DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648–XA418]

Takes of Marine Mammals Incidental To Specified Activities; Taking Marine Mammals Incidental to West Dock Facility Construction Activities Associated With the Alaska LNG Project in Prudhoe Bay, Alaska

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

ACTION: Notice; issuance of an incidental harassment authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an incidental harassment authorization (IHA) to the Alaska Gasline Development Corporation (AGDC) to incidentally harass, by Level A and Level B harassment, marine mammals during a particular activity (West Dock facility construction) associated with construction of the Alaska Liquefied Natural Gas (AK LNG) Project in Prudhoe Bay, Alaska.

DATES: This Authorization is applicable from July 1, 2023 through June 30, 2024.

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

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the ''take'' of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed incidental take authorization may be provided to the public for review.

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

The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

Summary of Request

On March 28, 2019, NMFS received a request from AGDC for an IHA to take marine mammals incidental to construction activities in Prudhoe Bay, Alaska. AGDC submitted revised applications on May 29, 2019; September 16, 2019; October 31, 2019, February 7, 2020; and February 25, 2020. The application was deemed adequate and complete on May 21, 2020. AGDC's request is for take of a small number of six species of marine mammals by harassment. Neither AGDC nor NMFS expects serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

This IHA authorizes incidental take, for one year, for one discrete project (West Dock facility construction). This project is part of the larger AK LNG project for which AGDC has also requested a five-year Letter of Authorization (LOA) (84 FR 30991, June 28, 2019) for incidental take associated with project activities in Cook Inlet, Alaska. The larger project involves a pipeline that will span approximately 807 miles (mi) (1,290 kilometers (km)) from a gas treatment facility on Alaska's North Slope, which holds 35 trillion cubic feet (ft^3) of proven gas reserves, to a liquefaction and export facility in southcentral Alaska.

Description of the Specified Activity

AGDC plans to construct an integrated liquefied natural gas (LNG) project with interdependent facilities to liquefy supplies of natural gas from Alaska, in particular from the Point Thomson Unit (PTU) and Prudhoe Bay Unit (PBU) production fields on the Alaska North Slope (North Slope), for export in foreign commerce and for in-state deliveries of natural gas. AGDC plans to construct an AK LNG Gas Treatment Plant (GTP), which they would construct with large, pre-fabricated modules that that can only be transported to the North Slope with barges (sealifts).

AGDC is proposing to modify the existing West Dock causeway and associated dock heads in Prudhoe Bay, Alaska in order to facilitate offloading modular construction components and transporting them to the GTP construction site. Vibratory and impact pile driving associated with the work at West Dock would introduce underwater sound that may result in take by Level A and Level B harassment of marine mammals in Prudhoe Bay, Alaska. AGDC proposes to conduct pile driving up to 24 hours per day. Construction is expected to occur on approximately 123 days from July through October during the open water (*i.e.,* ice-free) season.

A detailed description of the planned construction project is provided in the **Federal Register** notice for the proposed IHA (85 FR 43382; July 16, 2020). Since that time, no changes have been made to the planned construction activities other than AGDC's planned construction timeframe, which has been shifted to July 1, 2023 to June 30, 2024. Therefore, a detailed description is not provided here. Please refer to that **Federal Register** notice for the description of the specific activity.

Comments and Responses

A notice of NMFS's proposal to issue an IHA to AGDC was published in the **Federal Register** on July 16, 2020 (85 FR 43382). That notice described, in detail, AGDC's activity, the marine mammal species that may be affected by the activity, and the anticipated effects on marine mammals. During the 30-day public comment period, NMFS received substantive comments from the Marine Mammal Commission, the Alaska Eskimo Whaling Commission (AEWC), the Center for Biological Diversity (CBD), the Pipeliners Union 798 United Association and its members, and a member of the general public. NMFS reopened the public comment period, at the request of the AEWC, from September 16, 2020 to November 16, 2020 (85 FR 57836; September 16, 2020). During the reopened comment period, NMFS received letters from the AEWC and the North Slope Borough (NSB), an additional reference from the CBD, and another comment from a member of the public. Two commenters stated that they believe that NMFS should not authorize marine mammal take for the AK LNG project in Prudhoe

Bay, and another commenter and its organization's members expressed general support for the project. Our responses to the substantive comments received are provided here, and the comments have been posted online at: *https://www.fisheries.noaa.gov/action/incidental-take-authorization-alaska-gasline-development-corporation-liquefied-natural-gas-0.* Please see the commenters' letters for full detail regarding justification for their recommendations.

Comment 1: During the initial public comment period on the proposed IHA, NMFS received a request from the Alaska Eskimo Whaling Commission (AEWC) requesting a 60-day extension of the comment period. The request indicated that the AEWC required more time to conduct their review and provide comments.

The AEWC reiterated that (1) the Whaling Captains, community members, and the thousands of Alaska Natives who depend on the success of their harvests for their food security will be directly affected by any adverse effects from this project, and that (2) they have a direct stake in ensuring that this project is properly and thoroughly reviewed. Specifically, they noted that in addition to other challenges to reviewing the proposed IHA within the 30 days initially provided, the summer months are a time when many community members engage in a wide range of subsistence activities.

Response: Given the factors listed by AEWC in its request, and the fact that the specified activity the IHA addresses was not scheduled to start until 2022 (now 2023), NMFS elected to provide additional time for public comment.

Due to the timing of the request, it was not feasible to publish a notice in the **Federal Register** announcing a comment period extension prior to the close of the initial public comment period. Therefore, NMFS reopened the public comment period from September 16, 2020 until November 16, 2020 to receive additional information and comments (85 FR 57836; September 16, 2020). NMFS fully considered comments and information submitted during both comment periods in the preparation of this final IHA, and responses are included in this section.

Comment 2: A commenter stated that NMFS should address in a substantive manner the apparent rejection of the Peer Review Panel's (PRP) recommendations and comments.

Response: NMFS fully considered the PRP's comments, as described in the *Monitoring Plan Peer Review* section of this notice and the notice of the proposed IHA, and NMFS adopted some of the panel's recommendations. The final IHA includes additional recommendations by the PRP that were not included in the proposed IHA: the requirement for AGDC to conduct sound source verification (SSV) and to use three hydrophones in its passive acoustic monitoring (PAM) setup during the open water period, rather than one hydrophone required by the proposed IHA. For a full discussion of the panel's comments, and rationale for which recommendations were and were not adopted, please see the *Monitoring Plan Peer Review* section of this notice.

Comment 3: Commenters expressed concern regarding the proposed take by Level A harassment of ringed and bearded seals, and take by Level A harassment of bowhead whales, which AGDC requested in its application. The commenters stated that an IHA should not authorize take by Level A harassment, and rather take by Level A harassment should only be authorized through a rulemaking process and subsequent LOA(s). One commenter stated that NMFS must do a better job to explain how it reached its conclusions that there will be no Level A harassment take and how AGDC will be able to ensure that no Level A harassment take occurs if the mitigation and monitoring is insufficient.

Response: Section 101(a)(5)(D) of the MMPA and the associated implementing regulations allow for the authorization of incidental take by harassment (including both Level A and Level B harassment) through an IHA. However, for all incidental take authorizations, NMFS aims to avoid or minimize take by Level A harassment for all species, and, in this case, particularly bowhead whale given its importance to subsistence communities.

As described in the *Take Calculation and Estimation* section of this notice, NMFS does not expect take by Level A harassment of bowhead whale to occur due to the shallow water depth in the project area. Additionally, no bowhead whales have been observed during Aerial Surveys of Arctic Marine Mammals (ASAMM) surveys in Block 1a (which encompasses the Level A harassment zone) since Block 1a surveys in began in 2016. Further, shutdown requirements within designated shutdown zones for low-frequency (LF) cetaceans (which include bowhead whales) are expected to prevent take by Level A harassment given the large size and visibility of bowhead whales. Additionally, Level A harassment zones are calculated with an associated duration component based on the amount of pile driving expected to occur within one day. Therefore, a marine mammal is not taken by Level A harassment instantaneously when it enters the Level A harassment zone, and given the shallow depths, even if a bowhead did enter the Level A harassment zone, we would not expect it to remain within the zone for a long enough period to incur permanent threshold shift (PTS).

Take by Level A harassment of ice seals is authorized through this IHA. NMFS recognizes the importance of these animals to subsistence communities also and has worked with AGDC to minimize expected take of ice seals by Level A harassment to the extent practicable. As noted in the Negligible Impact Analysis and Determination section, we expect that the relatively small number of Level A harassment exposures, for seals only, will result only in slight PTS within the lower frequencies associated with pile driving.

Comment 4: A commenter stated that there is no information in the record demonstrating that pile driving in the mid-Beaufort Sea, even in shallow water, will not disturb the fall bowhead whale migration as it travels west past the project area toward Utqiaġvik. The commenter described the 2019 and 2020 Utqiaġvik hunts. Please refer to the AEWC's comment letter, submitted during the comment extension, for additional detail on the 2019 and 2020 Utqiaġvik hunts, beyond what is provided below.

The commenter stated that the early fall harvest in 2020 and the variation in harvest outcomes between 2019 and 2020 are only two examples of the unprecedented changes we are seeing in our marine ecosystem, including in the behavior of our resources. Given the unpredictability of our times, we are being forced to adapt our hunting practices and to become more flexible in our planning. As a result, harvesting periods and established time-area closures may vary in coming years.

The commenter stated that as the changes we are experiencing continue to unfold, it is essential that everyone—hunters, developers, and regulators—increase our vigilance in monitoring changes to the whales' migratory behavior.

The commenter stated that we do not know whether, given the whales' sensitivity to anthropogenic sounds and vibrations in the ocean, there is potential for deflection of the migration and other behavioral changes as the migration passes the proposed project. Unfortunately, based on the current record, the AEWC and NMFS cannot reasonably conclude that the construction activity will not have an

impact on our critical fall bowhead whale subsistence harvest at Utqiaġvik.

In its initial letter, the commenter stated that suspension of pile driving activities until Utqiaġvik completes its fall harvest would help to ensure adequate mitigation of impacts from that sound source, and the commenter initially recommended such a shutdown. However, in a second letter, the commenter stated that it recognizes that because the timing of the migration and completion of the harvest are difficult to predict, a shutdown throughout this period could be prohibitive from the perspective of the operator. Therefore, because the risk of interference will be borne by the Utqiaġvik Whaling Captains should the project go forward, the AEWC requests that NMFS direct AGDC to meet directly with the Whaling Captains Associations and to continue meeting with the AEWC. The AEWC also requests that NMFS reiterate the requirement for signing the Conflict Avoidance Agreement (CAA) as the Federal Energy Regulatory Commission (FERC) has done in its Order Granting Authorization of the Project.

Response: Utqiaġvik is approximately 320 km (200 mi) from West Dock, and farther north and disruption of bowhead whale behavioral patterns as a result of AGDC's pile driving is not expected to impact individuals in the vicinity of Utqiaġvik. As described in the Estimated Take section, only a small number of bowhead whales (a maximum of 110, less than 0.65% of the stock) are expected to be disturbed by the construction activities, and even if some subset of these individuals deflected farther offshore near the project site, it is reasonable to predict that most individuals would likely resume a more typical migration path by the time they reach the Utqiaġvik hunting area and, therefore, significant impacts to the Utqiaġvik hunt would not be expected. Further, as noted by the commenter, it is impracticable for AGDC to cease pile driving during the Utqiaġvik whaling season, given the relatively short open water work window, the potential long duration of the whaling season, and the requirement to cease pile driving during the Nuiqsut whaling season, which occurs closer to the project site. As such, NMFS is not requiring AGDC to cease pile driving during the Utqiaġvik whaling season. However, AGDC is required to continue coordinating with subsistence groups, including the Whaling Captains Associations (Utqiaġvik, Nuiqsut, and Kaktovik), as described in the Plan of Cooperation (POC). This additional coordination may result in additional mitigation measures, if agreed upon by the communities and AGDC. AGDC will also conduct an SSV to determine sound source levels and propagation for the construction noise, which will further inform and refine our understanding of the distance to which the construction noise is expected to propagate and the likely impact on marine mammals (including bowhead whales).

Regarding the CAA, AGDC is required by FERC to enter the CAA for the construction season. NMFS supports and encourages participation of applicants in the CAA process. Where measures likely to be identified through the CAA process are necessary to ensure an unmitigable adverse impact on subsistence uses or that the activities have the least practicable adverse impact on the affected species or stocks and their habitat (paying particular attention to the availability of the species or stock for taking for certain subsistence uses), similar or identical measures would be appropriately included in the IHA; however, NMFS does not require applicants to sign the CAA.

Comment 5: Commenters suggested that NMFS require AGDC to use sound attenuation such as a bubble curtain. In a related comment, a commenter stated that NMFS thoughtlessly adopted the applicant's justification that ''bubble curtains would be very difficult to deploy, and may not result in significant sound reduction.'' The commenter stated that while NMFS could and should require bubble curtains to reduce pile driving noise, there are also other technologies available to reduce the noise from pile driving. For example, the commenter stated that NMFS should consider the effectiveness of pile caps, dewatered cofferdams, and other physical barrier mitigation. The PRP recommended consideration of bubble curtains, noise mitigation screens, and hydro sound dampers (nets with air-filled or foam-filled elastic balloons) (Bellmann 2014; Elmer and Savery 2014) to decrease the size of the Level A and Level B harassment zones. In a related comment, the Commission suggested consideration of other noise attenuation devices, but did not suggest specific devices. Rather, it recommended that NMFS determine whether any type of sound attenuation device could be effective in the shallow-water conditions of the proposed project site.

In another related comment, a commenter stated that the benefit of sound attenuation is reducing risk of injury to seals and whales, diminishing the amount of sound that would propagate to the area of the main bowhead migration, and decreasing the size of Level A and Level B harassment zones. Reduction in the size of these zones would achieve more realistically observable zones (see PRP comments). Therefore, observers can do a better job of implementing mitigation measures to avoid Level A harassment takes more efficiently and realistically observe the entire Level B harassment zone to estimate actual takes. The commenter stated that if NMFS does not require sound attenuation devices, it should require AGDC to strengthen their proposed monitoring plan by requiring that observers be able to see most of the Level A and B monitoring zones during the open water period.

Response: NMFS fully considered whether requiring the use of bubble curtains or other sound attenuation methods was appropriate for this IHA, and included additional explanation of these considerations below. Where conditions are appropriate, bubble curtains, cofferdams, and pile caps are generally the most common noise attenuation methods used in construction projects. The West Dock area is an industrial location with existing piles and dock structures. Conditions in the project area mean that the common practice of using bubble curtains for attenuation is not appropriate, as the water is shallow and therefore sound source level reductions are likely to be minimal (Caltrans, 2020), effective deployment of a bubble curtain system is logistically challenging in shallow water, and there is potential for sea ice. Sound attenuation devices have not been used for pile driving in this area during past projects.

NMFS notes that in some instances during the project, such as during the gravel pouring at the barge bridge abutments, sheet piles will act as a cofferdam. NMFS considered this noise isolation in its effects analysis, but did not refer to the sheet piles as a cofferdam or mitigation measure, as they are a planned construction component, rather than an additional mitigation measure.

Regarding the noise mitigation screens and hydro sound dampeners suggested by the PRP, as stated previously, the window for working in this area is extremely short, and construction will occur on a tight schedule in an effort to complete construction during one season. Given the short construction schedule, experimentation with less-common sound attenuation methods, such as mitigation screens and hydro sound dampeners, is not practicable.

AGDC does not have a confirmed contractor and therefore cannot guarantee that a less common sound attenuation device will be available for use, as well as the tight construction schedule, it is impracticable to require AGDC to implement any other less-common sound attenuation methods. Regarding the recommended use of pile caps, AGDC has not yet selected a contractor, and therefore is unable to guarantee that a contractor will be able to implement certain methods, such as pile caps. Further, available data does not show that pile caps are effective for noise reduction (Caltrans, 2020).

As stated in the *Ensonified Area* section of this notice, AGDC and NMFS modeled the Level A and Level B harassment zones using practical spreading. Given the shallow water in the project area, we expect that the Level A and Level B harassment zones included in the IHA are conservative. Additionally, AGDC intends to conduct SSV to verify sound source levels, propagation, and the Level A and Level B harassment zone sizes. NMFS intends to update the Level A and Level B harassment zone sizes with the verified zone sizes and potentially the associated shutdown zones, as appropriate. It is likely that the SSV will reflect smaller zone sizes, which would therefore be easier for protected species observers (PSOs) to observe a larger portion of the zones.

Please see Comment 23 for a response to the recommendation to require AGDC to strengthen their proposed monitoring plan by requiring that observers be able to see most of the Level A and Level B harassment zones during the open water season.

Comment 6: Commenters, and the Commission, noted that the PRP recommended that AGDC incorporate sound attenuation, such as bubble curtains, during pile driving. The commenters stated that NMFS did not address this recommendation by the PRP in the notice of the proposed IHA, and recommended that NMFS address it in the notice of the final IHA. One commenter further stated that NMFS has not adequately responded to the PRP's findings that many of the applicant's objectives cannot be reasonably obtained.

Response: NMFS did not respond to the sound attenuation recommendation in the *Monitoring Plan Peer Review* section of the proposed or final IHA, as mitigation measures are beyond the scope of the PRP's charge, and NMFS did not find a response in that section to be appropriate. Rather, NMFS has responded to the PRP's recommendation, and that of public commenters, in its responses to Comment 5 in this section. NMFS provided an explanation of why it adopted certain recommendations from the PRP, and why it did not recommend others in the *Monitoring Plan Peer Review* section of the notice of the proposed IHA, and this notice. However, NMFS has updated that discussion given that AGDC has since determined that SSV and the use of additional hydrophones in its PAM setup are practicable. Please see the *Monitoring Plan Peer Review* section for additional detail.

Comment 7: A commenter stated that the latest POC at the time of publication of the proposed IHA primarily focuses on past activities and outlines sporadic meetings over five years, during which time the project has gone through multiple changes in leadership. Often it is missing important details or includes a PowerPoint presentation but no indication of the discussion. Contrary to its express purpose, this POC does not: allow for evaluation of the quality of information provided to our hunters and residents; offer an account of any concerns that might have been raised by our communities in the public meetings; or provide for a path forward to address local concerns. For example, these preliminary meetings would have been the place to raise the issue of Level A harassment takes, to discuss any concerns related to potential impacts to Utqiaġvik, and to discuss the contingency plans in the ice-covered season. In short, this POC does not demonstrate that the applicant has engaged in consultation with local communities that is meaningful or honorable.

Further, the POC is lacking details in Section 2 on ongoing communications. It states ''Alaska LNG will develop a Communication Plan and will implement this plan before initiating construction or present.'' Yet it does not outline or delineate a plan on moving forward.

Response: AGDC's initial meetings with subsistence groups were part of the National Environmental Policy Act (NEPA) Environmental Impact Statement (EIS) public scoping process, so AGDC provided high-level information on the overall project and sought input, as detailed information regarding marine mammal impacts was not available at the time. AGDC has continued to meet with subsistence groups and has discussed more detailed project information in these more recent meetings.

AGDC has updated the POC to include the information that the commenter stated was initially lacking. Regarding a path forward to address local concerns, AGDC will, in conjunction with NMFS, AEWC, and the Whaling Captains Associations from Utqiaġvik, Nuiqsut, and Kaktovik, develop and agree with these groups to a Communications Plan. The plan will identify the most effective way to communicate with local subsistence users and the Whaling Captains' Associations. It will be posted on the project website and sent to the organizations for feedback before being finalized. The goals along with the timeline, tools, and process for developing a robust Communications Plan are provided in Appendix C of the revised POC, available at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-alaska-gasline-development-corporation-liquefied-natural-gas-0.*

Comment 8: A commenter recommended that NMFS direct AGDC to meet directly with the Whaling Captains Associations to collaboratively develop appropriate means of mitigating potential impacts from the pile driving activity on the fall harvest at Utqiaġvik and to continue meeting with the AEWC.

Response: The final IHA includes a requirement that AGDC must conduct the coordination with subsistence communities as described in the POC. The POC indicates that AGDC will meet with the Whaling Captains Associations (Utqiaġvik, Nuiqsut, and Kaktovik), and continue to meet with the AEWC. AGDC will continue to work with NMFS, AEWC, and the Whaling Captains Associations from Utqiaġvik, Nuiqsut, and Kaktovik, develop and agree to a Communications Plan. The goals along with the timeline, tools, and process for developing a robust Communications Plan are provided in Appendix C of the revised POC, available at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-alaska-gasline-development-corporation-liquefied-natural-gas-0.*

Comment 9: The Commission recommended that NMFS require AGDC to (1) meet with ice seal subsistence hunters in Nuiqsut and other North Slope communities and with members of the Ice Seal Committee to discuss its proposed construction activities in the winter of 2023 and the use of a subsistence advisor (as well as the possible use of trained dogs) and (2) revise its mitigation and monitoring measures as necessary to minimize disturbance of seals and subsistence hunting activities, based on input received.

Response: The final IHA includes a requirement that AGDC must conduct

the coordination with subsistence communities as described in the POC, which includes coordination with the ice seal committee. AGDC will only work during the winter/spring contingency period in the event that unforeseen circumstances or delays prevent them from completing construction during the open water season, and intends to clearly describe its potential winter construction to the ice seal committee and other subsistence groups. Additionally, the final IHA includes a requirement that AGDC must consult with an experienced subsistence advisor for detection of seal lairs for activities that occur in winter, and must implement a 150-m avoidance buffer in the event lairs are identified during construction. NMFS is not requiring AGDC to utilize trained dogs to detect ringed seal lairs, as there are a very limited number of trained dogs available for detecting seal lairs, and further Alaska Native subsistence hunters have raised concerns about polar bears following the scent of the dogs to hunt those lairs (pers. comm., Sheyna Wisdom).

AGDC will continue to work closely with subsistence hunters from North Slope communities, including the ice seal committee to minimize disturbance of seals and subsistence hunting. If additional measures are agreed upon, they will be added to the POC, which as described previously, AGDC is required by the IHA to follow.

Comment 10: A commenter stated that each year it devotes substantial resources toward negotiating a CAA with oil and gas companies to mitigate the impacts of oil and gas exploration on our subsistence lifestyle and our way of life. Thus, the analysis in the **Federal Register** of potential impacts to subsistence uses should begin with a discussion of whether the operator has signed the CAA and, if so, what the CAA includes as mitigation measures for our subsistence activities. By setting forth that discussion—and by incorporating those mitigation measures into the IHA, along with the measures already discussed by NMFS—the agency provides itself a firm, rational basis to issue a ''no unmitigable adverse impact'' finding, as required by the MMPA. The commenter noted that such steps are necessary even though a recent Order from FERC for this project requires a signed CAA before construction can begin. Another commenter stated that the proposed authorization depends on a CAA with Alaska Native villages, although it is unclear what the agreement will entail, and therefore, it is arbitrary for NMFS to rely on such agreements to determine that there will not be adverse impacts to subsistence use.

Response: NMFS did not use the potential CAA to justify its preliminary unmitigable adverse impact determination in the proposed IHA. Rather, NMFS described what a CAA is, and mentioned that AGDC was considering whether it would enter a CAA or similar agreement with the AEWC, and that it would discuss and evaluate a CAA in the meetings discussed in the notice. As described in this final notice, AGDC has determined that it will enter the CAA for the construction season, as it is required by a FERC order (noted by commenters). NMFS' unmitigable adverse impact analysis and determination is based upon our analysis of the impacts of the action on subsistence uses and the mitigation measures included in the IHA and described in this notice. As stated above, NMFS supports and encourages participation of applicants in the CAA process. Where measures likely to be identified through the CAA process are necessary to ensure an unmitigable adverse impact on subsistence uses or that the activities have the least practicable adverse impact on the affected species or stocks and their habitat (paying particular attention to the availability of the species or stock for taking for certain subsistence uses), similar or identical measures would be appropriately included in the IHA, however, NMFS does not require applicants to sign the CAA.

Substantial mitigation measures have been agreed upon to minimize potential impacts to subsistence activities as described in the Mitigation Measures section of this notice. The final IHA requires project aircraft to transit at an altitude of 457 m (1,500 ft) (except in specific circumstances, such as landing or takeoff), as included in the 2020 CAA. We note, though, that AGDC will sign the CAA in the year in which work is conducted rather than this year, so the exact mitigation measures included in the CAA are not known. However, in addition to the specific mitigation measures outlined in the IHA, the IHA requires AGDC to conduct coordination with subsistence communities to resolve conflicts and to notify the communities of any changes in the operation, as described in its POC, in addition to FERC's requirement that it sign the CAA prior to the start of construction. This additional coordination may result in additional mitigation measures, if agreed upon by the communities and AGDC.

Comment 11: Commenters stated that the IHA focuses only on pile driving and does not address other activities associated with AGDC's project, such as screeding, gravel deposition, multi-beam hydrographic surveys, barge bridge tail wall pile driving, drilling/augering noise, construction of the seabed pad. A commenter further stated that gravel deposition for the causeway widening and 31-acre (0.13 km^2) dockhead and annual screeding of 13.7 acres (0.06 km^2) of seabed will destroy habitat for marine mammals and their prey. It will also cause sedimentation and turbidity in the project area and nearby vicinity. The filling and screeding activities will suspend contaminants in the water column, which can be taken up by marine mammals or their prey. The activities will also harm benthic organisms, and the sedimentation and turbidity will adversely affect benthic organisms, plankton, and fish that are prey for marine mammals (Bluhm and Gradenger, 2008). NMFS' rationale that screeding impacts are discountable because of naturally high sedimentation and turbidity is inadequate to address the additive impacts of the construction activities.

Commenters stated that more consideration should be given to potential impacts from the sources listed above and to NMFS' decision to exclude these items from further analysis. One commenter asked NMFS to encourage organizations to deal with all aspects of a proposed project in future IHAs.

A commenter also stated that NMFS provides an unsupported claim that because annual installation of a barge bridge and construction of a seabed pad sound like ordinary construction they do not expect take from these activities. If the AK LNG project, however, were not being built these construction noises would not occur. There is no evidence that normal construction noise and activities do not take marine mammals.

A commenter stated that it is unclear if there has been discussion of the cumulative impacts from these sources (in reference to screeding, gravel deposit, and vessel traffic).

Response: AGDC did not request take for the activities listed by the commenters. NMFS considers all aspects of a project in its analysis, and concurs that take is unlikely to occur for activities other than pile driving, and therefore, has not included take for those activities in the final IHA.

As described in the proposed IHA, we do not expect take from screeding to occur as a result of AGDC's activities, however, the proposed and final IHAs include a requirement for AGDC to follow all mitigation measures described

in the biological opinion, including a shutdown zone of 215 m for screeding. NMFS has added this specific requirement to the final IHA as well.

