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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XC374

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Seismic Survey in Cook Inlet, Alaska

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

ACTION: Notice; issuance of incidental take authorization.

SUMMARY: In accordance with the Marine Mammal Protection Act (MMPA) regulations, notification is hereby given that NMFS has issued an Incidental Harassment Authorization (IHA) to the Apache Alaska Corporation (Apache) to take marine mammals, by harassment, incidental to a proposed 3D seismic survey in Cook Inlet, Alaska, between March 2013 and March 2014.

DATES: Effective March 1, 2013, to March, 1, 2014.

ADDRESSES: An electronic copy of the IHA and application may be obtained by writing P. Michael Payne, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910 or by telephoning the contact listed below (see FOR FURTHER INFORMATION CONTACT), or visiting the internet at: http://www.nmfs.noaa.gov/pr/permits/incidental.htm. Documents cited in this notice may also be viewed, by appointment, during regular business hours, at the aforementioned address.

FOR FURTHER INFORMATION CONTACT: Brian D. Hopper, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Background

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

Authorization for incidental taking of small numbers of marine mammals 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 subsistence uses (where relevant). The authorization must set forth the permissible methods of taking, other means of effecting the least practicable adverse impact on the species or stock and its habitat, and requirements pertaining to the mitigation, monitoring and reporting of such takings. NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Section 101(a)(5)(D) of the MMPA established an process by which citizens of the U.S. can apply for an authorization to incidentally take small numbers of marine mammals by harassment. Section 101(a)(5)(D) establishes a 45-day time limit for NMFS review of an application followed by a 30-day public notice and comment period on any proposed authorizations for the incidental harassment of marine mammals. Within 45 days of the close of the comment period, NMFS must either issue or deny the authorization.

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: "any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]."

Summary of Request

NMFS received an application on June 15, 2012, from Apache for the taking, by harassment, of marine mammals incidental to a 3D seismic survey program in Cook Inlet, Alaska. This is the second IHA application NMFS has received from Apache for takes of marine mammals incidental to conducting a seismic survey in Cook Inlet. On April 30, 2012, NMFS issued a one-year IHA to Apache for their first season of seismic acquisition in Cook Inlet (77 FR 27720). On December 10, 2012, NMFS published a notice in the Federal Register (77 FR 73434) discussing the effects on marine mammals and making preliminary determinations regarding a proposed IHA. The notice initiated a 30 day public comment period, which closed on January 9, 2013. Except for the location and the size of the survey area and the potentially earlier commencement date for survey operations, the activities proposed for the second survey season are essentially the same as those conducted during the first season.

Apache's 3D seismic surveys would employ the use of two source vessels. Each source vessel would be equipped with compressors and 2400 in^3 air gun arrays, as well as additional lower-powered and higher frequency survey equipment for collecting bathymetric and shallow sub-bottom data. In addition, one source vessel would be equipped with a 440 in^3 shallow water air gun array, which it can deploy at high tide in the intertidal area in less than 1.8 m of water.

The proposed survey would take place in Cook Inlet. During the 2013 survey season, Apache anticipates acquiring seismic data in an area that extends from just south of Anchor Point along the east coast extending up to Point Possession and along the west coast from the McArthur River up to south of the Beluga river, in water depths of 0–128 m (0–420 ft). Apache's planned area of seismic acquisition within this area is shown in Figure 1 below.

For the 2013 survey season, Apache intends to mobilize crews and equipment in February 2013 in order to be ready to conduct marine surveys between April and May 2013. Apache expects to complete its survey by December 15, 2013. Impacts to marine mammals may occur from noise produced from active acoustic sources (primarily air guns) used in the survey.

Description of the Specified Activity

In 2010, Apache acquired over 300,000 acres of oil and gas leases in Cook Inlet with the primary objective to explore for and develop oil fields. In the spring of 2011, Apache conducted a seismic test program to evaluate the feasibility of using new nodal (i.e., no cables) technology seismic recording equipment for operations in the Cook Inlet environment and to test various seismic acquisition parameters to finalize the design for a 3D seismic program in Cook Inlet. The test program took place in late March 2011 and results indicated that the nodal technology was feasible in the Cook Inlet environment. Apache proposes to conduct a phased 3D seismic survey program throughout Cook Inlet over the course of three to five years. The first area surveyed – and the subject of the IHA issued in April 2012 – was located in mid-Cook Inlet extending along the west coast from the Big River up to south of the Beluga River, and on the east coast from Salamantof on the Kenai peninsula to 4.4 miles north of the Swanson River. In the notice of the proposed IHA (77 FR 73434, December 10, 2012), NMFS described the second area to be surveyed – and the subject of this IHA – as covering a lower portion of Cook Inlet, but

also including all of Area 1. Following the publication of the proposed IHA, Apache clarified to NMFS that Area 2 includes all of Area 1 in mid Cook Inlet and some of Area 3 to the north/northeast of Area 1; however, survey operations in 2013 are expected to occur in a smaller section of Area 2 (see Figure 1).

The survey operations are essentially the same as those that were conducted in Area 1 under the IHA for the first seismic season. The survey would again be conducted from multiple vessels. Apache employs the use of two source vessels. Each source vessel is equipped with compressors and 2400 in^3 air gun arrays. In addition, one source vessel is equipped with a 440 in^3 shallow water air gun array, which it can deploy at high tide in the intertidal area in less than 1.8 m of water. Three shallow draft vessels support cable/nodal deployment and retrieval operations, and one mitigation/chase vessel is used, which also provides berthing for the Protected Species Observers (PSOs). Finally, two smaller jet boats are used for personnel transport and node support in the extremely shallow water of the intertidal area. For additional information, such as vessel specifications, see Apache's application.

The survey will take approximately 160 days to complete over the course of 8-9 months. Apache anticipates conducting survey operations 24 hours per day. During each 24 hour period, seismic operations would be active; however air guns would only be used for approximately 2.5 hours during each of the slack tide periods. There are approximately four slack tide periods in a 24-hour day, therefore, air gun operations would be active during approximately 10-12 hours per day, if weather conditions allow.

NMFS outlined the description of the specified activities covered by this IHA in a previous notice for the proposed IHA (77 FR 73434, December 10, 2012). Except for the clarification noted above regarding the size and scope of Area 2 and the timing of the survey, the

activities to be conducted have not changed between the proposed IHA notice and this final notice announcing the issuance of the IHA. For a more detailed description of the activity, including vessel and acoustic source specifications, the reader should refer to the proposed IHA notice (77 FR 73434, December 10, 2012), the IHA application, and associated documents (see ADDRESSES).

Comments and Responses

A notice of receipt of the Apache application and proposed IHA was published in the Federal Register on December 10, 2012 (77 FR 73434). During the 30-day public comment period, NMFS received comments from the Marine Mammal Commission (Commission), the Alaska Department of Natural Resources, environmental non-governmental organizations (NGOs), the International Association of Geophysical Contractors (IAGC), the Seldovia Village Tribe, the Kenaitze Indian Tribe, and one member of the public. Following are their comments and NMFS's responses:

Comment 1: The Commission recommended that NMFS refrain from taking additional action on the IHA until it has received and reviewed more specific information concerning the location and timing of Apache's proposed action.

Response: We believe that Apache's application requesting authorization to harass marine mammals incidental to seismic survey operations in Cook Inlet contained sufficient information regarding the location and timing of Apache's seismic survey to make the required findings under the MMPA.

Comment 2: The Commission recommended that NMFS require that Apache not conduct seismic activities in the inlet until after May and use aerial surveys or other means to confirm that the majority of beluga whales have moved out of the proposed survey area before

initiating those activities.

Response: Beluga whales remain in Cook Inlet year-round, but demonstrate seasonal movement within the Inlet; in the summer and fall, they concentrate in upper Cook Inlet's rivers and bays, but tend to disperse offshore and move to mid-Inlet in winter (Hobbs et al., 2005). The available information indicates that in the winter months belugas occur in deeper waters in mid-Inlet past Kalgin Island, with occasional forays into the upper inlet, including the upper ends of Knik and Turnagain Arms. The spatial dispersal and diversity of winter prey are likely to influence the wider beluga winter range throughout the mid-Inlet. Apache now expects to commence its seismic survey in April, which would coincide with the time of year when belugas are dispersed offshore in the mid-Inlet and away from river mouths. In the spring, beluga whales are regularly sighted in the upper Inlet beginning in late April or early May, coinciding with eulachon runs in the Susitna River and Twenty Mile River in Turnagain Arm, and outside of the area where Apache will be conducting seismic surveys at that time. Therefore, NMFS believes that the timing and location for the commencement of the seismic survey, as proposed, will largely avoid areas and seasons that overlap with important beluga whale behavioral patterns.

Comment 3: The Commission recommended that NMFS explain how we accounted for the effects of the proposed action in the context of all the other risk factors that are or may be affecting Cook Inlet beluga whales and inhibiting their recovery.

Response: Section 101(a)(5)(D) of the MMPA requires NMFS to make a determination that the harassment incidental to a specified activity will have a negligible impact on the affected species or stocks of marine mammals, and will not result in an unmitigable adverse impact on the availability of marine mammals for taking for subsistence uses. Neither the MMPA nor NMFS' implementing regulations specify how to consider other activities and their impacts on the same

populations. However, consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338, September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into the negligible impact analysis via their impacts on the environmental baseline (e.g., as reflected in the density/distribution and status of the species, population size and growth rate, and ambient noise).

In addition, cumulative effects were addressed in the Environmental Assessment and biological opinion prepared for this action, both of which NMFS indicated would be completed prior to the issuance of an IHA (77 FR 73434, December 10, 2012). These documents, as well as the Alaska Marine Stock Assessments and the most recent abundance estimate for Cook Inlet beluga whales (Shelden et al., 2012), are part of NMFS' Administrative Record for this action, and provided the decision maker with information regarding other activities in the action area that affect marine mammals, an analysis of cumulative impacts, and other information relevant to the determination made under the MMPA.

Comment 4: The Commission recommended that NMFS encourage Apache to use and expand data-sharing agreements with other entities to maximize the utility of seismic data and minimize the number of impacts of new seismic studies.

Response: We agree and have encouraged Apache to cooperate with other interested parties to minimize the impacts of new seismic surveys in the region. Currently, Apache works with other oil and gas operators in the area to enter into cooperative agreements. Sometimes these negotiations are successful, but at other times the companies cannot reach an agreement acceptable to both parties. Apache will continue its discussions with other operators in Cook Inlet to find opportunities to joint venture in oil and gas operations, including seismic data acquisition.

Comment 5: The Commission recommended that NMFS correct the estimated distance to the 190 dB threshold for the offshore surveys to 0.18 km.

Response: The maximum distance to the 190 dB threshold for the channel surveys should be 0.18 km not 1.18 km. The information in Table 2 of the proposed IHA (77 FR 73434, December 10, 2012) is correct and Table 4 should read 0.18 km not 1.18 km. NMFS regrets the unintentional error and apologizes for any confusion caused by the discrepancy.

Comment 6: The Commission recommended that NMFS require that Apache either amend its application to seek authorization for the maximum number of marine mammals that may be taken or provide sufficient and consistent justification for requiring fewer takes, particularly of beluga whales, harbor porpoises, and harbor seals.

Response: To provide some allowance for the uncertainties, Apache calculated both "maximum estimates" as well as "average estimates" of the numbers of marine mammals that could potentially be affected. For a few marine mammal species, several density estimates were available, and in those cases the mean and maximum estimates were determined from the survey data. In other cases, no applicable density estimate (or perhaps a single estimate) was available, so adjustments were used to arrive at "average" and "maximum" estimates. The species-specific estimation of these numbers is provided in Table 5 of the Federal Register notice for the proposed IHA (77 FR 73434, December 10, 2012). NMFS has determined that the average density data of marine mammal populations will be used to calculate estimated take numbers for species commonly reported in the vicinity of seismic survey operations – harbor seals and harbor porpoises - because using maximum density numbers for these species will result in overestimates that do not account for marine mammals avoiding the sound source before they are in the harassment zones. For killer whales and Steller sea lions, which have been documented in

the past but whose occurrence is rare or whose average densities are too low to yield a take number due to extra-limital distribution in the vicinity of the proposed survey area, NMFS used the maximum densities to calculate takes of these species. For Cook Inlet beluga whales, NMFS has consulted with the beluga whale experts at NOAA's National Marine Mammal Laboratory (NMML), which directed NMFS to a recently published habitat model developed for Cook Inlet beluga whales that provides densities throughout the inlet based on the data from aerial surveys (Goetz et al., 2012), and offered to conduct an analysis that would apply the model to Apache's seismic survey for the purpose of estimating beluga whale densities and takes. Additional information on the habitat-based model and the results of NMML's analysis are provided below in the Estimated Takes of Marine Mammals and Basis for Estimating "Take by Harassment" sections of this notice.

Comment 7: The Commission recommended that NMFS include harbor porpoises as one of the species for which implementation of delay and shutdown procedures are required when observers detect aggregations of five or more animals approaching or within the 160 dB harassment zone, based on studies reporting that harbor porpoises are particularly sensitive to air gun sounds.

Response: We agree with the proposal from the Commission regarding mitigation. These measures will be implemented if groups of five or more harbor porpoises are seen approaching or within the 160 dB zone.

Comment 8: The Commission states that the proposed monitoring measures do not appear adequate to monitor the disturbance (160 dB) zone and determine whether the requested numbers of takes have been exceeded. The Commission recommended that NMFS ensure that the monitoring measures included in the authorization are sufficient to account for all takes of

marine mammals and require Apache to provide timely reports of the numbers of marine mammals taken so that, if necessary, surveys can be stopped before the authorized takes are exceeded – the measures used should account not only for the marine mammals observed, but also those marine mammals that are present but not observed.

Response: Section 101(a)(5)(D)(ii)(III) of the MMPA requires IHAs to include requirements pertaining to the monitoring and reporting of such taking by harassment. NMFS' implementing regulations at 50 CFR 216.108(c) state that a monitoring program must, if appropriate, document the effects (including acoustical) on marine mammals and document or estimate the actual level of take. As the cited regulation suggests, monitoring is not required to document all takes that may occur. The monitoring measures for Apache's seismic surveys include standard methods contained in IHAs for industry and research-related seismic survey activities to monitor takings (and they are also used to implement mitigation (i.e., the prescribed means of effecting the least practicable impact)). Given the size of the estimated Level B harassment zone, we acknowledge that some marine mammals within or entering the zone may not be immediately detected. However, the suite of required monitoring for this survey—vessel-based, shore-based, and aerial—allows for sufficient monitoring of effects and level of take (it also provides monitoring for purposes of triggering mitigation). The results of the monitoring report for the 2012 survey support this finding. Moreover, some of the required mitigation, namely the ramp-up and use of a mitigation air gun at night, is designed to prevent more serious types of take that could occur if a marine mammal were to be in the safety zone undetected. NMFS acknowledges that monitoring at night or in reduced visibility is more difficult, but observes that (1) the great majority of Apache's 2012 survey occurred when full visual monitoring was available (given the longer day during the main months of operation), which is

likely to be true for the 2013 survey as well, and (2) prohibiting operations during nighttime and periods of lower visibility would reduce operational flexibility and lengthen the survey period, increasing the potential for interactions with marine mammals.

