DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 217

[Docket No. 200709–0185]

RIN 0648–BH44

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Alaska Liquefied Natural Gas (LNG) Project in Cook Inlet

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

ACTION: Final rule.

SUMMARY: Upon application from the Alaska Gasline Development Corporation (AGDC), NMFS is issuing regulations under the Marine Mammal Protection Act (MMPA) for the taking of marine mammals incidental to the Alaska Liquefied Natural Gas (LNG) project in Cook Inlet, Alaska, over the course of five years (2020–2025). These regulations allow NMFS to issue a Letter of Authorization (LOA) for the incidental take of marine mammals during the specified construction activities carried out during the rule's period of effectiveness, set forth the permissible methods of taking, set forth other means of effecting the least practicable adverse impact on marine mammal species or stocks and their habitat, and set forth requirements pertaining to the monitoring and reporting of the incidental take.

DATES: Effective January 1, 2021 through December 31, 2025.

ADDRESSES: To obtain an electronic copy of the AGDC's LOA application or other referenced documents, visit the internet at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable.* In case of problems accessing these documents, please call the contact listed below (see **FOR FURTHER INFORMATION CONTACT**).

FOR FURTHER INFORMATION CONTACT: Shane Guan, Office of Protected Resources, NMFS, (301) 427–8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable.* In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Purpose and Need for Regulatory Action

This final rule establishes a framework under the authority of the MMPA (16 U.S.C. 1361 *et seq.*) to allow for the authorization of take of marine mammals incidental to the AGDC's construction activities of an LNG facility in Cook Inlet, Alaska.

We received an application from AGDC requesting five-year regulations and authorization to take multiple species of marine mammals. Take would occur by Level A and Level B harassment incidental to impact and vibratory pile driving and pipe laying. Please see ''Background'' below for definitions of harassment.

Legal Authority for the Proposed Action

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1371(a)(5)(A)) directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region for up to five years if, after notice and public comment, the agency makes certain findings and issues regulations that set forth permissible methods of taking pursuant to that activity and other means of effecting the ''least practicable adverse impact'' on the affected species or stocks and their habitat (see the discussion below in the Mitigation section), as well as monitoring and reporting requirements. Section 101(a)(5)(A) of the MMPA and the implementing regulations at 50 CFR part 216, subpart I, provide the legal basis for issuing this final rule containing five-year regulations, and for any subsequent letters of authorization (LOAs). As directed by this legal authority, this final rule contains mitigation, monitoring, and reporting requirements.

Summary of Major Provisions Within the Final Rule

Following is a summary of the major provisions of this final rule regarding AGDC's construction activities. These measures include:

- Required time/area closure for beluga whale during summer months in the western portion of the Cook Inlet;
- Required monitoring of the construction areas to detect the presence of marine mammals before beginning construction activities;
- Shutdown of construction activities under certain circumstances to avoid injury of marine mammals; and
- Soft start for impact pile driving to allow marine mammals the opportunity to leave the area prior to beginning impact pile driving at full power.

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 must 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 such 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 such takings are set forth.

NMFS has defined ''negligible impact'' in 50 CFR 216.103 as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

The MMPA states that the term ''take'' means to harass, hunt, capture, kill or attempt to harass, hunt, capture, or kill any marine mammal. Except with respect to certain activities not pertinent here, 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).

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 incidental harassment authorization) with respect to potential impacts on the human environment.

Accordingly, NMFS has adopted the Federal Energy Regulatory Commission's (FERC's) Final Environmental Impact Statement (FEIS). Our independent evaluation of the FEIS found that it includes the requisite information analyzing the effects on the human environment of issuing the Letter of Authorization (LOA). NMFS is a cooperating agency on the FERC's FEIS.

The FERC's EIS is available at *https://www.ferc.gov/industries/gas/enviro/eis/2020/03-06-20-FEIS.asp.*

Summary of Request

On April 18, 2017, NMFS received a request from AGDC for a LOA to take marine mammals incidental to constructing LNG facilities in Cook Inlet. The application was deemed adequate and complete on March 14, 2018. AGDC's request is for takes of a small number of five species of marine mammals by Level B harassment. On April 11, 2018, NMFS published a Notice of Receipt announcing the receipt of AGDC's LOA application (83 FR 15556). Further analysis by NMFS concludes that potential effects to marine mammals from AGDC's activity could result in Level A harassment. Neither AGDC nor NMFS expects serious injury or mortality to result from this activity. However, since AGDC's LNG facility construction activities are expected to last for five years, an LOA is appropriate. On June 28, 2019, NMFS published a proposed rule (84 FR 30991; June 28, 2019) and proposed regulations to govern takes of marine mammals incidental to AGDC's LNG facility construction and requested comments on the proposed regulations. After the public comment period, NMFS further worked with AGDC to address the public comments, which included the addition of monitoring and mitigation measures. On February 17, 2020, AGDC submitted a revised LOA application that includes these additional monitoring and mitigation measures.

Description of Proposed Activity

Overview

AGDC proposes to construct facilities to transport and offload LNG in Cook Inlet, AK, for export. The Project activities include:

- Construction of the proposed Marine Terminal in Cook Inlet, including construction of a temporary Marine Terminal Material Offloading Facility (Marine Terminal MOF) and a permanent Product Loading Facility (PLF);
- Construction of the Mainline (main pipeline) across Cook Inlet, including the potential construction of a temporary Mainline Material Offloading Facility (Mainline MOF) on the west side of Cook Inlet; and

Components of proposed construction activities in Cook Inlet that have the potential to expose marine mammals to received acoustic levels that could result in take include:

- Vibratory and impact pile driving associated with Marine Terminal MOF and PLF construction; and
- Anchor handling associated with pipe laying across the Cook Inlet.

There is no change in the AGDC's proposed LNG facilities construction from what was described in the proposed rule (84 FR 30991; June 28, 2019).

Dates and Duration

AGDC plans to start the Alaska LNG facilities construction on April 1, 2021, and complete it by the end of October 31, 2025. Construction activities would be divided into phases, with all construction occurring between April 1 and October 31 each year from 2021 to 2025. During the construction season, crews will be working 12 hours per day, 6 days per week.

Specific Geographic Region

The Alaska LNG facilities, which include a Marine Terminal and the Mainline crossing, will be constructed in Cook Inlet. The Marine Terminal would be constructed adjacent to the proposed onshore LNG Plant near Nikiski, Alaska.

In addition, a Mainline Material Offloading Facility (Mainline MOF) may be constructed on the west side of Cook Inlet to support installation of the Cook Inlet shoreline crossing and onshore construction between the Beluga Landing shoreline crossing and the Yentna River. The Mainline MOF would be located near the existing Beluga Landing.

A map of the Alaska LNG facilities action area is provided in Figure 1 below and is also available in Figures 2 to 4 in the LOA application.

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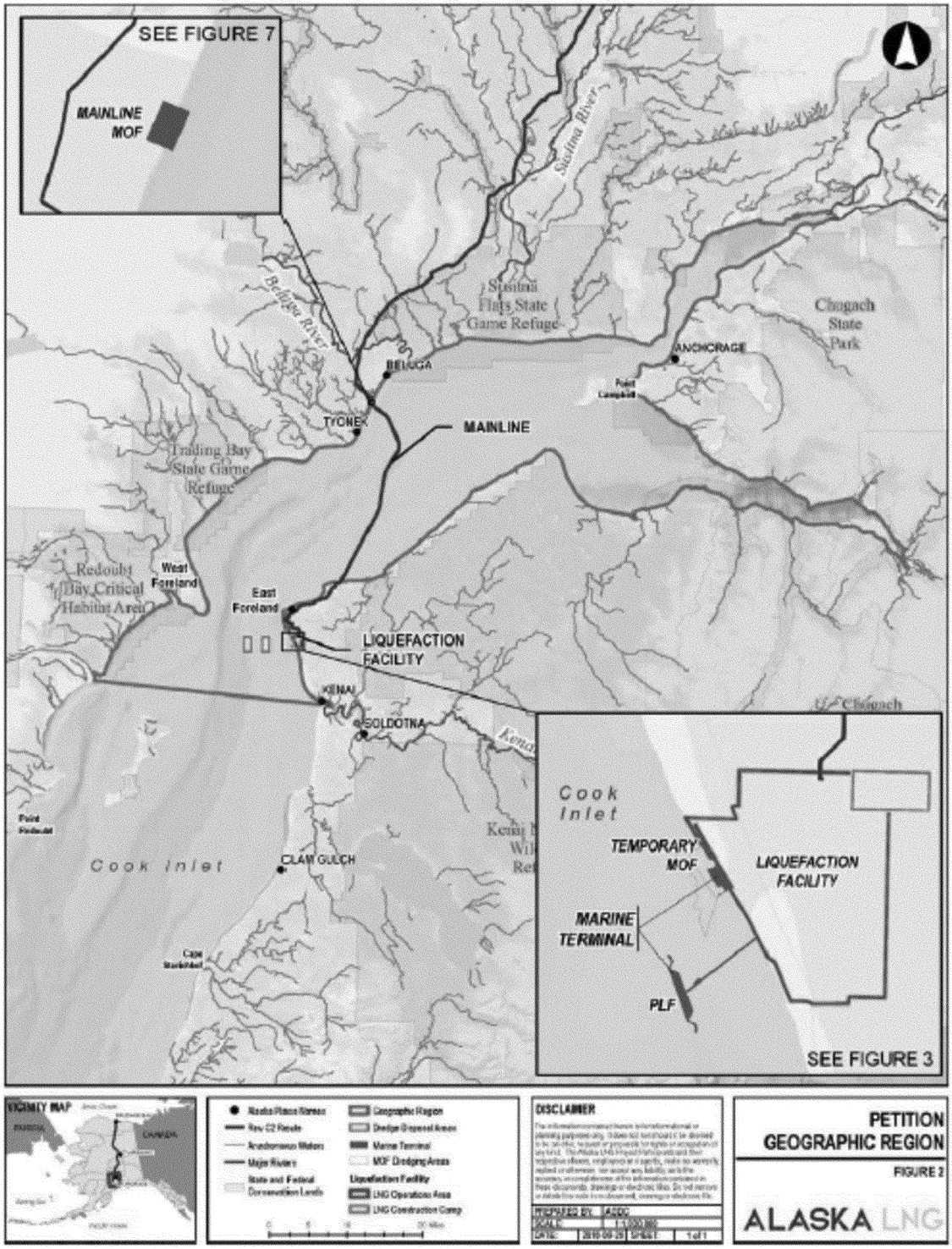

Figure 1. Geographic area of the proposed Alaska LNG facilities (AGDC, 2018) (see AGDC's LOA application for color legends).

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Detailed Description of Specific Activity

The construction of the Alaska LNG facilities includes the construction of a product loading facility, marine terminal material offloading facility, a mainline material offloading facility, and the Mainline crossing of Cook Inlet. For all construction activities, each season extends from April 1 through October 31, during which construction crews would be working 12 hours per day, six days per week.

The following provides a detailed description of the Alaska LNG facilities to be constructed.

Product Loading Facility (PLF)

The proposed PLF would be a permanent facility used to load LNG carriers (LNGCs) for export. It consists of two loading platforms, two berths, a Marine Operations Platform, and an access trestle that supports the piping that delivers LNG from shore to LNGCs and includes all the equipment to dock LNGCs. Analyzed elements of the PLF are shown in Figures 3 and 4 of the LOA application, and are described as follows.

- PLF Loading Platforms—Two loading platforms, one located at either end of the north-south portion of the trestle, would support the loading arm package, a gangway, supporting piping, cabling, and equipment. The platforms would be supported above the seafloor on steel-jacketed structures called quadropods;
- PLF Berths—Two berths would be located in natural water depths greater than—53 feet (ft) mean lower low water (MLLW) and would be approximately 1,600 feet apart at opposite ends of the north-south portion of the trestle. Each berth would have four concrete pre-cast breasting dolphins and six concrete pre-cast mooring dolphins. The mooring and breasting dolphins would be used to secure vessels alongside the berth for cargo loading operations. The mooring and breasting dolphins would be supported over the seabed on quadropods. A catwalk, supported on two-pile bents, would connect the mooring dolphins to the loading platforms;
- Marine Operations Platform—A Marine Operations Platform would be located along the east-west portion of the access trestle (Figure 4 of the LOA application) and would support the proposed Marine Terminal Building, an electrical substation, piping, cabling, and other equipment used to monitor the loading operations. The platform would be supported above the seafloor on four-pile bents; and
- Access Trestle—This structure is T-shaped with a long east-west oriented section and a shorter north-south oriented section and carries pipe rack, roadway, and walkway. The pipe rack contains LNG loading system pipelines, a fire water pipeline, utility lines, power and instrument cables, and lighting. The east-west portion of the trestle extends from shore, seaward, for a distance of approximately 3,650 feet and would be supported on three-pile and four-pile bents at 120-foot intervals. The north-south oriented portion of the access trestle is approximately 1,560 feet long, and is supported on five-pile quadropods.

The PLF would be constructed using both overhead and marine construction methods. As planned, the PLF would be constructed over the course of four ice-free seasons (Seasons 2–5); however, Season 2 activities associated with PLF construction include only installation of onshore portions of the PLF and are not included in the analysis. Activities in Seasons 3 through 5 are described below.

In Season 3, the marine construction activities would be mobilized and the cantilever bridge would be commissioned. A total of 35 bents and quadropod structures would be installed for part of the east-west and north-south access trestles and berth loading platforms.

In Season 4, the remainder of the bents for the east-west access trestle would be installed. Additionally, bents supporting the Marine Operations Platform and north-south trestle would be installed. A total of 26 bent and quadropod structures would be installed.

In Season 5, installation of the mooring quadropods would be completed, and the bents supporting the catwalk between the loadout platforms and the mooring dolphins would be installed. A total of 18 bent and quadropod structures would be installed.

PLF bents and quadropods are expected to be installed with impact hammers. The anticipated production rate for installation of the bents is one bent per six construction days, and for quadropods it is one quadropod per eight work days. Pile driving is expected to occur during only two of the six days for bents and two of the eight days for quadropods. It is also assumed the impact hammer would only be operated approximately 25 percent of time during the two days of pile driving.

Marine Terminal Material Offloading Facility (Marine Terminal MOF)

The proposed Marine Terminal MOF, to be located near the PLF in Nikiski, would consist of three berths and a quay that would be used during construction of the Liquefaction Facility to enable direct deliveries of equipment modules, bulk materials, construction equipment, and other cargo to minimize the transport of large and heavy loads over road infrastructure.

The Marine Terminal MOF quay would be approximately 1,050 feet long and 600 feet wide, which would provide sufficient space for cargo discharge operations and accommodate 200,000 square feet of staging area. It would have a general dock elevation of +32 feet MLLW.

The quay would have an outer wall consisting of combi-wall (combination of sheet piles and pipe piles) tied back to a sheet pile anchor wall, and 11 sheet pile coffer cells, backfilled with granular materials.

Berths at the Marine Terminal MOF would include:

- One Lift-on/Lift-off (Lo-Lo) berth with a maintained depth alongside of −32 feet MLLW;
- One Roll-on/Roll-off (Ro-Ro) berth with a maintained depth alongside of −32 feet MLLW; and
- One grounded barge bed with a ground pad elevation of +10 feet MLLW.

The Temporary MOF has been designed as a temporary facility and would be removed early in operations when it is no longer needed to support construction of the Liquefaction Facility.

The Temporary MOF would be constructed over the course of two construction seasons (Seasons 1 and 2).

The combi-wall and the first six of eleven coffer cells would be installed in Season 1. An equal amount of sheet pile anchor wall would be associated with the combi-wall, but this is not considered in the analysis as the anchor wall would be driven into fill and would not generate substantial underwater sound. Six 24-inch template pipe piles would be installed with a vibratory hammer before the sheet pile is installed for each coffer cell and then removed when coffer cell installation is complete. The remaining five coffer cells and fill would be installed in Season 2, along with the quadropods for the dolphins for the Ro-Ro berth.

The Marine Terminal MOF would be constructed using both land-based (from shore and subsequently from constructed portions of the Marine Terminal MOF) and marine construction methods. The anticipated production rate for installation of combi-wall and coffer cells is 25 linear feet per day per crew, with two crews operating, and vibratory hammers operating 40 percent of each 12-hour construction day. The anticipated production rate for quadropod installation is the same as described in Section 1, above.

Dredging would be conducted over two ice free seasons. Dredging at the Marine Terminal MOF during the first season of marine construction may be conducted with either an excavator or clamshell (both mechanical dredges). Various bucket sizes may be used. Sediment removed would be placed in split hull or scow/hopper barges tended

by tugs that would transport the material to the location of dredge material placement.

Dredging at the Marine Terminal MOF during the second season may be conducted with either a hydraulic (cutter head) dredger or a mechanical dredger. For a hydraulic dredger, the dredged material would be pumped from the dredge area to the disposal location or pumped into split-hull barges for transport to the placement location. If split-hull barges are used rather than direct piping of material, a manifold system may be set up to load multiple barges simultaneously. For a mechanical dredger, two or more sets of equipment would likely be required to achieve total dredging production to meet the Project schedule. Personnel transfer, support equipment, and supply would be similar to the first season. However, due to the low activity level and source levels from dredging, we do not consider there would be take of marine mammals. Therefore, dredging is not further analyzed in this document.

Mainline Material Offloading Facility (Mainline MOF)

A Mainline MOF may be required on the west side of Cook Inlet to support installation of the Cook Inlet shoreline crossing, and onshore construction between the South of Beluga Landing shoreline crossing and the Yentna River. The Mainline MOF would be located near, but at a reasonable distance, from the existing Beluga Landing. Use of the existing landing is not considered to be feasible.

The Mainline MOF would consist of a quay, space for tugs, and berths including:

- Lo-Lo Berth for unloading pipes and construction materials;
- Ro-Ro Berth and ramp dedicated to Ro-Ro operations; and
- Fuel berth dedicated to unloading fuel.

The quay would be 450 feet long (along the shoreline) and 310 feet wide (extending into the Cook Inlet). A Ro-Ro ramp (approximately 80 feet by 120 feet) would be constructed adjacent to the quay. Both the quay and the Ro-Ro ramp would consist of anchored sheet pile walls backed by granular fill. The sources for the granular material would be onshore. Surfacing on the quay would be crushed rock. Some fill material for the quay and Ro-Ro ramp are expected to be generated by excavation of the access road. Any additional needed fill materials and crushed rock for surfacing would be barged in.

The quay and the Ro-Ro ramp are located within the 0-foot contour, so berths would be practically dry at low tide. No dredging is planned; vessels would access the berths and ground themselves during high tide cycles. The proposed top level of the Mainline MOF is +36 feet MLLW, which is about 11 feet above Mean Higher High Water (MHHW).

Approximately 1,270 feet of sheet pile would be installed for construction of the quay and Ro-Ro ramp, and a corresponding length of sheet pile would be installed as anchor wall; however, only 670 feet of sheet pile would be installed in the waters of Cook Inlet. The remainder would be installed as anchor wall in fill material, or in the intertidal area when the tide is out, and would not result in underwater sound.

The Mainline MOF would be constructed in a single construction season (Season 1). A break-down of activities per season is provided below. Crews are expected to work 12 hours per day, six days per week. The sheet pile would be installed using marine equipment, with the first 50 percent of embedment conducted using a vibratory hammer and the remaining 50 percent conducted using an impact hammer. Hammers would be expected to be operated either 25 percent of a 12-hour construction day (impact hammer) or 40 percent of a 12-hour construction day (vibratory hammer).

Mainline Crossing of Cook Inlet

The proposed Mainline, a 42-inch-diameter, natural gas pipeline, would cross the Cook Inlet shoreline on the west side of the inlet (north landfall) south of Beluga Landing at pipeline milepost (MP) 766.3, traverse Cook Inlet in a generally southward direction for approximately 26.7 miles, and cross the east Cook Inlet shoreline near Suneva Lake at MP 793.1 (south landfall). The pipe would be trenched into the seafloor and buried from the shoreline out to a water depth of approximately 35–45 feet MLLW on both sides of the inlet, approximately 8,800 feet from the north landfall and 6,600 feet from the south landfall. Burial depth (depth of top of pipe below the seafloor) in these areas would be 3–6 feet. Seaward of these sections, the concrete coated pipeline would be placed on the seafloor. Additional footprint would be impacted by the use of anchors to hold the pipelay vessel in place while installing the pipeline on the seafloor.

Geophysical surveys would be conducted just prior to pipeline construction. A detailed bathymetric profile (longitudinal and cross) would be conducted. Types of geophysical equipment expected to be used for the surveys could include:

- Single-beam echosounder planned for use during this program operate at frequencies greater than 200 kilohertz (kHz);
- Multi-beam echo sounders planned for this program operate at frequencies greater than 200 kHz;
- Side-scan sonar system planned for use during this program operate at a frequency of 400 and 900 kHz; and
- Magnetometer. These instruments do not emit sound.

Operation of geophysical equipment such as echosounders and side-scan sonars at frequencies greater than 200 kHz are not considered to result in takes of marine mammals due to the extremely high frequencies emitted that are above the range of marine mammals' hearing thresholds. Magnetometers do not emit underwater sound. Therefore, geophysical surveys are not evaluated further in this document.

The pipeline would be trenched and buried in the nearshore portions of the route across the Cook Inlet.

The nearshore portion of the trench is expected to be constructed using amphibious or barge-based excavators. This portion of the trench would extend from the shoreline out to a transition water depth where a dredge vessel can be employed. On the west side of the inlet (Beluga Landing) this is expected to be from the shore out 655 feet, and on the east side (Suneva Lake) from the shoreline out 645 feet. The trench basis is to excavate a mustow slope trench that would not retain sediments (*i.e.,* a self-cleaning trench). A backhoe dredge may also be required to work in this portion of the crossing.