Gravel deposition will produce a continuous sound of a relatively short duration, does not require seafloor penetration, and will affect a very small portion of habitat for marine mammals and their prey. Therefore, NMFS does not expect gravel deposition to result in marine mammal harassment. Further, a portion of the gravel deposition will occur behind sheet piles, which will act as an acoustic barrier which further supports the conclusion that take from gravel deposition is unlikely to occur.

Regarding the planned multi-beam hydrographic surveys, which AGDC will perform to identify high and low spots in the seabed prior to each season, the survey would be conducted with equipment emitting sound above 200 kiloHertz (kHz), which (as described in the Marine Mammal Hearing section of the notice of the proposed IHA (85 FR 43382; July 16, 2020)), is above the highest frequency in the generalized hearing ranges of marine mammals (35 kHz for LF cetaceans, 160 kHz for MF and HF cetaceans, 86 kHz for phocids, and 39 kHz for otariids). We do not expect these surveys to take marine mammals, as marine mammals are unlikely to hear the surveys, much less respond to them. The stranding events in Madagascar and the Gulf of California (described in Comment 12, below) involved different sources from that which AGDC plans to use, and in those events, the sources were within marine mammal hearing ranges.

NMFS included the barge bridge tail wall piles to be installed in-water in its analysis. A large portion of the barge bridge tail wall piles will be driven into dry ground, and therefore installation is unlikely to result in take of marine mammals. Please see Comment 16 for information about why NMFS does not expect take from in-air noise (such as pile driving on land).

Construction of the seabed pad includes drilling or augering holes through the sea ice, an initial through-ice bathymetric survey, and smoothing of the seabed (including potential gravel fill and installation of rock-filled marine mattresses) is not predicted to result in the take of marine mammals for the reasons described below.

Drilling/augering and the through-ice bathymetric survey are the first steps of the seabed pad preparation, which is expected to begin in February. Cetaceans are not predicted to be present in the area during this time (Quakenbush *et al.,* 2018, Citta *et al.,* 2016) and while ringed seals likely will be present, few, if any, spotted or bearded seals are likely to be present during that time (Bengston *et al.,* 2005; Lowry *et al.,* 1998; Simpkins *et al.,* 2003). Therefore, take of cetaceans from drilling/augering is not expected, and take of spotted or bearded seals is so low as to be discountable. Given that drilling/augering is expected to occur in February, prior to ringed seals establishing lairs, we would not expect ringed seals to build their lairs close enough to the project so as to be disturbed by the drilling/augering activity. The potential that a seal might be disturbed by the activity and build its lair in an alternate location due to drilling/augering is accounted for in the Level B harassment takes, which have considered all likely take by behavioral disturbance, including that which could influence lair location.

Smoothing of seabed (screeding) is unlikely to result in take, and NMFS has included a shutdown zone for screeding, as described above. Gravel deposition is not expected to take marine mammals for the reasons described above. While placement of rock-filled mattresses could result in take due to the physical presence of the equipment and mattresses, the likelihood of marine mammals being close enough to this activity to be taken is discountable, as the activity will occur in very shallow water (surface of the pad will be −6 ft (1.8 m) MLLW).

As NMFS stated in the in the *In-water Construction Effects on Potential Foraging Habitat* section, a small amount of seafloor habitat will be disturbed or covered as a result of pile driving, gravel deposition, screeding, and other seabed preparation; however, for the reasons described in that section, NMFS does not expect those activities to meaningfully impact the amount of habitat available to marine mammals, and it will not result in the take of marine mammals. Further, while the project will likely increase turbidity in the immediate project area, this increased turbidity will be very localized and of a short duration, and it is not expected to have a significant impact on marine mammal habitat for the reasons described in the *In-water Construction Effects on Potential Foraging Habitat* section of the proposed IHA. The filling and screeding activities could also result in the suspension, and potentially consumption, of contaminants by marine mammal prey, and subsequently marine mammals, as suggested by the commenter; however, given the limited duration of filling and screeding activates, we expect suspension and consumption of contaminants by marine mammals and their prey would be minimal, and would not impact the fitness of any individual marine mammal.

Installation of the barge bridge involves moving two barges into place against the mooring dolphins with tugs, where they will be ballasted and fastened to the causeway abutments and to each other. Moving the barges into place is expected to occur in a relatively slow, predictable manner, and while marine mammals do respond to vessel noise, NMFS does not expect that any behavioral responses to movement of the barges are likely to qualify as take of marine mammals. Ballasting the barges is unlikely to take a marine mammal, given the nature of the activity.

Regarding discussion of the cumulative impacts from screeding, gravel deposition, and vessel traffic, NMFS has described immediately above (and in responses to Comments 13 and 14 for vessel noise and vessel strike) why these activities are unlikely to result in the take of marine mammals and the discussion is applicable to the unlikelihood of aggregate impacts of these activities as well.

Comment 12: A commenter stated that geophysical surveys with echosounders and sonar have been linked to marine mammal harm and harassment. The proposed project will include geophysical surveys conducted prior to pipeline construction, including single-beam echosounder, multi-beam echosounder, and side-scan sonar. In 2008, an Independent Scientific Review Panel identified a multi-beam echosounder as the ''most plausible and likely behavioral trigger'' for a massive stranding event of hundreds of whales in Madagascar. In 2002, in the Gulf of California a beaked whale stranding event also correlated with a scientific research survey using multi-beam sonar. While these echosounders and sonar may have used lower frequencies than the one proposed here, it is concerning that high-power echosounders have the potential to negatively impact marine mammals across far distances from the source. NMFS failed to adequately consider the potential impacts from these surveys, and it should mitigate them with restrictions on low-frequency systems, larger safety zones, and time area closures.

Response: As stated in response to Comment 11, AGDC will perform multi-beam echosounder hydrographic surveys to identify high and low spots in the seabed prior to each season; however, the survey would be conducted with equipment emitting

sound above 200 kHz, which is outside of marine mammals' hearing ranges.

AGDC did not propose and does not plan to conduct the other activities (single-beam echosounder and side-scan sonar) suggested in this comment; therefore, NMFS did not discuss these activities in the proposed or final authorization, and did not propose or require associated mitigation.

Comment 13: Commenters stated NMFS must consider impacts from vessel noise (Erbe *et al.,* 2019). The Chukchi and Beaufort Seas have very little vessel traffic, and the Arctic's seals and whales are at risk from vessel collisions and disturbance (McFarland, 2017). The determination that vessels do not need to be considered in this rulemaking because it is ordinary vessel traffic is in error. The proposed project will include numerous vessel trips for the construction of the AK LNG facilities in a sensitive remote area. The commenter further states that NMFS calculated that there will be 184 vessel trips per year associated with the Prudhoe Bay construction. Specifically, there is a significant risk that endangered bowhead and other whales will be harassed or harmed by vessels traveling from Asia to Dutch Harbor to Port Clarence to Prudhoe Bay Offshore Staging Area (south of Reindeer Island) to the West Dock. Notably, the route could endanger North Pacific right whales. NMFS must analyze the impacts of the proposed action on North Pacific right whales whose population hovers around 26–31 individuals.

The commenter stated that NMFS must account for take by vessel traffic. First, low frequency noise from vessels tends to overlap with the communication sounds that marine mammals use, and therefore vessels can mask important communications (Southall *et al.,* 2018; Putland *et al.,* 2018; Clark *et al.,* 2009). Ship noise has been associated with decreased foraging activity for humpback whales (Blair *et al.,* 2016).

Response: AGDC requested authorization of take associated with construction activities at West Dock in Prudhoe Bay. AGDC did not predict, and did not request authorization for take from vessel noise or vessel strike associated with vessel transit, or for any other activities other than West Dock project construction activities addressed in this notice, or activities in the related AK LNG Cook Inlet rule (85 FR 50720; August 17, 2020). NMFS concurs that such take is not likely to occur. Therefore, vessel transit noted by the commenter is not within the scope of this IHA.

Because vessels will be in transit, exposure to ship noise will be temporary and relatively brief and will occur in a predictable manner, and also the sounds are of relatively lower levels. Regarding masking, elevated background noise from multiple vessels and other sources can interfere with the detection or interpretation of acoustic cues, but the brief exposures to one or two AGDC vessels at a time would be unlikely to disrupt behavioral patterns in a manner that would qualify as take. Please see Section 6.4.7 of the Biological Opinion for additional information about vessel noise, and Section 2.1.2 of the Biological Opinion for required mitigation measures associated with vessel transit.

Regarding North Pacific right whales, the species does not occur in the project area, and therefore, no take of North Pacific right whales associated with the construction activities at West Dock is expected to occur. While North Pacific right whales and bowhead whales may occur in areas where project vessels will transit, take associated with vessel noise or vessel strike is not likely to occur for the reasons stated above (vessel noise) and in NMFS' response to Comment 14 (vessel strike).

Comment 14: A commenter expressed concern about potential vessel strike associated with the AK LNG project, stating that collisions with vessels is one of the biggest threats to the world's endangered whales.

In a related comment, a commenter recommended that NMFS require AGDC to implement vessel speed restrictions of 10 knots or less to reduce the risk of marine mammal ship strikes, reduce air pollution and reduce ocean noise that can mask marine mammal communications and displace marine mammals.

Response: The potential for vessel strikes is so low as to be discountable during the construction phase of the project, given the lack of known previous ship strikes in the area (as discussed in section 6.3.2 of the Biological opinion) and the required mitigation measures for vessel transit included in Section 2.1.2 of the Biological Opinion, which are expected to further reduce the potential for vessel strikes. The mitigation measures in the Biological Opinion pertaining to vessel transit (which AGDC is required to adhere to), include a requirement for vessels traveling between West Dock/Endicott and Foggy Island Bay not to exceed speeds of 10 knots in order to reduce the risk of vessel strikes. AGDC only requested, and this IHA only authorizes, take associated with the construction at West Dock. Therefore, mitigation associated with other components of AGDC's broader AK LNG project is not included in the IHA.

Potential impacts on marine mammals from vessels involved in the construction at West Dock were also discussed in Section 4.6.3.2 of the Alaska LNG Project Final EIS. NMFS served as a cooperating agency and participated in the development of the Alaska LNG Project EIS, and adopted the Final EIS on February 16, 2021.

Comment 15: A commenter stated that ballast water and invasive species from ships can have harmful ecological impacts that may affect the Arctic habitat.

Response: The impacts of AGDC's activity on the human environment (including invasive species and ballast water management) are addressed in the Alaska LNG Project Final EIS. Please see Section 4.3.3.3 of that document for additional information regarding planned ballast water management. AGDC did not request take of marine mammals associated with the introduction of invasive species. NMFS concurs that the introduction of invasive species from the exchange of ballast water is unlikely to result in the take of marine mammals and did not authorize associated take.

Comment 16: A commenter stated that NMFS ignores out-of-water noise impacts on marine mammals. However, the marine mammals that are impacted by the proposed activities also inhabit sea ice and land above water. Some pinnipeds are equally susceptible to noise in air as in water (Kastak *et al.,* 2007). Southall *et al.* (2019) provides in-air PTS and TTS thresholds for pinnipeds.

In a related comment, a commenter stated that while NMFS admits that there are non-acoustic stressors, it nonetheless completely writes them off without any support. The commenter cited the following from the notice of the proposed IHA: ''Potential non-acoustic stressors could result from the physical presence of the equipment and personnel; however, any impacts to marine mammals are expected to primarily be acoustic in nature.''

Response: In-air stressors and non-acoustic stressors, such as the physical presence of land-based equipment and personnel, are not expected to affect cetaceans, given that cetaceans are present only in the water at some distance from shore and the activity and remain under water the majority of the time, and therefore are not expected to be exposed to these stressors. While AGDC may use barges to stage land-based equipment during some activities, these barges would be stationary, and at

the project site where the water is extremely shallow (less than 14.2 ft. (4.3 m) at West Dock); therefore, we do not expect bowhead whales to occur close enough to the barge or equipment to be disturbed by its presence. Given the rare occurrence of beluga whales within the barrier islands, as evidenced by Block 1a ASAMM survey data, we expect the potential for beluga whales to be disturbed by barges to be so low as to be discountable. (Block 1a encompasses the area between the shoreline and the barrier islands, including Prudhoe Bay. ASAMM reports include just one beluga whale was observed in survey Block 1a in 2018.) We also do not expect gray whales to occur close enough to the barge or equipment to be disturbed by its presence, as gray whales rarely occur within the barrier islands, as also evidenced by Block 1A ASAMM surveys.

As stated in the *Acoustic Impacts* section of the notice of the proposed IHA, there are no known pinniped haulouts near the project location. Therefore, it is unlikely that pinnipeds would be taken by exposure to in-air noise during the open water season. While there is a chance that a pinniped could swim by the construction site with its head out of the water during on-land construction such as pile driving, and be taken by Level B harassment, the likelihood of that occurring is so low as to be discountable. Additionally, there is a small chance that an individual animal could haul out in an area that is not a normal haulout site, but the chance of that occurring is also discountable. Further, if AGDC must work during their contingency period, they will begin pile driving prior to March 1 (see Mitigation Measures), so we would not expect ringed seals to build their lairs close enough to the project site to be taken by in-air sound during the contingency period, other than potentially by building their lair in an alternate location due to construction noise, as discussed in NMFS' response to Comment 27.

While the presence of non-acoustic stressors could affect pinnipeds, a pinniped in the water that is close enough to be disturbed by a non-acoustic stressor is likely to have already been counted as taken due to in-water noise from activities occurring in the water. As noted above, while there is a chance that a pinniped could swim by the construction site with its head out of the water, or haul out in an area that is not a normal haulout site, and be taken by Level B harassment due to non-acoustic stressors, it is so unlikely as to be considered discountable.

Therefore, while a pinniped could be taken due to disturbance from in-air or non-acoustic stressors during construction, we would expect very few of these takes, if any. Further, any such takes would be within the margin of error in the take estimate and their potential effects fully considered in the analysis. Accordingly, additional takes from non-acoustic stressors have not been added into this final IHA.

Comment 17: A commenter stated that aircraft transportation is also part of the project; however, NMFS has completely ignored the impacts of aircraft noise and disturbance. Ice seals are sensitive to out-of-water noise, including hauling out in response to aircraft noise (Bradford *and Weller,* 2005; Born *et al.,* 1999).

Response: NMFS assessed the impacts of aircraft and does not expect aircraft noise from this project to result in the take of marine mammals. Born *et al.* (1999) analyzed ''escape responses'' (*i.e.,* hauled out animals entering the water) from an aircraft and a helicopter flying at an altitude of 150 m. The results of the study indicated that if the aircraft do not approach the seals closer than 500 m at that altitude, the risk of flushing the seals into the water can be greatly reduced. While Bradford and Weller (2005) note that helicopter presence resulted in flushing of most of the hauled out seals during observations, they did not note specific distances of the helicopter at which flushing occurred.

The final IHA includes a requirement that all aircraft must transit at an altitude of 457 meters (m) (1,500 feet (ft)) or higher, to the extent practicable, while maintaining Federal Aviation Administration flight rules (*e.g.,* avoidance of cloud ceiling, etc.), excluding takeoffs and landing. This altitude is significantly higher than the 150 m aircraft and helicopter altitudes analyzed in Born *et al.* (1999). If flights must occur at altitudes less than 457 m (1,500 ft) due to environmental conditions, aircraft will make course adjustments, as needed, to maintain at least a 457 m (1,500 ft) separation from all observed marine mammals. Helicopters (if used) will not hover or circle above marine mammals.

Comment 18: A commenter stated that NMFS' improperly narrowed analysis to only consider pile driving and removal activities is arbitrary because so many of the activities that are part of the project will also cause take of marine mammals. This resulted in an underestimate of take and improperly segmented the negligible impact determination. Additionally, many of these activities will take place over the multiple years and are therefore inappropriate for approval under an IHA.

Response: First, activities other than pile driving and removal are not expected to result in the take of marine mammals for the reasons described in NMFS' responses to Comments 11 through 17 and the associated sections of this notice and the notice of the proposed IHA. The take estimate reflects the best available science, and a negligible impact determination is supported by the analysis in the Negligible Impact Analysis and Determination section of this notice and the notice of the proposed IHA. An IHA is appropriate, as AGDC expects the construction at West Dock, for which it requested authorization for the take of marine mammals, to occur over one year, and no serious injury or mortality is expected or authorized. While other project components associated with the AK LNG project may occur over a longer timeframe than just one year, we do not expect these activities to result in take for the reasons described in NMFS' Comment responses indicated above, and the associated sections of this notice and the notice of the proposed IHA.

Second, the MMPA specifically provides for issuance of IHAs for periods of not more than one year, provided the appropriate findings are made, even when the activities associated with a larger project are expected to span multiple years.

Comment 19: A commenter stated that additional potential impacts from activities which NMFS does not expect take (see Comments 11 through 17), as well as the proposed Level A harassment, should have been outlined in analysis and in the POC, as well as and in the meetings with the potentially affected communities.

Response: Regulations at 50 CFR 216.104(a)(12) require IHA applicants conducting activities in or near a traditional Arctic subsistence hunting area and/or that may affect the availability of a species or stock of marine mammals for Arctic subsistence uses to provide a POC or information that identifies what measures have been taken and/or will be taken to minimize adverse effects on the availability of marine mammals for subsistence purposes. A plan must include a statement that the applicant has notified and provided the affected subsistence community with a draft POC, a schedule for meeting with the affected subsistence communities to discuss planned activities and to resolve potential conflicts regarding any aspects of either the operation or the POC, a description of what measures the

applicant has taken and/or will take to ensure that planned activities will not interfere with subsistence whaling or sealing; and what plans the applicant has to continue to meet with the affected communities, both prior to and while conducting the activity, to resolve conflicts and to notify the communities of any changes in the operation. The POC includes these required components. It is not necessary for the POC to include a full discussion of the project and its impacts, as the relevant activities are addressed in an applicant's IHA application and NMFS' **Federal Register** notice of the proposed authorization (85 FR 43382; July 16, 2020).

Comment 20: A commenter stated that AGDC needs to consult with NMFS, the NSB, and the AEWC to ensure that there are enough acoustic monitoring devices deployed and placed in the most appropriate locations and distances from West Dock. Additionally, multiple commenters recommended that NMFS require AGDC to implement the acoustic monitoring suggestions provided by the PRP, including real-time PAM. In a related comment, a commenter stated that while requiring one passive acoustic monitoring device, NMFS did not require any real-time monitoring of it. The device will be used only to collect sound source level and general presence of marine mammals after the fact. The commenter stated that despite the potential usefulness of PAM given that this is a stationary activity, NMFS failed to use it for avoiding impacts to marine mammals. Another commenter also invited AGDC and NMFS to investigate other methods to mitigate these impacts.

Response: NMFS and AGDC have had extensive discussions about potential mitigation for marine mammals, including measures recommended by the PRP and by commenters. AGDC has consulted further with NSB and AEWC and intends to continue to do so, as stated in the POC. The required mitigation included in this final IHA ensures that AGDC's activities will have the least practicable adverse impact on the affected species and stocks, as well as subsistence uses of those species and stocks. Since publication of the proposed IHA, NMFS and AGDC have determined that it is practicable for AGDC to deploy three hydrophones in its PAM setup during the open-water season, as suggested by the PRP, rather than just one as stated in the proposed IHA. Please see AGDC's monitoring plan for additional information on the planned location for each device. If work is required during the ice-covered contingency period, AGDC will deploy one hydrophone during that construction. Additional hydrophones during this period are not expected to provide meaningful additional data, as stated in NMFS' response to Comment 24. Further, NMFS does not expect the use of PAM to conduct real-time mitigation to be notably more effective in minimizing impacts than the included requirements due to the limited expected marine mammal vocalizations expected during the project period. Moreover, the significant additional cost and effort associated with real-time PAM implementation are impracticable. Therefore, in consideration of these limitations, further described in the *Monitoring Plan Peer Review* section of this notice, NMFS did not require AGDC to use PAM to conduct real-time mitigation.

Comment 21: A commenter stated that this IHA is for activities that are not set to begin for almost 2 years from the date of publication—July 1, 2022 to June 30, 2023—and will require a renewal. While the bulk of the noise will occur in the first year, the associated activity is likely to span six years. Section 101(a)(5)(D) is intended for projects limited to one year—beginning to end. The current project is much greater in time and in its scope of potential impacts than Congress intended.

Response: As noted in the Changes from the Proposed IHA to Final IHA section, AGDC now expects to begin construction in 2023, and therefore, the effective date of the final authorization is one year later than proposed.

While AGDC's inland construction is expected to occur over six years, AGDC plans to conduct the activities that are expected to result in the harassment of marine mammals within one year. Furthermore, while 101(a)(5)(D) may only authorize take of marine mammals for a duration of one year, the statute does not limit use of this section to activities that last one year or less. AGDC has requested authorization for activities that are expected to occur within one year, the activities are not expected to result in serious injury or mortality, and an IHA is appropriate.

Regarding the start date, while the start date is not until July 2023, the IHA includes a provision stating that the authorization may be modified, suspended or revoked if NMFS determines: (1) The authorized taking is likely to have or is having more than a negligible impact on the species or stocks of affected marine mammals, (2) the authorized taking is likely to have or is having an unmitigable adverse impact on the availability of the affected species or stocks for subsistence uses, or (3) the prescribed measures are likely not or are not effecting the least practicable adverse impact on the affected species or stocks and their habitat.

Regarding renewals, NMFS issued a one-year IHA with the understanding that AGDC can complete the planned work for which the IHA authorizes take within the one-year period. As necessary, NMFS makes the decision of whether or not to issue a Renewal after one is requested based on current information and the best available science, and in adherence with the renewal criteria described in the notice of the proposed IHA (85 FR 43382; July 16, 2020). NMFS may issue a one-time, one-year Renewal IHA if upon review of the request for Renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings in the initial IHA remain valid.

Comment 22: A commenter stated that it is supportive of industrial activities that balance the development of resources and protection of subsistence resources to ensure our people meet their nutritional and cultural needs. The NSB and its residents not only benefit from the financial revenue generated by industry but also continue to rely upon subsistence resources. Balanced development helps fund State and NSB programs that provide many services for our residents while also ensuring the continued access to subsistence resources that our people have used for millennia. The AGDC's proposed project is likely such an example, but some of the mitigation and monitoring aspects need to be strengthened. In order for this balanced development to occur adequately, we need to have (1) quality baseline information about resources, (2) effective mitigation measures, and (3) appropriate monitoring.

Response: This final IHA reflects the best available scientific information. NMFS has responded in separate comment responses to the commenter's specific recommendations regarding mitigation and monitoring measures.

Comment 23: A commenter stated that the potential impact on ringed and bearded seals is a concern as is the inability of AGDC to effectively monitor the ensonified area. Monitoring the entire area is needed in order to mitigate possible takes and to estimate the actual number of takes relative to those that are permitted. The commenter further stated that it is important that industrial activities are mitigated as much as possible to reduce possible impacts to

their hunters' ability to land whales, given challenges during the 2019 whaling season. A commenter stated that because Level A harassment takes could result in injury or mortality, observers play an important mitigation role. If a marine mammal is about to enter or is within the Level A harassment zone, the observer must halt operations to prevent injury. NMFS should require AGDC to have a monitoring plan that allows observers to see the entire Level A monitoring zone.

In a related comment, a commenter stated that NMFS failed to meet the least practicable adverse impact standard because the proposed shutdown zones are smaller than the Level A harassment zones. The commenter asserts that NMFS failed to ensure that ice seals are adequately protected from take, and that rather than adopting more effective monitoring methods for the shutdown zone such as passive acoustic or thermal monitoring in response to the PRP's comment that PSOs would be unable to adequately monitor the shutdown zone, NMFS decreased the shutdown zone to 500 m for seals.

Commenters stated that previous monitoring for oil and gas projects show that sightability curves begin to drop off at ~1 km for whales and ~200 m for seals even when conditions are suitable for seeing marine mammals (LGL *et al.,* 2011, Figures 3.28 and 3.44). This means that whales and seals beyond those distances would be very difficult, if not impossible at times, to see. The result of this difficulty could be misinterpretations of data, such as a downward bias in estimated takes. The situation is even worse during inclement and windy weather or in low light conditions and at night. Observers stationed near the pile driving activities would not be able to adequately monitor the entirety of Level A zones.

Regarding Level B harassment, a commenter stated that monitoring the Level B harassment zone is required by NMFS so that IHA applicants can estimate how many marine mammals they disturbed during the construction activities. This is important to ensure that Level B harassment takes are kept small and do not exceed those allowed by NMFS. Monitoring and mitigating impacts are especially important for marine mammals that are important for subsistence.

In order to estimate the number of Level B harassment takes, there needs to be adequate monitoring of the Level B harassment zones. Currently, AGDC is planning to have observers at West Dock and use some passive acoustic monitoring. We expect that AGDC is planning to use observations within the viewable zone of observers and somehow expand those observations to the entire Level B zone to estimate takes. The Open Water PRP did a good job of explaining the weaknesses and difficulties of using this approach. NMFS should take advantage of the expertise of that panel and implement their recommendations on how to improve visual monitoring.

Response: NMFS is required to include measures that ensure the least practicable adverse impact, as we have done here, but the MMPA does not require applicants to mitigate to avoid all takes. In this case, shutdown zones that encompass the vast majority of the Level A harassment zones (all but the outer portion of the phocid zone for impact pile driving, and an extremely small (6 m) portion of the mid-frequency (MF) cetacean zone during impact driving of 48-inch piles) have been required, resulting in avoidance of Level A harassment for all but minimal numbers for three pinniped stocks, and minimization of more severe Level B harassment. Monitoring of these shutdown zones is expected to be effectively accomplished with the monitoring protocols outlined below.

