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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RTID 0648-XA125

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Crowley Kotzebue Dock Upgrade Project in Kotzebue, Alaska

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

ACTION: Notice; proposed incidental harassment authorization; request for comments on proposed authorization and possible renewal.

SUMMARY: NMFS has received a request from Crowley Fuels, LLC for authorization to take marine mammals incidental to the Crowley Kotzebue Dock Upgrade in Kotzebue, 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-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 authorizations 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. Physical comments should be sent to 1315 East-West Highway, Silver Spring, MD 20910 and electronic comments should be sent to *ITP.Davis@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 received electronically, including all attachments, must not exceed a 25-megabyte file size. Attachments to electronic comments will be accepted in Microsoft Word or Excel or Adobe PDF file formats only. All comments received are a part of the public record and will generally be posted online at *https://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: Leah Davis, 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/permit/incidental-take-authorizations-under-marine-mammal-protection-act*. 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 issued or, if the taking is limited to harassment, a notice of a proposed incidental take authorization may be 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 January 13, 2020, NMFS received a request from Crowley Fuels, LLC (Crowley) for an IHA to take marine mammals incidental to pile driving activities at the Crowley Kotzebue Dock. The application was deemed adequate and complete on April 9, 2020. Crowley's request is for take of a small number of nine species of marine mammals, by Level B harassment only. Neither Crowley nor NMFS expects serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Proposed Activity

Overview

Crowley is proposing to upgrade their existing sheet pile bulkhead dock for vessel-based fuel and cargo distribution in Kotzebue, Alaska, as the existing bulkhead at the dock is corroding and has reached the end of its useful service life. Crowley is proposing to construct a new dock wall on the water ward side of the existing dock. Vibratory pile driving would introduce underwater sounds that may result in take, by Level B harassment, of marine mammals across approximately 52.5 km^2 (20.3 mi^2) in Kotzebue Sound. Crowley is not proposing to conduct any demolition of the current facility.

Crowley's Kotzebue Dock provides berthing for the company's bulk fueling operations. The dock also provides essential access for community barges, cargo-loading, transloading, subsistence harvest, and other community events; all of which are necessary operations to the City of Kotzebue, its residents, and adjacent villages supported by Kotzebue's connections to marine-based transportation.

Dates and Duration

The proposed IHA would be effective from June 1, 2020 to May 31, 2021. Work would take place between June and September 2020 with approximately 87 days of in-water work during daylight hours. Pile driving is expected to occur for approximately 100 minutes per day. Project activities are planned to avoid traditional ice seal harvest windows in an effort to avoid negative impacts to subsistence hunting.

Specific Geographic Region

The Crowley Kotzebue Dock Upgrade Project is located in Qikiqtaġruq (Kotzebue) on the northernmost shoreline of the Baldwin Peninsula between Kotzebue Sound and Hotham Inlet (Figure 1). Kotzebue Sound is an embayment on the western coast of Alaska of the Chukchi Sea, which is itself an embayment of the Arctic Ocean (extending from Wrangel Island to Point Barrow and south to the Bering Strait). The Sound is an extremely shallow marine waterbody (averaging less than 20 meters deep) bounded by the Seward Peninsula to the south and west, the Baldwin Peninsula to the east, and the Noatak River delta and Cape Krusenstern to the north. Marine waters here are warmer than usual for the Chukchi Sea and are affected by the Alaska Coastal current and by the significant freshwater input of the Selawik, Noatak, and Kobuk Rivers. Basin sediments in the Sound are typically gravelly mud or sandy mud (Audubon, 2010).

Figure 1: Project Location in Kotzebue, AK

Detailed Description of Specific Activity

The new dock will be constructed with an OPEN CELL SHEET PILE® (OCSP) structure, a bulkhead utilizing flat-web sheet piles, fabricated connector wyes, and anchor piles. This type of bulkhead is a flexible steel sheet pile membrane supported by soil contact with the embedded steel pile tail walls. No demolition is planned for this project, so the new sheet pile bulkhead will provide additional protection for the existing fuel header system and associated piping. A new potable water service and 120/208-volt power service will be provided at the south end of the new dock.

The dock will be constructed one cell at a time, with only one hammer operating at a time. Temporary piles for bulkhead template structures will be installed to aid with sheet pile cell construction and will be removed after the permanent sheet piles or support piles have been installed. Temporary template piles will be either steel pipe piles (18-inch or smaller) or H-piles (14-inch or smaller). Temporary template piles will be driven with a vibratory hammer. All piles are expected to be installed using land-based crane and a vibratory hammer. Crowley anticipates that the largest size vibratory hammer used for the project will be an APE 200-6 (eccentric moment of 6,600 inch-pounds) or comparable vibratory hammer from another manufacturer such as ICE or HPSI. Crowley estimates that no more than 10 template piles will be installed per day. Temporary piles will be removed following bulkhead construction using vibratory extraction methods. Means and methods for extraction will be similar to temporary pile installation.

The new sheet pile bulkhead dock consists of 14 OCSP cells. Crowley will install the sheet piles in pairs using the vibratory hammer on land. After all the piles for a sheet pile cell have been installed, Crowley will place clean gravel fill within the cell. This process will continue sequentially until all of the sheet pile cells are installed and backfilled. Fourteen-inch H-pile anchor piles with welded connectors to secure the structure will be installed at the end of each sheet pile tail wall using a vibratory hammer on land.

Crowley will transport gravel fill from an off-site quarry to the project site using loaders, dump trucks, and dozers within the project footprint as needed. It will be placed within the cells from the shore (or occasionally a barge) using the same equipment and will be finished using roller compactors and graders. Because the gravel fill will be placed behind the sheet piles, we do not expect it to result in take of marine mammals, and it will not be discussed further in this notice.

Twenty-four-inch pipe piles will be installed at nine locations along the dock face to support mooring bollards. Bollard piles will be driven into completed, compacted cells using a vibratory hammer on land. Therefore, we do not expect pile driving of the bollard piles to result in in-water impacts to marine mammals, and we do not discuss bollard piles further in this document.

A new potable water service and 120/208-volt power service will be provided near the south end of the new dock. The potable water service will consist of a buried two-inch diameter HDPE line. The power service will be routed in a buried conduit from the nearby Crowley Dock Office. We do not expect installation of these services to result in impacts to marine mammals, and we do not consider them further in this document.

Table 1: In-Water Sound Source Levels and Quantities for Project Activities

Pile size	Quantity	Source level (at 10m)			Literature source
		dB RMS	dB SEL	dB peak	
Temporary Template Piles	170[a]	158.0			Caltrans, 2015[b]

(18-inch Steel Pipe Piles)					
ALTERNATE Temporary Template pile (14-inch H-pile)	170 [a]	158.8			Caltrans, 2015[c]
Anchor Piles (14" HP14x89 or Similar)	15	158.8			Caltrans, 2015[c]
Sheet Piles (20-inch PS31 or Similar)	650	160.7			Unisea, 2015

[a] Each pile will be installed and removed.
[b] Average of three 18-inch pipe piles at Prichard Lake Pumping Plant
[c] Port of Alaska Test Pile Project

Table 2: Airborne Source Levels

Source	**Source Level[a]**	**Literature Source**
Temporary Template Piles (18-inch Steel Pipe Piles)	87.5	Laughlin (2010)
ALTERNATE Temporary Template Pile (14-inch H-pile)	87.5	Laughlin (2010)[b]
Anchor Piles (14" HP14x89 or Similar)	87.5	Laughlin (2010)[b]
Sheet Piles (20-inch PS31 or Similar)	96.4	Laughlin (2010)[c]
Bollard Piles	92.1	NAVFAC (2015)[d]
Gravel Fill	96.4	Laughlin (2010)[c]

[a] Source levels for airborne noise sources are reported in dBL5EQ re: 20 µPa (micropascal) @ 15 meters
[b] Data for airborne noise levels of vibratory driving of 18-inch piles from Laughlin (2010) was measured at 87.5 dBL5EQ re: 20 µPa at 15 meters. This source level is used as a proxy for the 14-inch H piles.
[c] Data for airborne noise levels from sheet pile driving and gravel fill were not available, so the source level for vibratory installation of 30-inch piles from Laughlin (2010) was used as a proxy.
[d] Airborne noise levels for vibratory driving of 24-inch pipe piles were measured during the Bangor Test Pile Program at 92 RMS LEQ dB re: 20 µPa at 15.2 meters (NAVFAC 2015)

Occasionally individual seals haul out on beach areas northeast of the project. However, anticipated source levels for airborne noises are not anticipated to exceed disturbance thresholds for non-harbor seal pinnipeds beyond the 10-meter shutdown zone that will be implemented during all project activities, so we do not expect Level B harassment takes from airborne sounds.

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. Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (SARs; *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS's website (*https://www.fisheries.noaa.gov/find*-species).

Table 3 lists all species or stocks for which take is expected and proposed to be authorized for this action, and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2016). 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's SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species 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's 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's U.S. 2018 SARs and draft 2019 SARs (*e.g.*, Muto *et al.*, 2019). All values presented in Table 3 are the most recent available at the time of publication and are available in the 2018 SARs (Muto *et al.*, 2019a, Carretta *et al.*, 2019a) and draft 2019 SARs (Muto *et al.*, 2019b, Carretta *et al.*, 2019b) (available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports*).

Table 3: Species That Spatially Co-Occur With the Activity to the Degree That Take is Reasonably Likely to Occur

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, N_{min}, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Eschrichtiidae						
Gray whale	Eschrichtius robustus	Eastern North Pacific	- / - ; N	26,960 (0.05, 25,849, 2016)	801	139
Family Balaenopteridae (rorquals)						
Minke whale	Balaenoptera acutorostra	Alaska	- / - ; N	NA (see SAR, NA, see SAR)	UND	0
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Beluga whale	Delphinapterus leucas	Beaufort Sea	- / - ; N	39,258 (0.229, NA, 1992)	UND	139
		Eastern Chukchi Sea	- / - ; N	20,752 (0.7, 12,194, 2012)	244	67
Killer whale	Orcinus orca	Gulf of Alaska, Aleutian Islands, Bering Sea Transient	- / - ; N	587 c (NA, 587, 2012)	5.87	1

Family Phocoenidae (porpoises)						
Harbor porpoise	Phocoena phocoena	Bering Sea	- / - ; Y	48,215 (0.223, NA, 1999)	UND	0.2
Order Carnivora – Superfamily Pinnipedia						
Family Phocidae (earless seals)						
Bearded seal	Erignathus barbatus	Beringia	T / D ; Y	see SAR (see SAR, see SAR, 2013	See SAR	557
Ringed seal	Phoca (pusa) hispida	Alaska	T / D ; Y	see SAR (see SAR, see SAR, 2013	5,100	863
Spotted seal	Phoca largha	Alaska	- / - ; N	461,625 (see SAR, 423,237, 2013)	12,697	329
Ribbon seal	Histriophoca fasciata	Alaska	- / - ; N	184,697 (see SAR, 163,086, 2013)	9,785	3.9

1 - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.
2- NMFS marine mammal stock assessment reports online at: www.nmfs.noaa.gov/pr/sars/. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance.
3 - These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (e.g., commercial fisheries, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.

As indicated above, all nine species (with 10 managed stocks) in Table 3 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur, and we have proposed authorizing it. All species that could potentially occur in the proposed survey areas are included in Table 2 of the IHA application. While Eastern North Pacific Alaska Resident Stock killer whales, bowhead whales, fin whales, humpback whales, and narwhals could potentially occur in the area, the 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.