With respect to timely reporting, to better account for marine mammal takes that occur during the survey and ensure that takes do not exceed the amount authorized in the IHA, NMFS has included an additional reporting requirement in the IHA that will require the applicant to submit weekly and monthly reports to the Permits and Conservation Division. These reports will contain information regarding the species detected, in-water activity occurring at the time of the sighting, behavioral reactions to in-water activities, and the number of marine mammals taken. NMFS believes that the inclusion of a weekly and monthly reporting requirement will allow both NMFS and Apache to regularly track the number and nature of marine mammal takes, and ensure that takes do not exceed what is authorized by the IHA. Apache must to report to NMFS immediately if 25 belugas are detected in the Level B harassment zone to allow us to consider making necessary adjustments to monitoring and mitigation. NMFS will require that seismic survey operations involving the use of air guns and pingers cease if 30 beluga whales are detected in the Level B harassment zone.

Comment 9: The Commission recommended that NMFS provide a 30-day public review and comment period that starts with the publication of the notices in the printed edition of the Federal Register.

Response: Although NMFS requested that the notice of the proposed IHA be available for review immediately upon filing with the Federal Register, due to a clerical error, the public review and comment period reflected the publication date of the notice; therefore, the public review and comment period for the proposed IHA did, in fact, start with publication in the

Federal Register.

Comment 10: The Alaska Department of Natural Resources and Kenaitze Indian Tribe support issuance of the IHA and appreciate Apache's commitment to ensuring that activities in the Cook Inlet region result in responsible resource development.

Response: NMFS appreciates the review conducted by the State and Tribal natural resource managers and the continued collaboration and cooperation between the State of Alaska and Apache.

Comment 11: Environmental NGOs commented that NMFS failed to properly estimate take by adopting Apache's analysis that contains errors in its density calculations.

Response: The revised density and take estimates are provided in the Estimated Takes of Marine Mammals and Basis for Estimating "Take by Harassment" sections of this notice.

Comment 12: Environmental NGOs commented that NMFS underestimated the size of Apache's impact area by: (1) relying on an outdated and incorrect threshold for behavioral take; (2) disregarding the best available evidence on the potential for temporary and permanent threshold shift on mid- and high-frequency cetaceans and on pinnipeds; and (3) failing to calculate take using in situ propagation analysis.

Response: The comment that NMFS uses an outdated and incorrect threshold for behavioral takes does not include any specific recommendations. NMFS uses 160 dB as the exposure level for calculating Level B harassment takes for most species in most cases. This threshold was established for underwater sound sources (except explosives and tactical active sonar) based on measured avoidance responses observed in whales in the wild. Specifically, the 160 dB threshold was derived from data for mother-calf pairs of migrating gray whales (Malme et al., 1983, 1984) and bowhead whales (Richardson et al., 1985, 1986) responding to seismic air

guns (e.g., impulsive sound source). We acknowledge there is more recent information bearing on behavioral reactions to seismic air guns, but those data only illustrate how complex and context-dependent the relationship is between the two. See 75 FR 49710, 49716 (August 13, 2010) (IHA for Shell seismic survey in Alaska; response to comment 9). Accordingly, it is not a matter of merely replacing the existing threshold with a new one. NOAA is developing relatively sophisticated new draft guidelines for determining acoustic impacts, including information for determining Level B harassment thresholds. The draft guidelines will undergo a rigorous review that includes internal agency review, public notice and comment, and peer review before any final product is published. In the meantime, and taking into consideration the facts and available science, NMFS is using the 160 dB threshold for estimating takes of marine mammals in Cook Inlet by Level B harassment.

The comment that NMFS disregarded the best available evidence on the potential for temporary and permanent threshold shift on mid- and high-frequency marine mammals and pinnipeds does not contain any specific recommendations. We acknowledge there is more recent information available bearing on the relevant exposure levels for assessing temporary and permanent hearing impacts. Again, NMFS will be issuing new draft acoustic guidelines, but that process is not complete so we did not use it to assign new thresholds for calculate take estimates for hearing impacts. However, we did consider the information and it suggests the current 180 and 190 dB thresholds are conservative in that they likely overestimate potential for hearing impacts. See 75 FR 49710, 49715, 49724 (August 13, 2010) (IHA for Shell seismic survey in Alaska; responses to comment 8 and comment 27). Moreover, the required mitigation is designed to ensure there are no exposures to those injury thresholds.

As for in situ propagation analysis, Apache plans to conduct a Sound Source Verification

(SSV) study prior to commencing seismic survey operations in Area 2. If the results from the SSV study show that the harassment zones are larger than anticipated, Apache will adjust the zones and monitor based on the new information as needed.

Comment 13: Environmental NGOs comment that the proposed IHA fails to properly evaluate the impacts of stress, the risk of stranding, potential reduction in prey, effects of increased turbidity, and cumulative impacts from other activities in Cook Inlet.

Response: NMFS provided a detailed discussion of the potential effects of this action in the notice of the proposed IHA (77 FR 73434, December 10, 2012) and believes the analyses and preliminary determinations were appropriate. The comment does not provide any specific recommendations or criticism regarding the sufficiency of those analyses. The potential effects of this action are also adequately addressed in NMFS's Environmental Assessment and Biological Opinion (which is incorporated by reference herein).

See response to Comment 3 for information on NMFS' cumulative effects analysis.

Comment 14: Environmental NGOs comment that the IHA fails to justify adequately the specific level of take it would authorize, particularly given its analysis showing average and maximum take numbers that exceed the proposed authorization.

Response: See response to Comment 6.

Comment 15: Environmental NGOs comment that NMFS provides inadequate justification for its small numbers and negligible impact determinations.

Response: This general comment contained no specific criticism or recommendations. NMFS believes the proposed and final IHA Federal Register notices contain sufficient justification for both the small numbers and negligible impact determinations. NMFS' conclusions regarding small numbers and negligible impact are provided in the Determinations

section of this notice.

Comment 16: Environmental NGOs comment that NMFS has failed to adequately consider the current beluga population level and trends, or the fact that it is likely that subsistence use of whales will be prohibited for many years into the future in its analysis regarding whether the proposed survey will have an "unmitigable adverse impact" on the subsistence harvest.

Response: Under NMFS MMPA implementing regulations at 50 CFR 216.103, unmitigable adverse impact means 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 meeting subsistence needs by: (i) causing the marine mammal 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. Currently there is no subsistence hunting of Cook Inlet belugas authorized (73 FR 60976, October 15, 2008). There can be no impacts on Cook Inlet beluga subsistence uses in the immediate future because they are not permitted. Moreover, any takes that occur from this IHA will not have impacts on future subsistence hunts for belugas if and when they resume because the anticipated takes are not expected to have any of the effects contemplated in NMFS' definition (above) of unmitigable adverse impact. Apache did not request and NMFS does not anticipate, nor is it authorizing, any Level A harassment takes of Cook Inlet beluga whales or takes by mortality incidental to the seismic surveys. The required mitigation and monitoring measures are designed to avoid exposing any marine mammals, including Cook Inlet beluga whales, to sound levels that may result in injury. For example, protected species observers will

monitor the marine mammal exclusion zone while a sound source is active and have the authority to require power-downs or shut-downs to ensure that Level A harassment takes do not occur. In the unlikely event that marine mammals are exposed to potentially injurious levels of sound, the IHA will require Apache to cease work and report the incident to NMFS.

Comment 17: Environmental NGOs comment that the mitigation measures proposed for the Apache survey fail to meet the MMPA's "least practicable adverse impact" standard, and provide a list of approximately eight measures that NMFS "failed to consider or adequately consider."

Response: NMFS provided a detailed discussion of proposed mitigation measures and the MMPA's "least practicable adverse impact" standard in the notice of the proposed IHA (77 FR 73434, December 10, 2012), which are repeated in the Mitigation section of this notice. The measures that NMFS allegedly failed to consider or adequately consider are identified and discussed below:

(1) Seasonal exclusions around river mouths, including the Beluga River: Due to the location of the 2013 seismic survey, NMFS has added a 10 mile (16 km) exclusion zone around the Susitna Delta (which includes the Beluga River) to the IHA. This mitigation mirrors a measure in the Incidental Take Statement for the 2012 and 2013 Biological Opinions. Seismic surveys operations involving the use of air guns will be prohibited in this area between April and October. (In addition, the Alaska Department of Fish and Game (ADF&G) prohibits the use of air guns within 1 mile (1.6 km) of the mouth of any stream listed by the ADF&G on the Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes.) See additional explanation in "Mitigation Measures Considered but not Required" section, below.

(2) Use of advance aerial surveys to redirect activity if sufficient numbers of belugas or other species are sighted: Safety and weather permitting, aerial surveys will occur daily. Aerial surveys will be required when operating near river mouths to identify large congregations of beluga whales and harbor seal haul outs. In addition, daily aerial surveys must be conducted when there are any seismic-related activities (including, but not limited to, node laying/retrieval or air gun operations) occurring north or east of a line from Tyonek across to the eastern side of Number 3 Bay of the Captain Cook State Recreation Area, Cook Inlet (roughly the southern-most point of Corps defined Region 9). The purposes of these surveys is to mitigate impacts and reduce incidental take by identifying the presence of Cook Inlet belugas near the Susitna Delta and alert the vessels accordingly of necessary actions to avoid or minimize potential disturbance, to monitor the effects of the seismic program on Cook Inlet belugas and their primary feeding and reproduction areas, and to ensure that any displacement from the Susitna Delta region is temporary and would not be likely to cause harm to whales by reducing their ability to feed. This information allows for better planning by PSOs and assists in better understanding of the movements of large groups of beluga whales with respect to the tide. Moreover, aerial observations can be used to locate rarely seen animals (e.g., gray whales) that are difficult to track from the vessels.

(3) Field testing and use of alternative technologies, such as vibroseis and gravity gradiometry, to reduce or eliminate the need for air guns: Apache requested takes of marine mammals incidental to the seismic survey operations described in the IHA application, which identified air guns arrays as the technique Apache would employ to acquire seismic data. It would be impractical for NMFS to require Apache to make this kind of change to the underlying activity and is beyond the scope of the request for takes incidental to Apache's operation of air

guns and other active acoustic sources.

(4) Independent determination and required use of the lowest practicable source level in conducting air gun activity: This general comment contained no specific recommendations. Apache determined the array sizes during the test line surveyed in March 2011 and utilizes the minimum source level necessary to image the sub-surface targets.

(5) Observance of a 10 knot speed limit for all vessels, including supply vessels, employed in the activity: NMFS does not agree with the recommendation that vessels observe a 10 knot speed limit. Stipulating vessel speeds would severely hamper Apache's seismic survey, increase the amount of time needed to complete the survey, and would not be practicable. In any event, Apache has indicated that vessels typically move at 2-4 knots during seismic surveys and NMFS requires speed and course alterations when a marine mammal is detected outside the 160 dB zone and, based on position and relative motion, is likely to enter the zone.

(6) Limitation of the mitigation air gun to the longest shot interval necessary to carry out its intended purpose: This general comment contained no specific recommendations. Apache set the mitigation gun interval to mimic the timing of the shot interval used for the full array (approximately 24 seconds). NMFS believes that the shot interval of the mitigation air gun is appropriate to carry out its intended purpose.

(7) Immediate suspension of air gun activity, pending investigation, if any beluga strandings occur within or within an appropriate distance of the Area 2 survey: There is no evidence in the literature that air gun pulses cause marine mammal strandings and the sounds produced by air guns are quite different from sound sources that have been associated with stranding events, such as military mid-frequency active sonar. Nevertheless, the IHA requires Apache to immediately cease activities and report unauthorized takes of marine mammals, such

as injury, serious injury, or mortality. Activities cannot resume until NMFS is able to review the circumstances of the unauthorized take, determine what is necessary to minimize the likelihood of further unauthorized take and ensure MMPA compliance. Apache may not resume activities until notified by NMFS.

(8) Establishment of a larger exclusion zone for beluga whales that is not predicated on the detection of cow-calf pairs: This comment does not provide any justification for why the exclusion (safety) zone for beluga whales (other than groups of five or more and cow-calf pairs) should be expanded beyond the 180 dB zone. We not that prior to commencing seismic survey activities in 2013, Apache will conduct another sound source verification study to measure the distance to the 180/190 dB safety zone and to the 160 dB harassment zone. If the sound source verification study reveals that the distance is greater than the distances measures prior to the 2012 seismic survey, the zones and monitoring will be expanded as needed. Apache is required to shut down active sound sources if groups of five or more beluga whales, killer whales, and harbor porpoises or beluga cow-calf pairs are observed within or approaching the 160 dB zone.

Comment 18: Environmental NGOs comment that monitoring measures should include passive acoustic monitoring superior to over-the-side hydrophone, require aerial-based monitoring in areas other than river mouths, and at least 2 ship-based PSOs per vessel on watch at all times during daylight hours with a maximum of 2 consecutive hours on watch and 8 hours of watch time per day per PSO.

Response: The passive acoustic monitoring plan for Apache's 2012 survey anticipated the use of a bottom-mounted telemetry buoy to broadcast acoustic measurements using a radio-system link back to a monitoring vessel. Although a buoy was deployed during the first week of surveying under the 2012 IHA, it was not successful. Upon deployment, the buoy immediately

turned upside down due to the strong current in Cook Inlet. After retrieval, the buoy was not redeployed and the survey used a single omni-directional hydrophone lowered from the side of the mitigation vessel. During the entire 2012 survey season, Apache's PAM equipment yielded only six confirmed marine mammal detections, one of which was a Cook Inlet beluga whale. The single Cook Inlet beluga whale detection did not, however, result in a shutdown procedure. Given the limited capability of this particular PAM methodology for Apache's project in Cook Inlet (see Austin and Zeddies, 2012 for more information), as compared to visual monitoring methods, including expanded daily aerial surveys, the bottom-mounted telemetry buoy and omni-directional hydrophone are no longer considered practicable, and will not be a component of the 2013 seismic survey.

The IHA requires aerial surveys when operating near river mouths. In addition, NMFS has added the following monitoring measure: Safety and weather permitting, aerial surveys must be conducted when there are any seismic-related activities (including but not limited to node laying/retrieval or airgun operations) occurring north or east of a line from Tyonek across to the eastern side of Number 3 Bay of the Captain Cook State Recreation Area, Cook Inlet (roughly the southern-most point of Corps defined Region 9). Surveys are to be flown even if the air guns are not being fired.

Vessel-based observers are stationed on three vessels with two PSOs on the support vessel and one PSO on each of the two source vessels. Due to space limitations onboard the source vessels, no more than one PSO could be accommodated on each vessel. PSOs monitored for marine mammals during all daylight hours prior to and during seismic survey operations, unless precluded by weather (e.g., fog, ice, high sea states). PSOs on the vessels rotated observation shifts every 4-6 hours in order to better monitor the survey area, implement

mitigation measures, and avoid fatigue. In addition, vessel crews are be instructed to assist with detecting marine mammals and implementing mitigation measures.

Comment 19: The IAGC encouraged NMFS to review a recent peer-reviewed scientific paper regarding the impacts of seismic surveys on fish. They referred NMFS to a study by Lokkeborg et al. (2012) that provides additional, updated information challenging the Engas et al. (1993) assessment that seismic surveys have adverse impacts on Norwegian fisheries.

Response: NMFS acknowledges this comment and has reviewed the study by Lokkeborg et al. (2012), which was published in the Canadian Journal of Fisheries Aquatic Sciences on July 10, 2012. However, this does not change the analysis provided in the notice of the proposed IHA (77 FR 73434, December 10, 2012).

Comment 20: The IAGC encouraged NMFS to consider frequency weighting in development of incidental take estimates.

Response: Frequency weighting takes into account that all marine mammal species do not have identical hearing capabilities. To reflect this, Southall et al. 2007 proposed that marine mammals be divided into five functional hearing groups and subsequently recommended frequency weighting functions for each of these groups. NMFS agrees that taking into account frequencies that marine mammals hear is an important consideration. For example, if a sound is entirely outside the hearing range of a species, it is not considered to have the potential to cause a significant response.