The least practicable adverse impact standard includes a practicability component, and it is not practicable for AGDC to observe the entire Level A harassment zone for all species during all activities, given that the largest Level A harassment zone for phocids is estimated to be 843 m. The potential impacts of the activity were appropriately considered in the analysis, and given that the shutdown zones do not include the entire estimated Level A harassment zones for all activities, the IHA authorizes Level A harassment take of ringed, spotted and bearded seal, in case an animal enters the Level A harassment zone and remains in the zone for a long enough period to incur PTS. (Given the duration component associated with calculation of Level A harassment zones, a marine mammal that enters A Level A harassment zone does not always incur PTS.) There is no evidence suggesting that PTS (especially of the small degree that could potentially result from exposure to the pile driving in this activity) has the potential to cause mortality. As described in the Negligible Impact Analysis and Determination section, animals that experience PTS will likely only receive slight PTS, *i.e.,* minor degradation of hearing capabilities within regions of hearing that align most completely with the frequency range of the energy produced by pile driving, *i.e.,* the low-frequency region below 2 kilohertz (kHz), not severe hearing impairment or impairment in the regions of greatest hearing sensitivity. If hearing impairment occurs, it is most likely that the affected animal will lose a few decibels in its hearing sensitivity, which in most cases is not likely to meaningfully affect its ability to forage and communicate with conspecifics. The visibility distances cited by the commenter were also cited by the PRP, and originate from ship-based PSO observations in the Chukchi Sea (LGL *et al.,* 2011). As NMFS described in the *Monitoring Plan Peer Review* section of this notice and the notice of the proposed IHA, while the 500 m shutdown distance for phocids is greater than the 200 m estimated by the PRP, AK LNG project PSOs will observe from elevated platforms on shore. Shore-based PSOs typically have greater visibility than vessel-based PSOs, and the elevation is expected to increase the distance that PSOs can effectively observe. NMFS consulted with AGDC and its contractor, who has extensive experience conducting monitoring for marine mammals on the North Slope of Alaska, and given the elevated PSO sites and equipment, AGDC expects that PSOs will be able to effectively observe phocids at distances up to 500 m, large cetaceans at 2–4 km, and belugas at 2–3 km, and NMFS concurs. Therefore, the shutdown zones included in the proposed and final IHA are the largest practicable for AGDC to implement, and that PSOs will be able to effectively observe marine mammals within. However, we note that the biological opinion includes a requirement for proportionate monitoring at all distances within the Level A harassment zone, such as a wedge of a circle, where that wedge contains at least 10 percent of the total zone (*i.e.,* a 36 degree wedge), in the event that PSOs cannot fully observe the Level A harassment zone.

As noted above, the shutdown zones are expected to minimize the potential for more severe Level B harassment take of marine mammals. However, monitoring requiring that PSOs observe the entire Level B harassment zone is not included, as it is not practicable, given the zone sizes. Monitoring the full zones would require multiple vessels, which is a great expense, potential safety risk to PSOs, and would result in additional vessel traffic in the project area. Given that AGDC is attempting to complete construction during the open-water period and the extended daylight on the North Slope during that time, the majority of the work will be completed during daylight hours, despite AGDC's

plans to work 24 hours per day. Additionally, as stated in the *Mitigation for Marine Mammals and Their Habitat* section, PSOs will test and use night vision devices (NVDs) and infrared (IR) for nighttime and low visibility monitoring. The IHA also requires AGDC to record visibility conditions every 30 minutes throughout construction, which will inform the portion of the Level A and Level B harassment zones PSOs were able to observe.

The monitoring required by the final IHA, as well as the biological opinion, will allow NMFS to have an estimate of the actual number of takes that result from the activities relative to the number authorized. PSO observations in the area visible to them will provide a good sample of the actual takes of marine mammals. Additionally, the final IHA also includes a requirement for AGDC to deploy three hydrophones during the open-water season, and one during the contingency period (should construction be required during that time) to conduct PAM. While these devices will not be monitored in real-time or used for the purposes of implementing mitigation, PAM detections of marine mammals will further inform the actual number of takes that result from the activities relative to the number authorized. Please see the Monitoring and Reporting section for additional information.

For the reasons described in the *Monitoring Plan Peer Review* section of this notice, NMFS is not requiring AGDC to use the distance sampling methods recommended by the PRP.

Comment 24: Commenters expressed concerned that NMFS may allow pile driving to occur during the ice-covered season. When ice covers the Beaufort Sea, seals continue to use the area for feeding and pupping. Monitoring seals under ice, especially to prevent Level A takes and avoid serious injury or mortality, is next to impossible. Additionally, because the ocean and lagoons are ice covered, it is more risky to seals because they cannot simply stick their heads out of the water to avoid loud sounds. The commenter stated that if NMFS is going to allow AGDC to conduct pile driving during ice-covered period, adequate monitoring, that must include acoustic monitoring, should be required by NMFS. A commenter also said that disturbing or injuring seals could impact subsistence hunting and resources. In a related comment, a commenter questioned whether options to pile drive have been considered during the winter months.

Response: AGDC has considered the potential to conduct pile driving during its winter/spring contingency period. However, AGDC intends to complete construction during the open-water season when the additional ice-related concerns raised by the commenter are not a concern, and seals are not building or using lairs. If AGDC does conduct construction during the ice-covered season, it will implement mitigation and monitoring measures for seals that are expected to avoid injury of seals, and minimize potential disturbance of seals, as described in the Mitigation Measures section of this notice, in NMFS' response to Comments 9 and 44, and in the *Monitoring Plan Peer Review* section of this notice.

AGDC is highly motivated to complete work during the open-water season, as work during the ice-covered winter/spring contingency period would require additional equipment and include other constraints.

Regarding monitoring, if construction during the contingency period is required, AGDC will deploy one hydrophone for PAM of marine mammals. Additional hydrophones during the contingency period are not warranted, as we do not expect cetaceans to be present in the area during this time (Quakenbush *et al.,* 2018, Citta *et al.,* 2016) and while ringed seals likely will be present, few, if any, spotted or bearded seals are likely to be present during that time (Bengston *et al.,* 2005; Lowry *et al.,* 1998; Simpkins et al., 2003). NMFS is not requiring AGDC to place the hydrophone in a certain location, as the location will depend on conditions in the construction year. As requested by the NSB and AEWC, if construction is required during the contingency period, AGDC will submit an acoustic monitoring plan to NMFS and AEWC for review once contractor is selected, but prior to the construction season. While the device will not be monitored in real-time or used for the purposes of implementing mitigation, PAM detections of marine mammals will further inform the actual number of takes that result from the activities relative to the number authorized.

Regarding whether alternatives to pile driving have been considered, the Alaska LNG Project Final EIS identifies the alternatives that FERC and AGDC considered and assesses their impact on the human environment. The MMPA requires that NMFS analyze the specified activity that the applicant proposes (in this case, pile driving) in the context of the standards described in section 101(a)(5)(D), and issue an authorization provided the necessary findings are made. As described in this notice, NMFS has made the necessary determinations and issued the authorization.

Comment 25: A commenter urged NMFS to withdraw its proposed IHA to allow the incidental take of marine mammals for the AK LNG Project in Prudhoe Bay. The commenter states that the project threatens the survival of threatened and endangered bowhead whales, ice seals, and other Arctic wildlife.

Response: As described in this notice, NMFS has made the necessary findings, as required by Section 101(a)(5)(D) of the MMPA and NMFS' implementing regulations, and therefore, withdrawing the proposed IHA was not warranted. The best available information does not indicate that this authorization threatens the survival of threatened and endangered bowhead whales, ice seals, and other Arctic wildlife as suggested by the commenter.

Comment 26: A commenter stated that NMFS underestimated take from acoustic stressors. The commenter asserted that there are several concerns with the estimates of take from pile driving and removal. Some marine mammals are more sensitive to noise, behavioral harassment was inadequately considered, and NMFS' density estimates are problematic. The commenter references specific examples of effects of noise on bottlenose dolphins, beluga whales, harbor porpoises, harbor seals, and bowhead whales.

The commenter further stated that NMFS also does not take into account that bowhead whales travel in groups of two to five whales (Clarke *et al.,* 2018; 2019). Fall activities will also result in higher takes of bowhead whales that occur in greater densities in September and October. NMFS also assumes that bowhead whales do not occur nearshore in waters less than 15 ft (4.5 m); however, a recent tagging study found that immature whales aggregate in shallow waters and that habitat degradation or displacement from shallow aggregation areas could have energetic costs for these young whales (Harwood *et al.,* 2017).

The commenter suggests that a recent study shows that beluga whales have sensitive hearing (Mooney *et al.,* 2018). Beluga whales in the Beaufort Sea have site fidelity (Clarke 2018) and animals with site fidelity can be more vulnerable to noise impacts (Forney *et al.,* 2017). Beluga whales also move into estuaries in the summer to rub on the substrate to molt (Anderson *et al.,* 2017), which could mean that they are present in

Prudhoe Bay in higher densities in the summer.

Response: NMFS is aware that some species of marine mammals are more sensitive to noise than others and considers such sensitivity in development of mitigation measures. Of note, bottlenose dolphin and harbor seal do not occur in the project area, and specific examples of effects to these species are not relevant to this action. Harbor porpoises are considered to be extremely rare in the Beaufort Sea, particularly in the project area (Megan Ferguson, pers. comm., November 2019), and therefore no harbor porpoise take was proposed or authorized, and sensitivity of harbor porpoise to noise is also not relevant to this action. Regarding sensitivity of bowhead whales, the commenter references multiple papers regarding bowhead whale behavioral reactions to seismic airguns (please see CBD's letter for additional details), which are not part of this action. However, NMFS does recognize bowhead sensitivity to noise, and is requiring that during the Nuiqsut whaling season, AGDC must cease pile driving and vessels must transit landward of Cross Island to prevent potential impacts to bowheads during that important subsistence hunting period.

Regarding the comment that NMFS did not consider bowhead whale group size, the densities calculated from the ASAMM surveys inherently consider group size, as they are calculated in consideration of many animals over a large area. (NMFS notes that for gray whale, it considered group size in addition to the density-based take calculation, as the calculation resulted in a number of takes that was smaller than the typical group size.)

Regarding the presence of bowhead whales in shallow water, the paper referenced by the commenter (Harwood *et al.,* 2017) references Koski *et al.* (1988) and Koski and Miller (2009), which found that immature bowhead whales that summer on the Beaufort shelf occur in shallow water, considered to be <20 m (65.6 ft). This is far deeper than the Level A harassment zone (approximately 5.8 m (19 ft) deep at the isopleth) where NMFS has determined bowhead whales are not likely to occur, as no bowhead whale has been recorded in waters less than 16.4 ft (5 m) deep (Clarke and Ferguson 2010). Further, there have been no bowhead whales observed in Block 1a during ASAMM surveys since they began in 2016, further supporting NMFS' conclusion bowhead whales are not expected to occur within the Level A harassment zone during construction. Block 1a encompasses the area between the shoreline and the barrier islands, including Prudhoe Bay.

The beluga whale density estimates included in this notice reflect that beluga whales are more likely to be present in higher densities in the summer; however, NMFS conservatively used the summer density to estimate potential Level B harassment takes during all work, not just the portion likely to occur in the summer months. Additionally, the summer density is expected to be an overestimate for the AK LNG analysis, even for the summer months, because the data is based on sighting effort outside of the barrier islands, and beluga whales rarely occur within the barrier islands, as evidenced by Block 1a ASAMM survey data. One beluga whale was observed in survey Block 1a in 2018. However, this sighting was a ''sighting on search,'' meaning that the sighting occurred off of the survey transect, and therefore was not included in the density calculation. There have been no other Block 1a beluga sightings reported from ASAMM surveys to date. Therefore, the authorized number of takes by Level B harassment of beluga whale are likely an overestimate. Even if a beluga whale did respond to the construction noise to a degree that is considered a take by Level B harassment outside of the Level B harassment zone, such a take is likely within the margin of error of the take estimate.

Comment 27: A commenter stated that NMFS irrationally discounted behavioral harassment that amounts to take. NMFS admits that behavioral harassment that displaces marine mammals from important feeding or breeding area for a prolonged period could be significant; however, it failed to ever consider whether the behavioral harassment resulting from the proposed activities amounts to take. For example, NMFS mistakes displacement of seals for mitigation when it relies on construction activities to discourage seals from building lairs near the project.

Response: Winter and spring construction activities could result in the disruption of a ringed seal's behavioral patterns (*i.e.,* if a seal would have otherwise built a lair in the project area, it could be displaced). However, a seal which is taken by Level B harassment by behavioral disturbance (causing it to build its lair in a different location) would still be counted as one take by Level B harassment, though it is important to consider how the impacts of different types of take may impact an individual. Given that the average ringed seal ice structure density in the vicinity of the project area is 1.58 structures per km^2 (Table 11), and the in-air impact area of the project extends approximately 16.8 m from the project location, it is unreasonable to expect that more than a few takes from the displacement of seal lair construction, an above water behavior, would occur. These few specific potential takes are covered by the take estimate and authorization and their impacts have been appropriately considered in the analysis. There are many other available locations for the seals to construct their lairs away from the project area, so potentially preventing a few individual seals from constructing lairs in the project area is not expected to negatively affect pupping success. NMFS also notes that construction is only expected to occur during this contingency period if AGDC is unable to complete construction during the open-water season, and NMFS expects that if AGDC works during the contingency period, it would be because of construction delays (and therefore, days on which they did not work) during their planned open water work season.

Comment 28: A commenter stated that NMFS assumed that prey would not be affected by the proposed activities, which is especially problematic because in only looking at the narrow one-year period, NMFS ignored the multiyear impacts of the proposed activities that will continue for at least six years. The commenter further states that NMFS acknowledges prey fish will avoid area during pile driving, but without support anticipates a ''rapid return to normal recruitment, distribution and behavior.'' Pile driving causes fish mortality and behavioral responses, including dispersing schools of fish (Casper *et al.,* 2017; Hawkins *et al.,* 2014; Herbert-Read *et al.,* 2017).

Response: As stated previously, AGDC requested take for pile driving associated with construction at West Dock, and NMFS concurs with AGDC's assessment that other activities raised by the commenter are not expected to cause the take of marine mammals, as described in response to Comments 11 through 17. Impacts to prey species resulting from the specified activity described in AGDC's application (*i.e.,* the construction activities at West Dock and associated pile driving) are, as appropriate, addressed in NMFS' analysis; however, it is not appropriate to consider impacts on prey from activities that are not part of the specified activity (*i.e.,* those that do not occur during the year that this IHA covers).

NMFS acknowledged in the notice of proposed IHA that ''potential prey (*i.e.,*

fish) may avoid the immediate area due to the temporary loss of this foraging habitat during pile driving activities. The duration of fish avoidance of this area after pile driving stops is unknown, but we anticipate a rapid return to normal recruitment, distribution and behavior'' (Hastings and Popper, 2005, Popper and Hastings, 2009). Further, in the *In-water Construction Effects on Potential Prey* section of the notice of proposed IHA and this notice, NMFS acknowledges that ''[sound pressure levels (SPLs)] of sufficient strength have been known to cause injury to fish and fish mortality,'' however, the West Dock area already has limited prey availability, and therefore, even if fish mortality did occur, we would expect that marine mammals would forage elsewhere in the vast foraging area available to marine mammals outside of the immediate project area.

Comment 29: A commenter stated that NMFS underestimated take because its density estimates were wrong. For example, the density estimates for ringed seals were not corrected for unobserved animals. Also, lacking data for the summer and fall, NMFS simply cut density estimates by 50 percent without any rational basis for choosing this percentage.

Importantly, NMFS not only relied on old density data for winter, but it also incorrectly calculated the density. While NMFS said that the most recent [ASAMM] surveys did not specify species, it is worth noting that NMFS relied on proportionality measures for determining the density of other seal species and could have done the same to use newer survey data. For example, for spotted seals NMFS assumes that they are 20 percent of seals and bearded seals are 17 percent of sightings. This same approach could be used to determine seal densities with more recent surveys (Clarke *et al.,* 2020).

Response: NMFS worked directly with Dr. Megan Ferguson of the National Marine Mammal Laboratory (NMML), one of the authors of the ASAMM reports, to calculate the cetacean densities using the available ASAMM survey data at the time (through 2018). NMFS has discussed the more recent 2019 surveys in the *Marine Mammal Occurrence* and *Estimated Take* sections of this notice. Further, while we expect that new ASAMM data will likely become available between the time that this IHA is issued and when AGDC begins work, given that the new data would be averaged with previous observations (beginning in 2011 for bowhead and gray whale and 2014 for beluga whale), we do not expect that new survey data would have more than a minor effect on the densities or estimated take calculations for cetaceans.

Regarding the phocids take estimates, NMFS noted the limited availability of recent data in the notice of proposed IHA. As stated by the commenter, and in the notice of the proposed IHA, the ringed seal densities used to estimate take are not corrected for unobserved animals, and therefore may result in an underestimated density. However, as also noted, the fact that density calculations were conservatively calculated only from sightings observed in water depths greater than 10 ft. (3 m) (Moulton *et al.,* 2002a, Moulton *et al.,* 2002b, Richardson and Williams, 2003), while the water surrounding the project site is shallow (less than 14.2 ft. (4.3 m) at West Dock), is likely to result in some degree of overestimation of density. Also for ringed seals, as stated by the commenter, NMFS estimated that the summer ringed seal density would be 50 percent of the spring density, as also calculated for the Liberty Drilling and Production Island Final Rule (84 FR 70274; December 20, 2019). The surveys were flown in the spring, when the greatest percentage of seals have abandoned their lairs and are hauled out on the ice (Kelly *et al.,* 2010) and therefore provide the best available information on ringed seal densities. During the summer, ringed seals range considerable distances; ringed seals make trips farther offshore to find sea ice during the summer (Von Duyke *et al.,* 2020), supporting the expected lower densities in the coastal project area during the summer months in comparison to the spring when ringed seals mostly haul out on the ice. Therefore, NMFS continued to estimate the summer ringed seal density as 50 percent of the spring ringed seal density in the final IHA. NMFS has appropriately considered the best available, though limited, data regarding the density of ringed seals in both the density and take estimates.

The commenter recommended that NMFS use the 2019 ASAMM surveys (Clarke *et al.,* 2020) which were conducted during summer and fall 2019, to apply a method of estimating proportionality of seal species with that data, similar to which NMFS did in the proposed IHA with the Northstar data. While the ASAMM data is more recent, most ASAMM pinniped observations are not identified to species, and pinniped observations in the ASAMM surveys include walrus observations. The reports used in the take calculation in this IHA to determine proportionality of seals in the project area do not all include walrus observations. Therefore, it is not appropriate to apply these same proportions to the ASAMM data. NMFS is unaware of, and the commenter has not offered, more recent alternative sources that are appropriate for calculating proportions of all pinnipeds in the Beaufort Sea, including walrus.

Comment 30: A commenter stated that NMFS' decision that take would only occur on 123 days rather than the AGDC's estimated 164 days is arbitrary and underestimates take. NMFS says that AGDC will complete construction during the April to October season and therefore the take will overlap with some piles being installed on the same day and thus only occur on 123 days, and therefore, NMFS also cuts the estimated marine mammal take by 25 percent. But then it allows for a contingency period in case the construction takes longer. The commenter states that activities during the contingency period will have increased impacts that have not been adequately analyzed. Moreover, NMFS states that ''AGDC will only operate one hammer at a time during all pile driving;'' which may mean that not more than one pile is installed on the same day. This underestimates both the negligible impact and small numbers determination.

Response: As stated in the notice of the proposed IHA, AGDC expects to conduct the planned construction between July and October. As described in that notice, NMFS recognizes that AGDC may work outside of this period in their February to April contingency period; however, we expect that if AGDC works during the contingency period, it would be because of construction delays (and therefore, days on which they did not work) during their planned open water work season, rather than additional construction activity or time, and we expect that construction during that period would be very limited. Therefore, work during the contingency period is already accounted for in the take estimate and is not expected to meaningfully change the number of takes of marine mammals.

Additionally, as stated in the Description of Marine Mammals in the Area of Specified Activities section of the notice of the proposed IHA, ringed seals and bearded seals are the only species of marine mammals that may occur in the project area during the winter/spring contingency period. Therefore, for all other species, work during the contingency period rather than the open water season would likely reduce the number of takes from the project. Bearded seal densities are expected to be much lower in the

winter/spring than in the summer/fall, as noted in Table 12 of this notice. Therefore, if work is required during the contingency period due to construction delays during the open water season, takes of bearded seals are also expected to be lower than we have estimated in this authorization. For ringed seals, as NMFS noted in its response to Comment 27, there is a chance that a few seals could choose not to construct lairs in the project area due to construction noise in the contingency period, should construction occur during that time. However, as noted previously, construction during the contingency period, if any, is expected to be very limited. Further, the majority of the project area in Prudhoe Bay is of 3 m depth or less, and is expected to be dominated by bottomfast ice in Feb–April. Far fewer animals will be exposed to spring-based work because shorefast ice will be stationary, and only those seals that have breathing holes or lairs near the project are expected to be exposed.

As stated by the commenter, and in the notice of the proposed IHA, AGDC will only operate one hammer at a time during all pile driving. The expected pile installation rate and number of piles AGDC expects to install per day incorporates the planned use of just one hammer at a time. Therefore, these estimates directly informed the expected amount of time spent pile driving in one day and therefore, the resulting take estimates on each construction day. Additionally, the plan to operate only one hammer at a time does not mean that multiple hammers (of the same or different types) cannot be used on the same day. Rather, it only means that one hammer can actually be operating, and therefore producing sound, at any given time.

Comment 31: A commenter stated that NMFS' definition of small numbers conflates this criterion with the negligible impact requirement. Although NMFS uses different headings for its small numbers and negligible impact findings, by defining small numbers to be relative to the overall population the criterion ends up being similar to the negligible impact finding.

The commenter further stated that instead, the small numbers requirement is intended to protect individual marine mammals. As the Ninth Circuit stated in *Center for Biological Diversity* v. *Salazar*, ''[l]egislative history confirms our reading of the statute if such confirmation is needed. The House Report accompanying Section 101(a)(4)–(5) of the MMPA indicates that Congress intended '' 'small numbers' '' and '' 'negligible impact' '' to serve as two separate standards'' (*Center for Biological Diversity* v. *Salazar,* 695 F.3d 893 (9th Cir. 2012)). The requirement that NMFS authorize the take of only ''small numbers'' of individual animals is no mere technicality. Congress's intent was that the MMPA protect not only populations, but individual marine mammals. While the ''negligible impact'' standard should serve to protect the species or population as a whole, the ''small numbers'' requirement guarantees that Congress's directive to protect individual marine mammals is carried out.

The commenter asserts the IHA fails to ensure that only small numbers of bowhead whales, ice seals, and the other marine mammals impacted by the AK LNG activities will be taken.

Response: NMFS did not conflate the small numbers determination with the separate, negligible impact determination. These analyses and determinations are not only discussed under separate headings, as noted by the commenter, but are also analyzed using separate criteria.

As stated in the small numbers section, the MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted number of individuals to be taken is fewer than one third of the species or stock abundance, the take is considered to be of small numbers. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities. NMFS directly stated in the Small Numbers section of the proposed IHA, and this final IHA, that ''Our analysis shows that less than one-third of the best available population abundance estimate of each stock could be taken by harassment (in fact, take of individuals is less than two percent of the abundance for all affected stocks). The number of animals proposed to be taken for each stock would be considered small relative to the relevant stock's abundances even if each estimated taking occurred to a new individual, which is an unlikely scenario.''

This proportional approach relative to the affected population is supported by CBD v. Salazar, the same case cited by the commenter, which found that ''The Service can analyze small numbers in relation to the size of the larger population, so long as the 'negligible impact' finding remains a distinct, separate standard.'' The negligible impact standard remains a distinct, separate standard, as evidenced in the Negligible Impact Analysis and Determination section, through which NMFS evaluates the type, context, and severity of any authorized take to assess the impacts of the take on the fitness and reproduction of any affected individual marine mammals, and then, where appropriate, analyzes how any impacts on individual fitness may or may not accrue to affect rates of recruitment and survival of the species or stock. This analysis is clearly and appropriately distinct from the small numbers evaluation.

For a more detailed discussion of NMFS' interpretation and implementation of the small numbers standard, we refer the reader to the Small Numbers section of the Final Rule for the Taking Marine Mammals Incidental to Geophysical Surveys Related to Oil and Gas Activities in the Gulf of Mexico (86 FR 5438; January 19, 2021).

The commenter did not explain what it meant by its assertion that the IHA fails to ensure that only small numbers of bowhead whales, ice seals, and the other marine mammals impacted by the AK LNG activities will be taken.

Comment 32: A commenter stated that NMFS failed to implement ''means of effecting the least practicable impact'' on marine mammals by instead requiring mitigation measures that are known to be ineffective and by failing to adopt additional mitigation measures. PSOs are not as effective in mitigating acoustic impacts as time-area restrictions (*NRDC* v. *Pritzker* 828 F.3d 1125, 1133 (9th Cir. 2016), *Conserv. Council of Hawaii, et al.* v. *National Marine Fisheries Service, et al.,* 97 F. Supp. 3d 1210, 1230 (D. Haw. 2015); Dolman *et al.,* 2009). For example, visual observation detection rates of marine mammals decline significantly as sea states rise above Beaufort 1 (Barlow 2015).

Another commenter also noted that the IHA must prescribe ''means of effecting the least practicable adverse impact' on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as 'mitigation').'' The commenter stated that NMFS must ensure any proposed mitigation is sufficiently protective.

Response: The proposed and final IHAs require AGDC to implement a number of mitigation measures that

would minimize impacts to marine mammals. These include PSOs, establishment of shutdown zones, pre-activity monitoring, use of NVDs and IR (for nighttime and low visibility monitoring), soft start procedures for impact pile driving, and a requirement to begin construction prior to March 1 in the event that construction during the contingency period is necessary. Further, the authorization includes a requirement for AGDC to cease construction during the Nuiqsut whaling season. Please see the Mitigation Measures section for information about how these measures are expected to reduce impacts to marine mammals.

AGDC is required to abide by marine mammal mitigation measures NMFS consistently requires in pile driving incidental take authorizations, as they are considered effective at minimizing the impact to marine mammals. After evaluating all of the applicable information, NMFS has concluded that the required mitigation measures will affect the least practicable adverse impact on the affected marine mammal species and stocks and their habitats.

Comment 33: A commenter recommended that NMFS place an overall cap on all authorizations for marine mammal incidental take in the Arctic. The commenter stated that various construction, vessel traffic, oil and gas, and other activities are cumulatively threatening the conservation and recovery of Arctic species.

Response: The MMPA requires that NMFS issue an incidental take authorization, provided the necessary findings are made for the specified activity put forth in the application and appropriate mitigation and monitoring measures are set forth, as described in the Background section of this notice.

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 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 (such as UMEs)). See the Negligible Impact Analysis and Determination section of this notice.

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.

In this case, we have found that the total marine mammal take from the planned activity will have a negligible impact on all affected marine mammal species or stocks, small numbers of marine mammals will be taken relative to the population size of the affected species or stocks, and that there will not be an unmitigable adverse impact on subsistence uses from AGDC's planned activities. Further, the cumulative effects to listed species of the specified activity in combination with other activities are analyzed in the ESA biological opinion, and the cumulative impacts to the human environment are considered in the Alaska LNG Project Final EIS. Section 101(a)(5(D) of the MMPA does not allow for a set limit on cumulative takings of marine mammals in the Arctic or other regions.

