.noaa.gov/pr/sars/*. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable due to lack of recent surveys allowing for accurate assessment of stock abundance.

[4] 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. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.

[5]The two humpback whale Distinct Population Segments (DPSs) making up the California, Oregon, and Washington (CA/OR/WA) stock present in Southern California are the Mexico DPS, listed under the ESA as Threatened, and the Central America DPS, which is listed under the ESA as Endangered.

[6]The best available abundance estimate and Nmin are likely an underestimate for the entire stock because it is based upon a survey that covered only a small portion of the stock's range. PBR for this stock is undetermined due to this estimate being older than 8 years.

As indicated above, all four species (with eight managed stocks) in Table 1 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur. All species that could potentially occur in the proposed survey areas are included in Table 3-1 of the IHA application. While a biologically important area (BIA)

for sperm whales (*Physeter physeter*) surrounds Amaknack Island (Brower *et al.*, 2022), and killer whales (*Orcinus orca*) have been reported in the area, the temporal and/or spatial occurrence of these species is such that take is not expected to occur, and they are not discussed further beyond the explanation provided here. Previous monitoring for a construction project at Dutch Harbor, adjacent to Iliuliuk Bay, documented no sightings of any of these three species. Additionally, the shallow and confined nature of the bay makes it unsuitable habitat for sperm whales. Killer whales may occur within Iliuliuk Bay, but are infrequent and short-term visitors to the area and would be highly visible on approach.

In addition, the northern sea otter (*Enhydra lutris kenyoni*) may be found in Iliuliuk Bay. However, northern sea otters are managed by the U.S. Fish and Wildlife Service and are not considered further in this document.

Humpback Whale

The humpback whale is found worldwide in all oceans. Prior to 2016, humpback whales were listed under the ESA as an endangered species worldwide. Following a 2015 global status review (Bettridge *et al.,* 2015), NMFS established 14 Distinct Population Segments (DPS) with different listing statuses (81 FR 62259, September 8, 2016) pursuant to the ESA. Humpback whales found in the project area are predominantly from the three DPSs that are present in Alaska.

Whales from the Western North Pacific (WNP), Mexico, and Hawaii DPSs overlap on feeding grounds off Alaska and are not visually distinguishable. Members of different DPSs are known to intermix on feeding grounds; therefore, all waters off the coast of Alaska should be considered to have ESA-listed humpback whales. Based on an analysis of migration between winter mating/calving areas and summer feeding areas using photo-identification, Wade *et al*. (2016) concluded that the humpback whales in the Aleutian Islands, Bering, Chukchi, and Beaufort Seas summer feeding areas are primarily

from the recovered Hawaii DPS (91 percent), followed by the Mexico DPS (7 percent), and Western North Pacific DPS (2 percent).

The DPSs of humpback whales that were identified through the ESA listing process do not equate to the existing MMPA stocks. The updated stock delineations for humpback whales under the MMPA are currently out for public review in the draft 2022 SARs, as mentioned above. Until this review is complete, NMFS considers humpback whales in the Aleutian Islands to be part of either the Central North Pacific stock or of the Western North Pacific stock (Muto *et al*., 2021).

Humpback whales are found throughout the Aleutian Islands, Gulf of Alaska, and Bering Sea in a variety of marine environments, including open-ocean, near-shore waters, and areas within strong tidal currents (Dahlheim *et al.,* 2009). Satellite tracking indicates humpbacks frequently congregate in shallow, highly productive coastal areas of the North Pacific Ocean and Bering Sea (Kennedy *et al.*, 2014). The waters surrounding the eastern Aleutian Islands are dominated by strong tidal currents, water-column mixing, and unique bathymetry. These factors are thought to concentrate the small fish and zooplankton that compose the typical humpback diet in Alaska, creating a reliable and abundant food source for whales. Unalaska Island is situated between Unimak and Umnak Passes, which are known to be important humpback whale migration routes and feeding areas (Kennedy *et al*., 2014). Humpback whales are often present near the project area during summer and show up in the larger area of Unalaska Bay beginning in April and are present well into October most years (USACE, 2019). Presence in Unalaska Bay and Iliuliuk Bay appears to be largely prey-driven, so large variations in abundance between months and years is common.

The most common areas to see most humpback whales in Unalaska Bay is shown in the orange shading on Figure 4-3 of the IHA application. Up to 60 humpback whales at one time have been observed during USACE 2018 surveys and use of this general area is

supported by casual observations over the past 23 years of working in the area. Humpback whales have been seen in Captains Bay, Iliuliuk Bay, and inside Dutch Harbor, but are always in smaller numbers than the overall Unalaska Bay area.

NMFS identified a portion of the area surrounding the Aleutian Islands as a Biologically Important Area (BIA) for humpback whales for feeding during the months of May through January (Brower *et al.* 2022). BIAs are spatial and temporal boundaries identified for certain marine mammal species where populations are known to concentrate for specific behaviors such as migration, feeding, or breeding. This BIA was identified based on tagging studies, visual observations, and acoustic detections of high numbers of humpback whales feeding in the area (Brower *et al.*, 2022). Initial designation of humpback whale BIAs helped to inform the critical habitat designation finalized by NMFS in 2021 (86 FR 21082, April 21, 2021).

Critical habitat became effective on May 21, 2021 (86 FR 21082) for the Central America, Mexico, and Western North Pacific DPS of humpback whales. The nearshore boundaries of the critical habitat for Mexico and Western North Pacific DPS humpback whales in Alaska are defined by the 1-meter isobath relative to MLLW. Additionally, on the north side of the Aleutian Islands, the seaward boundary is defined by a line extending from 55º 41' N, 162º 41' W to 55º 41' N, 169º 30' W, then southward through Samalga Pass to a boundary drawn along the 2,000-meter isobath on the south side of the islands.

The critical habitat does not include manmade structures (such as ferry docks or seaplane facilities) and the land on which they rest within the critical habitat boundaries. Sites owned or controlled by the Department of Defense (DoD) are also excluded from the critical habitat where they overlap. Essential features identified as essential to the conservation of the Mexico DPS and Western North Pacific DPS relevant to this IHA are the prey species of each (which are primarily euphausiids and small pelagic schooling

fish) are of sufficient quality, abundance, and accessibility within humpback whale feeding areas to support feeding and population growth. Material and equipment barges' routes would transit through critical habitat on the way to the project site.

Harbor Porpoise

Harbor porpoise range throughout the coastal waters of the North Pacific Ocean from Point Barrow along the Alaska Coast and throughout the Gulf of Alaska (Muto *et al.,* 2021). While existing data suggests that the stock structure is likely more fine-scaled than current analyses have been able to describe, there are currently two defined stocks of harbor porpoise that may be present in the project area. These are the Bering Sea and Gulf of Alaska stocks. The Bering Sea stock occurs around the Aleutian Islands and northward, while the Gulf of Alaska Stock occurs south of the Aleutians and ranges throughout southcentral Alaskan coastal waters. There is likely some overlap in stocks around Unimak Pass (Muto *et al.,* 2021), potentially including the action area. Harbor porpoise typically occur in waters less than 100 m deep, tend to be solitary or occur in small groups, and can be difficult for observers to detect.