There are data to indicate that frequency weighting is an important consideration associated with noise-induced hearing loss (Finneran and Schlundt, 2009; Finneran and Schlundt, 2011). We are in the process of reviewing and considering these data within our updated marine mammal NOAA acoustic guidelines. Southall et al., 2007 recommended criteria

for onset of injury (i.e., permanent threshold shift) are presented using a cumulative sound exposure level, which takes into account not only the received level during exposure but also the duration of exposure, as well as incorporating frequency weighting functions. In situations where exposures of lower level but longer duration are possible (which could be possible for resident populations or population with a small range), there must be caution using the Southall et al., 2007 criteria (i.e., noise-induced hearing loss my occur at a lower level than shorter exposures of higher level but with the same cumulative sound exposure level; Mooney et al., 2009, Finneran et al., 2010).

For behavior, the relationship between severity of response and frequency weighting is less clear and does not necessarily correspond to the severity of behavioral response expected. Behavioral effects are more challenging to predict since they often involve other variables beyond detection (e.g. perception and cognition, contextual cues, and previous experience). Despite most of the acoustic energy from seismic activities occurring outside the best hearing range of odontocetes, there are data showing that these species do behaviorally respond to these types of activities in some contexts, although not necessarily in a biologically significant way. Miller et al. (2005) indicates that belugas in the Beaufort Sea may have responded (avoidance) to seismic activity, although belugas may have already been in the process of leaving the area due to their seasonal migration.

Comment 21: The IAGC commented that NMFS should provide Environmental Assessments, Biological Opinions, and other documents for review at the same time as the proposed IHA.

Response: In the notice of the proposed IHA (77 FR 73434, December 10, 2012), NMFS indicated that an Environmental Assessment (EA) was being prepared and would be completed

prior to NMFS' decision to issue or deny the IHA. The Environmental Assessment and Biological Opinion prepared for the IHA NMFS issued to Apache in April 2012 have been available and posted at http://www.nmfs.noaa.gov/pr/permits/incidental.htm. The information in those publically available documents provided a basis for the EA we prepared for the subject IHA. All comments on the proposed IHA that were also relevant to the effects of our action on the affected environment were considered.

Based on changed in the proposed action, namely the potential survey area, we reinitiated section 7 consultation and a new biological opinion was issued. The time needed to conduct consultations does not allow for prior public review.

Comment 22: The Seldovia Village Tribe opposed the operation of seismic air guns unless NMFS required that the activities cease when marine mammals are within or approaching the Level A harassment (injury) zone.

Response: As described in detail in the notice of the proposed IHA (77 FR 73434, December 10, 2012), as well as in this document, NMFS does not believe that Apache's seismic survey will cause injury or mortality to marine mammals. NMFS requires that Apache establish, monitor, and implement mitigation measures in an area where sound has the potential to cause injury. NMFS mitigation or shutdown "safety radii" for limiting marine mammal exposure to impulsive sources typically correspond to the distances within which received sound levels are greater than or equal to 180 dB for cetaceans and greater than or equal to 190 dB for pinnipeds. These safety criteria are based on an assumption that SPLs received at lower levels will not result in injury or impair hearing. During Apache's survey, these "safey zones" will be monitored by PSOs for the presence of marine mammals and air guns will be shut down if marine mammals are observed approaching or within these zones. No injury and/or mortality of marine mammals

is expected, and none was authorized.

Description of Marine Mammals in the Area of the Specified Activity

The marine mammal species under NMFS's jurisdiction that could occur near operations in Cook Inlet include three cetacean species, all odontocetes (toothed whales): beluga whale (Delphinapterus leucas), killer whale (Orcinus orca), and harbor porpoise (Phocoena phocoena), and two pinniped species: harbor seal (Phoca vitulina richardsi) and Steller sea lions (Eumetopias jubatus). The marine mammal species that is likely to be encountered most widely (in space and time) throughout the period of the planned surveys is the harbor seal.

Of the five marine mammal species likely to occur in the proposed marine survey area, only Cook Inlet beluga whales and Steller sea lions are listed as endangered under the ESA (Steller sea lions are listed as two distinct population segments (DPSs), an eastern and a western DPS; the relevant DPS in Cook Inlet is the western DPS). These species are also designated as "depleted" under the MMPA. Despite these designations, Cook Inlet beluga whales and the western DPS of Steller sea lions have not made significant progress towards recovery. The Cook Inlet population of beluga whales has been decreasing at a rate of 1.1 percent annually for nearly a decade (Allen and Angliss, 2011). With respect to Steller sea lions, results of aerial surveys conducted in 2008 (Fritz et al., 2008) confirmed that the recent (2004-2008) overall trend in the western population of adult and juvenile Steller sea lions in Alaska is stable or possibly in decline; however, there continues to be considerable regional variability in recent trends. Pursuant to the ESA, critical habitat has been designated for Cook Inlet beluga whales and Steller sea lions. The proposed action falls within critical habitat designated in Cook Inlet for beluga whales, but is not within critical habitat designated for Steller sea lions. The portion of beluga whale critical habitat – identified as Area 2 in the critical habitat designation - where the

seismic survey will occur is located south of the Area 1 critical habitat where belugas are particularly vulnerable to impacts due to their high seasonal densities and the biological importance of the area for foraging, nursery, and predator avoidance. Area 2 critical habitat is largely based on dispersed fall and winter feeding and transit areas in waters where whales typically appear in smaller densities or deeper waters (76 FR 20180, April 11, 2011).

Cetaceans

Beluga Whales—Cook Inlet beluga whales reside in Cook Inlet year-round although their distribution and density changes seasonally. Factors that are likely to influence beluga whale distribution within the inlet include prey availability, predation pressure, sea-ice cover, and other environmental factors, reproduction, sex and age class, and human activities (Rugh et al., 2000; NMFS 2008). Seasonal movement and density patterns as well as site fidelity appear to be closely linked to prey availability, coinciding with seasonal salmon and eulachon concentrations (Moore et al., 2000). For example, during spring and summer, beluga whales are generally concentrated near the warmer waters of river mouths where prey availability is high and predator occurrence in low (Huntington 2000; Moore et al., 2000). During the winter (November to April), belugas disperse throughout the upper and mid-inlet areas, with animals found between Kalgin Island and Point Possession (Rugh et al., 2000). During these months, there are generally fewer observations of beluga whales in the Anchorage and Knik Arm area (NMML 2004; Rugh et al., 2004).

Beluga whales use several areas of the upper Cook Inlet for repeated summer and fall feeding. The primary hotspots for beluga feeding include the Big and Little Susitna rivers, Eagle Bay to Eklutna River, Ivan Slough, Theodore River, Lewis River, and Chickaloon River and Bay (NMFS 2008). Availability of prey species appears to be the most influential environmental

variable affecting Cook Inlet beluga whale distribution and relative abundance (Moore et al. 2000). The patterns and timing of eulachon and salmon runs have a strong influence on beluga whale feeding behavior and their seasonal movements (Nemeth et al., 2007; NMFS 2008). The presence of prey species may account for the seasonal changes in beluga group size and composition (Moore et al., 2000). Aerial and vessel-based monitoring conducted by Apache during the March 2011 2D test program in Cook Inlet reported 33 beluga sightings. One of the sightings was of a large group (~25 individuals on March 27, 2011) of feeding/milling belugas near the mouth of the Drift River. Also on March 27, 2011, PSOs onboard the M/V Dreamcatcher reported a group of seven beluga whales approximately 0.5 nm from the vessel. Land-based PSOs were able to observe this group of beluga whales for approximately 2.5 hrs. A single beluga whale was observed near the mouth of the Drift River by the aerial-based monitors on March 28, 2011, prior to the seismic ramp-up period. If belugas are present during the late summer/early fall, they are more likely to occur in shallow areas near river mouths in upper Cook Inlet. For example, no beluga whales were sighted in Trading Bay during the SSV conducted in September 2011 because during this time of year they are more likely to be in the upper regions of Cook Inlet. In the notice of the proposed IHA (77 FR 73434, December 10, 2012), expected densities were calculated from the annual aerial surveys conducted by NMFS between 2000 and 2012(Rugh et al. 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007; Shelden et al. 2008, 2009, 2010, 2012; Hobbs et al. 2011). Those densities were presented in Table 5 of the proposed IHA. During the public comment period, in response to NMFS' request to apply a correction factor to the beluga whale aerial survey data, Apache submitted updated density estimates for beluga whales that applied a correction factor based on previously published studies. For example, in Hobbs et al. (2000), the correction for whales in missed groups was

1.015 (CV = 3%) for the years 1994–98 and 1.021 (CV = 1%) for the years 1999 and 2000. In all the subsequent annual survey reports (2001-2011), the authors stated that the correction factors for that particular year are within the range for 1999-2000. Therefore, a correction factor of 1.021 was applied to all of the highest number of sightings for each year and calculated the densities/takes the same as for the previous IHA. Using this correction factor, the estimated maximum take increased from 11.98 to 12.2 (12), so there was no difference from the previous uncorrected approach with respect to "whole" animals.

After receiving the new information from Apache, NMFS sent the updated density estimates to beluga whale experts at the National Marine Mammal Laboratory (NMML) for their review. NMML staff indicated that Apache appeared to account for both on and off effort flight hours (instead of just on-effort hours) and had not included 1,810 km of coastline. NMML attempted to correct Apache's calculations by including on-effort survey hours and 1,810 km of coastline, but determined that the resulting take calculations for beluga whales were grossly inaccurate and unreliable. NMML staff directed NMFS to a published habitat model developed for Cook Inlet beluga whales that provides densities throughout the inlet based on the data from aerial surveys (Goetz et al., 2012), and agreed to conduct an analysis that would apply the habitat-based model to Apache's seismic survey for the purpose of estimating beluga whale densities and takes. Additional information on the habitat-based model and the results of NMML's analysis are provided below.

Killer Whales—In general, killer whales are rare in upper Cook Inlet, where transient killer whales are known to feed on beluga whales and resident killer whales are known to feed on anadromous fish (Shelden et al., 2003). The availability of these prey species largely determines the likeliest times for killer whales to be in the area. Between 1993 and 2004, 23 sightings of

killer whales were reported in the lower Cook Inlet during aerial surveys by Rugh et al. (2005). Surveys conducted over a span of 20 years by Shelden et al. (2003) reported 11 sightings in upper Cook Inlet between Turnagain Arm, Susitna Flats, and Knik Arm. No killer whales were spotted during recent surveys by Funk et al. (2005), Ireland et al. (2005), Brueggeman et al. (2007a, 2007b, 2008), or Prevel Ramos et al. (2006, 2008). Eleven killer whale strandings have been reported in Turnagain Arm, six in May 1991 and five in August 1993. Therefore, very few killer whales, if any, are expected to approach or be in the vicinity of the action area.

Harbor Porpoise—The most recent estimated density for harbor porpoises in Cook Inlet is 7.2 per 1,000 km^2 (Dahlheim et al., 2000) indicating that only a small number use Cook Inlet. Harbor porpoise have been reported in lower Cook Inlet from Cape Douglas to the West Foreland, Kachemak Bay, and offshore (Rugh et al., 2005). Small numbers of harbor porpoises have been consistently reported in upper Cook Inlet between April and October, except for a recent survey that recorded higher than usual numbers. Prevel Ramos et al. (2008) reported 17 harbor porpoises from spring to fall 2006, while other studies reported 14 in the spring of 2007 (Brueggeman et al. 2007) and 12 in the fall (Brueggeman et al. 2008). During the spring and fall of 2007, 129 harbor porpoises were reported between Granite Point and the Susitna River; however, the reason for the increase in numbers of harbor porpoise in the upper Cook Inlet remains unclear and the disparity with the result of past sightings suggests that it may be an anomaly. The spike in reported sightings occurred in July, which was followed by sightings of 79 harbor porpoises in August, 78 in September, and 59 in October, 2007. It is important to note that the number of porpoises counted more than once was unknown, which suggests that the actual numbers are likely smaller than those reported. In addition, recent passive acoustic research in Cook Inlet by the Alaska Department of Fish and Game and the National Marine

Mammal Laboratory have indicated that harbor porpoises occur in the area more frequently than previously thought, particularly in the West Foreland area in the spring (NMFS, 2011); however overall numbers are still unknown at this time.

Pinnipeds

Two species of pinnipeds may be encountered in Cook Inlet: harbor seal and Steller sea lion.

Harbor Seals—Harbor seals inhabit the coastal and estuarine waters of Cook Inlet. In general, harbor seals are more abundant in lower Cook Inlet than in upper Cook Inlet, but they do occur in the upper inlet throughout most of the year (Rugh et al., 2005). Harbor seals are non-migratory; their movements are associated with tides, weather, season, food availability, and reproduction. The major haulout sites for harbor seals are located in lower Cook Inlet and their presence in the upper inlet coincides with seasonal runs of prey species. For example, harbor seals are commonly observed along the Susitna River and other tributaries along upper Cook Inlet during the eulachon and salmon migrations (NMFS, 2003). During aerial surveys of upper Cook Inlet in 2001, 2002, and 2003, harbor seals were observed 24 to 96 km south-southwest of Anchorage at the Chickaloon, Little Susitna, Susitna, Ivan, McArthur, and Beluga Rivers (Rugh et al., 2005). During the 2D test program in March 2011, two harbor seals were observed by vessel-based PSOs. On March 25, 2011, one harbor seal was observed approximately 400 m from the M/V Miss Diane. At the time of the observation, the vessel was operating the positioning pinger and PSOs instructed the operator to implement a shut-down. The pinger was shut down for 30 minutes while PSO monitored the area and re-started the device when the animal was not sighted again during the 30 minute site clearing protocol. No unusual behaviors were reported during the time the animal was observed. The second harbor seal was observed on

March 26, 2011, by vessel-based PSO onboard the M/V Dreamcatcher approximately 4260 m from the source vessel, which was operating the 10 in^3 air gun at the time. The animal was well outside of the 160 dB zone (330 m for the 10 in^3 air gun) and no unusual behaviors were observed. Many harbor seals were observed during the 3D seismic survey conducted under the April 2012 IHA, especially when survey operations were conducted close to shore. NMFS and Apache do not anticipate encountering large haulouts of seals in Area 2 - the closest haulout site to the action area is located on Kalgin Island, which is approximately 22 km away from the McArthur River – but we do expect to see curious individual harbor seals; especially during large fish runs in the various rivers draining into Cook Inlet.

Steller Sea Lion—Two separate stocks of Steller sea lions are recognized within U.S. waters: an eastern U.S. stock, which includes animals east of Cape Suckling, Alaska; and a western U.S. stock, which includes animals west of Cape Suckling (NMFS, 2008). Individuals in Cook Inlet are considered part of the western U.S. stock, which is listed as endangered under the ESA. Steller sea lions primarily occur in lower, rather than upper Cook Inlet and are rarely sighted north of Nikiski on the Kenai Peninsula. Haul-outs and rookeries are located near Cook Inlet at Gore Point, Elizabeth Island, Perl Island, and Chugach Island (NMFS, 2008). No Steller seal lion haul-outs or rookeries are located in the vicinity of the proposed seismic survey. Furthermore, no sightings of Steller sea lions were reported by Apache during the 2D test program in March 2011. During the 3D seismic survey in 2012, Steller sea lions were observed on three separate occasions (approximately 4 individuals). Although Apache has requested takes of Steller sea lions, Steller sea lions would be rare in the action area during seismic survey operations.

Apache's application contains additional information on the status, distribution, seasonal

distribution, and abundance of each of the species under NMFS' jurisdiction mentioned in this document. Please refer to the application for that information (see ADDRESSES). Additional information can also be found in the NMFS Stock Assessment Reports (SAR). The Alaska 2011 SAR is available at: http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2011.pdf.