NMFS was unable to locate evidence supporting the presence of resident killer whales within Kotzebue Sound. Based on evidence of predation on marine mammals, NMFS expects killer whales within the Sound to be from transient stocks. Additionally, Bowhead whales (Braham *et al.*, 1984), humpback whales, and fin whales (Clarke *et al.*, 2013) do not typically occur within the area that may incur noise from this project above thresholds that may result in Level B harassment of these species. As noted in the *Specific Geographic Region* section, Kotzebue Sound is relatively shallow, further reducing the likelihood for these species to occur. The narwhal occurs in Canadian waters and occasionally in the Alaskan Beaufort Sea and the Chukchi Sea, but it is considered extralimital in U.S. waters and is not expected to be encountered. There are scattered records of narwhal in Alaskan waters, including reports by subsistence hunters (Reeves *et al.*, 2002); however, we do not expect narwhals to occur in Kotzebue Sound during the project period.

In addition, the polar bear (*Ursus maritimus*) and Pacific walrus (*Odobenus rosmarus divergens*) may occur in the project area. However, both species are managed by the U.S. Fish and Wildlife Service and are not considered further in this document.

Gray Whale

Gray whales are distributed throughout the North Pacific Ocean and are found primarily in shallow coastal waters (NMFS, 2019d and Carretta *et al.*, 2019). There are currently two populations of gray whales in the North Pacific Ocean: the eastern North Pacific population and the endangered western North Pacific Population.

Only the eastern North Pacific populations range extends into the project areas. Most whales in the eastern population spend the summer and fall months feeding in the Chukchi, Beaufort, and northwestern Bering Seas (Carretta *et al.*, 2019). Despite the shallow waters, gray whales feed in the outer area of Kotzebue Sound between May and November (Audubon, 2010). Gray whales were reported as present and feeding (sometimes in large numbers) in Kotzebue Sound and a gray whale was harvested by whale hunters at Sisualiq in 1980 (Frost *et al.*, 1983).

There have been five reports of gray whale strandings within inner Kotzebue Sound between 2010 and 2019, including one in Hotham Inlet. An additional unidentified large whale was reported stranded south of Cape Blossom in 2018 (Savage, pers. comm. 2019).

We are unaware of any information indicating that Kotzebue Sound is an area of particular biological importance for gray whales. Clarke *et al*. (2015) identified "biologically important areas" for cetaceans in the Arctic region, including reproductive, feeding, and migratory areas, as well as areas where small and resident populations reside. The authors did not identify Kotzebue Sound as an important area for gray whales.

Minke Whale

Minke whales are widely distributed throughout the northern hemisphere and are found in both the Pacific and Atlantic oceans. Minke whales in Alaska are considered migratory and typically occur in the Arctic during the summer months, and near the equator during winter months (NMFS, 2019e). There have been reports of Minke whales as sometimes present in Kotzebue Sound during the summer months. Two individuals beached in the mouth of the Buckland River in autumn during the late 1970s (Frost *et al.,* 1983). Minke whales are believed to calve in the winter months (NMFS, 2019e); however, little is known about their breeding areas. We are unaware of any information indicating that Kotzebue Sound is an area of particular biological importance for minke whales. Clarke *et al*. (2015) identified "biologically important areas" for cetaceans in the Arctic region, including reproductive, feeding, and migratory areas, as well as areas where small and resident populations reside, and no areas were identified for minke whales.

Beluga Whale

Five beluga whale stocks occur in Alaska: the Eastern Chukchi Sea Stock, the Beaufort Sea Stock, the Eastern Bering Sea Stock, the Bristol Bay Stock and the Cook Inlet Stock. While each stock is unique and isolated from one another genetically and/or physically there is some crossover of the Eastern Chukchi Sea and the Beaufort Sea Stock during the late summer. The Eastern Chukchi Sea is the primary stock in the project area; however, the Beaufort Sea Stock may also occur in the project area.

Beluga whales are distributed throughout seasonally ice-covered Arctic and subarctic waters of the Northern Hemisphere both offshore and in coastal waters (Muto *et al.*, 2019). Factors including ice cover, tidal conditions, access to prey, temperature, and human interactions affect the seasonal distribution (Muto *et al.*, 2019).

The Beaufort Sea and Eastern Chukchi Sea Stocks of beluga whales migrate seasonally between the Bering and Beaufort/Chukchi Seas (Muto *et al.*, 2019). The Beaufort Sea Stock leaves the Bering Sea in early spring and move through the Chukchi Sea and into the Canadian waters of the Beaufort Sea. In late fall this stock returns to the Bering Sea. The Eastern Chukchi Sea Stock move into the Chukchi Sea and western Beaufort Sea for the summer months and migrate to the Bering Sea in the fall. Belugas from the Eastern Chukchi Sea Stock are known to move into coastal areas in late June until about mid-July (Muto *et al.*, 2019).

Acoustic surveys for beluga in the northeastern Chukchi Sea detected them in every month between April and November (Delarue *et al.*, 2011). As ice begins to break up between late May and mid-June, belugas move into Kotzebue Sound from the northwest to Sisualiq Spit and then down the Baldwin Peninsula to Escholtz Bay. Belugas continue to move throughout the Sound until winter (Northwest Arctic Borough [NAB], 2016; Audubon, 2010). Reports of belugas at Sisualiq include groups of 75 – 100 individuals, described as moving clockwise into the Sound. Along the west coast of Baldwin peninsula, they have been reported in groups of 200 – 300, culminating in groups of 1,000 or more in Eschscholtz Bay and near the Chamisso Islands (Frost *et al.*, 1983).

Belugas return to their birth areas during the summer where they give birth every two to three years. They give birth in the warmer waters during the summer where the calves, lacking blubber to protect them from cold water, can remain in warmer, shallow waters of tidal flats and estuaries. Females reach breeding age between 9 and 14 years, slightly earlier than males. Mating is believed to occur in the late winter and early spring months, either during the migration or at the wintering grounds (NMFS, 2019f). Belugas in Kotzebue Sound are known to concentrate to give birth in Eschscholtz Bay, with smaller numbers giving birth in Selawik Lake or Goodhope Bay (NAB, 2016). The NAB subsistence mapping project identified Kotzebue as an important use area for beluga feeding and birthing (both outside of the calculated Level B harassment zone for this project) as well as rearing.

Subsistence users and researchers have recently noted a significant decrease in the distribution and activity of beluga whales in the Sound. They suspect that an increase in killer whale activity within the bay may be responsible as evidence indicates that increased predation may be encouraging silence in the belugas that remain. (Huntington *et al.*, 2016b, Eurich, 2016).

Killer Whale

Killer whales occur in every ocean of the world (NMFS, 2019b); however, killer whales occur at higher densities in colder waters of both hemispheres (Muto *et al.*, 2019). Killer whales occur throughout the North Pacific and along the entire coast of Alaska. Resident killer whales have large ranges and in the North Pacific occur year-round in ice-free waters of the Chukchi and Bering Seas, the Aleutian Islands and the Gulf of Alaska (Wynne, 2017).

Five killer whale stocks occur in Alaskan waters: the Eastern North Pacific (ENP) Alaska Resident Stock; the ENP Northern Resident Stock; the ENP Gulf of Alaska, Aleutian Islands, and Bering Sea Transient Stock; the AT1 Transient Stock; and the West Coast Transient Stock (Muto *et al.*, 2019). None of the stocks have ranges shown extending into the Chukchi Sea (Muto *et al.*, 2019); however, sightings of killer whales have been reported in Kotzebue Sound in the 1980s and recently in 2008 (Eruich, 2016; Lowry *et al.*, 1987). The ENP Alaska Resident Stock and the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient Stock are the only stocks with a known range into the Bering Sea, and the transient stock's range may extend into the Chukchi Sea and Kotzebue Sound.

Killer whales have been reported hunting beluga whales and even grey or minke whales in Eschscholtz Bay and the mouth of the Buckland River as early as the 1970s (Frost *et al.*, 1983). Recently, subsistence users and researchers have noted a significant decrease in the distribution and activity of beluga whales in the Sound. They believe that an increase in killer whale activity within the Bay may be responsible as evidence indicates that increased predation may be encouraging silence in the belugas that remain (Huntington *et al.*, 2016b, Eurich 2016).

Photo identification of individuals spotted in the southern Chukchi sea during transect surveys (during which at least 37 individuals were spotted six times) identified transient type killer whales. Based on reports of predation of belugas and harbor porpoises, it appears likely individuals found in the southern Chukchi Sea and Kotzebue Sound are of the transient, mammal-eating population of the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient Stock (Clarke *et al.*, 2013).

Harbor porpoise

In the eastern North Pacific Ocean, harbor porpoises range from Point Barrow, along the Alaska coast, and down the west coast of North America to Point Conception, California. NMFS currently recognizes three stocks of harbor porpoise within this range (Muto *et al.*, 2019). The Bering Sea stock occurs within the project area, ranging from throughout the Aleutian Islands and into all waters north of Unimak Pass.

The harbor porpoise frequents nearshore waters and coastal embayments throughout their range, including bays, harbors, estuaries, and fjords less than 650 feet (198 m) deep (NMFS, 2018g). The presence of harbor porpoises was detected in Kotzebue Sound between September and November and between January and March during acoustic monitoring in 2014 & 2015. Porpoises had not previously been reported under the ice in the Chukchi (Whiting *et al.*, 2019).

Bearded Seal

There are two recognized subspecies of the bearded seal: *Erignathus barbatus barbatus and E. b. nauticus.* The *E.b. nauticus* subspecies occurs in the project area and consists of two DPSs: Beringia and Okhotsk. The Alaska Stock of bearded seals is defined as the portion of the Beringia DPS found in U.S. Waters (Muto *et al.*, 2019).

Bearded seals have a circumpolar distribution and their normal range extends from the Arctic Ocean to Sakhalin Island or from 80° N to 45° N. In U.S. waters, bearded seals occur across the continental shelf throughout the Bering, Chukchi, and Beaufort Seas (Muto *et al.*, 2019).

Many bearded seals spend the winter months in the Bering Sea and then move north through the Bering Strait between late April and June. They then continue into the Chukchi Sea where they spend the summer months along the fragmented and drifting ice pack. Bearded seals have been observed in the Chukchi Sea year-round when sea ice coverage was greater than 50 percent. Juveniles may not migrate north to follow the ice, as most adults do, and may remain along the coasts of the Bering and Chukchi Seas. Apart from these juveniles, seasonal distribution appears to be correlated with the ice pack (Muto *et al.*, 2019). Bearded seals are most common in the Sound during spring, before the more aggressive spotted seals arrive and drive them from the area until the juveniles return to the sound in fall (Huntington *et al.*, 2016). Juvenile (birth-year) seals tend to remain in Kotzebue Sound near Sisualiq Spit and the mouth of the Noatak River through the summer (NAB, 2016).

Recently mapped ranges show adult bearded seals in Kotzebue Sound from March until June and returning in October and November (Audubon, 2010). The NAB (2016) has identified the project area, and more broadly, Kotzebue Sound, as a bearded seal important use area for feeding and migration. Additionally, they identified a high-density feeding area north of the project area, along Sisualiq Spit (see application, Figure 5).

Bearded seals consume a diet consisting primarily of benthic organisms such as demersal fishes and epifaunal and infaunal invertebrates (Muto *et al.,* 2019). Bearded seals feed throughout Kotzebue Sound, but prime feeding grounds are off the Chamisso Islands, where clam and shrimp are abundant (Huntington *et al.,* 2016).

The primary threat to bearded seals is a loss of sea-ice habitat due to climate change. Lack of suitable ice cover with access to shallow feeding areas during summer months during which bearded seals whelp, nurse, and molt potentially decreases food availability and increases predation rates. The potential for habitat modifications due to ocean acidification also pose a potential risk to bearded seals due to changes in prey availability, although this possibility is complex and less threatening to bearded seals due to their apparent dietary flexibility. Increases in shipping and habitat modification for development also pose a potential future risk to bearded seal survival (Muto *et al.,* 2019). Observations of low-snow years found that decreased snow protection around pupping dens left seal pups vulnerable to shore predators, such as jaegers, ravens, and fox (Huntington *et al.,* 2016).