Comment 34: A commenter stated that NMFS should consider time restrictions during September and October when the region is a BIA for bowhead whales. (Please see the figures in the Center for Biological Diversity's comment letter for additional information.) The commenter stated that vessel traffic through the Bering Strait should be prohibited during bowhead and beluga whale migration through the narrow passage. The commenter further stated that no activities should be authorized when ringed seals are building their subnivean lairs starting in late February until they leave their lairs.

Response: Regarding additional restrictions on construction activities during September and October for bowhead whales, the proposed and final IHAs include a requirement that AGDC must shut down pile driving operations during the Nuiqsut whaling season, approximately August 25–September 15, though the shutdown will be adaptively managed based on coordination with the Whaling Captain Associations, as the exact whaling dates may change. Further, the final IHA includes a requirement that project vessels must transit landward of Cross Island during the Nuiqsut whaling season. Given the short duration of the construction season, prohibiting work during additional periods during the open water season is not practicable, and may extend the duration of the project beyond the one-year duration expected, which would extend the timeframe of impacts to marine mammals and incur additional costs for AGDC. Therefore, this recommendation is impracticable to implement. Additionally, the BIAs referenced by the commenter (Clarke *et al.,* 2015) are addressed in the Description of Marine Mammals in the Area of Specified Activities section of the proposed IHA, and do not spatially overlap with the Level A or Level B harassment zones.

The recommendation to prohibit activities from the time when ringed seals are building their subnivean lairs until they leave their lairs is not practicable to implement for the same reasons stated above for the bowhead whale recommendation. NMFS included mitigation in the proposed and final IHAs requiring AGDC to begin work by March 1 in the event that work during the contingency period is necessary, which NMFS expects will deter ringed seals from building their subnivian lairs in the project area, and will prohibit further take of ringed seals during that period. Additionally, construction will only occur during the late winter and early spring in the event that AGDC is unable to complete construction during the planned open-water season.

Comment 35: A commenter stated that NMFS should require in-situ SSV be used to ensure that the Level A and Level B zones are sufficient.

Response: As described in the *Ensonified Area* section, the Level A and Level B harassment zones were calculated using practical spreading. NMFS expects that the calculated zone sizes are conservative given that the water in the project area is shallow, and sound does not propagate as well in shallow water. However, since publication of the proposed IHA, AGDC has determined that it is practicable to conduct SSV, and this final authorization requires AGDC to do so.

Comment 36: The Commission stated that NMFS used source level data from Caltrans (2015) for impact installation of 60-in cast-in-steel-shell (CISS) piles as a proxy for 48-in piles. However, the source levels included in Table I.2.-1 of

Caltrans (2015) for 60-in CISS piles are attenuated source levels, not unattenuated source levels. Those piles were driven within either a cofferdam (see section I.3.2 in Caltrans 2015) or a sound attenuation device (isolation casing with a bubble curtain, see sections I.11 and I.11.2). NMFS indicated in the **Federal Register** notice that AGDC would not be using a sound attenuation device (85 FR 43406; July 16, 2020). Therefore, NMFS' use of the source levels from Caltrans was not appropriate. Caltrans (2015) did not include unattenuated source levels for impact installation of 60-in piles, and the attenuated source levels are less than unattenuated source levels for impact installation of 48-in piles.

For impact installation of 48-in piles, NMFS has consistently used and deemed as best available source levels from Austin *et al.* (2016; see 84 FR 31004; June 28, 2019, 85 FR 19312; April 6, 2020, 85 FR 21404; April 17, 2020, 85 FR 31151; May 22, 2020, 85 FR 40252; July 6, 2020). The source levels of 186.7 decibels (dB) re 1 micro Pascal squared (μPa^2)-sec single-strike (s-s) at 11 m, 198.6 dB re 1 µPa root-mean-square (rms) at 10 m, and 212.5 dB re 1 µPa peak (pk) at 11 m should have been used for AGDC's proposed activities as well (see values for pile IP5 in Tables 9, 11, and 7, respectively, in Austin *et al.* 2016). Those source levels are unattenuated, originate from Alaska, and have been used consistently in other recent IHAs that involve impact installation of 48-in piles. As such, the Commission recommended that NMFS use unattenuated source levels of 186.7 dB re 1 μPa^2-secs-s at 11 m, 198.6 dB re 1 µPa rms at 10 m, and 212.5 dB re 1 µPa peak at 11 m from Austin *et al.* (2016) for impact installation of 48-in piles rather than the attenuated source levels from Caltrans (2015).

Response: The Commission is correct that the proxy source levels NMFS used for impact driving 48-in piles (60-in CISS piles) are attenuated source levels, and that AGDC is not using a sound attenuation device. However, NMFS disagrees that the Austin *et al.* (2016) source levels suggested by the commenter are more appropriate than the proxy used in the proposed IHA.

NMFS reviewed numerous source levels for impact installation of 48-in piles normalized to 10 m (Table 1). The proxy source levels used for impact installation of 48-in piles in the proposed authorization (pk, root mean square sound pressure level (SPL_{rms}) and sound exposure level (SEL)) are higher, and therefore more conservative, than the median source level in NMFS' review of available source levels for impact installation of 48-in piles. Given the shallow water depth at the Prudhoe Bay site, we expect that source levels for the AK LNG project will be lower than average. (Note that AGDC will also conduct SSV to verify the zone sizes.)

TABLE 1—ACOUSTIC DATA FROM UNATTENUATED IMPACT INSTALLATION OF 48″ STEEL PIPE PILES

Processed data (# of datasets used to calculate the median):	Source dist. (m)	Measured SPL_{pk} (dB re 1 µPa)	Measured SPL_{rms} (dB re 1 µPa)	Measured SEL (dB re 1 μPa^2s)	Normalized to 10-m SL SPL_{pk} (dB re 1 µPa @10 m)	Normalized to 10m SL SPL_{rms} (dB re 1 µPa @10 m)	Normalized to 10m SL SEL (dB re 1 μPa^2s @10 m)	Location	Report
TP#11 (2)	10	207	192	179.5	207	192	179.5	Naval Base Kitsap.	Naval Base Kitsap at Bangor Test Pile Program Acoustic Monitoring Report (I&R 2012); p. 61, 64, 67.
TP#5 (2)	10	207.5	192	180.5	207.5	192	180.5	Naval Base Kitsap.	Naval Base Kitsap at Bangor Test Pile Program Acoustic Monitoring Report (I&R 2012); p. 62, 64, 67.
A3 (3)	10	212.3	198.6	183.1	212.3	198.6	183.1	Columbia River Crossing.	Columbia River Crossing Test Pile Report (David Evans & Associates, 2011); pdf: 97.
A4 (2)	10	213.45	199.65	183.05	213.45	199.65	183.05	Columbia River Crossing.	Columbia River Crossing Test Pile Report (David Evans & Associates, 2011); pdf: 109.
B2 (3)	10	207.1	196.7	182	207.1	196.7	182	Columbia River Crossing.	Columbia River Crossing Test Pile Report (David Evans & Associates, 2011); pdf: 130.
	10	200	183	173	200	183	173	Philadelphia Naval Shipyard.	NAVFAC Pile-driving at Atlantic Fleet Naval Installations (2017); p. 31.
	10	200	185	174	200	185	174	Philadelphia Naval Shipyard.	NAVFAC Pile-driving at Atlantic Fleet Naval Installations (2017); p. 31.
	10	203	187	176	203	187	176	Philadelphia Naval Shipyard.	NAVFAC Pile-driving at Atlantic Fleet Naval Installations (2017); p. 31.

TABLE 1—ACOUSTIC DATA FROM UNATTENUATED IMPACT INSTALLATION OF 48″ STEEL PIPE PILES—Continued

Processed data (# of datasets used to calculate the median):	Source dist. (m)	Measured SPL_{pk} (dB re 1 µPa)	Measured SPL_{rms} (dB re 1 µPa)	Measured SEL (dB re 1 μPa^2s)	Normalized to 10-m SL SPL_{pk} (dB re 1 µPa @10 m)	Normalized to 10m SL SPL_{rms} (dB re 1 µPa @10 m)	Normalized to 10m SL SEL (dB re 1 μPa^2s @10 m)	Location	Report
TT–13.5R Mid (9)	10	205	186	174	205	186	174	Naval Base Kitsap.	Naval Base Kitsap at Bangor Trident Support Facilities EHW–2 (2013); p. 94, 101, 107.
IP5	11	212.5	197.9	186.7	213.3278537	198.7278537	187.5278537	Port of Anchorage.	Austin et al. (2016); p. 70–73.
IP6 (off)	12	208.7	193.2	184.5	210.2836249	194.7836249	186.0836249	Port of Anchorage.	Austin et al. (2016); p. 70–73.
IP1	14	213.2	199	185.1	216.1225607	201.9225607	188.0225607	Port of Anchorage.	Austin et al. (2016); p. 70–73.
Median	.....	.....	.....	.....	207.3	193.4	181.3	.....	

Therefore, given that source levels at the project site are likely lower given the water depth, and considering that the 60-in CISS pile attenuated proxy source level is higher than the median source level of other source levels for impact installation of 48-in piles, NMFS has continued to use the initially proposed source levels to calculate the Level A and Level B harassment zones for the final authorization. NMFS intends to update the Level A and Level B harassment zone sizes with the verified zone sizes, and potentially the associated shutdown zones, as appropriate. It is likely that the SSV will reflect smaller zone sizes, which would therefore be easier for protected species observers (PSOs) to observe a larger portion of the zones.

Comment 37: The Commission recommended that NMFS (1) increase the (a) Level A harassment zones from 1,575 m to 2,249 m for LF cetaceans, from 56 m to 80 m for MF cetaceans, and from 843 m to 1,204 m for phocids, (b) shutdown zones from 1,600 m to at least 2,250 m for LF cetaceans and from 50 m to at least 80 m for MF cetaceans, and (c) Level B harassment zone from 2,154 m to 3,754 m during impact installation of 48-in piles; (2) revise the numbers of Level A and B harassment takes during impact installation of 48-in piles; (3) include Level A harassment takes of bowhead whales during impact installation of 48-in piles or prohibit AGDC from conducting such activities at night or in low-visibility conditions; and (4) ensure the Level A harassment takes were estimated correctly for MF cetaceans and phocids during all proposed activities.

Response: As stated in NMFS' response to Comment 36, NMFS did not adopt the commenter's recommended source level change for impact installation of 48-in piles. Therefore, it is not appropriate to adopt the recommended changes to the Level A and Level B harassment zones and shutdown zones that were based upon those recommended source level changes, nor is it appropriate to revise the number of Level A and Level B harassment takes that are estimated to occur during impact installation of 48-in piles, as those recommendations are based upon a change to the Level A and Level B harassment zone sizes.

Take by Level A harassment of bowhead whale during any activity, including impact installation of 48-in piles, is still not expected to occur given the water depth in the Level A harassment zone. Further, there have been no bowhead whales observed in Block 1a (which encompasses the area between the shoreline and the barrier islands, including Prudhoe Bay) during ASAMM surveys since they began in 2016, further supporting NMFS' conclusion bowhead whales are not expected to occur within the Level A harassment zone during construction. Additionally, in the rare event that a bowhead whale were to enter the Level A harassment zone, it is likely that PSOs would detect the animal and that a shutdown would be implemented, preventing a take by Level A harassment. Therefore, Level A harassment take of bowhead whale is not included in this authorization. The final authorization does not prohibit AGDC from conducting construction activities at night or in low-visibility conditions, but notes that AGDC will use NVD and IR during those conditions. Additionally, given that most construction is expected to occur during the open water period when daylight is continuous (July and August), or the majority of the time (>70 percent of the time in September), the majority of construction will occur during daylight hours, even with work occurring 24-hours per day. (Although, NMFS recognizes that other conditions, such as fog, could limit visibility.)

NMFS updated the Level A harassment take calculations for phocids and beluga whale by correcting the zone sizes used in the calculation. The updated calculation did not result in a change to the authorized Level A harassment take of beluga whale, but the authorized Level A harassment take of ringed seal, spotted seal, and bearded seal decreased. Please see the Estimated Take section for additional information on changes to the take estimate.

Comment 38: The Commission recommended that NMFS (1) have its experts in underwater acoustics and bioacoustics review and finalize as soon as possible, its recommended proxy source levels for impact pile driving of the various pile types and sizes, (2) compile and analyze the source level data for vibratory pile driving of the various pile types and sizes in the near term, and (3) ensure action proponents use consistent and appropriate proxy source levels in all future rulemakings and proposed IHAs. If a subset of source level data is currently available (*i.e.,* vibratory pile driving of 24-in steel piles), those data should be reviewed immediately and used—the data should not be retained until the other vibratory source levels are finalized.

Response: NMFS concurs with the Commission's recommendation and has prioritized these efforts.

Comment 39: A commenter stated that NMFS' finding that there would be no impacts on subsistence harvest is arbitrary.

Response: NMFS did not find that there would be no impacts to subsistence harvests. Rather, NMFS found that, based on the description of the specified activity, the mitigation measures described to minimize adverse effects on the availability of marine mammals for subsistence purposes, and

the planned mitigation and monitoring measures, there will not be an unmitigable adverse impact on subsistence uses from AGDC's planned activities. NMFS has described the potential impacts to subsistence harvests in the Effects of Specified Activities on Subsistence Uses of Marine Mammals section of this notice, and the notice of the proposed IHA, and described the mitigation for subsistence harvests in the Mitigation for Subsistence Uses of Marine Mammals or Plan of Cooperation section of both notices.

Comment 40: A commenter stated that the AK LNG activities will likely adversely impact the subsistence uses of the Native Village of Nuiqsut, which enacted Resolution 16–04 resolving ''that the United States should not schedule or hold any new oil and gas leases in the Beaufort or Chukchi Seas'' because the threat of oil and gas activities to subsistence uses, among other reasons. Even if pile driving activities are ceased during the bowhead whale hunt, vessel activities will adversely impact Nuiqsut's fall bowhead whale hunt and possibly other marine mammal harvest activities in the Beaufort Sea. However, NMFS failed to consider the impacts of vessels.

The commenter further stated that the decision that there will be no impacts on Kaktovik subsistence use because the hunting grounds are farther off is arbitrary because the take authorization affects the same stocks of marine mammals that are used by Kaktovik hunters.

Response: The commenter's mention of Resolution 16–04 is inapplicable to NMFS' action as it relates to issues outside of NMFS' authority. NMFS is responsible for authorizing the take of marine mammals incidental to certain specified activities, but does not allow or disallow the activities themselves. Also, the AK LNG project is not the same as an oil and gas lease in the Beaufort or Chukchi Sea.

As the commenter noted, the proposed and final IHAs include a measure requiring AGDC to cease pile driving during the Nuiqsut whaling season (approximately August 25–September 15). Additionally, the final IHA includes a measure that requires AGDC to limit barges to waters landward of Cross Island during the Nuiqsut whaling season in an effort to avoid any potential impacts on subsistence uses.

Regarding impacts on Kaktovik subsistence hunts, while the commenter is correct that the IHA does authorize the take of stocks of marine mammals which are harvested by Kaktovik hunters, the subsistence activities that Kaktovik engages in are unlikely to be affected in any of the ways described in the first paragraph of the Unmitigable Adverse Impact Analysis and Determination section of this notice. It is unlikely that the planned activities would have any effects on the use of marine mammals for subsistence by residents of Kaktovik given the distance from Kaktovik and Kaktovik's very limited use of waters offshore of Prudhoe Bay, and considering that the planned activities would occur in an already developed area. The best available information supports NMFS' finding that AGDC's activities will not result in an unmitigable adverse impact on subsistence uses as defined in 50 CFR 216.103.

Please see NMFS' response to Comments 13 and 14 for a discussion of potential impacts of vessel transit.

Comment 41: The Commission stated that given the lack of stakeholder meetings and the limited number of entities contacted to date, it recommends that, before further action is taken on issuance of an IHA, NMFS require AGDC to (1) revise its POC to include a summary of all meetings held to date with communities, subsistence groups, and co-management organizations, (2) make available to the public and North Slope communities on a publicly accessible website its Communication Plan detailing how it will communicate its project plans and seek input on proposed mitigation and monitoring measures from all potentially affected communities, subsistence groups, and co-management organizations well in advance of the commencement of construction activities, and most importantly, (3) include in the Communication Plan measures for conducting timely and effective two-way communications with affected subsistence users immediately prior to, during, and after construction activities.

Response: The POC has been updated with more information, including meeting summaries (Appendix A) and plans for continued communication with communities and marine mammal co-management organizations. AGDC travelled to Nuiqsut in 2018 and 2019, and has had individual outreach to Nuiqsut community leaders. There has also been substantial engagement with the AEWC over the past three years, which will continue as the Project progresses. The POC has been updated to reflect this communication. The projected start date is two years from the date of submission, so AGDC has ample time to coordinate directly with the Village of Nuiqsut, Whaling Captains Associations for Nuiqsut, Kaktovik and Utqiaġvik and other marine mammal co-management organizations and has committed to do so. Further, AGDC has committed to ongoing work sessions with a working group of the AEWC. AGDC is committed to conducting timely and effective two-way communication with subsistence users before, during and after construction activities, and will work with subsistence groups and co-management organizations to create a Communications Plan, which it will post to the AK LNG project website. Please see the POC for additional information.

Comment 42: A commenter stated that for the reasons stated in its comments, supplemental comments and petition for rehearing on FERC's Order granting authorization for the AK LNG project, NMFS cannot rely on the project's flawed EIS or inadequate Biological Opinion. The commenter stated that additionally for the IHA proposed here, NMFS must define a different purpose and need that is consistent with its duties to protect marine mammals, and it must evaluate different alternatives that would mitigate adverse effects on Arctic marine mammals.

Response: Consistent with the regulations published by the Council on Environmental Quality (CEQ), it is common and sound NEPA practice for NMFS to participate as a cooperating agency and adopt a lead agency's (in this case FERC) NEPA analysis when, after independent review, NMFS determines the document to be sufficient in accordance with 40 CFR 1506.3. Specifically here, NMFS is satisfied that the Alaska LNG Project Final EIS adequately addresses the impacts of issuing the MMPA IHA and that NMFS' comments and concerns have been adequately addressed. NMFS' early participation in the NEPA process and role in shaping and informing analyses using its special expertise ensured that the analysis in the Alaska LNG Project Final EIS is sufficient for purposes of NMFS' own NEPA obligations related to its issuance of incidental take authorizations under the MMPA.

Regarding the purpose and need, NMFS' purpose and need is consistent with its duties to protect marine mammals. It is clearly stated in Footnote 8 (p. 1–11) of Volume 1 of the Alaska LNG Project Final EIS, stating ''The purpose of NMFS's action, which is a direct outcome of AGDC's request for authorization to take marine mammals incidental to construction activities in Cook Inlet and Prudhoe Bay, is to evaluate AGDC's applications pursuant

to the MMPA and 50 CFR 216 and to issue incidental take authorizations (ITAs), if appropriate. The need for NMFS' action is to consider the impacts of AGDC's activities on marine mammals and ultimately allow AGDC to conduct its activities in compliance with the MMPA if the requirements of section 101(a)(5)(A) and (D) are satisfied.'' NMFS' purpose and need are supported by the analysis in FERC's Alaska LNG Final EIS for AGDC's proposed activities associated with the AK LNG Project.

Regarding the alternatives, NMFS' involvement in development of the Alaska LNG Project Final EIS and role in evaluating the effects of incidental take under the MMPA ensured that the Alaska LNG Project Final EIS includes adequate analysis of a reasonable range of alternatives. For NMFS, declining to issue the requested ITA to AGDC constitutes the NMFS No Action Alternative, which is consistent with our statutory obligation under the MMPA to grant or deny ITA requests. Since the underlying activities would not be carried out, as indicated in the Alaska LNG Final EIS (Executive Summary, page ES–6), the requested take of marine mammals would not occur. NMFS considers the No Action Alternative to be the environmentally preferable alternative as negative impacts to marine mammals would be avoided. If no construction activities occur, no disturbance to marine mammals would occur from pile driving associated with construction of the LNG facilities and pipelines/transmission lines.

The other alternative NMFS considers is its Proposed Action, which called for issuance of an ITA to the applicant, AGDC, to authorize the requested take subject to specified requirements, including mitigation, monitoring and reporting requirements. As part of this alternative, and through the public and agency review processes under NEPA and MMPA, NMFS considers a range of mitigation measures to carry out its duty to identify other means of effecting the least practicable adverse impact on the species or stocks that are the subject of the ITA request. For AGDC's construction activities in Prudhoe Bay, these measures were initially identified in the proposed IHA (85 FR 43382; July 16, 2020) and modified for this final IHA in response to public comment and agency review. The Proposed Action alternative considered by NMFS is consistent with the Proposed Action (Preferred Alternative) evaluated by FERC, as it would provide the ITAs necessary to achieve the activities identified in that alternative and analyzed in the Alaska LNG Project Final EIS.

Finally, NMFS' Proposed Action to issue ITAs to AGDC for construction activities associated with the AK LNG Project and FERC's Proposed Action (also the Preferred Alternative) effectively meet NMFS' stated purpose and need for acting. NMFS has an obligation to issue a requested ITA if certain statutory and regulatory determinations are made after providing for adequate public review and comment concerning the ITA request. Denying the application, as would be required under the No Action Alternative, would be contrary to NMFS' responsibilities, given the results of the analysis conducted under the MMPA, and would thus not support NMFS' ability to meet its purpose and need for acting.

This approach to evaluating a reasonable range of alternatives is consistent with NMFS policy and practice for issuing MMPA incidental take authorizations. NMFS has independently reviewed and evaluated the Alaska LNG Project Final EIS, including the range of alternatives, and determined that the EIS fully satisfies NMFS' NEPA obligations related to its decision to issue this IHA, and we have adopted it.

Regarding the Biological Opinion, NMFS consulted internally with NMFS' Alaska Regional Office (AKRO). AKRO conducted a thorough analysis and we refer any questions or comments on that document to the AKRO.

Please see the mitigation-related comments for a response to the commenter's recommendations for inclusion of measures that would mitigate adverse effects on Arctic marine mammals.

Comment 43: The Commission stated that although operators are generally able to complete the installation of a pile if visibility becomes limited due to nightfall or deteriorating weather conditions, NMFS does not typically allow pile driving to occur 24-hours a day in its authorizations. It is not clear whether AGDC has discussed its plans to conduct pile driving at night with local communities, as no reference was made to nighttime pile driving in the outreach materials provided in the POC. Concerns have been raised by Native Alaskan communities about activities occurring ''all night long'' for other projects. Restricting pile driving to daylight hours would help to ensure that AGDC is effecting the least practicable adverse impact on affected species. The Commission recommended that NMFS include in the final authorization the requirement that AGDC conduct pile driving activities during daylight hours only.

Response: NMFS analyzes the action that an applicant has proposed. While many applicants propose to conduct pile driving during daylight hours only, in which case NMFS discusses that in the **Federal Register** notice, and sometimes elects to include it in the IHA itself, AGDC proposed to conduct pile driving up to 24-hours per day.

Work is expected to start in July, when there are 24 hours of available sunlight for visibility, so the crews will do their best to get as much done in the early months of the project as possible. As the available daylight wanes and fall approaches, AGDC will test NVDs to detect marine mammals in low visibility. If these devices do not prove to be effective in detecting marine mammals, lighting will be used to monitor the immediate area around the pile driving work.

The open water season is extremely short, and therefore, the ability to work 24-hours per day is a key component to AGDC's ability to complete construction on time, particularly given the requirement for AGDC to shut down work during Nuiqsut whaling. Shorter workdays would likely extend the number of days required for the work (extending the overall duration of impacts on marine mammals), and could require a second work season and involve significant equipment and manpower expense, which is impracticable.

In AGDC's most recent project update to AEWC in the Third Triannual Meeting (10/28/2020), AGDC discussed pile driving plans, including the 24 hour work day.

Comment 44: To ensure that seal lairs in the construction area are identified and avoided as proposed, the Commission recommended that NMFS include in the final authorization the requirement that AGDC (1) use an experienced subsistence advisor, and consider the use of trained dogs, to detect seal lairs before construction activities begin and (2) require construction crews to avoid seal lairs by at least 150 m.

Response: As stated in the notice of the proposed IHA, AGDC plans to consult an experienced subsistence advisor for detection of seal lairs during construction activities that occur in winter. The advisor would survey areas within a buffer zone of Dock Head 4 (DH4) where water depth is greater than 3 m (10 ft) to identify potential ringed seal structures before activities begin. AGDC will avoid identified ringed seal structures by a minimum of 150 m (500 ft). The subsistence advisor and 150 m

buffer requirements have been added to the final IHA.

Although trained dogs may be effective in identifying seals, there are a limited number of trained dogs available. Further, Alaska Native subsistence hunters have previously indicated that polar bears often follow the scent of the dogs to hunt those lairs (pers. comm., Sheyna Wisdom). Therefore, NMFS has not required the use of dogs for detection of seal lairs as suggested by the commenter.

Comment 45: The Commission recommended that NMFS (1) reinforce that AGDC keep a running tally of the total takes, based on observed and extrapolated takes, for Level A and B harassment consistent with condition 4(h) of the final authorization, (2) include condition 6(b)(xix) in the final authorization, and, if necessary, (3) provide AGDC a simple example of how to extrapolate takes to estimate the number of total takes.

Response: The IHA indicates the number of takes authorized for each species. We agree that AGDC must ensure they do not exceed authorized takes, but do not concur with the recommendation to keep a running tally of extrapolated takes, as that is not necessary to ensure compliance with the IHA. CFR 216.108(c) requires a monitoring program to ''document or estimate the actual level of take.'' The final authorization includes measure 6(b)(xix) from the proposed IHA, though it is now measure 6(b)(xviii) and NMFS slightly modified it to clarify that rather than precisely extrapolating the observed take, AGDC will estimate potential exposures within the entire harassment zones based upon the number of observed exposures and the percentage of the Level A or Level B harassment zone that was not visible. NMFS is not prescribing an exact method for how AGDC should calculate the estimate of total potential takes.

Comment 46: The Commission stated that it has raised ongoing concerns regarding NMFS's renewal process in the past few years, and notes that although NMFS responded generally to those concerns just recently, the Commission has not yet had time to consider fully whether and how it plans to respond. For purposes of its comment letter regarding this IHA, the Commission recommended that NMFS refrain from issuing a renewal for any authorization unless it is consistent with the procedural requirements specified in section 101(a)(5)(D)(iii) of the MMPA.

Response: In prior responses to comments about IHA Renewals (*e.g.,* 84 FR 52464; October 02, 2019 and 85 FR 53342, August 28, 2020), NMFS has explained how the Renewal process, as implemented, is consistent with the statutory requirements contained in section 101(a)(5)(D) of the MMPA, provides additional efficiencies beyond the use of abbreviated notices, and further, promotes NMFS' goals of improving conservation of marine mammals and increasing efficiency in the MMPA compliance process. Therefore, we intend to continue implementing the Renewal process as a general matter.