Potential Effects of the Specified Activity on Marine Mammals

NMFS considered the potential effects of sound from air guns, pingers, vessels, aircraft, and land-based explosives. In addition, NMFS considered the effects of vessel operations and the potential for ship strikes.

Potential Effects of Air Gun Sounds on Marine Mammals

The effects of sounds from air gun pulses might include one or more of the following: tolerance, masking of natural sounds, behavioral disturbance, and temporary or permanent hearing impairment or non-auditory effects (Richardson et al., 1995). As outlined in previous NMFS documents, the effects of noise on marine mammals are highly variable, often depending on species and contextual factors, and can be categorized as follows (based on Richardson et al., 1995):

(1) Tolerance

Numerous studies have shown that pulsed sounds from air guns are often readily detectable in the water at distances of many kilometers. Numerous studies have also shown that marine mammals at distances more than a few kilometers from operating survey vessels often show no apparent response. That is often true even in cases when the pulsed sounds must be readily audible to the animals based on measured received levels and the hearing sensitivity of that mammal group. In general, pinnipeds and small odotocetes (toothed whales) seem to be more tolerant of exposure to air gun pulses than baleen whales. Although various toothed

whales, and (less frequently) pinnipeds have been shown to react behaviorally to air gun pulses under some conditions, at other times, mammals of both types have shown no overt reactions. For example, the available evidence also indicates that Cook Inlet beluga whales are less impacted behaviorally by anthropogenic sounds compared to marine mammals in more pristine acoustic environments (e.g., the Beaufort Sea) given the Cook Inlet population's greater experience with anthropogenic sounds.

(2) Behavioral Disturbance

Marine mammals may behaviorally react to sound when exposed to anthropogenic noise. These behavioral reactions are often shown as: changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where noise sources are located; and/or flight responses (e.g., pinnipeds flushing into water from haulouts or rookeries).

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification have the potential to be biologically significant if the change affects growth, survival, or reproduction. Examples of significant behavioral modifications include:

- Drastic change in diving/surfacing patterns (such as those thought to be causing beaked whale stranding due to exposure to military mid-frequency tactical sonar);
- Habitat abandonment due to loss of desirable acoustic environment; and
- Cessation of feeding or social interaction.

The onset of behavioral disturbance from anthropogenic noise depends on both external factors (characteristics of noise sources and their paths) and the receiving animals (hearing, motivation, experience, demography) and is also difficult to predict (Southall et al., 2007).

Currently NMFS uses a received level of 160 dB re 1 μPa to estimate the onset threshold for marine mammal behavioral harassment for impulse noises (such as air gun pulses). As explained below, NMFS has determined that use of this threshold is appropriate for Apache's IHA considering the scientific literature pertaining to this issue and the evidence specific to the marine mammal species and populations in question.

(3) Masking

Marine mammals use acoustic signals for a variety of purposes, which differ among species, but include communication between individuals, navigation, foraging, reproduction, and learning about their environment (Erbe and Farmer, 2000; Tyack, 2000). Masking, or auditory interference, generally occurs when sounds in the environment are louder than, and of a similar frequency as, auditory signals an animal is trying to receive. Masking is a phenomenon that affects animals that are trying to receive acoustic information about their environment, including sounds from other members of their species, predators, prey, and sounds that allow them to orient in their environment. Masking these acoustic signals can disturb the biological functions of individual animals or groups of animals over long distances and times, which could potentially have population-level effects.

Masking occurs when noise and signals (that the animal utilizes) overlap at both spectral and temporal scales. For the air gun noise generated from the proposed seismic surveys, noise will consist of low frequency (under 500 Hz) pulses with extremely short durations (less than one second). Lower frequency man-made noises are more likely to affect detection of

communication calls and other potentially important natural sounds such as surf and prey noise. There is little concern regarding masking near the noise source due to the brief duration of these pulses and relatively longer silence between air gun shots (approximately 12 seconds). However, at long distances (over tens of kilometers away), due to multipath propagation and reverberation, the durations of air gun pulses can be "stretched" to seconds with long decays (Madsen et al., 2006), although the intensity of the noise is greatly reduced.

This could affect communication signals used by low frequency mysticetes when they occur near the noise band and thus reduce the communication space of animals (e.g., Clark et al., 2009) and cause increased stress levels (e.g., Foote et al., 2004; Holt et al., 2009); however, no baleen whales are expected to occur within the action area. Marine mammals are thought to be able to compensate for masking by adjusting their acoustic behavior by shifting call frequencies, and/or increasing call volume and vocalization rates. For example, blue whales are found to increase call rates when exposed to seismic survey noise in the St. Lawrence Estuary (Di Iorio and Clark, 2010). The North Atlantic right whales (Eubalaena glacialis) exposed to high shipping noise increase call frequency (Parks et al., 2007), while some humpback whales respond to low-frequency active sonar playbacks by increasing song length (Miller el al., 2000).

(4) Hearing Impairment

Marine mammals exposed to high intensity sound repeatedly or for prolonged periods can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Kastak et al., 1999; Schlundt et al., 2000; Finneran et al., 2002; 2005). TS can be permanent (PTS), in which case the loss of hearing sensitivity is unrecoverable, or temporary (TTS), in which case the animal's hearing threshold will recover over time (Southall et al., 2007). Just like masking, marine mammals that suffer from PTS or TTS could have reduced

fitness in survival and reproduction, either permanently or temporarily. For transient sounds, the sound level necessary to cause TTS is inversely related to the duration of the sound.

Researchers have studied TTS in certain captive odontocetes and pinnipeds exposed to strong sounds (reviewed in Southall et al., 2007). However, there has been no specific documentation of TTS let alone permanent hearing damage, i.e., permanent threshold shift (PTS), in free-ranging marine mammals exposed to sequences of air gun pulses during realistic field conditions.

Temporary Threshold Shift - TTS is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises and a sound must be stronger in order to be heard. At least in terrestrial mammals, TTS can last from minutes or hours to (in cases of strong TTS) days. For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the noise ends. Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals, and none of the published data concern TTS elicited by exposure to multiple pulses of sound. Available data on TTS in marine mammals are summarized in Southall et al. (2007).

To avoid the potential for injury, NMFS (1995, 2000) concluded that cetaceans and pinnipeds should not be exposed to pulsed underwater noise at received levels exceeding 180 and 190 dB re 1 μPa (rms), respectively. The 180 and 190 dB (rms) criteria are not considered to be the levels above which TTS might occur. Rather, they are the received levels above which, in the view of a panel of bioacoustics specialists convened by NMFS before TTS measurements for marine mammals started to become available, one could not be certain that there would be no injurious effects, auditory or otherwise, to marine mammals. NMFS also assumes that cetaceans

and pinnipeds exposed to levels exceeding 160 dB re 1 μPa (rms) may experience Level B harassment.

For toothed whales, researchers have derived TTS information for odontocetes from studies on the bottlenose dolphin and beluga. The experiments show that exposure to a single impulse at a received level of 207 kPa (or 30 psi, p-p), which is equivalent to 228 dB re 1 Pa (p-p), resulted in a 7 and 6 dB TTS in the beluga whale at 0.4 and 30 kHz, respectively. Thresholds returned to within 2 dB of the pre-exposure level within 4 minutes of the exposure (Finneran et al., 2002). For the one harbor porpoise tested, the received level of air gun sound that elicited onset of TTS was lower (Lucke et al., 2009). If these results from a single animal are representative, it is inappropriate to assume that onset of TTS occurs at similar received levels in all odontocetes (cf. Southall et al., 2007). Some cetaceans apparently can incur TTS at considerably lower sound exposures than are necessary to elicit TTS in the beluga or bottlenose dolphin.

In pinnipeds, researchers have not measured TTS thresholds associated with exposure to brief pulses (single or multiple) of underwater sound. Initial evidence from more prolonged (non-pulse) exposures suggested that some pinnipeds (harbor seals in particular) incur TTS at somewhat lower received levels than do small odontocetes exposed for similar durations (Kastak et al., 1999, 2005; Ketten et al., 2001). The TTS threshold for pulsed sounds has been indirectly estimated as being an SEL of approximately 171 dB re 1 $\mu Pa^2 \cdot s$ (Southall et al., 2007) which would be equivalent to a single pulse with a received level of approximately 181 to 186 dB re 1 μPa (rms), or a series of pulses for which the highest rms values are a few dB lower. Corresponding values for California sea lions and northern elephant seals are likely to be higher (Kastak et al., 2005).

No cases of TTS are expected as a result of Apache's proposed activities given the strong likelihood that marine mammals would avoid the approaching air guns (or vessel) before being exposed to levels high enough for there to be any possibility of TTS, and the mitigation measures proposed to be implemented during the survey described later in this document.

Permanent Threshold Shift - When PTS occurs, there is physical damage to the sound receptors in the ear. In severe cases, there can be total or partial deafness, whereas in other cases, the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter, 1985). There is no specific evidence that exposure to pulses of air gun sound can cause PTS in any marine mammal, even with large arrays of air guns. However, given the possibility that mammals close to an air gun array might incur at least mild TTS, there has been further speculation about the possibility that some individuals occurring very close to air guns might incur PTS (e.g., Richardson et al., 1995; Gedamke et al., 2008). Single or occasional occurrences of mild TTS are not indicative of permanent auditory damage, but repeated or (in some cases) single exposures to a level well above that causing TTS onset might elicit PTS.

Relationships between TTS and PTS thresholds have not been studied in marine mammals, but are assumed to be similar to those in humans and other terrestrial mammals (Southall et al., 2007). PTS might occur at a received sound level at least several dBs above that inducing mild TTS if the animal were exposed to strong sound pulses with rapid rise times. Based on data from terrestrial mammals, a precautionary assumption is that the PTS threshold for impulse sounds (such as air gun pulses as received close to the source) is at least 6 dB higher than the TTS threshold on a peak-pressure basis, and probably greater than 6 dB (Southall et al., 2007).

Given the higher level of sound necessary to cause PTS as compared with TTS, it is considerably less likely that PTS would occur during the proposed seismic survey in Cook Inlet. Cetaceans generally avoid the immediate area around operating seismic vessels, as do some other marine mammals. Some pinnipeds show avoidance reactions to air guns, but their avoidance reactions are generally not as strong or consistent as those of cetaceans, and occasionally they seem to be attracted to operating seismic vessels (NMFS, 2010).

(5) Non-auditory Physical Effects

Non-auditory physical effects might occur in marine mammals exposed to strong underwater pulsed sound. Possible types of non-auditory physiological effects or injuries that theoretically might occur in mammals close to a strong sound source include stress, neurological effects, bubble formation, and other types of organ or tissue damage. Some marine mammal species (i.e., beaked whales) may be especially susceptible to injury and/or stranding when exposed to strong pulsed sounds. However, there is no definitive evidence that any of these effects occur even for marine mammals in close proximity to large arrays of air guns, and beaked whales do not occur in the proposed project area. In addition, marine mammals that show behavioral avoidance of seismic vessels, including most baleen whales, some odontocetes (including belugas), and some pinnipeds, are especially unlikely to incur non-auditory impairment or other physical effects. The distances to the 180 and 190 dB thresholds for the air gun arrays proposed to be used by Apache are provided in Table 1.

Therefore, it is unlikely that such effects would occur during Apache's proposed surveys given the brief duration of exposure and the planned monitoring and mitigation measures described later in this document.

(6) Stranding and Mortality

Marine mammals close to underwater detonations of high explosive can be killed or severely injured, and the auditory organs are especially susceptible to injury (Ketten et al., 1993; Ketten, 1995). Air gun pulses are less energetic and their peak amplitudes have slower rise times. To date, there is no evidence that serious injury, death, or stranding by marine mammals can occur from exposure to air gun pulses, even in the case of large air gun arrays.

However, in numerous past IHA notices for seismic surveys, commenters have referenced two stranding events allegedly associated with seismic activities, one off Baja California and a second off Brazil. NMFS has addressed this concern several times, including in the Federal Register notice announcing the IHA for Apache's first seismic survey in 2012, and, without new information, does not believe that this issue warrants further discussion. For information relevant to strandings of marine mammals, readers are encouraged to review NMFS' response to comments on this matter found in 69 FR 74905 (December 14, 2004), 71 FR 43112 (July 31, 2006), 71 FR 50027 (August 24, 2006), 71 FR 49418 (August 23, 2006), and 77 FR 27720 (May 11, 2012).

It should be noted that strandings related to sound exposure have not been recorded for marine mammal species in Cook Inlet. Beluga whale strandings in Cook Inlet are not uncommon; however, these events often coincide with extreme tidal fluctuations ("spring tides") or killer whale sightings (Shelden et al., 2003). For example, in August 2012, a group of Cook Inlet beluga whales stranded in the mud flats of Turnagain Arm during low tide and were able to swim free with the flood tide. No strandings or marine mammals in distress were observed during the 2D test survey conducted by Apache in March 2011 and none were reported by Cook Inlet inhabitants. Furthermore, no strandings were reported during seismic survey operations conducted under the April 2012 IHA. As a result, NMFS does not expect any marine mammals

will incur serious injury or mortality in Cook Inlet or strand as a result of the proposed seismic survey.

Potential Effects from Pingers on Marine Mammals

Active acoustic sources other than the air guns have been proposed for Apache's 2013 seismic survey in Cook Inlet. The specifications for the pingers (source levels and frequency ranges) were provided in the notice of the proposed IHA (77 FR 73434, December 10, 2012). In general, the potential effects of this equipment on marine mammals are similar to those from the air guns, except the magnitude of the impacts is expected to be much less due to the lower intensity of the source (i.e., an animal would need to be within 25 m of the boat to be exposed to received levels of sound above 160 dB, which is unlikely to occur without triggering mitigation).

Potential Effects from Vessels and Vessel Noise on Marine Mammals

Vessel activity and noise associated with vessel activity will temporarily increase in the action area during Apache's seismic survey as a result of the operation of eight vessels. To minimize the effects of vessels and noise associated with vessel activity, Apache will follow NMFS' Marine Mammal Viewing Guidelines and Regulations and will alter heading or speed if a marine mammal gets too close to a vessel. In addition, vessels will be operating at slow speed (2-4 knots) when conducting surveys and in a purposeful manner to and from work sites in as direct a route as possible. Marine mammal monitoring observers and passive acoustic devices will alert vessel captains as animals are detected to ensure safe and effective measures are applied to avoid coming into direct contact with marine mammals. Therefore, NMFS neither anticipates nor authorizes takes of marine mammals from ship strikes.

Odontocetes, such as beluga whales, killer whales, and harbor porpoises, often show tolerance to vessel activity; however, they may react at long distances if they are confined by ice,

shallow water, or were previously harassed by vessels (Richardson, 1995). Beluga whale response to vessel noise varies greatly from tolerance to extreme sensitivity depending on the activity of the whale and previous experience with vessels (Richardson, 1995). Reactions to vessels depends on whale activities and experience, habitat, boat type, and boat behavior (Richardson, 1995) and may include behavioral responses, such as altered headings or avoidance (Blane and Jaakson, 1994; Erbe and Farmer, 2000); fast swimming; changes in vocalizations (Lesage et al., 1999; Scheifele et al., 2005); and changes in dive, surfacing, and respiration patterns.

There are few data published on pinniped responses to vessel activity, and most of the information is anecdotal (Richardson, 1995). Generally, sea lions in water show tolerance to close and frequently approaching vessels and sometimes show interest in fishing vessels. They are less tolerant when hauled out on land; however, they rarely react unless the vessel approaches within 100-200 m (330-660 ft; reviewed in Richardson, 1995).