Ringed Seal

Of five recognized subspecies of ringed seals, *P. h. hispida* is the only subspecies occurring in Alaska (Muto *et al.,* 2019). Ringed seals occur throughout Arctic waters in all "seasonally ice-covered seas." In winter and early spring when sea ice is at its maximum coverage, they occur in the northern Bering Sea, in Norton and Kotzebue Sounds, and throughout the Chukchi and Beaufort Seas. Seasonal movement patterns are not well documented; however, they generally winter in the Bering and Chukchi Seas and are believed to migrate north in spring as the seasonal ice melts and retreats. Presumably, they continue moving north and spend summers in the pack ice of the northern Chukchi and Beaufort Seas. They may also appear on nearshore ice remnants in the Beaufort Sea. Movement becomes increasingly restricted in the fall as freeze-up progresses, and seals are thought move south and west from summer grounds in the Beaufort Sea along with the ice pack (Muto *et al.,* 2019).

Cooperative satellite tagging efforts between local hunting experts and biologists have found that, while ringed seals are present in Kotzebue Sound year-round, juveniles are more likely to travel long distances while adults stay closer to the Sound. Ringed seals are common in the Sound during spring before the more aggressive spotted seals arrive, driving them from the area until they return to the Sound in fall (Huntington *et al.,* 2016). Recently mapped ranges show ringed seals in Kotzebue Sound from February until June and returning in October and November (Audubon, 2010).

The NAB (2016) has identified the project area, and more broadly, Kotzebue Sound, as an important use area for ringed seal feeding. Additionally, they identified a high-density feeding area south of the project area, along the southern end of Baldwin Peninsula (see application, Figure 6).

The primary threat to ringed seals is a loss of sea-ice habitat due to climate change. Observations of low-snow years found that decreased snow protection around pupping dens left seal pups vulnerable to shore predators, such as jaegers, ravens, and fox (Huntington *et al.,* 2016). Lack of suitable ice cover with access to shallow feeding areas during summer months during which ringed seals whelp, nurse, and molt potentially decreases food availability and increases predation rates. The potential for habitat modifications due to ocean acidification also pose a potential risk to ringed seals due to changes in prey availability. Increases in shipping and habitat modification for development also pose a potential future risk to ringed seal survival (Muto *et al.*, 2019).

Spotted Seal

Spotted seals are an important resource for Alaska Native subsistence hunters. Approximately 64 Alaska Native communities in western and northern Alaska, from Bristol Bay to the Beaufort Sea, regularly harvest ice seals (Ice Seal Committee, 2016).

Spotted seals occur along the continental shelf of the Bering, Chukchi, and Beaufort Seas in Alaska. They also occur in the Sea of Okhotsk south to the western Sea of Japan and northern Yellow Sea. Spotted seals are grouped into three Distinct Population Segments (DPS) based on their breeding area: the Bering Sea DPS, the Okhotsk DPS and the Southern DPS. The Alaska Stock of spotted seals is defined as the portion of the Bering Sea DPS that is U.S. waters. The Bering Sea DPS includes breeding areas in the Bering Sea and portions of the East Siberian, Chukchi, and Beaufort Seas (Muto *et al.*, 2019).

The distribution of spotted seals correlate seasonally to the life periods when spotted seals haul out land and when the spotted seals haul out on sea ice for whelping, nursing, breeding and molting. From the late-fall through spring, spotted seals occur where sea ice is available for them to haul out. From summer through fall, the seasonal sea ice has melted and spotted seals use land for hauling out (Muto *et al.*, 2019). An estimated 69,000 – 101,000 spotted seals from the eastern Bering Sea use the Chukchi Sea during the spring open-water period (Boveng *et al.*, 2017). In 1976 aerial surveys of spotted seals in the Bering Sea, densities ranged between 0.013 and 1.834 seals per seals per km^2 (Braham *et al.*, 1984).

Spotted seals haul out between June and December in Krusenstern Lagoon, the Noatak River delta, the tip of the Baldwin Peninsula, and Cape Espenberg (Audubon, 2010). Subsistence users report that spotted seals move into the area in July, following fish runs into the Sound and up the Noatak River (NAB, 2016). Spotted seals in the Chamisso Islands were reported in groups of up to 20, but they may reach groups of over 1,000 at Cape Espenberg (Frost *et al.*, 1983).

The NAB (2016) has identified the project area, and more broadly, Kotzebue Sound, as an important use area for spotted seal feeding, birthing, and rearing. Specifically, the project overlaps with a high-density feeding that extends from Kotzebue across the channel to Sisualiq Spit (see application, Figure 6). Additionally, NAB has identified two important haulouts, one adjacent to the project area to the south, and one north of the project area at the mouth of the Noatak River.

Ribbon Seal

Ribbon seals range from the North Pacific Ocean and Bering Sea into the Chukchi and western Beaufort Seas in Alaska. Ribbon seals occur on Bering Sea from late March to early May. From May to mid-July, the ice recedes, and ribbon seals move further north into the Bering Strait and the southern part of the Chukchi Sea (Muto *et al.*, 2019). An estimated 6,000 – 25,000 ribbon seals from the eastern Bering Sea use the Chukchi Sea during the spring open-water period (Boveng *et al.*, 2017).

Ribbon seals reach breeding age between one and five years of age and give birth to a single pup on offshore season sea ice in April and early May. Weaning of most ribbon seal pups is completed by mid- May. Mating occurs soon after weaning (NMFS, 2019h).

Ribbon seals are becoming increasingly rare in Kotzebue Sound (Huntington *et al.*, 2016) Range mapping of the ribbon seal shows them present in the project vicinity from June to December; however, they typically concentrate further offshore, outside of the Sound (Audubon, 2010).

Unusual Mortality Events (UME)

A UME is defined under the MMPA as “a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response.” Currently, there are ongoing investigations in Alaska involving gray whales and ice seals.

Since January 1, 2019, elevated gray whale strandings have occurred along the west coast of North America from Mexico through Alaska. This event has been declared an Unusual Mortality Event (UME), though a cause has not yet been determined. More information is available at https://www.fisheries.noaa.gov/national/marine-life-distress/2019-2020-gray-whale-unusual-mortality-event-along-west-coast.

Since June 1, 2018, elevated ice seal strandings have occurred in the Bering and Chukchi seas in Alaska. This event has been declared an Unusual Mortality Event (UME), though a cause has not yet been determined. More information is available at https://www.fisheries.noaa.gov/national/marine-life-distress/2018-2020-ice-seal-unusual-mortality-event-alaska.

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. Current data indicate that 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) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges based on available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. 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 4.

Table 4: 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 and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information. Nine marine mammal species (five cetacean and four phocid pinniped species) have the reasonable potential to co-occur with the proposed survey activities. Please refer to Table 3. Of the cetacean species that may be present, two are classified as low-frequency cetaceans (*i.e*., gray whale and minke whale), two are classified as mid-frequency cetaceans (*i.e*., beluga whale and killer whale), and one is classified as a high-frequency cetacean (*i.e*., harbor porpoise).

Potential Effects of Specified Activities on Marine Mammals and their Habitat

This section includes a summary and discussion of the ways that components of the specified activity may impact marine mammals and their habitat. The **Estimated Take** 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** 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 how those impacts on individuals are likely to impact marine mammal species or stocks.

Description of Sound Sources

The marine soundscape is comprised of both ambient and anthropogenic sounds. Ambient sound is defined as the all-encompassing sound in a given place and is usually a composite of sound from many sources both near and far. The sound level of an area is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g*., waves, wind, precipitation, earthquakes, ice, atmospheric sound), biological (*e.g*., sounds produced by marine mammals, fish, and invertebrates), and anthropogenic sound (*e.g*., vessels, dredging, aircraft, construction).

The sum of the various natural and anthropogenic sound sources at any given location and time—which comprise "ambient" or "background" sound—depends not only on the source levels (as determined by current weather conditions and levels of biological and shipping activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10-20 dB from day to day (Richardson *et al.*, 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals.

In-water construction activities associated with the project would include vibratory pile driving and pile removal and impact pile driving. The sounds produced by these activities fall into one of two general sound types: Impulsive and non-impulsive. Impulsive sounds (e.g., explosions, gunshots, sonic booms, impact pile driving) are typically transient, brief (less than one second), broadband, and consist of high peak sound pressure with rapid rise time and rapid decay (ANSI 1986; NIOSH 1998; ANSI 2005; NMFS, 2018). Non-impulsive sounds (*e.g*. aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems) can be broadband, narrowband or tonal, brief or prolonged (continuous or intermittent), and typically do not have the high peak sound pressure with raid rise/decay time that impulsive sounds do (ANSI 1995; NIOSH 1998; NMFS 2018). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.*, Ward 1997 in Southall *et al.*, 2007).

Two types of pile hammers would be used on this project: Impact and vibratory. Impact hammers operate by repeatedly dropping a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is characterized by rapid rise times and high peak levels, a potentially injurious combination (Hastings and Popper, 2005). Vibratory hammers install piles by vibrating them and allowing the weight of the hammer to push them into the sediment. Vibratory hammers produce significantly less sound than impact hammers. Peak sound pressure levels (SPLs) may be 180 dB or greater, but are generally 10 to 20 dB lower than SPLs generated during impact pile driving of the same-sized pile (Oestman *et al.*, 2009). Rise time is slower, reducing the probability and severity of injury, and sound energy is distributed over a greater amount of time (Nedwell and Edwards 2002; Carlson *et al.*, 2005).

The likely or possible impacts of Crowley's proposed activity on marine mammals could involve both non-acoustic and acoustic stressors. Potential non-acoustic stressors could result from the physical presence of the equipment and personnel; however, any impacts to marine mammals are expected to primarily be acoustic in nature. Acoustic stressors include effects of heavy equipment operation during pile installation and removal.

Acoustic Impacts

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

NMFS defines a noise-induced threshold shift (TS) as a change, usually an increase, in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS 2018). The amount of threshold shift is customarily expressed in dB. A TS can be permanent or temporary. As described in NMFS (2018), 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)—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), 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 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.

Currently, TTS data only exist for four species of cetaceans (bottlenose dolphin (Tursiops truncatus), beluga whale (Delphinapterus leucas), harbor porpoise (Phocoena phocoena), and Yangtze finless porpoise (Neophocoena asiaeorientalis)) and five species of pinnipeds exposed to a limited number of sound sources (*i.e*., mostly tones and octave-band noise) in laboratory settings (Finneran 2015). TTS was not observed in trained spotted (Phoca largha) and ringed (Pusa hispida) seals exposed to impulsive noise at levels matching previous predictions of TTS onset (Reichmuth *et al.*, 2016). In general, harbor seals and harbor porpoises have a lower TTS onset than other measured pinniped or cetacean species (Finneran 2015). Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species. No data are available on noise-induced hearing loss for mysticetes. For summaries of data on TTS in marine mammals or for further discussion of TTS onset thresholds, please see Southall *et al.*, (2007), Finneran and Jenkins (2012), Finneran (2015), and Table 5 in NMFS (2018). Installing piles requires vibratory pile driving in this project. There would likely be pauses in activities producing the sound during each day. Given these pauses and that many marine mammals are likely moving through the ensonified area and not remaining for extended periods of time, the potential for TS declines.

Behavioral Harassment—Exposure to noise from pile driving and removal also has the potential to behaviorally disturb marine mammals. 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).

Disturbance may result in 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. Pinnipeds may increase their haul out time, possibly to avoid in-water disturbance (Thorson and Reyff 2006). Behavioral responses to sound are highly variable and context-specific and any reactions depend on numerous intrinsic and extrinsic factors (*e.g.*, species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day), as well as the interplay between factors (*e.g.*, Richardson *et al.*, 1995; Wartzok *et al.*, 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). In general, pinnipeds seem more tolerant of, or at least habituate more quickly to, potentially disturbing underwater sound than do cetaceans, and generally seem to be less responsive to exposure to industrial sound than most cetaceans. Please see Appendices B-C of Southall *et al.*, (2007) for a review of studies involving marine mammal behavioral responses to sound.