Comment 47: A commenter stated that NMFS should avoid a one-year renewal. It further stated that the potential extension and overlap of activities should be avoided.

Response: The commenter does not state what it is referring to regarding ''overlap of activities'' that it suggests should be avoided by not issuing a renewal. NMFS makes the decision of whether or not to issue a Renewal after one is requested based on current information and the best available science.

Comment 48: The Commission stated that NMFS' review processes (including its early review team meetings) are not adequately identifying and evaluating whether appropriate source levels, Level A harassment inputs, modeling methodologies, Level A and B harassment zones, densities, group size estimates, take estimates, shutdown zones, *etc.* have been proposed. The Commission recommended that NMFS make a concerted effort to review applications, **Federal Register** notices, and draft and final authorizations more thoroughly to minimize inaccuracies and ensure transparency for the public. In this instance, the information provided to the PRP was not accurate and the panel's review of AGDC's monitoring plan as required under section 101(a)(5)(D)(ii)(III) may have been compromised. NMFS should provide the PRP with the revised Level A and B harassment zones and shutdown zones and allow for additional review and comments before issuing any IHA to AGDC. NMFS also should consider whether the inaccuracies are sufficient to warrant revision and re-publication of the proposed IHA.

Response: While we acknowledge that errors are sometimes made, we disagree with the Commission's assertion that NMFS' review of the issues raised is broadly inadequate. Nonetheless, we continue to look for ways to improve our methods, analyses, and review process. Regarding the specific example raised, as explained in response to Comment 36, NMFS disagrees with the Commission regarding their recommended source level revision, and has not incorporated that recommendation into this final IHA. Therefore, the Level A and Level B harassment zones and the shutdown zones did not change, and the recommendation to provide the PRP with updated Level A and Level B harassment zones and shutdown zones is not necessary, nor is re-publication of the proposed IHA.

Changes From the Proposed IHA to Final IHA

The proposed IHA indicated that the authorization would be effective from July 1, 2022 to June 30, 2023. However, AGDC has since indicated that it does not expect to begin construction prior to July 1, 2023; therefore, this final IHA is effective from July 1, 2023 to July 1, 2024.

NMFS also added several mitigation and monitoring requirements to the final IHA in consideration of public comments received. NMFS added an explicit requirement for AGDC to abide by its POC. Additionally, NMFS added a measure that requires AGDC to consult an experienced subsistence advisor for detection of ringed seal lairs during winter construction activities, should they occur, and a measure requiring AGDC to implement a 150 m buffer between identified ringed seal lairs and construction activities. Both measures related to ringed seal lairs were discussed in the notice of the proposed IHA as measures that AGDC intended to implement, but had not been included in the proposed IHA. The final IHA also includes a requirement for aircraft to transit at a minimum altitude of 457 m (1,500 ft) or higher to the extent practicable, as well as a shutdown zone for screeding activities. Both the aircraft and screeding measures were included in the biological opinion, which AGDC is required to follow, as stated in both the proposed and final IHAs. The final IHA also includes a measure that requires vessels to transit landward of Cross Island during the entirety of the Nuiqsut whaling season (approximately August 25–September 15, though the exact dates may change). This measure was already included in the POC.

Since publication of the proposed IHA, through discussions with the AEWC and NMFS, AGDC has determined that it is practicable to increase the acoustic monitoring it will conduct. The final IHA requires AGDC to conduct SSV for pile driving, and includes additional requirements for an acoustic monitoring plan and acoustic monitoring report, including some reporting metrics recommended by the

PRP. The IHA allows NMFS to update the Level A and Level B harassment zones and shutdown zones, as appropriate, pending review and approval of the results of the acoustic monitoring. Additionally, the final IHA requires AGDC to deploy three hydrophones during construction in the open-water season, rather than just one, as stated in the proposed IHA. AGDC will deploy the hydrophones three days prior to the start of construction, and they will remain deployed through construction and for three days after the completion of construction. AGDC will still deploy just one hydrophone during the ice-cover season, should AGDC need conduct construction activities during that time. As stated in the proposed IHA, these hydrophones will be used for PAM of marine mammals, but will not be monitored in real time or used for mitigation. The final IHA also includes an additional reporting measure related to PAM for marine mammals which was suggested by the PRP, requiring AGDC to report marine mammal detection rates from PAM, summarized into daily or weekly periods. AGDC will include this information in its acoustic monitoring report, but is not required to submit this information to NMFS on a daily or weekly basis throughout the project duration.

The final IHA includes several slight modifications to the take estimate. NMFS updated the Level A harassment take calculations for phocids and beluga whale by correcting the zone sizes used in the calculation. The updated calculation did not result in a change to the authorized Level A harassment take of beluga whale, but the authorized Level A harassment take of ringed seal, spotted seal, and bearded seal decreased. Additionally, NMFS updated the Level B harassment take estimate for beluga whales to account for an increased density due to the incorporation of recently-available 2019 ASAMM survey data (Clarke *et al.,* 2020). The resulting Level B harassment take estimate for beluga whales increased to 55 Level B harassment takes in the final IHA from the 31 Level B harassment takes estimated in the proposed IHA. Please see the Estimated Take section for additional information on changes to the take estimate.

Finally, since publication of the proposed IHA, NMFS published a proposed rule for the Designation of Critical Habitat for the Beringia Distinct Population Segment (DPS) of the Bearded Seal (86 FR 1433; January 8, 2021), and a revised proposed rule for the Designation of Critical Habitat for the Arctic Subspecies of the Ringed Seal (86 FR 1452; January 8, 2021). Please see the Description of Marine Mammals in the Area of Specified Activities section for additional information.

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.,* physical and behavioral descriptions) may be found on NMFS' website (*https://www.fisheries.noaa.gov/find-species*). Additional information may be found in the Aerial Survey of Arctic Marine Mammals (ASAMM) reports, which are available online at *https://www.fisheries.noaa.gov/alaska/marine-mammal-protection/aerial-surveys-arctic-marine-mammals.*

Table 2 lists all species or stocks for which take is expected and authorized for this action, and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (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's SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS' U.S. Pacific and Alaska SARs (*e.g.,* Muto *et al.,* 2019). All values presented in Table 2 are the most recent available at the time of publication and are available in the 2019 Pacific and Alaska SARs (Carretta *et al.,* 2019; Muto *et al.,* 2019) and draft 2020 Alaska SARs (published since publication of the proposed IHA and available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports*).

TABLE 2—SPECIES FOR WHICH TAKE IS REASONABLY LIKELY TO OCCUR

Common name	Scientific name	Stock	ESA/MMPA status; strategic (Y/N) [1]	Stock abundance (CV, N_{min}, most recent abundance survey) [2]	PBR	Annual M/SI [3]
Order Cetartiodactyla—Cetacea—Superfamily Mysticeti (baleen whales)						
Family Eschrichtiidae:						
Gray whale	*Eschrichtius robustus*	Eastern North Pacific	-/-; N	26,960 (0.05, 25,849, 2016)	801	131
Family Balaenidae:						
Bowhead whale	*Balaena mysticetus*	Western Arctic	E/D; Y	16,820 (0.052, 16,100, 2011).	161	56
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae:						
Beluga whale	*Delphinapterus leucas*	Beaufort Sea	-/-; N	39,258 (0.229, NA, 1992)	UND	102
		Eastern Chukchi Sea	-/-; N	13,305 (0.51, 8,875, 2017)	178	55

TABLE 2—SPECIES FOR WHICH TAKE IS REASONABLY LIKELY TO OCCUR—Continued

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 Carnivora—Superfamily Pinnipedia						
Family Phocidae (earless seals):						
Ringed seal	*Phoca (pusa) hispida*	Arctic	T/D; Y	see SAR (see SAR, see SAR, 2012–2013.	6,459	863
Spotted seal	*Phoca largha*	Bering	-/-; N	461,625 (see SAR, 423,237, 2013).	25,394	5,254
Bearded seal	*Erignathus barbatus*	Beringia	T/D; Y	see SAR (see SAR, see SAR, 2012–2013.	See SAR	6,709

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

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

[3] These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.,* commercial fisheries, ship strike).

As indicated above, all six species (with seven managed stocks) in Table 2 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur, and we have authorized take. While a harbor porpoise was sighted in the 2017 ASAMM survey (Clarke *et al.,* 2018), the spatial occurrence of harbor porpoise is such that take is not expected to occur, and they are not discussed further beyond the explanation provided here. Harbor porpoise (*Phocoena phocoena*) are considered to be extremely rare in the Beaufort Sea, particularly in the project area (Megan Ferguson, pers. comm., November 2019).

In addition, the polar bear may be found in Prudhoe Bay. However, polar bears are managed by the U.S. Fish and Wildlife Service and are not considered further in this document.

A detailed description of the of the species likely to be affected by AGDC's project, including brief introductions to the species and relevant stocks as well as available information regarding population trends and threats, and information regarding local occurrence, were provided in the **Federal Register** notice for the proposed IHA (85 FR 43382; July 16, 2020); since that time, we are not aware of any changes in the status of these species and stocks, other than the proposed critical habitat designations under the ESA for the Beringia DPS of the Bearded Seal and the Arctic Subspecies of the Ringed Seal, discussed below; therefore, other than the critical habitat discussion, detailed descriptions are not provided here. Please refer to that **Federal Register** notice for these descriptions. Please also refer to NMFS' website (*https://www.fisheries.noaa.gov/find-species*) for generalized species accounts.

Critical Habitat

On January 8, 2021, NMFS published a proposed rule for the Designation of Critical Habitat for the Beringia DPS of the Bearded Seal (86 FR 1433). NMFS identified the physical and biological features essential to the conservation of the species: (1) Sea ice habitat suitable for whelping and nursing, which is defined as areas with waters 200 m or less in depth containing pack ice of at least 25 percent concentration and providing bearded seals access to those waters from the ice; (2) sea ice habitat suitable as a platform for molting, which is defined as areas with waters 200 m or less in depth containing pack ice of at least 15 percent concentration and providing bearded seals access to those waters from the ice; (3) primary prey resources to support bearded seals in waters 200 m or less in depth: benthic organisms, including epifaunal and infaunal invertebrates, and demersal and schooling pelagic fishes; and (4) acoustic conditions that allow for effective communication by bearded seals for breeding purposes within waters used by breeding bearded seals. The proposed designation under the ESA comprises a specific area of marine habitat in the Bering, Chukchi, and Beaufort seas, extending from mean lower low water (MLLW) to a depth of 200 m within the U.S. Exclusive Economic Zone (EEZ), including this construction project's Level A and Level B harassment zones (see 86 FR 1433, January 8, 2021 for additional detail and a map of the proposed area).

On January 8, 2021, NMFS also published a revised proposed rule for the Designation of Critical Habitat for the Arctic Subspecies of the Ringed Seal (86 FR 1452). This proposed rule revises NMFS' December 9, 2014, proposed designation of critical habitat for the Arctic subspecies of the ringed seal under the ESA. NMFS identified the physical and biological features essential to the conservation of the species: (1) Snow-covered sea ice habitat suitable for the formation and maintenance of subnivean birth lairs used for sheltering pups during whelping and nursing, which is defined as areas of seasonal landfast (shorefast) ice and dense, stable pack ice, excluding any bottom-fast ice extending seaward from the coastline (typically in waters less than 2 m deep), that have undergone deformation and contain snowdrifts of sufficient depth, typically at least 54 cm deep; (2) Sea ice habitat suitable as a platform for basking and molting, which is defined as areas containing sea ice of 15 percent or more concentration, excluding any bottom-fast ice extending seaward from the coastline (typically in waters less than 2 m deep); and (3) Primary prey resources to support Arctic ringed seals, which are defined to be Arctic cod, saffron cod, shrimps, and amphipods. The revised proposed designation comprises a specific area of marine habitat in the Bering, Chukchi, and Beaufort seas, extending from MLLW to an offshore limit within the U.S. EEZ, including this construction project's Level A and Level B harassment zones (see 86 FR 1452; January 8, 2021 for additional detail and a map of the proposed area).

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

The effects of underwater noise from AGDC's construction activities have the

potential to result in behavioral harassment of marine mammals in the vicinity of the survey area. The notice of proposed IHA (85 FR 43382; July 16, 2020) included a discussion of the effects of anthropogenic noise on marine mammals and the potential effects of underwater noise from AGDC's construction activities on marine mammals and their habitat. That information and analysis is incorporated by reference into this final IHA determination and is not repeated here; please refer to the notice of proposed IHA (85 FR 43382; July 16, 2020).

Estimated Take

This section provides an estimate of the number of incidental takes authorized through this IHA, which will inform both NMFS' consideration of ''small numbers'' and the negligible impact determination.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines ''harassment'' as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment). Authorized takes would primarily be by Level B harassment, as use of the acoustic source (*i.e.,* vibratory and impact pile driving) has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (Level A harassment) to result, primarily for phocids, due to their lack of visibility and the size of the Level A harassment zones. Auditory injury is unlikely to occur to cetaceans for the reasons described in the *Take Calculation and Estimation* section, below. The mitigation and monitoring measures are expected to minimize the severity of the taking to the extent practicable.

As described previously, no 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 harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) and the number of days of activities. We note that while these basic factors can contribute to a basic calculation to provide an initial prediction of takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.,* previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the take estimate.

Acoustic Thresholds

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

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

AGDC's construction activity includes the use of continuous (vibratory pile driving) and impulsive (impact pile driving) sources, and therefore the 120 and 160 dB re 1 µPa (rms) are applicable.

Level A harassment for non-explosive sources—NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). AGDC's construction activity includes the use of impulsive (impact pile driving) and non-impulsive (vibratory pile driving) sources.

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

TABLE 3—THRESHOLDS IDENTIFYING THE ONSET OF PERMANENT THRESHOLD SHIFT

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

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

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

Ensonified Area

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

The sound field in the project area is the existing background noise plus additional construction noise from the planned project. Marine mammals are expected to be affected via sound generated by the primary components of the project (*i.e.,* vibratory pile driving and removal). The maximum (underwater) area ensonified above the thresholds for behavioral harassment referenced above is 67.7 km^2 (26.1 mi^2), and the calculated distance to the farthest behavioral isopleth is approximately 4.6 km (2.9 mi).

The project includes vibratory pile installation and removal and impact pile installation. Source levels for these activities are based on reviews of measurements of the same or similar types and dimensions of piles available in the literature. Source levels for each pile size and activity are presented in Table 4. Source levels for vibratory installation and removal of piles of the same diameter are assumed to be the same.

TABLE 4—SOUND SOURCE LEVELS FOR PILE DRIVING

Pile size and type	Hammer type	Source level (at 10m)			Literature source
		SPL_{rms}	Peak	SEL	
11.5-inch H-Pile	Impact	183	200	170	Caltrans 2015 (12-in H-Pile).
14-inch H-Pile	Impact	187	208	177	Caltrans 2015 (14-in H-Pile).
	Vibratory	150	160	150	Caltrans 2015 (12-in H-Pile).
48-inch Pipe Pile	Impact	195	210	185	Caltrans 2015 (60-in CISS Pile).
Sheet Piles (19.69-inch and 25-inch)	Vibratory	160	175	160	Caltrans 2015 (AZ Sheet Pile).

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

TL = B * Log10 (R1/R2),

where

TL = transmission loss in dB

B = transmission loss coefficient

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

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

Absent site-specific acoustical monitoring with differing measured transmission loss, a practical spreading value of 15 is used as the transmission loss coefficient in the above formula. Project and site-specific transmission loss data for the Prudhoe Bay portion of AGDC's AK LNG project are not available; therefore, the default coefficient of 15 is used to determine the distances to the Level A and Level B harassment thresholds. However, as discussed in the Monitoring and Reporting section, AGDC will conduct SSV for pile driving. NMFS may adjust the shutdown zones and revise the Level A and Level B harassment zones, as appropriate, pending review and approval of the results of acoustic monitoring.

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

TABLE 5—USER SPREADSHEET INPUT PARAMETERS USED FOR CALCULATING LEVEL A HARASSMENT ISOPLETHS

	11.5-inch H-pile	14-inch H-pile	14-inch H-pile	48-inch pipe pile	19.69-inch sheet piles	25-inch sheet piles
Spreadsheet Tab Used	E.1) Impact pile driving.	E.1) Impact pile driving.	A.1) Vibratory pile driving.	E.1) Impact pile driving.	A.1) Vibratory pile driving.	A.1) Vibratory pile driving.
Weighting Factor Adjustment (kHz)	2	2	2.5	2	2.5	2.5.
Source Level	170 dB SEL	177 dB SEL	150 SPL_{rms}	185 dB SEL	160 SPL_{rms}	160 SPL_{rms}.
Number of piles within 24-h period[a]	26.09[b]	4	8	1.25	15.24[b]	12.
Duration to drive a single pile (minutes).			15		18.9	24.

TABLE 5—USER SPREADSHEET INPUT PARAMETERS USED FOR CALCULATING LEVEL A HARASSMENT ISOPLETHS—Continued

	11.5-inch H-pile	14-inch H-pile	14-inch H-pile	48-inch pipe pile	19.69-inch sheet piles	25-inch sheet piles
Number of strikes per pile	1,000	1,000		1,000		
Propagation (xLogR)	15	15	15	15	15	15.
Distance from source level measurement (meters).	10	10	10	10	10	10.

[a] These estimates include contingencies for weather, equipment, work flow, and other factors that affect the number of piles per day, and are assumed to be a maximum anticipated per day. Given that AGDC plans to pile drive up to 24 hours per day, it is appropriate to assume that the number of piles installed within the 24-hour period may not be a whole number.

[b] These averages assume that AGDC will drive 11.5-inch H-piles and sheet piles at a rate of 25 feet per day.

TABLE 6—CALCULATED DISTANCES TO LEVEL A AND LEVEL B HARASSMENT ISOPLETHS

Activity	Hammer type	Level A harassment zone (m)			Level B harassment zone (m)
		LF cetaceans	MF cetaceans	Phocids	
11.5-inch H-Pile	Impact	1,194	43	639	341
14-inch H-Pile	Impact	1,002	36	536	631
	Vibratory	2	<1	1	1,000
48-inch Pipe Pile	Impact	1,575	56	843	2,154
19.69-inch Sheet Piles	Vibratory	17	2	10	4,642
25-inch Sheet Piles	Vibratory	17	2	10	4,642

Level A harassment zones are typically smaller than Level B harassment zones. However, in rare cases such as the impact pile driving of the 11.5-inch and 14-inch H-piles in AGDC's project, the calculated Level A harassment isopleth is greater than the calculated Level B harassment isopleth. Calculation of Level A harassment isopleths include a duration component, which in the case of impact pile driving, is estimated through the total number of daily strikes and the associated pulse duration. For a stationary sound source such as impact pile driving, we assume here that an animal is exposed to all of the strikes expected within a 24-hour period. Calculation of a Level B harassment zone does not include a duration component. Depending on the duration included in the calculation, the calculated Level A harassment isopleths can be larger than the calculated Level B harassment isopleth for the same activity.

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.

Each fall and summer, NMFS and BOEM conduct an aerial survey in the Arctic, the ASAMM surveys (Clarke *et al.,* 2012, 2013a, 2014, 2015, 2017a, 2017b, 2018, 2019, 2020). The goal of these surveys is to document the distribution and relative abundance of bowhead, gray, right, fin and beluga whales and other marine mammals in areas of potential oil and natural gas exploration, development, and production activities in the Alaskan Beaufort and northeastern Chukchi Seas. Traditionally, only fall surveys were conducted but, in 2011, the first dedicated summer survey effort began in the ASAMM Beaufort Sea study area. AGDC used these ASAMM surveys as the data source to estimate seasonal densities of cetaceans (bowhead, gray and beluga whales) in the project area. The ASAMM surveys are conducted within blocks that overlay the Beaufort and Chukchi Seas oil and gas lease sale areas offshore of Alaska (Figure 16 in AGDC's application), and provide sighting data for bowhead, gray, and beluga whales during summer and fall months. During the summer and fall, NMFS observed for marine mammals on effort for 13,484 km and 12,846 km, respectively, from 2011 through 2018, and an additional 1643 km during summer 2019 and 2055 km during fall 2019. Data from those surveys are used for this analysis. We note that the Prudhoe Bay portion of the AK LNG project is in ASAMM survey Block 1a. The inshore boundary of Block 1 terminates at the McClure Island group, and it was not until 2016 that on-effort surveys began inside the McClure Island group (Block 1a; including Prudhoe Bay) since bowhead whales, the focus of the surveys, are not likely to enter this area given its shallow depth. However, no bowhead whales and only one beluga whale have been observed in Block 1a (including Prudhoe Bay). Therefore, the density estimates provided here, calculated using data from block 1, are likely an overestimate because they rely on offshore surveys where marine mammals are more likely to be present.

Bowhead Whale

AGDC calculated density estimates for bowhead whale by dividing the average number of whales observed per km of transect effort from 2011 to 2018 in ASAMM Block 1 (whales/km in Table 7) by two times the effective strip width (ESW) to encompass both sides of the transect line (whales per km/(2 × ESW). The ESW for bowhead whales from the Aero Commander aircraft is 1.15 km (0.71 mi) (Ferguson and Clarke 2013). Therefore, the summer density estimate is 0.005 bowhead whales/km^2, and the fall density estimate is 0.017 bowhead whales/km^2. The resulting densities are expected to be overestimates for the AK LNG analysis because the data is based on sighting effort outside of the barrier islands, and bowhead whales rarely occur within the barrier islands. However, AGDC conservatively used the higher fall density to estimate potential Level B harassment takes, and NMFS concurs. (Note that inclusion of the 2019 ASAMM surveys reduces the fall bowhead density to 0.016 bowhead whales/km^2. However, NMFS has conservatively used the higher density included in the proposed IHA to calculate Level B harassment take of bowhead whale, as described in the *Take Calculation and Estimation* section, below.)

As noted in the Description of Marine Mammals in the Area of Specified Activities section of the proposed IHA (85 FR 43382; July 16, 2020), we do not expect bowhead whales to be present

during AGDC's winter/spring contingency pile driving period.

TABLE 7—BOWHEAD WHALE SIGHTING DATA FROM 2011 THROUGH 2019 AND RESULTING DENSITIES

Year	Summer				Fall			
	Number of whales sighted	Transect effort (km)	Whales/km	Whales/km$^{2\,a}$	Number of whales sighted	Transect effort (km)	Whales/km	Whales/km$^{2\,a}$
2011	1	346	0.003	0.001	24	1,130	0.021	0.009
2012	5	1,493	0.003	0.001	17	1,696	0.010	0.004
2013	21	1,582	0.013	0.006	21	1,121	0.019	0.008
2014	17	1,393	0.012	0.005	79	1,538	0.051	0.022
2015	15	1,262	0.012	0.005	17	1,663	0.010	0.004
2016	97	1,914	0.051	0.022	23	2,360	0.010	0.004
2017	8	3,003	0.003	0.001	255	1,803	0.141	0.061
2018	2	2,491	0.001	0.0004	69	1,535	0.045	0.020
2019[c]	6	1,643	0.004	0.002	45	2,055	0.022	0.010
Total	166	13,484	[b] 0.012	[b] 0.005	505	12,846	[b] 0.039	[b] 0.017

[a] Calculated using an effective strip width of 1.15 km.
[b] Value represents average, not total, across all years.
[c] Note that inclusion of the new 2019 data results in a lower fall bowhead whale density (0.016). NMFS has conservatively used the higher fall density included in the proposed IHA (85 FR 43382; July 16, 2020) to calculate Level B harassment take of bowhead whale. Therefore, the 2019 data is not included in calculations in the "TOTAL" row.

Gray Whale

Gray whale sightings in the Beaufort Sea have increased in recent years; however, encounters are still infrequent. AGDC calculated density estimates for gray whale by dividing the average number of whales observed per km of transect effort (whales/km in Table 8) by two times the ESW to encompass both sides of the transect line (whales per km/(2 × ESW). The ESW for gray whales from the Aero Commander aircraft is 1.20 km (0.75 mi) (Ferguson and Clarke 2013). Therefore, the summer and fall density estimates are both 0.00003 gray whales/km^2. The resulting densities are expected to be overestimates for the AK LNG analysis because the data is based on sighting effort outside of the barrier islands, and gray whales rarely occur within the barrier islands as evidenced by Block 1a ASAMM surveys.

Similar to bowhead whale described above, gray whale densities were calculated using ASAMM survey data from 2011 to 2018. Inclusion of the 2019 ASAMM surveys reduces the summer gray whale density to 0.000028 gray whales/km^2. However, NMFS has conservatively used the slightly higher density included in the proposed IHA to calculate Level B harassment take of gray whale, as described in the *Take Calculation and Estimation* section, below.

As noted in the Description of Marine Mammals in the Area of Specified Activities section of the proposed IHA (85 FR 43382; July 16, 2020), we do not expect gray whales to be present during AGDC's winter/spring contingency pile driving period.

TABLE 8—GRAY WHALE SIGHTING DATA FROM 2011 THROUGH 2019 AND RESULTING DENSITIES

Year	Summer				Fall			
	Number of whales sighted	Transect effort (km)	Whales/km	Whales/km$^{2\,a}$	Number of whales sighted	Transect effort (km)	Whales/km	Whales/km$^{2\,a}$
2011	0	346	0	0	0	1,130	0	0
2012	0	1,493	0	0	0	1,696	0	0
2013	0	1,582	0	0	0	1,121	0	0
2014	0	1,393	0	0	1	1,538	0.0007	0.0003
2015	0	1,262	0	0	0	1,663	0	0
2016	1	1,914	0.003	0.001	0	2,360	0	0
2017	0	3,003	0	0	0	1,803	0	0
2018	0	2,491	0	0	0	1,535	0	0
2019	0	1,643	0	0	0	2,055	0	0
Total	1	13,484	[b] 0.00007	[b] 0.00003	1	12,846	[b] 0.00008	[b] 0.00003

[a] Calculated using an effective strip width of 1.20 km.
[b] Value represents average, not total, across all years.
[c] Note that inclusion of the new 2019 data results in a lower fall bowhead whale density (0.016). NMFS has conservatively used the higher fall density included in the proposed IHA to calculate Level B harassment take of bowhead whale. Therefore, the 2019 data is not included in calculations in the "TOTAL" row.