The addition of eight vessels and noise due to vessel operations associated with the seismic survey would not be outside the present experience of marine mammals in Cook Inlet, although levels may increase locally. Given the large number of vessels in Cook Inlet and the apparent habituation to vessels by Cook Inlet beluga whales and the other marine mammals that may occur in the area, vessel activity and noise is not expected to have effects that could cause significant or long-term consequences for individual marine mammals or their populations.

Potential Effects from Aircraft Noise on Marine Mammals

Apache plans to utilize the crew helicopter or small fixed-wing aircraft to conduct aerial surveys in order to identify locations or congregations of beluga whales and other marine mammals prior to the commencement of operations. The aircraft should be used every day, but

must be used for surveys near river mouths. In addition, weather and safety permitting, daily aerial surveys must be conducted when there are any seismic-related activities (including but not limited to node laying/retrieval or air gun operations) occurring north or east of a line from Tyonek across to the eastern side of Number 3 Bay of the Captain Cook State Recreation Area, Cook Inlet (roughly the southern-most point of Corps defined Region 9). Surveys are to be flown even if the air guns are not being fired. Aerial surveys will fly at an altitude of 305 m (1,000 ft) when practicable and weather conditions permit. In the event of a marine mammal sighting, aircraft will try to maintain a radial distance of 457 m (1,500 ft) from the marine mammal(s). Aircraft will avoid approaching marine mammals from head-on, flying over or passing the shadow of the aircraft over the marine mammals.

Studies on the reactions of cetaceans to aircraft show little negative response (Richardson et al., 1995). In general, reactions range from sudden dives and turns and are typically found to decrease if the animals are engaged in feeding or social behavior. Whales with calves or in confined waters may show more of a response. Generally there has been little or no evidence of marine mammals responding to aircraft overflights when altitudes are at or above 1,000 ft, based on three decades of flying experience in the Arctic (NMFS, unpublished data). Based on long-term studies that have been conducted on beluga whales in Cook Inlet since 1993, NMFS expect that there will be no effects of this activity on beluga whales or other cetaceans. No change in beluga swim directions or other noticeable reactions have been observed during the Cook Inlet aerial surveys flown from 600 to 800 ft. (e.g., Rugh et al., 2000). By applying the operational requirements discussed above, sound levels underwater are not expected to reach NMFS' harassment thresholds.

The majority of observations of pinnipeds reacting to aircraft noise are associated with

animals hauled out on land or ice. There are very little data describing the reactions of pinnipeds in water to aircraft (Richardson et al., 1995). In the presence of aircraft, pinnipeds hauled out for pupping or molting generally became alert and then rushed or slipped (when on ice) into the water. Stampedes often result from this response and may increase pup mortality due to crushing or an increase rate of pup abandonment. The greatest reactions from hauled out pinnipeds were observed when low flying aircrafts passed directly above the animal(s) (Richardson et al., 1995). Although noise associated with aircraft activity could cause hauled out pinnipeds to rush into the water, there are no known haul out sites in the vicinity of the survey site.

Therefore, the operation of aircraft during the seismic survey is not expected to have effects that could cause significant or long-term consequences for individual marine mammals or their populations. To minimize the noise generated by aircraft, Apache will follow NMFS' Marine Mammal Viewing Guidelines and Regulations found at http://www.alaskafisheries.noaa.gov/protectedresources/mmv/guide.htm.

Land-based Explosives

The onshore component of the seismic survey involves the underground detonation of explosive devices to acquire seismic data on land. Because underwater sound levels associated with the land-based explosives were previously unknown, in September 2011, Apache conducted a SSV study, which found that marine mammals would not be exposed to underwater sound levels that exceed the NMFS injury or harassment thresholds.

Anticipated Effects on Marine Mammal Habitat

NMFS included a detailed discussion of the potential effects of this action on marine mammal habitat, including physiological and behavioral effects on marine fish and invertebrates, in the notice of the proposed IHA (77 FR 73434, December 10, 2012). While NMFS anticipates

that the specified activity may result in marine mammals avoiding certain areas due to temporary ensonification, this impact to habitat is temporary and site-specific. The main impact associated with the activity would be temporarily elevated noise levels and the associated direct effects on marine mammals.

Mitigation

In order to issue an incidental take authorization under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses.

To reduce the potential for disturbance from acoustic stimuli associated with the activities, Apache and/or its designees will implement the following mitigation measures for marine mammals:

(1) Operation of Mitigation Air Gun at Night

Apache proposes to conduct both daytime and nighttime operations. Nighttime operations would only be initiated if a mitigation air gun (typically the 10 in^3) has been continuously operational from the time that PSO monitoring has ceased for the day. The mitigation air gun would operate on a longer duty cycle than the full air gun arrays, firing every 30-45 seconds. Seismic activity would not ramp up from an extended shut-down (i.e., when the air gun has been down with no activity for at least 10 minutes) during nighttime operations and survey activities would be suspended until the following day because dedicated PSOs would not be on duty. At night, the vessel captain and crew would maintain lookout for marine mammals

and would order the air gun(s) to be shut down if marine mammals are observed in or about to enter the established safety radii. After a shut down during night operations, seismic survey activities will be suspended until the following day when the full safety zone is visible.

(2) Safety and Disturbance Zones

NMFS mitigation or shutdown "safety radii" for limiting marine mammal exposure to impulse sources typically correspond to the distances within which received sound levels are ≥180 dB_{rms} re 1 μPa for cetaceans and ≥190 dB_{rms} re 1 μPa for pinnipeds. These safety criteria are based on an assumption that SPLs received at levels lower than these will not injure these animals or impair their hearing abilities. Disturbance or behavioral effects to marine mammals from underwater sound may occur from exposure to sound at lower SPLs, at distances greater than the safety radii (Richardson et al., 1995). The disturbance zone is defined as the area between the 180/190 dB threshold and the 160 dB threshold where NMFS has determined that harassment in the form of behavioral disturbance may occur.

The proposed survey would use air gun sources composed of two 2400 in^3 air guns, a single 440 in^3 air gun, and a single 10 in^3 air gun. Safety and disturbance radii for the sound levels produced by the planned air gun configurations and pinger were estimated for the 2012 IHA issued for Area 1; however, distances to the 190, 180, and 160 dB thresholds were measured in late April 2012 (see Table 1) and would be used for mitigation purposes during the seismic survey activities until the results from the 2013 SSV study are available.

Table 1. Distances to Sound Thresholds for Monitoring and Mitigation

Source	190 dB	180 dB	160 dB
Pinger	1 m	3 m	25 m
10 cui air gun	10 m	33 m	330 m
440 cui air gun	NA	NA	NA
2,400 cui air gun (nearshore)	380 m	1400 m	9500 m

2,400 cui air gun (offshore)	290 m	910 m	8700 m

In addition to the marine mammal monitoring radii described above, pursuant to Alaska Department of Fish and Game restrictions, there would be a 1.6 km setback of sound source points from the mouths of any anadromous streams.

Apache also plans to use dedicated vessels to deploy and retrieve the nodal recording system. Sounds produced by those vessels are not expected to exceed 180 dB (rms). Therefore, mitigation related to acoustic impacts from these activities is not required.

(3) Speed and Course Alterations

If a marine mammal is detected outside the applicable safety radius and, based on its position and the relative motion, is likely to enter the safety radius, changes of the vessel's speed and/or direct course will be considered if this does not compromise operational safety. For marine seismic surveys using large arrays, course alterations are not typically possible. However, for the smaller air gun arrays planned during the proposed site surveys, such changes may be possible. After any such speed and/or course alteration is begun, the marine mammal activities and movements relative to the survey vessel will be closely monitored to ensure that the marine mammal does not approach within the safety radius. If the mammal appears likely to enter the safety radius, further mitigative actions will be taken, including a power down or shut down of the air gun(s).

(4) Power-downs

A power-down for mitigation purposes is the immediate reduction in the number of operating air guns such that the radii of the 190 dB rms and 180 dB rms zones are decreased to the extent that an observed marine mammal(s) are not in the applicable safety zone of the full

array. During a power-down, one "mitigation" air gun, typically the 10 in^3, continues firing. Operation of the 10 in^3 air gun decreases the safety radii to 10 m, 33 m, and 330 m for the 190 dB, 180 dB, and 160 dB, respectively. The continued operation of one air gun is intended to (a) alert marine mammals to the presence of the survey vessel in the area, and (b) retain the option of initiating a ramp up to full operations under poor visibility conditions.

The array will be immediately powered down whenever a marine mammal is sighted approaching close to or within the applicable safety zone of the full array, but is outside the applicable safety zone of the single mitigation air gun. Likewise, if a mammal is already within the safety zone when first detected, the air guns will be powered down immediately. If a marine mammal is sighted within or about to enter the applicable safety zone of the single mitigation air gun, it too will be shut down (see following section).

Following a power-down, operation of the full air gun array would not resume until the marine mammal has cleared the safety zone. The animal would be considered to have cleared the safety zone if it:

- is visually observed to have left the safety zone of the full array, or
- has not been seen within the zone for 15 min in the case of pinnipeds or small odontocetes, or
- has not been seen within the zone for 30 min in the case of large odontocetes.

(5) Shut-downs

The operating air gun(s) will be shut down completely if a marine mammal approaches or enters the safety radius and a power-down is not practical or adequate to reduce exposure to less than 190 or 180 dB rms, as appropriate. In most cases, this means the mitigation air gun will be

shut down completely if a marine mammal approaches or enters the estimated safety radius around the single 10 in^3 air gun while it is operating during a power down. Air gun activity will not resume until the marine mammal has cleared the safety radius. The animal would be considered to have cleared the safety radius as described above under power down procedures.

(6) Ramp-ups

A ramp-up of an air gun array provides a gradual increase in sound levels, and involves a step-wise increase in the number and total volume of air guns firing until the full volume is achieved. The purpose of a ramp-up (or "soft start") is to "warn" cetaceans and pinnipeds in the vicinity of the air guns and to provide the time for them to leave the area and thus avoid any potential injury or impairment of their hearing abilities.

During the proposed seismic survey, the seismic operator will ramp up the air gun array slowly. NMFS requires the rate of ramp-up to be no more than 6 dB per 5-minute period. Ramp-up is used at the start of air gun operations, after a power- or shut-down, and after any period of greater than 10 minutes in duration without air gun operations (i.e., extended shutdown).

A full ramp-up after a shut down will not begin until there has been a minimum of 30 minutes of observation of the safety zone by PSOs to assure that no marine mammals are present. The entire safety zone must be visible during the 30-minute lead-in to a full ramp up. If the entire safety zone is not visible, then ramp-up from a cold start cannot begin. If a marine mammal(s) is sighted within the safety zone during the 30-minute watch prior to ramp-up, ramp-up will be delayed until the marine mammal(s) is sighted outside of the safety zone or the animal(s) is not sighted for at least 15-30 minutes: 15 minutes for small odontocetes and pinnipeds (e.g. harbor porpoises, harbor seals, and Steller sea lions), or 30 minutes for large odontocetes (e.g., killer whales and beluga whales).

(7) Shut-downs for Aggregations of Whales, Harbor Porpoises, and Beluga Cow-Calf Pairs

The following additional protective measures beluga whale cow-calf pairs and aggregations of whales and harbor porpoises are required. Specifically, a 160-dB vessel monitoring zone would be established and monitored in Cook Inlet during all seismic surveys. Whenever an aggregation of beluga whales, killer whales, or harbor porpoises (five or more animals of any age/sex class), or any beluga whale cow-calf pairs are observed approaching the 160-dB safety zone around the survey operations, the survey activity would not commence or would shut down, until they are no longer present within the 160-dB safety zone of seismic surveying operations.

Additional Mitigation Measures Proposed by NMFS

In addition to the mitigation measures discussed above, NMFS requires the following protective measures:

(1) All vessels should reduce speed when within 300 yards (274 m) of whales, and those vessels capable of steering around such groups should do so. Vessels may not be operated in such a way as to separate members of a group of whales from other members of the group;

(2) Avoid multiple changes in direction and speed when within 300 yards (274 m) of whales; and

(3) When weather conditions require, such as when visibility drops, support vessels must adjust speed (increase or decrease) and direction accordingly to avoid the likelihood of injury to whales.

(4) When aggregations of five or more harbor porpoises are observed approaching the 160 dB zone around survey operations, the survey activity will not commence or will shut down, until they are no longer present within the 160 dB zone. (This was recommended in a comment

from the Commission).

(5) Apache must immediately report to NMFS if 25 beluga whales are detected in the disturbance zone. If the number of detected takes is meets or exceeds the amount authorized for any marine mammal species, Apache must immediately cease survey operations involving the use of active sound sources (e.g., air guns and pingers) and notify NMFS.

(6) Apache must not operate air guns within 10 miles (16 km) of the mean higher high water (MHHW) line of the Susitna Delta (Beluga River to the Little Susitna River) between mid-April and mid-October (to avoid any effects to belugas in an important feeding and potential breeding area).

(7) Safety and weather permitting, aerial surveys shall be conducted on a daily basis when there are any seismic-related activities (including but not limited to node laying/retrieval or airgun operations) occurring north or east of a line from Tyonek across to the eastern side of Number 3 Bay of the Captain Cook State Recreation Area, Cook Inlet (roughly the southern-most point of Corps defined Region 9). Surveys are to be flown even if the air guns are not being fired.

Mitigation Measures Considered but not Required

NMFS considered whether time/area restrictions were warranted. Mirroring a requirement in the Incidental Take Statement for the related Biological Opinion, NMFS has included an exclusion zone that extends 10 miles (16 km) from the mean higher high water (MHHW) line of the Susitna Delta (Beluga River to the Little Susitna River) to avoid impacts to beluga in an important feeding and potential breeding area. Between mid-April and mid-October, air guns may not be operated within the exclusion zone. NMFS determined that such restrictions are not necessary or practicable elsewhere in the 2013 survey area. Beluga whales

remain in Cook Inlet year-round, but demonstrate seasonal movement within the Inlet; in the summer and fall, they concentrate in upper Cook Inlet's rivers and bays, but tend to disperse offshore and move to mid-Inlet in winter (Hobbs et al., 2005). The available information indicates that in the winter months belugas are dispersed in deeper waters in mid-Inlet past Kalgin Island, with occasional forays into the upper inlet, including the upper ends of Knik and Turnagain Arms. Their winter distribution does not appear to be associated with river mouths, as it is during the warmer months. The spatial dispersal and diversity of winter prey are likely to influence the wider beluga winter range throughout the mid-Inlet. Apache now expects to mobilize crews and equipment for its seismic survey in February 2013, which would coincide with the time of year when belugas are dispersed offshore in the mid-Inlet and away from river mouths. In the spring, when survey operations are expected to start, beluga whales are regularly sighted in the upper Inlet beginning in late April or early May, coinciding with eulachon runs in the Susitna River and Twenty Mile River in Turnagain Arm. Therefore, NMFS believes that the timing and location of the seismic survey, with the exclusion zone around the Susitna Delta, will avoid areas and seasons that overlap with important beluga whale behavioral patterns.

NMFS also considered whether to require time area restrictions for areas identified as home ranges during August through March for 14 satellite-tracked beluga whales in Hobbs et al., 2005. NMFS has determined not to require time/area restrictions for these areas within the phase 2 survey area. The areas in question within phase 2 are relatively large areas in which belugas are dispersed. In addition, data for 14 tracked belugas does not establish that belugas will not appear in other areas - particularly during the periods of the year when belugas are more dispersed in Cook Inlet. Time/area restrictions for these areas thus would not yield a material benefit for the species. Such restrictions also are not practicable given the applicant's need to survey the areas

in question and the need for operational flexibility given weather conditions, real-time adjustment of operations to avoid marine mammals and other factors. The suite of other mitigation and monitoring measures will still apply.

