ALASKA WILDERNESS LEAGUE—AUDUBON ALASKA—CENTER FOR BIOLOGICAL DIVERSITY—EARTHJUSTICE—NATURAL RESOURCES DEFENSE COUNCIL—NORTHERN ALASKA ENVIRONMENTAL CENTER—OCEAN CONSERVATION RESEARCH—PACIFIC ENVIRONMENT—SIERRA CLUB—WORLD WILDLIFE FUND

September 17, 2012

VIA EMAIL

Michael Payne, Chief
Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225
E: itp.guan@noaa.gov

Re: Taking Marine Mammals Incidental to Marine Seismic Survey in the Beaufort and Chukchi Seas, Alaska, 77 Fed. Reg. 49,921 (August 17, 2012)

Dear Mr. Payne:

The undersigned groups submit the following comments on the National Marine Fisheries Service's ("NMFS") August 17, 2012, issuance of a proposed incidental harassment authorization ("IHA") pursuant to the Marine Mammal Protection Act ("MMPA").[1] NMFS proposes to allow the incidental take by Level B harassment of nine marine mammal species and by Level A harassment of three marine mammal species resulting from ION Geophysical's ("ION's") seismic survey activities in the Beaufort and Chukchi seas that are scheduled to begin in October 2012. NMFS should deny ION's application.

ION's proposal is remarkable for both its scope and timing. ION intends to use a survey vessel equipped with a 26-gun array with a total volume of 4,450 cubic inches. Not only is this an incredibly powerful array, but the surveying will take place across a large portion of the Alaskan Beaufort and Chukchi seas, with transect lines of approximately 7,175 kilometers (4,458 miles). The total area of water exposed to sounds greater than or equal to 160 dB will be 209,752 square kilometers. ION will survey for 76 days, beginning in October and lasting into December, when the Arctic is subject to increasing darkness, inclement weather, rough seas, and encroaching ice. As a consequence of the timing, the survey vessel is to be accompanied by an icebreaker, adding further to the disturbance.

[1] A compact disc of the sources cited in this letter has been provided separately to NMFS. NMFS should consider the sources provided on the compact disc in assessing ION's application, and the sources should be included in the administrative record for the IHA decision.

A large seismic airgun array can produce effective peak pressures of sound higher than those of virtually any other man-made source save explosives;[2] and although airguns are vertically oriented within the water column, horizontal propagation is so significant as to make them, even under present use, one of the leading contributors to low-frequency ambient noise thousands of miles from any given survey.[3] Indeed, the enormous scale of this acoustic footprint has now been confirmed by studies of seismic sound in numerous regions around the globe, including the Arctic, the northeast Atlantic, Greenland, and Australia.[4]

This proposed IHA for ION puts vital marine mammal species at risk. It does not represent sound, science-based management of the crucial resources NMFS is charged with overseeing. The proposal is not precautionary, does not utilize the best available science, and would, if finalized, violate the MMPA in the following three ways:

- ION's proposed survey has the potential to result in "serious injury" by causing permanent hearing loss in marine mammals in clear violation of regulations implementing the MMPA that prohibit the issuance of an IHA for activity that has even the potential to result in serious injury to marine mammals.

- ION's survey would result in harassment takes of a large number of marine mammals, in violation of the "small numbers" requirement of the MMPA. NMFS proposes to authorize the harassment of over 250 bowhead whales, almost 5,000 beluga whales (12.45% of the population), and over 60,000 seals (24% of the population). These estimates on their own are not small numbers, and it is likely that NMFS has underestimated potential take based on improper threshold and density calculations that do not utilize the best available science.

- ION's proposed survey has the potential to have more than a negligible impact on populations of marine mammals, in violation of the MMPA. NMFS has underestimated the impacts of stress as well as the impacts of airguns on bowhead whale populations and has not even considered cumulative impacts.

Additionally, there is a great deal of uncertainty regarding population levels of marine mammals expected to be present during the fall and winter season in the Beaufort and Chukchi seas, as well as the long-term biological impacts of sound on those marine mammals. Due to this uncertainty, it is possible that the effects of ION's proposed surveying could be greater than those assessed in the proposed IHA and could affect far greater numbers of marine mammals than NMFS has estimated in the proposed IHA.

In light of these and other flaws discussed below, NMFS should not, and cannot consistent with the MMPA, issue the IHA as currently proposed.

---

[2] *See* National Research Council ("NRC"), *Ocean Noise and Marine Mammals* (2003).
[3] Nieukirk, S.L., K.M., Stafford, D.K. Mellinger, R.P. Dziak, and C.G. Fox, Low-frequency whale and seismic airgun sounds recorded in the mid-Atlantic Ocean, *Journal of the Acoustical Society of America* 115(4):1832-1843 (2004).
[4] *See* discussion, *infra* at Section I(B)(1), related to the 160dB threshold for pulsed sounds.

I. THE PROPOSED AUTHORIZATION DOES NOT COMPLY WITH THE MARINE MAMMAL PROTECTION ACT

NMFS's proposed authorization to ION does not comply with the requirements of the MMPA. Congress enacted the MMPA in 1972 in response to widespread concern that "certain species and population stocks of marine mammals are, or may be, in danger of extinction or depletion as a result of man's activities[.]"[5] The legislative history states that the purpose of the MMPA is to manage marine mammals "for their benefit and not for the benefit of commercial exploitation."[6] The primary mechanism by which the MMPA protects marine mammals is through a moratorium on takings.[7] Under the MMPA, the term "take" is broadly defined to mean "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal."[8] "Harassment" is further defined to include acts of "torment" or "annoyance" that have the "potential" to injure a marine mammal or marine mammal stock in the wild or have the potential to "disturb" them "by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering."[9]

The MMPA provides several narrow exceptions to the moratorium on take. Relevant here, NMFS may, upon request, authorize take in the form of harassment by an IHA for a period of not more than one year, provided certain conditions are met. An activity: (i) must be "specified" and limited to a "specific geographical region," (ii) must result in the incidental take of only "small numbers of marine mammals of a species or population stock," (iii) can have no more than a "negligible impact" on species and stocks, and (iv) cannot have "an unmitigatable adverse impact on the availability of such species or stock for taking for subsistence uses" by Alaska Natives.[10] In issuing an authorization, NMFS must provide for the monitoring and reporting of such takings and must prescribe methods and means of effecting the "least practicable impact" on the species or stock and its habitat.[11] Finally, for an IHA to issue, the activity cannot have the "*potential* to result in serious injury or mortality[.]"[12] As discussed below, NMFS has not demonstrated that the proposed IHA will meet the standards imposed by the MMPA and its governing regulations.