Beluga Whale

AGDC calculated beluga densities for survey block 1 (the area offshore from the McClure Island group) using ASAMM data collected from 2014–2018. Beluga sighting data was included in surveys from 2011 to 2013; however, this data is only summarized by depth zone, rather than by survey block. Therefore, the National Marine Mammal Laboratory (Megan Ferguson, pers.

comm., November 18, 2019), advised NMFS and AGDC to calculate beluga whale density using the 2014–2018 ASAMM data, as it is more recent and incorporates more years. Density estimates for beluga whale were calculated by dividing the average number of whales observed per km of transect effort (whales/km in Table 9) by two times the effective strip width to encompass both sides of the transect line (whales per km/(2 × ESW). The ESW for beluga whales from the Aero Commander aircraft is 0.614 km (0.38 mi) (Ferguson and Clarke 2013). Using the 2014 to 2018 data, the resulting summer density estimate included in the proposed IHA was 0.005 beluga whales/km^2, and the fall density estimate included in the proposed IHA was 0.001 beluga whales/km^2. AGDC conservatively used the higher summer density to estimate potential Level B harassment takes, and NMFS concurred for the proposed IHA (85 FR 43382; July 16, 2020).

Inclusion of the recently-available 2019 ASAMM survey results for beluga whale in block 1 increased the summer beluga whale density to 0.009 whales/km^2 since publication of the proposed IHA. Therefore, as described further in the *Take Calculation and Estimation* section, below, NMFS used the updated summer density to calculate beluga whale Level A and Level B harassment take.

The resulting densities are expected to be overestimates for the AK LNG analysis because the data is based on sighting effort outside of the barrier islands, and beluga whales rarely occur within the barrier islands, as evidenced by Block 1a ASAMM survey data. One beluga whale was observed in survey Block 1a in 2018. However, this sighting was a ''sighting on search,'' meaning that the sighting occurred off of the survey transect, and therefore was not included in the density calculation.

As noted in the Description of Marine Mammals in the Area of Specified Activities section of the proposed IHA (85 FR 43382; July 16, 2020), we do not expect beluga whales to be present during AGDC's winter/spring contingency pile driving period.

TABLE 9—BELUGA WHALE SIGHTING DATA FROM 2011 THROUGH 2019 AND RESULTING DENSITIES

Year	Summer				Fall			
	Number of whales sighted	Transect effort (km)	Whales/km	Whales/km$^{2\,a}$	Number of whales sighted	Transect effort (km)	Whales/km	Whales/km$^{2\,a}$
2014	13	1,393	0.009	0.008	9	1,538	0.006	0.005
2015	37	1,262	0.029	0.024	3	1,663	0.002	0.001
2016	0	1,914	0	0	1	2,360	0.0004	0.0003
2017	4	3,003	0.001	0.001	0	1,803	0	0
2018	6	2,491	0.002	0.002	0	1,535	0	0
2019[c]	63	1,643	0.038	0.031	1	2,055	0.0005	0.0004
Total	60	11,706	[b] 0.012	[b] 0.009	13	10,954	[b] 0.001	[b] 0.001

[a] Calculated using an effective strip width of 0.614 km.
[b] Value represents average, not total, across all years.
[c] Values included in the updated ''TOTAL'' row.

Ringed Seal

Ringed seals are the most abundant species in the project area. They haul out on the ice to molt between late May and early June, and spring aerial surveys provide the most comprehensive density estimates available. Industry monitoring programs for the construction of the Northstar production facility conducted spring aerial surveys in the area surrounding West Dock from 1997 to 2002 (Frost *et al.,* 2002; Moulten *et al.,* 2002b; Moulton *et al.,* 2005; Richardson and Williams, 2003). Spring surveys are expected to provide the best ringed seal density information, as the greatest percentage of seals have abandoned their lairs and are hauled out on the ice (Kelly *et al.,* 2010). Densities were consistently very low in areas where the water depth was less than 10 ft. (3 m), and only sightings observed in water depths greater than 10 ft. (3 m) have been included in the density calculations (Moulton *et al.,* 2002a, Moulton *et al.,* 2002b, Richardson and Williams, 2003). The average observed spring ringed seal density from this monitoring effort was 0.548 seals/km^2 (Table 10). These densities are not corrected for unobserved animals, and therefore may result in an underestimated density. However, NMFS and AGDC do not expect this to be a concern, given that the density calculations conservatively only included sightings observed in water depths greater than 10 ft (3 m) (Moulton *et al.,* 2002a, Moulton *et al.,* 2002b, Richardson and Williams, 2003), while the water surrounding the project site is shallow (less than 10 ft at the project site), and therefore densities are likely to be lower.

TABLE 10—RINGED SEAL DENSITIES ESTIMATED FROM SPRING AERIAL SURVEYS CONDUCTED FROM 1997 TO 2002

Year	Density (seals/km^2)
1997	0.43
1998	0.39
1999	0.63
2000	0.47
2001	0.54
2002	0.83
Average	0.548

In order to generate a summer density, as AGDC expects that the majority of their work will occur during the summer, we first began with the spring density. Summer densities in the project area are expected to significantly decrease as ringed seals range considerable distances during the open water season. Summer density was estimated to be 50 percent of the spring density (0.548 seals/km^2), resulting in a summer density estimate of 0.274 ringed seals/km^2. Like summer density estimates, fall density data are limited. Ringed seals remain in the water through the fall and into the winter. Given the lack of data, fall density is assumed the same as the summer density of 0.274 ringed seals/km^2.

During the winter months, ringed seals create subnivean lairs and maintain breathing holes in the landfast ice. Tagging data suggest that ringed seals utilize multiple lairs and Kelly *et al.* (1986) determined that, on average, one seal used 2.85 lairs, although the authors suggested that this is likely an underestimate. Density estimates for the number of ringed seal ice structures have been calculated (Frost and Burns 1989; Kelly *et al.* 1986; Williams *et al.* 2001), and the average density of ice structures from these reports is 1.58/km^2.

To estimate ringed seal density in the winter, the average ice structure density (1.58/km^2) was divided by the average number of structures used by the seals (2.85 structures). The estimated density is 0.509 ringed seals/km^2 in the winter; however, this is likely an overestimate as the average number of ice structures utilized is thought to be an underestimate (Kelly *et al.,* 1986).

While more recent ASAMM surveys have been conducted in the project area (2016–2019), these surveys did not identify observed pinnipeds to species, and therefore were not used to calculate take of pinnipeds.

TABLE 11—RINGED SEAL ICE STRUCTURE DENSITY IN THE VICINITY OF THE PROJECT AREA

Year	Ice structure density (structures per km^2)	Source
1982	3.6	Frost and Burns 1989.
1983	0.81	Kelly *et al.,* 1986.
1999	0.71	Williams *et al.,* 2001.
2000	1.2	Williams *et al.,* 2001.
Average Density	1.58.	

Given that AGDC will only pile drive during the winter if they are unable to complete the work during the summer and fall open water season, AGDC estimated ringed seal takes using summer densities, rather than winter. NMFS concurs with this approach.

Spotted Seal

The spotted seal occurs in the Beaufort Sea in small numbers during the summer open water period. At the onset of freeze-up in the fall, spotted seals return to the Chukchi and then Bering Sea to spend the winter and spring. As such, we do not expect spotted seals to occur in the project area during AGDC's winter/spring contingency period.

Only a few of the studies referenced in calculating the ringed seal densities also include data for spotted seals. Given the limited spotted seal data, NMFS expects that relying on this data may result in an underestimate, and that it is more conservative to calculate the spotted seal density as a proportion of the ringed seal density. Therefore, summer spotted seal density was estimated as a proportion of the ringed seal summer density based on the percentage of pinniped sightings observed during monitoring projects in the region (Harris *et al.,* 2001; Aerts *et al.,* 2008; Hauser *et al.,* 2008; HDR 2012). Spotted seals comprised 20 percent of the pinniped sightings during these monitoring efforts. Therefore, summer spotted seal density was calculated as 20 percent of the ringed seal density of 0.274 seals/km^2. This results in an estimated spotted seal summer density of 0.055 seals/km^2.

Bearded Seal

The majority of bearded seals spend the winter and spring in the Chukchi and Bering seas; however, some remain in the Beaufort Sea year-round. A reliable population estimate for the bearded seal stock is not available, and occurrence in the Beaufort Sea is less known than that in the Bering Sea. Spring aerial surveys conducted as part of industry monitoring for the Northstar production facility provide limited sighting numbers from 1999–2002 (Moulton *et al.,* 2000, Moulton *et al.,* 2001, Moulton *et al.,* 2002a, Moulton *et al.,* 2003). During the 4 years of survey, an average of 11.75 bearded seals were observed during 3,997.5 km^2 of effort. Using this data, winter and spring density are estimated to be 0.003 bearded seals/km^2.

Bearded seals occur in the Beaufort Sea more frequently during the open water season, rather than other parts of the year. Only a few of the studies referenced in calculating the ringed seal densities also include data for bearded seals. Given the limited bearded seal data, NMFS expects that relying on this data may result in an underestimate, and that it is more conservative to calculate the bearded seal density as a proportion of the ringed seal density. Therefore, summer density was estimated as a proportion of the ringed seal summer density based on the percentage of pinniped sightings observed during monitoring projects in the region (Harris *et al.,* 2001; Aerts *et al.,* 2008; Hauser *et al.,* 2008; HDR 2012). Bearded seals comprised 17 percent of the pinniped sightings during these monitoring efforts. Therefore, summer bearded seal density was calculated as 17 percent of the ringed seal density of 0.274 seals/km^2. This results in an estimated bearded seal summer density of 0.047 seals/km^2. The same estimate is assumed for bearded seal fall density.

As noted in the Description of Marine Mammals in the Area of Specified Activities section and in Table 12, bearded seals could potentially occur in the project area during AGDC's winter/spring contingency period. However, we would expect very few, if any, bearded seals to be present during this time. In consideration of this species presence information, and AGDC's plan to conduct most construction during the open-water season, NMFS used the summer density in the take calculation described below.

TABLE 12—MARINE MAMMAL DENSITIES IN THE GEOGRAPHIC REGION BY SEASON

Species	Winter (Nov–Mar)	Spring (Apr–Jun) [a]	Summer (Jul–Aug)	Fall (Sept–Oct)
Bowhead Whale	0	0	0.005	0.017
Gray Whale	0	0	0.00003	0.00003
Beluga Whale[b]	0	0	0.009	0.001
Ringed Seal	0.507	0.548	0.274	0.274
Spotted Seal	0	0	0.055	0
Bearded Seal	0.003	0.003	0.047	0.047

[a] AGDC's pile driving contingency period extends from late February to April 2024, however, very little if any pile driving is likely to occur in April.
[b] As noted above, the beluga whale densities were updated to include 2019 ASAMM survey data. (Clarke *et al.,* 2020).

Take Calculation and Estimation

In this section, we describe how the information provided above is brought together to produce a quantitative take estimate.

To estimate Level A and Level B harassment takes, AGDC first multiplied the area (km^2) estimated to be ensonified above the Level A or Level B harassment thresholds for each species, respectively, for pile driving (and removal) of each pile size and hammer type by the duration (days) of that activity in that season by the seasonal density for each species (number of animals/km^2). NMFS generally concurs with, and has adopted this method, with the exception of the estimated duration of the activity, as described below.

AGDC expects that construction will likely be completed during the open-water construction season. AGDC calculated that the construction will require approximately 164 days of in-water work; however, this estimate does not take into account that different pile types would be installed on the same day, therefore reducing the total number of pile driving days. Therefore, NMFS expects that the take calculation using AGDC's method described above overestimates take. Taking into consideration the number of calendar days, construction occurring 6 days per week, and no work occurring on days during the whaling season, there are 123 days in the months of July through October on which the work is expected to occur (75 percent of the 164 days used to inform the take estimate in AGDC's application). As such, NMFS is authorizing 75 percent of the take estimate calculated by AGDC for each species (except for Level A harassment take of bowhead whales and beluga whales, and Level B harassment of gray whales as noted below).

NMFS recognizes that AGDC may work for a short time outside of this period in their February to April contingency period; however, we expect that if AGDC works during the contingency period, it would be because of construction delays (and therefore, days on which they did not work) during their planned open water work season. Additionally, we recognize that ringed seals may be present in ice lairs during the contingency period. However, AGDC must initiate pile driving prior to March 1, as described in the Mitigation Measures section. Initiating pile driving before March 1 is expected to discourage seals from establishing birthing lairs near pile driving. As such, we expect that this measure will eliminate the potential for physical injury to ringed seals during this period. Therefore, NMFS expects that the take estimate described herein is reasonable even if AGDC must pile drive during their contingency period.

NMFS calculated take using summer densities for all species except for bowhead whale. For bowhead whales, NMFS conservatively calculated take using the fall density.

For bowhead whale, including the 2019 ASAMM surveys decreases the fall bowhead density to 0.016 bowhead whales/km^2. However, NMFS has conservatively used the higher density included in the proposed IHA to calculate Level B harassment take of bowhead whale. Using the lower density results in an estimate of 103 Level B harassment takes of bowhead, which NMFS considers to be a negligible difference, though less conservative.

For gray whale, including the 2019 ASAMM survey data decreases the summer density to 0.000028 gray whales/km^2. Using this lower density results in a calculated take estimate of 0.18 takes by Level B harassment of gray whale, but in consideration of group size, the take estimate remains 2 takes by Level B harassment, as included in the proposed IHA.

For beluga whale, including the 2019 ASAMM survey data increases the summer density to 0.0009 beluga whales/km^2, which significantly increases the estimated Level A and Level B harassment takes. Therefore, NMFS recalculated the Level A and Level B harassment take estimates using this new density. The updated estimates are included in Table 14 and Table 15.

As noted in Table 15, in the proposed IHA (85 FR 43382; July 16, 2020), Level A harassment takes for beluga whale and phocids were erroneously calculated using the LF cetacean Level A harassment zone sizes. The calculations in Table 15 and in the final IHA reflect the corrected estimated Level A harassment take for phocids and beluga whale, calculated using the correct Level A harassment zone sizes. The Final IHA does not authorize Level A harassment take of beluga whale (nor was it included in the proposed IHA) despite the change to the calculation, given the small size of the Level A harassment zones, the low likelihood that a beluga will occur in this area, the lack of modeled Level A harassment takes, and the required mitigation, as described below.

TABLE 13—AREA OF LEVEL A AND LEVEL B HARASSMENT ZONES

	Area of level A harassment zone (km^2)			Area of level B harassment zone (km^2)
	LF cetaceans	MF cetaceans	Phocids	
11.5-in H-pile (impact)	4.48	0.01	1.28	0.37
14-in H-pile (impact)	3.15	0.00	0.90	1.25

TABLE 13—AREA OF LEVEL A AND LEVEL B HARASSMENT ZONES—Continued

	Area of level A harassment zone (km^2)			Area of level B harassment zone (km^2)
	LF cetaceans	MF cetaceans	Phocids	
14-in H-pile (vibratory)	0.00	0.00	0.00	3.14
48-in pipe pile (impact)	7.80	0.01	2.23	14.58
19.69-in sheet pile (vibratory)	0.00	0.00	0.00	67.68
25-in sheet pile (vibratory)	0.00	0.00	0.00	67.68

TABLE 14—ESTIMATED LEVEL B HARASSMENT TAKES BY SPECIES, PILE SIZE AND TYPE, AND INSTALLATION/REMOVAL METHOD

Activity	Estimated duration (days)	Calculated level B harassment takes					
		Bowhead whale	Gray whale	Beluga whale [b]	Ringed seal	Spotted seal	Bearded seal
DH4							
Sheet Pile	36	41.65	0.08	20.85	668.04	133.61	113.57
Anchor Pile (11.5-inch H-pile)	9	0.06	0	0.03	0.90	0.18	0.15
Mooring Dolphins (48-inch Pipe Pile)	10	2.49	0	1.25	39.98	8.00	6.80
Spud Piles (14-inch H-pile)	12	0.64	0	0.32	10.34	2.07	1.76
South Bridge Abutment							
Dock Face (Sheet Pile)	23	26.61	0.05	13.32	426.80	85.36	72.56
Tailwall (Sheet Pile)	23	26.61	0.05	13.32	426.80	85.36	72.56
Anchor Pile (14-inch H-pile)	1	0.02	0	0.01	0.34	0.07	0.06
North Bridge Abutment							
Dock Face (Sheet Pile)	24	27.76	0.05	13.90	445.36	89.07	75.71
Tailwall (Sheet Pile)	17	19.67	0.04	9.85	315.46	63.09	53.63
Anchor Pile (14-inch H-pile)	1	0.02	0	0.01	0.34	0.07	0.06
Barge Bridge							
Mooring Dolphins (48-inch Pipe Piles)	4	1.00	0	0.50	15.99	3.20	2.72
Spud Piles (14-inch H-piles)	4	0.21	0	0.11	3.45	0.69	0.59
Total	164	146.74	0.27	73.46	2353.8	470.76	400.15
Level B Harassment Take Authorized (75% of Total)	123	110	[a] 2	55	1,765	353	300

[a] 75 percent of the calculated total is 0.2 takes, however, to account for group size (Clarke *et al.,* 2017), NMFS is authorizing two Level B harassment takes of gray whale.
[b] Includes updated density data from 2019 ASAMM surveys (Clarke *et al.,* 2020).

TABLE 15—CALCULATED LEVEL A HARASSMENT TAKES BY SPECIES, PILE SIZE AND TYPE, AND INSTALLATION/REMOVAL METHOD

Activity	Estimated duration (days)	Calculated level A harassment takes					
		Bowhead whale	Gray whale	Beluga whale [c d]	Ringed seal [c]	Spotted seal [c]	Bearded seal [c]
DH4							
Sheet Pile	36	0	0	0	0	0	0
Anchor Pile (11.5-inch H-pile)	9	0.69	0	0	3.16	0.63	0.54
Mooring Dolphins (48-inch Pipe Pile)	10	1.33	0	0	6.11	1.23	1.05
Spud Piles (14-inch H-pile)	12	0	0	0	0	0	0
South Bridge Abutment							
Dock Face (Sheet Pile)	23	0	0	0	0	0	0
Tailwall (Sheet Pile)	23	0	0	0	0	0	0
Anchor Pile (14-inch H-pile)	1	0.05	0	0	0.25	0.05	0.04
North Bridge Abutment							
Dock Face (Sheet Pile)	24	0	0	0	0	0	0
Tailwall (Sheet Pile)	17	0	0	0	0	0	0

TABLE 15—CALCULATED LEVEL A HARASSMENT TAKES BY SPECIES, PILE SIZE AND TYPE, AND INSTALLATION/REMOVAL METHOD—Continued

Activity	Estimated duration (days)	Calculated level A harassment takes					
		Bowhead whale	Gray whale	Beluga whale [c d]	Ringed seal [c]	Spotted seal [c]	Bearded seal [c]
Anchor Pile (14-inch H-pile)	1	[a] 0.05	0	0	0.2466	0.0495	0.0423
Barge Bridge Mooring Dolphins (48-inch Pipe Piles)	4	0.53	0	0	2.44	0.49	0.42
Spud Piles (14-inch H-piles)	4	0	0	0	0	0	0
Total	164	2.65	0	0	12.20	2.45	2.09
Level A Harassment Take Authorized (75% of Total)	123	[b] 0	0	0	9	2	2

[a] Note that the notice of proposed IHA mistakenly stated 0.5, rather than 0.05. However, the "Total" cell was calculated correctly.
[b] 75 percent of the calculated total is 1.99 takes, however, we do not expect bowheads to occur within the Level A harassment zone, and we do not propose to authorize Level A harassment take of bowhead whale.
[c] In the proposed IHA, Level A harassment takes for beluga whale and phocids were erroneously calculated using the LF cetacean Level A harassment zone sizes. The calculations in this table and in the final IHA reflect the corrected estimated Level A harassment take, calculated using the Level A harassment zone for belugas and phocids, respectively.
[d] Beluga whale take estimates were updated to reflect inclusion of the 2019 ASAMM data in the density calculation. (However, the "Level A harassment Take Authorized" did not change.)

We do not expect bowhead whales to occur within the Level A harassment zones due to the shallow waters (approximately 19 ft in depth at the isopleth), lack of historic sightings, and required mitigation. As previously noted, waters less than 15 ft (4.5 m) deep are considered too shallow to support these whales, and in three decades of aerial surveys by BOEM (ASAMM), no bowhead whale has been recorded in waters less than 16.4 ft (5 m) deep (Clarke and Ferguson 2010). Further, no bowhead whales have been observed during ASAMM surveys in Block 1a (which encompasses the Level A harassment zone) since Block 1a surveys in began in 2016. Additionally, shutdown requirements within designated shutdown zones for LF cetaceans (which include bowhead whales) are expected to prevent take by Level A harassment given the large size and visibility of bowhead whales. Additionally, Level A harassment zones are calculated with an associated duration component based on the amount of pile driving expected to occur within one day. Therefore, a marine mammal is not taken by Level A harassment instantaneously when it enters the Level A harassment zone, and given the shallow depths, even if a bowhead did enter the Level A harassment zone, we would not expect it to remain within the zone for a long enough period to incur PTS. Therefore, we do not expect Level A harassment of bowhead whales to occur, and are not authorizing Level A harassment take of bowheads.

The likelihood of gray whales occurring in the Level A harassment zone is extremely low, as evidenced by the very low densities included in the *Marine Mammal Occurrence* section and the lack of modeled takes in Table 15. Further, shutdown requirements within designated shutdown zones for LF cetaceans (which include gray whales) are expected to prevent take by Level A harassment given the large size and visibility of gray whales, and the duration component associated with the Level A harassment zones. Even if a gray whale did enter the Level A harassment zone, we would not expect it to remain within the zone for a long enough period to incur PTS, given the mitigation and visibility. Therefore, we do not expect Level A harassment of gray whales to occur, and are not authorizing Level A harassment take of gray whale.

The largest Level A harassment zone for mid-frequency cetaceans (including the beluga whale) extends 56 m from the source during impact driving of the 48-inch pipe piles (Table 6). Considering the small size of the Level A harassment zones, and the low likelihood that a beluga will occur in this area, Level A harassment take is unlikely to occur. Further, no Level A harassment takes are modeled given the corrected zone size used in the calculation in this final IHA. Additionally, AGDC is planning to implement a 50 m shutdown zone during this activity, which includes the <1 m peak PTS isopleth. We expect shutdown zones will eliminate the potential for Level A harassment take of beluga whale. Therefore, we are not authorizing takes of beluga whale by Level A harassment.

TABLE 16—AUTHORIZED INCIDENTAL TAKE BY LEVEL A AND LEVEL B HARASSMENT, BY SPECIES AND STOCK

Common name	Stock	Level A harassment take [e]	Level B harassment take [e]	Total instances of take	Stock abundance	Percent of stock
Bowhead Whale	Western Arctic	0	110	110	16,820	0.65
Gray Whale	Eastern North Pacific	0	2	2	26,960	0.007
Beluga Whale [a]	Beaufort Sea	0	55	55	39,258	0.14
	Chukchi Sea				[c] 13,305	0.4
Ringed Seal	Arctic [d]	9 [b]	1,765	1,774	N/A	N/A
Spotted Seal	Bering [d]	2 [b]	353	355	461,625	0.08

TABLE 16—AUTHORIZED INCIDENTAL TAKE BY LEVEL A AND LEVEL B HARASSMENT, BY SPECIES AND STOCK—Continued

Common name	Stock	Level A harassment take [e]	Level B harassment take [e]	Total instances of take	Stock abundance	Percent of stock
Bearded Seal	Beringia [d]	2 [b]	300	302	N/A	N/A

[a] As noted in the Description of Marine Mammals in the Area of Specified Activities section, beluga whales in the project area are likely to be from the Beaufort Sea stock. However, we have conservatively attributed all takes to each stock in our analysis.
[b] Updated to reflect the correct Level A harassment zone size for phocids.
[c] Updated to reflect the 2020 Draft SAR estimate. The former stock abundance estimate was 20,752.
[d] These stock names were updated in the 2020 Draft SARs. The stock names were all formerly "Alaska."
[e] The estimated number of takes by Level A harassment and Level B harassment does not necessarily equate to the number of individual animals NMFS expects will be harassed (which may be lower), but rather to the instances of take (*i.e.,* exposures above the Level A harassment and Level B harassment threshold) that are anticipated to occur. These instances may represent either brief exposures (minutes) or, in some cases, longer durations of exposure within a day. Some individuals may experience multiple instances of take (*i.e.,* on multiple days) over the course of the year, which means that the number of individuals taken is smaller than the total estimated takes. Repeat takes of the same individual are more likely for pinnipeds given the likelihood of an individual to remain in the project area for a longer period of time in comparison to a cetacean, and the greater anticipated instances of pinniped takes.

Effects of Specified Activities on Subsistence Uses of Marine Mammals

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

The communities of Nuiqsut, Utqiaġvik and Kaktovik engage in subsistence harvests off the North Slope of Alaska. Alaska Native communities have harvested bowhead whales for subsistence and cultural purposes with oversight and quotas regulated by the International Whaling Commission (IWC). The NSB Department of Wildlife Management has been conducting bowhead whale subsistence harvest research since the early 1980's to collect the data needed by the IWC to set harvest quotas. Bowhead whale harvest (percent of total marine mammal harvest), harvest weight, and percent of households using bowhead whale are presented in Table 25 of AGDC's application.

Most of the Beaufort Sea population of beluga whales migrate from the Bering Sea into the Beaufort Sea in April or May. The spring migration routes through ice leads are similar to those of the bowhead whale. Fall migration through the western Beaufort Sea occurs in September or October. Surveys of the fall distribution strongly indicate that most belugas migrate offshore along the pack ice front beyond the reach of subsistence harvesters. Beluga whales are harvested opportunistically during the bowhead harvest and throughout ice-free months. No beluga whale harvests were reported in 2006 survey interviews conducted by Stephen R. Braund & Associates (SRBA) in any community (SRBA 2010). Beluga harvests were also not reported in Nuiqsut and Kaktovik, although households did report using beluga whale, likely through sharing from other communities (Brown *et al.,* 2016). We do not expect the planned activities at the AK LNG project site to affect beluga whale subsistence harvests, as none are expected.

Gray whale harvests were not reported by any of the communities surveyed by Alaska Department of Fish and Game (ADF&G) in any of the survey years, and therefore are not included as an important subsistence species and are not further discussed.

The community of Utqiaġvik's subsistence activities occur outside of the area impacted by activities considered in this authorization. As described below, we do not expect impacts to Utqiaġvik's subsistence activities, and therefore they are not discussed further beyond the explanation provided here.

Impacts to marine mammals from the planned construction would mostly include limited, temporary behavioral disturbances of seals, however, some slight PTS within the lower frequencies associated with pile driving is possible. Additionally, a small number of takes of bowhead whales, by Level B harassment only, are predicted to occur in the vicinity of AGDC's activity. Even if some subset of taken individuals deflected farther offshore near the project site, it is reasonable to predict that most individuals would likely resume a more typical migration path by the time they reach the Utqiaġvik hunting area, and therefore, significant impacts to the Utqiaġvik hunt would be unlikely. Please refer to AGDC's application for additional information.