From the transition water depth to water depths of the –35 feet or –45 feet MLLW, a trailing suction hopper dredger would be used to excavate a trench for the pipeline. Alternative burial techniques, such as plowing, backhoe dredging, or clamshell dredging, would be considered if conditions become problematic for the dredger. After installation of the nearshore pipelines, a jet sled or mechanical burial sled could be used to achieve post dredge burial depths.

Pipeline joints would be welded together onshore in 1,000-foot-long strings and laid on the ground surface in an orientation that approximates the offshore alignment. A pipe pull barge would be anchored offshore near the seaward end of the trench, and would then be used to pull the pipe strings from their onshore position, out into the trench.

Following pipeline installation, the trench is expected to backfill naturally through the movement of seafloor sediments. If manual backfilling is

required, the backfill would be placed by reversing the flow of the trailing suction hopper dredger used offshore (see below) or mechanically with the use of excavators.

Seaward of the trenched sections, the pipeline would be laid on the seafloor across Cook Inlet using conventional pipelay vessel methods. The pipelay vessel would likely employ 12 anchors to keep it positioned during pipe laying and provide resistance as it is winched ahead 80 feet each time an additional 80-foot section of pipe is added/welded on the pipe string. Dynamic positioning may be used in addition to the conventional mooring system. Mid-line buoys may be used on the anchor chains when crossing other subsea infrastructure (*i.e.,* pipelines and cables). A pipe laying rate of 2,000 to 2,500 feet per 24-hour period is expected. It is anticipated that three anchor handling attendant tugs would be used to repeatedly reposition the anchors, thereby maintaining proper position and permitting forward movement. The primary underwater sound sources of concern would be from the anchor handling tugs (AHTs) during the anchor handling for the pipelay vessel.

The pipeline crossing of Cook Inlet would be installed in two consecutive construction seasons (Seasons 3 and 4). Work from the pipelay vessel and pull barge would be conducted 24 hours per day, seven days per week, until the work planned for that season is completed. Anchor handling durations were estimated differently for the two construction seasons. Anchor handling is expected to be conducted 25 percent of the time that the pull barge is on site in Season 3. The estimate for anchor handling duration in Season 4 was based on the proposed route length, the total numbers of individual anchors moves, and the estimated time required to retrieve and reset each anchor (approximately 30 minutes per anchor to retrieve and reset). A break-down of activities per season is provided below.

Activities in Season 3 in include:

- Conduct onshore enabling works including establishing winch/laydown and welding area, and excavation of a trench through onshore sections of the shore approach (open cut the shoreline).
- Excavate trench in very nearshore waters using land and amphibious excavation equipment.
- Conduct pre-lay excavation of the pipe trench out to depths of –35 to –45 feet MLLW using various subsea excavation methods.
- Install the pipe in the nearshore trenches using a pull barge.

Anchor handling would occur for approximately six (5.75 days) 24-hour periods in Season 3.

Activities in Season 4 include:

- Lay unburied offshore section of Mainline across Cook Inlet using conventional pipelay vessel. The Applicant estimates that anchor handling would occur over 13 24-hour periods in Season 4.
- Tie-in the offshore section to the buried nearshore sections on both sides of the Cook Inlet.
- Flood, hydrotest, and dry the Mainline pipeline with Cook Inlet.

A summary of pile driving activities for the entire Alaska LNG facilities construction, breaking down by seasons and project elements, is provided in Table 1.

TABLE 1—IN-WATER PILE DRIVING ASSOCIATED WITH ALASKA LNG FACILITIES CONSTRUCTION

Element	Driving method	Pile type & size	Pile number or length	Number strikes/hr (impact only)	Hours pile driving/day	Number days	Total piling hours
Season 1:							
Marine Terminal MOF combi wall.	Vibratory	60-in steel pipe.	35	NA	11	11	120
Marine Terminal MOF combi wall.	Vibratory	Sheet pile	1075 ft	NA	11	11	120
Marine Terminal MOF cell.	Vibratory	18-in steel pipe.	36	NA	11	28	288
Marine Terminal MOF cell.	Vibratory	Sheet pile	2454 ft	NA	9.5	28	264
Season 2:							
Marine Terminal MOF cell.	Vibratory	18-in steel pipe.	30	NA	10	27	264
Marine Terminal MOF cell.	Vibratory	Sheet pile	2447 ft	NA	10	27	264
Marine Terminal MOF Ro-Ro dolphin quads.	Impact	24-in steel pipe.	7	1560	7	7	48
Marine Terminal MOF Ro-Ro dolphin quads.	Impact	48-in steel pipe.	28	1560	7	7	48
Mainline MOF	Vibratory	Sheet pile	670 ft	NA	10.5	7	72
Mainline MOF	Impact	Sheet pile	670 ft	1560	7	7	48
Season 3:							
Berth 1	Impact	48-in steel pipe.	20	1560	6	8	48
Berth 2	Impact	48-in steel pipe.	20	1560	6	8	48
N–S access trestle	Impact	48-in steel pipe.	40	1560	6	16	96
E–W access trestle	Impact	60-in steel pipe.	33	1560	6.6	22	144
E–W access trestle	Impact	60-in steel pipe.	40	1560	6	20	120
Season 4:							
Breasting dolphin berths 1 & 2.	Impact	Steel pipe 48-in.	8	1560	6	4	24

TABLE 1—IN-WATER PILE DRIVING ASSOCIATED WITH ALASKA LNG FACILITIES CONSTRUCTION—Continued

Element	Driving method	Pile type & size	Pile number or length	Number strikes/hr (impact only)	Hours pile driving/day	Number days	Total piling hours
Breasting dolphin berths 1 & 2.	Impact	60-in steel pipe.	32	1560	6	12	72
Mooring dolphin	Impact	48-in steel pipe.	2	1560	12	2	24
Mooring dolphin	Impact	60-in steel pipe.	8	1560	12	2	24
N–S access trestle	Impact	48-in steel pipe.	30	1560	6	12	72
E–W access trestle	Impact	60-in steel pipe.	28	1560	7	14	96
Operation platform	Impact	60-in steel pipe.	12	1560	8	6	48
Season 5:							
Mooring dolphin	Impact	48-in steel pipe.	10	1560	8	6	48
Mooring dolphin	Impact	60-in steel pipe.	40	1560	7	14	96
Catwalk	Impact	60-in steel pipe.	8	1560	6	16	96

A summary of anchor handling activities associated to mooring, trenching, and pipe laying are provided in Table 2.

TABLE 2—DURATION OF ANCHOR HANDLING ASSOCIATED WITH ALASKA LNG FACILITIES PROJECT

Season	Activity	Hours/day	Days
3	Mooring	6.00	9
3	Pipe trenching	6.00	14
4	Pipeline days at a rate of 2,500 feet per day	6.00	53

Comments and Responses

NMFS published a Proposed Rule in the **Federal Register** on June 28, 2019 (84 FR 30991). During the 30-day public comment period on the Proposed Rule, NMFS received comments from the Marine Mammal Commission (Commission), Center for Biological Diversity (CBD), Cook Inletkeeper, Friends of Animals (FoA), Environmental Investigation Agency (EIA), Defenders of Wildlife (DoF), and an anonymous person. All relevant comments and responses are provided below.

Comment 1: The Commission, CBD, Cook Inletkeeper, DoW, and EIA state that they are concerned about the potential cumulative impacts of human activities on the endangered Cook Inlet beluga whale population. The Commission in particular recommends that NMFS defer issuance of a final rule to AGDC or any other applicant proposing to conduct sound-producing activities in Cook Inlet until it has a reasonable basis for determining that authorizing any additional incidental harassment takes of Cook Inlet beluga whales would not contribute to or exacerbate the stock's decline. CBD, Cook Inletkeeper, FoA, and the anonymous person request that NMFS deny AGDC's request for an MMPA incidental take authorization.

Response: In accordance with our implementing regulations at 50 CFR 216.104(c), we use the best available scientific evidence to determine whether the taking by the specified activity within the specified geographic region will have a negligible impact on the species or stock and will not have an unmitigable adverse impact on the availability of such species or stock for subsistence uses. Based on the scientific evidence available, which includes the inclusion of updated density estimates for Cook Inlet beluga whales as well as consideration of the revised abundance estimates (NMFS 2020), NMFS determined that the impacts of the AGDC LNG facility construction activities, which are primarily acoustic in nature, would meet these standards.

In addition, NMFS worked with AGDC and developed a suite of rigorous monitoring and mitigation measures to reduce impacts to Cook Inlet beluga whales and other marine mammals to the lowest level practicable. Some of the major measures that were put in place after the Proposed Rule was published include: (1) Time/area restriction to minimize underwater noise input in the Susitna River delta during summer months (to reduce impacts to belugas during important foraging behaviors) by prohibiting in-water pile driving in west Cook Inlet; (2) requiring AGDC to implement shutdown measures for beluga whales to prevent Level B harassment, shutdown measures for humpback whales and killer whales to prevent Level A harassment, and a 1,000-m exclusion zone for harbor porpoises and harbor seals to reduce Level A harassment; and (3) requiring AGDC to test the effectiveness of air bubble curtains around in-water pile driving. If the results of passive acoustic monitoring show that the air bubble curtain can reduce the source level by 2-dB or greater for a specific type of pile, AGDC will be required to deploy the air bubble curtain system for the driving of such piles. These additional mitigation measures are expected to further reduce both the number and severity of marine mammal takes, particular the Cook Inlet beluga whale, in the AGDC LNG facility construction area. NMFS included these additional mitigation measures after working with AGDC and determined that they are

practicable to further reduce potential impacts to Cook Inlet beluga whales.

Our analysis indicates that issuance of these regulations will not contribute to or worsen the observed decline of the Cook Inlet beluga whale population. Additionally, the ESA Biological Opinion determined that the issuance of regulations is not likely to jeopardize the continued existence of the Cook Inlet beluga whales or destroy or adversely modify Cook Inlet beluga whale critical habitat. The Biological Opinion also outlined Terms and Conditions and Reasonable and Prudent Measures to reduce impacts, which have been incorporated into the rule. Therefore, based on the analysis of potential effects, the parameters of the activity, and the rigorous mitigation and monitoring program, NMFS determined that the activity would have a negligible impact on the population.

Moreover, the LNG facility construction activity would take only small numbers of marine mammals relative to their population sizes. As described in the proposed rule notice, NMFS used a method that incorporates density of marine mammals overlaid with the anticipated ensonified area to calculate an estimated number of takes for belugas, which was estimated to be less than 10% of the stock abundance. The refined analysis using a 1 km by 1 km grid of Cook Inlet beluga whale density later showed that the estimated take would be even smaller (see detailed discussion in Estimated Take section below), at less than 5% of the population for any given year, which NMFS considers small. Based on all of this information, NMFS determined that the number of beluga whales likely to be taken is small.

Comment 2: The Commission recommends that NMFS ensure that AGDC's draft environmental impact statement (EIS) addresses the cumulative impacts of AGDC's proposed activities and all other sound-producing activities on beluga whales, as well as other marine mammals. CBD, Cook Inletkeeper, and EIA also comment that NMFS did not provide adequate analysis for how it arrived at its take estimates and negligible impact finding, and that NMFS did not look into the ongoing and cumulative impacts of the proposed activities combined with other foreseeable activities in Cook Inlet.

Response: Both the statute and the agency's implementing regulations call for analysis of the effects of the applicant's activities on the affected species and stocks, not analysis of other unrelated activities and their impacts on the species and stocks. That does not mean, however, that effects on the species and stocks caused by other non-AGDC activities are ignored. The preamble for NMFS' implementing regulations under section 101(a)(5) (54 FR 40338; September 29, 1989) explains in response to comments that the impacts from other past and ongoing anthropogenic activities are to be incorporated into the negligible impact analysis via their impacts on the environmental baseline. Consistent with that direction, NMFS has factored into its negligible impact analyses the impacts of other past and ongoing anthropogenic activities via their impacts on the baseline (*e.g.,* as reflected in the density/distribution and status of the species, population size and growth rate, and other relevant stressors). See the Analysis and Negligible Impact Determination section of this rule.

Regarding the analysis supporting the take estimates and the negligible impact finding, for the assessments of potential impacts to Cook Inlet beluga whales and other marine mammals in the vicinity of AGDC's LNG facilities construction area, NMFS evaluated the noise sources as well as other stressors produced by the construction activities. We analyzed the noise source types, source levels, and the duration of noise-producing activities, as well as the expanses of ensonified areas in different seasons, to estimate the number of marine mammals that would be exposed to noise levels that could result in takes—both in the forms of Level A harassment and Level B harassment. In addition, NMFS analyzed the likely impacts of those takes on individual marine mammals and the impact on their habitat, including marine mammal prey species and the Cook Inlet beluga whale critical habitat, to support the determination that the authorized takes will result in a negligible impact to the affected species and stocks. These analyses were detailed in the Potential Effects of Specified Activities on Marine Mammals and Their Habitat and Estimated Takes by Incidental Harassment sections in the proposed rule (84 FR 39931; June 18, 2019).

Our 1989 final rule for the MMPA implementing regulations also addressed public comments regarding cumulative effects from future, unrelated activities. There we stated that such effects are not considered in making findings under section 101(a)(5) concerning negligible impact. We indicated that NMFS would consider cumulative effects that are reasonably foreseeable when preparing a NEPA analysis and also that reasonably foreseeable cumulative effects would be considered under section 7 of the ESA for ESA-listed species. Accordingly, detailed analysis of the cumulative impacts of the proposed activities combined with other foreseeable activities (including sound-producing activities) in Cook Inlet is provided in FERC's FEIS and, further, the reasonably foreseeable cumulative effects on listed species are considered in NMFS biological opinion.

Comment 3: The Commission also recommends that NMFS establish annual limits on the total number and types of takes that are authorized for all sound-producing activities in Cook Inlet before issuing the final rule. FoA states that the proposed project would have more than a negligible impact when analyzed in combination with other authorizations.

Response: As mentioned above, under the MMPA NMFS is required to make our required determinations for the specified activity and, therefore, establishing limits on the total number of takes authorized across multiple actions is inappropriate. Further, setting limits on the number and types of takes across all projects is also unnecessary in the context of the consideration of AGDC's activity. There are few incidental takes of Cook Inlet beluga whales currently authorized under the MMPA in Cook Inlet, and the projects for which takes are authorized are separated spatially and temporally. NMFS considered the effects of potential overlap in projects and the effects of sources other than those authorized for incidental take on Cook Inlet beluga whales in the Cumulative Effects section of the FERC's Final EIS. The analysis concludes that the issuance of an authorization to AGDC for the proposed LNG facility construction in Cook Inlet would not have significant impacts to Cook Inlet beluga whale and other marine mammals in the study area, provided that prescribed monitoring and mitigation measures are implemented.

Comment 4: The Commission recommends that NMFS require AGDC to submit a stakeholder engagement plan that includes stakeholders contacted (or to be contacted), a summary of input received, a schedule for ongoing community engagement, and measures that would be implemented to mitigate any potential conflicts with subsistence hunting.

Response: NMFS worked with AGDC to ensure that AGDC engages with stakeholders throughout the project area, including Cook Inlet, including submission of a Stakeholder Engagement Plan (Plan). AGDC provided the Plan to NMFS in April 2020, which includes a list of

stakeholders to be further contacted, and implementation of the Plan through communication. The Plan provides a detailed analysis of subsistence use of marine mammals in the Cook Inlet area, which indicates that Cook Inlet does not have as strong of a subsistence hunting community. Nevertheless, AGDC stated in the Plan that it will actively involve subsistence communities in the process, hearing concerns, and responding to issues. No concerns were raised by subsistence users through this process. Through the Stakeholder Engagement Plan, AGDC would implement measures to keep subsistence users in the Cook Inlet region informed of its project activities.

Comment 5: The Commission states that the estimated mean density of beluga whales of 0.000158 animals/km^2 near the temporary MOF appears to be an underestimate when compared to densities used by other recent applicants to estimate takes associated with activities in similar areas of Cook Inlet. The Commission further states that density estimates for beluga whales in Cook Inlet are typically derived from a habitat model developed by Goetz *et al.* (2012), which generated density for each 1-square-km cell of Cook Inlet. The Commission recommends that NMFS ensure consistency in density estimates used by applicants for beluga whales in Cook Inlet and update relevant habitat density models as new information becomes available.

Response: Density estimates for beluga in Cook Inlet in the Proposed Rule did use a habitat based model developed by Goetz *et al.* (2012). The analysis separated the data into upper, middle, and lower Cook Inlet; and the Goetz model is provided in GIS so that a specific density can be selected for a specific location. AGDC used the highest density estimate for each project location, which in all cases was the Goetz model for the specific area.

After the Proposed Rule was published, AGDC conducted additional analyses using Goetz *et al.* (2012) modeled aerial survey data collected by NMFS between 1993 and 2008 and developed beluga whale summer densities for each 1-square-kilometer cell of Cook Inlet. To develop a density estimate associated with Project components, the GIS files of the predicted ensonified area for both Level A and Level B harassment associated with each location and pile type, size, and hammer was overlain with the GIS file of the 1-square-kilometer beluga density cells. The cells falling within each ensonified area were provided in an output spreadsheet, and an average cell density for each Project component was calculated. This level of detailed analysis shows that average beluga whale density near the temporary MOF is 0.00005 animal/km^2.

Regarding the Commission's recommendation that NMFS ensure consistency across authorization, while we agree that the best available science should consistently be used to support density estimates for all projects, we disagree that this means the identical density estimate must necessarily be used for all projects. Density estimates themselves may appropriately vary to best inform activities conducted at varied temporal and spatial scales.

Comment 6: For harbor seal take estimates, the Commission recommends that NMFS use the haul-out correction factor of 2.33 from Boveng *et al.* (2012) to revise the yearly abundance estimates and resulting density estimates and recalculate the number of takes accordingly. The Commission also recommends that NMFS use the gray whale and harbor porpoise densities specified in Table 9 of the Hilcorp Final Rule (84 FR 37481; July 31, 2019) and recalculate the numbers of takes accordingly. The Commission further recommends that NMFS (1) consult with researchers at the Alaska Fisheries Science Center that specialize in both cetacean and pinniped density derivation to ensure it is compiling, enumerating, and analyzing the aerial sightings data and estimating the various marine mammal densities correctly and (2) use marine mammal densities consistently for all future incidental take authorizations in Cook Inlet.

Response: NMFS consulted with researchers at the Alaska Fisheries Science Center and revised the yearly abundance estimates and resulting density estimates and recalculated the number of takes of harbor seals and harbor porpoises as suggested by the Commission (pers. comm.; J. London; April 16, 2020). The revised abundance and density estimates are used in take calculation described in the Estimated Take section.

The gray whale was not originally included in the AGDC LOA application, as it was added by NMFS in the Proposed Rule. Further analysis (see Description of Marine Mammals in the Area of Specified Activities section) led us to conclude that takes of gray whale are highly unlikely in upper Cook Inlet where AGDC's construction activity is located. Therefore, this species is not included in the analysis for the final rule.

NMFS addressed the comment about density estimation consistency in our response to the previous comment.

Comment 7: The Commission states that animal modeling that considers various operational and animal scenarios is the best way to determine the appropriate accumulation time to assess acoustic impacts. The Commission recommends that NMFS continue to make a priority to address the modeling issue to resolve in the near future and consider incorporating animal modeling into its user spreadsheet for acoustic impact assessment.

Response: NMFS has formed a working group to explore and develop such a model-based approach as discussed in the comment.

Comment 8: The Commission, CBD, and Cook Inletkeeper point out that AGDC's method for estimating days of pile driving activities, which sums fractions of days in which activities occur to generate the total number of days for each proposed activity, is inconsistent with NMFS' policy for enumerating takes for construction activities in general and underestimated the numbers of days of pile driving activity and Level A and Level B takes. The Commission recommends that NMFS revise the numbers of Level A and Level B harassment takes for all marine mammal species to reflect the actual number of days that impact and vibratory pile driving will occur, regardless of the duration of those activities on a given day.

Response: NMFS worked with AGDC to better characterize the activity and quantify the days of pile driving. Given that the precise number of piles to be installed or removed is generally unknown, the actual number of pile driving days is used in the revised take calculation to calculate potential takes, as recommended.

Comment 9: The Commission recommends that NMFS refrain from authorizing Level A harassment takes for species in which the proposed activities are not likely to result in Level A harassment takes during vibratory pile and sheet pile driving, which includes harbor porpoises, Dall's porpoises, Steller sea lions, and California sea lions.

Response: NMFS worked with AGDC and evaluated the potential impact to marine mammal species in the project area and reassessed the likelihood of the species' presence. Based on the reassessment, NMFS determined that it is highly unlikely that AGDC's proposed construction activities would result in Level A harassment of Dall's porpoise, Steller sea lion, or California sea lion in the project area, due to extra-limital distribution of these species. However, presence of harbor porpoise has been

confirmed near the AGDC's project location. In addition, the relatively large Level A harassment zone for high-frequency cetaceans and the difficulty of detection harbor porpoise in the field make it challenging to implement shutdown measures in a timely fashion. Therefore, we consider the possibility that harbor porpoise could be taken by Level A harassment if AGDC PSOs fail to detect an animal before it enters an exclusion zone and remains for the amount of time necessary to incur PTS. The possibility of harbor porpoise Level A harassment is also confirmed by our calculations (see Estimated Take section). Accordingly, a small number of Level A harassment takes of harbor porpoise have been analyzed and authorized.