A. NMFS Cannot Issue an IHA Because ION's Activities Have the Potential to Result in Serious Injury of Marine Mammals

The standard for determining whether an IHA is appropriate is exceptionally protective. Generally, IHAs are limited to activities that will result in only the "taking by harassment" of marine mammals.[13] For those activities that could result in "taking" other than by harassment, interested parties must continue to use the pre-existing procedures for authorization through

[5] 16 U.S.C. § 1361(1).
[6] H. R. Rep. No. 92-707, at 11 (1971), reprinted in 1972 U.S.C.C.A.N. 4144, 4154.
[7] 16 U.S.C. § 1371(a).
[8] *Id*. §1362(13).
[9] *Id*. § 1362(18); *see also* 50 C.F.R. § 216.3 (defining "Level A" and "Level B" harassment).
[10] *See* 16 U.S.C. § 1371(a)(5)(D)(i).
[11] *Id*. § 1371(a)(5)(D)(ii)(I).
[12] 50 C.F.R. § 216.107 (emphasis added).
[13] 16 U.S.C. § 1371(a)(5)(D)(i).

specific regulations, often referred to as "five-year regulations."[14] NMFS's IHA regulations for the Arctic provide further that an IHA cannot be used for "activities that have the *potential* to result in serious injury or mortality[.]"[15] NMFS has explained that if there is even the possibility of serious injury, NMFS must establish that the "potential for serious injury can be *negated* through mitigation requirements[.]"[16] Otherwise, the applicant must seek authorization through five-year regulations.

Historically, NMFS has employed thresholds of 180dB for cetaceans and 190dB for pinnipeds to estimate take by Level A harassment or injury.[17] As a precautionary measure, NMFS has usually established mitigation requirements to ensure that cetaceans and pinnipeds avoid exposure to these levels of sound by establishing an exclusion zone within the 180/190 dB exposure area.[18] In this instance, ION is proposing to conduct survey activities during the late fall and winter months, under conditions of considerable darkness and ice cover. NMFS has acknowledged that ION's mitigation measures will not keep marine mammals out of the 180/190dB danger zone. However, rather than denying the IHA, as NMFS should, NMFS attempts to rationalize why, notwithstanding the fact that marine mammals will enter the danger zone, none have the potential to suffer serious injury, and it is appropriate to issue the IHA here.

The rationales NMFS advances in support of this conclusion are flawed, contrary to available evidence, and arbitrary. First, although NMFS admits animals will suffer permanent hearing loss, also termed permanent threshold shift ("PTS"), it concludes, in an unsupported departure from prior practice, that PTS does not constitute serious injury. Second, it asserts that both temporary and permanent hearing loss occur at higher levels of noise than the best available science supports. Third, in another unsupported departure from past practice, it asserts that 90% of the animals that enter the 180/190 dB zones will escape injury because they will not be exposed to sound for long enough or will avoid the loudest sources of noise; but available data undermine those assumptions. ION's survey and associated activities carry the potential to cause serious injury to marine mammals, and the proposed IHA does not negate the potential for such injury. NMFS's proposal thus violates the MMPA and its implementing regulations.

---

[14] *See id*. § 1371(a)(5)(A).
[15] 50 C.F.R. § 216.107 (emphasis added).
[16] 60 Fed. Reg. 28,379, 28,380 (May 31, 1995) (emphasis added).
[17] *See, e.g.*, 77 Fed. Reg. 49,921, 49, 946 (Aug. 17, 2012) ("[I]t is current NMFS practice to estimate take by Level A harassment for received levels above 180 dB re 1µPa (rms) for cetaceans and 190 dB re 1µPa (rms) for pinnipeds."); 77 Fed. Reg. 25,830, 25,842 (May 1, 2012) ("The distances to received levels of 180 dB and 190 dB re 1 µPa (rms) are mainly relevant as exclusion radii to avoid level A harassment of marine mammals through implementation of shut down and power down measures.").
[18] *Id*.; *see also* 77 Fed. Reg. 50,290, 50,313 (Aug. 20, 2012) ("In our 2002 and 2007 rules, we, along with the Navy, based their estimate of take by injury or the significant potential for such take (Level A harassment) on the criterion of 180–dB. We continue to believe this is a scientifically supportable and conservative value for preventing auditory injury or the significant potential for such injury (Level A harassment), as it represents a value less than where the potential onset of a minor temporary threshold shift in hearing might occur based on Schlundt *et al.'s* (2000) research.").

1. Permanent Hearing Loss Constitutes Serious Injury for Marine Mammals

NMFS has recognized in the past that permanent hearing loss or permanent threshold shift in marine mammals should be considered a serious injury. In promulgating the regulations that govern IHAs in the Arctic, NMFS asserted that permanent hearing loss qualifies as serious injury and that activities that cause permanent threshold shift are not appropriate for authorization through an IHA:

> Serious injury for marine mammals, such as permanent hearing or eyesight loss, or severe trauma, could lead fairly quickly to the animal's death. . . . [I]f an application indicates that an acoustic source at its maximum output level has the potential to cause a temporary threshold shift in a marine mammal's hearing ability, that taking would constitute a "harassment" take, since the animal's hearing ability would recover and the [IHA] application would be appropriate. However, if the acoustic source at its maximum level had the potential to cause a permanent threshold shift in a marine mammal's hearing ability, that activity would be considered to be capable of causing serious injury to a marine mammal and would therefore *not be appropriate* for an incidental harassment authorization.[19]

ION's survey and associated activities carry the potential to cause serious injury to marine mammals through permanent hearing loss.