Harbor porpoise tend to be short-term, infrequent visitors to Iliuliuk Bay. While there were no detections of this species during monitoring and survey efforts in 2017 and 2018, a group of approximately eight porpoises was spotted by USACE biologists during 2017 project scoping efforts (USACE, 2019).

Steller Sea Lion

Steller sea lions were listed as threatened range-wide under the ESA on November 26, 1990 (55 FR 49204). Steller sea lions were subsequently partitioned into the western and eastern Distinct Population Segments (DPSs; western and eastern stocks) in 1997 (62 FR 24345, May 5, 1997). The eastern DPS remained classified as threatened until it was delisted in November 2013. The western DPS (those individuals west of the 144◦ W longitude or Cape Suckling, Alaska) was upgraded to endangered status

following separation of the DPSs, and it remains endangered today. There is regular movement of both DPSs across this 144◦ W longitude boundary (Jemison *et al.,* 2013) however, due to the distance from this DPS boundary, it is likely that only western DPS Steller sea lions are present in the project area. Therefore, animals potentially affected by the project are assumed to be part of the western DPS. Sea lions from the eastern DPS, are not likely to be affected by the proposed activity and are not discussed further.

Steller sea lions do not follow traditional migration patterns, but will move from offshore rookeries in the summer to more protected haulouts closer to shore in the winter. They use rookeries and haulouts as resting spots as they follow prey movements and take foraging trips for days, usually within a few miles of their rookery or haulout. They are generalist marine predators and opportunistic feeders based on seasonal abundance and location of prey. Steller sea lions forage in nearshore as well as offshore areas, following prey resources. They are highly social and are often observed in large groups while hauled out, but alone or in small groups when at sea (NMFS, 2022).

Steller sea lions are distributed throughout the Aleutian Islands, occurring year-round in the proposed action area. Steller sea lions are drawn to fish processing plants and high forage value areas, such as anadromous streams. Dutch Harbor is one of the busiest commercial fishing ports in the United States, with consistent fishing vessel traffic in and out of Iliuliuk Bay. Steller sea lions were common during periodic USACE winter surveys in Dutch Harbor between 2000 and 2016, but they were not abundant near the proposed project area. Single marine mammals were observed on occasion outside the Dutch Harbor spit. In past years during winter surveys during 2000 to 2006, there were two areas outside of Iliuliuk Bay where large aggregations of 50 to 60 Steller sea lions were common (USACE, unpublished data; see Figure 4-5 of the IHA application for further detail).

Critical habitat for Steller sea lions was designated by NMFS in 1993 based on the following essential physical and biological habitat features: terrestrial habitat (including rookeries and haulouts important for rest, reproduction, growth, social interactions) and aquatic habitat (including nearshore waters around rookeries and haulouts, free passage for migration, prey resources, and foraging habitats) (58 FR 45269).

There are three major haulouts and one major rookery within 20 nautical miles of the Proposed Project site (see Figure 4-6 in the IHA application). The major haulouts include Old Man Rocks and Unalaska/Cape Sedanka (approximately 15 nautical miles southeast straight-line distance from the project site) and Akutan/Lava Reef (approximately 19 nautical miles northeast straight-line distance from the project site). The closest rookery is Akutan/Cape Morgan (approximately 19 nautical miles east straight-line distance from the project site). Another major rookery is located approximately 19 nmi from the project location (straight line distance over mountains) at Akutan/Lava Reef. As of 2014, the number of adult Steller sea lions using these sites was: 1,129 (Akutan/Cape Morgran rookery); 182 (Akutan/Lava Reef haulout); 15 (Old Man Rocks haulout); and 0 (Unalaska/Cape Sedanka haulout) (NMFS, 2021).

In addition to major rookery and haulout locations, there are three special aquatic foraging areas in Alaska for the Steller sea lion (Shelikof Strait area, Bogoslof area, and Seguam Pass area). The project site is within the outer limits of the Bogoslof foraging area (Figure 4-7 in the IHA application).

Since the ensonified action area is within 20 nmi of major haulouts and a major rookery, it would intersect Steller sea lion designated critical habitat. Additionally, since Iliuliuk Bay is within Steller sea lion critical habitat, material and equipment barges' routes would transit through critical habitat on the way to the project site.

Harbor Seal

Harbor seals inhabit coastal and estuarine waters off Alaska and are one of the most common marine mammals in Alaska. They haul out on rocks, reefs, beaches, and drifting glacial ice. They are opportunistic feeders and often adjust their distribution to take advantage of locally and seasonally abundant prey, feeding in marine, estuarine, and occasionally fresh waters (Womble *et al.,* 2009, Allen and Angliss, 2015). Harbor seals are generally non-migratory, with local movements associated with such factors as tide, weather, season, food availability and reproduction. They deviate from other pinniped species in that pupping may occur on a wide variety of haulout sites rather than particular major rookeries (ADF&G, 2022).

There are 12 distinct stocks of harbor seals in Alaska. A 1996 to 2018 survey resulted in an estimated 243,938 harbor seals throughout Alaska. The Aleutian Island Stock is the only stock that occurs within the project area and is estimated to consist of 5,588 harbor seals. The ability to obtain data on the Aleutian Island Stock is limited due to the region's size and weather; in addition, it is difficult to acquire the logistics to conduct aerial surveys in the region.

In skiff-based surveys conducted in the western Aleutians from 1977 to 1982, 1,619 harbor seals were observed. Compared to an aerial survey conducted in 1999 resulting in 884 harbor seals being observed, there was a 45 percent decrease in harbor seal population (Small *et al.*, 2008). Figure 4-1 in the IHA applications shows the locations where these surveys were conducted in the Fox Islands. The Fox Islands includes Unalaska Island, which had a multitude of locations surveyed.

Harbor seals occur throughout Unalaska Bay. They are usually observed as single individuals in the water, but often in groups when hauled out. They occasionally haul out in three locations when in Iliuliuk Bay (Figure 4-2 in the IHA application). They typically haul out in groups of 1 to 10 individuals during calm conditions. Around 40 harbor seals can haul out near Ulakta Head when the tide is at lower levels in calm seas.

Additionally, although they can be found anywhere along the shoreline, they are more commonly seen routinely foraging at the kelp beds along the shoreline.

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) 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. Marine mammal hearing groups and their associated hearing ranges are provided in Table 2.

Table 2 -- 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).	

The pinniped functional hearing group was modified from Southall *et al*. (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al*., 2006; Kastelein *et al*., 2009; Reichmuth *et al.*, 2013).

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

Potential Effects of Specified Activities 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 expected

to, or reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

Description of Sound Sources

Sound-producing in-water construction activities associated with the project would include confined blasting. The sounds produced by confined blasting are considered impulsive (as compared to non-impulsive, defined below). The distinction between the two sound types is important because they have differing potential to cause physiological effects, particularly with regard to hearing (*e.g.*, Ward 1997 in Southall *et al*., 2007). Please see Southall *et al*. (2007) for an in-depth discussion of these concepts.

Impulsive sound sources (*e.g.*, explosions, gunshots, sonic booms, impact pile driving) produce signals that are brief (typically considered to be less than 1 second), broadband, atonal transients (ANSI 1986; Harris 1998; NIOSH 1998; ISO 2003; ANSI 2005) and occur either as isolated events or repeated in some succession. 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.