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.

Stress responses – An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (*e.g*., 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), however distress is an unlikely result of this project based on observations of marine mammals during previous, similar projects in the area.

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*., pile driving, 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. Masking of natural sounds can result when human activities produce high levels of background sound at frequencies important to marine mammals. Conversely, if the background level of underwater sound is high (*e.g*. on a day with strong wind and high waves), an anthropogenic sound source would not be detectable as far away as would be possible under quieter conditions and would itself be masked.

Airborne Acoustic Effects—Pinnipeds that occur near the project site could be exposed to airborne sounds associated with pile driving and removal that have the potential to cause behavioral harassment, depending on their distance from pile driving activities. Cetaceans are not expected to be exposed to airborne sounds that would result in harassment as defined under the MMPA.

Airborne noise would primarily be an issue for pinnipeds that are swimming or hauled out near the project site within the range of noise levels exceeding the acoustic thresholds. We recognize that pinnipeds in the water could be exposed to airborne sound that may result in behavioral harassment when looking with their heads above water. Most likely, airborne sound would cause behavioral responses similar to those discussed above in relation to underwater sound. For instance, anthropogenic sound could cause hauled-out pinnipeds to exhibit changes in their normal behavior, such as reduction in vocalizations, or cause them to temporarily abandon the area and move further from the source. However, these animals would previously have been `taken' because of exposure to underwater sound above the behavioral harassment thresholds, which are, in all cases, larger than those associated with airborne sound. Occasionally individual seals haul out on beach areas northeast of the project site. However, as noted previously, anticipated source levels for airborne noises are not anticipated to exceed disturbance thresholds for non-harbor seal pinnipeds beyond the 10-meter shutdown zone that will be implemented for all activities, so we do not expect Level B harassment takes due to airborne sounds.

Therefore, we do not believe that authorization of incidental take resulting from airborne sound for pinnipeds is warranted, and airborne sound is not discussed further here.

Marine Mammal Habitat Effects

Crowley's construction activities could have localized, temporary impacts on marine mammal habitat by increasing in-water sound pressure levels and slightly decreasing water quality. Construction activities are of short duration and would likely have temporary impacts on marine mammal habitat through increases in underwater sound. Increased noise levels may affect acoustic habitat (see masking discussion above) and adversely affect marine mammal prey in the vicinity of the project area (see discussion below). During vibratory pile driving, elevated levels of underwater noise would ensonify the area where both fish and mammals may occur and could affect foraging success. Additionally, marine mammals may avoid the area during construction, however, displacement due to noise is expected to be temporary and is not expected to result in long-term effects to the individuals or populations.

In-Water Construction Effects on Potential Foraging Habitat

Crowley’s project involves installing a new sheet pile bulkhead on the water ward side of the existing, degrading dock. The total seafloor area affected from installing the new bulkhead is a very small area compared to the vast foraging area available to marine mammals in Kotzebue.

Avoidance by potential prey (*i.e.*, fish) of the immediate area due to the temporary loss of this foraging habitat is possible. The duration of fish avoidance of this area after pile driving stops is unknown, but we anticipate a rapid return to normal recruitment, distribution and behavior. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity in Kotzebue Sound.

A temporary and localized increase in turbidity near the seafloor would occur in the immediate area surrounding the area where piles are installed (and removed in the case of the temporary templates). The sediments on the sea floor will be disturbed during pile driving; however, suspension will be brief and localized and is unlikely to measurably affect marine mammals or their prey in the area. In general, turbidity associated with pile installation is localized to about a 25-foot radius around the pile (Everitt *et al.*, 1980). Cetaceans are not expected to be close enough to the project pile driving areas to experience effects of turbidity, and any pinnipeds could avoid localized areas of turbidity. Therefore, the impact from increased turbidity levels is expected to be discountable to marine mammals. Furthermore, pile driving and removal at the project site would not obstruct movements or migration of marine mammals.

Impacts to potential foraging habitat are expected to be temporary and minimal based on the short duration of activities.

In-Water Construction Effects on Potential Prey

Numerous fish and invertebrate prey species occur in Kotzebue Sound and Hotham Inlet. Construction activities would produce continuous (*i.e*., vibratory pile driving) and impulsive (*i.e*., impact pile driving) sounds. Fish react to sounds that are especially strong and/or intermittent low-frequency sounds. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. 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). Sound pulses at received levels of 160 dB may cause subtle changes in fish behavior. SPLs of 180 dB may cause noticeable changes in behavior (Pearson *et al.*, 1992; Skalski *et al.*, 1992). SPLs of sufficient strength have been known to cause injury to fish and fish mortality.

The most likely impact to fish from pile driving activities at the project site would be temporary behavioral avoidance of the area. The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated.

In addition to fish, prey sources such as marine invertebrates could potentially be impacted by sound stressors as a result of Crowley's project. However, studies show that crustaceans, such as euphausiid and copepod prey species, are not particularly sensitive to noise, including loud noises from operation of seismic airguns (Wiese 1996). While these prey species do use sound for important behaviors, including predator detection (Chu *et al*., 1996), we expect that the vibratory pile driving noise from Crowley's project would be inconsequential to invertebrate populations.

In summary, given the short daily duration of sound associated with individual pile driving events and the relatively small areas being affected, pile driving activities associated with the proposed action are not likely to have a permanent, adverse effect on any fish or invertebrate habitat, or populations of fish or invertebrate species. Thus, we conclude that impacts of the specified activity are not likely to have more than short-term adverse effects on any prey habitat or populations of prey species. Further, any impacts to marine mammal habitat are not expected to result in significant or long-term consequences for individual marine mammals, or to contribute to adverse impacts on their populations.

Estimated Take

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 determination. 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 be by Level B harassment only, in the form of disruption of behavioral patterns and/or TTS for individual marine mammals resulting from exposure to acoustic sources. Based on the nature of the activity and the anticipated effectiveness of the mitigation measures (*i.e.*, shutdown zones) discussed in detail below in the **Proposed Mitigation** section, Level A harassment is neither anticipated nor proposed to be authorized.

As described previously, no mortality is anticipated or proposed to be authorized for this activity. Below we describe how the take is estimated.

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) and the number of days of activities. We note that while these basic factors can contribute to a basic calculation to provide an initial prediction of 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 estimate.

Acoustic Thresholds

Using the best available science, NMFS has developed 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).

Level B Harassment for non-explosive sources – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*, 2007, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μPa rms (microPascal, root mean square) for continuous (*e.g.*, vibratory pile-driving) and above 160 dB re 1 μPa (rms) for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources.

Crowley's proposed project includes the use of continuous (vibratory pile driving) sources only, and therefore the 120dB re 1 μPa (rms) is applicable.

Level A harassment for non-explosive sources - 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 or non-impulsive). Crowley's proposed project includes the use of non-impulsive (vibratory pile driving) sources.

These thresholds are provided in Table 5. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2018 Technical Guidance, which may be accessed at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*.

Table 5: Thresholds Identifying the Onset of Permanent Threshold Shift

	PTS Onset Acoustic Thresholds* **(Received Level)**	
Hearing Group	**Impulsive**	**Non-impulsive**
Low-Frequency (LF) Cetaceans	*Cell 1* $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	*Cell 2* $L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	*Cell 3* $L_{pk,flat}$: 230 dB	*Cell 4* $L_{E,MF,24h}$: 198 dB

	$L_{E,MF,24h}$: 185 dB	
High-Frequency (HF) Cetaceans	*Cell 5* $L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	*Cell 6* $L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	*Cell 7* $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	*Cell 8* $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	*Cell 9* $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	*Cell 10* $L_{E,OW,24h}$: 219 dB

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

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

Ensonified Area

Here, we describe operational and environmental parameters of the activity that will feed into identifying the area ensonified above the acoustic thresholds, which include source levels and transmission loss coefficient.

The sound field in the project area is the existing background noise plus additional construction noise from the proposed project. Marine mammals are expected to be affected via sound generated by the primary components of the project (*i.e.*, vibratory pile driving and removal). The maximum (underwater) area ensonified above the thresholds for behavioral harassment referenced above is 52.5 km^2 (20.3 mi^2), and the calculated distance to the farthest behavioral harassment isopleth is approximately 5.2 km (2.0 mi).

The project includes vibratory pile installation and removal. Source levels for these activities are based on reviews of measurements of the same or similar types and dimensions of piles available in the literature. Source levels for each pile size and activity are presented in Table 6. Source levels for vibratory installation and removal of piles of the same diameter are assumed to be the same.

Table 6: **Sound Source Levels for Pile Driving**

Pile Size	**Source Level (dB RMS SPL at 10m)**	**Literature Source**
Template Piles (18" pipe piles) [a]	158.0	Pritchard Lake Pumping Plant, 2014[b]
Alternate Template Piles (14" H piles)[a]	158.8	URS Corporation, 2007[c]
Anchor Piles (14" H piles)[b]	158.8	URS Corporation, 2007[c]
Sheet Piles	160.7	PND, 2016

[a] As noted in the *Detailed Description of Specific Activity* section, Crowley has not determined the exact type of template pile they will use. As such, we conservatively conducted the impact analysis with the maximum potential pile sizes that they may choose to use.
[b] Source level is the average of three 18-inch pipe piles installed at Pritchard Lake Pumping Plant. Data originally provided by Illingworth and Rodkin, Inc. and accessed in Caltrans, 2005.
[c] Port of Anchorage Test Pile Driving Program. Accessed in Caltrans, 2015. The applicant averaged the vibratory installation levels from Table I.4-9, normalized to a consistent 10-foot distance. The applicant rejected any source levels more than one standard deviation from the average (Piles 2 and 12 Down).

Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is:

$$TL = B * \text{Log10}\ (R1/R2),$$

where

TL = transmission loss in dB

B = transmission loss coefficient

R1 = the distance of the modeled SPL from the driven pile, and

R2 = the distance from the driven pile of the initial measurement

Absent site-specific acoustical monitoring with differing measured transmission loss, a practical spreading value of 15 is used as the transmission loss coefficient in the above formula. Site-specific transmission loss data for Crowley's Kotzebue dock are not available; therefore, the default coefficient of 15 is used to determine the distances to the Level A and Level B harassment thresholds.

When the NMFS Technical Guidance (2016) was published, in recognition of the fact that ensonified area/volume could be more technically challenging to predict because of the duration component in the new thresholds, we developed a User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to help predict takes. We note that because of some of the assumptions included in the methods used for these tools, we anticipate that isopleths produced are typically going to be overestimates of some degree, which may result in some degree of overestimate of Level A harassment take. However, these tools offer the best way to predict appropriate isopleths when more sophisticated 3D modeling methods are not available, and NMFS continues to develop ways to quantitatively refine these tools, and will qualitatively address the output where appropriate. For stationary sources such as pile driving, NMFS User Spreadsheet predicts the distance at which, if a marine mammal remained at that distance the whole duration of the activity, it would incur PTS. Inputs used in the User Spreadsheet, and the resulting isopleths are reported below.

Table 7: User Spreadsheet Input Parameters Used for Calculating Level A Harassment Isopleths.

(All calculations were completed in User Spreadsheet tab A.1: Vibratory Pile Driving with a weighting factor adjustment of 2.5kHz.)

	Template Piles (18-in Pipe Pile)	Alternate Template Piles (14-in H-piles)	Anchor Piles (14-in H-piles)	Sheet Piles
Source Level (RMS SPL)	158	158.8	158.8	160.7
Number of Piles within 24-h Period	10	10	10	9
Duration to Drive a Single Pile (minutes)	10	10	10	10
Propagation (xLogR)	15	15	15	15
Distance From Source Level Measurement (m)	10	10	10	10

Table 8: **Calculated Distances to Level A and Level B Harassment Isopleths**.