Comment 10: The Commission recommends that NMFS (1) require AGDC to provide a detailed hydroacoustic monitoring plan, (2) provide the plan to the Commission for review, and (3) include in the final rule, the requirement to conduct hydroacoustic monitoring during impact and vibratory pile driving of each pile type to verify and adjust the extents of the Level A and B harassment zones, as necessary.

Response: NMFS required AGDC to provide a detailed hydroacoustic monitoring plan for its pile driving activities associated with the LNG facility construction in Cook Inlet and received the plan in February 2020. NMFS has provided the plan to the Commission for review and addressed all comments and questions from the Commission. NMFS also required AGDC to conduct hydroacoustic monitoring at the beginning of in-water pile driving of each pile type to verify and adjust the extents of the Level A and Level B harassment zones, as necessary.

Comment 11: The Commission states that the proposed number of Level A and B harassment takes also are not allocated appropriately based on the extents of the Level A and B harassment zones. As an example, the Commission points out that in Year 5, the Level A harassment zone for high-frequency cetaceans during impact installation of 48- and 60-in pile is 4,524 m, which is 97 percent of the Level B harassment zone of 4,642 m. However, NMFS proposed to authorize 10 Level A harassment takes and 20 Level B harassment takes of harbor porpoises for that year. The Commission recommends that NMFS reallocate the proposed Level A and B harassment take for low-frequency and high-frequency for Years 2, 3, 4, and 5 to ensure that the authorized limits reflect the relative extents of each harassment zone.

Response: NMFS worked with AGDC and recalculated the takes based on animal density, ensonified area, and pile driving days. The estimated takes conservatively reflect the relative extents of each harassment zone. However, it is important to note that while NMFS agrees that comparison of the areas of the Level B and Level A harassment zones is a useful qualitative consideration, we do not agree with the Commission's premise that takes must necessarily be allocated proportionally to the areas of the Level B and Level A harassment zones, as these two ''zones'' do not represent the same thing. The Level B harassment zone is based on a threshold utilizing a metric of instantaneous exposure and the general underlying assumption is that if an animal enters this zone, even momentarily, it will be exposed above the received level threshold for Level B harassment and thereby taken. Alternately, the thresholds for incurring PTS are not solely based on an instantaneous exposure to some level of sound, they are based on an accrual of energy that results from a combination of the animal's proximity to the source and the time spent there. The isopleth produced by NMFS' User Spreadsheet (which delineates the Level A harassment zone) includes an assumption about the amount of time that an animal would need to remain within the distance identified and, therefore, does not support the assumption that any animal that enters the zone, even briefly, is taken by Level A harassment. Animals that only come within the outer edges of the Level A zone would need to remain there near the full duration of time indicated for the full day of pile driving operation to incur PTS (typically 30 minutes to multiple hours), while animals coming further within the zone would need to remain for progressively shorter amounts of time as they get closer to the source to risk incurring PTS.

Comment 12: The Commission states that AGDC would not be able to monitor the entire Level B harassment zones due to the extent of these zones and recommends that NMFS specify how AGDC should enumerate the numbers of marine mammals taken particularly when observers are only monitoring a portion of the Level A and B harassment zones.

Response: NMFS has worked with AGDC on the effectiveness of marine mammal monitoring for extended distances and concluded that if the protected species observers (PSOs) are placed in locations with appropriate height and equipment, they are able to detect beluga whales out to 1.5 km from the site on clear days. However, during less ideal visibility conditions when only a portion of the Level B harassment zone is visible, AGDC are required to enumerate the numbers of marine mammal taken based on take number within the area that is within the visual observation corrected by the proportion of area beyond visual observation.

Comment 13: The Commission recommends that NMFS require AGDC to keep a tally of the numbers of marine mammals taken, alert NMFS when the authorized limit is close to being met, and follow any guidance provided.

Response: AGDC is required to keep a tally of the number of marine mammals taken and alert NMFS when the authorized limit is close to being met based on prescribed monitoring measured in the final rule. In addition, AGDC is required to keep a tally of all marine mammal sightings during the pile driving activities.

Comment 14: The CBD and Cook Inletkeeper state that NMFS did not adequately consider the impacts to Cook Inlet beluga whale critical habitat.

Response: The Cook Inlet beluga whale critical habitat is adequately addressed in the Negligible Impact Analysis and Determination section. We noted that AGDC's LNG facilities construction activities could potentially impact Cook Inlet beluga whale critical habitat. Satellite-tagging studies and aerial survey indicate that seasonal shifts exist in Cook Inlet beluga whale distribution, with the whales spending a great percentage of time in coastal areas during the summer and early fall (June through October or November), and dispersing to larger ranges that extend to the middle of the inlet in winter and spring (November or December through May). However, fine scale modeling based on NMFS long-term aerial survey data indicate that the AGDC's proposed LNG facilities construction does not overlap with beluga whale high density areas during the summer and fall (Goetz *et al.,* 2012).

Further, NMFS also addressed potential effects on beluga whale prey species. Studies have shown that fish reacted to sounds when the sound level increased to about 20 dB above the detection level of about 120 dB (Ona, 1988); however, the physical injury and mortality to fish only occurred in the immediate vicinity of impact pile driving (Caltrans, 2015). Therefore, it is highly unlikely that in-water impact pile driving would cause noticeable level fish injury or mortality. During the Alaska LNG facilities construction, only a small fraction of the available habitat would be ensonified at any given time. Disturbance to fish species would be

short-term, and fish would return to their pre-disturbance behavior once the pile driving activity ceases.

Furthermore, potential impacts to Cook Inlet beluga whale critical habitat were also addressed in the FERC's FEIS, of which NMFS is a cooperating agency. In addition, the ESA Biological Opinion determined that the issuance of regulations is not likely to jeopardize the continued existence of the Cook Inlet beluga whales or destroy or adversely modify Cook Inlet beluga whale critical habitat. NMFS adequately considered impacts in critical habitat in the analyses supporting its determination.

Comment 15: Citing a study by Mooney *et al.* (2018), the CBD and Cook Inletkeeper claim that NMFS thresholds of 120 dB re 1μPa (rms) for continuous and 160 dB re 1μPa (rms) for impulsive or intermittent sources to determine Level B harassment are insufficiently conservative to protect Cook Inlet beluga whale because beluga whales are highly sensitive to noise.

Response: The study CBD and Cook Inletkeeper cited addresses the variation of hearing sensitivity in a wild beluga whale population Bristol Bay, AK. The study used auditory evoked potential (AEP) to obtain audiograms of 26 wild beluga whales during capture-release events. The results showed that most beluga whales from the study showed sensitive hearing with low thresholds (<80 dB re 1 1μPa) from 16 to 100 kHz, a frequency range that is much higher than noises generated from in-water pile driving, vessels, and pipe laying. Although not reported in their AEP study, audiograms provided in the paper show a rapid decrease in beluga whale hearing sensitivity as the frequencies get lower, like most odontocetes. Behavioral audiograms of beluga whales show that hearing sensitivity in the frequency below 1 kHz is above 100 dB re 1 1μPa, and elevates to above 120 dB 1μPa at about 100 Hz (White *et al.,* 1978).

In addition, CBD and Cook Inletkeeper are confused between the animals' detection thresholds and threshold of noise induced behavioral disturbances. Being able to detect the sound does not indicate that the animal would respond to the sound, much less be taken by Level B harassment, as defined under the MMPA. Studies show that animals usually respond to received noise at levels much higher than their hearing thresholds.

Comment 16: CBD states that impacts of pile driving on beluga whales have been underestimated. CBD further states that pile driving [noise] could mask ''strong bottlenose dolphin vocalizations'' 10–15 km from the source (David, 2006).

Response: NMFS has carefully reviewed the best available scientific information in assessing impacts to marine mammals and recognizes that these activities have the potential to impact marine mammals through threshold shifts, behavioral effects, stress responses, and auditory masking. However, NMFS has determined that the nature of such potentially localized exposure means that the likelihood of any impacts to fitness and population level disturbance from the authorized take, including from detrimental energetic effects or reproductive impacts, is low. NMFS has also prescribed a robust suite of mitigation measures, such as shutdown measures to avoid beluga Level B harassment, which is expected to further reduce both the number and severity of beluga whale takes.

NMFS considers it highly unlikely that dolphin vocalizations could be masked by pile driving noise. As discussed in detail in the Potential Effects of Specified Activities on Marine Mammals and Their Habitat section of the proposed rule, auditory masking occurs at the frequency band that the animals utilize. Since noise generated from vibratory pile driving is mostly concentrated at low frequency ranges below 2 kHz, it is expected to have minimal effects masking high frequency echolocation (clicks) and communication (whistles) sounds by odontocetes, including bottlenose dolphins. The analysis by David (2006) on masking is flawed as it did not adequately consider the frequency spectra of pile driving noise as it relates to auditory frequency response of the dolphin.

Comment 17: CBD and Cook Inletkeeper claims that NMFS relied on avoidance [behavior] to make its negligible determination.

Response: CBD's claim is inaccurate. NMFS did not rely on marine mammal avoidance behavior to make our negligible determination. To the contrary, NMFS considered avoidance as a form of Level B harassment. As stated clearly in the Proposed Rule (84 FR 39901; June 28, 2019), ''marine mammals' exposure to certain sounds could lead to behavioral disturbance (Richardson *et al.,* 1995), such as 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 noise sources are located; and/or flight responses (*e.g.,* pinnipeds flushing into water from haul-outs or rookeries).''

Comment 18: CBD and Cook Inletkeeper state that NMFS failed to account for numerous harmful activities such as dredging, pipeline trenching, vessels transiting, and geophysical surveys that could result in takes of marine mammals.

Response: As stated in the Proposed Rule (84 FR 39901; June 28, 2019), dredging activity would occur during the construction of the Marine Terminal MOF using either a hydraulic (cutter head) dredger or a mechanical dredger, and pipeline trenching would occur in the Cook Inlet during pipeline laying operations. These activities typically have low noise levels (120-dB isopleths are typically within 150 m) and slow, predictable movement, which support the unlikelihood of resulting take. For example, URS (2007) measured underwater sound level was 141 dB re 1 μPa rms at 12 m associated with U.S. Army Corps of Engineers (USACE) dredging activities at the Port of Alaska (formerly Port of Anchorage). The resulting 120-dB isopleths was 134.6 m. In addition, these activities are typically associated with slow moving barge/vessel and the noise output are intermittent. Nevertheless, NMFS considers how other activities associated with pipeline trenching, such as anchor handling that generates much louder noise, could cause takes of marine mammals. Effects from these activities have been analyzed and takes were estimated.

Although noises generated from the vessel can be louder than dredging noise, similar to dredging, the movement is relatively predictable, and habituation to vessel traffic has been documented for some marine mammals in more industrialized areas. Therefore, we do not consider animals exposed to transiting vessels likely to respond in a manner that would rise to the level of a take as defined under the MMPA.

The equipment AGDC proposed to use for its geophysical surveys are all high-frequency sources with frequencies above 200 kHz, as described in the Proposed Rule. These frequencies are beyond the detection thresholds of marine mammals. Therefore, NMFS does not expect operating these sources would have takes of marine mammals.

Comment 19: CBD, Cook Inletkeeper, and FoA claim that the small numbers determination is flawed and that NMFS underestimated Cook Inlet beluga takes.

Response: NMFS does not agree with CBD, Cook Inletkeeper, and FoA's

assessment. As described in details in the Proposed Rule (84 FR 39901; June 28, 2019), density estimates for Cook Inlet beluga were based on a habitat-based model developed by Goetz *et al.* (2012). Take estimates were calculated using the beluga whale densities in different areas of the Cook Inlet that overlap with the construction activities, taking into consideration ensonified areas and the duration of each activity. After the Proposed Rule was published, AGDC conducted additional analysis, which NMFS concurred was appropriate, using Goetz *et al.* (2012) modeled aerial survey data collected by NMFS between 1993 and 2008 and developed beluga whale densities for each 1-square-kilometer cell of Cook Inlet. The calculation shows that the maximum annual take of Cook Inlet beluga whale, adjusted for group number is 13 animals. This translates to less than 5% of the Cook Inlet beluga whale stock's population.

Regarding the small numbers determination, NMFS disagrees that it is flawed. NMFS refers the reader to the **Federal Register** Notice announcing NMFS' issuance of five IHAs authorizing take incidental to seismic surveys in the Atlantic (83 FR 63268; December 7, 2018), in which the agency describes in detail its method and rationale for determining whether take of marine mammals constitutes small numbers. As described in that notice, and in the associated sections of this notice, the small numbers determination and negligible impact analysis are conducted separately using entirely different approaches, although they necessarily consider some of the same biological information. Also, contrary to the commenter's assertion, NMFS has indicated that the determination of whether take of marine mammals is of small numbers is appropriately considered on an annual basis and the commenter has offered no justification for why this might not be appropriate.

Comment 20: CBD and Cook Inletkeeper state that the proposed rule failed to ensure the least practicable adverse impact. Specifically, CBD and Cook Inletkeeper claimed that NMFS did not address the following issues: Limit on cumulative beluga whale takings in Cook Inlet; time-area restrictions; larger exclusion zones; air curtains or other noise reduction technologies; and sound source verification.

Response: NMFS does not agree with CBD and Inletkeeper's assertion. As described in the Proposed Rule (84 FR 39901; June 28, 2019), NMFS worked with AGDC and proposed a wide range of monitoring and mitigation to achieve the least practicable adverse impact. These measures included, but were not limited to: (1) Limiting in-water pile driving activities to daylight hours only; (2) implementing shutdown measures for beluga whales to prevent Level A harassment of this species; (3) implementing soft start for all impact pile driving; and (4) monitoring both Level A and Level B harassment zones to ensure takes does not exceed the number or species that would not be authorized. NMFS has described why these measures, along with monitoring and mitigation measures described in the proposed rule, will ensure the least practicable adverse impacts to AGDC's LNG facility construction project. After the Proposed Rule was published, NMFS further worked with AGDC to identify additional practicable measures and included the following additional mitigation and monitoring measures: (1) Prohibiting in-water pile driving near beluga whale summer feeding ground between June 1 and September 7 in west Cook Inlet; (2) implementing larger exclusion zones for shutdown measures to prevent/reduce Level B harassment of Cook Inlet beluga whales; (3) implementing shutdown measure to prevent Level A harassment of all mid-frequency cetaceans; (4) implement shutdown measures to reduce Level A takes of all other marine mammals; (5) requiring AGDC to conduct passive acoustic monitoring to assess the range of ensonified zones; (6) requiring AGDC to assess the effectiveness of air bubble curtains by conducting sound source verification; and (7) requiring AGDC to deploy air bubble curtains to reduce pile driving noise level if the air bubble curtains are found to be able to achieve a noise reduction of 2 dB or more. These additional monitoring and mitigation measures address four out of the five concerns raised by CBD and Cook Inletkeeper. Regarding CBD and Cook Inletkeeper's comments on limiting cumulative beluga whale takes in Cook Inlet, NMFS addressed this in Response to Comments 2 and 3 above. Additionally, for the issuance of the LOA, our analysis showed that at a maximum, 14 Cook Inlet beluga whales could be exposed to noise levels that result to Level B harassment in a given year without any mitigation measures in place. This number equates to 5% of the Cook Inlet beluga whale population. Implementation of required monitoring and mitigation are likely to further reduce the severity and number of takes of Cook Inlet beluga whale.

Comment 21: CBD and Cook Inletkeeper claims that NMFS finding of no unmitigable impacts on subsistence harvest is arbitrary because the proposed action may have an adverse impact on the availability of beluga whales, harbor seals, Steller sea lions, and sea otters for Native Alaskan subsistence harvest.

Response: NMFS does not agree with CBD and Cook Inletkeeper's assertion. First, there is no subsistence harvest of Cook Inlet beluga whales because of its low population in more than a decade. The criteria established for when subsistence hunt of Cook Inlet beluga could resume included the need for a ten-year average abundance estimate to exceed 350 animals, as well as a requirement for an increasing population trajectory; therefore, there are no active subsistence uses of beluga whales that the activity could interfere with. Further, as described in this notice, the Level B harassment take of beluga whales allowed through these regulations would be of small numbers and of a low degree not expected to effect the fitness, reproduction, or survival of any individuals, and therefore would not impede the recovery of the population or otherwise affect the ten-year abundance average. In regard to other marine mammal species, NMFS conducted a thorough analysis on substance use of these species. Jones and Kostick (2016) reported that 2 percent of households in Nikiski, the closest village to AGDC's proposed project area, used harbor seals and 1 percent reported using unknown seal species (both gifted from another region). No marine mammals were actively hunted by Alaska Native residents in Nikiski. There is limited use of marine mammals thought to be from the small number of Alaska Natives living in Nikiski (Jones and Kostick, 2016). In other locations, the hunt of marine mammals is conducted opportunistically and at such a low level that totals approximately 50 harbor seals and fewer than 10 Steller sea lions in a typical year. Therefore, AGDC's program is not expected to have an impact on the subsistence use of marine mammals.

Nevertheless, NMFS required AGDC to develop a stakeholder engagement plan and communicate with subsistence users in the region to inform its proposed activities.

Comment 22: CBD and Cook Inletkeeper claim the draft Environmental Impact Statement (EIS) is flawed based on the assertion that (1) the purpose and need are too narrowly defined; (2) NMFS failed to consider a reasonable range of alternatives related to mitigation measures; and (3) the discussion of environmental and cumulative impacts of the proposed

project is inadequate as it does not discuss the planned oil and gas lease sales, the Hilcorp seismic survey and exploratory drilling, and Pebble Mine.

Response: NMFS does not agree with CBD and Cook Inletkeeper's assertions. First, NMFS worked with the Federal Energy Regulatory Commission (FERC) and clarified NMFS' responsibility in the ''Purpose and Scope of This EIS'' section of the final EIS. Specifically, the EIS states that NMFS, in accordance with 40 CFR 1506.3 and 1505.2, intends to adopt this EIS and issue a separate record of decision (ROD) associated with its decision to grant or deny AGDC's request for regulations and a Letter of Authorization (LOA) pursuant to Section 101(a)(5)(A) of the MMPA for construction activities in Cook Inlet.

In regard to the range of alternatives being considered, NMFS worked with FERC and required a suite of monitoring and mitigation measures that are the most protective to ensure the least practicable adverse impact. While a range of alternatives concerning the scope of the project were presented in the EIS, many of these project-related alternatives were eliminated either due to no environmental advantage or impracticable for the project and were eliminated.

Finally, we note that the projects that CBD and Cook Inletkeeper note (planned oil and gas lease sales, the Hilcorp seismic survey and exploratory drilling, and Pebble Mine) are all discussed in the Cumulative Impacts of the final EIS (pages 4–1188 and 4–1189 of the FEIS). The first two projects are also shown in a map on page 4–1168 of the FEIS, while the site of Pebble Mine is outside the vicinity of AGDC's proposed project area in Cook Inlet.

Comment 23: CBD and Cook Inletkeeper states that NMFS should not issue take authorization under the Endangered Species Act (ESA).

Response: NMFS disagree with CBD and Cook Inletkeeper's opinion. As stated in Response to Comment 1, NMFS is required to issue a marine mammal incidental take authorization for a specified activity within the specified geographic region if NMFS is able to determine that the activity will have a negligible impact on the species or stock and will not have an unmitigable adverse impact on the availability of such species or stock for subsistence uses. Based on the scientific evidence available, NMFS determined that the impacts of the AGDC LNG facility construction activities meet these standards.

Regarding ESA compliance for the NMFS authorization (under the MMPA) of ESA-listed species such the Cook Inlet beluga whale and Western North Pacific, Hawaii, and Mexico DPS of humpback whales, NMFS' Permit and Conservation Division requested initiation of section 7 consultation with the Alaska Region for the promulgation of 5-year regulations and the subsequent issuance of annual LOAs. The Alaska Region issued a Biological Opinion concluding that NMFS' action is not likely to adversely affect the listed species named above or adversely modify their critical habitat.

Comment 24: FoA states that the proposed project would create noise pollution that is likely to cause hearing damage to Cook Inlet beluga whales.

Response: NMFS does not agree with FoA's assertion. While FoA did not define what constitute to ''noise pollution,'' NMFS provided an in-depth analysis on noise generated from AGDC's proposed LNG facility construction. Based on the analysis, NMFS finds it extremely unlikely that a beluga whale would experience hearing damage (permanent threshold shift) from the proposed AGDC construction activity. The analysis is supported by scientific information presented in NMFS' *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (V.2.0)* (NMFS, 2016; 2018) and based on density estimate of Cook Inlet beluga whales in the project area, ensonified area and noise exposure duration from construction activities. Our analysis showed that anticipated takes of Cook Inlet beluga whales are expected to be limited to short-term Level B harassment. Beluga whales present in the vicinity of the action area and taken by Level B harassment would most likely show overt brief disturbance (startle reaction) and avoidance of the area from elevated noise levels during pile driving.

Comment 25: FoA states that the proposed project is susceptible to catastrophic events, such as oil spill, which is reasonably likely to negatively impact the species.

Response: Oil spills are not considered because take of marine mammals due to oil spills are not anticipated or authorized. AGDC is required to comply with all regulations related to pileline laying and vessel transiting and is responsible for ensuring its compliance with those regulations. An oil spill, or a violation of other federal regulations, is not authorized under this rule.

Comment 26: FoA claims that NMFS' issuance of the LOA would violate the NEPA, and that NMFS should prepare a Programmatic EIS (PEIS).