Mitigation Conclusions

NMFS has carefully evaluated the applicant's proposed mitigation measures and considered a range of other measures in the context of ensuring that NMFS prescribes the means of effecting the least practicable impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another:

- The manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals;
- The proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and
- The practicability of the measure for applicant implementation.

Based on our evaluation of the applicant's proposed measures, as well as other measures considered, NMFS has determined that the mitigation measures provide the means of effecting the least practicable impact on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Monitoring and Reporting

In order to issue an ITA 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 ITAs

must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area.

Summary of 2012 Monitoring and Mitigation

Marine mammal monitoring was conducted in central Cook Inlet between May 6 and September 30, 2012, which resulted in a total of 6,912 hours of observations. Monitoring was conducted from the two seismic survey vessels, a mitigation vessel, four land platforms, and an aerial platform (either a helicopter or small fixed wing aircraft). PSOs monitored from the seismic vessels, mitigation vessel, and land platforms during all daytime seismic operations. Aerial overflights were conducted 1-2 times daily over the survey area and surrounding coastline, including the major river mouths, to monitor for larger concentrations of marine mammals in and around the survey site. Passive acoustic monitoring (PAM) took place from the mitigation vessel during all night time seismic survey operations and most daytime seismic survey operations. During the entire 2012 survey season, Apache's PAM equipment yielded only six confirmed marine mammal detections, one of which was a Cook Inlet beluga whale. The single Cook Inlet beluga whale detection did not, however, result in a shutdown procedure.

Six identified species and three unidentified species of marine mammals were observed from the vessel, land, and aerial platforms between May 6 and September 30, 2012. The species observed included Cook Inlet beluga whales, harbor seals, harbor porpoises, Steller sea lion, gray whale, and California sea lions. PSOs also observed unidentified species including a large cetacean, pinniped, and marine mammal. The gray whale and California sea lion were not included in the 2012 IHA, so mitigation measures were implemented for these species to prevent unauthorized takes. There were a total of 882 sightings and an estimated 5,232 individuals (the

number or individuals is typically higher than the number of sightings because a single sighting may consist of multiple individuals). Harbor seals were the most frequently observed marine mammal at 563 sightings (~3,471 individuals), followed by beluga whales with 151 sightings (~1,463 individuals), harbor porpoises with 137 (~190 individuals), and gray whales with 9 sightings (9 individuals). Steller sea lions were observed on three separate occasions (~4 individuals) and California sea lions were observed once (~2 individuals). No killer whales were observed during seismic survey operations conducted under the 2012 IHA.

A total of 88 safety zone clearing delays, 154 shut downs, 7 power downs, 23 shut downs followed by a power down, and 1 speed and course alteration occurred under the 2012 IHA. Safety zone clearing delays, shut downs, and shut downs followed by a power down occurred most frequently during harbor seal sightings (n=61, n=110, n=14, respectively), followed by harbor porpoise sightings (n=18, n=28, n=6, respectively), and then beluga whale sightings (n=5, n=6, n=3, respectively). Power downs occurred most frequently with harbor seal (n=3) and harbor porpoise (n=3) sightings. One speed and course alteration occurred in response to a beluga whale sighting. A total of 17 Level B harassment takes were detected from May 6 to September 30, 2012, including harbor porpoise (n=4) and harbor seals (n=13). No other marine mammal species were detected in the Level B harassment zone. There were no detected Level A harassment takes of either cetaceans or pinnipeds during the 2012 seismic survey.

Monitoring Measures

Apache will provide marine mammal monitoring to implement the mitigation measures that require real-time monitoring.

(1) Visual Vessel-based Monitoring

Vessel-based monitoring for marine mammals will be done by experienced PSOs

throughout the period of marine survey activities. PSOs will monitor the occurrence and behavior of marine mammals near the survey vessel during all daylight periods during operation and during most daylight periods when air gun operations are not occurring. PSO duties will include watching for and identifying marine mammals, recording their numbers, distances, and reactions to the survey operations, and documenting take.

A sufficient number of PSOs will be required onboard the survey vessel to meet the following criteria: (1) 100 percent monitoring coverage during all periods of survey operations in daylight; (2) maximum of 4 consecutive hours on watch per PSO; and (3) maximum of 12 hours of watch time per day per PSO.

PSO teams will consist of experienced field biologists. An experienced field crew leader will supervise the PSO team onboard the survey vessel. Apache currently plans to have PSOs aboard the three vessels: the two source vessels (M/V Peregrine Falcon and M/V Arctic Wolf) and one support vessel (M/V Dreamcatcher). Two PSOs will be on the source vessels and two PSOs will be on the support vessel to observe the safety, power down, and shut down areas. The vessel-based observers will watch for marine mammals during all periods when sound sources are in operation and for a minimum of 30 minutes prior to the start of air gun or pinger operations after an extended shut down.

Crew leaders and most other biologists serving as observers will be individuals with experience as observers during seismic surveys in Alaska or other areas in recent years.

The observer(s) will watch for marine mammals from the best available vantage point on the source and support vessels, typically the flying bridge. The observer(s) will scan systematically with the unaided eye and 7×50 reticle binoculars. Laser range finders will be available to assist with estimating distance. Personnel on the bridge would assist the observer(s)

in watching for marine mammals.

All observations will be recorded in a standardized format. Data would be entered into a custom database using a notebook computer. The accuracy of the data will be verified by computerized validity data checks as the data are entered and by subsequent manual checks of the database. These procedures will allow for initial summaries of the data to be prepared during and shortly after the completion of the field program, and will facilitate transfer of the data to statistical, geographical, or other programs for future processing and achieving. When a mammal sighting is made, the following information about the sighting will be recorded:

(A) Species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from the PSO, apparent reaction to activities (e.g., none, avoidance, approach, paralleling, etc.), closest point of approach, and behavioral pace;

(B) Time, location, speed, activity of the vessel, sea state, ice cover, visibility, and sun glare; and

(C) The positions of other vessel(s) in the vicinity of the PSO location.

The ship's position, speed of support vessels, and water temperature, water depth, sea state, ice cover, visibility, and sun glare will also be recorded at the start and end of each observation watch, every 30 minutes during a watch, and whenever there is a change in any of those variables.

(2) Visual Shore-based Monitoring

In addition to the vessel-based PSOs, Apache will utilize a shore-based station to visually monitor for marine mammals. The shore-based station will follow all safety procedures, including bear safety. The location of the shore-based station will need to be sufficiently high to

observe marine mammals; the PSOs will be equipped with pedestal mounted "big eye" (20x110) binoculars. The shore-based PSOs will scan the area prior to, during, and after the air gun operations, and will be in contact with the vessel-based PSOs via radio to communicate sightings of marine mammals approaching or within the project area.

(3) Aerial-based Monitoring

When survey operations occur near a river mouth, Apache will utilize the crew helicopter or a small fixed-wing aircraft to conduct aerial surveys near river mouths prior to the commencement of air gun operations in order to identify locations where beluga whales congregate. In addition, aerial surveys shall be conducted on a daily basis (weather and safety permitting) when there are any seismic-related activities (including but not limited to node laying/retrieval or air gun operations) occurring north or east of a line from Tyonek across to the eastern side of Number 3 Bay of the Captain Cook State Recreation Area, Cook Inlet (roughly the southern-most point of Corps defined Region 9). Surveys are to be flown even if the air guns are not being fired. The types of helicopters currently planned for use by Apache include a Bell 407, Bell UH1B, and ASB3. A twin-engine Islander, or similar fixed-wing aircraft, may also be used to conduct aerial surveys in lieu of helicopter. Weather and safety permitting, aerial surveys will fly at an altitude of 305 m (1,000 ft). In the event of a marine mammal sighting, aircraft will attempt to maintain a radial distance of 457 m (1,500 ft) from the marine mammal(s). Aircraft will avoid approaching marine mammals from head-on, flying over or passing the shadow of the aircraft over the marine mammal(s). By following these operational requirements, sound levels underwater are not expected to meet or exceed NMFS harassment thresholds (Richardson et al., 1995; Blackwell et al., 2002).

Based on data collected from Apache during its survey operations conducted under the

April 2012 IHA, NMFS believes that the foregoing monitoring measures will allow Apache to identify animals nearing or entering the 160 dB zone with a reasonably high degree of effectiveness.

Reporting Measures

(1) Weekly Field Reports

During the proposed survey, the PSOs will prepare a report each day summarizing the recent results of the monitoring program. The field reports will summarize the species and numbers of marine mammals sighted. These reports will be provided to NMFS and to the survey operators on a weekly basis. At the end of each month, a summary of the weekly reports will be submitted to NMFS.

(2) Technical Report

The results of Apache's 2013 monitoring program, including estimates of "take" by harassment (based on presence in the 160 dB harassment zone), will be presented in the "90-day" and Final Technical reports. The Technical Report will include:

(a) Summaries of monitoring effort (e.g., total hours, total distances, and marine mammal distribution through the study period, accounting for sea state and other factors affecting visibility and detectability of marine mammals);

(b) Analyses of the effects of various factors influencing detectability of marine mammals (e.g., sea state, number of observers, and fog/glare);

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

(d) Analyses of the effects of survey operations;

- sighting rates of marine mammals during periods with and without seismic survey activities (and other variables that could affect detectability), such as:
- initial sighting distances versus survey activity state;
- closest point of approach versus survey activity state;
- observed behaviors and types of movements versus survey activity state;
- numbers of sightings/individuals seen versus survey activity state;
- distribution around the source vessels versus survey activity state; and
- estimates of take by harassment based on presence in the 160 dB disturbance zone.

(3) Comprehensive Report

Following the survey season, a comprehensive report describing the vessel-based, shore-based, and aerial-based monitoring programs will be prepared. The comprehensive report will describe the methods, results, conclusions and limitations of each of the individual data sets in detail. The report will also integrate (to the extent possible) the studies into a broad based assessment of industry activities, and other activities that occur in Cook Inlet, and their impacts on marine mammals. The report will help to establish long-term data sets that can assist with the evaluation of changes in the Cook Inlet ecosystem. The report will attempt to provide a regional synthesis of available data on industry activity in this part of Alaska that may influence marine mammal density, distribution and behavior.

(4) Notification of Injured or Dead Marine Mammals

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA, such as an injury (Level A harassment), serious injury or mortality (e.g., ship-strike, gear interaction, and/or entanglement), Apache will

immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinators. The report will include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

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

In the event that Apache discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), Apache will immediately report the incident to the Chief of the Permits and Conservation Division, Office of

Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinators. The report will include the same information identified in the paragraph above. Activities will be able to continue while NMFS reviews the circumstances of the incident. NMFS will work with Apache to determine whether modifications in the activities are appropriate.

In the event that Apache discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Apache will report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinators, within 24 hours of the discovery. Apache would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network.

Estimated Take of Marine Mammals

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]. Only take by Level B behavioral harassment is anticipated as a result of the proposed marine survey. Anticipated impacts to marine mammals are associated with noise propagation from the sound sources (e.g., air guns and pingers) used in the seismic survey; no take is expected to result from the detonation of explosives onshore, as

supported by the SSV study, or from vessel strikes.

Apache requests authorization to take five marine mammal species by Level B harassment. These five marine mammal species are: Cook Inlet beluga whale (Delphinapterus leucas); killer whale (Orcinus orca); harbor porpoise (Phocoena phocoena); harbor seal (Phoca vitulina richardsi), and Steller sea lion (Eumetopias jubatus).

The full suite of potential impacts to marine mammals was described in detail in the Potential Effects of the Specified Activity on Marine Mammals section found earlier in this document and in the notice of the proposed IHA (77 FR 73434, December 10, 2012). The potential effects of sound from the proposed seismic survey might include one or more of the following: tolerance; masking of natural sounds; behavioral disturbance; non-auditory physical effects; and, at least in theory, temporary or permanent hearing impairment (Richardson et al. 1995). The most common and likely impact would be from behavioral disturbance, including avoidance of the ensonified area or changes in speed, direction, and/or diving profile of the animal. Hearing impairment (TTS and PTS) are highly unlikely to occur based on the required mitigation and monitoring measures that would preclude marine mammals being exposed to noise levels high enough to cause hearing impairment.

For impulse sounds, such as those produced by air gun(s) and pingers used in the seismic survey, NMFS uses a received level of 160 dB_{rms} re 1 μPa to indicate the onset of Level B harassment. However, not all animals react to sounds at this level, and many will not show strong reactions (and in some cases any reaction) until sounds are stronger. Southall et al. (2007) provide a severity scale for ranking observed behavioral responses of both free-ranging marine mammals and laboratory subjects to various types of anthropogenic sound (see Table 4 in Southall et al. (2007)). Tables 7, 9, and 11 in Southall et al. (2007) outline the numbers of low-

frequency cetaceans, mid-frequency cetaceans, and pinnipeds in water, respectively, reported as having behavioral responses to multi-pulses in 10-dB received level increments. These tables illustrate that although some studies have found moderate responses at these levels, some show that more severe reactions did not occur until sounds were much higher than 160 dB_{rms} re 1μPa, while some also show reactions to sounds lower than 160 dB_{rms} re 1 μPa. However, Tables 9 and 11 for mid-frequency cetaceans and pinnipeds, respectively, do not report significant reactions to multiple pulse sounds below 160 dB, except one study involving whales in the Beaufort Sea – a less industrialized and sparsely populated area compared to Cook Inlet. Beluga whales in that area are not as experienced with the types and variety of sound sources as the belugas in Cook Inlet.

To estimate take by Level B harassment, Apache provided calculations for the 160-dB isopleths and then overlaid those isopleths with the density of marine mammals in the total area ensonified within those isopleths over the time of the surveys. Apache provided a full description of the methodology used to estimate takes by harassment in its IHA application (see ADDRESSES), which is also provided in the following sections. Following the publication of the Federal Register notice of the proposed IHA for Area 2, NMFS asked Apache to apply a correction factor to take estimates for beluga whales in its analysis (Hobbs et al., 2000). After receiving the new information from Apache, NMFS sent the updated density estimates to beluga whale experts at NOAA's National Marine Mammal Laboratory (NMML) for their review. NMML directed NMFS to a published habitat model developed for Cook Inlet beluga whales that was not considered by Apache and provides densities throughout the inlet based on the data from aerial surveys (Goetz et al., 2012). NMML agreed to conduct an analysis that would apply the habitat-based model to Apache's seismic survey for the purpose of estimating beluga whale

densities and takes. The results of NMML's analysis using the habitat-based model are provided below.

Basis for Estimating "Take by Harassment"

As stated previously, it is current NMFS policy to estimate take by Level B harassment for impulse sounds at a received level of 160 dB_{rms} re 1μPa. As described earlier in this notice, impulsive sounds would be generated by air gun arrays that would be used to obtain geological data during the surveys. To estimate potential takes by Level B harassment in this application, as well as for mitigation radii to be implemented by PSOs, ranges to the 160 dB_{rms} re 1 μPa isopleths were estimated at three different water depths (5 m, 25 m, and 45 m) for nearshore surveys and at 80 m for channel surveys (Tables 2 and 3).