Activity	**Level A Harassment Zone (m)**					**Level B Harassment Zone (m)**[a]
	Low-Frequency Cetaceans	**Mid-Frequency Cetaceans**	**High-Frequency Cetaceans**	**Phocid Pinnipeds**	**Otariid Pinnipeds**	
Template Piles (18-in Pipe Pile)	6	1	9	4	<1	3415
Alternate Template Piles (14-in H-piles)	7	1	10	4	<1	3861
Anchor	7	1	10	4	<1	3861

Piles (14-in H-piles)						
Sheet Piles	9	1	13	5	<1	5168

[a] All Level B harassment zones were calculated using practical spreading (15logR) and a 120dB re 1 μPa rms threshold.

Table 9: Estimated Area Ensonified Above the Level B Harassment Take Threshold, and Estimated Days of Construction for Each Activity

(The estimated days of construction for each activity include a 10 percent contingency period to account for potential construction delays.)

Pile Size	Estimated Area Ensonified Above Level B Harassment Take Threshold (km^2)	Estimated Duration (days)
Template Piles (18-in Pipe Pile)	24.8	37[a]
Alternate Template Piles (14-in H-piles)	32.1	37[a]
Anchor Piles (14-in H-piles)	32.1	2
Sheet Piles	52.5	48
All Activities		87

[a] Includes both installation and removal.

Marine Mammal Occurrence and Take Calculation and Estimation

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations. We describe how the information provided above is brought together to produce a quantitative take estimate.

Gray Whale

Gray whales were reported as present and feeding (sometimes in large numbers) in Kotzebue Sound, and a gray whale was harvested by whale hunters at Sisualiq in 1980 (Frost *et al.*, 1983). Additionally, between 2010 and 2019, there were five reports of gray whale strandings within inner Kotzebue Sound, including one in Hotham Inlet. An additional unidentified large whale was reported stranded south of Cape Blossom in 2018

(Savage, pers. comm. 2019). NMFS was unable to locate data describing frequency of gray whale occurrence, group size, or density within the project area.

Crowley plans to construct 14 cells in the proposed dock, and construction of each is expected to require approximately one week; however, NMFS estimates that construction of all cells will last 15 weeks to account for potential delays or other unforeseen circumstances. NMFS expects that a gray whale or group of gray whales may enter the project area periodically throughout the duration of the construction period, averaging one gray whale per week. Therefore, given the limited information in the project area to otherwise inform a take estimate, NMFS proposes to issue 15 Level B harassment takes of gray whale.

The largest Level A harassment zone for low-frequency cetaceans extends 8.5m from the source during vibratory pile driving of the sheet piles (Table 8). Crowley is planning to implement a 10m shutdown zone during all construction activities, which, especially in combination with the already low frequency of gray whales entering the area, is expected to eliminate the potential for Level A harassment take of gray whale. Therefore, Crowley did not request Level A harassment takes of gray whale, nor is NMFS is proposing to authorize any.

Minke Whale

Minke whales were reported as sometimes present in Kotzebue Sound during the summer months and two individuals beached in the mouth of the Buckland River in autumn during the late 1970s (Frost *et al.*, 1983). NMFS was unable to locate additional, more recent data describing frequency of minke whale occurrence, group size, or density within the project area.

Crowley plans to construct 14 cells in the proposed dock, and construction of each is expected to require approximately one week; however, NMFS estimates that construction of all cells will last 15 weeks to account for potential delays or other unforeseen circumstances. NMFS estimates that a minke whale may enter a Level B harassment zone every other week throughout the duration of the construction period. Therefore, given the limited information in the project area to otherwise inform a take estimate, NMFS proposes to issue eight Level B harassment takes of minke whale.

The largest Level A harassment zone for low-frequency cetaceans extends 8.5m from the source during vibratory pile driving of the sheet piles (Table 8). Crowley is planning to implement a 10m shutdown zone during all construction activities, which, especially in combination with the already low likelihood of minke whales entering the area, are expected to eliminate the potential for Level A harassment take of minke whale. Therefore, Crowley did not request Level A harassment takes of minke whale, nor is NMFS is proposing to authorize any.

Beluga Whale

Reports of belugas at Sisualiq Spit, directly across from Kotzebue, include groups of 75-100 individuals, described as moving clockwise into the Sound. Along the west coast of Baldwin peninsula, they have been reported in groups of 200 - 300, culminating in groups of 1,000 or more in Eschscholtz Bay and near the Chamisso Islands (Frost *et al.*, 1983).

Beluga whales from the Beaufort Sea and Eastern Chukchi Sea stocks have the potential to be taken by Level B harassment. Crowley estimates that 100 beluga whales may be taken, by Level B harassment, on each project day, for a total of 8,700 Level B harassment takes (100 beluga whales x 87 estimated in-water work days = 8,700 Level B harassment takes). NMFS expects that this is a conservative estimate; however, given the limited information in the project area to otherwise inform a take estimate, NMFS proposes to issue 8,700 Level B harassment takes of beluga whale.

The largest Level A harassment zone for mid-frequency cetaceans extends 0.8m from the source during vibratory installation of the sheet piles (Table 8). Crowley is planning to implement a 10m shutdown zone during all construction activities, which, given the extremely small size of the Level A harassment zones, is expected to eliminate the potential for Level A harassment take of beluga whale. Therefore, takes of beluga whale by Level A harassment have not been requested, and are not proposed to be authorized.

Killer Whale

Photo identification of individuals spotted in the southern Chukchi sea during transect surveys (during which at least 37 individuals were spotted six times) identified transient type killer whales. Sightings reported included two sightings of 14 whales each in July, 3 sightings of 18 whales each in August, and one sighting of 5 whales in September, with an average group size of 15 animals (Clarke *et al.*, 2013).

Due to Crowley's project's remote location at the fringes of the known range of the stock, it is unlikely that more than one or two pods would be located in the region during construction. Crowley conservatively estimates, and NMFS agrees, that 15 Gulf of Alaska, Aleutian Islands, and Bering Sea Transient killer whales may be present in the Level B harassment zone on a maximum of 25 percent of project days, given the transient nature of the animals. Therefore, NMFS proposes to authorize Level B harassment take of 15 individuals on 22 project days (25% of total expected days (87 days)) for a total of 330 Level B harassment takes.

The largest Level A harassment zone for mid-frequency cetaceans extends 0.8m from the source during vibratory installation of the sheet piles (Table 8). Crowley is planning to implement a 10m shutdown zone during all construction activities, which, given the extremely small size of the Level A harassment zones, is expected to eliminate the potential for Level A harassment take of killer whale. Therefore, takes of killer whale by Level A harassment were not requested, and are not proposed to be authorized.

Harbor Porpoise

The harbor porpoise frequents nearshore waters and coastal embayments throughout their range, including bays, harbors, estuaries, and fjords less than 650 feet (198 m) deep (NMFS, 2019g). Harbor porpoises have been detected in Kotzebue Sound between September and November and between January and March during acoustic monitoring in 2014 & 2015. Porpoises had not previously been reported under the ice in the Chukchi (Whiting *et al.,* 2019). NMFS was unable to locate a density or group size for Kotzebue Sound, and therefore used the maximum harbor porpoise group size (four animals) from the Distribution and Relative Abundance of Marine Mammals in the Eastern Chukchi and Western Beaufort Seas, 2018 Annual Report (Clarke *et al.*, 2019). NMFS estimates that approximately two groups of four harbor porpoises may be present during each week of construction for a total of 120 Level B harassment takes of harbor porpoise (4 animals in a group x 2 groups per week x 15 weeks = 120 Level B harassment takes).

The largest Level A harassment zone for high-frequency cetaceans extends 12.6m from the source during vibratory installation of the sheet piles (Table 8). Crowley is planning to implement a 10m shutdown zone during all construction activities, which, given the small size of the Level A harassment zones, and the associated duration component, is expected to eliminate the potential for Level A harassment take of harbor porpoise. Therefore, Crowley did not request takes of harbor porpoise by Level A harassment, nor is NMFS proposing to authorize any.

Bearded Seal

Aerial surveys of ringed and bearded seals in the Eastern Chukchi Sea in May and June reported relatively few bearded seals within inner Kotzebue Sound, as bearded seals typically congregate on offshore ice rather than nearshore. In 1976 aerial surveys of bearded seals in the Bering Sea, densities ranged between 0.006 and 0.782 seals per seals per km^2. Bearded seals were typically spotted in groups of one to two individuals with occasional larger groupings in denser areas (Braham *et al.*, 1984). Bengtson *et al.*, 2005 includes bearded seal densities calculated from aerial surveys in May and June 1999 and May 2000, however, the density for the project area was zero in both years. However, data shows that at least some bearded seals are nearby from June to September, and could potentially enter the project area (Bengtson *et al.*, 2005, Quakenbush *et al.*, 2019). Therefore, NMFS determined that 0.782 (Braham *et al.*, 1984) is the most appropriate density, considering those available.

Given the known association between ice cover and bearded seal density, NMFS estimates that bearded seal density will be highest when the project begins in June, and will taper off as the ice melts (Quakenbush *et al.*, 2019). As such, NMFS has estimated take for the month of June separately from the remainder of the expected project period (July through September).

As noted in the *Detailed Description of Specific Activity* section, Crowley will construct the dock upgrade one cell at a time, with construction of each cell requiring approximately one week. In an effort to separate out work that will occur in June, NMFS made several assumptions: (1) NMFS assumes that the best density available is 0.782 (Braham *et al.*, 1984); (2)While there are 14 cells and construction of each is expected to require approximately one week, NMFS estimates that construction of all cells will last 15 weeks to account for potential delays or other unforeseen circumstances; (3) NMFS assumes that each cell will require the same number of each pile type, and therefore the same duration for installation (and removal of template piles), despite known differences in design among some cells; and (4) NMFS assumes that construction will require approximately 87 in-water workdays.

NMFS calculated the assumed days per cell for each activity (Table 10) by considering the proportion of the assumed project days for each activity out of the 87 total project days in comparison to the assumed days per cell out of the expected duration of seven days to complete a cell (see assumption (2), above). (*i.e*. Assumed Project Days/87 days = Assumed Days per Cell/ 7 days). NMFS calculated the Anticipated Days in June by multiplying the Assumed Days per Cell x 4 weeks of June.

NMFS calculated take for each activity during the month of June (Table 10) by multiplying the anticipated days in June x area of Level B harassment zone (km^2) x density ($0.782km^2$). Given these assumptions and takes per activity (Table 10), NMFS estimates approximately 1045 bearded seal takes in the month of June (sum of Takes per Activity in Table 10).

Table 10: NMFS Assumptions for Bearded Seal June Take Estimate

Pile Type	Assumed Project Days	Assumed Days per Cell	Anticipated Days in June	Area of Level B Harassment Zone (km^2)	Take per Activity
Template Piles[a]	37[b]	3.0	12	32.1	385
Anchor Piles (14-in H-piles)	2	0.2	0.8	32.1	20
Sheet Piles	48	3.9	15.6	52.5	640

[a] Conservatively assumes 14-inch H-piles rather than 18-inch pipe piles.
[b] Includes installation and removal

During the months of July to September, NMFS expects that the number of bearded seals in the project area will be much lower due to the lack of sea ice. NMFS considered the relative number of ringed and bearded seals locations reported in Quakenbush *et al*., (2019, Figures 7, 30, and 55), and estimates that approximately twice as many bearded seals (two to four) are likely to occur in the project area than ringed seals (one to two), because tagging studies show that nearly all of the ringed seals spend the summer north of Point Hope (Figures 30 and 55). NMFS estimates that approximately 14 Level B harassment takes of bearded seals takes may occur each week. Given the assumed 15 weeks of construction, and four assumed weeks of construction in June, NMFS estimates that Crowley will conduct pile driving activities for 11 weeks from July through September. To estimate bearded seal takes during that period, NMFS multiplied the estimated weekly take estimate by the estimated number of weeks of construction, for a total of 154 Level B harassment takes from July to September (14 bearded seals x 11 weeks of construction = 154 Level B harassment takes).