Response: NMFS originally declared its intent to prepare a PEIS for oil and gas activities in Cook Inlet, Alaska (79 FR 61616; October 14, 2014). However, in a 2017 **Federal Register** notice (82 FR 41939; September 5, 2017), NMFS indicated that due to a reduced number of Incidental Take Authorization (ITA) requests in the region, combined with funding constraints at that time, we were postponing any potential preparation of a PEIS for oil and gas activities in Cook Inlet. As stated in the 2017 **Federal Register** notice, should the number of ITA requests, or anticipated requests, noticeably increase, NMFS will re-evaluate whether preparation of a PEIS is necessary. Currently, the number of ITA requests for activities that may affect marine mammals in Cook Inlet is at such a level that preparation of a PEIS is not yet necessary. Nonetheless, under NEPA, NMFS is required to consider cumulative effects of other potential activities in the same geographic area, and these are discussed in greater detail in FERC's Alaska LNG Project Final Environmental Impact Statement (FERC, 2020), which NMFS adopted.

Comment 27: DoW requests NMFS defer the comment period for the Proposed Rule until later in the EIS process, when additional relevant information could be available for NMFS and public review, or reopen a public comment period before finalizing the rulemaking on its own determination that additional relevant information has become available.

Response: When evaluating the AGDC's petition to take marine mammal incidental to its proposed construction of LNG facilities in Cook Inlet, Alaska, NMFS has conducted thorough review of the scope of the proposed activities and the level of potential impacts to marine mammals. In doing so, NMFS consulted internally with its experts who have the best scientific information on the species and their habitat. A Proposed Rule is published for public comment only when NMFS is convinced that it has all relevant information to conduct the impact analyses to support preliminary findings pursuant to the statutory standards. While the NEPA analysis will be finalized at a later time, since NMFS is a cooperating agency on the FERC's EIS, NMFS reviewed all the public comments from the EIS as well to inform its final decision. Therefore, in this case, NMFS does not believe there was a need to defer the public comment period, or reopen a public comment period before finalize the rulemaking.

Comment 28: DoW states that NMFS' proposed rule did not consider

operational noise associated with the proposed LNG facilities. Citing FERC's DEIS, DoW states that the highest noise levels would occur when there are two LNG carrier ships docked at the facility. DoW states that NMFS should include this additional noise in its analysis.

Response: The action being considered here is the issuance of a Letter of Authorization under a rulemaking for the incidental take of small numbers of marine mammals that could result from AGDC's proposed construction of LNG facilities in Cook Inlet. Our action does not include the operation of LNG carrier ships in the future. Therefore, potential impacts to marine mammals beyond what were analyzed for AGDC's proposed LNG facilities construction activities were not analyzed, and any takes caused by those activities are not authorized.

Comment 29: DoW claims that twelve hours of noise exposure every day from April through October and the take of 7% Cook Inlet beluga whales should not be considered a negligible impact.

Response: NMFS does not agree with DoW's conclusion and nor are the assumptions upon which it is based accurate. First, while some of the pile driving activities may occur twelve hours per day, construction activities are expected to be conducted six days a week from April through October. In addition, not all construction activities generate intense underwater noise, and most of the in-water pile driving activities would not last for 12 hours per day. Furthermore, as marine mammals move around Cook Inlet, animals would only be exposed to in-water construction noise when they are present in the area. Finally, the negligible impact determination considers relevant biological and contextual factors, *i.e.,* the anticipated impacts to the individuals and the stock, of the take authorized, as described in details in the Proposed Rule (84 FR 39901; June 28, 2019).

Comment 30: The EIA expressed concern about potential renewal of the proposed incidental take authorization (IHA).

Response: NMFS does not propose to issue nor renew an IHA to AGDC for the proposed LNG facility construction in Cook Inlet. EIA may be confused with NMFS proposed issuance of an LOA under a 5-year regulation. The regulations are valid for five years from the date of issuance with a maximum of a five-year Letter of Authorization requested under these regulations. If AGDC wanted to pursue marine mammal take authorization beyond the effective period of these regulations, they would need to apply anew for an IHA or LOA.

Comment 31: EIA is concerned that it was not able to comment on the updated version of the LOA application until July 24, 2019, and that the only application available was a previous version dated February 20, 2019. EIA further states that it was difficult to evaluate the project's impact, because the activities described in both documents are roughly similar for each season and estimates rely on the same research for each density estimate, but NMFS estimated a total of 14 beluga takes from Level B harassments from 2020–2025, while AGDC estimated 10 belugas but in different seasons.

Response: While reviewers were mistakenly not provided the most up-to-date version of the application, the scope of the project and analytical methods were accurately described and remained the same in later versions. In AGDC's LOA application, it estimated a total of 10 Cook Inlet beluga whale noise exposure by Level B harassment over the 5-year period of the activity but requested for an annual take of 32 animals. In NMFS' analysis, which is using the same methods, we proposed an annual take of 20 beluga whales based on exposure analysis that is adjusted to account for group size.

Changes Between Proposed Rule and Final Rule

Several changes were made after the publication of the proposed rule on June 28, 2019 (84 FR 39931). Those changes resulted from updated marine mammal density and population information, more detailed analyses on potential impacts using refined data sets, and additional mitigation and monitoring measures to minimize impacts. The changes between proposed and final rules are summarized below.

Authorized takes of marine mammal species were reduced from 10 species to 5 species. In the proposed rule, NMFS proposed to authorize takes of humpback whale, fin whale, gray whale, beluga whale, killer whale, harbor porpoise, Dall's porpoise, harbor seal, California sea lion, and Steller sea lion. In the final rule, takes of fin whale, gray whale, Dall's porpoise, California sea lion, and Steller sea lion are not authorized because data show that they are not likely to be present and exposed to the construction activities (see Description of Marine Mammals in the Area of Specified Activities section below).

Take numbers of marine mammals were updated based on the newest information on population estimates and refined density modeling. Marine mammal density data in the proposed rule were based on NMFS aerial survey in Cook Inlet from 2000 to 2016. In the final rule, additional density from the 2018 aerial survey were also included. In addition, Cook Inlet beluga whale density was further updated based on the latest population estimated that became available in January 2020 (NMFS, 2020), and the take estimate for this species was reanalyzed using a more refined density grid than what was used for the proposed rule. The take number for harbor seals was adjusted based on comments from the Commission and consultation with NMFS National Marine Mammal Laboratory.

The final rule also included additional monitoring and mitigation measures to further reduce potential impacts to marine mammals. Many of these measures are based on consideration of public comments. These additional monitoring and mitigation measures include:

- Implementing time/area restriction to minimize potential noise exposure to Cook Inlet beluga whales in the Susitna River Delta;
- Implementing larger exclusion zones for all in-water construction activities to prevent or reduce Level A harassment for all marine mammals and to prevent Level B harassment for Cook Inlet beluga whales;
- Requiring sound source verification (SSV) measurement for in-water pile driving to better understand underwater noise generated from pile driving activities; and
- Deploying air bubble curtains to attenuate noise from in-water pile driving if SSV results show a 2-dB reduction of noise from air bubble curtains.

Description of Marine Mammals in the Area of Specified Activities

Sections 4 and 5 of the IHA 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' Stock Assessment Reports (SARs; *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.,* physical and behavioral descriptions) may be found on NMFS' website (*www.fisheries.noaa.gov/find-species*).

Five species that were analyzed in the Proposed Rule (84 FR 39901; June 28, 2019) but since were removed in the

final analysis due to their extralimital presence in the proposed area, based on in depth analysis of NMFS marine mammal aerial survey data (summarized in Shelden *et al.,* 2017; 2019). These species are: Fin whale (Balaenoptera physalus), gray whale (*Eschrichtius robustus*), Dall's porpoise (*Phocoenoides dali*), California sea lion (*Zalophus californianus*), and Steller sea lion (*Eumetopias jubatus*). As take of these species is not anticipated as a result of the proposed activities, these species are not analyzed further in this document.

Table 3 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 (2019). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS' SARs). While no mortality is anticipated or authorized here, PBR is included here as a gross indicator of the status of the species and other threats.

TABLE 3—MARINE MAMMALS WITH POTENTIAL PRESENCE WITHIN THE PROJECT AREA

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 Balaenopteridae:						
Humpback whale	*Megaptera novaeangliae*	Western North Pacific	E/D; Y	1,107 (0.300, 865)	3.0	2.6
Family Delphinidae:						
Killer whale	*Orcinus orca*	Eastern North Pacific Alaska Resident.	-; N	2,347 (NA, 2,347)	24	1
Beluga whale [4]	*Delphinapterus leucas*	Cook Inlet	E/D; Y	279 (0.06, NA)	unk	0
Family Phocoenidae (porpoises):						
Harbor porpoise	*Phocoena phocoena*	Gulf of Alaska	-; N	31,046 (2.14, NA)	unk	72
Order Carnivora—Superfamily Pinnipedia						
Family Phocidae (earless seals):						
Harbor seal	*Phoca vitulina*	Cook Inlet/Shelikof Strait	-; N	28,411 (NA, 26,907)	807	107

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

[2] NMFS marine mammal stock assessment reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region#reports.* CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance.

[3] These values, found in NMFS' 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.

[4] Cook Inlet beluga whale population estimates are updated based on Sheldon *et al.* (2019).

Marine mammal species that could potentially occur in the proposed construction areas are included in Table 3. Detailed discussion of these species is provided in the LOA application and summary information is provided below.

In addition, sea otters may be found in Cook Inlet. However, sea otters are managed by the U.S. Fish and Wildlife Service and are not considered further in this document.

Humpback Whale

The humpback whale is distributed worldwide in all ocean basins. In winter, most humpback whales occur in the subtropical and tropical waters of the Northern and Southern Hemispheres. Humpback whales in the high latitudes of the North Pacific Ocean are seasonal migrants that feed on euphausiids and small schooling fishes (Nemoto, 1957, 1959; Clapham and Mead, 1999). The humpback whale population was considerably reduced as a result of intensive commercial exploitation during the 20th century.

The historical summer feeding range of humpback whales in the North Pacific encompassed coastal and inland waters around the Pacific Rim from Point Conception, California, north to the Gulf of Alaska and the Bering Sea, and west along the Aleutian Islands to the Kamchatka Peninsula and into the Sea of Okhotsk and north of the Bering Strait (Zenkovich, 1954; Nemoto, 1957; Tomlin, 1967; Johnson and Wolman, 1984). Historically, the Asian wintering area extended from the South China Sea east through the Philippines, Ryukyu Retto, Ogasawara Gunto, Mariana Islands, and Marmust Islands (Rice, 1998). Humpback whales are currently found throughout this historical range. Most of the current winter range of humpback whales in the North Pacific is relatively well known, with aggregations of whales in Japan, the Philippines, Hawaii, Mexico, and Central America. The winter range includes the main islands of the Hawaiian archipelago, with the greatest concentration along the west side of Maui. In Mexico, the winter breeding range includes waters around the southern part of the Baja California peninsula, the central portions of the Pacific coast of mainland Mexico, and the Revillagigedo Islands off the mainland coast. The winter range also extends from southern Mexico into Central America, including Guatemala, El Salvador, Nicaragua, and Costa Rica (Calambokidis *et al.,* 2008).

Although there is considerable distributional overlap in the humpback whale stocks that use Alaskan waters, the whales seasonally found in lower Cook Inlet are probably of the Central North Pacific stock (Barlow *et al.,* 2011; Allen and Angliss 2015).

Humpback whale use of Cook Inlet has been observed to be confined to Lower Cook Inlet; the whales have been regularly seen near Kachemak Bay during the summer months (Rugh *et al.,* 2005). There are anecdotal observations of humpback whales as far north as Anchor Point, with recent summer observations extending to Cape Starichkof (Owl Ridge, 2014). Humpback whales will move about their

range. It is possible for a small number of humpback whales to be observed near the Marine Terminal construction area, but they are unlikely to venture north into the proposed Upper Cook Inlet pipeline crossings.

Killer Whale

Killer whales are widely distributed, although they occur in higher densities in colder and more productive waters (Allen and Angliss, 2015). Two different stocks of killer whales inhabit the Cook Inlet region: The Alaska Resident Stock and the Gulf of Alaska, Aleutian Islands, Bering Sea Transient Stock (Allen and Angliss, 2015).

Killer whales are occasionally observed in Lower Cook Inlet, especially near Homer and Port Graham (Shelden *et al.,* 2003; Rugh *et al.,* 2005). A concentration of sightings near Homer and inside Kachemak Bay may represent high use, or high observer-effort given most records are from a whale-watching venture based in Homer. The few whales that have been photographically identified in Lower Cook Inlet belong to resident groups more commonly found in nearby Kenai Fjords and Prince William Sound (Shelden *et al.,* 2003). Prior to the 1980s, killer whale sightings in Upper Cook Inlet were very rare (Rugh *et al.,* 2005). During aerial surveys conducted between 1993 and 2004, killer whales were observed on only three flights, all in the Kachemak and English Bay area (Rugh *et al.,* 2005). However, anecdotal reports of killer whales feeding on belugas in Upper Cook Inlet began increasing in the 1990s, possibly in response to declines in sea lions and harbor seals elsewhere (Shelden *et al.,* 2003). Observations of killer whales in beluga summering grounds have been implicated as a possible contributor to decline of Cook Inlet belugas in the 1990s, although the number of confirmed mortalities from killer whales is small (Shelden *et al.,* 2003). Recent industry monitoring programs only reported a few killer whale sightings (Kendall *et al.,* 2015). The sporadic movements and small numbers of this species suggest that there is a rare possibility of encountering this whale during Marine Terminal construction and Mainline pipe laying. There is, however, a greater possibility of transiting vessels associated with the Project encountering killer whales during transit through Lower Cook Inlet.

Beluga Whale

The Cook Inlet beluga whale distinct population segment (DPS) is a small, geographically isolated, and genetically distanced population separated from other beluga populations by the Alaska Peninsula (O'Corry-Crowe *et al.,* 1997). The Cook Inlet beluga DPS was originally estimated at 1,300 whales in 1979 (Calkins, 1989) and has been the focus of management concerns since experiencing a dramatic decline between 1994 and 1998, when the stock declined 47 percent, attributed to overharvesting by subsistence hunting (Mahoney and Shelden, 2000). Prior to subsistence hunting restrictions, harvest was estimated to annually remove 10 to 15 percent of the population (Mahoney and Shelden, 2000). Only five belugas have been harvested since 1999, yet the population has continued to decline. NMFS listed the population as ''depleted'' in 2000 because of the decline, and as ''endangered'' under the ESA in 2008 when the population failed to recover following a moratorium on subsistence harvest.

In April 2011, NMFS designated critical habitat for Cook Inlet beluga whales (76 FR 20180; April 11, 2011) in two specific areas of Cook Inlet:

- *Area 1:* All marine waters of Cook Inlet north of a line from the mouth of Threemile Creek (61°08.5′ N, 151°04.4′ W) connecting to Point Possession (61°02.1′ N, 150°24.3′ W), including waters of the Susitna River south of 61°20.0′ N, the Little Susitna River south of 61°18.0′ N, and the Chickaloon River north of 60°53.0′ N; and
- *Area 2:* All marine waters of Cook Inlet south of a line from the mouth of Threemile Creek (61°08.5′ N, 151°04.4′ W) to Point Possession (61°02.1′ N, 150°24.3′ W) and north of 60°15.0′ N, including waters within 2 nautical miles seaward of mean-high high water (MHHW) along the western shoreline of Cook Inlet between 60°15.0′ N and the mouth of the Douglas River (59°04.0′ N, 153°46.0′ W); all waters of Kachemak Bay east of 151°40.0′ W; and waters of the Kenai River below the Warren Ames bridge at Kenai, Alaska.

The Cook Inlet beluga whale population is estimated to have declined from 1,300 animals in the 1970s (Calkins, 1989) to about 340 animals in 2014 (Shelden *et al.,* 2015). The current population estimate is 279 animals (Shelden *et al.,* 2019). The precipitous decline documented in the mid-1990s was attributed to unsustainable subsistence practices by Alaska Native hunters (harvest of more than 50 whales per year) (Mahoney and Shelden, 2000). In 2006, a moratorium of the harvest of Cook Inlet beluga whales was agreed upon through a cooperative agreement between the Cook Inlet Marine Mammal Council and NMFS.

During late spring, summer, and fall, beluga whales concentrate near the Susitna River mouth, Knik Arm, Turnagain Arm, and Chickaloon Bay (Nemeth *et al.,* 2007) where they feed on migrating eulachon and salmon (Moore *et al.,* 2000). Critical Habitat Area 1 reflects this summer distribution. During winter, beluga whales concentrate in deeper waters in the mid-inlet to Kalgin Island, and in the waters along the west shore of Cook Inlet to Kamishak Bay. Although belugas may be found throughout Cook Inlet at any time of year, they generally spend the ice-free months in Upper Cook Inlet and expand their distribution south and into more offshore waters of Upper Cook Inlet in winter. These seasonal movements appear to be related to changes in the physical environment from sea ice and currents and shifts in prey resources (NMFS, 2016). Belugas spend most of their time year-round in the coastal areas of Knik Arm, Turnagain Arm, Susitna Delta, Chickaloon Bay, and Trading Bay (Goetz *et al.,* 2012). During the open-water months in Upper Cook Inlet (north of the Forelands), beluga whales are typically concentrated near river mouths (Rugh *et al.,* 2010).

Satellite tags from 10 whales tagged from 2000 through 2002 transmitted through the fall, and of those, three tags deployed on adult males transmitted through April and late May. None of the tagged beluga moved south of Chinitna Bay on the western side of Cook Inlet. A review of marine mammal surveys conducted in the Gulf of Alaska from 1936 to 2000 discovered only 31 beluga sightings among 23,000 marine mammal sightings, indicating that very few belugas occur in the Gulf of Alaska outside of Cook Inlet (Laidre *et al.,* 2000 cited in Allen and Angliss, 2014).

Based on these studies, it is anticipated that beluga whales are most likely to occur near the Marine Terminal in moderate densities during the period when sea ice is typically present in Cook Inlet north of the Forelands (December through May; Goetz *et al.,* 2012). Few belugas may occur near the Marine Terminal during the ice-free period (June through November). Belugas would not be expected to focus their foraging (dive) efforts near the proposed Marine Terminal location. If belugas do forage near the Marine Terminal, their foraging dives are more likely to be long and deep during the sea-ice season (December through May; Goetz *et al.,* 2012).

Beluga whales could be found in the vicinities of the Mainline crossing during summer–fall and the Marine Terminal construction area during

winter. Previous marine mammal surveys conducted between the Beluga River and the West Forelands (Nemeth *et al.,* 2007; Brueggeman *et al.,* 2007a, b; Lomac-MacNair *et al.,* 2013, 2014; Kendall *et al.,* 2015) suggest that beluga whale numbers near the proposed Mainline MOF on the west side of Cook Inlet and the pipeline landing peak in May and again in October, with few whales observed in the months in between.

Beluga whales are expected to occur along the entire portion of the Mainline route within Upper Cook Inlet year-round; but, as discussed previously, beluga distribution is concentrated in mustow coastal waters near Knik Arm, Chickaloon Bay, and Trading Bay during the ice-free season (June through November), and in deeper waters of the Susitna Delta, and offshore between East and West Forelands, and around Fire Island during the sea-ice season (December through May) (Goetz *et al.,* 2012). Belugas may remain near the Mainline route during the winter (December through May).

Belugas forage in the Trading Bay area from June to through November (Goetz *et al.,* 2012). Belugas may remain near the Mainline route during the winter (December through May) (Goetz *et al.,* 2012). Belugas would be expected to focus their foraging (dive) efforts near the Trading Bay area during June to November, south of where the proposed Mainline would enter Cook Inlet.

Harbor Porpoise

The Gulf of Alaska harbor porpoise stock is distributed from Cape Suckling to Unimak Pass (Allen and Angliss, 2015). They are found primarily in coastal waters less than 328 feet deep (Hobbs and Waite, 2010) where they feed on Pacific herring (*Clupea pallasii*), other schooling fishes, and cephalopods.

Although harbor porpoises have been frequently observed during aerial surveys in Cook Inlet, most sightings are of single animals, and the sightings have been concentrated nearshore between Iliamna and Tuxedni bays on the lower west side of Lower Cook Inlet (Rugh *et al.,* 2005; Shelden *et al.,* 2013). No harbor porpoises were recorded near Nikiski during NMFS aerial surveys conducted between 1993 and 2012 (Shelden *et al.,* 2013). Dahlheim *et al.* (2000) estimated the 1991 Cook Inlet-wide population at 136 animals. However, they are one of the three marine mammals (besides belugas and harbor seals) regularly seen in Upper Cook Inlet (Nemeth *et al.,* 2007), especially during spring eulachon and summer salmon runs. Brueggeman *et al.* (2007a, b) also reported small numbers of harbor porpoise between Granite Point and the Beluga River. Recent industry monitoring programs in Lower and Middle Cook Inlet reported harbor porpoise sightings in all summer months (Lomac-MacNair *et al.,* 2013, 2014; Kendall *et al.,* 2015). Because harbor porpoise have been observed throughout Cook Inlet during the summer months, they represent a species that could be encountered during all phases and locations of construction.

Harbor Seal

Harbor seals inhabit coastal and estuarine waters along the West Coast, including southeast Alaska west through the Gulf of Alaska and Aleutian Islands, in the Bering Sea and Pribilof Islands (Allen and Angliss, 2015). At more than 150,000 animals state-wide, harbor seals are one of the more common marine mammal species in Alaskan waters (Allen and Angliss, 2015). Harbor seals haul out on rocks, reefs, beaches, and drifting glacial ice (Allen and Angliss, 2015).