Table 2. Distances to Sound Thresholds for Nearshore Surveys

Threshold (dB re 1 μPa)	Water Depth at Source Location (m)	Distance in the Onshore Direction (km)	Distance in the Offshore Direction (km)	Distance in the Parallel to Shore Direction (km
160	5	0.85	3.91	1.48
	25	4.70	6.41	6.34
	45	5.57	4.91	6.10
180	5	0.46	0.60	0.54
	25	1.06	1.07	1.42
	45	0.70	0.83	0.89
190	5	0.28	0.33	0.33
	25	0.35	0.36	0.44
	45	0.10	0.10	0.51

Table 3. Distances to Sound Thresholds for the Channel Surveys

Threshold (dB re 1 μPa)	Water Depth at Source Location (m)	Distance in the Broadside Direction (km)	Distance in the Endfire Direction (km)
160	80	4.24	4.89
180	80	0.91	0.98
190	80	0.15	0.18

Table 4. Areas Ensonified to 160 dB for Nearshore Surveys

Nearshore Survey Depth Classification	Depth Range (m)	Area Ensonifed to 160 dB (km^2)
Shallow	5-21	346
Mid-Depth	21-38	458
Deep	38-54	455

The areas ensonified to the 160 dB isopleth for the nearshore survey are provided in Table 4. The area ensonifed to the 160 dB isopleth for the channel survey is 389 km^2.

The notice of the proposed IHA (77 FR 73434, December 10, 2012) describes Apache's estimated densities of marine mammals that may occur in the areas where activities are planned, and areas of water that may be ensonified by pulsed sounds to ≥160 dB. The following paragraphs provide information regarding Apache's approach to correcting the density estimates for Cook Inlet beluga whales, NMML's review of the corrected densities and recommendations, and NMFS revised estimates of beluga whale densities and take estimates based on NMML's habitat-based model.

Marine mammal densities near the planned activities in Cook Inlet were estimated from the annual aerial surveys conducted by NMFS between 2000 and 2011 for Cook Inlet beluga whales (Rugh et al., 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007; Shelden et al., 2008, 2009, 2010; Hobbs et al., 2011). These surveys are flown in June to collect abundance data for beluga whales, but sightings of other marine mammals are also reported. Although these data are only collected in one month each year, these surveys provide the best available relatively long-term data set for sighting information in the proposed action area, but do not correct for missed whales or account for seasonal variations in distribution or habitat use of each species. To correct for missed whales, Apache applied the correction factor of 1.015 (CV= 3%) for the years 1994 to 1998 and 1.021 (CV=1%) for the years 1999 and 2000, which was applied in Hobbs et al.

(2000). In the subsequent annual aerial survey reports (2001 to 2011), the authors state that the correction factors are within the range for 1999 and 2000. Therefore, Apache applied the correction factor of 1.021 to all of the highest number of sightings for each year and calculated the densities and takes the same as the previous IHA.

After receiving the new information from Apache, NMFS sent the updated density estimates to beluga whale experts at NMML for their review. NMML staff indicated that Apache's calculations appeared to account for both on and off effort flight hours (instead of just on-effort hours) and had not included 1,810 km of coastline. NMML attempted to correct Apache's calculations by including on-effort survey hours and 1,810 km of coastline, but the resulting take calculations for beluga whales were grossly inaccurate and unreliable. NMML staff directed NMFS to a published habitat model developed for Cook Inlet beluga whales that provides densities throughout the inlet based on the data from aerial surveys (Goetz et al., 2012). Moreover, NMML staff agreed to conduct an independent analysis that would apply the habitat-based model to Apache's seismic survey for the purpose of estimating beluga whale densities and takes. Additional information on the habitat-based model is provided in Goetz et al., (2012). A summary of the habitat-based model and the results of NMML's analysis are provided below.

NMML developed a predictive habitat model from the distribution and group size of beluga whales observed between 1994 and 2008. A 2-part "hurdle" model (a hurdle model is a modified count model in which there are two processes, one generating the zeros and one generating the positive values) was applied to describe the physical and anthropogenic factors that influence (1) beluga presence (mixed model logistic regression) and (2) beluga count data (mixed model Poisson regression). Beluga presence was negatively associated with sources of anthropogenic disturbance and positively associated with fish availability and access to tidal flats

and sandy substrates. Beluga group size was positively associated with tidal flats and proxies for seasonally available fish. Using this analysis, Goetz et al. (2012) produced habitat maps for beluga presence, group size, and the expected number of belugas in each 1 km^2 cell of Cook Inlet.

The habitat-based model developed by NMML uses a Geographic Information System (GIS). A GIS is a computer system capable of capturing, storing, analyzing, and displaying geographically referenced information; that is, data identified according to location. NMML created a digital representations of Apache's actual anticipated 2013 marine survey area (called a shapefile), which included a 9.5 km "buffer" to represent the approximate distance from the sound source to the 160 dB isopleth. This is a smaller portion of Area 2, where Apache plans on conducting operations during the 2013 survey. When NMML staff applied their model of beluga density estimates to the 2013 survey area, they estimated that at a total of 21.5 belugas could taken by Level B harassment (Figure 1). This estimate assumed a "snap shot" survey (i.e., that the entire survey area would be ensonified at once rather than the sum of multiple track lines). In reality, the entire area will not be completely ensonfied at once, and most of the survey will occur where beluga density is extremely low or zero based on the NMML habitat model. Calculating a take or exposure level for each transect line separately and adding those up over the survey period will likely be lower (or not significantly different) than if one assumes the entire area is ensonfied at one time, particularly since the operation will only be at the "edges" for a short time where the beluga densities are highest and almost all of the estimate take occurs based on NMML's calculation. For this and other reasons explained in the notice, we believe 21.5 (22) takes is a reasonable estimate for the survey.

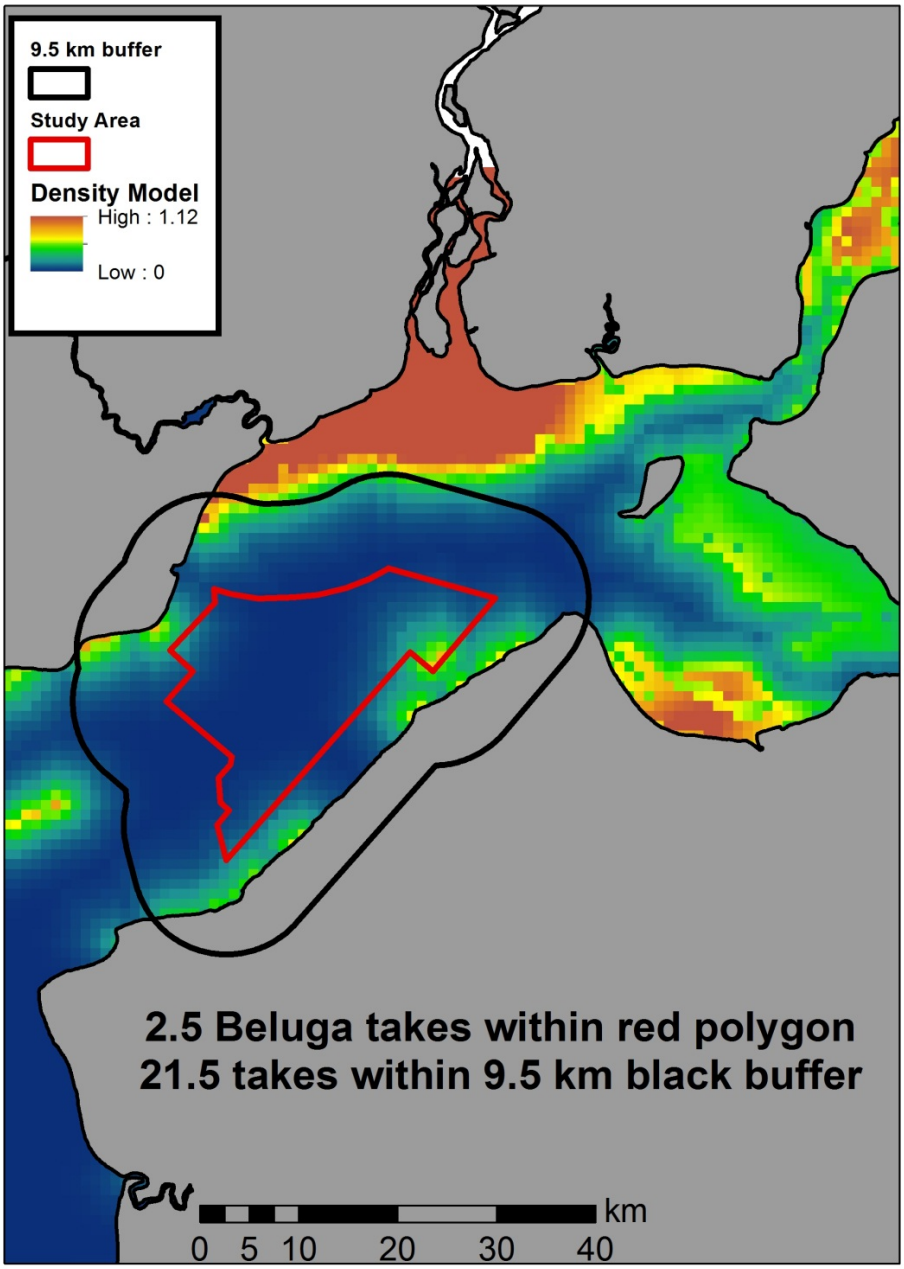

Figure 1. NMML Estimate of Beluga Density and Takes in the 2013 Survey Area

Table 5. Summary of Apache's Marine Mammal Densities

	Density (number/km^2)	
Species	Maximum	Average
Harbor seal (total number observed)	0.00644	0.00317
Harbor porpoise (total number observed)	0.00179	0.00006
Killer whale (total number observed)	0.00011	0.00001
Steller sea lion (total number observed)	0.00035	0.00011

Fifteen species of marine mammals are known to occur in Cook Inlet, but Apache only request takes by Level B harassment of five (Cook Inlet beluga whales, killer whales, harbor porpoises, harbor seals, and Steller sea lions) that are most likely to be encountered during the proposed survey. Two of the five species (Cook Inlet beluga whales and western population of Steller sea lions) are listed as endangered under the ESA.

Potential Number of Takes by Harassment

This subsection provides estimates of the number of individuals potentially exposed to sound levels ≥ 160 dB_{rms} re 1 μPa during seismic survey operations. Except for Cook Inlet beluga whales, the estimates were calculated by multiplying the expected densities by the anticipated area ensonified by levels ≥ 160 dB_{rms} re 1 μPa by the number of expected days that will be subject to seismic survey activities in the action area. As discussed above, NMML's analysis multiplied beluga whale densities from their habitat-based model by the entire 2013 survey area within Area 2. According to section 2 in Apache's IHA application, a survey crew will collect seismic data 10-12 hours per day over approximately 160 days over the course of 8 to 9 months. Apache assumes that over the course of these 160 days, 100 days would be working in the offshore region and 60 days would be working in the shallow, intermediate, and deep nearshore region. Of those 60 days in the nearshore region, 20 days would be spent

working in each of the three depths. It is important to note that environmental conditions (such as ice, wind, and fog) will play a significant role in the actual number of operating days; therefore, these are considered over estimates.

Except for Cook Inlet beluga whales, the number of estimated takes by Level B harassment was calculated using the following assumptions:

- The number of nearshore and shallow water survey days is 20 and daily acoustic footprint is 356 km^2.
- The number of nearshore and intermediate water depth survey days is 20 and daily acoustic footprint is 468 km^2.
- The number of nearshore and deep water depth survey days is 20 days and daily acoustic footprint is 455 km^2.
- The number of offshore survey days is 100 and daily acoustic footprint is 389 km^2.

The probability of sightings for harbor seals and Steller sea lions is higher than what is anticipated because there are no haul-out sites within the action area. These density estimates are skewed by the numbers observed in large haul outs during aerial surveys. Seals in the water usually travel in small groups or as single individuals; therefore, although Table 3 indicates an average of 204 and maximum of 414 seals to be observed, it is highly unlikely that those number of seals will actually be taken by harassment during the proposed seismic survey.

Similarly, the number of actual takes by Level B harassment of Steller sea lions is expected to be much lower than the average of seven and maximum of 22. During the NMFS aerial surveys, no Steller sea lions were observed in upper Cook Inlet. Less than five Steller sea

lions have been observed by the Port of Anchorage monitoring program, and those observed have been juvenile animals (likely male). According to Apache's final report submitted under the 2012 IHA, only four Steller sea lions were observed during seismic survey operations conducted between May 6 and September 30, 2012. Therefore, Apache anticipates that there will be less than five Steller sea lions in the proposed action area during the effective period of the IHA.

The average and maximum observations for harbor porpoise and killer whales shown in Table 6 appear to be reasonable based on the NMFS aerial surveys, although the actual number of animals is expected to be low.

The NMML analysis found that a total of 21.5 Cook Inlet beluga whales in the 2013 survey area within Area 2 could be taken by Level B harassment over the course of the seismic survey. NMFS recognizes that the NMML analysis has limitations, including calculating take based on the expected project area rather than on a transect-by-transect basis, relying on data from the June beluga surveys, and not accounting for the fact that operations shut down if animals are observed within or approaching the 180 dB safety zone. However, estimating the number of belugas that actually will be exposed to 160 dB is difficult and imprecise by nature and NMFS believes that the NMML estimate is reasonably accurate. In addition, it is important to note that a combination of factors - including extensive visual and acoustic monitoring used throughout this project, particularly for sighting beluga whales approaching the area – are expected to result in the actual number of takes being no higher than (and likely, much lower than) the NMML estimates. Furthermore, based on the time it took to complete the previous year's survey, the total number of days surveying that will actually occur is likely to be much lower than the 160 days used to estimate total takes over the duration of the survey; therefore,

this take estimate is likely to be conservative. Finally, NMFS will require that seismic survey operations involving the use of air guns and pingers cease if 30 beluga whales are detected in the Level B harassment zone and Apache must immediately report to NMFS if 25 belugas are detected in that zone to allow us to consider making any necessary adjustments to monitoring and mitigation. As a result, due to the actual number of days and hours Apache is likely to be operating air guns near river mouths and taking into account the monitoring and mitigation measures applicable when operating seismic survey equipment near rivers, Apache expects the actual number of takes by Level B harassment estimated for Cook Inlet beluga whales to be no higher than (and likely much lower than) the numbers provided in the NMML analysis. This conclusion is also supported by (1) the survey's avoidance of areas of high beluga density in late spring and summer when most of Apache's surveying effort is expected to occur; (2) the availability of alternative, suitable beluga habitat outside of the areas ensonified to 160 dB; (3) the beluga's tendency to avoid local noise sources when alternative, suitable habitat is available and they lack motivation to remain; and (4) the experience of Apache's survey operations in 2012, in which no observed takes of belugas occurred.

Table 6. Probability of Sightings per Species for Year 2

	Shallow (356 km^2)		Intermediate (458 km^2)		Deep (455 km^2)		Offshore (389 km^2)		Total	
	20 days		20 days		20 days		100 days		160 days	
Species	max	avg	max	avg	max	avg	max	avg	max	avg
Harbor seals	45.9	22.6	59.0	29.0	58.6	28.9	250.5	123.4	414	203.8
Harbor porpoises	12.8	0.4	16.4	0.6	16.3	0.6	69.7	2.4	115.2	4.0
Killer whales	0.8	0.1	1.0	0.1	1.0	0.1	4.3	0.6	7.2	1.0
Steller sea lions	2.5	0.8	3.2	1.1	3.2	1.0	13.6	4.5	22.5	7.4

Estimated Take Conclusions

Cetaceans—Effects on cetaceans are generally expected to be restricted to avoidance of

an area around the seismic survey and short-term changes in behavior, falling within the MMPA definition of "Level B harassment."