Therefore, throughout the entire project period, NMFS estimates, and proposes to authorize 1,199 Level B harassment takes of bearded seals (1,045 estimated takes in June + 154 estimated takes from July to September = 1,199 Level B harassment takes).

The largest Level A harassment zone for phocids extends 5.2m from the source during vibratory installation of the sheet piles (Table 8). Crowley is planning to implement a 10m shutdown zone during all construction activities, which, given the extremely small size of the Level A harassment zones, is expected to eliminate the potential for Level A harassment take of bearded seals. Therefore, takes of bearded seal by Level A harassment have not been requested, and are not proposed to be authorized.

Ringed Seal

Ringed seals are distributed throughout Arctic waters in all "seasonally ice-covered seas." In winter and early spring when sea ice is at its maximum coverage, they occur in the northern Bering Sea, in Norton and Kotzebue Sounds, and throughout the Chukchi and Beaufort Seas. In years with particularly extensive ice coverage, they may occur as far south as Bristol Bay (Muto *et al.*, 2019). In 1976 aerial surveys of ringed seals in the Bering Sea, densities ranged between 0.005 and 0.017 seals per seals per km2 (Braham *et al.*, 1984). Surveys of seals in their breeding grounds in the Sea of Okhotsk in 1964 found densities of 0.1 to 2 seals per km^2 (CNRC, 1965). Bengtson *et al.*, 2005 includes ringed seal densities calculated from aerial surveys in May and June 1999 and May 2000. Densities for the waters surrounding Kotzebue ranged from 3.82 (2000) to 5.07 (1999).

Given the known association between ice cover and ringed seal density, NMFS estimates that ringed seal density will be highest when the project begins in June, and will taper off as the ice melts (Quakenbush *et al.*, 2019). As such, NMFS has estimated take for the month of June separately from the remainder of the expected project period (July through September).

As noted in the *Detailed Description of Specific Activity* section, Crowley will construct the dock upgrade one cell at a time, with construction of each cell requiring approximately one week. In an effort to separate out work that will occur in June, NMFS made several assumptions: (1) NMFS assumes that the best density available 5.07 animals/km^2 (Bengtson *et al.*, 2005); (2)While there are 14 cells and construction of each is expected to require approximately one week, NMFS estimates that construction of all cells will last 15 weeks to account for potential delays or other unforeseen circumstances; (3) NMFS assumes that each cell will require the same number of each pile type, and therefore the same duration for installation (and removal of template piles), despite known differences in design among some cells; and (4) NMFS assumes that construction will require approximately 87 in-water workdays.

NMFS calculated the assumed days per cell for each activity (Table 11) by considering the proportion of the assumed project days for each activity out of the 87 total project days in comparison to an assumed days per cell out of the expected duration of seven days to complete a cell (see assumption (2), above). (i.e. Assumed Project Days/87 days = Assumed Days per Cell/ 7 days). NMFS calculated the Anticipated Days in June by multiplying the Assumed Days per Cell x 4 weeks of June.

NMFS calculated take for each activity during the month of June (Table 11) by multiplying the anticipated days in June x area of Level B harassment zone (km^2) x density (5.07/ km^2). Given these assumptions (Table 11), NMFS estimates 6,235 ringed seal takes in the month of June (sum of Takes per Activity in Table 11).

Table 11: **NMFS Assumptions for Ringed Seal June Take Estimate.**

Pile Type	Assumed Project Days[b]	Assumed Days per Cell	Anticipated Days in June	Area of Level B Harassment Zone (km^2)	Take per Activity
Template Piles[a]	37[b]	3.0	12	32.1	1,953
Anchor Piles (14-in H-piles)	2	0.2	0.8	32.1	130
Sheet Piles	48	3.9	15.6	52.5	4,152

[a] Conservatively assumes 14-inch H-piles rather than 18-inch pipe piles.
[b] Includes installation and removal

During the months of July to September, NMFS expects that the number of ringed seals in the project area will much lower due to the lack of sea ice. NMFS considered the relative number of ringed and bearded seals locations reported in Quakenbush *et al*. (2019, Figures 30, and 55), and estimates that approximately twice as many bearded seals (two to four) are likely to occur in the project area than ringed seals (one to two). NMFS estimates that approximately seven Level B harassment takes of ringed seals takes may occur each week. Given the assumed 15 weeks of construction, and four assumed weeks of construction in June, NMFS estimates that Crowley will conduct pile driving activities for 11 weeks from July through September. To estimate ringed seal takes during that period, NMFS multiplied the estimated weekly take estimate by the estimated number of weeks of construction, for a total of 77 Level B harassment takes (7 ringed seals x 11 weeks of construction = 77 Level B harassment takes from July to September).

Therefore, throughout the entire project period, NMFS estimates, and proposes to authorize 6,312 Level B harassment takes of ringed seals (6,235 estimated takes in June + 77 estimated takes from July to September).

The largest Level A harassment zone for phocids extends 5.2m from the source during vibratory installation of the sheet piles (Table 8). Crowley is planning to implement a 10m shutdown zone during all construction activities, which, given the extremely small size of the Level A harassment zones, is expected to eliminate the potential for Level A harassment take of ringed seals. Therefore, takes of ringed seal by Level A harassment have not been requested, and are not proposed to be authorized.

Spotted Seal

From the late-fall through spring, spotted seals are distributed where sea ice is available for hauling out. From summer through fall, the seasonal sea ice has melted and spotted seals haul out on land (Muto *et al.*, 2019). An estimated 69,000 -101,000 spotted seals from the eastern Bering Sea use the Chukchi Sea during the spring open-water period (Boveng *et al.,* 2017). In 1976 aerial surveys of spotted seals in the Bering Sea, densities ranged between 0.013 and 1.834 seals per seals per km^2 (Braham *et al.,* 1984). According to Audubon (2010), spotted seals haul out between June and December in Krusenstern Lagoon, the Noatak River delta, the tip of the Baldwin Peninsula, and Cape Espenberg. Subsistence users report that spotted seals move into the area in July, following fish runs into the Sound and up the Noatak River (NAB, 2016). Spotted seals in the Chamisso Islands were reported in groups of up to 20, but they may reach groups of over 1,000 at Cape Espenberg (Frost *et al.*, 1983).

To calculate estimated Level B harassment takes, Crowley used a density of 1.834 spotted seals/km^2 (Braham *et al.*, 1984). NMFS was not able to locate information to support a separate take calculation for June from the remainder of the work period, as was done for the other ice seals. Therefore, NMFS calculated Level B harassment takes by multiplying 1.834 spotted seals/km^2 x the area ensonified above the Level B harassment threshold during each pile driving activity x estimated days of construction for each activity (Table 9) for a total of 6,917 Level B harassment takes. Given that the Braham *et al*., 1984 density is from the Bering Sea, and Boveng *et al*., 2017 states that spotted seals from the Bering Sea use the Chukchi Sea during the open water period, NMFS expects that this Bering Sea density provides an appropriate estimate for Kotzebue during the project period. Additionally, the estimated group size of up to 20 individuals at the Chamisso Islands is over 50km from the project site, and NMFS expects that the count of 1,000 animals at Cape Epsenberg (Frost *et al.*, 1983) is an outlier. Therefore, given the limited information in the project area to otherwise inform a take estimate, NMFS proposes to issue 6,917 Level B harassment takes of spotted seal.

The largest Level A harassment zone for phocids extends 5.2m from the source during vibratory installation of the sheet piles (Table 8). Crowley is planning to implement a 10m shutdown zone during all construction activities, which, given the extremely small size of the Level A harassment zones, is expected to eliminate the potential for Level A harassment take of spotted seals. Therefore, takes of spotted seal by Level A harassment have not been requested, and are not proposed to be authorized.

Ribbon Seal

Ribbon seals range from the North Pacific Ocean and Bering Sea into the Chukchi and western Beaufort Seas in Alaska. They occur in the Bering Sea from late March to early May. From May to mid- July the ice recedes, and ribbon seals move further north into the Bering Strait and the southern part of the Chukchi Sea (Muto *et al.*, 2019). An estimated 6,000 - 25,000 ribbon seals from the eastern Bering Sea use the Chukchi Sea during the spring open-water period (Boveng *et al.*, 2017). In 1976 aerial surveys of ribbon seals in the Bering Sea, maximum reported densities were 0.002 seals per seals per km^2 (Braham *et al.*, 1984). Range mapping of the ribbon seal shows them present in the project vicinity from June to December; however, they typically concentrate further offshore, outside of the Sound (Audubon, 2010).

To calculate estimated Level B harassment takes, Crowley used a density of 0.002 ribbon seals/km^2 (Braham *et al.*, 1984). NMFS recognizes that this density estimate is from the Bering Sea, but was unable to locate more local or recent data describing frequency of ribbon seal occurrence, group size, or density within the project area. Crowley calculated a Level B harassment take estimate by multiplying 0.002 ribbon seals/km^2 x the area ensonified above the Level B harassment threshold during each pile driving activity x estimated days of construction for each activity, for a total of eight Level B harassment takes. Given the limited information in the project area to otherwise inform a take estimate, NMFS proposes to issue eight Level B harassment takes of ribbon seal.

The largest Level A harassment zone for phocids extends 5.2m from the source during vibratory installation of the sheet piles (Table 8). Crowley is planning to implement a 10m shutdown zone during all construction activities, which, given the extremely small size of the Level A harassment zones, is expected to eliminate the potential for Level A harassment take of ribbon seals. Therefore, takes of ribbon seal by Level A harassment have not been requested, and are not proposed to be authorized.

Table 12: **Estimated Take by Level B harassment, by Species and Stock.**

Common Name	**Stock**	**Level B Harassment Take**	**Stock Abundance**	**Percent of Stock**

Gray Whale	Eastern North Pacific	15	26,960	.06
Minke Whale	Alaska	8	N/A	N/A
Killer Whale	Gulf of Alaska, Aleutian Islands, and Bering Sea Transient	330	587	56.2
Beluga Whale	Beaufort Sea	8,700	39,258	22.1
	Eastern Chukchi Sea		20,752	4.3
Harbor Porpoise	Bering Sea	120	48,215	0.2
Bearded Seal	Alaska	1,199	N/A	N/A
Ringed Seal	Alaska	6,312	N/A	N/A
Spotted Seal	Alaska	6,917	461,625	1.5
Ribbon Seal	Alaska	8	184,697	0.004

Potential Effects of Specified Activities on Subsistence Uses of Marine Mammals

The activity may impact the availability of the affected marine mammal stocks or species for subsistence uses. The subsistence uses that may be affected and the potential impacts of the activity on those uses are described below. Measures included in this IHA to reduce the impacts of the activity on subsistence uses are described in the **Proposed Mitigation** section. Last, the information from this section and the **Proposed Mitigation** section is analyzed to determine whether the necessary findings may be made in the **Unmitigable Adverse Impact Analysis and Determination** section.

Residents of Qikiqtaġruq (Kotzebue), Ipnatchiaq (Deering), Nunatchiaq (Buckland), Nuataaq (Noatak), and Nuurvik (Noorvik) harvest marine mammals from Kotzebue Sound during all seasons. Traditional harvests include bowhead and beluga whales and all four seal species discussed in this notice, as well as subsistence fishing. Additionally, a gray whale harvest at Sisualiq Spit was reported to the Alaska Department of Fish & Game (ADF&G) in 1980 (Frost *et al*., 1983).

Beluga whales are routinely hunted throughout the Sound in spring and summer (NAB, 2016). Traditional hunting grounds for beluga (sisuaq) are directly across from Kotzebue at Sisualiq Spit (Huntington *et al.*, 2016). Recently, regional hunters have reported a significant change in the presence of beluga whales in the Sound. There are no longer sufficient whales to make a traditional, coordinated drive hunt on Sisualiq Spit, and Belugas are no longer common in Eschscholtz Bay, either. Hunters attribute the decrease to a variety of factors, including engine noise (both air and vessel traffic have increased), lack of coordinated hunts, and killer whale pressure (Huntington *et al.*, 2016b). Impacts from Crowley's project are not expected to reach the traditional beluga harvest grounds.