Large numbers of harbor seals concentrate at the river mouths and embayments of Lower Cook Inlet, including the Fox River mouth in Kachemak Bay (Rugh *et al.,* 2005). Montgomery *et al.* (2007) recorded over 200 haulout sites in Lower Cook Inl*et al*one. However, only a few hundred seals seasonally occur in Upper Cook Inlet (Rugh *et al.,* 2005; Shelden *et al.,* 2013), mostly at the mouth of the Susitna River where their numbers vary in concert with the spring eulachon and summer salmon runs (Nemeth *et al.,* 2007; Boveng *et al.,* 2012). In 2012, up to 83 harbor seals were observed hauled out at the mouths of the Theodore and Lewis rivers during April to May monitoring activity associated with a Cook Inlet seismic program (Brueggeman, 2007a). Montgomery *et al.* (2007) also found seals elsewhere in Cook Inlet to move in response to local steelhead (*Onchorhynchus mykiss*) and salmon runs. Recent industry monitoring programs in Lower and Middle Cook Inlet reported harbor seal sightings in all summer months, both in-water and on haulouts (Lomac-MacNair *et al.,* 2013, 2014; Kendall *et al.,* 2015). During summer, small numbers of harbor seals are expected to occur near the Marine Terminal construction area near Nikiski, and along the proposed Mainline pipeline crossing route.

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 on the basis of 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 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. The functional groups and the associated frequencies are indicated below (note that these frequency ranges correspond to the range for the composite group, with the entire range not necessarily reflecting the capabilities of every species within that group):

- Low-frequency cetaceans (mysticetes): Generalized hearing is estimated to occur between approximately 7 Hz and 35 kHz;
- Mid-frequency cetaceans (larger toothed whales, beaked whales, and most delphinids): Generalized hearing is estimated to occur between approximately 150 Hz and 160 kHz;
- High-frequency cetaceans (porpoises, river dolphins, and members of the genera *Kogia* and *Cephalorhynchus;* including two members of the genus *Lagenorhynchus,* on the basis of recent echolocation data and genetic data): Generalized hearing is estimated to occur between approximately 275 Hz and 160 kHz;
- Pinnipeds in water; Phocidae (true seals): Generalized hearing is estimated to occur between approximately 50 Hz to 86 kHz; and
- Pinnipeds in water; Otariidae (eared seals): Generalized hearing is estimated to occur between 60 Hz and 39 kHz.

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 (2016) for a review of available information. Five marine mammal species (4 cetacean and 1 pinniped (phocid) species) have the reasonable potential to co-occur with the proposed construction activities. Please refer to Table 3. Of the cetacean species that may be present, one species is classified as low-frequency cetaceans (*i.e.,* humpback whale), two are classified as mid-frequency cetaceans (killer and beluga whales), and one is classified as high-frequency cetaceans (*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 by Incidental Harassment* 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 by Incidental Harassment section, and the 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.

Potential impacts to marine mammals from the Alaska LNG project are from noise generated during in-water pile driving and anchor handling activities.

Acoustic Effects

Acoustic effects to marine mammals from the proposed Alaska LNG facilities construction mainly include behavioral disturbances and temporary masking of animals in the area. A few individual animals could experience mild levels of temporary and/or permanent hearing threshold shift.

The AGDC's LNG facilities construction project using in-water pile driving and anchor handling during trenching and pipe laying could adversely affect marine mammal species and stocks by exposing them to elevated noise levels in the vicinity of the activity area.

Threshold Shift (noise-induced loss of hearing)—Exposure to high intensity sound for a sufficient duration may result in auditory effects such as a noise-induced threshold shift (TS)—an increase in the auditory threshold after exposure to noise (Finneran *et al.,* 2005). Factors that influence the amount of threshold shift include the amplitude, duration, frequency content, temporal pattern, and energy distribution of noise exposure. The magnitude of hearing threshold shift normally decreases over time following cessation of the noise exposure. The amount of TS just after exposure is the initial TS. If the TS eventually returns to zero (*i.e.,* the threshold returns to the pre-exposure value), it is a temporary threshold shift (TTS) (Southall *et al.,* 2007). When animals exhibit reduced hearing sensitivity (*i.e.,* sounds must be louder for an animal to detect them) following exposure to an intense sound or sound for long duration, it is referred to as a noise-induced TS. An animal can experience TTS or permanent threshold shift (PTS). TTS can last from minutes or hours to days (*i.e.,* there is complete recovery), can occur in specific frequency ranges (*i.e.,* an animal might only have a temporary loss of hearing sensitivity between the frequencies of 1 and 10 kHz), and can be of varying amounts (for example, an animal's hearing sensitivity might be reduced initially by only 6 dB or reduced by 30 dB). PTS is permanent, but some recovery is possible. PTS can also occur in a specific frequency range and amount as mentioned above for TTS.

For marine mammals, published data are limited to the captive bottlenose dolphin, beluga, harbor porpoise, and Yangtze finless porpoise (Finneran, 2015). For pinnipeds in water, data are limited to measurements of TTS in harbor seals, an elephant seal, and California sea lions (Kastak *et al.,* 1999, 2005; Kastelein *et al.,* 2012b).

Lucke *et al.* (2009) found a TS of a harbor porpoise after exposing it to airgun noise with a received sound pressure level (SPL) at 200.2 dB (peak-to-peak) re: 1 micropascal (μPa), which corresponds to a sound exposure level (SEL) of 164.5 dB re: 1 μPa^2 s after integrating exposure. Because the airgun noise is a broadband impulse, one cannot directly determine the equivalent of root mean square (rms) SPL from the reported peak-to-peak SPLs. However, applying a conservative conversion factor of 16 dB for broadband signals from seismic surveys (McCauley, *et al.,* 2000) to correct for the difference between peak-to-peak levels reported in Lucke *et al.* (2009) and rms SPLs, the rms SPL for TTS would be approximately 184 dB re: 1 μPa, and the received levels associated with PTS (Level A harassment) would be higher. Therefore, based on these studies, NMFS recognizes that TTS of harbor porpoises is lower than other cetacean species empirically tested (Finneran & Schlundt, 2010; Finneran *et al.,* 2002; Kastelein and Jennings, 2012).

Marine mammal hearing plays a critical role in communication with conspecifics, and interpretation of environmental cues for purposes such as predator avoidance and prey capture. 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 occurs during a time 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. Also, depending on the degree and frequency range, the effects of PTS on an animal could range in severity, although it is considered generally more serious because it is a permanent condition. Of note, 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 one can infer that strategies exist for coping with this condition to some degree, though likely not without cost.

Masking—In addition, chronic exposure to excessive, though not high-intensity, noise could cause masking at particular frequencies for marine mammals, which utilize sound for vital biological functions (Clark *et al.,* 2009). Acoustic masking is when other noises such as from human sources interfere with animal detection of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their performance fitness in survival and reproduction.

Masking occurs at the frequency band that the animals utilize. Therefore, since noise generated from vibratory pile driving is mostly concentrated at low frequency ranges, it may have less effect on high frequency echolocation sounds

by odontocetes (toothed whales). However, lower frequency man-made noises are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey noise. It may also affect communication signals when they occur near the noise band and thus reduce the communication space of animals (*e.g.,* Clark *et al.,* 2009) and cause increased stress levels (*e.g.,* Foote *et al.,* 2004; Holt *et al.,* 2009).

Unlike TS, masking, which can occur over large temporal and spatial scales, can potentially affect the species at population, community, or even ecosystem levels, as well as individual levels. Masking affects both senders and receivers of the signals and could have long-term chronic effects on marine mammal species and populations. Recent science suggests that low frequency ambient sound levels have increased by as much as 20 dB (more than three times in terms of SPL) in the world's ocean from pre-industrial periods, and most of these increases are from distant shipping (Hildebrand, 2009). For AGDC's LNG facilities construction project, noises from pile driving contribute to the elevated ambient noise levels in the project area, thus increasing potential for or severity of masking. Baseline ambient noise levels in the vicinity of project area are high due to ongoing shipping, construction and other activities in Cook Inlet.

Behavioral Disturbance—Finally, marine mammals' exposure to certain sounds could lead to behavioral disturbance (Richardson *et al.,* 1995), such as 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 noise sources are located; and/or flight responses (*e.g.,* pinnipeds flushing into water from haulouts or rookeries).

The onset of behavioral disturbance from anthropogenic noise depends on both external factors (characteristics of noise sources and their paths) and the receiving animals (hearing, motivation, experience, demography) and is also difficult to predict (Southall *et al.,* 2007). Currently NMFS uses a received level of 160 dB re 1 μPa (rms) to predict the onset of behavioral disturbance from impulse noises (such as impact pile driving), and 120 dB re 1 μPa (rms) for continuous noises (such as vibratory pile driving). For the AGDC's LNG facilities construction project, both 160- and 120-dB levels are considered for effects analysis because AGDC plans to conduct both impact and vibratory pile driving.

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be biologically significant if the change affects growth, survival, and/or reproduction, which depends on the severity, duration, and context of the effects.

Potential Effects on Marine Mammal Habitat

Project activities that could potentially impact marine mammal habitats by causing acoustical injury to prey resources and disturbing benthic habitat include dredging/trenching, disposal of dredged material, and facility installation, as well as impacting marine mammal prey from noise generated by in-water pile driving.

Approximately 42 hectares (103 acres) would be disturbed directly by dredging of the Marine Terminal MOF and trenching for the Mainline crossing, and another 486 hectares (1,200 acres) would be disturbed by the disposal of dredged material. Approximately 26 hectares (64 acres) of seafloor would be disturbed by installation of the Marine Terminal MOF, Mainline MOF, and Mainline Crossing. Additional area would be indirectly affected by the re-deposition of sediments suspended in the water column by the dredging/trenching and dredge disposal. However, such disturbances are expected to be temporary and mild. Recovery and re-colonization of the benthic habitat are expected to occur as soon as any anthropogenic stressors are removed.

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

The level of sound at which a fish will react or alter its behavior is usually well above the detection level. Fish have been found to react to sounds when the sound level increased to about 20 dB above the detection level of 120 dB (Ona, 1988); however, the response threshold can depend on the time of year and the fish's physiological condition (Engas *et al.,* 1993). In general, fish react more strongly to pulses of sound (such as noise from impact pile driving) rather than continuous signals (such as noise from vibratory pile driving) (Blaxter *et al.,* 1981), and a quicker alarm response is elicited when the sound signal intensity rises rapidly compared to sound rising more slowly to the same level.

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

Estimated Take

This section provides an estimate of the number of incidental takes authorized through the LOA under the rulemaking, which will inform both NMFS' consideration of ''small numbers'' and the negligible impact determination. We note several changes that have been made to this section since the Proposed Rule was published, including: The density of beluga whales used for take estimation has changed; take methodologies and estimates for Cook Inlet beluga whale and harbor seal have changed for Level B harassment. These changes are described in more detail below. In addition, take of fin whale, grey whale, Dall's porpoise, California sea lion, and Steller sea lion is no longer proposed for authorization because these species are unlikely to occur in the AGDC's LNG facilities construction area in Cook Inlet. This is explained in the Description of Marine Mammals in the Area of Specified Activities section above.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines ''harassment'' as: Any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would primarily be by Level B harassment, as noise

generated from in-water pile driving (vibratory and impact) and anchor handling has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (Level A harassment) to result, primarily for low- and high-frequency cetacean species and phocids because predicted auditory injury zones are larger than for mid-frequency cetacean species. Auditory injury is unlikely to occur for mid-frequency cetacean species. The prescribed mitigation and monitoring measures are expected to minimize the severity of such taking to the extent practicable.

As described previously, no serious injury or mortality is anticipated or 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 disturbed 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 experience behavioral disturbance (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 Level B harassment. NMFS predicts that marine mammals are likely to experience behavioral disturbance in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μPa (rms) for continuous (*e.g.,* vibratory pile-driving, drilling) and above 160 dB re 1 μPa (rms) for non-explosive impulsive (*e.g.,* seismic airguns) or intermittent (*e.g.,* scientific sonar) sources.

Because AGDC's Alaska LNG facilities project involves the generation of non-impulsive (vibratory pile driving and anchor handling) and impulsive (impact pile driving) sources, both 120 and 160 dB re 1 μPa (rms) thresholds are used to evaluate Level B harassment as explained above.

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). AGDC's Alaska LNG facilities project involves the generation of impulsive (impact pile driving) and non-impulsive (vibratory pile driving and anchor handling) sources.

These thresholds are provided in the Table 4 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2016 Technical Guidance, which may be accessed at: *http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm.*

TABLE 4—THRESHOLDS IDENTIFYING THE ONSET OF PERMANENT THRESHOLD SHIFT

Hearing group	PTS onset thresholds		Behavioral thresholds	
	Impulsive	Non-impulsive	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	$L_{pk,flat}$: 219 dB; $L_{E,LF,24h}$: 183 dB.	$L_{E,LF,24h}$: 199 dB.		
Mid-Frequency (MF) Cetaceans	$L_{pk,flat}$: 230 dB; $L_{E,MF,24h}$: 185 dB.	$L_{E,MF,24h}$: 198 dB.		
High-Frequency (HF) Cetaceans	$L_{pk,flat}$: 202 dB; $L_{E,HF,24h}$: 155 dB.	$L_{E,HF,24h}$: 173 dB	$L_{rms,flat}$: 160 dB	$L_{rms,flat}$: 120 dB.
Phocid Pinnipeds (PW) (Underwater)	$L_{pk,flat}$: 218 dB; $L_{E,PW,24h}$: 185 dB.	$L_{E,PW,24h}$: 201 dB.		
Otariid Pinnipeds (OW) (Underwater)	$L_{pk,flat}$: 232 dB; $L_{E,OW,24h}$: 203 dB.	$L_{E,OW,24h}$: 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 (LE) has a reference value of 1 μPa2s. 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.

Source Levels

The project includes impact pile driving and vibratory pile driving and anchor handling associated with trenching and cable laying activities. Source levels of pile driving activities are based on reviews of measurements of the same or similar types and dimensions of piles available in the literature (Caltrans, 2015). Based on this review, the following source levels are assumed for the underwater noise produced by construction activities:

- Source levels of impact driving of 18- and 24-inch steel piles are based on those of 24-inch steel pile impact driving reported by California Department of Transportation (Caltrans) in a pile driving source level compendium document (Caltrans, 2015);
- Source level of impact driving of 60-inch steel pile is based on that of same type and size of steel pile reported in the Caltrans compendium document (Caltrans, 2015) in shallow-water (5 m);
- Source levels of impact driving of 48-inch steel pile is based on that of same type and size of steel pile reported by Austin *et al.* (2016) on the Anchorage Port Modernization Project Test Pile Program in water depth 18 m;
- Source level of impact pile driving of steel sheet pile is based on that of 24-in steel AZ sheet pile impact driving reported in the Caltrans compendium (Caltrans, 2015);
- Source levels of vibratory pile driving of 18- and 24-in steel piles are based on that of 36-inch steel pile vibratory driving reported in the Caltrans compendium (Caltrans, 2015);
- Source levels of vibratory pile driving of 48- and 60-in steel piles are based on that of 72-inch steel pile vibratory driving reported in the Caltrans compendium (Caltrans, 2015);
- Source level of vibratory pile driving of steel sheet pile is based on that of 24-in steel AZ sheet pile vibratory driving reported in the Caltrans compendium (Caltrans, 2015); and
- Underwater sound levels associated with offshore pipe laying and trenching operations when engaging thrusters and anchor handling were based on measurements by Blackwell and Greene (2003) of a tug pushing a full barge near the Port of Alaska when engaging thrusters during docking. The levels are calculated from measured 149 dB re 1 μPa rms at 100 meters/328 feet applying 15*log(r), which yield a source level of 178.9 dB re 1 μPa rms at 1 meter.

A summary of source levels from different pile driving activities is provided in Table 5.

TABLE 5—SUMMARY OF IN-WATER PILE DRIVING SOURCE LEVELS

[At 10 m from source]

Method	Pile type/size	SPL_{pk} (dB re 1 μPa)	SPL_{rms} (dB re 1 μPa)	SEL (dB re 1 μPa^2-s)	Reference
Impact driving	18-in steel pipe pile	207	194	178	Caltrans 2015.
Impact driving	24-in steel pipe pile	207	194	178	Caltrans 2015.
Impact driving	48-in steel pipe pile	210	200	185	Austin *et al.* 2016.
Impact driving	60-in steel pipe pile	210	195	185	Caltrans 2015.
Impact driving	Sheet pile	205	190	180	Caltrans 2015.
Vibratory driving	18-in steel pipe pile	180	170	170	Caltrans 2015.
Vibratory driving	24-in steel pipe pile	180	170	170	Caltrans 2015.
Vibratory driving	48-in steel pipe pile	183	170	170	Caltrans 2015.
Vibratory driving	60-in steel pipe pile	183	170	170	Caltrans 2015.
Vibratory driving	Sheet pile	175	160	160	Caltrans 2015.
Anchor handling and thruster		NA	178.9	178.9	Blackwell & Greene 2003.

These source levels are used to compute the Level A harassment zones and to estimate the Level B harassment zones.

Estimating Injury Zones

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. In the prior analysis for the Proposed Rule, AGDC used NMFS User Spreadsheet and simple geometric spreading model with transmission loss coefficient 15 to calculate Level A and Level B harassment distances, respectively. However, after the public comment period, in response to NMFS' concern of needing a more sophisticated acoustic model to have estimates of the expected ensonified zones, AGDC contracted SLR Corporation to perform a quantitative noise modeling assessment to identify the ensonified distances and areas. Using the dBSea software package, this modeling incorporates one-third octave band spectral sound level for each of the sources, bathymetry for each project location, water depth, sound speed profiles (temperature and salinity for both spring and summer profiles), and seafloor characteristics.

Specifically, pile driving noise was modelled as a single stationary, omni-directional point source in each of the three main construction areas (PLF, Temporary MOF, and Mainline MOF) for each pile and hammer type. Source spectral shape information for each noise source and location were used from other studies. All piling sources were assumed to be located midway down the water column. Noise associated with anchor handling during pipe laying is represented as a series of five points on a line along the route, assuming a depth midway in the water

column (see Figure 12 of AGDC LOA application).

Modelling for this assessment used the dBSea software package. The fluid parabolic equation modelling algorithm has been used with 5 Padé terms to calculate the transmission loss between the source and the receiver at low frequencies (16 Hz up to 1 kHz). For higher frequencies (1 kHz up to 8 kHz) the ray tracing model has been used with 1000 reflections for each ray.

The received noise levels throughout the project have been calculated following the procedure outlined below:

- One-third octave source spectral levels are obtained via reference spectral curves with subsequent corrections based on their corresponding overall source levels;
- Transmission loss is modelled at one-third octave band central frequencies along 100 radial paths at regular increments around each source location, out to the maximum range of the bathymetry data set or until constrained by land;
- The bathymetry variation of the vertical plane along each modelling path is obtained via interpolation of the bathymetry dataset which has 50 m grid resolution;
- The one-third octave source levels and transmission loss are combined to obtain the received levels as a function of range, depth and frequency at 100 m intervals; and
- The overall received levels are calculated at a 1-m depth resolution along each propagation path by summing all frequency band spectral levels.

The predicted distances to the thresholds and ensonified areas for pile driving and anchor handling are summarized in Table 6. In practice, the distances to the Level A harassment thresholds are controlled by the cumulative sound exposure levels (SEL_{cum}) within 24 hours.

For the low frequency cetaceans (humpback whale), the predicted distances to the Level A harassment distances range from 238 meters for the vibratory driving of sheet piles at the temporary MOF to 3,239 meters for the impact pile diving of 48-inch pipe piles at the temporary MOF. For the mid-frequency cetaceans (beluga and killer whales), the predicted distances to the Level SELs range from 0 to 248 meters for the impact driving of sheet piles at the Mainline MOF. For the high frequency cetaceans (harbor porpoise), the predicted distances to the Level A harassment distances ranges from 0 to 2,350 meters at for impact pile driving of 48-inch and 60-inch pipe piles at the PLF. For phocids (harbor seals), the predicted distances to the Level A harassment distances ranges from 0 to 1,018 meters impact pile driving of 48-inch and 60-inch pipe piles at the PLF.

TABLE 6—MODELED HARASSMENT ZONES AND MAXIMUM DISTANCES

Activity description	Level A distance (m) (Level A area (km²))				Level B distance (m) (area (km²))
	LF	MF	HF	PW	
Impact drive of 48-inch pipe piles at PLF	3,175 (10.914)	211 (0.065)	2,350 (8.703)	1,018 (1.984)	3,593 (13.24)
Impact drive of 60-inch pipe piles at PLF	.....	.....	.....	.....	2,254 (6.39)
Vibratory drive of sheet piles at temporary MOF	238 (0.039)	NA	NA	NA	4,377 (18.23)
Impact drive of 24-inch pipe piles at temporary MOF	1,639 (2.142)	238 (0.018)	1,762 (3.829)	558 (0.477)	2,271 (3.91)
Impact drive of 48-inch pipe piles at temporary MOF	3,239 (7.442)	238 (0.060)	679 (0.585)	955 (0.935)	3,546 (9.21)
Vibratory drive of all size pipe piles at temporary MOF	285 (0.125)	NA	NA	246 (0.012)	5,584 (27.70)
Vibratory drive of sheet piles at Mainline MOF	244 (0.055)	NA	NA	212 (0.020)	3,179 (14.75)
Impact drive of sheet piles at Mainline MOF	1,161 (2.365)	248 (0.058)	896 (1.196)	617 (0.696)	764 (1.13)
Anchor handling location 1	NA	NA	NA	NA	1,896 (8.17)
Anchor handling location 2	.....	.....	.....	.....	2,855 (20.67)
Anchor handling location 3	.....	.....	.....	.....	2,446 (16.50)
Anchor handling location 4	.....	.....	.....	.....	2,349 (15.16)
Anchor handling location 5	.....	.....	.....	.....	2,195 (5.01)

LF: Low-Frequency Cetaceans; MF: Mid-Frequency Cetaceans; HF: High-Frequency Cetaceans; PW: Phocid Pinnipeds, Underwater; OW: Otariid Pinnipeds, Underwater.