The planned activities and associated harassment of marine mammals are not expected to impact marine mammals in numbers or locations sufficient to render them unavailable for Utqiaġvik subsistence harvest given the short-term, temporary, and localized nature of construction activities, and the planned mitigation measures. Additionally, no serious injury or mortality of marine mammals is expected or authorized, and the activities are not expected to have any impacts on reproductive or survival rates of any marine mammal species. Altogether, the authorized take by harassment will not have an unmitigable adverse impact on the availability of any species or stock for subsistence uses.

Kaktovik

Kaktovik is the easternmost village in the NSB. Kaktovik is located on the north shore of Barter Island, situated between the Okpilak and Jago rivers on the Beaufort Sea coast. Kaktovik's subsistence-harvest areas are to the east of the project area and target marine mammal species migrating eastward during spring and summer occur seaward of the project area and westward in the fall.

Kaktovik bowhead whale hunters reported traveling between Camden Bay to the west and Nuvagapak Lagoon to the east (SRBA 2010). This range does not include the project area impacted by the activities analyzed for this IHA. The small number of takes of bowhead whales, by Level B harassment only, predicted to occur in the vicinity of AGDC's activity are not expected to have any impacts on the fitness of any bowhead whales. Further, we do not expect construction activities to deflect the bowhead whale migration offshore in the Kaktovik hunting area, given the distance from the western extent of the

hunting area (Camden Bay) to the predicted Level B harassment isopleths. Even if some subset of taken individuals deflected farther offshore near the project site, it is reasonable to predict that most individuals would likely resume a more typical migration path by the time they reach the Kaktovik hunting area during the eastbound migration, and during the westbound migration, a bowhead exposed to construction noise would have already passed the hunting area prior to exposure. Significant impacts to the Kaktovik hunt would be unlikely, and Kaktovik bowhead whale hunting is not discussed further. Please refer to AGDC's application for additional information.

Ringed, spotted and bearded seals are harvested by the community of Kaktovik. Residents hunt seals in rivers during ice-free months, primarily July-August. Ringed seals are an important subsistence resource for Native Alaskans living in communities along the Beaufort Sea coast. Kaktovik hunters travel by boat to look for ringed seals on floating ice (often while also hunting for bearded seal) or sometimes along the ice edge by snow machine before break-up, during the spring (SRBA 2010). In 2006, 7 people (18 percent of survey respondents) indicated that they had recently hunted for ringed seals in Kaktovik (SRBA 2010). Residents reported looking for ringed seal, usually while also searching for bearded seal, offshore between Prudhoe Bay to the west and Demarcation Bay to the east (SRBA 2010). Ringed seal hunting typically peaks between March and August but continues into September, as well (SRBA 2010). Although residents reported hunting ringed seals up to approximately 30 mi (48 km) from shore, the highest numbers of overlapping use areas generally occur within a few miles from shore (SRBA 2010). The total use area for ringed seal from 1995–2006 encompassed approximately 2,139 mi^2 (5540 km^2). Harvest of ringed seals by Kaktovik hunters does not typically occur to the west of Camden Bay. Additionally, impacts to ringed seals are expected to include temporary behavioral disturbances and some slight PTS within the lower frequencies associated with pile driving. Serious injury or mortality of ringed seals is not anticipated from the planned activities, and the activities are not expected to have any impacts on ringed seal reproductive or survival rates, or to impact availability of ringed seals. Therefore, AK LNG project activities are not expected to impact Kaktovik ringed seal harvests.

Kaktovik hunters harvested 126 pounds of spotted seals in 1992 (ADF&G CSIS; retrieved and analyzed August 15, 2018). Spotted seals were not reported harvested in 2006 survey interviews conducted in Nuiqsut (SRBA 2010).

Kaktovik bearded seal hunting occurs along the coast as far west as Prudhoe Bay and as far east as the United States/Canada border (SRBA 2010). Residents reported looking for bearded seal as far as approximately 30 mi (48 km) from shore, but generally hunt them closer to shore, up to 5 mi (8 km; SRBA 2010). Between 1994 –2003, 29 bearded seals were taken in Kaktovik. In 2006, 7 people (18 percent of survey respondents) indicated that they had recently hunted for bearded seals in Kaktovik (SRBA 2010). Bearded seal hunting activities, like ringed seal, begin in March, peaking in July and August, and then conclude in September (SRBA 2010).

The community of Kaktovik is approximately 100 (direct) mi (160 km) from the planned project at Prudhoe Bay; subsistence activities for these communities primarily occur outside of the project construction area and the associated Level A and Level B harassment zones. The planned construction and use of improvements to West Dock would occur in Prudhoe Bay, adjacent to existing oil and gas infrastructures, and in an area that is not typically used for subsistence other than extremely limited bearded seal hunting by residents of Kaktovik.

Because of the distance from Kaktovik and Kaktovik's very limited use of waters offshore of Prudhoe Bay, and because the planned activities would occur in an already-developed area, it is unlikely that the planned activities would have any effects on the use of marine mammals for subsistence by residents of Kaktovik. Further, the planned activities are not expected to impact marine mammals in numbers or locations sufficient to render them unavailable for subsistence harvest given the short-term, temporary, and localized nature of construction activities, and the planned mitigation measures. Impacts to marine mammals would mostly include limited, temporary behavioral disturbances of seals, with some potential slight PTS within the lower frequencies associated with pile driving. Serious injury or mortality of marine mammals is not anticipated from the planned activities, and the activities are not expected to have any impacts on reproductive or survival rates of any marine mammal species. Therefore, we do not discuss Kaktovik's subsistence activities further.

Nuiqsut

The planned construction activities would occur closest to the marine subsistence use area used by the Native Village of Nuiqsut. Nuiqsut is located on the west bank of the Nechelik Channel on the lower Colville River, about 25 mi (40 km) from the Arctic Ocean and approximately 150 mi (242 km) southeast of Utqiaġvik. Nuiqsut subsistence hunters utilize an extensive search area, spanning 16,322 mi^2 (km^2) across the central Arctic Slope (see Figure 19 of AGDC's application, Brown *et al.,* 2016). Marine mammal hunting is primarily concentrated in two areas: 1) Harrison Bay, between Atigaru Point and Oliktok Point, including a northward extent of approximately 50 mi (80 km) beyond the Colville River Delta (Brown *et al.,* 2016); and 2) east of the Colville River Delta between Prudhoe and Foggy Island bays, which includes an area of approximately 100 square mi surrounding the Midway Islands, McClure Island and Cross Island (Brown *et al.,* 2016). The community of Nuiqsut uses subsistence harvest areas adjacent to the planned construction area; however, West Dock is not a common hunting area, nor is it visited regularly by Nuiqsut subsistence hunters primarily because of its industrial history.

The community of Nuiqsut also harvests ringed, spotted and bearded seals. Seal hunting typically begins in April and May with the onset of warmer temperatures. Many residents continue to hunt seals after spring breakup as well (Brown *et al.,* 2016).

The most important seal hunting area for Nuiqsut hunters is off the Colville Delta, an area extending as far west as Fish Creek and as far east as Pingok Island. Seal hunting search areas by Nuiqsut hunters also included Harrison Bay, and a 30-mi (48-km) stretch northeast of Nuiqsut between the Colville and Kuparuk rivers, near Simpson Lagoon and Jones Islands (Brown *et al.,* 2016). Cross Island is a productive area for seals, but is too far from Nuiqsut to be used on a regular basis. Seal subsistence use areas of Nuiqsut from 1995 through 2006 are depicted in Figure 21 of AGDC's application.

Ringed seals are an important subsistence resource for Native Alaskans living in communities along the Beaufort Sea coast. Nuiqsut residents commonly harvest ringed seal in the Beaufort Sea during the summer months (SRBA 2010). There are a higher number of use areas extending east and

west of the Colville River delta. Residents reported traveling as far as Cape Halkett to the west and Camden Bay to the east in search of ringed seal. Survey respondents reported traveling offshore up to 30 mi (48 km; SRBA 2010). Residents reported hunting ringed seals throughout the late spring, summer, and early fall with a higher number of use areas reported in June, July, and August (SRBA 2010). In 2006, 12 people (36 percent of survey respondents) indicated that they had recently hunted for ringed seals in Nuiqsut (SRBA 2010).

Nuiqsut bearded seal use areas extend as far west as Cape Halkett, as far east as Camden Bay, and offshore up to 40 mi (64 km). In 2006, 12 people (69 percent of survey respondents) indicated that they had recently hunted for bearded seals in Nuiqsut (SRBA 2010). Nuiqsut hunters reported hunting bearded seal during the summer season in open water as the seals are following the ice pack. Residents reported hunting bearded seal between June and September, although a small number of use areas were reportedly used in May and October (SRBA 2010). The number of reported bearded seal use areas peak in July and August, when the majority of seals are available along the ice pack (SRBA 2010).

Nuiqsut's bowhead whale hunt occurs in the fall at Cross Island, a barrier island located approximately 12 mi (19 km) northwest of West Dock. Nuiqsut whalers base their activities from Cross Island (Galginaitis 2014), and the whaling search and the harvest areas typically are concentrated north of the island. Hunting activities between 1997 and 2006 occurred almost as far west as Thetis Island, as far east as Barter Island (Kaktovik), and up to approximately 50 mi (80 km) offshore (SRBA 2010). Harvest locations in 1973–2011 and GPS tracks of 2001–2011 whaling efforts are shown in Figure 19 of AGDC's application.

Bowhead whales are harvested by Nuiqsut whalers during the fall whaling season. Nuiqsut residents typically hunt bowhead whales in September, although a small number of use areas were reported in August and extending into October (SRBA 2010). Pile driving will not occur during Nuiqsut whaling, as stated in the Mitigation Measures section.

Nuiqsut subsistence hunting crews operating from Cross Island have harvested three to four bowhead whales per year (Bacon *et al.,* 2009; Galginaitis 2014). In 2014, the AEWC allocated Nuiqsut a quota of four bowhead whales each year; however, through transfers of quota from other communities, in 2015 Nuiqsut was able to harvest five whales (Brown *et al.,* 2016). In 2006, 10 people (30 percent of survey respondents) in Nuiqsut indicated that they had recently hunted for bowhead whales (SRBA 2010). In 2016, Nuiqsut whaling crews harvested four bowhead whales (Suydam *et al.,* 2017).

Nuiqsut is 70 mi (112 km) away from the planned project, and is likely to be the community that has the greatest potential to experience any impacts to subsistence practices. AGDC asserts that the primary potential for AK LNG project impacts to Nuiqsut's subsistence use of marine mammals is associated with barge activity, which it states could interfere with summer seal and fall bowhead whale hunting (Alaska LNG 2016). As described previously, barging activity is unlikely to incidentally take marine mammals; however, the noise or presence of barges could affect the behavior of whales in a manner that makes successful harvests more difficult. Although barge activities would not cease during Nuiqsut's fall bowhead whale hunting activities, the final IHA requires vessels to transit landward of Cross Island during the entirety of the Nuiqsut whaling season (approximately August 25-September 15, though the exact dates may change).

Pile driving associated with construction at West Dock could affect subsistence hunting of bowhead whales, as the Level B harassment zones extend up to 4.6 km from the pile driving site for some pile and hammer type combinations. As such, AGDC will not pile drive during the Nuiqsut whaling season (see Mitigation Measures). AGDC has consulted with AEWC and NSB on mitigation measures to limit impacts (Alaska LNG 2016), and has continued to provide formal and informal project updates to these groups, and is committed to continuing coordination as described in AGDC's POC.

The planned activities are not expected to impact marine mammals in numbers or locations sufficient to render them unavailable for subsistence harvest given the short-term, temporary, and localized nature of construction activities, and the planned mitigation measures. Impacts to marine mammals would mostly include limited, temporary behavioral disturbances of seals, however, some slight PTS within the lower frequencies associated with pile driving is possible. Serious injury or mortality of marine mammals is not anticipated from the planned activities, and the activities are not expected to have any impacts on reproductive or survival rates of any marine mammal species.

In summary, impacts to subsistence hunting are not expected due to the distance between West Dock construction and primary seal hunting areas, the limited extent of impacts to marine mammals (Level B harassment, and slight Level A harassment for a small number of seals) and planned mitigation during the Nuiqsut bowhead whale hunt.

Mitigation Measures

In order to issue an IHA under Section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses. NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

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

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

(2) The practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

Mitigation for Marine Mammals and Their Habitat

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

- Conduct briefings between construction supervisors and crews and the marine mammal monitoring team prior to the start of all pile driving activity and when new personnel join the work, to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures;
- For in-water construction, heavy machinery activities other than pile driving, if a marine mammal comes within 10 m (33 ft), operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions;
- For those marine mammals for which Level B harassment take has not been requested, in-water pile installation/removal will shut down immediately when it is safe to do so if such species are observed within or entering the Level B harassment zone; and
- If take reaches the authorized limit for an authorized species, pile installation will be stopped as these species approach the Level B harassment zone to avoid additional take.

TABLE 17—SHUTDOWN ZONES DURING PILE INSTALLATION AND REMOVAL

Activity	Hammer Type	Shutdown Zone (m)		
		LF cetaceans	MF cetaceans	Phocids
11.5-inch H-Pile	Impact	1,200	50	500
14-inch H-Pile	Impact	1,200	50	500
	Vibratory	10	10	10
48-inch Pipe Pile	Impact	1,600	50	500
Sheet Piles	Vibratory	20	10	10
Screeding		215		

Aircraft must transit at an altitude of 457 m (1,500 ft) or higher, to the extent practicable, while maintaining Federal Aviation Administration flight rules (*e.g.,* avoidance of cloud ceiling, *etc.*), excluding takeoffs and landing. If flights must occur at altitudes less than 457 m (1,500 ft) due to environmental conditions, aircraft must make course adjustments, as needed, to maintain at least a 457 m (1,500 ft) separation from all observed marine mammals. Helicopters (if used) must not hover or circle above marine mammals. A minimum transit altitude is expected to reduce the potential for disturbance to marine mammals from transiting aircraft.

AGDC is required to implement all mitigation measures described in the biological opinion (issued on June 3, 2020).

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

Establishment of Shutdown Zones—AGDC will establish shutdown zones for all pile driving and removal activities. The purpose of a shutdown zone is generally to define an area within which shutdown of the activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area). Shutdown zones will vary based on the activity type and marine mammal hearing group (see Table 17). The largest shutdown zones are generally for low frequency cetaceans as shown in Table 17. In this instance, the largest shutdown zone for low frequency cetaceans is 1,600 m. AGDC expects that they will be able to effectively observe phocids at distances up to 500 m, large cetaceans at 2–4 km, and belugas at 2–3 km.

The placement of PSOs during all pile driving and removal activities (described in detail in the Monitoring and Reporting section) will ensure that the entire shutdown zone is visible during pile installation. If visibility degrades to where the PSO determines that they cannot effectively monitor the entire shutdown zone during pile driving, the applicant may continue to drive the pile section that was being driven to its target depth when visibility degraded to unobservable conditions, but will not drive additional sections of pile. Pile driving may continue during low light conditions to allow for the evaluation of NVDs and IR sensing devices.

Monitoring for Level A and Level B Harassment—AGDC will monitor the Level B harassment zones (areas where SPLs are equal to or exceed the 160 dB rms threshold for impact driving and the 120 dB rms threshold during vibratory driving) and Level A harassment zones, to the extent practicable. Monitoring the Level A and Level B harassment zones enables observers to be aware of and communicate the presence of marine mammals in the project area outside the shutdown zone and thus prepare for a potential shutdown of activity should the animal enter the shutdown zone. Placement of PSOs on elevated structures on West Dock will allow PSOs to observe phocids within the Level A and Level B harassment zones, to an estimated distance of 500 m. However, due to the large Level A and Level B harassment zones (Table 6), PSOs will not be able to effectively observe the entire zones during all activities for all species. Therefore, marine mammal exposures within the visible portion of the harassment zones will be recorded, and potential exposures within the entire harassment zones will be estimated based upon the number of observed exposures and the percentage of the Level A or Level B harassment zone that was not visible. AGDC will also conduct acoustic monitoring as described in the Monitoring and Reporting section, below.

Pre-activity Monitoring—Prior to the start of daily in-water construction activity, or whenever a break in pile driving or removal of 30 minutes or longer occurs, PSOs will observe the shutdown zone and the visible portions of the Level A and Level B harassment zones for a period of 30 minutes. If a marine mammal is observed within the shutdown zone, a soft-start cannot proceed until the animal has left the zone or has not been observed for 15 minutes (pinnipeds) or 30 minutes (cetaceans). When a marine mammal for which Level B harassment take is authorized is present in the Level B harassment zone, activities may begin and Level B harassment take will be recorded. If the entire Level B harassment zone is not visible at the start of construction pile driving or removal activities can begin. If work ceases for more than 30 minutes, the pre-activity monitoring of both the Level

B harassment zone and shutdown zones will commence.

Nighttime Monitoring—PSOs will use NVDs and IR for nighttime and low visibility monitoring. AGDC will select devices for monitoring, and will test the devices to determine the efficacy of the monitoring equipment and technique. For a detailed explanation of AGDC's plan to test the NVDs and IR equipment, please see AGDC's 4MP, available online at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable.* (Please note that AGDC will not assess object detection at distance intervals using buoys as stated in the 4MP. Rather, they will test object detection on land using existing landmarks at known distances from PSOs, such as road signs.)

Soft Start—Soft-start procedures are believed to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. For impact pile driving, contractors will be required to provide an initial set of three strikes from the hammer at reduced energy, followed by a 30-second waiting period. This procedure will be conducted three times before impact pile driving begins. Soft start will be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of thirty minutes or longer.

Pile Driving During Contingency Period—In the event that AGDC must continue pile driving or removal during their contingency period (February-April 2024), AGDC must begin pile driving before March 1, the known onset of ice seal lairing season. Initiating pile driving before March 1 is expected to discourage seals from establishing birthing lairs near pile driving. Discouraging seals from establishing birthing lairs near pile driving will likely reduce potential instances of take by Level B harassment by reducing the likelihood of an individual seal occurring within the Level B harassment zone on multiple occasions, which would be far more likely if seals established lairs within the zone. Additionally, a subsistence advisor would survey areas within a buffer zone of DH4 where water depth is greater than 10 ft (3 m) to identify potential ringed seal structures before activity begins. Construction crews must avoid identified ice seal structures by a minimum of 500 ft. (150 m). NMFS expects these measures to prevent physical interaction between seals and construction equipment.

AGDC does not plan to use a bubble curtain or other sound attenuation device, and NMFS concurs that sound attenuation is not appropriate for this project for the reasons described in NMFS' response to Comment 5 in the Comments and Responses section.

Mitigation for Subsistence Uses of Marine Mammals or Plan of Cooperation

Regulations at 50 CFR 216.104(a)(12) further require IHA applicants conducting activities in or near a traditional Arctic subsistence hunting area and/or that may affect the availability of a species or stock of marine mammals for Arctic subsistence uses to provide a POC or information that identifies what measures have been taken and/or will be taken to minimize adverse effects on the availability of marine mammals for subsistence purposes. A plan must include the following:

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

AGDC provided a draft POC to NMFS on March 27, 2019 and submitted revised versions on February 7, 2020, November 16, 2020, December 21, 2020, and most recently, January 4, 2021. The POC outlines AGDC's extensive coordination with subsistence communities that may be affected by the AK LNG project. It includes a brief description of the project, community outreach that has already been conducted, as well as the concerns raised in those discussions and how they were addressed, and project mitigation measures. AGDC will continue coordination with subsistence communities throughout the project duration, and will develop a Communications Plan in coordination with subsistence groups, as described below and in the POC. The POC is a living document and has been updated throughout the project review and permitting process. The final IHA includes a requirement stating that AGDC must conduct the communication and coordination as described in the POC, which is available on our website at *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act.*

AGDC continues to document its communications with the North Slope subsistence communities, as well as the substance of its communications with subsistence stakeholder groups, and has developed mitigation measures that include measures suggested by community members as well as industry standard measures. AGDC will continue to routinely engage with local communities and subsistence groups. Multiple user groups are often consulted simultaneously as part of larger coalition meetings such as the Arctic Safety Waterways Committee meetings. Local communities and subsistence groups identified by AGDC are listed in the POC. AGDC will develop a Communication Plan and will implement this plan before initiating construction operations to coordinate activities with local subsistence users, as well as Village Whaling Captains' Associations, to minimize the risk of interfering with subsistence hunting activities, and keep current as to the timing and status of the bowhead whale hunt and other subsistence hunts. A project informational mailer with a request for community feedback (traditional mail, email, phone) will be sent to community members prior to construction. Following the construction season, AGDC intends to have a post-season co-management meeting with the commissioners and committee heads to discuss results of mitigation measures and outcomes of the preceding season. The goal of the post-season meeting is to build upon the knowledge base, discuss successful or unsuccessful outcomes of mitigation measures, and possibly refine plans or mitigation measures if necessary.

The AEWC works annually with industry partners to develop a CAA. This agreement implements mitigation measures that allow industry to conduct their work in or transiting the vicinity of active subsistence hunters, in areas where subsistence hunters anticipate hunting, or in areas that are in sufficient proximity to areas expected to be used for subsistence hunting where the planned activities could potentially adversely affect the subsistence bowhead whale hunt through effects on bowhead whales, while maintaining the availability of bowheads for subsistence hunters. AGDC is required to enter the

CAA for the construction year by an order from the FERC.

AGDC will not conduct pile driving during the Nuiqsut whaling season in an effort to eliminate effects on the availability of bowhead whales for subsistence hunting that could occur as a result of project noise. Nuiqsut whaling is approximately August 25-September 15, though the exact dates may change.

Barging activities could potentially impact Nuiqsut's fall bowhead whale hunt and possibly other marine mammal harvest activities in the Beaufort Sea. As mentioned previously, barging activities are beyond the scope of this IHA, and no take is expected to occur as a result of barging activities. However, the final IHA requires AGDC to limit barges to waters landward of Cross Island during the Nuiqsut whaling season (approximately August 25–September 15, though the exact dates may change) in an effort to avoid any potential impacts on subsistence uses. AGDC has consulted with AEWC and NSB on mitigation measures to limit impacts (Alaska LNG 2016), and has continued to provide formal and informal project updates to these groups, as recently as October 2020. As described above in the Effects of Specified Activities on Subsistence Uses of Marine Mammals section, AGDC's construction activities at West Dock do not overlap with the areas where subsistence hunters typically harvest ice seals, and given the extent of impacts to seals described in that section, these activities are not expected to impact subsistence hunts of ice seals. Therefore, the final IHA does not include mitigation measures for subsistence harvest of ice seals; however, AGDC will continue to meet with subsistence groups, including the Ice Seal Committee, as described in the POC.

Based on our evaluation of the applicant's planned measures, as well as other measures considered by NMFS, NMFS has determined that the planned mitigation measures provide the means effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for subsistence uses.

Monitoring and Reporting

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

Visual Monitoring

Marine mammal monitoring must be conducted in accordance with the Marine Mammal Monitoring Plan, available online at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable.* 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;
- At least one PSO must have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization.
- Where a team of three or more PSOs are required, a lead observer or monitoring coordinator must be designated. The lead observer must have prior experience working as a marine mammal observer during construction;
- Other PSOs may substitute education (degree in biological science or related field) or training for experience.
- PSOs may also substitute Alaska native traditional knowledge for experience. (NMFS recognizes that PSOs with traditional knowledge may also have prior experience, and therefore be eligible to serve as the lead PSO.); and
- AGDC must submit PSO curriculum vitae for approval by NMFS prior to the onset of pile driving.

PSOs should have the following additional qualifications:

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

At least two PSOs will be present during all pile driving/removal activities. PSOs will have an unobstructed view of all water within the shutdown zone. PSOs will observe as much of the Level A and Level B harassment zone as possible. PSO locations are as follows:

i. Dock Head 4—During impact pile driving at DH4, two PSOs must be stationed to view toward the east, north, and west of the seawater treatment plant. During vibratory pile driving at

DH4, two PSOs must monitor from each PSO location (four PSOs); and

ii. Barge Bridge—During work at the barge bridge, two PSOs must be stationed at the north end of the bridge.

PSOs will be stationed on elevated platforms at DH4, and on the elevated bridge during work at the barge bridge. They will possess the equipment described in the 4MP, including NVDs during nighttime monitoring. However, during the primary construction season, nighttime on the North Slope will be brief. Given the elevated PSO sites and equipment, AGDC expects that they will be able to effectively observe phocids at distances up to 500 m, large cetaceans at 2–4km, and belugas at 2–3km, however, PSOs will not be able to effectively observe the entire area of the Level A (seals only) or Level B harassment zones during all pile driving activities.

PSOs will begin monitoring three days prior to the onset of pile driving and removal activities and continue through three days after completion of the pile driving and removal activities. PSOs will monitor 24 hours per day, even during periods when construction is not occurring. In addition, observers shall record all incidents of marine mammal occurrence, regardless of distance from activity, and shall document any behavioral reactions in concert with distance from piles being driven or removed. Pile driving activities include the time to install or remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than 30 minutes.

Acoustic Monitoring

Acoustic monitoring, to be conducted for purposes of measuring sound source levels and sound propagation, must be conducted in accordance with accepted methodology as described in an Acoustic Monitoring Plan, which AGDC must develop after its contractor is selected. The plan must be reviewed by NMFS, the NSB, and the AEWC, and approved by NMFS. AGDC must conduct acoustic monitoring for the number of each pile type and size indicated in the approved plan. NMFS may adjust the shutdown zones and revise the Level A and Level B harassment zones, as appropriate, pending review and approval of the results of acoustic monitoring.

AGDC will also conduct PAM for marine mammals. AGDC will deploy three hydrophones during the open-water season to monitor for marine mammals, in accordance with the Marine Mammal Monitoring and Mitigation Plan, dated December 21, 2020 and the Acoustic Monitoring Plan referenced above. This PAM is intended to inform the estimate of marine mammals in the Level B harassment zone, given that PSOs are not able to observe the entire zone for all species and activities.

AGDC will deploy the hydrophones in the locations recommended by the PRP, as shown in Figure 4 of its Marine Mammal Monitoring and Mitigation Plan (dated December 21, 2020), and will adjust the locations as appropriate if the Level B harassment zones are adjusted following SSV results. AGDC will deploy the PAM recorders three days prior to the start of pile driving, and will retrieve them three days after completion of pile driving during the open-water season.