Bowhead whales are harvested mostly by the residents between Kivalina and Point Hope (NAB, 2016). We do not expect Crowley's project to impact bowhead whales, given that the whales are primarily targeted outside of the Sound, and the project is not expected to impact their prey or migratory behavior.

Bearded and ringed seals are the most commonly harvested seals in the Kotzebue Sound area (Huntington *et al.*, 2016). Bearded seals are the primary focus for Kotzebue Sound hunters in the spring, with harvests occurring near Cape Krusenstern and

Goodhope Bay. Hunt effort for bearded seals appears equal in spring and fall (NAB 2016). In thinner ice years, there is less suitable denning habitat for ice seals and more danger for seal hunters to camp out and to approach the seals. Hunters report that there is no longer ice for hunting bearded seals into July, as there was in the 1980s.

Huntington *et al.,* (2016) report that bearded and ringed seals are hunted from ice breakup until the spotted seals arrive and chase them from the area. The NAB (2016) also reported harvest efforts for spotted and ribbon seals in Kotzebue Sound. With the exception of bearded seals, there were limited hunting efforts in the spring (March – May) with nearly twice as much harvest effort in the fall (September – November) and significantly less hunting in summer (June – August).

Ribbon seals have always been infrequent in Kotzebue Sound, but are becoming increasingly more rare (Huntington *et al.,* 2016). They are not harvested for human consumption, but their hides are harvested and meat and blubber used as dog food. Generally, hunters reported that there is less need for seal hunting than in the past because they are needed less for sled dog feed and sealskin storage containers (Huntington *et al.,* 2016).

Project activities mostly avoid traditional ice seal harvest windows (noted above) and are generally not expected to negatively impact hunting of seals. However, as noted above, some seal hunting does occur throughout the project period. The project could deter target species and their prey from the project area, increasing effort required for a successful hunt. Construction may also disturb beluga whales, potentially causing them to avoid the project area and reducing their availability to subsistence hunters as well.

Additionally, Crowley's dock provides essential water access for subsistence harvests, so construction at the dock has the potential to reduce access for subsistence hunters.

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, we carefully consider 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, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

Mitigation for Marine Mammals and their Habitat

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

- Conduct briefings between construction supervisors and crews and the marine mammal monitoring team prior to the start of all pile driving activity and when new personnel join the work, to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures;
- For in-water heavy machinery work other than pile driving (*e.g.*, standard barges, *etc.*), if a marine mammal comes within 10 m, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions. This type of work could include the following activities: (1) Movement of the barge to the pile location; or (2) positioning of the pile on the substrate via a crane (*i.e.*, stabbing the pile);
- For those marine mammals for which Level B harassment take has not been requested, in-water pile installation/removal will shut down immediately if such species are observed within or on a path towards the Level B harassment zone; and

- If take reaches the authorized limit for an authorized species, pile installation will be stopped as these species approach the Level B harassment zone to avoid additional take.

Additionally, Crowley is required to implement all mitigation measures described in the biological opinion (not yet issued).

The following mitigation measures would apply to Crowley's in-water construction activities.

Establishment of Shutdown Zones- Crowley will establish a 10-meter shutdown zone for all construction activities. The purpose of a shutdown zone is generally to define an area within which shutdown of the activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area).

The placement of protected species observers (PSOs) during all pile driving and removal activities (described in detail in the **Proposed Monitoring and Reporting** section) will ensure that the entire shutdown zone is visible during pile installation. Should environmental conditions deteriorate such that marine mammals within the entire shutdown zone would not be visible (*e.g.*, fog, heavy rain), pile driving and removal must be delayed until the PSO is confident marine mammals within the shutdown zone could be detected.

Monitoring for Level B Harassment- Crowley will monitor the Level B harassment zones (areas where SPLs are equal to or exceed the 120 dB rms threshold during vibratory pile driving). Monitoring zones provide utility for observing by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring zones enable observers to be aware of and communicate the presence of marine mammals in the project area outside the shutdown zone and thus prepare for a potential cease of activity should the animal enter the shutdown zone. Placement of PSOs on the shorelines around Kotzebue will allow PSOs to observe marine mammals within the Level B harassment zones. However, due to the large Level B harassment zones (Table 8), PSOs will not be able to effectively observe the entire zone. Therefore, Level B harassment exposures will be recorded and extrapolated based upon the number of observed takes and the percentage of the Level B harassment zone that was not visible.

Pre-activity Monitoring- Prior to the start of daily in-water construction activity, or whenever a break in pile driving/removal or drilling of 30 minutes or longer occurs, PSOs will observe the shutdown and monitoring zones for a period of 30 minutes. The shutdown zone will be considered cleared when a marine mammal has not been observed within the zone for that 30-minute period. If a marine mammal is observed within the shutdown zone, a soft-start cannot proceed until the animal has left the zone or has not been observed for 15 minutes. If the Level B harassment zone has been observed for 30 minutes and no species for which take is not authorized are present within the zone, work can commence and continue even if visibility becomes impaired within the Level B harassment monitoring zone. When a marine mammal for which Level B harassment take is authorized is present in the Level B harassment zone, activities may begin and Level B harassment take will be recorded. If the entire Level B harassment zone is not visible at the start of construction, piling or drilling activities can begin. If work ceases for more than 30 minutes, the pre-activity monitoring of both the Level B harassment zone and shutdown zones will commence.

Mitigation for Subsistence Uses of Marine Mammals or Plan of Cooperation

Regulations at 50 CFR 216.104(a)(12) further require IHA applicants conducting activities that take place in Arctic waters to provide a Plan of Cooperation (POC) or information that identifies what measures have been taken and/or will be taken to minimize adverse effects on the availability of marine mammals for subsistence purposes. A plan must include the following:

- A statement that the applicant has notified and provided the affected subsistence community with a draft plan of cooperation;
- A schedule for meeting with the affected subsistence communities to discuss proposed activities and to resolve potential conflicts regarding any aspects of either the operation or the plan of cooperation;
- A description of what measures the applicant has taken and/or will take to ensure that proposed activities will not interfere with subsistence whaling or sealing; and
- What plans the applicant has to continue to meet with the affected communities, both prior to and while conducting the activity, to resolve conflicts and to notify the communities of any changes in the operation.

Crowley provided a draft Plan of Cooperation (POC) to affected parties on November 12, 2019. It includes a description of the project, community outreach that has already been conducted, and project mitigation measures. Crowley is working on their plan for continuing coordination with subsistence communities throughout the project duration. The POC is a live document and will be updated throughout the project review and permitting process.

Crowley will coordinate with local subsistence groups to avoid or mitigate impacts to beluga whale harvests. Additionally, project activities avoid traditional ice seal harvest windows, and are not expected to negatively impact hunting of bearded or ringed seals. Crowley will coordinate with local communities and subsistence groups throughout construction to avoid or mitigate impacts to ice seal harvests.

Based on our evaluation of Crowley's proposed measures, as well as other measures considered by NMFS, NMFS has preliminarily determined that the proposed mitigation measures provide the means 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 in the proposed action area. 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 action; 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).
- Mitigation and monitoring effectiveness.

Visual Monitoring

Marine mammal monitoring must be conducted in accordance with the Marine Mammal Monitoring Plan, dated February 2020. Marine mammal monitoring during pile driving and removal must be conducted by NMFS-approved PSOs in a manner consistent with the following:

- Independent PSOs (*i.e.*, not construction personnel) who have no other assigned tasks during monitoring periods must be used;

- 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;
- Other PSOs may substitute education (degree in biological science or related field) or training for experience. PSOs may also substitute Alaska native traditional knowledge for experience. (NMFS recognizes that PSOs with traditional knowledge may also have prior experience, and therefore be eligible to serve as the lead PSO.); and
- Crowley must submit PSO CVs for approval by NMFS prior to the onset of pile driving.

PSOs must have the following additional qualifications:

- Ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to 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.

Three PSOs will be present during all pile driving/removal activities. A PSO will be have an unobstructed view of all water within the shutdown zone. All three PSOs will observe as much of the Level B harassment zone as possible. PSO locations are as follows (also included in Figure 2 of the 4MP, dated February 2020):

(1) At or near the site of pile driving;

(2) Along the shore, north of the project site; and

(3) Along the shore, south of the project site.

Monitoring would be conducted 30 minutes before, during, and 30 minutes after pile driving/removal and drilling activities. In addition, observers shall record all incidents of marine mammal occurrence, regardless of distance from activity, and shall document any behavioral reactions in concert with distance from piles being driven or removed. Pile driving activities include the time to install or remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving or drilling equipment is no more than 30 minutes.

Reporting

A draft marine mammal monitoring report will be submitted to NMFS within 90 days after the completion of pile driving and removal activities. The report 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 during observation, including direction of travel and estimated time spent within the Level A and Level B harassment zones while the source was active;
- Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;
- Locations of all marine mammal observations;
- Detailed information about any implementation of any mitigation triggered (*e.g*., shutdowns and delays), a description of specific actions that ensued, and resulting behavior of the animal, if any;
- Description of attempts to distinguish between the number of individual animals taken and the number of incidences of take, such as ability to track groups or individuals;
- An extrapolation of the estimated takes by Level B harassment based on the number of observed exposures within the Level B harassment zone and the percentage of the Level B harassment zone that was not visible; and
- Other human activity in the area.

If no comments are received from NMFS within 30 days, the draft 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 event that personnel involved in the construction activities discover an injured or dead marine mammal, the IHA-holder must immediately cease the specified activities and report the incident to the Office of Protected Resources (OPR) (301-427-8401), NMFS and to the Alaska regional stranding coordinator (907-586-7209) as soon as feasible. If the death or injury was clearly caused by the specified activity, the IHA-holder must immediately cease the specified activities until NMFS is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of the IHA. The IHA-holder must not resume their activities until notified by NMFS.

The report must include the following information:

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

Monitoring Plan Peer Review

The MMPA requires that monitoring plans be independently peer reviewed where the proposed activity may affect the availability of a species or stock for taking for subsistence uses (16 U.S.C. 1371(a)(5)(D)(ii)(III)). Regarding this requirement, NMFS' implementing regulations state that upon receipt of a complete monitoring plan, and at its discretion, NMFS will either submit the plan to members of a peer review panel for review or within 60 days of receipt of the proposed monitoring plan, schedule a workshop to review the plan (50 CFR 216.108(d)).

NMFS established an independent peer review panel (PRP) to review Crowley's Monitoring Plan for the proposed project in Kotzebue. NMFS provided Crowley's monitoring plan to the PRP and asked them to answer the following questions:

1. Will the applicant's stated objectives effectively further the understanding of the impacts of their activities on marine mammals and otherwise accomplish the goals stated below? If not, how should the objectives be modified to better accomplish the goals below?

2. Can the applicant achieve the stated objectives based on the methods described in the plan?

3. Are there technical modifications to the proposed monitoring techniques and methodologies proposed by the applicant that should be considered to better accomplish the objectives?

4. Are there techniques not proposed by the applicant (*i.e.*, additional monitoring techniques or methodologies) that should be considered for inclusion in the applicant's monitoring program to better accomplish the objectives?

5. What is the best way for an applicant to present their data and results (formatting, metrics, graphics, etc.) in the required reports that are to be submitted to NMFS (*i.e.*, 90-day report and comprehensive report)?

The PRP met in March 2020 and will provide a final report to NMFS containing recommendations for Crowley's monitoring plan in April 2020. The PRP's full report will be posted on NMFS' website when available, at *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act*. NMFS will consider all of the recommendations made by the PRP, and will incorporate appropriate changes in to the monitoring requirements of the IHA, if issued. Additionally, NMFS will publish the PRP's findings and recommendations in the **Federal Register** notice announcing the final IHA, if issued.