Marine Mammal Occurrence

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations.

Marine mammal density data in the proposed rule were based on NMFS aerial survey in Cook Inlet from 2000 to 2016. In the final rule, additional density from the 2018 aerial survey were also included.

In addition, Cook Inlet beluga whale density was further updated based on the latest population estimated that became available in January 2020 (NMFS, 2020), and take estimate of this species was reanalyzed using a more refined density grid than what was used for the proposed rule (see below). Take numbers for harbor seals were adjusted to account for animals that were hauled out,

Density estimates were calculated for marine mammals (except beluga whales) using aerial survey data collected by NMFS in Cook Inlet between 2000 and 2018 (summarized in Shelden *et al.,* 2017; 2019). To estimate the densities of marine mammals, the total number of animals of each species for each year observed over the 19-year survey period was divided by the total area surveyed each year (Tables 7).

Table 7 summarizes the number of marine mammals, other than beluga whales, observed each year during the NMFS Annual Aerial Surveys and the area covered. To calculate a conservative density for exposure estimation, the total number of individuals per species observed in each survey year was divided by the area covered during that year and then averaged across all years. The total number of animals observed accounts for the entire Cook Inlet, so these densities may not be representative of the expected densities at Project locations. The raw densities were not corrected for animals missed during the aerial surveys as no accurate correction factors are currently available for these species except for harbor seal.

For harbor seal take estimates, density numbers were adjusted using a correction factor of 2.33 from Boveng *et al.* (2012) to revise the yearly abundance estimates and resulting density estimates and recalculate the number of takes accordingly.

The averaged marine mammal densities other than beluga whale is provided in Table 8.

TABLE 7—SIGHTING AND DENSITIES OF MARINE MAMMALS OTHER THAN BELUGA WHALE DURING NMFS AERIAL SURVEY BETWEEN 2000 AND 2018

Species	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2014	2016	2018
Humpback whale	11	26	20	20	16	18	14	3	7	5	2	9	1	11	6	0
Killer whale	0	15	0	0	0	0	0	0	0	0	33	0	9	0	0	0
Harbor porpoise	29	26	0	0	101	2	0	4	6	42	10	31	11	128	17	0
Harbor seal	1,800	1,485	1,606	974	956	1,087	1,798	1,474	2,037	1,415	1,156	1,811	1,812	2,115	1,909	1,380
Harbor seal (adjusted)	4,194	3,460	3,742	2,269	2,227	2,533	4,189	3,434	4,746	3,297	2,693	4,220	4,222	4,928	4,448	3,215
Area surveyed (km²)	6,911	5,445	5,445	5,236	6,492	5,445	6,702	5,236	7,121	5,864	6,074	6,702	6,283	6,702	8,377	10,471
Density estimates (x10⁻3 individuals/km²)																
Humpback whale	1.59	4.78	3.67	3.82	2.46	3.31	2.09	0.57	0.98	0.85	0.33	1.34	0.16	1.64	0.72	0.00
Killer whale	0.00	2.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.43	0.00	1.43	0.00	0.00	0.00
Harbor porpoise	4.20	4.78	0.00	0.00	15.6	3.67	0.00	0.76	0.84	7.16	1.65	4.63	1.75	19.1	2.03	0.00
Harbor seal	607	635	687	433	343	465	625	656	667	562	443	630	672	735	531	307

TABLE 8—DENSITY ESTIMATES FOR MARINE MAMMALS OTHER THAN BELUGA WHALES

Species	Mean density (animals/km²)
Humpback whale	0.00177
Killer whale	0.00060
Harbor porpoise	0.00439
Harbor seal	0.56246

Beluga whale density estimates were based on the maximum number of beluga whales observed during each survey year of the NMFS Annual Aerial Surveys and the area covered. To estimate beluga densities, the maximum number of belugas observed each survey year was divided by the area covered, and these annual densities were then averaged across all 16 survey years. The survey area can be separated into Upper, Middle, and Lower Cook Inlet, resulting in different densities for beluga whales in each area. Using these combined data for Middle and Lower Cook Inlet, the density for beluga whales using the NMFS Annual Aerial Surveys for all Project components is 0.00050 whales per square kilometer, which is what was used for take estimation in the Proposed Rule.

Goetz *et al.* (2012) modeled aerial survey data collected by NMFS between 1993 and 2008 and developed beluga whale summer densities for each 1-square-kilometer (0.4-square-mile) cell of Cook Inlet. Given the clumped and distinct distribution of beluga whales in Cook Inlet during the summer months, these results provide a more precise estimate of beluga whale density at a given location than multiplying all aerial observations by the total survey effort. Accordingly, NMFS used more refined density estimates to inform the take calculations in this Final Rule. To develop a density estimate associated with Project components, the GIS files of the predicted ensonified area for both Level A and B associated with each location and pile type, size, and hammer were overlain with the GIS file of the 1-square-kilometer (0.4-square-mile) beluga density cells. The cells falling within each ensonified area were provided in an output spreadsheet, and an average cell density for each Project component was calculated. Table 9 shows beluga density for each project component.

TABLE 9—AVERAGE BELUGA WHALE DENSITY (ANIMALS/km²) WITHIN PREDICTED LEVEL A AND LEVEL B HARASSMENT AREAS FOR EACH PROJECT COMPONENT

Project component	Average density within Level A harassment zone	Average density within Level B harassment zone
Impact drive for 48-inch pipe piles at PLF	0.00004	0.00005
Impact drive for 60-inch pipe piles at PLF	0.00005	0.00005
Impact drive for 24-inch pipe piles at temporary MOF	0.00000	0.00005
Impact drive for 48-inch pipe piles at temporary MOF	0.00000	0.00005
Vibratory drive for all size pipe piles at temporary MOF	0.00000	0.00005
Vibratory drive for sheet piles at temporary MOF	0.00000	0.00006
Impact drive for sheet piles at Mainline MOF	0.04150	0.04146
Vibratory drive for sheet piles at Mainline MOF	0.00000	0.03245
Anchor handling at Location 1	0.00000	0.02199
Anchor handling at Location 2	0.00000	0.00180
Anchor handling at Location 3	0.00000	0.00075
Anchor handling at Location 4	0.00000	0.00284
Anchor handling at Location 5	0.00000	0.02323
Anchor handling at all locations	0.00000	0.00551

Take Calculation and Estimation

Here we describe how the information provided above is brought together to produce a quantitative take estimate. For all marine mammals, estimated takes are calculated based on ensonified area for a specific pile driving activity multiplied by the marine mammal density in the action area, multiplied by the number of pile driving days.

For both Level A and Level B harassment, estimated exposure are calculated using the following steps:

- Number of takes per activity = density (average number of animals per km²) * area of ZOI (km²) * number of days;
- Marine mammal densities in the project area are provided in Tables 8 and 9;

• The number of days for each activity component is provided in Table 1; and

• Takes by Level A and Level B harassment are calculated separately based on the respective ZOIs for each type of activity, providing a maximum estimate for each type of take which corresponds to the authorization requested under the MMPA.

For beluga whale, NMFS considered group size from the long-term scientific monitoring effort and opportunistic observation data at Port of Alaska to determine if these numbers represented realistic scenarios. The Alaska Pacific University (APU) scientific monitoring data set documented 390 beluga whale sightings. Group size exhibits a mode of 1 and a median of 2, indicating that over half of the beluga groups observed over the 5-year span of the monitoring program were of individual beluga whales or pairs. The 95th percentile of group size from the APU scientific monitoring data set is 11.1 beluga whales. This means that, of the 390 documented beluga whale groups in this data set, 95 percent consisted of fewer than 11.1 whales; 5 percent of the groups consisted of more than 11.1 whales. Therefore, a group number of 11 is added to the estimated value to allow for one encounter with a larger group of whales.

For killer whale and harbor porpoise, a group number of 3 is added to the estimated value to adjust for estimated takes of these two species.

The estimated numbers of instances of acoustic harassment (takes) by year, species and severity (Level A or Level B) are shown in Table 10.

TABLE 10—ESTIMATED NUMBERS OF MARINE MAMMALS THAT MAY BE EXPOSED TO RECEIVED NOISE LEVELS THAT CAUSE LEVEL A AND LEVEL B HARASSMENT

Year	Species	Estimated Level A harassment	Estimated Level B harassment	Estimated total take	Abundance	Percentage (instances take versus abundance)
1	Humpback whale *	0	1	1	1,107	0.09
	Killer whale	0	4	4	2,347	0.17
	Beluga whale	0	11	11	279	3.94
	Harbor porpoise	0	5	5	31,046	0.02
	Harbor seal	1	316	317	28,411	1.12
2	Humpback whale *	0	4	4	1,107	0.36
	Killer whale	0	4	4	2,347	0.17
	Beluga whale	0	14	14	279	5.02
	Harbor porpoise	0	12	12	31,046	0.04
	Harbor seal	4	1,080	1,084	28,411	3.82
3	Humpback whale *	1	2	3	1,107	0.27
	Killer whale	0	4	4	2,347	0.04
	Beluga whale	0	12	12	279	4.30
	Harbor porpoise	4	5	9	31,046	0.03
	Harbor seal	21	169	190	28,411	0.67
4	Humpback whale *	1	2	3	1,107	0.27
	Killer whale	0	5	5	2,347	0.21
	Beluga whale	0	13	13	279	4.66
	Harbor porpoise	4	6	10	31,046	0.03
	Harbor seal	17	236	253	28,411	0.89
5	Humpback whale *	1	1	2	1,107	0.18
	Killer whale	0	4	4	2,347	0.17
	Beluga whale	0	11	11	279	3.94
	Harbor porpoise	5	5	10	31,046	0.03
	Harbor seal	45	190	235	28,411	0.83

* Includes Hawaii, Western North Pacific, and Mexico DPS's.

Mitigation

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

Additional mitigation measures that were not included in the proposed rule but were added to the final rule include:

(1) Time/area restriction of pile driving and noise generating activities during summer months in the western portion of Cook Inlet at the Mainline Material Offloading Facility (Mainline MOF). The density of beluga whales is notably higher in this area and the measure was added in order to further reduce the number of takes of beluga whales.

(2) Deployment of air bubble curtains for in-water pile driving activities if the air bubble curtains can show to reduce noise level by 2 dB. This measure is to reduce the noise level from pile driving, as air bubble curtain system would reduce potential takes of marine mammals by reducing the ensonified zones. The in situ measurement will determine whether continued implementation is warrant by measuring the likely conservation benefit (degree of sound reduction) versus the financial cost to the company.

(3) Vessel speed and transits restriction in western portion of Cook Inlet during summer months. This measure would minimize disturbances to beluga whales in the Susitna Delta during the time when beluga whales are likely to congregate in the area.

NMFS included these mitigation measures after working with AGDC and determined that they are practicable to further reduce potential impacts to Cook Inlet beluga whales.

Time/Area Restriction

For pile driving, work would occur only during daylight hours, when visual monitoring of marine mammals can be conducted. Other construction activities, such as pipe laying, anchor handling, and dredging could occur outside of daylight hours or during periods of low visibility.

Pile driving associated with the Mainline MOF will not occur from June 1 to September 7 (pile driving can occur from September 8 to May 31).

Other than the activities described in the Description of Proposed Activity section (*e.g.,* sheet pile driving, anchor handling, trenching, pipe-laying and support vessels), AGDC will not engage in in-water sound-producing activities within 10 miles (16 km) of the mean higher high water (MHHW) line of the Susitna Delta (Beluga River to the Little Susitna River) between April 15 and October 15 for activities with underwater noise levels in excess of 120 dB rms re 1μPa @1 m.

Establishing and Monitoring Level A and Level B Harassment Zones, and Exclusion Zones

Before the commencement of in-water construction activities, which include impact pile driving and vibratory pile driving, AGDC must establish Level A harassment zones where received underwater SEL_{cum} could cause PTS (see Table 6 above).

AGDC must also establish Level B harassment zones where received underwater SPLs are higher than 160 dB_{rms} re 1 μPa for impulsive noise sources (impact pile driving) and 120 dB_{rms} re 1 μPa for non-impulsive noise sources (vibratory pile driving).

For all impact and vibratory pile driving, AGDC is required to establish the exclusion zones and implement shutdown measures for humpback whale and killer whale to prevent Level A harassment. AGDC is required to establish a maximum of 1,000-m exclusion zone and implement shutdown measures for harbor porpoise and harbor seal to minimize Level A harassment. AGDC is required to establish the exclusion zones and implement shutdown measures for beluga whale to prevent Level A and Level B harassment. AGDC is required to establish a 2,900-m clearance zone for beluga whale before activities involving anchor handling can occur.

If visibility degrades to where the entire exclusion zones cannot be effectively monitored during pile driving, AGDC may continue to drive the pile section that was being driven to its target depth but will not drive additional sections of pile.

Further, AGDC must implement shutdown measures if the number of marine mammals observed within harassment zones and recorded as a takes for any particular marine mammal species reaches the authorized limit, or any marine mammal species/stocks not authorized to take under the LOA, and such species are sighted within the vicinity of the project area and are approaching the Level B harassment zone during in-water construction activities.

A summary of these exclusion zones based on Level A and Level B harassment distances for different project components is provided in Table 11.

TABLE 11—MARINE MAMMAL EXCLUSION ZONES

Pile driving activities	Exclusion distances (m)				
	Humpback whale	Killer whale	Harbor porpoise	Harbor seal	Beluga whale *
Impact pile driving of 48- and 60-inch piles at PLF	3,200	250	1,000	1,000	3,600
Impact pile driving of 24- and 48-inch piles at temporary MOF	3,300	250	1,000	1,000	3,600
Vibratory pile driving of all types and sizes of piles at temporary MOF	300	250	250	250	5,600
Vibratory pile driving of sheet piles at Mainline MOF	300	250	250	250	3,200
Impact pile driving of sheet piles at Mainline MOF	1,200	250	1,000	650	800
Anchor handling	NA	NA	NA	NA	** 2,900

* These zones also apply to all marine mammals if the number of take is approaching to the authorized takes, and to all marine mammals that takes are not authorized.

** The 2,900m zone will be a clearing zone prior to the start of work, since activities cannot start and stop. Beluga whales occurring within this clearing zone during anchor handling operations will be recorded as having been taken by harassment.

In all cases, a minimum of 10-m exclusion zone must be established for in-water construction and heavy machinery not addressed elsewhere in these measures. If marine mammals are found within the exclusion zone, pile driving of the segment would be delayed until they move out of the area. If a marine mammal is seen above water and then dives below, the contractor would wait 30 minutes for large cetaceans (baleen whales) and 15 minutes for small cetaceans (beluga and killer whales and porpoises) and pinnipeds. If no marine mammals of that species are seen by the observer in that time it can be assumed that the

animal has moved beyond the exclusion zone.

If pile driving of a segment ceases for 30 minutes or more and a marine mammal is sighted within the designated exclusion zone prior to commencement of pile driving, the observer(s) must notify the pile driving operator (or other authorized individual) immediately and continue to monitor the exclusion zone. Operations may not resume until the marine mammal has exited the exclusion zone or 30 minutes have elapsed for large cetaceans or 15 minutes have elapsed for small cetaceans and pinnipeds since the last sighting.

Soft Start

Once the exclusion zone has been cleared of all marine mammals, soft-start procedures must be implemented immediately prior to impact pile driving activities. Soft-start is comprised of an initial set of three strikes from the hammer at about 40 percent energy, followed by a 30-seconds waiting period, then two subsequent three-strike sets with associated 30-seconds waiting periods at the reduced energy.

If circumstances result in discontinuation of pile driving for greater than 30 minutes, then the PSO will monitor the exclusion zone for 30 minutes prior to the resumption of pile driving and will ensure that the zone remains devoid of marine mammals for the 30 minutes immediately prior to the restarting of pile driving. Impact Pile driving will resume following an additional soft start.

Noise Attenuation

For pile-driving at the Mainline MOF near the Beluga River, and on the east side of Cook Inlet near Nikiski associated with the liquefaction facility, AGDC must deploy air bubble curtains around piles. If the sound source verification (SSV) measurements indicate that the best-performing bubble curtain configuration provides less than a 2 dB reduction in in-water sound beyond the bubble curtain, use of the bubble curtain may be discontinued.

Vessel Transits

Consistent with NMFS marine mammal viewing guidelines (*https://alaskafisheries.noaa.gov/pr/mm-viewing-guide*), operators of vessels will, at all times, avoid approaching within 100 yards of marine mammals. Operators will observe direction of travel of marine mammals and attempt to maintain a distance of 100 yards or greater between the animal and the vessel by working to alter vessel course or velocity.

The vessel operator will avoid placing the vessel between members of a group of marine mammals in a way that may cause separation of individuals in the group from other individuals in that group. A group is defined as being three or more whales observed within 500-m (1,641-ft) of one-another and displaying behaviors of directed or coordinated activity (*e.g.,* migration or group feeding).

If the vessel approaches within 1.6 km (1 mi) of one or more whales, the vessel operator will take reasonable precautions to avoid potential interaction with the whales by taking one or more of the following actions, as appropriate:

(1) Steering to the rear of whale(s) to avoid causing changes in their direction of travel.

(2) Maintaining vessel speed of 10 knots (19 km/hr) or less when transiting to minimize the likelihood of lethal vessel strikes.

(3) Reducing vessel speed to less than 5 knots (9 km/hour) within 274 m (300 yards) of the whale(s).

Project vessels must remain a minimum of 2.8 km (1.5 nm) seaward of the mean lower low water (MLLW) line between the Little Susitna River and –150.80 degrees west longitude (see Figure 2 for line depicting the approximate MLLW line) to minimize the impacts of vessel sound and avoid strikes on Cook Inlet beluga whales within this highly essential portion of their critical habitat during late spring and throughout the summer the Susitna Delta Exclusion Zone is defined as the union of the areas defined by:

(1) A 16 km (10-mile) buffer of the Beluga River thalweg seaward of the mean lower low water (MLLW) line,

(2) A 16 km (10-mile) buffer of the Little Susitna River thalweg seaward of the MLLW line, and,

(3) A 16 km (10-mile) seaward buffer of the MLLW line between the Beluga River and Little Susitna River.

(4) The buffer extends landward along the thalweg to include intertidal waters within rivers and streams up to their mean higher high water line (MHHW). The seaward boundary has been simplified so that it is defined by lines connecting readily discernable landmarks.

For vessels operating in the Susitna Delta Exclusion Zone, the following will be implemented:

(1) All project vessels operating within the designated Susitna Delta area will maintain a speed above ground below 4 knots. PSOs will note the numbers, date, time, coordinates, and proximity to vessels of all belugas observed during operations, and report these observations to NMFS in monthly PSO reports.

(2) Vessel crew will be trained to monitor for ESA-listed species prior to and during all vessel movements within the Susitna Delta Exclusion Zone. The vessel crew will report sightings to the PSO team for inclusion in the overall sighting database and reports.

(3) Vessel operators will not move their vessels when they are unable to adequately observe the 100-meter zone around vessels under power (in gear) due to darkness, fog, or other conditions, unless necessary for ensuring human safety.

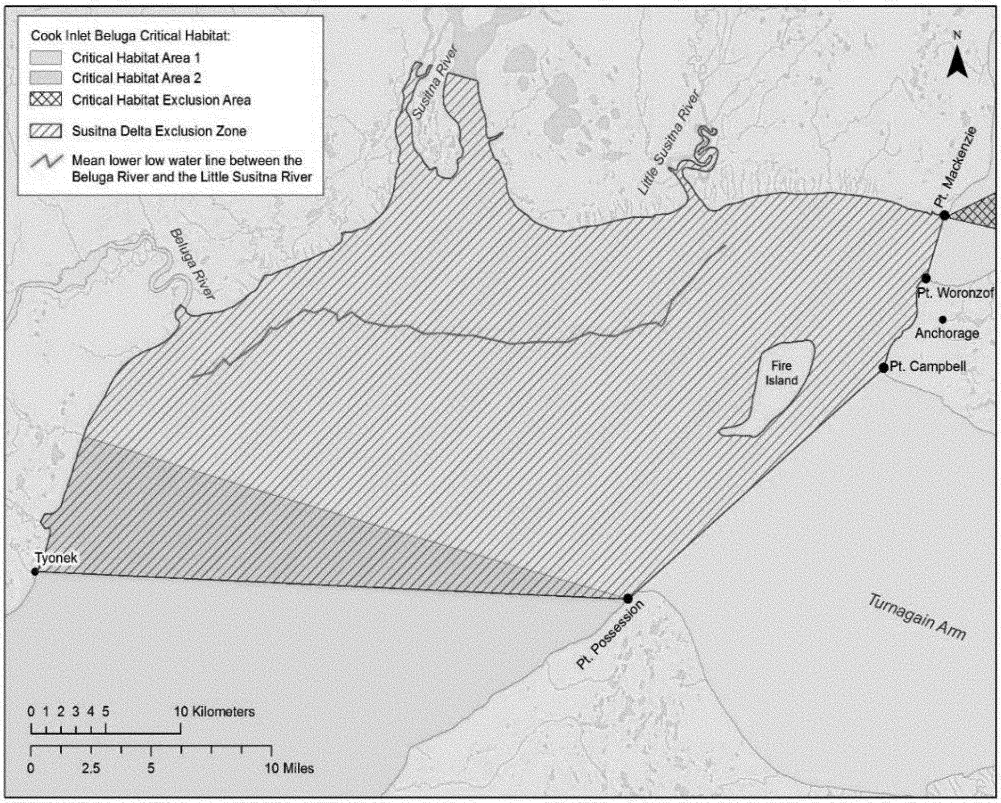

Figure 2. Susitna Delta Exclusion Zone, showing MLLW line between the Beluga and Little Susitna Rivers

Based on our evaluation of the required measures, NMFS has determined that the prescribed mitigation measures provide the means 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.