The requested take numbers of individual cetaceans represent varying proportions of the populations of each species in Cook Inlet (Table 7). For Cook Inlet beluga whales, Apache requested 30 takes by Level B harassment. The authorized number of 30 beluga whale takes is based on NMML's estimate of 22 whales, which was adjusted by the average group size of approximately 8 whales reported during the 2012 seismic survey to account for the fact that these whales often travel in groups. This number is approximately 10 percent of the population of approximately 312 animals (Shelden et al., 2012). NMFS will require Apache to immediately contact the Office of Protected Resources if 25 belugas are detected in either the disturbance zone or the safety zone to discuss the need to make modifications to the monitoring and mitigation. If 30 belugas are detected in the disturbance zone, seismic survey operations involving the use of air guns and pingers must cease. For other cetaceans that might occur in the vicinity of the seismic survey in Cook Inlet, the requested takes represent an even smaller percentage of their respective populations. The requested takes of 10 killer whales and 20 harbor porpoises represent 0.89 percent and 0.06 percent of their respective populations in the proposed action area.

Pinnipeds—Two pinniped species may be encountered in the proposed action area, but the harbor seal is likely to be the more abundant species in this area. The number of takes requested for individuals exposed to sounds at received levels $\geq$160 dB_{rms} re 1 µPa during the proposed seismic survey are as follows: harbor seals (200) and Steller sea lions (20). These numbers represent 0.69 percent and 0.12 percent of their respective populations in the proposed action area.

Table 7. Authorized Number of Takes

Species	Number of Authorized Takes	Population Abundance	Percent of Population
Beluga whales	30	312	9.6
Harbor seals	200	29,175	0.69
Harbor porpoises	20	31,406	0.06
Killer whales	10	1,437	0.89
Steller sea lions	20	41,197	0.12

Determinations

Negligible Impact

NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival." In making a negligible impact determination, NMFS considers a variety of factors, including but not limited to: (1) the number of anticipated mortalities; (2) the number and nature of anticipated injuries; (3) the number, nature, intensity, and duration of Level B harassment; and (4) the context in which the takes occur.

Given the required mitigation and related monitoring, no injuries or mortalities are anticipated to occur as a result of Apache's proposed seismic survey in Cook Inlet, and none are proposed to be authorized. Additionally, animals in the area are not expected to incur hearing impairment (i.e., TTS or PTS) or non-auditory physiological effects. The small number of takes that are anticipated are expected to be limited to short-term Level B behavioral harassment. Although it is possible that some marine mammal individuals may be exposed to sounds from seismic survey activities more than once, the duration of these multi-exposures is expected to be low since both the animals and the survey vessels will be moving constantly in and out of the

survey area and the seismic air guns do not operate continuously all day, but for a few hours at a time totaling about 12 hours a day.

Odontocete (including Cook Inlet beluga whales, killer whales, and harbor porpoises) reactions to seismic energy pulses are usually assumed to be limited to shorter distances from the air gun(s) than are those of mysticetes, in part because odontocete low-frequency hearing is assumed to be less sensitive than that of mysticetes. When in the Canadian Beaufort Sea in summer, belugas appear to be fairly responsive to seismic energy, with few being sighted within 6–12 mi (10–20 km) of seismic vessels during aerial surveys (Miller et al. 2005). However, as noted above, Cook Inlet belugas are more accustomed to anthropogenic sound than beluga whales in the Beaufort Sea. Accordingly, NMFS does not find this data determinative here. Also, due to the dispersed distribution of beluga whales in Cook Inlet during winter and the concentration of beluga whales in upper Cook Inlet from late April through early fall, belugas would likely occur in small numbers in the phase two survey area during the survey period and few will likely be affected by the survey activity in a manner that would be considered behavioral harassment. In addition, due to the constant moving of the survey vessel, the duration of the noise exposure by cetaceans to seismic impulse would be brief. For the same reason, it is unlikely that any individual animal would be exposed to high received levels multiple times.

Taking into account the mitigation measures that are planned, effects on cetaceans are generally expected to be restricted to avoidance of a limited area around the survey operation and short-term changes in behavior, falling within the MMPA definition of "Level B harassment". Animals are not expected to permanently abandon any area that is surveyed, and any behaviors that are interrupted during the activity are expected to resume once the activity moves away from the area. Only a very small portion of marine mammal habitat will be affected at any time, and

other areas within Cook Inlet will be available for necessary biological functions. In addition, the area where the survey will take place is not known to be an important location where beluga whales congregate for feeding, calving, or nursing.

Furthermore, while the estimated amount of take is not the principal factor in NMFS' negligible impact analysis, the estimated numbers of animals potentially exposed to sound levels sufficient to cause Level B harassment are low percentages of the population sizes in Cook Inlet, as shown in Table 7.

Mitigation measures such as controlled vessel speed, dedicated marine mammal observers, non-pursuit, and shut downs or power downs when marine mammals are seen within defined ranges will further reduce short-term reactions and minimize any effects on hearing sensitivity. In all cases, the effects of the seismic survey are expected to be short-term, with no lasting biological consequence. Therefore, the exposure of cetaceans to sounds produced by the phase two seismic survey is not anticipated to have an effect on annual rates or recruitment or survival.

Some individual pinnipeds may be exposed to sound from the proposed marine surveys more than once during the time frame of the project. However, as discussed previously, due to the constant moving of the survey vessel, the probability of an individual pinniped being exposed to sound multiple times is much lower than if the source is stationary. Taking into account the mitigation measures that are planned, effects on pinnipeds are generally expected to be restricted to avoidance of a limited area around the survey operation and short-term changes in behavior, falling within the MMPA definition of "Level B harassment". Animals are not expected to permanently abandon any area that is surveyed, and any behaviors that are interrupted during the activity are expected to resume once the activity moves out of the area. Only a very small

portion of marine mammal habitat will be affected at any time, and other areas within Cook Inlet will be available for necessary biological functions. In addition, the area where the survey will take place is not known to be an important location where pinnipeds haulout. The closest known haulout site is located on Kalgin Island, which is about 22 km from the McArthur River. Therefore, NMFS has determined that the exposure of pinnipeds to sounds produced by the proposed seismic survey in Cook Inlet is not expected to result in more than Level B harassment and will not have an adverse effect on annual rates of recruitment or survival. Therefore, it is anticipated to have no more than a negligible impact on the animals.

Potential impacts to marine mammal habitat were discussed previously in this document (see the "Anticipated Effects on Habitat" section). Although some disturbance is possible to food sources of marine mammals, the impacts are anticipated to be minor enough as to not affect rates of recruitment or survival of marine mammals in the area. Based on the size of Cook Inlet where feeding by marine mammals occurs versus the localized area of the marine survey activities, any missed feeding opportunities in the direct project area would be minor based on the fact that other feeding areas exist elsewhere.

Small Numbers

The requested takes authorized under the MMPA represent 9.6 percent of the Cook Inlet beluga whale population of approximately 312 animals (Shelden et al., 2012), 0.89 percent of the combined Alaska resident stock and Gulf of Alaska, Aleutian Island and Bering Sea stock of killer whales (1,123 residents and 314 transients), and 0.06 percent of the Gulf of Alaska stock of approximately 31,046 harbor porpoises. The take requests presented for harbor seals represent 0.69 percent of the Gulf of Alaska stock of approximately 29,175 animals. The requested takes proposed for Steller sea lions represent 0.12 percent of the western stock of approximately

41,197 animals. These take estimates represent the percentage of each species or stock that could be taken by Level B behavioral harassment if each animal is taken only once. The number of marine mammals taken is small relative to the affected species or stocks. In addition, while NMFS' small numbers determination is based on the authorized amount of take, the mitigation and monitoring measures (described previously in this document) in the IHA are expected to prevent take from exceeding the amounts authorized and likely to reduce even further any potential disturbance to marine mammals.

Conclusion

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 mitigation and monitoring measures, NMFS finds that the total taking from Apache's proposed seismic survey in Cook Inlet will have a negligible impact on the affected species or stocks. NMFS also finds that small numbers of marine mammals will be taken relative to the populations of the affected species or stocks.

Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses

Section 101(a)(5)(D) also requires NMFS to determine that the authorization will not have an unmitigable adverse effect on the availability of marine mammal species or stocks for subsistence use. NMFS has defined "unmitigable adverse impact" in 50 CFR 216.103 as: an impact resulting from the specified activity: (1) That is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by: (i) Causing the marine mammals to abandon or avoid hunting areas; (ii) Directly displacing subsistence users; or (iii) Placing physical barriers between the marine mammals and the subsistence hunters; and (2) That cannot be sufficiently mitigated by other measures to increase the availability of marine

mammals to allow subsistence needs to be met.

The subsistence harvest of marine mammals transcends the nutritional and economic values attributed to the animal and is an integral part of the cultural identity of the region's Alaska Native communities. Inedible parts of the whale provide Native artisans with materials for cultural handicrafts, and the hunting itself perpetuates Native traditions by transmitting traditional skills and knowledge to younger generations (NOAA 2007). However, due to dramatic declines in the Cook Inlet beluga whale population, on May 21, 1999, legislation was passed to temporarily prohibit (until October 1, 2000) the taking of Cook Inlet belugas under the subsistence harvest exemption in section 101(b) of the MMPA without a cooperative agreement between NMFS and the affected Alaska Native Organizations (ANOs) (Public Law No. 106-31, section 3022, 113 Stat. 57,100). That prohibition was extended indefinitely on December 21, 2000 (Public Law No. 106-553, section 1(a)(2), 114 Stat. 2762). NMFS subsequently entered into six annual co-management agreements (2000-2003, 2005-2006) with the Cook Inlet Marine Mammal Council, an ANO representing Cook Inlet beluga hunters, which allowed for the harvest of 1-2 belugas. On October 15, 2008, NMFS published a final rule that established long-term harvest limits on the Cook Inlet beluga whales that may be taken by Alaska Natives for subsistence purposes (73 FR 60976). That rule prohibits harvest for a 5-year period (2008-2012), if the average abundance for the Cook Inlet beluga whales from the prior five years (2003-2007) is below 350 whales. The next 5-year period that could allow for a harvest (2013-2017), would require the previous five-year average (2008-2012) to be above 350 whales.

There is a low level of subsistence hunting for harbor seals in Cook Inlet. Seal hunting occurs opportunistically among Alaska Natives who may be fishing or travelling in the upper Inlet near the mouths of the Susitna River, Beluga River, and Little Susitna River. Consistent with NMFS'

implementing regulations, Apache met with the Cook Inlet Marine Mammal Council (CIMMC) – a now dissolved ANO that represented Cook Inlet tribes - on March 29, 2011, to discuss the proposed activities and discuss any subsistence concerns. Apache also met with the Tyonek Native Corporation on November 9, 2010 and the Salamatof Native Corporation on November 22, 2010. Additional meetings were held with the Native Village of Tyonek, the Kenaitze Indian Tribe, and Knik Tribal Council, and the Ninilchik Traditional Council. According to Apache, during these meetings, no concerns were raised regarding potential conflict with subsistence harvest of marine mammals. Apache has identified the following features that are intended to reduce impacts to subsistence users:

- In-water seismic activities will follow mitigation procedures to minimize effects on the behavior of marine mammals and, therefore, opportunities for harvest by Alaska Native communities; and
- Regional subsistence representatives may support recording marine mammal observations along with marine mammal biologists during the monitoring programs and will be provided with annual reports.

Since the issuance of the April 2012 IHA, Apache has maintained regular and consistent communication with federally recognized Alaska Natives. The Alaska Natives, Native Corporations, and ANOs that Apache has communicated with include: the Native Village of Tyonek; Tyonek Native Corporation; Ninilchik Native Association; Ninilchik Traditional Council; Salamatof Native Association; Knikatnu; Knik Native Council; Alexander Creek; Cook Inlet Region, Inc.; the Native Village of Eklutna; Kenaitze Indian Tribe; and Seldovia Native Assocaition. Apache has shared information gathered during the seismic survey conducted under the April 2012 IHA, and plans on hosting an information exchange with Alaska Native

Villages, Native Corporations, and other Non-Governmental Organizations in the spring of 2013 where data from the past year's monitoring operations would be presented.

Apache concluded, and NMFS agrees, that the size of the affected area, mitigation measures, and input from the consultations Alaska Natives should result in the proposed action having no effect on the availability of marine mammals for subsistence uses. Apache and NMFS recognize the importance of ensuring that ANOs and federally recognized tribes are informed, engaged, and involved during the permitting process and will continue to work with the ANOs and tribes to discuss operations and activities.

On February 6, 2012, in response to requests for government-to-government consultations by the CIMMC and Native Village of Eklutna, NMFS met with representatives of these two groups and a representative from the Ninilchik. We engaged in a discussion about the proposed IHA for Area 1, the MMPA process for issuing an IHA, concerns regarding Cook Inlet beluga whales, and how to achieve greater coordination with NMFS on issues that impact tribal concerns. Following the publication of the proposed IHA, NMFS contacted the local Native Villages to inform them of the availability of the Federal Register notice and the opening of the public comment period. During the public comment period, NMFS received letters from two tribes – the Kenaitze Indian Tribe and the Seldovia Village Tribe – which were addressed in the Comment and Responses section of this notice.

NMFS anticipates that any effects from Apache's proposed seismic survey on marine mammals, especially harbor seals and Cook Inlet beluga whales, which are or have been taken for subsistence uses, would be short-term, site specific, and limited to inconsequential changes in behavior and mild stress responses. NMFS does not anticipate that the authorized taking of affected species or stocks will reduce the availability of the species to a level insufficient for a

harvest to meet subsistence needs by: (1) Causing the marine mammals to abandon or avoid hunting areas; (2) directly displacing subsistence users; or (3) placing physical barriers between the marine mammals and the subsistence hunters; and that cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met. Therefore, NMFS has determined that the proposed regulations will not have an unmitigable adverse impact on the availability of marine mammal stocks for subsistence uses.

Endangered Species Act (ESA)

There are two marine mammal species listed as endangered under the ESA with confirmed or possible occurrence in the proposed project area: the Cook Inlet beluga whale and Steller sea lion. In addition, the proposed action would occur within designated critical habitat for the Cook Inlet beluga whales. NMFS' Permits and Conservation Division consulted with NMFS' Alaska Region Protected Resources Division under section 7 of the ESA on the issuance of the first IHA to Apache under section 101(a)(5)(D) of the MMPA, which analyzed the impacts in the other areas where Apache's has proposed to conduct seismic surveys, including Area 2. On May 21, 2012, NMFS' Alaska Region issued a revised biological opinion, which concluded that the IHA is not likely to jeopardize the continued existence of the marine mammal species (such as Cook Inlet beluga whales and Steller sea lions) affected by the seismic survey or destroy or adversely modify designated critical habitat for Cook Inlet beluga whales. Although the biological opinion considered the effects of multiple years of seismic surveying in the entire project area as a whole, see figure 6 of the biological opinion, to be cautious in light of the change in scope, NMFS' Permits and Conservation Division requested reinitiation of consultation under Section 7 of the ESA to address these changes in the proposed action. A new Biological Opinion was issued on February 14, 2012. The Biological Opinion determined that

the issuance of IHA is not likely to jeopardize the continued existence of the Cook Inlet beluga whales or the western DPS of Steller sea lions, or destroy or adversely modify Cook Inlet beluga whale critical habitat. Finally, the Biological Opinion includes an Incidental Take Statement (ITS) for Cook Inlet beluga whales and Steller sea lions. The ITS contains reasonable and prudent measures implemented by terms and conditions to minimize the effects of this take.

National Environmental Policy Act (NEPA)

NMFS prepared an Environmental Assessment to determine whether this proposed activity will have a significant effect on the human environment. This analysis was completed prior to the issuance the IHA with NMFS' issuance of a Finding of No Significant Impact (FONSI).

Authorization

NMFS has issued an incidental harassment authorization for the take of marine mammals incidental to Apache's seismic survey in Cook Inlet, Alaska, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: February 20, 2013.

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Helen M. Golde,
Acting Director,
Office of Protected Resources,
National Marine Fisheries Service.

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