For its seismic survey, ION proposes using two towed arrays consisting of 26 active airguns with a total discharge volume of 4,450 cubic inches.[20] The estimated zero-to-peak source pressure level at 1 meter for each pulse is estimated at 250 dB and the sound exposure level for the full array is estimated to be 229 dB at 1 meter from the source.[21] In the proposed IHA, NMFS states it is assumed that permanent hearing loss or PTS can occur either from a single exposure at a received sound level higher than that necessary to inflict a temporary threshold shift ("TTS") or by repeated exposure to levels that cause a TTS.[22] ION's mitigation and monitoring is designed largely to prevent marine mammals from being exposed to sound levels in excess of 180 dB (for cetaceans) and 190 dB (for pinnipeds) through the use of visual observers, safety zones and ramp up procedures.[23]

NMFS acknowledges, correctly, that darkness and ice cover will limit the effectiveness of ION's mitigation and monitoring efforts. Although ION's mitigation measures include the use of night-vision devices ("NVDs") and a thermal imaging (FLIR) camera to assist the monitoring by observers in darkness and poor visibility, NMFS states "NVDs are not nearly as effective as visual observation during daylight hours."[24] Further, NMFS adds that both NVDs

[19] 60 Fed. Reg. 28,379, 28,380-81 (emphasis added).
[20] 77 Fed. Reg. 49,921, 49,923.
[21] Request by ION Geophysical for an Incidental Harassment Authorization to Allow the Incidental Take of Marine Mammals during a Marine Seismic Survey in the Arctic Ocean, October-December, 2012, Appendix B at 108 (revised June 2012).
[22] 77 Fed. Reg. at 49,928-29; 49,956.
[23] *Id*. at 49,936-37.
[24] *Id*. at 49,940.

and FLIR monitoring "remain relatively unproven in regards to their effectiveness under the conditions and i[n] the manner of use planned for this survey."[25] Accordingly, NMFS determined that Level A takes by PTS—takes that cause injury through permanent hearing loss—"*could occur*" "as the proposed monitoring and mitigation measures may not be 100% effective due to ice coverage and long periods of darkness."[26]

Rather than denying the application because the potential for permanent threshold shift—and serious injury—cannot be negated here, NMFS proposes to authorize it in this IHA.[27] It attempts to justify the decision by downplaying the seriousness of potential injury and stating that the degree of PTS is expected to be "minor" because it would only cause a small amount of hearing loss ("a few dBs of loss at certain frequencies").[28] This assertion—which is unsupported and unexplained—is a dramatic departure from NMFS's position that permanent hearing loss (of any degree) constitutes "serious injury." It also directly conflicts with NMFS's own assessment of the science. In response to comments regarding the taking of marine mammals incidental to Navy activities in 2001, NMFS stated that "It is simply not possible at this time to make a scientific judgment about the severity of different degrees of permanent hearing loss in marine mammals with the present state of scientific knowledge."[29] Similarly, NMFS acknowledged in policy guidance issued this year that uncertainty prevents NMFS from determining what types of noise-related injuries should be considered serious because "NMFS scientists making injury determinations are unlikely to detect noise-related injuries in live animals and because the state of science on identifying noise-related injuries in live marine mammals is still developing."[30]

It is undisputed that sound is a fundamental element of the marine environment. Whales, fish, and other wildlife depend on it for breeding, feeding, navigating, and avoiding predators—in short, for their survival and reproduction. Scientists recognize that permanent hearing loss can indirectly result in mortality by limiting feeding opportunities and reducing a marine mammal's ability to detect prey.[31] No amount of hearing loss is minor for a marine mammal, as NMFS itself has recognized. NMFS must deny ION's application because the activities have at the very least the potential to result in serious injury.

---

[25] *Id*.
[26] *Id*. at 49,946. *See also id*. at 49,956 (acknowledging that PTS may possibly occur as a result of ION's activity).
[27] *Id*.
[28] *Id*. at 49,954.
[29] 66 Fed. Reg. 22,450, 22,453 (May 4, 2001).
[30] NMFS, Guidelines for Distinguishing Serious from Non-Serious Injury of Marine Mammals Pursuant to the Marine Mammal Protection Act at 3 (Jan. 27, 2012).
[31] Wood, J., B.L. Southall, and D.J. Tollit, PG&E offshore 3-D Seismic Survey Project EIR – Marine Mammal Technical Draft Report. SMRU Ltd. at 24 (2012) ("PG&E Seismic Survey Project"); Marine Mammal Commission ("MMC"), *Marine Mammals and Noise: A Sound Approach to Research and Management* at 13 (March 2007) ("[B]ecause of the importance of sound in the daily lives of marine mammals, even temporary threshold shifts have the potential to increase an animal's vulnerability to predation, reduce its foraging efficiency, or impede its communication."); NRC, *Marine Mammal Populations and Ocean Noise: Determining when Noise Causes Biologically Significant Effects* at 31 (2005) ("Changes in hearing threshold, even TTSs, have the potential to affect population vital rates through increased predation or decreased foraging sources of individual animals that experience a TTS as they use sound for these tasks. A TTS also has the potential to decrease the range over which socially significant communication takes place, for example, between competing males, between males and females during mating season, and between mothers and offspring.").

2. NMFS Has Not Utilized the Best Available Science to Estimate Temporary and Permanent Hearing Loss Thresholds

NMFS asserts that animals that enter the 180/190 dB exclusion zone are unlikely to suffer either temporary or permanent hearing loss, and if a marine mammal should suffer temporary or permanent hearing loss, it would only be mild.[32] NMFS justifies this reasoning, in part, on studies it claims support significantly higher levels of sound exposure than the 180/190 dB precautionary thresholds.[33]

In terms of temporary hearing loss, NMFS cites studies conducted on the temporary threshold shift or TTS thresholds for primarily one species of cetacean, the bottlenose dolphin, which suggest that the exposure level necessary to elicit TTS in bottlenose dolphins may be as high as 210-214 dB for sounds of shorter duration.[34] NMFS then jumps to the conclusion that the TTS threshold for ***all*** species of cetaceans must also be high based on those same studies examining bottlenose dolphins.[35] These assumptions, however, are unfounded and contradicted by scientific evidence. A recent study by Lucke et. al. on the TTS thresholds for harbor porpoise using seismic sounds demonstrates that a harbor porpoise experienced TTS when exposed to airgun noise at 164 dB, a significantly lower level than what NMFS predicts.[36] The Lucke study demonstrates that TTS thresholds might be significantly different for different species of marine mammals. In fact, there have been no studies on TTS thresholds in baleen whales.[37] Thus, NMFS has not justified its shift away from using precautionary measures. NMFS cannot assume that TTS thresholds would be high for all species of marine mammals, or that temporary hearing loss would be unlikely for marine mammals that enter the exclusion zone.