Monitoring and Reporting

In order to issue an LOA for an activity, Section 101(a)(5)(A) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the 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 April 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 be eligible to serve as the lead PSO.); and

• AGDC 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.

Marine mammal monitoring must comply with the follow protocols:

(1) For pile driving activities, a minimum of two PSOs must be on duty at all times;

(2) For pile driving activities, PSOs must be stationed on a bluff with minimum height at 500 feet above sea level immediately above the construction site;

(3) For marine mammal monitoring during pipe laying activities, at least one PSO must be on the barge and on watch;

(4) PSOs may not exceed 4 consecutive watch hours; must have a minimum two-hour break between watches; and may not exceed a combined watch schedule of more than 12 hours in a 24-hour period;

(5) PSOs must have no other construction-related tasks while conducting monitoring;

(6) Monitoring must be conducted from 30 minutes prior to commencement of pile driving, throughout the time required to drive a pile, and for 30 minutes following the conclusion of pile driving;

(7) Monitoring must be conducted from 30 minutes prior to commencement of pipe laying activity, throughout the time of pipe laying, and for 30 minutes following the conclusion of pipe laying for the segment;

(8) During all observation periods, PSOs must use high-magnification (25X), as well as standard handheld (7X) binoculars, and the naked eye to search continuously for marine mammals;

(9) Monitoring distances must be measured with range finders. Distances to animals must be based on the best estimate of the PSO, relative to known distances to objects in the vicinity of the PSO; and

(10) Bearings to animals must be determined using a compass.

PSOs must collect the following information during marine mammal monitoring:

(1) Date and time that monitored activity begins and ends for each day conducted (monitoring period);

(2) Construction activities occurring during each daily observation period, including how many and what type of piles driven and distances covered during pipe laying;

(3) Deviation from initial proposal in pile numbers, pile types, average driving times, and pipe laying distances, etc.;

(4) Weather parameters in each monitoring period (*e.g.,* wind speed, percent cloud cover, visibility);

(5) Water conditions in each monitoring period (*e.g.,* sea state, tide state);

(6) For each marine mammal sighting:

○ Species, numbers, and, if possible, sex and age class of marine mammals;

○ Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving and pipe laying activities, and notable changes in patterns;

○ Location and distance from pile driving and pipe laying activities to marine mammals and distance from the marine mammals to the observation point; and

○ Estimated amount of time that the animals remained in the Level A and/or Level B harassment zones;

(7) Description of implementation of mitigation measures within each monitoring period (*e.g.,* shutdown or delay); and

(8) Other human activity in the area within each monitoring period.

Acoustic Monitoring

AGDC must conduct sound source verification (SSV) in accordance with the Sound Source Verification Plan, dated February 12, 2020, at the beginning of the pile driving to characterize the sound levels associated with different pile and hammer types, as well as to establish the marine mammal monitoring and mitigation zones.

(1) A minimum of 2 piles of each type and size must be measured.

(2) The following data, at minimum, shall be collected during acoustic monitoring and reported:

i. Hydrophone equipment and methods: Recording device, sampling rate, distance from the pile where recordings were made; depth of recording device(s).

ii. Type of pile being driven and method of driving during recordings.

iii. Mean, median, and maximum sound levels (dB re: 1μPa): Cumulative sound exposure level (SEL_{cum}), peak sound pressure level (SPL_{peak}), root mean square sound pressure level (SPL_{rms}), and single-strike sound exposure level (SEL_{s-s}).

(3) An SSV report must be submitted to NMFS within 72 hours after field measurements for approval of the results.

(4) The results of the SSV report may be used to adjust the extent of Level A and Level B harassment zones in-water pile driving.

Reporting

AGDC must notify NMFS 48 hours prior to the start of each activity in Cook Inlet that may cause harassment of marine mammals. If there is a delay in activity, AGDC will also notify NMFS as soon as practicable.

AGDC must submit monthly reports via email to NMFS Office of Protected Resources (OPR) and Alaska Regional Office (AKRO) for all months with project activities by the 15th of the month following the monthly reporting period. For example, for the monthly reporting period of June 1–30, the monthly report will be submitted by July 15. The monthly report will contain and summarize the following information:

• Dates, times, locations, heading, speed, weather, sea conditions (including Beaufort sea state and wind force), and a list of all in-water sound-producing activities occurring concurrent with marine mammal observations.

• Species, number, location, distance from the vessel, and behavior of all observed marine mammals, as well as associated project activity (*e.g.,* number of power-downs and shutdowns), observed throughout all monitoring activities.

• Observation data in (a) and (b) above will be provided in digital spreadsheet format that can be queried.

• An estimate of the number of animals (by species) exposed to sound at received levels greater than or equal to either the Level A or Level B harassment thresholds, with a

discussion of any specific behaviors those individuals exhibited.

• If the extent of Level B harassment zone is beyond visual observation, AGDC should make appropriate adjustment to estimate the numbers of marine mammals taken based on the portion of the areas that are monitored.

• A description of the implementation and effectiveness of the: (i) Terms and conditions of the Biological Opinion's Incidental Take Statement; and (ii) mitigation measures of the LOA. For the Biological Opinion, the report will confirm the implementation of each Term and Condition, as well as any conservation recommendations, and describe their effectiveness for minimizing the adverse effects of the action on ESA-listed marine mammals.

In addition, AGDC is required to keep a tally of the estimated number of marine mammals taken, and alert NMFS when the authorized limit is close to being met based on prescribed monitoring measured in the final rule. In addition, AGDC is required to keep a tally of all marine mammal sightings during the pile driving activities.

AGDC should immediately notify NMFS if the number of Cook Inlet beluga takes documented reaches 80% of the authorized takes in any given calendar year during which take is authorized.

Within 90 calendar days of the cessation of in-water work each year, a comprehensive annual report will be submitted to NMFS for review. The report will synthesize all sighting data and effort during each activity for each year. NMFS will provide comments within 30 days after receiving annual reports, and the action agency or its non-federal designee will address the comments and submit revisions within 30 days after receiving NMFS comments. If no comments are received from the NMFS within 30 days, the annual report is considered completed. The report will include the following information:

• Summaries of monitoring effort including total hours, observation rate by species and marine mammal distribution through the study period, accounting for sea state and other factors affecting visibility and detectability of marine mammals.

• Analyses of the effects of various factors that may have influenced detectability of marine mammals (*e.g.,* sea state, number of observers, fog/glare, and other factors as determined by the PSOs).

• Species composition, occurrence, and distribution of marine mammal sightings, including date, water depth, numbers, age/size/gender categories (if determinable), group sizes, and ice cover.

• Marine mammal observation data with a digital record of observation data provided in digital spreadsheet format that can be queried.

• Summary of implemented mitigation measures (*i.e.,* shutdowns and delays).

• Number of marine mammals during periods with and without project activities (and other variables that could affect detectability), such as: (i) Initial sighting distances versus project activity at the time of sighting; (ii) closest point of approach versus project activity; (iii) observed behaviors and types of movements versus project activity; (iv) numbers of sightings/individuals seen versus project activity; (v) distribution around the source vessels versus project activity; and (vi) numbers of animals detected in the exclusion zone.

• Analyses of the effects of project activities on listed marine mammals.

In addition to providing NMFS monthly and annual reporting of marine mammal observations and other parameters described above, AGDC will provide NMFS, within 90 days of project completion at the end of the five-year period, a report of all parameters listed in the monthly and annual report requirements above, noting also all operational shutdowns or delays necessitated due to the proximity of marine mammals. NMFS will provide comments within 30 days after receiving this report, and the action agency or its non-federal designee will address the comments and submit revisions within 30 days after receiving NMFS comments. If no comments are received from the NMFS within 30 days, the final report is considered as final.

In the event that personnel involved in the construction activities discover an injured or dead marine mammal, AGDC 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, AGDC 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 LOA. AGDC 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.

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' 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, this introductory discussion of our analyses applies to all the species listed in Table 3, given that the anticipated effects of AGDC's Alaska LNG facilities construction project activities involving pile driving and pipe laying on marine mammals are expected to be relatively similar in nature. Among the species that would be affected from AGDC's LNG facilities construction activities, the Cook Inlet beluga whale is expected to be the most vulnerable species due to its small

population and declining status (NMFS, 2020), and additional species-specific information is included in the analysis below.

Pile driving and removal activities associated with the project as well as pipe laying activity, 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 pipe laying. Potential takes could occur if individuals of these species are present in zones ensonified above the thresholds for Level A or Level B harassment, identified above, when these activities are underway.

Cook Inlet beluga whale and humpback whales are listed as endangered under the ESA. These stocks are also considered depleted under the MMPA. The estimated annual rate of decline for Cook Inlet beluga whales was 0.6 percent between 2002 and 2012. Data from Calambokidis *et al.* (2008) suggest the population of humpback whales may be increasing. The other species that may be taken by harassment during AGDC's LNG facilities construction project are not listed as threatened or endangered under the ESA nor as depleted under the MMPA.

Although a few individual marine mammals (up to 3 humpback whales, 13 harbor porpoises, and 88 harbor seals over the entire project duration of 5 years) are estimated to experience Level A harassment in the form of PTS if they stay within the Level A harassment zone during the entire pile driving for the day, the degree of injury that might occur would be expected to be mild and not likely to affect the reproduction or survival of the individual animals. Specifically, it is expected that, if hearing impairments occur, most likely the affected animal would lose a few dB in its hearing sensitivity, limited to the dominant frequency of the noise sources, *i.e.,* in the low-frequency region below 2 kHz. While we have considered the potential impacts to any individuals that could incur PTS, and the number authorized, we reiterate that in general marine mammals are likely to avoid areas where sound levels are intense enough to cause hearing impairment and it is unlikely to occur.

Under the majority of the circumstances, anticipated takes are expected to be limited to relatively short-term Level B harassment. Marine mammals present in the vicinity of the action area during the construction season and taken by Level B harassment would most likely show overt brief disturbance (startle reaction) and avoidance of the area from elevated noise levels during pile driving. Given the limited estimated number of incidents of Level A and Level B harassment and the limited, anticipated short-term nature of the responses by the individuals, the impacts of the estimated take are not expected to impact the fitness, reproduction, or survival of any individual marine mammals, and further are not expected to rise to the level that they would adversely affect any marine mammal species at the population level, through effects on annual rates of recruitment or survival. While AGDC's LNG facilities construction activities could in general increase the ambient noise level in the vicinity of the project area, the elevated noise levels are only expected during the construction work window during daytime and in the limited area immediately around the construction activities. Additionally, any potential auditory masking occur primarily in the frequency band of the noise, which is generally below 2 kHz for in-water pile driving, and would not be expected to mask most communication vocalizations of the species in the area, or echolocation calls. Given this, any potential auditory masking for marine mammals in the project area is expected to have relatively minor impacts.

Mitigation measures such as time/area restrictions, dedicated marine mammal observers, pre-construction exclusion zone clearance, deployment of air bubble curtains, soft-start, and shutdown measures when marine mammals are seen within the exclusion zones reduce both the number and severity of behavioral disturbances and minimize any effects on hearing sensitivity. In most cases, only cause Level B harassment in the form of behavioral disturbance and/or temporary avoidance. While some Level A harassment to a few individual harbor seals, harbor porpoises, and humpback whales may occur, individuals are unlikely to remain in the proximity of the source for a duration of time likely to result in more than a few dB of PTS (low level), and therefore these impacts are unlikely to impact individual fitness, reproduction, or survival incurred would be expected to be of a low level (no more than a few dB).

The area where the activities will take place is within the Cook Inlet beluga whale critical habitat. Satellite-tagging studies and aerial survey indicate that seasonal shifts exist in Cook Inlet beluga whale distribution, with the whales spending a great percentage of time in coastal areas during the summer and early fall (June through October or November), and dispersing to larger ranges that extend to the middle of the inlet in winter and spring (November or December through May) (Hansen and Hubbard, 1999; Rugh *et al.,* 2004; Hobbs *et al.,* 2005; Goetz *et al.,* 2012). However, fine scale modeling based on NMFS long-term aerial survey data indicate that the AGDC's proposed LNG facilities construction does not overlap with beluga whale high density areas during the summer and fall (Goetz *et al.,* 2012). Furthermore, specific mitigation measures are required to offer additional protections to Cook Inlet beluga whales given the vulnerable status of the population. These measures call for time and area restriction for all activities that generate underwater noise greater than 120 dB rms re 1 μPa, including in-water pile driving events, in west Cook Inlet construction area during summer months when beluga whales are likely to use the Susitna River delta for feeding. Additional mitigation measure to protect the Cook Inlet beluga whale also include implementing shutdown measures for beluga whales to prevent Level B harassment. These measures are expected reduce both the number and severity of the takes of beluga whales.

There are no known important habitats, such as rookeries or haulouts, in the vicinity of the AGDC's LNG facilities construction project for other marine mammal species. The project also is not expected to have significant adverse effects on affected marine mammals' habitat, including prey, as analyzed in detail in the Anticipated Effects on Marine Mammal Habitat section. Therefore, the exposure of marine mammals to sounds produced by AGDC's LNG facilities construction activities is not anticipated to have an effect on annual rates of recruitment or survival of the affected species or stocks.

In summary and as described above, the following factors primarily support our 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 series injury or mortality is anticipated or authorized;
- Injury—a small individuals of humpback whales, harbor porpoises, and harbor seals could experience mild level of PTS as a form of injury. However, as mentioned earlier in this section, the level of PTS is expected to be small;
- TTS—a small individuals of marine mammals could experience mild level of TTS before the threshold shifts become permanent. However, most of the TTS effects are expected to be brief

in duration, and will not progress into PTS;

• Behavioral disturbance—most of the noise effects on marine mammals are expected to be in the form of behavioral disturbance. However, such effects are expected to be in short duration, within the day during the construction activities when the animal is nearby. As construction activities only occur for a maximum of 12 hours during daylight hours between April and October of the year, chronic noise exposure would be limited; and

• Important Areas—the area where the activities will take place is within the Cook Inlet beluga whale critical habitat. However, fine scale modeling based on NMFS long-term aerial survey data indicate that the AGDC's proposed LNG facilities construction does not overlap with beluga whale high density areas during the summer and fall.

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 monitoring and mitigation measures, NMFS 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 section 101(a)(5)(A) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, 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.

The number of authorized takes are below one third of the stock abundance (in fact less than seven percent) of the population for all marine mammals (Table 10).

Based on the analysis contained herein of the proposed activity (including the prescribed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS 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 LOA, 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.

The project is unlikely to affect beluga whale harvests because no beluga harvest will take place in 2020, nor is one likely to occur in the other years that would be covered by the 5-year regulations and associated LOAs.

The proposed Marine Terminal construction activities would occur closest to the marine subsistence area used by Nikiski, while the offshore pipeline and Beluga Mainline MOF would occur within the subsistence use area used by Tyonek. However, the proposed action area is not an important native subsistence site for subsistence harvest of marine mammals because subsistence hunt is only conducted opportunistically. Also, because of the relatively small proportion of marine mammals utilizing Cook Inlet, the number harvested is expected to be extremely low (NMFS, 2013c). Therefore, AGDC's program is not expected to have an impact on the subsistence use of marine mammals.

Nevertheless, AGDC is required to and has prepared a Stakeholder Engagement Plan to involve subsistence communities in the process, hearing concerns, and responding to issues. Through the Stakeholder Engagement Plan, AGDC would implement the following measures to keep subsistence users in the Cook Inlet region informed of its project activities.

• Provide a stakeholder engagement specialist as a local point of contact;

• Provide informational letters summarizing planned activities for summer and winter on a periodic basis to a comprehensive list of stakeholders;

• Set up a call-in number for interested marine mammal hunters during active construction;

• When requested by stakeholders, as resources allow, attend meetings to provide information on upcoming projects; and

• Be available periodically at large-scale events in Anchorage for questions from the public and Alaska Native groups, such as the Alaska Federation of Natives or Alaska Forum for the Environment.

AGDC has travelled to several operations-related meetings and plans to schedule and plans to attend more meetings throughout the construction and operation period. AGDC has developed a comprehensive stakeholder list of Alaska native communities, organizations, and other interested parties in the Cook Inlet region. This list is a ''living'' list and will be updated with new stakeholders or as people change positions. The updated listed will be submitted to NMFS as part of the annual reports.

Adaptive Management

The regulations governing the take of marine mammals incidental to AGDC's proposed LNG facilities construction activities would contain an adaptive management component.

The reporting requirements associated with this Final Rule are designed to provide NMFS with monitoring data from the previous year to allow consideration of whether any changes are appropriate. The use of adaptive management allows NMFS to consider new information from different sources to determine (with input from AGDC regarding practicability) on an annual basis if mitigation or monitoring measures should be modified (including additions or deletions). Mitigation measures could be modified if new data suggests that such modifications would have a reasonable likelihood of reducing adverse effects to marine mammals and if the measures are practicable.

The following are some of the possible sources of applicable data to be considered through the adaptive management process: (1) Results from monitoring reports, as required by MMPA authorizations; (2) results from general marine mammal and sound research; and (3) any information which reveals that marine mammals may have been taken in a manner, extent, or number not authorized by these regulations or subsequent LOAs.

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 ITAs, NMFS consults internally, in this case with the Alaska Protected

Resources Division Office, whenever we propose to authorize take for endangered or threatened species.

Pursuant to the MMPA and through these regulations and the associated LOA, NMFS is authorizing take of Cook Inlet beluga whale and Hawaii, Western North Pacific, and Mexico DPS's of humpback whales, which are listed under the ESA.

The Permit and Conservation Division requested initiation of section 7 consultation with the Alaska Region for the promulgation of 5-year regulations and the subsequent issuance of a Letter of Authorization. The Alaska Region issued a Biological Opinion concluding that NMFS' action is not likely to adversely affect the listed species named above or adversely modify their critical habitat.

Classification

Pursuant to the procedures established to implement Executive Order 12866, the Office of Management and Budget has determined that this final rule is not significant. Pursuant to section 605(b) of the Regulatory Flexibility Act (RFA), the Chief Counsel for Regulation of the Department of Commerce certified to the Chief Counsel for Advocacy of the Small Business Administration at the proposed rule stage that this rule, if adopted, would not have a significant economic impact on a substantial number of small entities. The AGDC is the only entity that would be subject to the requirements in these final regulations. During construction, AGDC would employ or contract thousands of people and the Alaska LNG Project would generate a market value in the billions of dollars. AGDC is not a small governmental jurisdiction, small organization, or small business, as defined by the RFA. We did not receive any public comments on the certification. Therefore a final regulatory flexibility analysis is not required and none has been prepared.

List of Subjects in 50 CFR Part 217

Penalties, Reporting and recordkeeping requirements, Seafood, Transportation.

Dated: July 13, 2020.

Samuel D. Rauch III,

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

For reasons set forth in the preamble, 50 CFR part 217 is amended as follows:

PART 217—REGULATIONS GOVERNING THE TAKE OF MARINE MAMMALS INCIDENTAL TO SPECIFIED ACTIVITIES

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

Authority: 16 U.S.C. 1361 *et seq.,* unless otherwise noted.

■ 2. Add subpart E to part 217 to read as follows:

Subpart E—Taking and Importing Marine Mammals; Alaska Gasline Development Corporation Liquefied Natural Gas Facilities Construction

Sec.

217.40 Specified activity and specified geographical region.
217.41 Effective dates.
217.42 Permissible methods of taking.
217.43 Prohibitions.
217.44 Mitigation requirements.
217.45 Requirements for monitoring and reporting.
217.46 Letters of Authorization.
217.47 Renewals and modifications of Letters of Authorization.
217.48–217.49 [Reserved]

Subpart E—Taking and Importing Marine Mammals; Alaska Gasline Development Corporation Liquefied Natural Gas Facilities Construction

§ 217.40 Specified activity and specified geographical region.

(a) Regulations in this subpart apply only to the Alaska Gasline Development Corporation (AGDC) or successor entities and those persons it authorizes or funds to conduct activities on its behalf for the taking of marine mammals that occurs in the area outlined in paragraph (b) of this section and that occurs incidental to the activities described in paragraph (c) of this section.

(b) The taking of marine mammals by AGDC may be authorized in a Letter of Authorization (LOA) only if it occurs within AGDC's Alaska liquefied natural gas (LNG) facilities' construction areas, which are located between the Beluga Landing shoreline crossing on the north and the Kenai River south of Nikiski on the south in Cook Inlet, Alaska.

(c) The taking of marine mammals during this project is only authorized if it occurs incidental to construction activities associated with the proposed LNG facilities or the Mainline crossing of Cook Inlet.

§ 217.41 Effective dates.

Regulations in this subpart are effective January 1, 2021 through December 31, 2025.

§ 217.42 Permissible methods of taking.

Under LOAs issued pursuant to §§ 216.106 of this chapter and 217.46, the Holder of the LOAs (hereinafter ''AGDC'') may incidentally, but not intentionally, take marine mammals within the area described in § 217.40(b) by Level A harassment and Level B harassment associated with pile driving and pipe laying activities, provided the activity is in compliance with all terms, conditions, and requirements of the regulations in this subpart and the applicable LOAs.

§ 217.43 Prohibitions.

Notwithstanding takings contemplated in § 217.42 and authorized by LOAs issued under §§ 216.106 of this chapter and 217.46, no person in connection with the activities described in § 217.40 may:

(a) Violate, or fail to comply with, the terms, conditions, and requirements of this subpart or a LOA issued under §§ 216.106 of this chapter and 217.46;

(b) Take any marine mammal not specified in such LOAs; and

(c) Take any marine mammal specified in such LOAs in any manner other than as specified.