Non-impulsive sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or non-continuous (ANSI 1995; NIOSH 1998). Some of these non-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, vibratory pile driving, and active sonar systems. The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

Acoustic Impacts

Anthropogenic sounds cover a broad range of frequencies and sound levels and can have a range of highly variable impacts on marine life, from none or minor to potentially severe responses, depending on received levels, duration of exposure, behavioral context, and various other factors. The potential effects of underwater sound from active acoustic sources can potentially result in one or more of the following; temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, stress, and masking (Richardson *et al*., 1995; Gordon *et al*., 2004; Nowacek *et al*., 2007; Southall *et al*., 2007; Gotz *et al*., 2009). The degree of effect is intrinsically related to the signal characteristics, received level, distance from the source, and duration of the sound exposure. In general, sudden, high level sounds can cause hearing loss, as can longer exposures to lower level sounds. Temporary or permanent loss of hearing will occur almost exclusively for noise within an animal's hearing range. Specific manifestations of acoustic effects are first described before providing discussion specific to the USACE's blasting activities.

Richardson *et al*. (1995) described zones of increasing intensity of effect that might be expected to occur, in relation to distance from a source and assuming that the signal is within an animal's hearing range. The first zone is the area within which the acoustic signal would be audible (potentially perceived) to the animal, but not strong enough to elicit any overt behavioral or physiological response. The next zone corresponds with the area where the signal is audible to the animal and of sufficient intensity to elicit behavioral or physiological responsiveness. Third is a zone within which, for signals of high intensity, the received level is sufficient to potentially cause discomfort or tissue damage to auditory or other systems. Overlaying these zones to a certain extent is the area within which masking (*i.e*., when a sound interferes with or masks the ability of an animal to detect a signal of interest that is above the absolute hearing threshold) may occur; the masking zone may be highly variable in size.

Hearing Threshold Shift

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 decibels (dB). A TS can be permanent or temporary. As described in NMFS (2018), 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 and vocalization frequency range of the exposed species relative to the signal's frequency spectrum (*i.e.*, how an 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).

Permanent Threshold Shift (PTS) — 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 2018). Available data from humans and other terrestrial mammals indicate that a 40 dB threshold shift approximates PTS onset (see Ward *et al.,* 1958, 1959; Ward 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) — TTS is 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 cetacean 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 (Schlundt *et al.,* 2000; Finneran *et al.,* 2000, 2002). As described in Finneran (2015), marine mammal studies have shown the amount of TTS increases with cumulative sound exposure level (SELcum) in an accelerating fashion: At low exposures with lower SELcum, the amount of TTS is typically small and the growth curves have shallow slopes. At exposures with higher SELcum, 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 a 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). For cetaceans, published data on the onset of TTS are limited to the captive bottlenose dolphin (*Tursiops truncatus*), beluga whale (*Delphinapterus leucas*), 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*) (Reichmuth *et al.*, 2019; Sills *et al.,* 2020; Kastak *et al.,* 1999, 2007; Kastelein *et al.,* 2019a,b, 2021, 2022). These studies examine hearing thresholds measured in marine mammals before and after exposure to intense sounds. 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, 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, 2019b). 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 (Finneran *et al.,* 2010; Kastelein *et al.,* 2014; Kastelein *et al.,* 2015a; Mooney *et al.,* 2009). 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 the 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).

Behavioral Effects

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 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*., 2003; Southall *et al*., 2007; Weilgart, 2007; Archer *et al*., 2010). 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). Please see Appendices B-C of Southall *et al*. (2007) for a review 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*., 2003). 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, 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; NRC, 2003; Wartzok *et al*., 2003). 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-impulsive sound sources (typically seismic airguns or acoustic harassment devices) have been varied but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds, 2002; see also Richardson *et al*., 1995; 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. 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). This

highlights the importance of assessing the context of the acoustic effects alongside the received levels anticipated. Severity of effects from a response to an acoustic stimuli can likely vary based on the context in which the stimuli was received, particularly if it occurred during a biologically sensitive temporal or spatial point in the life history of the animal. There are broad categories of potential response, described 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,b). 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. 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 relationship between prey availability, foraging effort and success, and the life history stage 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, 2005b, 2006; Gailey *et al*., 2007).

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; Foote *et al*., 2004), while 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*., 2007b). In some cases, animals may cease sound production during production of aversive signals (Bowles *et al*., 1994).

Avoidance is the displacement of an individual from an area or migration path because 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 (*Eschrictius robustus*) are known to change direction—deflecting from customary migratory paths—in order to avoid noise from seismic surveys (Malme *et al*.,

1984). 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). 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 (Evans and England, 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 fish 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 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.

With blasting activities, it is likely that the onset of sound sources could result in temporary, short-term changes in an animal's typical behavior and/or avoidance of the affected area. These behavioral changes may include (Richardson *et al.*, 1995): changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where sound sources are located; and/or flight responses (*e.g.*, pinnipeds flushing into water from haulouts or rookeries). Pinnipeds may increase their haulout time, possibly to avoid in-water disturbance (Thorson and Reyff, 2006). If a marine mammal responds to a stimulus by

changing its behavior (*e.g.*, through relatively minor changes in locomotion direction/speed or vocalization behavior), the response may or may not constitute taking at the individual level, and is unlikely to affect the stock or the species as a whole. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on animals, and if so potentially on the stock or species, could potentially be significant (*e.g.*, Lusseau and Bejder, 2007; Weilgart, 2007). Given the nature of the proposed blasting activities (single, short-duration blasts on non-consecutive days), and the monitoring and mitigation measures described below, NMFS considers the most likely impact to marine mammals to be a short-term, temporary behavioral disturbance such as a startle or change in orientation. It is expected that animals would return to their normal behavioral patterns within a few minutes after the blasting event, and that no habitat abandonment is likely as a result of the proposed construction activities.

Stress Response

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.*, Seyle, 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. 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, 2003).

Auditory Masking

Sound can disrupt behavior through masking, or interfering 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). Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher intensity, and may occur whether the sound is natural (*e.g.*, snapping shrimp, wind, waves, precipitation) or anthropogenic (*e.g.*, shipping, sonar, seismic exploration) in origin. 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. Given the short duration (approximately 1 second each) and non-consecutive nature of the blasting events proposed, it is unlikely that masking would occur for any marine mammal species.

Non-Auditory Physiological Effects from Explosive Detonations

In addition to PTS and TTS, there is a potential for non-auditory physiological effects that could result from exposure to the detonation of explosives, which the USACE's activities include. Underwater explosions will send a shock wave and blast noise through the water, release gaseous by-products, create an oscillating bubble, and cause a plume of water to shoot up from the water surface. The shock wave and blast noise are of most concern to marine animals. The effects of an underwater explosion on a marine mammal depends on many factors, including the size, type, and depth of both the animal and the explosive charge; the depth of the water column; and the standoff distance between the charge and the animal, as well as the sound propagation properties of the environment. Potential impacts can range from brief effects (such as behavioral

disturbance), tactile perception, physical discomfort, slight injury of the internal organs and the auditory system, to death of the animal (Yelverton *et al*., 1973; DoN, 2001). Non-lethal injury includes slight injury to internal organs and the auditory system; however, delayed lethality can be a result of individual or cumulative sublethal injuries (DoN, 2001). Immediate lethal injury would be a result of massive combined trauma to internal organs as a direct result of proximity to the point of detonation (DoN, 2001). Generally, the higher the level of impulse and pressure level exposure, the more severe the impact to an individual.