In terms of permanent hearing loss, NMFS estimates that permanent threshold shift or PTS could occur for cetaceans at ~198 dB based on Southall et. al. (2007).[38] However, that threshold does not reflect the best available science. A number of recent studies indicate that anthropogenic sound can induce permanent threshold shift at lower levels than anticipated.[39] New data indicate that mid-frequency cetaceans, such as bottlenose dolphins and beluga whales, have greater sensitivity to sounds within their best hearing range than was supposed at the time Southall et al. (2007) was published.[40] It is both conservative and consistent with the methodology of that earlier paper to assume that low-frequency cetaceans, such as bowhead whales, which have never been studied for threshold shift, also have greater sensitivity to sounds

---

[32] 77 Fed. Reg. at 49,927-29.
[33] *Id*. at 49,927.
[34] *Id*.
[35] *Id*. at 49,927-28.
[36] Lucke, K., U. Siebert, P.A, Lepper, and M.A. Blanchet, Temporary shift in masked hearing thresholds in a harbor porpoise (Phocoena phocoena) after exposure to seismic airgun stimuli, *The Journal of the Acoustical Society of America* 125(6):4060-70 (2009).
[37] 77 Fed. Reg. at 49,927.
[38] *Id*. at 49,929.
[39] Kastak, D., J. Mulsow, A. Ghoul, and C. Reichmuth, Noise-induced permanent threshold shift in a harbor seal [abstract], *Journal of the Acoustical Society of America* 123(5):2986 (2008); Kujawa, S.G. and M.C. Liberman, Adding insult to injury: cochlear nerve degeneration after "temporary" noise-induced hearing loss, *Journal of Neuroscience* 29(45):14077-14085 (2009).
[40] *See* discussion in PG&E Seismic Survey Project at 46; MMC, Marine Mammals and Noise.

within their own best hearing range.[41] For this reason and others, Dr. Southall and colleagues reduced the threshold shift criteria for baleen whales exposed to airgun noise in the report they recently produced for the California State Lands Commission.[42] This recent research indicates it is possible marine mammals will experience injury, or potentially serious injury, at lower sound thresholds than NMFS uses in its assumptions.

3. The Correction Factor NMFS Employs to Estimate the Number of Level A Injury Takes is Arbitrary and Unsupported

In the proposed IHA, NMFS states that most marine mammals that enter the 180/190 dB exclusion zone during ION's survey will not suffer injury (approximately 90%), and even those 10% of animals that do actually suffer injury will not suffer serious injury. NMFS only estimates 8 total individual animals may potentially suffer Level A injury (4 ringed seals, 3 beluga whales, and 1 bowhead whale). NMFS justifies its conclusion that most animals that enter into the danger zone will remain uninjured on the assertion that marine mammals will naturally avoid airguns when they are operating at full strength. Under NMFS's theory, since marine mammals will not remain in high intensity areas for periods long enough to cause injury and both the vessels and animals are moving, any exposure will only be brief.[43]

The use of a correction factor to reduce the number of animals in the danger zone that are expected to potentially suffer injury contradicts NMFS's long-standing cautionary approach to auditory impairment, which assumed that any animal entering the 180/190 dB exclusion zone had the potential to suffer injury.[44] NMFS's justifications for the use of a correction factor—that marine mammals will avoid loud noises and that exposure will only be brief—are both flawed and unsupported by survey data and scientific evidence.

NMFS provides no scientific justification for its assertion that an animal will stay far enough away from an airgun to avoid injury, and available evidence undermines the assertion. Survey data indicate marine mammals, especially ice seals, do not always avoid loud noises. Reports from previous surveys suggest that, despite monitored exclusion zones, marine mammals routinely stray too close to the airguns, even during daylight hours.[45] In other words,

---

[41] *See* PG&E Seismic Survey Project at 46.
[42] *Id.*
[43] *See* 77 Fed. Reg. at 49,954.
[44] Moreover, NMFS provides no basis for its quantification of the proportion of animals—90%—that would avoid the potential for injury.
[45] *See, e.g.*, 77 Fed. Reg. at 49953-54 (identifying 8 cetaceans sightings in the ≥180 dB exclusion zone and 42 observations of seals within the 190 dB zone during seismic surveys in 2007 and 2008); LGL, Marine Mammal Monitoring and Mitigation During Open Water Seismic Exploration by ConocoPhillips Alaska, Inc. in the Chukchi Sea, July-October 2006 at 5-11-5-12 (Jan. 2007) (identifying 50 marine mammals likely exposed to potentially injurious sound levels); LGL, Marine Mammal Monitoring and Mitigation During Open Water Seismic Exploration by Shell Offshore Inc. in the Chukchi and Beaufort Seas, July-September 2006: 90-Day Report at 6-13 (Jan. 2007) (identifying 24 seals likely exposed to potentially injurious sound levels); LGL, Marine Mammal Monitoring and Mitigation During Open Water Seismic Exploration by Shell Offshore Inc. in the Chukchi and Beaufort Seas, July–November 2007: 90-Day Report at 5-43 (Jan. 2008) (identifying 26 sightings of 50 walrus within the exclusion zone); LGL, Marine Mammal Monitoring and Mitigation During Open Water Seismic Exploration by Shell Offshore Inc. in the Chukchi and Beaufort Seas, July–October 2008: 90-Day Report at 7-14 (Jan. 2009) (identifying 44 powerdowns involving 45 marine mammals).

if all marine mammals avoid airguns at distances great enough to eliminate the potential for harm and if ramp up procedures were 100% effective, then the imposition of exclusion zones would not result in the number of shutdowns and powerdowns that are recorded each year. Further, reports from past surveys indicate that there is at least the potential for animals to wander extremely close to an airgun, causing serious injury, especially during the darkness and harsh conditions of winter.[46] In addition, evidence cited in the previous section demonstrates that marine mammals may suffer temporary or permanent hearing loss at even lower exposure levels than NMFS assumes. A marine mammal, thus, may not need to approach very close to an airgun before it experiences injury or even serious injury.