§ 217.44 Mitigation requirements.

When conducting the activities identified in § 217.40(c), the mitigation measures contained in any LOAs issued under §§ 216.106 of this chapter and 217.46 must be implemented. These mitigation measures must include but are not limited to:

(a) *Time and area restriction.* AGDC must follow the following time and area restrictions.

(1) In-water pile driving must occur only during daylight hours. Times for other construction activities, such as pipe laying, anchor handling, and dredging are not restricted.

(2) Pile driving associated with the Mainline Material Offloading Facility (Mainline MOF) must not occur from June 1 to September 7 (pile driving can occur from September 8 to May 31).

(3) Other than in-water sheet pile driving and pile removal, anchor handling, trenching, pipe laying, and vessel transits related to these activities, AGDC may not engage in in-water sound-producing activities within 10 miles (16 km) of the mean higher high water (MHHW) line of the Susitna Delta (Beluga River to the Little Susitna River) between April 15 and October 15 which produce sound levels in excess of 120 dB rms re 1μPa @ 1 m.

(b) *Establishment of monitoring and exclusion zones.* (1) For all relevant in-water construction activity, AGDC must designate Level A harassment zones

with radial distances as identified in any LOA issued under §§ 216.106 of this chapter and 217.46.

(2) For all relevant in-water construction activity, AGDC must designate Level B harassment zones with radial distances as identified in any LOA issued under §§ 216.106 of this chapter and 217.46.

(3) For all in-water pile driving work, AGDC must implement an exclusion zone for each specific activity as identified in any LOA issued under §§ 216.106 of this chapter and 217.46. If a marine mammal comes within or enters the exclusion zone, AGDC must cease all operations.

(i) For humpback whale and killer whale during in-water pile driving activity, the exclusion zones must be based on the Level A harassment distances, but must not be less than 10 m from the pile.

(ii) For harbor porpoise and harbor seal during in-water pile driving activity, the exclusion zones must be based on the Level A harassment distances up to 1,000 m, but must not be less than 10 m from the pile.

(iii) For Cook Inlet beluga whale during in-water pile driving activity, the exclusion zones must be based on the Level B harassment distances.

(iv) A 2,900-m exclusion zone must be established for Cook Inlet beluga whale before pipe laying activity associated with anchor handling can occur.

(v) A minimum of 10-m exclusion zone must be established for in-water construction and heavy machinery not addressed elsewhere in this paragraph (b)(3).

(c) *Monitoring of exclusion zones.* Pile driving must only take place when the exclusion zones are visible and can be adequately monitored. If visibility degrades to where the entire exclusion zone cannot be effectively monitored during pile driving, AGDC may continue to drive the pile section that was being driven to its target depth, but may not drive additional sections of pile.

(d) *Shutdown measures.* (1) AGDC must deploy protected species observers (PSOs) to monitor marine mammals during in-water pile driving and pipe laying activities.

(2) Monitoring must take place from 30 minutes prior to initiation of pile driving or pipe laying activities through 30 minutes post-completion of pile driving or pipe laying activities.

(i) For pile driving activity, pre-activity monitoring must be conducted for 30 minutes to confirm that the exclusion zone is clear of marine mammals, and pile driving may commence only if observers have declared the exclusion zone clear of marine mammals for that full duration of time. Monitoring must occur throughout the time required to drive a pile. A determination that the exclusion zone is clear must be made during a period of good visibility (*i.e.,* the entire exclusion zone and surrounding waters must be visible to the naked eye).

(ii) If marine mammals are found within the exclusion zone, pile driving of the segment must be delayed until they move out of the area. If a marine mammal is seen above water and then dives below, the contractor must wait 30 minutes for large cetaceans (humpback whale) and 15 minutes for small cetaceans (beluga and killer whales and harbor porpoise) and pinnipeds. If no marine mammals of that species are seen by the observer in that time it can be assumed that the animal has moved beyond the exclusion zone.

(iii) If pile driving of a segment ceases for 30 minutes or more and a marine mammal is sighted within the designated exclusion zone prior to commencement of pile driving, the observer(s) must notify the pile driving operator (or other authorized individual) immediately and continue to monitor the exclusion zone. Operations may not resume until the marine mammal has exited the exclusion zone or 30 minutes have elapsed for large cetaceans or 15 minutes have elapsed for small cetaceans and pinnipeds since the last sighting.

(3) If a marine mammal authorized to be taken by Level B harassment enters or approaches the exclusion zone, if a marine mammal not specified in the LOAs enters the Level B harassment zone, or if the take of a marine mammal species or stock has reached the take limits specified in any LOA issued under §§ 216.106 of this chapter and 217.46 and enters the Level B harassment zone, AGDC must halt all construction activities at that location. If construction is halted or delayed due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily left and been visually confirmed beyond the shutdown or Level B harassment zone, whichever applicable, or 30 minutes have passed without re-detection of the animal if it is a larger cetacean (humpback whale), or 15 minutes have passed without re-detection of the animal if it is a small cetacean (beluga and killer whales and porpoises) or pinniped.

(e) *Soft start.* (1) AGDC must implement soft start techniques for impact pile driving. AGDC must conduct an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 30-second waiting period, then two subsequent three strike sets with associated 30-seconds waiting periods at the reduced energy.

(2) Soft start must be required for any impact driving, including at the beginning of the day, and at any time following a cessation of impact pile driving of 30 minutes or longer.

(f) *Noise attenuation device.* For pile-driving at the Mainline MOF near the Beluga River, and on the east side of Cook Inlet near Nikiski associated with the liquefaction facility, AGDC must deploy air bubble curtains around piles. If the sound source verification (SSV) measurements indicate that the best-performing bubble curtain configuration provides less than a 2 dB reduction in in-water sound beyond the bubble curtain, use of the bubble curtain may be discontinued.

(g) *Vessel transit.* (1) Operators of vessels must, at all times, avoid approaching within 100 yards of marine mammals. Operators must observe direction of travel of marine mammals and attempt to maintain a distance of 100 yards or greater between the animal and the vessel by working to alter vessel course or velocity.

(2) The vessel operator must avoid placing the vessel between members of a group of marine mammals in a way that may cause separation of individuals in the group from other individuals in that group. A group is defined as being three or more whales observed within 500-m of one-another and displaying behaviors of directed or coordinated activity (*e.g.,* migration or group feeding).

(3) If the vessel approaches within 1.6 km (1 mi) of one or more whales, the vessel operator must take reasonable precautions to avoid potential interaction with the whales by taking one or more of the following actions, as appropriate:

(i) Steering to the rear of whale(s) to avoid causing changes in their direction of travel.

(ii) Maintaining vessel speed of 10 knots (19 km/hr) or less when transiting to minimize the likelihood of lethal vessel strikes.

(iii) Reducing vessel speed to less than 5 knots (9 km/hour) within 274 m (300 yards) of the whale(s).

(4) Project vessels must remain a minimum of 2.8 km (1.5 nm) seaward of the mean lower low water (MLLW) line between the Little Susitna River and −150.80 degrees west longitude to minimize the impacts of vessel sound and avoid strikes on Cook Inlet beluga whales between June 1 and September 7. The Susitna Delta Exclusion Zone is

defined as the union of the areas defined by:

(i) A 16-km (10-mile) buffer of the Beluga River thalweg seaward of the mean lower low water (MLLW) line;

(ii) A 16-km (10-mile) buffer of the Little Susitna River thalweg seaward of the MLLW line; and

(iii) A 16-km (10-mile) seaward buffer of the MLLW line between the Beluga River and Little Susitna River.

(iv) The buffer extends landward along the thalweg to include intertidal waters within rivers and streams up to their mean higher high water line (MHHW). The seaward boundary has been simplified so that it is defined by lines connecting readily discernable landmarks.

(5) For vessels operating in the Susitna Delta Exclusion Zone, the following must be implemented:

(i) All project vessels operating within the designated Susitna Delta area must maintain a speed over ground below 4 knots. PSOs must note the numbers, date, time, coordinates, and proximity to vessels of all belugas observed during operations, and report these observations to NMFS in monthly PSO reports.

(ii) Vessel crew must be trained to monitor for Endangered Species Act (ESA)-listed species prior to and during all vessel movements within the Susitna Delta Exclusion Zone. The vessel crew must report sightings to the PSO team for inclusion in the overall sighting database and reports.

(iii) Vessel operators must not move their vessels when they are unable to adequately observe the 100-m zone around vessels under power (in gear) due to darkness, fog, or other conditions, unless necessary for ensuring human safety.

§ 217.95 Requirements for monitoring and reporting.

(a) *Marine mammal visual monitoring*—(1) *Protected species observers.* AGDC must employ trained protected species observers (PSO) to conduct marine mammal monitoring for its LNG facilities construction projects.

(i) The PSOs must observe and collect data on marine mammals in and around the project area for 30 minutes before, during, and for 30 minutes after all construction work. PSOs must have no other assigned tasks during monitoring periods, and must be placed at appropriate and safe vantage point(s) practicable to monitor for marine mammals and implement shutdown or delay procedures, when applicable, through communication with the equipment operator.

(ii) [Reserved]

(2) *Protected species observer qualifications.* AGDC must adhere to the following observer qualifications:

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

(ii) 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;

(iii) Other PSOs may substitute education (degree in biological science or related field) or training for experience;

(iv) AGDC must submit PSO CVs for approval by NMFS prior to the onset of pile driving;

(v) The PSOs must have the ability to conduct field observations and collect data according to assigned protocols;

(vi) The PSOs must have the experience or training in the field identification of marine mammals, including the identification of behaviors;

(vii) The PSOs must have sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;

(viii) The PSOs must have 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

(ix) The PSOs must have the 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.

(3) *Marine mammal monitoring protocols.* AGDC must adhere to the following marine mammal monitoring protocols:

(i) For pile driving activities, a minimum of two PSOs must be on duty at all times;

(ii) For pile driving activities, PSOs must be stationed on a bluff with minimum height 500 feet above sea level immediately above the construction site;

(iii) For marine mammal monitoring during pipe laying activities, at least one PSO must be on the barge and on watch;

(iv) PSOs may not exceed 4 consecutive watch hours; must have a minimum two-hour break between watches; and may not exceed a combined watch schedule of more than 12 hours in a 24-hour period;

(v) PSOs must have no other construction-related tasks while conducting monitoring;

(vi) Monitoring must be conducted from 30 minutes prior to commencement of pile driving, throughout the time required to drive a pile, and for 30 minutes following the conclusion of pile driving;

(vii) Monitoring must be conducted from 30 minutes prior to commencement of pipe laying activity, throughout the time of pipe laying, and for 30 minutes following the conclusion of pipe laying for the segment;

(viii) During all observation periods, PSOs must use high-magnification (25X), as well as standard handheld (7X) binoculars, and the naked eye to search continuously for marine mammals;

(ix) Monitoring distances must be measured with range finders. Distances to animals must be based on the best estimate of the PSO, relative to known distances to objects in the vicinity of the PSO; and

(x) Bearings to animals must be determined using a compass.

(4) *Marine mammal monitoring data collection.* PSOs must collect the following information during marine mammal monitoring:

(i) Date and time that monitored activity begins and ends for each day conducted (monitoring period);

(ii) Construction activities occurring during each daily observation period, including how many and what type of piles driven and distances covered during pipe laying;

(iii) Deviation from initial proposal in pile numbers, pile types, average driving times, and pipe laying distances, etc.;

(iv) Weather parameters in each monitoring period (*e.g.,* wind speed, percent cloud cover, visibility);

(v) Water conditions in each monitoring period (*e.g.,* sea state, tide state);

(vi) For each marine mammal sighting:

(A) Species, numbers, and, if possible, sex and age class of marine mammals;

(B) Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving and pipe laying activities, and notable changes in patterns;

(C) Location and distance from pile driving and pipe laying activities to marine mammals and distance from the marine mammals to the observation point; and

(D) Estimated amount of time that the animals remained in the Level A and/or Level B harassment zones;

(vii) Description of implementation of mitigation measures within each monitoring period (*e.g.,* shutdown or delay); and

(viii) Other human activity in the area within each monitoring period.

(b) *Acoustic monitoring.* AGDC must conduct a sound source verification (SSV) in accordance with the requirements in the LOA, at the beginning of the pile driving to characterize the sound levels associated with different pile and hammer types, as well as to establish the marine mammal monitoring and mitigation zones.

(1) A minimum of 2 piles of each type and size must be measured.

(2) The following data, at minimum, shall be collected during acoustic monitoring and reported:

(i) Hydrophone equipment and methods: Recording device, sampling rate, distance from the pile where recordings were made; depth of recording device(s);

(ii) Type of pile being driven and method of driving during recordings; and

(iii) Mean, median, and maximum sound levels (dB re: 1μPa): Cumulative sound exposure level (SEL_{cum}), peak sound pressure level (SPL_{peak}), root mean square sound pressure level (SPL_{rms}), and single-strike sound exposure level ($SEL_{s\text{-}s}$).

(3) An SSV report must be submitted to NMFS within 72 hours after field measurements for approval of the results.

(4) The results of the SSV report may be used to adjust the extent of Level A and Level B harassment zones in-water pile driving.

(c) *Reporting measures*—(1) *Notification.* AGDC must notify NMFS 48 hours prior to the start of each activity in Cook Inlet that may cause harassment of marine mammals. If there is a delay in activity, AGDC must also notify NMFS as soon as practicable.

(2) *Monthly report.* AGDC must submit monthly reports via email to NMFS Office of Protected Resources (OPR) and Alaska Regional Office (AKRO) for all months with project activities by the 15th of the month following the monthly reporting period. The monthly report must contain and summarize the following information:

(i) Dates, times, locations, heading, speed, weather, sea conditions (including Beaufort sea state and wind force), and a list of all in-water sound-producing activities occurring concurrent with marine mammal observations;

(ii) Species, number, location, distance from the vessel, and behavior of all observed marine mammals, as well as associated project activity (*e.g.,* number of power-downs and shutdowns), observed throughout all monitoring activities;

(iii) Observation data in paragraphs (a) and (b) of this section must be provided in digital spreadsheet format that can be queried;

(iv) An estimate of the number of animals (by species) exposed to sound at received levels greater than or equal to either the Level A or Level B harassment thresholds, with a discussion the time spent above those received levels and of any specific behaviors those individuals exhibited;

(v) If the extent of Level B harassment zone is beyond visual observation, AGDC must also include an appropriate adjustment to estimate the total numbers of marine mammals taken based on the portion of the areas that are monitored; and

(vi) A description of the implementation and effectiveness of the terms and conditions of the Biological Opinion's Incidental Take Statement and mitigation and monitoring measures of the LOA.

(3) *Marine mammal tally numbers.* (i) AGDC must keep a tally of the estimated number of marine mammals that are taken, based on the number of marine mammals observed within the applicable harassment zones, and alert NMFS when the authorized limit is close to being met based on prescribed monitoring measured in the final rule; and

(ii) AGDC must keep a tally of the number of marine mammal that are sighted during the pile driving and pipe laying activities.

(4) *Beluga whale takes.* AGDC must immediately notify NMFS if the number of Cook Inlet beluga estimated as taken (based on observed exposures above thresholds) reaches 80% of the authorized takes in any given calendar year during which take is authorized.

(5) *Annual report.* (i) AGDC must submit a comprehensive annual report to NMFS within 90 calendar days of the cessation of in-water work each year for review. The report must synthesize all sighting data and effort during each activity for each year.

(ii) NMFS will provide comments within 30 days after receiving annual reports, and AGDC must address the comments and submit revisions within 30 days after receiving NMFS comments.

(iii) If no comments are received from the NMFS within 30 days, the annual report is considered completed.

(iv) The report must include the following information:

(A) Summaries of monitoring effort including total hours, observation rate by species and marine mammal distribution through the study period, accounting for sea state and other factors affecting visibility and detectability of marine mammals.

(B) Analyses of the effects of various factors that may have influenced detectability of marine mammals (*e.g.,* sea state, number of observers, fog/glare, and other factors as determined by the PSOs).

(C) Species composition, occurrence, and distribution of marine mammal sightings, including date, water depth, numbers, age/size/gender categories (if determinable), group sizes, and ice cover.

(D) Marine mammal observation data with a digital record of observation data provided in digital spreadsheet format that can be queried.

(E) Summary of implemented mitigation measures (*i.e.,* shutdowns and delays).

(F) Number of marine mammals during periods with and without project activities (and other variables that could affect detectability), such as:

(*1*) Initial sighting distances versus project activity at the time of sighting;

(*2*) Closest point of approach versus project activity;

(*3*) Observed behaviors and types of movements versus project activity;

(*4*) Numbers of sightings/individuals seen versus project activity;

(*5*) Distribution around the source vessels versus project activity; and

(*6*) Numbers of animals detected in the exclusion zone.

(G) Analyses of the effects of project activities on listed marine mammals.

(6) *Final report.* (i) AGDC must provide NMFS, within 90 days of project completion at the end of the five-year period, a report of all parameters listed in the monthly and annual report requirements in paragraph (c) of this section, noting also all operational shutdowns or delays necessitated due to the proximity of marine mammals.

(ii) NMFS will provide comments within 30 days after receiving this report, and AGDC must address the comments and submit revisions within 30 days after receiving NMFS comments.

(iii) If no comments are received from the NMFS within 30 days, the final report is considered as final.

(7) *Reporting of injured or dead marine mammals.* (i) In the unanticipated event that the construction or demolition activities clearly cause the take of a marine mammal in a prohibited manner, such

as an injury, serious injury, or mortality, AGDC must immediately cease operations with the potential to impact marine mammals in the vicinity and immediately report the incident to the NMFS Office of Protected Resources, NMFS Alaska Regional Office, and the Alaska Region Stranding Coordinators. The report must include the following information:

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

(B) Description of the incident;

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

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

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

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

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

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

(ii) Activities must not resume until NMFS is able to review the circumstances of the prohibited take. NMFS must work with AGDC to determine what is necessary to minimize the likelihood of further prohibited take and ensure Marine Mammal Protection Act (MMPA) compliance. AGDC may not resume its activities until notified by NMFS via letter, email, or telephone.

(iii) In the event that AGDC discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.,* in less than a moderate state of decomposition as described in paragraph (c)(7)(iv) of this section), AGDC must immediately report the incident to the NMFS Office of Protected Resources, NMFS Alaska Regional Office, and the Alaska Regional Stranding Coordinators. The report must include the same information identified in paragraph (b)(3)(i) of this section. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with AGDC to determine whether modifications in the activities are appropriate.

(iv) In the event that AGDC discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the LOA (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), AGDC must report the incident to the NMFS Office of Protected Resources, NMFS Alaska Regional Office, and the Alaska Regional Stranding Coordinators, within 48 hours of the discovery. AGDC must provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. AGDC may continue its operations under such a case.

§ 217.46 Letters of Authorization.

(a) To incidentally take marine mammals pursuant to the regulations in this subpart, AGDC must apply for and obtain (LOAs) in accordance with § 216.106 of this chapter for conducting the activity identified in § 217.40(c).

(b) LOAs, unless suspended or revoked, may be effective for a period of time not to extend beyond the expiration date of the regulations in this subpart.

(c) If an LOA(s) expires prior to the expiration date of the regulations in this subpart, AGDC may apply for and obtain a renewal of the LOA(s).

(d) In the event of projected changes to the activity or to mitigation, monitoring, reporting (excluding changes made pursuant to the adaptive management provision of § 217.47(c)(1)) required by an LOA, AGDC must apply for and obtain a modification of LOAs as described in § 217.47.

(e) Each LOA must set forth:

(1) Permissible methods of incidental taking;

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

(3) Requirements for monitoring and reporting.

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

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

§ 217.47 Renewals and modifications of Letters of Authorization.

(a) An LOA issued under §§ 216.106 of this chapter and 217.46 for the activity identified in § 217.40(c) must be renewed or modified upon request by the applicant, provided that:

(1) The proposed specified activity and mitigation, monitoring, and reporting measures, as well as the anticipated impacts, are the same as those described and analyzed for the regulations in this subpart (excluding changes made pursuant to the adaptive management provision in paragraph (c)(1) of this section); and

(2) NMFS determines that the mitigation, monitoring, and reporting measures required by the previous LOA(s) under the regulations in this subpart were implemented.

(b) For LOA modification or renewal requests by the applicant that include changes to the activity or the mitigation, monitoring, or reporting measures (excluding changes made pursuant to the adaptive management provision in paragraph (c)(1) of this section) that do not change the findings made for the regulations in this subpart or result in no more than a minor change in the total estimated number of takes (or distribution by species or years), NMFS may publish a notice of proposed LOA in the **Federal Register**, including the associated analysis of the change, and solicit public comment before issuing the LOA.

(c) An LOA issued under §§ 216.106 of this chapter and 217.46 for the activity identified in § 217.40(c) may be modified by NMFS under the following circumstances:

(1) *Adaptive management.* After consulting with AGDC regarding the practicability of the modifications, NMFS may modify (including by adding or removing measures) the existing mitigation, monitoring, or reporting measures if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring set forth in the regulations in this subpart.

(i) Possible sources of data that could contribute to the decision to modify the mitigation, monitoring, or reporting measures in an LOA:

(A) Results from AGDC's monitoring from the previous year(s);

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

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

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

(2) *Emergencies.* If NMFS determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals specified in LOAs issued pursuant to §§ 216.106 of this chapter and 217.46, an LOA may be modified without prior notice or opportunity for public comment. Notice would be published in the **Federal Register** within 30 days of the action.

§ § 217.48–217.49 [Reserved]

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