Injuries resulting from a shock wave take place at boundaries between tissues of different density. Different velocities are imparted to tissues of different densities, and this can lead to their physical disruption. Blast effects are greatest at the gas-liquid interface (Landsberg, 2000). Gas-containing organs, particularly the lungs and gastrointestinal (GI) tract, are especially susceptible (Goertner, 1982; Hill, 1978; Yelverton *et al*., 1973). In addition, gas-containing organs including the nasal sacs, larynx, pharynx, trachea, and lungs may be damaged by compression/expansion caused by the oscillations of the blast gas bubble. Intestinal walls can bruise or rupture, with subsequent hemorrhage and escape of gut contents into the body cavity. Less severe GI tract injuries include contusions, petechiae (small red or purple spots caused by bleeding in the skin), and slight hemorrhaging (Yelverton *et al*., 1973).

Because the ears are the most sensitive to pressure, they are the organs most sensitive to injury (Ketten, 2000). Sound-related damage associated with blast noise can be theoretically distinct from injury from the shock wave, particularly farther from the explosion. If an animal is able to hear a noise, at some level it can damage its hearing by causing decreased sensitivity (Ketten, 1995). Sound-related trauma can be lethal or sub-lethal. Lethal impacts are those that result in immediate death or serious debilitation in or near an intense source and are not, technically, pure acoustic trauma (Ketten, 1995). Sub-

lethal impacts include hearing loss, which is caused by exposures to perceptible sounds. Severe damage (from the shock wave) to the ears includes tympanic membrane rupture, fracture of the ossicles, damage to the cochlea, hemorrhage, and cerebrospinal fluid leakage into the middle ear. Moderate injury implies partial hearing loss due to tympanic membrane rupture and blood in the middle ear. Permanent hearing loss also can occur when the hair cells are damaged by one very loud event, as well as by prolonged exposure to a loud noise or chronic exposure to noise. The level of impact from blasts depends on both an animal's location and, at outer zones, on its sensitivity to the residual noise (Ketten, 1995).

The above discussion concerning underwater explosions only pertains to open water detonations in a free field without mitigation. Given the proposed monitoring and mitigation measures discussed below, the size of the explosives used, and the environment, the USACE's blasting events are not likely to have non-auditory injury or mortality effects on marine mammals in the project vicinity. Instead, NMFS considers that the USACE's blasts are most likely to cause Level B harassment, including behavioral harassment and TTS, or in some cases PTS, in a few individual marine mammals. Neither NMFS nor the USACE anticipates non-auditory injuries of marine mammals as a result of the proposed construction activities.

Potential Effects on Marine Mammal Habitat

Water quality – Temporary and localized reduction in water quality will occur as a result of dredging, dredge disposal, and blasting when bottom sediments are disturbed. Effects to turbidity and sedimentation are expected to be short-term, minor, and localized. Currents are strong in the area and, therefore, suspended sediments in the water column should dissipate and quickly return to background levels. Following the completion of sediment-disturbing activities, the turbidity levels are expected to return to normal ambient levels following the end of construction. 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. 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 project is relatively small compared to the available habitat in Iliuliuk Bay and the greater Unalaska Bay. While the project area occurs within a humpback whale feeding BIA, the area impacted by the blasting activities is very small relative to the available foraging habitat, and blasting would occur for a single second on non-consecutive days in an area that is already highly trafficked by vessels. As a result, activity at the project site would be inconsequential in terms of its effects on marine mammal foraging.

Effects to Prey – Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.*, crustaceans, cephalopods, fish, 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.

Fish 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 strong and/or intermittent low-frequency sounds, and behavioral responses, such as flight or avoidance are the most likely effects. 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 fish, although several are based on studies in support of large, multiyear bridge construction projects (*e.g.*, Scholik and Yan, 2001, 2002; Popper and Hastings, 2009). Several studies have demonstrated that impulse 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.*, Pena *et al*., 2013; Wardle *et al*., 2001; Jorgenson and Gyselman, 2009; Cott *et al*., 2012). More commonly, though, the impacts of noise on fish are temporary.

Regarding impacts from explosive detonations, SPLs of sufficient strength have been known to cause injury to fish and fish mortality (Dahl *et al.,* 2020). 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*. (2012a) showed that a TTS of 4-6 dB was recoverable within 24 hours for one species. Smith *et al.* (2022) found that damage to the inner ears of fishes at up to 400 m away from an open-water explosion, but noted that the damage present was not linearly related to the distance from the blast. They also did not examine the potential time to recovery

from these injuries. Impacts would be most severe when the individual fish is close to the source. Injury caused by barotrauma can range from slight to severe and can cause death, and is most likely for fish with swim bladders. Barotrauma injuries have been documented during controlled exposure to explosions and impact pile driving, but the relationships between severity of injury and location of the fish relative to the sound source are not well understood (Halvorsen *et al*., 2012b; Casper *et al*., 2013; Dahl *et al.,* 2020). While physical impacts from blasting to fish are potentially severe, including barotrauma and mortality, the geographic range for these potential impacts from the explosion is likely to be limited. Given the other activity occurring within the blast zone (dredging and drilling), it is unlikely that many fishes would remain in a highly disturbed area with extensive construction operations occurring. NMFS therefore believes that the likelihood of injury and mortality to fishes from explosives will be minimized, and that any injurious effects would accrue only to individuals, with no overall impact to fish populations in and around the action area. With respect to non-injurious acoustic impacts, including TTS and behavioral disturbance, the blasting events will last less than 1 second each blast event, making the duration of potential acoustic impacts short term and temporary.

Construction activities would also produce continuous (*i.e*., dredging and drilling) sounds. Sounds from dredging and drilling activities are unlikely to elicit behavioral reactions from fish due to their similarity to sounds from vessel passages, which are common in the area. These sounds are unlikely to cause injuries to fish or have persistent effects on local fish populations. The duration of possible fish avoidance of this area after dredging or drilling stops is unknown, but a return to normal recruitment, distribution and behavior is anticipated. In addition, it should be noted that the area in question experiences a high level of anthropogenic noise from normal port operations and other vessel traffic.

The most likely impacts to fishes from the proposed project are behavioral disturbances, with some potential for TTS or non-auditory injury (ranging from superficial to serious); in general, impacts to fishes are expected to be minor and temporary.

Construction may have temporary impacts on benthic invertebrate species, another possible marine mammal prey source. Direct benthic habitat loss would result with the permanent loss of 0.03 km^2 of benthic habitat from deepening of the bar. However, the shallow habitat in the middle of the channel is not of high value to marine mammals, which are typically observed foraging either at the shoreline or further into open water, and represents a minimal portion of the available habitat. Further, vessel activity during passages in and out of Iliuliuk Bay creates minor disturbances of benthic habitats (*e.g.*, vessel propeller wakes). The most likely impacts on marine mammal habitat for the project are from underwater noise, bedrock removal, and turbidity, all of which may have impacts on marine mammal prey species. However, as described in the analysis, any impacts to fish and invertebrates are expected to be relatively short term and localized, and would be inconsequential to the fish and invertebrate populations, as well as the marine mammals that use them as prey.