This is especially true in the case of ringed seals. In the proposed IHA, NMFS expresses concern that ringed seals will likely be attracted to the sounds of the airguns and thus suffer from hearing impairment.[47] Seals are known to approach survey vessels even in open water, and the attraction of newly opened pathway will likely reinforce this response. Further, seals may have difficulty discerning the source of the noise if disoriented by the sounds of the icebreaker and the proximity of the survey vessel. Under the circumstances, seals could be exposed to multiple blasts at close range, increasing the likelihood they could suffer permanent hearing loss.[48]

***

For these several reasons, NMFS has both underestimated the degree of hearing loss that marine mammals will potentially suffer as a result of ION's proposed survey as well as the total number of marine mammals that may experience injury or serious injury. In line with the precautionary mandate of the MMPA, until NMFS can establish clear and defensible alternative thresholds, it must estimate Level A takes using the 180/190dB thresholds that it typically employs and recognize that animals entering these exclusion zones have at least the potential to suffer serious injury. Under that assumption, at least 23 beluga whales, 6 bowhead whales, and 277 ringed seals could potentially suffer serious injury as a result of the survey, because, as NMFS acknowledges, they could enter the exclusion zone.[49] Further, this number may itself be an underestimate, because it is based on an unsupported assumption that 90% of the animals in the survey area will remain far enough away from the survey to avoid the 180/190 dB exclusion zone.

Because NMFS has not negated the possibility of serious injury from ION's proposed seismic surveying, it may not issue an IHA under the MMPA.

---

[46] *See* note 45, *supra*.

[47] 77 Fed. Reg. at 49,928 ("Pinnipeds occasionally seem to be attracted to operating seismic vessels."). With regard to ice seals, NMFS stated, "The limited nature of this tendency for avoidance is a concern. It suggests that pinnipeds may not move away, or move very far away, before received levels of sound from an approaching seismic survey vessel approach those that may cause hearing impairment." *Id*. at 49,926. Nowhere in the proposed IHA does NMFS reconcile its assumption that pinnipeds will avoid airguns with its expressed concern that pinniped behavior precludes this possibility.

[48] *See, e.g.*, 75 Fed. Reg. at 49,760, 49,793 (Aug. 13, 2010) (noting that "[r]epeated noise exposure that leads to TTS could cause PTS").

[49] 77 Fed. Reg. at 49,953-54.

B. The Proposed IHA's Small Numbers Finding is Unjustified

The MMPA prohibits NMFS from authorizing the take of more than "small numbers" of marine mammals.[50] For the proposed IHA, NMFS estimates close to 5,000 beluga whales and over 60,000 ringed seals would be potentially exposed to sounds at or above 160 dB for pulsed sounds and 120 dB for continuous sounds during ION's proposed survey.[51] As a result, a large percentage of the beluga whale and ringed seal populations could be affected–close to 5,000 beluga whales or approximately 12.45% of the Beaufort Sea beluga whale population[52] and 60,000 ringed seals, or approximately 24% of the ringed seal population (as estimated in the proposed IHA). These figures are not either a "small" number of marine mammals nor a "small" proportion of the affected stock. A "definition of 'small number' that permits the potential taking of as much as 12% of the population of a species is plainly against Congress' intent."[53] The proposed authorization, as written, is contrary to the MMPA small numbers limitation.[54]

For beluga whale takes, NMFS does not provide any justification for its conclusion that 12.45% of the beluga whale population represents a small number despite the fact that federal courts have recognized that such a high percentage is more than a small number and NMFS has stated in the past that 12-14% represents a sizeable portion of a stock.[55]

For ringed seals, NMFS concedes in the proposed IHA that 24% of the ringed seal population seems to represent a "large number."[56] However, NMFS justifies the large take of ringed seals by concluding, in part, that the impacts are not expected to be "biologically significant," and that any harassment is expected to be "minor and brief."[57] NMFS's conclusions improperly conflate the analysis for "small numbers" with the analysis for "negligible impact." As the Ninth Circuit recently confirmed, such conflation violates the plain language of the MMPA.[58] The court emphasized that "small numbers" and "negligible impact" are two distinct standards that NMFS must independently satisfy when promulgating take authorizations.[59] Whether, the impacts will be "biologically significant" and whether the harassment will be "minor and brief" is relevant only to "negligible impact" analysis and cannot be used to justify the "small numbers" conclusion for ringed seals.

NMFS also justifies the large take of ringed seals by noting that: (1) population densities for ringed seals were overestimated and the number of ringed seals expected to occur in the

[50] 16 U.S.C. § 1371(a)(5)(D)(i).
[51] 77 Fed. Reg. at 49,954.
[52] NMFS uses a smaller number and percentage of beluga whale takes in its analysis based on the assumption that ION will utilize the "preferred alternative" to refuel. *Id*. at 49,954. If ION does not use the "preferred alternative," NMFS estimates that approximately 5,200 beluga whales or 13.33% of the population will be taken. *Id.*
[53] *Natural Res. Def. Council, v. Evans*, 279 F. Supp. 2d 1129, 1152 (N.D. Cal. 2003).
[54] In 2008, NMFS acknowledged that harassment of 12-14% of western Arctic bowheads represented "a sizeable portion" of the stock. 73 Fed. Reg. 66,106, 66,111 (Nov. 6, 2008).
[55] *Id.*
[56] 77 Fed. Reg. at 49,955 ("It may seem that a large number of ringed seals (up to 24.29%) would be taken as a result of the proposed seismic survey activity.").
[57] *Id.*
[58] *Ctr. for Biol. Diversity v. Salazar*, No. 10-35123, 2012 WL 3570667, at *6 (9th Cir. Aug. 21, 2012).
[59] *Id*. at *10 ("The Service can analyze 'small numbers' in relation to the size of the larger population, so long as the 'negligible impact' finding remains a distinct, separate standard.").

project area is much lower; (2) the percentage of unique individuals that would be affected may be inflated because it is likely individual seals will be taken multiple times; and (3) mitigation and monitoring measures are expected to further reduce any potential disturbance.[60]

With regard to the first justification, NMFS has admitted that survey data is not available in order to accurately estimate ringed seal densities. As a result, NMFS has attempted to estimate the greatest potential density, and is even potentially underestimating the number of ringed seals that may be present. NMFS cannot now abandon precaution while evaluating small numbers by stating that *actual* densities are likely to be lower.

With regard to the second justification, NMFS stated in other parts of the proposed IHA that ringed seals will likely not suffer serious injury from loud noises because they will *not* be "taken" multiple times.[61] It is arbitrary for NMFS to state that actual Level B take numbers will be lower because individuals will be taken multiple times, but simultaneously reason that Level A takes will be "less severe" because individuals will not be exposed to loud noises repeatedly.