Should construction be required during the contingency period when there will be ice-cover, AGDC will deploy one hydrophone at the end of the open-water season, located in between the 2,200 m and 4,700 m zones, perpendicular to the pile driving site. The location must be reviewed by NMFS, the NSB, and the AEWC, and approved by NMFS prior to deployment. Additional hydrophones during the contingency period are not warranted, as, as we do not expect cetaceans to be present in the area during this time (Quakenbush *et al.,* 2018, Citta *et al.,* 2016) and while ringed seals likely will be present, few, if any, spotted or bearded seals are likely to be present during that time (Bengston *et al.,* 2005; Lowry *et al.,* 1998; Simpkins *et al.,* 2003).

Reporting

A draft marine mammal monitoring report will be submitted to NMFS within 90 days after the completion of marine mammal and acoustic monitoring or 60 days prior to the issuance of any subsequent IHA for this project, whichever comes first. The report will include an overall description of work completed, a narrative regarding marine mammal sightings, and associated PSO data sheets. Specifically, the report must include:

- Dates and times (begin and end) of all marine mammal monitoring;
- Construction activities occurring during each daily observation period, including precise start and stop time of each type of construction operation mode, how many and what type of piles were driven or removed and by what method (*i.e.,* impact or vibratory);
- Total number of hours during which each construction activity type occurred;
- Total number of hours that PSOs were on duty during each construction activity, and total number of hours that PSOs were on duty during periods of no construction activity;
- Weather parameters and water conditions during each monitoring period (*e.g.,* wind speed, percent cover, visibility, sea state), and number of hours of observation that occurred during various visibility and sea state conditions;
- The number of marine mammals observed, by species and operation mode, relative to the pile location, and if pile driving or removal was occurring at time of sighting;
- The number of marine mammals observed (including periods with no construction);
- Age and sex class, if possible, of all marine mammals observed;
- PSO locations during marine mammal monitoring, including elevation above sea level;
- Distances and bearings of each marine mammal observed to the pile being driven or removed for each sighting (if pile driving or removal was occurring at time of sighting);
- Description of any marine mammal behavior patterns during observation, including direction of travel and estimated time spent within the Level A and Level B harassment zones while the source was active;
- Number of individuals of each species (differentiated by month as appropriate) detected within the Level A and Level B harassment zones;
- Histograms of perpendicular distances to PSO sightings, by species (or species group if sample sizes are small);
- Sighting rates summarized into daily or weekly periods for the before, during, and after construction periods;
- Maps showing visual detections by species and construction activity type.
- Detailed information about any implementation of any mitigation triggered (*e.g.,* shutdowns and delays), a description of specific actions that ensued, and resulting behavior of the animal, if any;
- Description of attempts to distinguish between the number of individual animals taken and the number of incidences of take, such as ability to track groups or individuals;
- An estimation of potential takes, by species, by Level A and Level B harassment based on the number of observed exposures within the Level A and Level B harassment zones and the percentages of the Level A and Level B harassment zones that were not visible; and

• Submit all PSO datasheets and/or raw sighting data (in a separate file from the Final Report referenced immediately above).

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

For the SSV, AGDC's acoustic monitoring report must, at minimum, include the following:

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

• Type and size of pile being driven, substrate type, method of driving during recordings.

• For impact pile driving: Pulse duration and mean, median, and maximum sound levels (dB re: 1µPa): Cumulative sound exposure level (SELcum), peak sound pressure level (SPLpeak), root-mean-square sound pressure level (SPL_{rms}), and single-strike sound exposure level (SELs-s).

• For vibratory driving/removal: Mean, median, and maximum sound levels (dB re: 1µPa): SPL_{rms}, SELcum, and timeframe over which the sound is averaged.

• Number of strikes (impact) or duration (vibratory) per pile measured, one-third octave band spectrum, power spectral density plot.

• Estimated source levels referenced to 10 m, transmission loss coefficients, and estimated Level A and Level B harassment zones.

For the PAM for marine mammals, AGDC's acoustic monitoring report must, at minimum, include the following:

• Number of marine mammal detections (including species, date and time of detections, and type of pile driving underway during each detection, if applicable).

• Detection rates summarized into daily or weekly periods for the before, during, and after construction periods.

• Received sound levels from pile driving activity.

• The following hydrophone equipment and method information: Recording devices, sampling rate, sensitivity of the PAM equipment, locations of the hydrophones, duty cycle, distance (m) from the pile where recordings were made, depth of recording devices, depth of water in area of recording devices.

In the event that personnel involved in the construction activities discover an injured or dead marine mammal, the IHA-holder shall report the incident to the Office of Protected Resources (OPR) (301–427–8401), NMFS and to the Alaska regional stranding coordinator (907–586–7209) as soon as feasible. If the death or injury was clearly caused by the specified activity, the IHA-holder must immediately cease the specified activities until NMFS is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of the IHA. The IHA-holder must not resume their activities until notified by NMFS.

The report must include the following information:

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

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

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

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

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

• General circumstances under which the animal was discovered.

Monitoring Plan Peer Review

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

NMFS established an independent PRP to review AGDC's Monitoring Plan for the planned project in Prudhoe Bay. NMFS provided AGDC's monitoring plan to the PRP and asked them to answer the following questions:

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

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

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

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

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

The PRP met in March 2020 and subsequently provided a final report to NMFS containing recommendations that the panel members felt were applicable to AGDC's monitoring plan. The panel concluded that the objectives are appropriate; however, they provided some recommendations to improve AGDC's ability to achieve their stated objectives. The PRP's primary recommendations and comments are summarized and addressed below. The PRP's full report is available on our website at *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act.*

The PRP recommended that AGDC station PSOs on elevated platforms to increase sighting distance. NMFS agrees, and the final IHA requires AGDC to provide elevated monitoring locations for PSOs. The structures would vary depending on the construction location.

The PRP recommended that PSOs focus on scanning the shoreline and water, alternately with visual scans and using binoculars, to detect as many animals as possible rather than following individual animals for any length of time to collect detailed behavioral information. NMFS requires PSOs to document and report the behavior of marine mammals observed within the Level A and Level B harassment zones. While NMFS agrees that PSOs should not document behavior at the expense of detecting other marine mammals, particularly within the shutdown zone, we are asking PSOs to record an estimate of the amount of time that an animal spends in the harassment zone, which is important to help understand the likelihood of incurring PTS (given the duration component of the thresholds) and the severity of behavioral disturbance.

The PRP recommended that the PSOs record visibility conditions at regular intervals (*e.g.,* every five minutes) and as they change throughout the day. The panel recommended using either laser range finders or a series of ''landmarks''

at varying distances from each observer. The PRP notes that if AGDC uses landmarks, AGDC could measure the distance to the landmarks on the ground before pile driving or removal begins, and reference these landmarks throughout the season to record visibility. The landmarks could be buildings, signs, or other stationary objects on land that are located at increasing distances from each observation platform. PSOs should record visibility according to the farthest landmark the laser range finder can detect or that the PSO can clearly see. In the final IHA, NMFS has required AGDC to record visibility conditions throughout construction; however, NMFS has required PSOs to record visibility every 30 minutes, rather than every five minutes, in an effort to minimize distraction from observing marine mammals. PSOs will be equipped with range finders, and will establish reference landmarks on land.

The PRP recommended that AGDC have a designated person on site keeping an activity log that includes the precise start and stop dates and times of each type of construction operation mode. AGDC's field lead PSO will record this information during construction.

The PRP commended AGDC's proposed use and experimentation with NVD and IR technology. The panel noted that there are many devices with a broad range of capabilities that should be thoroughly understood before the experiment is conducted. AGDC will select the most effective devices based on surveys of experienced PSOs and literature provided by the panel.

The PRP expressed concern about the limited effective visual detection range of the PSOs in comparison with the estimated size of the Level A and Level B harassment zones, including AGDC's ability to shut down at the proposed distances, and AGDC's ability to estimate actual Level A and Level B harassment takes. The panel noted that effective sighting distances are likely 200 m for seals, and 1 km for mysticetes, based on ship-based PSO observations in the Chukchi Sea (LGL *et al.* 2011). They noted that the effective sighting distance for beluga whales may be greater than 200 m, although visibility would likely decrease in windy conditions with white caps (DeMaster *et al.,* 2001). The panel recommended that AGDC implement real-time PAM to verify the harassment zone sizes, and to improve detection of marine mammals at distances where visual detection probability is limited or not possible. The panel recommended that AGDC begin PAM two to three weeks prior to the start of construction and continue through two to three weeks after construction activities conclude for the season. They recommended archival bottom mounted recorders as an alternative to real-time PAM, but noted that these setups are not as easy to relocate and that data can only be accessed after recovery.

In a related comment, the panel recommended that AGDC report total estimated Level A and Level B harassment takes using two methods. First, the panel recommended that AGDC assume that animal density is uniform throughout the Level B harassment zone and use distance sampling methods, such as Burt *et al.,* 2014, based only on the shore-based PSO observations to estimate actual takes by Level B harassment. Second, the PRP recommended that AGDC also use real-time PAM to estimate takes by Level B harassment only in the far field, assuming that each acoustic detection that occurs during pile driving or removal is a Level B harassment take.

In consideration of the effective sighting distances included in the PRP report, and estimated effective sighting distances from the applicant, NMFS has acknowledged the shorter likely sighting distances (via the potential takes by Level A harassment considered in the analysis) and has included a shutdown zone for phocids during impact pile driving of 500 m, as stated herein (and included in the proposed IHA), which is expected to be visible to PSOs. While this distance is greater than the 200 m estimated by the PRP, shore-based PSOs typically have greater visibility. Additionally, AGDC's PSOs will observe from elevated locations.

NMFS did not require AGDC to report Level A and Level B harassment takes using distance sampling methods, as NMFS does not believe that it is appropriate to apply precise distance sampling methods intended for systematic surveys to estimating take numbers in this situation. As noted by the panel, the assumption of uniform density throughout the Level A and Level B harassment zones is not likely appropriate for this project, given varying habitat attributes throughout the zones such as distance from the shore and water depth. The pile driving and removal activities are likely to further affect the distribution within the zones. However, as a simpler alternative to help understand the potential exposures within the unseen area, NMFS has required AGDC to include an estimation of potential takes by Level A and Level B harassment based on the number of observed exposures within the Level A or Level B harassment zone and the percentage of the Level A or Level B harassment zone that was not visible in their final report.

The final IHA does not require AGDC to implement real-time PAM (see below). However, the final IHA does require AGDC to conduct a SSV at the start of construction, and as appropriate, NMFS may update the Level A and Level B harassment zones and shutdown zones based on the SSV results. Additionally, the final IHA does require AGDC to deploy three archival PAM receivers during the open water season (rather than a single, archival PAM receiver as stated in the notice of the proposed IHA) to collect data that indicates the presence of marine mammals. As stated previously, the PRP recommended archival bottom mounted recorders as an alternative to real-time PAM, although AGDC will deploy these in stationary locations, rather than relocating the receivers for various construction activities as recommended by the PRP. If NMFS updates the Level B harassment zones following review of the SSV results, the hydrophones may be relocated, as described in AGDC's monitoring plan. AGDC will implement the majority, if not all, of the proposed pile driving and removal during the open water season. Since AGDC would need to deploy the PAM system after ice melt, deploying it two to three weeks before and after the construction period would narrow AGDC's open water work window by at least one month. Additionally, while AGDC's construction is occurring within a limited timeframe, other companies have operations in the area also, which may interfere with the ability to gather baseline data regarding marine mammal presence without interference from other industrial activities. Marine mammals in the project area are migratory, so presence within the work area would change throughout the suggested monitoring period, even if AGDC was not conducting the activity. As such, the Final IHA requires AGDC to deploy the three archival PAM receivers for three days prior to the start of construction, through construction, and for three days after completion of construction activities, rather than only during the active construction period only as stated in the proposed IHA. AGDC will deploy the hydrophones in the locations suggested by the PRP as recommended by the PRP and indicated in Figure 4 of AGDC's December 2020 4MP. If the Level A and Level B harassment zones are updated based on SSV results, the hydrophones may be relocated, as appropriate.

If construction during the contingency period is necessary, AGDC will deploy one overwintering hydrophone at the end of the open-water season for monitoring during the contingency period. Additional hydrophones during the contingency period are not warranted, as we do not expect cetaceans to be present in the area during this time (Quakenbush *et al.,* 2018, Citta *et al.,* 2016) and while ringed seals likely will be present, few, if any, spotted or bearded seals are likely to be present during that time (Bengston *et al.,* 2005; Lowry *et al.,* 1998; Simpkins *et al.,* 2003). A location for the contingency period hydrophone would be selected closer to construction, and must be reviewed by NMFS, the NSB, and the AEWC, and approved by NMFS prior to deployment.

Real-time PAM might be helpful if there were a limited ability to detect animals using other methods as required to support the implementation of mitigation action, such as shutting down operations at the time that a detection occurs. However, in this instance, visual monitoring by PSOs can adequately detect marine mammals and minimize Level A harassment take, and the authorization includes Level A harassment take of ice seals. Further, the operation of real-time PAM is significantly more costly than collecting PAM data for later analyses, as someone would need to monitor the data in real-time, and the PAM buoys would need to be relocated for changes in Level A and Level B harassment zone sizes between various pile sizes and installation or removal methods. Given the limitations described above, and the limited additional detection value added by the addition of real-time PAM in these circumstances, implementation of real-time PAM is not warranted in light of the associated cost and effort.

The PRP also recommended that PSOs observations begin 2–3 weeks prior to construction, continue through the construction season, and continue for 2–3 weeks after the construction season ends. Given that ice conditions in the weeks leading up to the construction period will differ from that during construction (as will ice seal presence), NMFS has required PSOs to observe from shore during the three days before construction begins, and for three additional days after the construction season ends, rather than 2–3 weeks. During the construction season, NMFS has required PSOs to monitor 24 hours per day, even during periods without construction.

The PRP also made recommendations regarding how AGDC should present their monitoring data and results. Please refer to part V of the report for those suggestions. As stated in the notice of the proposed IHA, AGDC will implement the reporting recommendations that do not require PAM as stated in the recommendations. At the time of publication of the proposed IHA, NMFS was still considering whether reporting recommendations h-j were appropriate for inclusion in the IHA. The final IHA requires AGDC to conduct the reporting in recommendations i and j (report received sound levels, propagation loss, isopleth distances and sound source levels, as well as sighting and acoustic detection rates summarized into daily or weekly periods for the before, during and after construction periods). However, NMFS is not requiring AGDC to include maps showing acoustic detections by species and construction activity type (part of recommendation h), as AGDC does not intend to set the hydrophones up as a localization array, and therefore, the data will not be appropriate for reporting specific locations of marine mammal detections.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.,* population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be ''taken'' through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.,* intensity, duration), the context of any responses (*e.g.,* critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.,* as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, the majority of our analyses apply to all of the species listed in Table 16, given that many of the anticipated effects of this project on different marine mammal stocks are expected to be relatively similar in nature. Where there are meaningful differences between species or stocks in anticipated individual responses to activities, impact of expected take on the population due to differences in population status or impacts on habitat, they are described independently in the analysis below.

Pile driving and removal activities associated with the project, as outlined previously, have the potential to disturb or temporarily displace marine mammals. Specifically, the specified activities may result in take, in the form of Level A and Level B harassment, from underwater sounds generated from pile driving and removal. Potential takes could occur if individuals of these species are present in zones ensonified above the thresholds for Level A or Level B harassment, identified above, when these activities are underway. While AGDC may pile drive at any time of day (24 hours per day), we do not expect noise-producing pile driving will actually occur at all times during a 24-hour period, given the general construction process, including time for setting up piles pile for installation.

The takes from Level A and Level B harassment will be due to potential behavioral disturbance, TTS and PTS. No mortality or serious injury is anticipated given the nature of the activity. Level A harassment is only anticipated for ringed seal, spotted seal, and bearded seal. The potential for Level A harassment is minimized through the construction method and the implementation of the required mitigation measures (see Mitigation Measures).

Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from other similar activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (*e.g.,* Thorson and Reyff 2006; HDR, Inc. 2012; Lerma 2014; ABR 2016). Most likely for pile driving, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving, although even this reaction has been observed primarily only in association with impact pile driving, which is just a portion of AGDC's construction. Level B harassment will be reduced to the level

of least practicable adverse impact through use of mitigation measures described herein. If sound produced by project activities is sufficiently disturbing, animals are likely to simply avoid the area while the activity is occurring. While vibratory driving associated with the project may produce sound at distances of many km from the project site, the project site itself is located in an active industrial area, as previously described. Therefore, we expect that animals disturbed by project sound will simply avoid the area and use more-preferred habitats.

In addition to the expected effects resulting from authorized Level B harassment, we anticipate that ringed seals, spotted seals, and bearded seals may sustain some limited Level A harassment in the form of auditory injury. However, animals that experience PTS will likely only receive slight PTS, *i.e.* minor degradation of hearing capabilities within regions of hearing that align most completely with the frequency range of the energy produced by pile driving, *i.e.* the low-frequency region below 2 kHz, not severe hearing impairment or impairment in the regions of greatest hearing sensitivity. If hearing impairment occurs, it is most likely that the affected animal will lose a few dB in its hearing sensitivity, which in most cases is not likely to meaningfully affect its ability to forage and communicate with conspecifics.

Habitat disturbance and alteration resulting from project activities could have a few highly localized, short-term effects for a few marine mammals; however, the area of affected habitat would be small compared to that available to marine mammal species. The activities may cause some fish to leave the area of disturbance, thus temporarily impacting marine mammals' foraging opportunities in a limited portion of the foraging range. We do not expect pile driving activities to have significant, long-term consequences to marine invertebrate populations. Given the short duration of the activities and the relatively small area of the habitat that may be affected, the impacts to marine mammal habitat, including fish and invertebrates, are not expected to cause significant or long-term negative consequences to marine mammals or to populations of fish or invertebrate species.

AGDC's February to April pile driving contingency period overlaps with the period when ringed seals are constructing subnivean lairs, giving birth, and nursing pups. As discussed in the Mitigation Measures section, AGDC will be required to begin construction prior to March 1 when ringed seals are known to begin constructing lairs. As such, we expect that ringed seals will construct their lairs away from the pile driving operations, therefore minimizing disturbance and avoiding any potential for physical injury to seals in lairs. Additionally, we expect that AGDC will complete the majority, if not all of the pile driving during the open water season, so any pile driving that did remain could likely be completed in the earlier portion of the contingency period, further reducing the potential for impacts to ringed seals while lairing or pupping.

As stated in the Description of Marine Mammals in the Area of Specified Activities section, since publication of the proposed IHA (85 FR 43382; July 16, 2020), NMFS published a proposed rule for the Designation of Critical Habitat for the Beringia DPS of the Bearded Seal (86 FR 1433; January 8, 2021) and a revised proposed rule for the Designation of Critical Habitat for the Arctic Subspecies of the Ringed Seal (86 FR 1452; January 8, 2021). NMFS considered the information provided in each proposed rule, and determined that neither proposed rule presents new information that changes NMFS' analyses, the take estimates, or any of the findings, for either species.

As described in the notice of the proposed IHA (85 FR 43382; July 16, 2020), unusual mortality events (UMEs) have been declared for both gray whales and ice seals; however, the take authorized here does not provide a cause for concern for any of these populations when considered in the context of these UMEs. For gray whales, the estimated abundance of the Eastern North Pacific stock is 26,960 (Carretta *et al.,* 2019) and the stock abundance has increased approximately 22 percent in comparison with 2010/2011 population levels (Durban *et al.,* 2017). For bearded seals, the minimum estimated mean M/SI (6,709) is well below the calculated partial PBR (8,210). This PBR is only a portion of that of the entire stock, as it does not include bearded seals that overwinter and breed in the Beaufort or Chukchi Seas (Muto *et al.,* 2019). For the Alaska stock of ringed seals and the Alaska stock of spotted seals, the M/SI (863 and 5,254, respectively) is well below the PBR for each stock (5,100 and 12,697, respectively) (Muto *et al.,* 2019). No serious injury or mortality is expected or authorized here, and Level B harassment takes of gray whale and ice seal species, and Level A harassment takes of ice seals will be reduced to the level of least practicable adverse impact through the incorporation of the mitigation measures. As such, the authorized Level B harassment takes of gray whales and ice seals and Level A harassment takes of ice seals are not expected to exacerbate or compound upon the ongoing UMEs.

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 mortality or serious injury is anticipated or authorized;
- The relatively small number of Level A harassment exposures, for seals only, are anticipated to result only in slight PTS within the lower frequencies associated with pile driving;
- The intensity of anticipated takes by Level B harassment is minimized through implementation of the mitigation measures described above. While some instances of TTS could occur, the majority of Level B harassment takes will likely be in the form of avoidance of the project area, temporary cessation of foraging and vocalizing, or changes in dive behavior;
- The area impacted by the specified activity is very small relative to the overall habitat ranges of all species;
- The Level B harassment zones do not overlap with known important areas for bowhead, gray, or beluga whale, including, specifically, any of the BIAs identified in the region (Clarke *et al.,* 2015);
- Impacts to critical behaviors such as lairing and pupping by ringed seals would be avoided and minimized through implementation of mitigation measures described above; and
- AGDC would cease pile driving during the Nuiqsut whaling season, therefore minimizing the amount or severity of take of bowhead whale during a time where animals are expected to migrate by in relatively higher density.

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

Small Numbers

As noted above, only small numbers of incidental take may be authorized under Sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers

and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted number of individuals to be taken is fewer than one third of the species or stock abundance, the take is considered to be of small numbers. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

The number of instances of take for each species or stock authorized to be taken as a result of this project is included in Table 16. Our analysis shows that less than one-third of the best available population abundance estimate of each stock could be taken by harassment (in fact, take of individuals is at most less than two percent of the abundance for all affected stocks). The number of animals authorized to be taken for each stock would be considered small relative to the relevant stock's abundances even if each estimated taking occurred to a new individual, which is an unlikely scenario.

For beluga whale, the percentages in Table 16 conservatively assume that all takes of beluga whale will be accrued to each stock; however, we expect that most, if not all, beluga whales taken by this project will be from the Beaufort Sea stock.

For the Alaska stock of bearded seals, a complete stock abundance value is not available. As noted in the 2019 Draft Alaska SAR (Muto *et al.,* 2019), an abundance estimate is currently only available for the portion of bearded seals in the Bering Sea (Conn *et al.,* 2012). The current abundance estimate for the Bering Sea is 301,836 bearded seals. Given the authorized 300 Level B harassment takes and 2 Level A harassment takes for the stock, comparison to the Bering Sea estimate, which is only a portion of the Alaska Stock (which also includes animals in the Chukchi and Beaufort Seas), shows that, at most, less than one percent of the stock is expected to be impacted.

A complete stock abundance value is also not available for the Alaska stock of ringed seals. As noted in the 2019 Draft Alaska SAR (Muto *et al.,* 2019), the abundance estimate available, 171,418 animals, is only a partial estimate of the Bering Sea portion of the population (Conn *et al.,* 2014). As noted in the SAR, this estimate does not include animals in the shore fast ice zone, and the authors did not account for availability bias. Muto *et al.* (2019) expect that the Bering Sea portion of the population is actually much higher. Given the authorized 1,765 Level B harassment takes and 9 Level A harassment takes for the stock, comparison to the Bering Sea partial estimate, which is only a portion of the Alaska Stock (also includes animals in the Chukchi and Beaufort Seas), shows that, at most, less than two percent of the stock is expected to be impacted.

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

Given the nature of the activity, and the required mitigation measures, serious injury and mortality of marine mammals is not expected to occur. Impacts to marine mammals would mostly include limited, temporary behavioral disturbances of seals, however, some slight PTS in seals within the lower frequencies associated with pile driving is possible. Additionally, a small number of takes of bowhead whales, by Level B harassment only, are predicted to occur in the vicinity of AGDC's activity. As described above, the required mitigation measures, such as implementation of shutdown zones, are expected to reduce the frequency and severity of takes of marine mammals.

Project activities could deter target species from Prudhoe Bay and the area ensonified above the relevant harassment thresholds. However, as noted in the Effects of Specified Activities on Subsistence Uses of Marine Mammals section, subsistence use of seals is extremely limited in this area, as it is not within the preferred and frequented hunting areas. Bowhead whales typically remain outside of the area between the barrier islands and Prudhoe Bay, minimizing the likelihood of impacts from AGDC's project. The authorized takes are not expected to affect the fitness of any bowhead whales, or cause significant deflection outside of the typical migratory path in areas where subsistence hunts occur. Additionally, during the Nuiqsut whaling season, the final IHA requires AGDC to cease pile driving and project vessels must transit landward of Cross Island, therefore minimizing the potential impact to the Nuiqsut hunt. AGDC will continue to coordinate with local communities and subsistence groups to minimize impacts of the project, as described in the POC, which the IHA requires AGDC to abide by.

Based on the description of the specified activity and the potential impacts described in the Effects of Specified Activities on Subsistence Uses of Marine Mammals section, the measures described to minimize adverse effects on the availability of marine mammals for subsistence purposes, as well as the mitigation measures required to directly reduce impacts to the affected species and stocks, NMFS has determined that there will not be an unmitigable adverse impact on subsistence uses from AGDC's planned activities.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*) and NOAA Administrative Order (NAO) 216–6A, NMFS must review our proposed action (*i.e.,* the issuance of an IHA) with respect to potential impacts on the human environment. Accordingly, NMFS adopted the FERC's EIS, as our independent evaluation of the document finds that it includes adequate information analyzing the effects on the human environment of issuing the IHA. NMFS is a cooperating agency on the FERC's EIS.

The FERC's EIS was made available for public comment from June 28, 2019 to October 3, 2019. The FERC's Final EIS is available at *https://www.ferc.gov/industries/gas/enviro/eis/2020/03-06-20-FEIS.asp.*

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to

jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species, in this case with the AKRO.

NMFS authorized take of bowhead whale, bearded seal (Beringia distinct population segment) and ringed seal (Arctic subspecies), which are listed under the ESA. On January 8, 2021, NMFS published a proposed rule for the Designation of Critical Habitat for the Beringia DPS of the Bearded Seal (86 FR 1433; January 8, 2021) and a revised proposed rule for the Designation of Critical Habitat for the Arctic Subspecies of the Ringed Seal (86 FR 1452; January 8, 2021). Neither ESA critical habitat rule has been finalized.

The NMFS AKRO issued a Biological Opinion under section 7 of the ESA, on the issuance of an IHA to AGDC under section 101(a)(5)(D) of the MMPA by the NMFS Office of Protected Resources. The Biological Opinion concluded that the action is not likely to jeopardize the continued existence of any of these species.

Authorization

NMFS has issued an IHA to AGDC for the potential harassment of small numbers of six marine mammal species incidental to construction of the AK LNG project in Prudhoe Bay, Alaska, provided the previously mentioned mitigation, monitoring and reporting requirements are followed.

Dated: February 16, 2021.

Donna S. Wieting,

Director, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. 2021–03472 Filed 2–19–21; 8:45 am]

BILLING CODE 3510–22–P