Estimated Take of Marine Mammals

This section provides an estimate of the number of incidental takes proposed for authorization through this IHA, which will inform both NMFS' consideration of "small numbers," and the negligible impact determinations.

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 explosive source (*i.e.*, confined blasting) has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury and tissue damage (Level A harassment) to result, primarily for cetaceans (humpback whale and harbor porpoise) and phocids because predicted auditory injury zones are larger than for otariids. 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. While blasting has the potential to result in mortality, when the isopleths within which mortality could occur were calculated, the zones were sufficiently small that the risk of mortality is considered discountable. 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 expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment). Thresholds have also been developed to identify the pressure levels above which animals may incur different types of tissue damage (non-acoustic Level A harassment or mortality) from exposure to pressure waves from explosive detonation.

Level A harassment – NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies 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 (including explosives) or non-impulsive). These thresholds are provided in Table 3, below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS' 2018 Technical Guidance, which may be accessed at: *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*.

Explosive sources – Based on the best available science, NMFS uses the acoustic and pressure thresholds indicated in Tables 3 and 4 to predict the onset of behavioral harassment, PTS, TTS, tissue damage, and mortality.

For explosive activities using single detonations *(i.e.*, no more than one detonation within a day), such as those described in the proposed activity, NMFS uses TTS onset thresholds to assess the likelihood of behavioral harassment, rather than the Level B Harassment threshold for multiple detonations indicated in Table 3. While marine mammals may also respond behaviorally to single explosive detonations, these responses are expected to typically be in the form of startle reaction, rather than a more meaningful

disruption of a behavioral pattern. On the rare occasion that a single detonation might result in a behavioral response that qualifies as Level B harassment, it would be expected to be in response to a comparatively higher received level. Accordingly, NMFS considers the potential for these responses to be quantitatively accounted for through the application of the TTS threshold, which, as noted above, is 5 dB higher than the behavioral harassment threshold for multiple explosives.

Table 3 -- Explosive Thresholds for Marine Mammals for PTS, TTS, and Behavior (multiple detonations)

Hearing Group	PTS Impulsive Thresholds	TTS Impulsive Thresholds	Behavioral Threshold (multiple detonations)
Low-Frequency (LF) Cetaceans	*Cell 1* $L_{p,0\text{-pk,flat}}$: 219 dB $L_{E,LF,24h}$: 183 dB	*Cell 2* $L_{p,0\text{-pk,flat}}$: 213 dB $L_{E,LF,24h}$: 168 dB	*Cell 3* $L_{E,LF,24h}$: 163 dB
Mid-Frequency (MF) Cetaceans	*Cell 4* $L_{p,0\text{-pk,flat}}$: 230 dB $L_{E,MF,24h}$: 185 dB	*Cell 5* $L_{p,0\text{-pk,flat}}$: 224 dB $L_{E,MF,24h}$: 170 dB	*Cell 6* $L_{E,MF,24h}$: 165 dB
High-Frequency (HF) Cetaceans	*Cell 7* $L_{p,0\text{-pk,flat}}$: 202 dB $L_{E,HF,24h}$: 155 dB	*Cell 8* $L_{p,0\text{-pk,flat}}$: 196 dB $L_{E,HF,24h}$: 140 dB	*Cell 9* $L_{E,HF,24h}$: 135 dB
Phocid Pinnipeds (PW) (Underwater)	*Cell 10* $L_{p,0\text{-pk,flat}}$: 218 dB $L_{E,PW,24h}$: 185 dB	*Cell 11* $L_{p,0\text{-pk,flat}}$: 212 dB $L_{E,PW,24h}$: 170 dB	*Cell 12* $L_{E,PW,24h}$: 165 dB
Otariid Pinnipeds (OW) (Underwater)	*Cell 13* $L_{p,0\text{-pk,flat}}$: 232 dB $L_{E,OW,24h}$: 203 dB	*Cell 14* $L_{p,0\text{-pk,flat}}$: 226 dB $L_{E,OW,24h}$: 188 dB	*Cell 15* $L_{E,OW,24h}$: 183 dB

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS/TTS onset.

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, ANSI defines peak sound pressure as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the overall marine mammal 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 4 -- Lung and GI Tract Injury Thresholds for Underwater Explosives

Hearing Group	Mortality (Severe lung injury)*	Slight Lung Injury*	GI Tract Injury

All Marine Mammals	*Cell 1* Modified Goertner model; Equation 1	*Cell 2* Modified Goertner model; Equation 2	*Cell 3* $L_{p,0\text{-pk,flat}}$: 237 dB

* Lung injury (severe and slight) thresholds are dependent on animal mass (Recommendation: Table C.9 from DON 2017 based on adult and/or calf/pup mass by species).

Note: Peak sound pressure (L_{pk}) has a reference value of 1 µPa. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, ANSI defines peak sound pressure as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the overall marine mammal generalized hearing range.

Modified Goertner Equations for severe and slight lung injury (pascal-second)

Equation 1: $103M^{1/3}(1 + D/10.1)^{1/6}$ Pa-s

Equation 2: $47.5M^{1/3}(1 + D/10.1)^{1/6}$ Pa-s

M animal (adult and/or calf/pup) mass (kg) (Table C.9 in DoN 2017)
D animal depth (meters)

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.

NMFS computed cumulative sound exposure impact zones from the blasting information provided by the USACE. Peak source levels of the confined blasts were calculated based on Hempen *et al*. (2007), and scaled using a distance of 10 ft (3 m) and a weight of 95 lbs (43.1 kg) for a single charge. The total charge weight is defined as the product of the single charge weight and the number of charges. In this case, the number of charges is 75. Explosive energy was then computed from peak pressure of the single maximum charge, using the pressure and time relationship of a shock wave (Urick, 1983). Due to time and spatial separation of each single charge by a distance of 10 ft (3m), the accumulation of acoustic energy is added sequentially, assuming the transmission loss follows cylindrical spreading within the matrix of charges. The sound exposure level (SEL) from each charge at its source can then be calculated, followed by

the received SEL from each charge. Since the charges will be deployed in a grid of 10 ft (3 m) by 10 ft (3 m) apart, the received SELs from different charges to a given point will vary depending on the distance of the charges from the receiver. Without specific information regarding the layout of the charges, the modeling assumes a grid of 8 by 9 charges with an additional three charges located in three peripheral locations. Among the various total SELs calculated (one at a receiver location corresponding to each perimeter charge), the largest value, SELtotal (max) is selected to calculate the impact range. Using the pressure versus time relationship above, the frequency spectrum of the explosion can be computed by taking the Fourier transform of the pressure (Weston, 1960), and subsequently be used to produce hearing range weighted metrics.

Frequency specific transmission loss of acoustic energy due to absorption is computed using the absorption coefficient, α (dB/km), summarized by François and Garrison (1982a, b). Seawater properties for computing sound speed and absorption coefficient were based on NMFS Alaska Fisheries Science Center report of mean measurements in Auke Bay (Sturdevant and Landingham, 1993) and the 2022 average seawater temperature from Unalaska (NOAA, 2023). Transmission loss was calculated using the sonar equation:

$$TL = SEL_{total(m)} - SEL_{threshold}$$

where $SEL_{threshold}$ is the Level A harassment threshold. The distances, R, where such transmission loss is achieved were computed numerically by combining both geometric transmission loss, and transmission loss due to frequency-specific absorption. A spreading coefficient of 20 is assumed to account for acoustic energy loss from the sediment into the water column. The outputs from this model are summarized in Table 5, below.