With regard to the third justification, as noted *supra*, the mitigation measures ION will employ are not 100% effective even in daylight hours. In this instance, ION will be operating in darkness for a large part of the survey, when mitigation measures will be much less effective, as NMFS has recognized. In addition, there are no mitigation measures to prevent marine mammals from entering the 160 dB zone, where Level B takes occur. Therefore, mitigation and monitoring measures will not reduce disturbance.

Overall, the justifications provided by NMFS are not consistent with the statutory standard of the MMPA. Critically, the MMPA definition of harassment is focused on "potential harassment," which supports the conclusion that all of the animals in a population are harassed "if there is the *potential* for the act to disrupt the behavioral patterns of the most sensitive individual in the group."[62]

NMFS's rationale recognizes the *potential* for a large number of beluga whales and ringed seals to be disturbed.[63] The MMPA only allows NMFS to authorize "the incidental, but not intentional, taking by harassment of *small numbers* of marine mammals."[64] Thus, even if all the estimated takes do not actually occur, as NMFS proposes in this case, the *potential* for those large takes to occur still exists, and should be included in the analysis of small numbers according to the definition of "harassment."

---

[60] *Id*. at 49,955.
[61] *Id*. at 49,955 ("[T]he probability of an individual pinniped being exposed multiple times is much lower than if the source is stationary.").
[62] *Natural Res. Def. Council v. Evans*, 279 F. Supp. 2d at 1157 (emphasis added); *see also* 16 U.S.C. § 1362(18)(A)(ii) (defining harassment to include any act of pursuit, torment, or annoyance that "has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns").
[63] NMFS states, "The estimated Level B behavioral takes proposed to be authorized represent up to 12.45% of the Beaufort Sea population of . . . beluga whales . . . [and] up to 24.29% . . . of U.S. Arctic stocks [of ringed seals]." 77 Fed. Reg. at 49,955.
[64] 16 U.S.C. § 1371(a)(5)(D) (emphasis added).

It would be arbitrary for NMFS to conclude there is the potential for the incidental taking by harassment of large numbers of marine mammals, but at the same time issue an IHA based on the assumption that only small numbers of marine mammal takes will actually occur. If NMFS can determine there will be fewer takes, it must substantiate its conclusion that only small numbers will be taken and limit its authorization accordingly to ensure that is the case. Trying to have it both ways, by issuing an IHA that allows every possible take, but then skirting the small numbers requirement by asserting take will, in fact, be less, is arbitrary and unlawful.

Further, NMFS has significantly underestimated the Level B takes in the proposed IHA. It is highly likely that even greater numbers of bowhead whales, beluga whales and ringed seals will be subjected to Level B harassment. To estimate take, NMFS multiplied the area exposed to 160 dB for pulsed sounds or 120dB for continuous sound by the expected density of each of the nine marine mammal species expected to be present. Errors at each step, however, result in the proposed IHA underestimating potential numbers of animals taken.

1. The 160-dB harassment threshold is arbitrary

The proposed IHA uses a single sound pressure level (160 dB re 1 µPa (RMS)) as a threshold for behavioral, sublethal take in all marine mammal species from seismic airguns.[65] This approach does not reflect the best available science, and the choice of threshold is not sufficiently conservative in several important respects. Indeed, five of the world's leading biologists and bioacousticians working in this field recently characterized the present threshold, in a comment letter to BOEM and NMFS, as "overly simplified, scientifically outdated, and artificially rigid."[66] NMFS must use a more conservative threshold.

In the first place, the method represents a major step backward from recent programmatic authorizations. For Navy sonar activity, NMFS has incorporated into its analysis linear risk functions that endeavor to take account of risk and individual variability and to reflect the potential for take at relatively low levels.[67] In the wake of these past authorizations for acoustic impacts on marine mammals, the agency's reversion to a single, non-conservative, bright-line threshold for all species is not tenable.

Furthermore, the 160 dB threshold is non-conservative, since the scientific literature establishes that behavioral disruption can occur at substantially lower received levels for some species. For example, a single seismic survey has been shown to cause endangered fin and humpback whales to stop vocalizing – a behavior essential to breeding and foraging – over an area at least 10,000 square nautical miles in size, and can cause baleen whales to abandon habitat over the same scale.[68] Similarly, a low-frequency, high-amplitude fish mapping device was recently found to silence humpback whales at distance of 200 km, where received levels ranged

[65] 77 Fed. Reg. at 49,924.
[66] Clark, C., D. Mann, P. Miller, D. Nowacek, and B. Southall, Comments on Arctic Ocean Draft Environmental Impact Statement at 2 (Feb. 28, 2012); *see* 40 C.F.R. § 1502.22.
[67] *See, e.g.*, 74 Fed. Reg. 4844, 4844-4885 (Jan. 27, 2009).
[68] Clark, C.W. and G.C. Gagnon, Considering the temporal and spatial scales of noise exposures from seismic surveys on baleen whales (2006) (IWC Sci. Comm. Doc. IWC/SC/58/E9); *see also* MacLeod, K., M.P. Simmonds, and E. Murray, Abundance of fin (*Balaenoptera physalus*) and sei whales (*B. Borealis*) amid oil exploration and development off northwest Scotland, *Journal of Cetacean Research and Management* 8:247-254 (2006).

from 88 to 110 dB.[69] Harbor porpoises are known to be acutely sensitive to a range of anthropogenic sources, including airguns. They have been observed to engage in avoidance responses fifty miles from a seismic airgun array – a result that is consistent with both captive and wild animal studies showing them abandoning habitat in response to pulsed sounds at very low received levels, well below 120 dB.[70] Bowhead whales migrating through the Beaufort Sea have shown almost complete avoidance at airgun received levels at 120-130 dB and below.[71] Beluga whales are highly sensitive to a range of low-frequency and low-frequency dominant anthropogenic sounds, including seismic airgun noise, which has been shown to displace belugas from near-coastal foraging areas out beyond the 130 dB isopleth.[72] These are merely examples, consistent with the broader literature.

Little if any of these data were available in 1999, when the High Energy Seismic Survey panel issued the report on which the 160 dB threshold is purportedly based;[73] since that time, the literature on ocean noise has expanded enormously.