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 responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), 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's 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 environmental 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 majority of our analyses apply to all of the species listed in Table 12, given that many of the anticipated effects of this project on different marine mammal stocks are expected to be relatively similar in nature. Where there are meaningful differences between species or stocks in anticipated individual responses to activities, impact of expected take on the population due to differences in population status or impacts on habitat, they are described independently in the analysis below.

Pile driving and removal activities associated with the project, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment, from underwater sounds generated from pile driving and removal. Potential takes could occur if individuals of these species are present in zones ensonified above the thresholds for Level B harassment, identified above, when these activities are underway.

The takes from Level B harassment would be due to potential behavioral disturbance and TTS. No mortality or serious injury is anticipated given the nature of the activity, and no Level A harassment is anticipated due to Crowley's construction method and planned mitigation measures (see **Proposed Mitigation** section).

Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from other similar activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (*e.g.*, Thorson and Reyff 2006; HDR, Inc. 2012; Lerma 2014; ABR 2016). Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving and removal, although even this reaction has been observed primarily only in association with impact pile driving, which Crowley does not plan to conduct. Level B harassment will be reduced to the level of least practicable adverse impact through use of mitigation measures described herein. If sound produced by project activities is sufficiently disturbing, animals are likely to simply avoid the area while the activity is occurring, particularly as the project is expected to occur over just 87 in-water work days, with an estimated 100 minutes of pile driving per work day over a period of approximately 11 hours.

The project is also not expected to have significant adverse effects on affected marine mammals' habitats. The project activities would not modify existing marine mammal habitat for a significant amount of time. The activities may cause some fish to leave the area of disturbance, thus temporarily impacting marine mammals' foraging opportunities in a limited portion of the foraging range. We do not expect pile driving activities to have significant consequences to marine invertebrate populations. Given the short duration of the activities and the relatively small area of the habitat that may be affected, the impacts to marine mammal habitat, including fish and invertebrates, are not expected to cause significant or long-term negative consequences.

As previously noted, the NAB subsistence mapping project identified Kotzebue Sound as an important use area for beluga feeding, birthing, rearing, and migration (Figure 8 in Crowley's application, originally from NAB, 2016). While the locations identified as important birthing areas do not overlap with calculated Level B harassment zone, the feeding, rearing, and migration important areas directly overlap with the Level B harassment zone. The area of the feeding, rearing, and migration important use areas in which impacts of Crowley's project may occur is small relative to both the overall area of the important use areas and the overall area of suitable beluga whale habitat outside of these important use areas. The area of Kotzebue Sound affected is also small relative to the rest of the Sound, such that it allows animals within the migratory corridor to still utilize Kotzebue Sound without necessarily being disturbed by the construction. Therefore, take of beluga whales using the feeding, rearing, and migratory important use areas, given both the scope and nature of the anticipated impacts of pile driving exposure, is not expected to impact reproduction or survivorship of any individuals.

The NAB (2016) subsistence mapping project also identified Kotzebue Sound as an important use area for bearded seal feeding and migration (Figure 5 in Crowley's application). The area of the feeding and migratory important use areas in which impacts of Crowley's project may occur is small relative to both the overall area of the important use areas and the overall area of suitable bearded seal habitat outside of these important use areas. The area of Kotzebue Sound affected is also small relative to the rest of the Sound, such that it allows animals within the migratory corridor to still utilize Kotzebue Sound without necessarily being disturbed by the construction. Additionally, as previously described, we expect that most bearded seals will have left the area during the project period. Therefore, take of bearded seal using the feeding and migratory important use areas, given both the scope and nature of the anticipated impacts of pile driving exposure, is not expected to impact reproduction or survivorship of any individuals.

The NAB (2016) subsistence mapping project also identified Kotzebue Sound as an important use area for ringed seal feeding, including a high density feeding area south of the project area (Figure 6 in Crowley's application). The area identified as important for high density feeding does not overlap with the calculated Level B harassment zone. The area of the feeding important use areas in which impacts of Crowley's project may occur is small relative to both the overall area of the important use areas and the overall area of suitable ringed seal habitat outside of these important use areas. Additionally, as previously described, NMFS expects that most ringed seals will have left the area during the project period. Therefore, take of ringed seal using the feeding and migratory important use areas, given both the scope and nature of the anticipated impacts of pile driving exposure, is not expected to impact reproduction or survivorship of any individuals.

Additionally, the NAB subsistence mapping project identified Kotzebue Sound as an important use area for spotted seal feeding, birthing, rearing, and migration, as well as important haul outs (Figure 9 in Crowley's application, originally from NAB, 2016). While the locations identified as important birthing areas do not overlap with calculated Level B harassment zone, the feeding, rearing, and migration important use areas directly overlap with the Level B harassment zone, and one key haulout is adjacent to the Level B harassment zone. However, the area of the feeding (including high density feeding), rearing, and migration important use areas in which impacts of Crowley's project may occur is small relative to both the overall area of the important use area and the overall area of suitable spotted seal habitat outside of these important use areas. The area of Kotzebue Sound affected is also small relative to the rest of the Sound, such that it allows animals within the migratory corridor to still utilize Kotzebue Sound without necessarily being disturbed by the construction. Therefore, take of spotted seals using the feeding and migratory important use areas and important haul outs, given both the scope and nature of the anticipated impacts of pile driving exposure, is not expected to impact reproduction or survivorship of any individuals.

As previously described, UMEs have been declared for both gray whales and ice seals, however, neither UME provides cause for concern regarding population-level impacts to any of these stocks. For gray whales, the estimated abundance of the Eastern North Pacific stock is 26,960 (Carretta *et al.*, 2019) and the stock abundance has increased approximately 22% in comparison with 2010/2011 population levels (Durban et al., 2017). For bearded seals, the minimum estimated mean M/SI (557) is well below the calculated partial PBR (8,210). This PBR is only a portion of that of the entire stock, as it does not included bearded seals that overwinter and breed in the Beaufort or Chukchi Seas (Muto *et al*., 2019). For the Alaska stock of ringed seals and the Alaska stock of spotted seals, the M/SI (863 and 329, respectively) is well below the PBR for each stock (5,100 and 12,697, respectively) (Muto *et al.*, 2019). No injury, serious injury, or mortality is expect or proposed for authorization, and Level B harassment takes of gray whale and ice seal species will be reduced to the level of least practicable adverse impact through the incorporation of the proposed mitigation measures. As such, the proposed Level B harassment takes of gray whales and ice seals would not exacerbate or compound upon the ongoing UMEs.

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 the species or stock through effects on annual rates of recruitment or survival:

- No mortality or serious injury or PTS is anticipated or authorized;
- The anticipated incidents of Level B harassment would consist of, at worst, temporary modifications in behavior that would not result in fitness impacts to individuals;
- The area impacted by the specified activity is very small relative to the overall habitat ranges of all species; and
- While impacts would occur within areas that are important for feeding, birthing, rearing, and migration for multiple stocks, because of the small footprint of the activity relative to the area of these important use areas, and the scope and nature of the anticipated impacts of pile driving exposure, we do not expect impacts to the reproduction or survival of any individuals.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the 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 above, only small numbers of incidental take 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. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

The number of instances of take for each species or stock proposed to be taken as a result of this project is included in Table 12. Our analysis shows that less than one-third of the best available population abundance estimate of each stock could be taken by harassment. The number of animals proposed to be taken for the Eastern North Pacific gray whale stock, Alaska minke whale stock, Beaufort Sea and Eastern Chuckchi Sea beluga whale stocks, Bering Sea harbor porpoise stock, and Alaska stocks of bearded, ringed, spotted and ribbon seals stocks discussed above would be considered small relative to the relevant stock's abundances even if each estimated taking occurred to a new individual, which is an unlikely scenario.

For beluga whale, the percentages in Table 12 also conservatively assume that all takes of beluga whale will be accrued to a single stock, when multiple stocks are known to occur in the project area. Additionally, we expect that most beluga whale takes will be of the same individuals, given that the calculated Level B harassment zone is an extremely small portion of each stock's overall range (Muto *et al.*, 2019a) and, therefore, the percentage of the stock taken is expected to be lower than that indicated in Table 12.

A lack of an accepted stock abundance value for the Alaska stock of minke whale did not allow for the calculation of an expected percentage of the population that would be affected. The most relevant estimate of partial stock abundance is 1,232 minke whales in coastal waters of the Alaska Peninsula and Aleutian Islands (Zerbini *et al.*, 2006). Given seven proposed takes by Level B harassment for the stock, comparison to the best estimate of stock abundance shows less than 1 percent of the stock is expected to be impacted.

For the Alaska stock of bearded seals, a lack of an accepted stock abundance value did not allow for the calculation of an expected percentage of the population that would be affected. As noted in the 2019 Draft Alaska SAR (Muto *et al.*, 2019), an abundance estimate is currently only available for the portion of bearded seals in the Bering Sea (Conn *et al.*, 2012). The current abundance estimate for the Bering Sea is 301,836 bearded seals. Given the proposed 1,199 Level B harassment takes for the stock, comparison to the Bering Sea estimate, which is only a portion of the Alaska Stock (also includes animals in the Chukchi and Beaufort Seas), shows less that, at most, less than one percent of the stock is expected to be impacted.

The Alaska stock of ringed seals also lack an accepted stock abundance value, and therefore, we were not able to calculate an expected percentage of the population that may be affected by Crowley's project. As noted in the 2019 Draft Alaska SAR (Muto *et al.*, 2019), the abundance estimate available, 171,418 animals, is only a partial estimate of the Bering Sea portion of the population (Conn *et al.*, 2014). As noted in the SAR, this estimate does not include animals in the shorefast ice zone, and the authors did not account for availability bias. Muto *et al*. (2019) expect that the Bering Sea portion of the population is actually much higher. Given the proposed 6,312 Level B harassment takes for the stock, comparison to the Bering Sea partial estimate, which is only a portion of the

Alaska Stock (also includes animals in the Chukchi and Beaufort Seas), shows less that, at most, less than 4 percent of the stock is expected to be impacted.

The expected take of the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock of killer whales, as a proportion of the population abundance, would be 58.8 percent if all takes were assumed to occur for unique individuals. However, it is unlikely that all takes would occur to unique individuals. The stock's SAR shows a distribution that does not extend north beyond the Bering Sea. Therefore, we expect that the individuals in the project area represent a small portion of the stock, and that it is likely that there will be multiple takes of a small number of individuals within the project area. As such, it is highly unlikely that more than one-third of the stock would be exposed to the construction noise.

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 will 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.

Bowhead whale are primarily targeted outside of the Sound, and the project is not expected to impact any prey species or migratory behavior. Beluga whales have been traditionally harvested in abundance at Sisualiq, and project impacts are not expected to reach traditional harvest areas. Additionally, project activities avoid traditional ice seal harvest windows. While some hunting continues throughout the summer, we do not anticipate that there would be impacts to seals that would make them unavailable for subsistence hunters. Additionally, Crowley will coordinate with local communities and subsistence groups to avoid or mitigate impacts to beluga whale and ice seal harvests, as noted in the **Proposed Mitigation** section.

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

Endangered Species Act (ESA)

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 the Alaska Region's Protected Resources Division Office.

NMFS is proposing to authorize take of bearded seal (Beringia DPS) and ringed seal (Arctic subspecies), which are listed under the ESA. The Permit and Conservation Division has requested initiation of Section 7 consultation with the Alaska Region 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 Crowley Fuels, LLC for conducting the Crowley Kotzebue Dock Upgrade Project in Kotzebue, Alaska beginning in June 2020, 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/permit/incidental-take-authorizations-under-marine-mammal-protection-act*.

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 project. In particular, we request comment on the marine mammal density and group size information used to inform the proposed take calculation. We also request at this time 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-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, or nearly identical, activities as described in the Specified Activities section of this notice is planned or (2) the activities as described in the Specified Activities 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 one 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 23, 2020.

Donna S. Wieting,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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