Table 5 -- Model Results of Impact Zones for Blasting in Meters (m)

Species	Mortality	Slight lung injury	GI Tract	PTS: SELcum	PTS: SPLpk	TTS: SELcum	TTS: SPLpk
Low frequency cetacean	4.0	9.2	25.8	344.66*	205.29	1,918*	409.62
High frequency cetacean	20.3	47.5	25.8	1,213.79	1,453.37*	4,435.57*	2,899.86
Otariid	13.8	32.3	25.8	40.00	91.92*	249.76*	183.40
Phocid	18.2	42.5	25.8	164.84	230.34*	909.10*	459.60

*For the dual criteria of SELcum and SPLpk, the largest of the two calculated distances for each species group was used in our analysis. The PTS and TTS distances for Steller sea lions resulting from the model seemed uncharacteristically small when compared to the other thresholds resulting from the model and were doubled to 92 m and 230 m respectively for take estimation, mitigation, and monitoring.

Marine Mammal Occurrence

In this section, we provide information about the occurrence of marine mammals, including density or other relevant information that will inform the take calculations. Reliable densities are not available for Iliuliuk Bay, and generalized densities for the North Pacific are not applicable given the high variability in occurrence and density at specific areas around the Aleutian Island chain. Therefore, the USACE consulted previous survey data in and around Iliuliuk Bay and Dutch Harbor to arrive at a number of animals expected to occur within the project area per day. Figure 4-8 and Table 4-3 in the IHA application provide further detail on observations of humpback whales, Steller sea lions, and harbor seals in and around Iliuliuk Bay. Harbor porpoise were not addressed in the IHA application; however, NMFS proposes authorization of harbor porpoise take out of an abundance of caution, based on the 2017 sighting of porpoises in the action area by USACE biologists.

Take Estimation

Here 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.

Since reliable densities are not available, the USACE has requested take based on the maximum number of animals that may occur in the blasting area per day multiplied by the number of days of the activity. The applicant varied these calculations based on certain factors. Because of the nature of the proposed blasting (i.e., no more than one blasting event per day), the behavioral thresholds associated with the activity are the same as for the onset of TTS for all species. Both behavioral disturbance and TTS may occur.

Humpback whale – Humpback whales are commonly sighted outside the mouth of Iliuliuk Bay, and were most common in August and September between 2 and 8 km from the survey site outside the mouth of the bay. Humpbacks were also spotted within Iliuliuk Bay in much lower numbers (maximum daily sightings within the bay: 4; outside the bay: 47) (USACE 2022). Based on the previous monitoring efforts in and around Iliuliuk Bay, USACE and NMFS estimate that a maximum of two animals may be present within the Level B harassment threshold for each blasting event. While NMFS expects that the monitoring and mitigation described later in this document will be effective at preventing injurious take of marine mammals, we recognize that humpback whales are common in the area, that animals may enter the blasting area after charges have been set, and that there is a limit on the amount of time detonation may be safely delayed. Humpback whales are highly visible, and their presence would likely be known before charges are laid on a blasting day. We therefore conservatively estimate up to 10 percent of the blasting events may include a humpback whale within the Level A harassment isopleth. With a maximum take of 2 animals per day, multiplied by a maximum of 24 days of blasting, we propose authorization of 48 takes by Level B harassment and up to 3 takes by Level A harassment of humpback whales.

Harbor porpoise – Harbor porpoise were not included in the IHA application. This species typically travels alone or in pairs, but may occasionally be sighted in larger

groups. Based on the USACE's observation of a group of eight individuals in the project area in 2017, and other infrequent sightings of harbor porpoise in and around Iliulliuk Bay, NMFS conservatively proposes an estimate of two animals within the Level B harassment threshold on up to 25 percent of blasting days. Out of an abundance of caution, and because this species is both very sensitive to noise (meaning the Level A harassment zone is comparatively larger), including explosions (von Benda-Beckmann *et al.,* 2015), and difficult to see in the field, NMFS also proposes that up to two harbor porpoise could be within the Level A harassment threshold for up to 10 percent of the blasting events. Given 24 days of blasting, we propose authorization of up to 12 harbor porpoise takes by Level B harassment, and up to 5 harbor porpoise takes by Level A harassment over the course of the activity.

Steller sea lion – During previous monitoring efforts, Steller sea lions were sighted most frequently inside of Iliuliuk Bay, within 4 km of the proposed project area. The maximum number of sightings in a single day was 32, though it is unclear whether this includes multiple sightings of the same large group of 10 to 12 individuals (USACE 2022). Steller sea lions in this area are known to congregate around and follow fishing vessels that regularly transit into and out of Dutch Harbor. Given the previous monitoring data, USACE and NMFS conservatively estimate that a maximum of two animals may be within the Level B harassment threshold for each blast. While NMFS expects that the monitoring and mitigation described later in this document will be effective at preventing injurious take of marine mammals, we recognize that Steller sea lions are common in the area, that animals may enter the blasting area after charges have been set, and that there is a limit on the amount of time detonation may be safely delayed. Steller sea lions may be difficult for observers to detect before charges are laid on a blasting day, and we therefore conservatively estimate up to two Steller sea lions may be within the Level A harassment isopleth for up to 20 percent of the blasting events. With a maximum take of 2 animals

per day, multiplied by a maximum of 24 days of blasting, the applicant requests authorization of 48 takes by Level B harassment and up to 5 takes by Level A harassment of Steller sea lions.

Harbor seal – Previous monitoring efforts documented harbor seals close to the shoreline Ulatka Head, on the northeastern side of Iliuliuk Bay between 1 and 4 km from the proposed project area, but were sighted throughout Iliuliuk Bay in all survey months (April – October) (USACE 2022). They were most frequently sighted in the summer months, with up to 43 sightings on a single day. Based on the high rate of sightings within a few hundred meters of the Level B harassment isopleth in the previous data, USACE and NMFS conservatively assume a maximum of 10 seals within the Level B harassment threshold for each blast. While NMFS expects that the monitoring and mitigation described later in this document will be effective at preventing injurious take of marine mammals, we recognize that harbor seals are common in the area, that animals may enter the blasting area after charges have been set, and that there is a limit on the amount of time detonation may be safely delayed. Harbor seals were frequently sighted close to the Level B threshold distance and may be difficult for observers to detect before charges are laid on a blasting day. We therefore conservatively estimate up to two harbor seals may be within the Level A harassment isopleth for up to 20 percent of the blasting events. With a maximum take of 10 animals per day, multiplied by a maximum of 24 days of blasting, the applicant requests authorization of 240 takes by Level B harassment and up to 5 takes by Level A harassment of harbor seals.

Proposed Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable 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. 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, as well as subsistence uses. 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 such things as cost and impact on operations.

In addition to the measures described later in this section, the USACE will employ the following standard mitigation measures:

• Conduct a briefing between construction supervisors and crews and the marine mammal monitoring team prior to the start of construction, and when new personnel join the work, to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures;

• For in-water and over-water heavy machinery work, if a marine mammal comes within 10 m, operations must cease and vessels must reduce speed to the minimum level required to maintain steerage and safe working conditions;

• Work may only occur during daylight hours, when visual monitoring of marine mammals can be conducted; and

• If take reaches the authorized limit for an authorized species, the blasting activity will be stopped as these species approach the Monitoring zones (Table 6) to avoid additional take of them.