The use of a multi-pulse standard for behavior harassment is also non-conservative, since it does not take into account the spreading of seismic pulses over time beyond a certain distance from the array.[74] NMFS' own Open Water Panel for the Arctic – which has included some of the country's leading marine bioacousticians – has characterized the seismic airgun array as a mixed impulsive/continuous noise source and has stated that NMFS should evaluate its impacts on that basis.[75] That analysis is supported by the masking effects model, in which several NMFS scientists have participated and by a number of papers showing that seismic exploration in the Arctic, the east Atlantic, off Greenland, and off Australia has raised ambient noise levels at significant distances from the array.[76] NMFS cannot ignore this science.

---

[69] Risch, D., P.J.Corkeron, W.T .Ellison, and S.M. van Parijs, Changes in humpback whale song occurrence in response to an acoustic source 200 km away, PLoS ONE 7(1):e29741 (2012).

[70] *See, e.g.*, Bain, D.E. and R. Williams, Long-range effects of airgun noise on marine mammals: responses as a function of received sound level and distance (2006) (IWC Sci. Comm. Doc. IWC/SC/58/E35).

[71] Miller, G.W., R.E. Elliot, W.R Koski,. V.D. Moulton, and W.J. Richardson, Whales, *in* Richardson, W.J. (ed.), Marine Mammal and Acoustical Monitoring of Western Geophysical's Open-Water Seismic Program in the Alaskan Beaufort Sea, 1998 (1999); Richardson, W.J., G.W. .Miller, and C.R. Greene Jr., Displacement of migrating bowhead whales by sounds from seismic surveys in shallow waters of the Beaufort Sea, *Journal of the Acoustical Society of America* 106:2281 (1999).

[72] Miller, G.W., V.D. Moulton, R.A. Davis, M. Holst, P. Millman, A. MacGillivray, and D. Hannay, Monitoring Seismic Effects on Marine Mammals—Southeastern Beaufort Sea, 2001-2002 at 511-542 (2005).

[73] High Energy Seismic Survey Team, High energy seismic survey review process and interim operational guidelines for marine surveys offshore Southern California, prepared for The California State Lands Commission and The U.S. Minerals Management Service, Pacific Outer Continental Shelf Region (Feb. 18, 1999).

[74] *See* Expert Panel Review of Monitoring Protocols in Applications for Incidental Harassment Authorizations Related to Oil and Gas Exploration in the Chukchi and Beaufort Seas, 2011: Statoil and ION Geophysical at 4-5 (Mar. 9, 2011) ("Expert Panel Review 2011").

[75] *Id.* at 5.

[76] Gedamke, J., Ocean basin scale loss of whale communication space: potential impacts of a distant seismic survey, Biennial Conference on the Biology of Marine Mammals, November-December 2011, Tampa, FL (2011) (abstract); Nieukirk, S.L., H. Klinck, K. Klinck, D.K. Mellinger, and R.P. Dziak, Seismic airgun sounds and whale vocalization recorded in the Fram Strait and Greenland Sea, Biennial Conference on the Biology of Marine Mammals, November-December 2011, Tampa, FL (2011) (abstract); Nieukirk, S.L., D.K. Mellinger, S.E. Moore, K. Klinck, R.P. Dziak, and J. Goslin, Sounds from airguns and fin whales recorded in the mid-Atlantic Ocean, 1999-2009, *Journal of the Acoustical Society of America* 131(2):1102-1112 (2012); Nieukirk, S.L., K.M. Stafford, D.K. Mellinger, R.P. Dziak, and C.G. Fox, Low-frequency whale and seismic airgun sounds recorded in the mid-Atlantic

Finally, the threshold's basis in the root mean square ("RMS") of sound pressure, rather than in peak pressure, is non-conservative. Studies have criticized the use of RMS for seismic sound because of the degree to which pulsed sounds must be "stretched," resulting in significant potential underestimates of marine mammal take.[77]

If NMFS would modify its threshold estimates, as it must based on the best available science, the estimated number of marine mammal takes could be significantly higher than the number of marine mammal takes NMFS has already predicted.

2. The density calculations do not account for the migration of whales

The proposed IHA's use of a "density" measure in determining take during the bowhead migration is inappropriate. In the Beaufort Sea, NMFS has repeatedly found that using density is unsuited for determining bowhead take during the fall migration.[78] Measuring potential harassment using a density approach assumes that animals remain relatively stationary from one day to the next, but this assumption is inapplicable for surveying that will take place within a migratory corridor. The proposed IHA does not indicate the rationale for using an approach that ignores the fact that bowhead whales will pass through the Beaufort and Chukchi seas in the fall. Nor is it clear that NMFS adequately considered the migration of beluga whales in the Beaufort Sea and whether a density approach in that instance is equally inappropriate. Properly taking the bowhead migration into account, along with an appropriate sound threshold for harassment, could dramatically increase the estimate of harassed whales.

Therefore, not only does NMFS facially authorize takes that exceed the "small numbers" requirements of the MMPA, it also underestimates total takes. A more correct estimate would increase the number of marine mammal takes even further. The proposed IHA is thus unlawful because it does not meet the "small numbers" requirement of the MMPA.

C. The proposed IHA's finding of negligible impact is unjustified

A "negligible impact" is defined 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."[79] NMFS must base its determination of negligible impact on the "best available scientific evidence."[80] In *Brower v. Evans*, the Ninth Circuit found that ESA caselaw "provides insightful and analogous provisions and analysis" when considering a best available science requirement.[81] The court has invoked the ESA's best available science standard to require that agencies give the "'benefit of the

---

Ocean, *Journal of the Acoustical Society of America* 115(4):1832-1843 (2004); Roth, E.H., J.A. Hildebrand, S.M. Wiggins, and D. Ross, Underwater ambient noise on the Chukchi Sea continental slope, *Journal of the Acoustical Society of America* 131(1):104-110 (2012).

[77] Madsen, P.T., Marine mammals and noise: Problems with root-mean-squared sound pressure level for transients, *Journal of the Acoustical Society of America* 117(6):3952-57 (2005).

[78] *See, e.g.*, 76 Fed. Reg. 68,974, 69,009 (Nov. 7, 2011); 73 Fed. Reg. 66,106, 66,115 (Nov. 6, 2008).

[79] 50 C.F.R. § 216.103.

[80] *Id.* §§ 216.104(c); 216.102(a).

[81] 257 F.3d 1058, 1070 (9th Cir. 2001).

doubt'" to the species.[82]

NMFS has not fully considered the potential impacts on marine mammals because it ignores impacts of stress, underestimates impacts on bowhead whales, and neglects to conduct a cumulative impacts analysis.