Table 6 -- Monitoring and Pre-Clearance Zones for Blasting Activities for Species with Take Proposed for Authorization

	Pre-Clearance Zones (m)		Monitoring Zones (m)
	Level A Harassment Thresholds (PTS)	Level B Harassment Thresholds (TTS)	
Humpback whale	345	1,918	2,500
Harbor Porpoise	1,214	4,500	5,000
Steller sea lion	92	250	2,500
Harbor seal	231	910	2,500

The USACE would be required to implement the following mitigation requirements:

Establishment of Pre-clearance and Monitoring Zones — The USACE and NMFS have identified pre-clearance zones associated with the distances within which Level A harassment and Level B harassment are expected to occur. Additionally, monitoring zones that extend beyond the pre-clearance zones have been established. Monitoring zones provide utility for observing by establishing monitoring protocols for areas adjacent to the pre-clearance zones. Monitoring zones enable observers to be aware of and communicate the presence of marine mammals in the project area outside the Level B harassment pre-clearance zone and thus prepare for a potential cessation of activity should the animal enter the Level A harassment zone (Table 6).

Pre-monitoring and Delay of Activities- Prior to the start of daily in-water activity, or whenever a break in activity of 30 minutes or longer occurs, the observers will observe the pre-clearance and monitoring zones for a period of 30 minutes. Pre-clearance zones will be considered cleared when a marine mammal has not been observed within the zone for that 30-minute period. If any marine mammal is observed within the Level A pre-clearance zone, activity cannot proceed until the animal has left the zone or has not been observed for 15 minutes. If marine mammals are observed within the Level B pre-clearance or monitoring zones but outside of the Level A pre-clearance zones, work may proceed in good visibility conditions. If work ceases for more than 30 minutes, the pre-activity monitoring of both the monitoring zone and shutdown zone will commence.

In the event that a large whale for which take is not authorized is sighted within either the monitoring or the Level A or Level B pre-clearance zones during monitoring prior to placement of charges on a planned blast day, USACE will evaluate whether environmental conditions allow for blasting to be delayed to the following day. If charges have already been laid before the whale is sighted, blasting would not commence until the whale has been positively observed outside of the monitoring zone, subject to the safety restrictions discussed below.

Charges for blasting will not be laid if marine mammals are within the Level A pre-clearance zone or appear likely to enter the Level A pre-clearance zone. However, once charges are placed, they cannot be safely left undetonated for more than 24 hours. For blasting, the monitoring and pre-clearance zones will be monitored for a minimum of 30 minutes prior to detonating the blasts. If a marine mammal is sighted within the Level A or Level B pre-clearance zones following the emplacement of charges, detonation will be delayed until the zones are clear of marine mammals for 30 minutes. This will continue as long as practicable within the constraints of the blasting design but not

beyond sunset on the same day as the charges cannot lay dormant for more than 24 hours, which may force the detonation of the blast in the presence of marine mammals. All other legal measures to avoid injury will be utilized; however, the charges will be detonated when delay is no longer feasible.

Charges will be laid as early as possible in the morning and stemming procedures will be used to fill the blasting holes to potentially reduce the noise from the blasts. Blasting will only be planned to occur in good visibility conditions, and at least 30 minutes after sunrise and at least one hour prior to sunset. The zones will also be monitored for 1 hour post-blasting.

If a detonation occurs when a marine mammal is known to be within the Level A or Level B pre-clearance zones, USACE will observe the blast area for two hours after the blasting event, or until visibility or safety conditions decline to the point that monitoring is no longer feasible, to determine as much as possible about the behavior and physical status of the marine mammal affected by the blasting event.

Based on our evaluation of the applicant's proposed measures, as well as other measures considered by NMFS, NMFS has preliminarily determined that the proposed mitigation measures provide the means of effecting the least practicable impact on 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 such species or stock for subsistence uses.

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for 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 while conducting the activities. 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.

Visual Monitoring

Monitoring will be conducted 30 minutes before, during, and 30 minutes after construction activities. In addition, observers must record all incidents of marine mammal

occurrence, regardless of distance from activity, and must document any behavioral reactions in concert with distance from construction activities.

Protected Species Observers (PSOs) will be land- and boat-based. For blasting, three PSOs will be required (two land-based and one boat-based). Observers will be stationed at locations that provide adequate visual coverage for shutdown and monitoring zones. Potential observation locations are depicted in Figure 3-1 of the applicant's Marine Mammal Monitoring and Mitigation Plan. During blasting, pre-blast monitoring, and post-blast monitoring, three observers will be on duty. Optimal observation locations will be selected based on visibility and the type of work occurring. All PSOs will be trained in marine mammal identification and behaviors and are required to have no other project-related tasks while conducting monitoring. In addition, monitoring will be conducted by qualified observers, who will be placed at the best vantage point(s) practicable to monitor for marine mammals and implement shutdown/delay procedures when applicable. Monitoring of construction activities must be conducted by qualified PSOs (see below), who must have no other assigned tasks during monitoring periods. The applicant must adhere to the following conditions when selecting observers:

- Independent PSOs must be used (*i.e.*, not construction personnel);
- At least one PSO must have prior experience working as a marine mammal observer during construction activities;
- Other PSOs may substitute education (degree in biological science or related field) or training for experience;
- Where a team of three or more PSOs are required, a lead observer or monitoring coordinator must be designated. The lead observer must have prior experience working as a marine mammal observer during construction; and
- The applicant must submit PSO curriculum vitaes for approval by NMFS.

The applicant must ensure that observers 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 prepare a report of observations including, but not limited to, the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates, 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.

At least 24 hours prior to blasting, the USACE will notify the Office of Protected Resources, NMFS Alaska Regional Office, and the Alaska Regional Stranding Coordinator that blasting is planned to occur, as well as notify these parties within 24 hours after blasting that blasting actually occurred. If a marine mammals is known to be within the Level A or Level B pre-clearance zones during a detonation, USACE will report the following information within 24 hours of the blasting event:

- Description of the blasting event;
- PSO positions and monitoring effort for the 24 hours preceding the blast;
- Environmental conditions (*e.g.,* Beaufort sea state, visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;

- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

A draft marine mammal monitoring report will be submitted to NMFS within 90 days after the completion of construction activities. It will include an overall description of work completed, a narrative regarding marine mammal sightings, and associated PSO data sheets. Specifically, the report must include:

- Date and time that monitored activity begins or ends;
- Construction activities occurring during each observation period;
- Weather parameters (*e.g.,* percent cover, visibility);
- Water conditions (*e.g.*, sea state, tide state);
- Species, numbers, and, if possible, sex and age class of marine mammals;
- Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from construction activity;
- Distance from construction activities to marine mammals and distance from the marine mammals to the observation point;
- Locations of all marine mammal observations; and
- Other human activity in the area.

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

In the unanticipated event that the specified activity likely causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as a serious injury or mortality, the USACE will immediately cease the specified activities and report the incident to the Office of Protected Resources, NMFS Alaska Regional Office, and the Alaska Regional Stranding Coordinator. The report will include the following

information:

- Description of the incident;
- Environmental conditions (*e.g.,* Beaufort sea state, visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

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

In the event that the USACE discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (*e.g.,* in less than a moderate state of decomposition as described in the next paragraph), the USACE will immediately report the incident to the Office of Protected Resources, NMFS Alaska Regional Office, and the Alaska Regional Stranding Coordinator. The report will include the same information identified in the paragraph above. Activities will be able to continue while NMFS reviews the circumstances of the incident. NMFS will work with the USACE to determine whether modifications in the activities are appropriate.

In the event that the USACE discovers an injured or dead marine mammal and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the USACE will report the incident to

the Office of Protected Resources, NMFS Alaska Regional Office, and the NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinator, within 24 hours of the discovery. The USACE will provide photographs, video footage (if available), or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Coordinator.

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, the discussion of our analysis applies to all the species listed in Table 1, given that the anticipated effects of this activity on these different marine

mammal stocks are expected to be similar. There is little information about the nature or severity of the impacts, or the size, status, or structure of any of these species or stocks that would lead to a different analysis for this activity.

As stated in the mitigation section, pre-clearance zones equal to or exceeding Level A isopleths shown in Table 6 for blasting will be implemented for all species. Serious injury or mortality is not anticipated nor authorized.

Behavioral disturbances of marine mammals to blasting, if any, are expected to be mild and temporary due to the short-term duration of the noise produced by the source and the fact that only a single blasting event will occur on a given day. Additionally, blasting events will not occur on consecutive days. Given the short duration of noise-generating activities per day and that blasting events would occur on a maximum of 24 days, any harassment would be temporary. For all species except humpbacks, there are no known biologically important areas near the project zone that would be impacted by the construction activities. The proposed project area occupies a small percentage of the humpback whale feeding BIA and Critical Habitat areas, and there is sufficient similar habitat nearby. Acoustic impacts will be short-term and temporary in duration. The region of Iliuliuk Bay where the project will take place is located in a highly trafficked commercial port area with regular marine vessel traffic.

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

- No serious injury or mortality is anticipated or authorized;
- Authorized Level A harassment will be very small amounts and of low degree;
- The intensity of anticipated takes by Level B harassment is relatively low for all stocks. Level B harassment will be primarily in the form of behavioral

disturbance, resulting in avoidance of the project areas around where blasting is occurring, with some TTS that may limit the detection of acoustic cues for relatively brief amounts of time;

- While a feeding BIA and Critical Habitat for humpback whales exist in the action area, the proposed activity occupies a small percentage of the total BIA and of the Critical Habitat, and would occur on a short term, temporary basis.
- The USACE will implement mitigation measures, such as pre-clearance zones, for all in-water and over-water activities; and
- Monitoring reports from similar work in Alaska have documented little to no effect on individuals of the same species impacted by the specified activities (USACE, 2020).

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted previously, only 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 number of individuals 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 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.

Table 7 below shows take as a percent of population for each of the species listed above.

Table 7 -- Summary of Authorized Instances of Level A and Level B Harassment

Species	DPS/Stock	Number of Takes by Level B Harassment by Stock	Number of Takes by Level A Harassment by Stock	Stock Abundance	Percent of Population
Humpback whale	Western North Pacific DPS	0.96	0	1,107	0.1
	Mexico DPS	3.36	0	4,973	0.1
	Hawaii DPS	43.68	3	10,103	0.5
Harbor seal	Aleutian Island Stock	240	5	5,588	4.4
Harbor porpoise[1]	Bering Sea	12	5	31,046	0.05
	Gulf of Alaska				
Steller sea lion	Western DPS	48	5	52,932	0.1

[1] There is not enough information available to determine takes for separate stocks for harbor porpoise. Calculations have been based on the best available stock abundance for the Gulf of Alaska stock, as there are no available data for the Bering Sea stock. This number is conservative, because it represents a minimum value of both stocks.

Table 7 presents the number of animals that could be exposed to received noise levels that may result in take by Level A or Level B harassment for the construction at Iliuliuk Bay, Unalaska. Our analysis shows that less than one-third of the best available population estimate of each affected stock could be taken. Therefore, the numbers of animals authorized to be taken for all species would be considered small relative to the relevant stocks or populations even if each estimated taking occurred to a new individual—an extremely unlikely scenario. For harbor seals and Steller sea lions occurring in the vicinity of the project site, there will almost certainly be some overlap in individuals present day-to-day, and these takes are likely to occur only within some small portion of the overall regional stock.

Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated 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 issue an IHA, NMFS must find that the specified activity 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.

Subsistence activities in Unalaska have historically included the harvest of pinnipeds and sea otters. However, subsistence harvests of marine mammals declined between 1994 and 2008 (the last year for which data are available) (ADF&G 2022b). Additionally, a ban on firearm discharge within the city limits of the City of Unalaska means that current subsistence harvesting typically occurs from skiffs in areas outside of Dutch Harbor and Iliuliuk Bay, including Wide Bay, Kalekta Bay, Bishop Point, Wislow Island, and Beaver Inlet. The proposed activity would not impact these areas.

Any impacts to marine mammals from the proposed activity are likely to be short-term and temporary, and limited to the area around the proposed blasting site. While a limited number of individuals may experience PTS, there are no expected impacts to the availability of marine mammals for subsistence uses due to the proposed activity.

Based on the description of the specified activity, and the proposed mitigation and monitoring measures, NMFS has preliminarily determined that there will not be an unmitigable adverse impact on subsistence uses from USACE'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 issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species, in this case with NMFS Alaska Regional Office.

NMFS is proposing to authorize take of the Mexico and Western North Pacific DPSs of humpback whales, and the western DPS of Steller sea lion, which are listed under the ESA. The Permits and Conservation Division has requested initiation of section 7 consultation with the NMFS Alaska Regional Office for the issuance of this IHA. NMFS will conclude the ESA consultation prior to reaching a determination regarding the proposed issuance of the authorization.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to the USACE for conducting confined blasting in Iliuliuk Bay, Unalaska between November 1, 2023 and October 31, 2024, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. A draft of the proposed IHA can be found at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities.*

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this notice of proposed IHA for the proposed Unalaska (Dutch Harbor) Channel Deepening Project. We also request comment on the potential renewal of this proposed IHA as described in the paragraph below. Please include with your comments any supporting data or literature citations to help inform decisions on the request for this IHA or a subsequent renewal IHA.

On a case-by-case basis, NMFS may issue a one-time, 1-year renewal IHA following notice to the public providing an additional 15 days for public comments when (1) up to another year of identical or nearly identical activities as described in the **Description of Proposed Activity** section of this notice is planned or (2) the activities as described in the **Description of Proposed Activity** section of this notice would not be completed by the time the IHA expires and a renewal would allow for completion of the activities beyond that described in the *Dates and Duration* section of this notice, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to the needed renewal IHA effective date (recognizing that the renewal IHA expiration date cannot extend beyond 1 year from expiration of the initial IHA).
- The request for renewal must include the following:

(1) An explanation that the activities to be conducted under the requested renewal IHA are identical to the activities analyzed under the initial IHA, are a subset of the activities, or include changes so minor (*e.g.*, reduction in pile size) that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take).

(2) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.

Upon review of the request for renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings in the initial IHA remain valid.

Dated: April 6, 2023.

Kimberly Damon-Randall,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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