1. Stress can harm marine mammals

At high levels, anthropogenic noise can cause temporary or permanent hearing damage to marine mammals. This, however, is not the only source of potential harm. Marine mammals can also suffer long-term impacts attributable to exposure to lower levels of noise.

Noise exposure is likely to result in stress, and stress can impair an animal's immune system.[83] Stress can occur even in the absence of any behavioral change or exclusion from habitat. The consequences will depend on the duration of exposure, population condition, and other factors like exposure to pathogens and immunosuppressing compounds. Indeed, the Navy has conservatively assumed in its EISs for active sonar training that any effect sufficient to cause hearing loss or produce a behavioral response sufficient to cause take under the MMPA will also produce a stress-response and contribute to a marine mammal's allostatic load.[84] A recent New England Aquarium study of North Atlantic right whales, the closest relative of the bowhead whale, indicates that shipping noise alone can induce chronic stress in marine mammals.[85]

NMFS, while acknowledging the potential for chronic stress to significantly affect marine mammal health, and while expecting that anthropogenic noise would induce physiological stress responses in marine mammals, does not incorporate chronic stress into its impact analysis because it assumes that marine mammals will avoid seismic vessels and the duration of exposure will be brief.[86] NMFS has too quickly eliminated stress from consideration, especially considering the cumulative stress impacts that will result given that ION's proposed survey will impact the same bowhead fall migration population that will be affected by Shell's plans for exploratory drilling west of Camden Bay.

---

[82] *Conner v. Burford*, 848 F.2d 1441, 1454 (9th Cir. 1988) (quoting H.R. Conf. Rep. No. 96-697, at 12 (1979), *reprinted in* 1979 U.S.C.C.A.N. 2572, 2576).

[83] Wright, A.J. et al., Do Marine Mammals Experience Stress Related to Anthropogenic Noise*?, International Journal of Comparative Psychology* 20(2):274-316 (2007); Romano, T.A., M.J. Keogh, C. Kelly., P. Feng, L. Berk, C.E. Schlundt, D.A. Carder, and J. Finneran, Anthropogenic Sound and Marine Mammal Health: Measures of the Nervous and Immune Systems Before and After Intense Sound Exposure, *Canadian Journal of Fisheries and Aquatic Sciences* 61:1124–1134 (2004).

[84] *See e.g.*, U.S. Navy, Southern California Range Complex: Final Environmental Impact Statement/ Overseas Environmental Impact Statement at 3.9-102 (2008).

[85] Rolland, R.M., S.E. Parks, K.E. Hunt, M. Castellote, P.J. Corkeron, D.P. Nowacek, S.K. Wasser, and S.D. Kraus, Evidence that ship noise increases stress in right whales, *Proceedings of the Royal Society B: Biological Sciences* doi:10.1098/rspb.2011.2429 (2012).

[86] 77 Fed. Reg. at 49,929-30.

2. NMFS underestimates impacts on bowhead whales

NMFS must address the fact that "in mid to late October and November substantial numbers of bowheads likely still will be in the Beaufort Sea including near Barrow, which is an important feeding area."[87] The proposed IHA makes only passing mention of feeding, asserting that the surveying will take place "after most" bowheads have migrated out of the project area.[88] NMFS must more thoroughly analyze impacts on bowhead feeding activities in its impact conclusions.

NMFS should also require that ION provide additional clarification about the location and timing of its surveying. The proposed IHA describes the surveying as beginning in deeper waters (> 1,000m) in the eastern half of the survey area before moving to the west in late October or early November.[89] It maintains that ION will first survey in the deep water area of the northwestern Beaufort before moving toward shore in order to avoid migrating bowhead whales.[90] However, as indicated above, bowhead migration has the potential to extend into late October and even November. Given the importance of the issue for bowheads, NMFS must specify the earliest date at which ION may survey in more shallow waters near the migration corridor, and include the specific timing of ION's operations in its conclusions and recommendations.

NMFS does not fully consider the impacts of ION's survey on migrating bowhead whale mother and calf pairs. Cows and calves are known to favor the tail end of the spring and fall migrations.[91] Females with calves are considered to be more susceptible to noise disturbances, and NMFS must at least evaluate the necessity of additional mitigation to protect this vulnerable segment of the population.[92] As other agencies have recognized in the past, the potential effects of noise on females and calves merit "special consideration."[93] In the past, NMFS has implemented mitigation measures specifically to protect mothers and calves. In 2006, NMFS required a 120-dB safety zone for 4 or more cow-calf pairs to reduce impacts from Arctic seismic operations.[94] ION's proposed survey will likely have the greatest impacts on mother-calf

[87] Expert Panel Review of Monitoring and Mitigation Protocols in Applications for Incidental Take Authorizations Related to Oil and Gas Exploration, Including Seismic Surveys, in the Chukchi and Beaufort Seas at 12 (March 2010) ("Expert Panel Review 2010").
[88] 77 Fed. Reg. at 49,933.
[89] *Id*. at 49,923.
[90] *Id*.
[91] NMFS, Biological Opinion for the Authorization of Small Takes Under the Marine Mammal Protection Act for certain Oil and Gas Exploration Activities in the U.S. Beaufort and Chukchi Seas, Alaska for 2010 at 19, 21 (July 13, 2010) (In the spring, the "last whales to pass Barrow tend to be females that are accompanied by calves[.]"; "Eskimo whalers report that smaller whales precede large adults and cow-calf pairs on the fall migration."); 76 Fed. Reg. 68,974, 69,020 (Nov. 7, 2011) ("Cow/calf pairs typically migrate through the area later in the season (i.e., late September/October[.])").
[92] NMFS, Biological Opinion for Oil and Gas Leasing and Exploration Activities in the U.S. Beaufort and Chukchi Seas, Alaska; and Authorization of Small Takes Under the Marine Mammal Protection Act at 86 (July 17, 2008) ("2008 BiOp") (in other mammal species, including cetaceans, "females with young are more responsive to noise and human disturbance than other segments of the population").
[93] *See, e.g.*, Minerals Management Service, Final Programmatic Environmental Assessment, Arctic Ocean Outer Continental Shelf Seismic Surveys – 2006 (OCS EIS/EA 2006-038) at 110-111 (June 2006) (PEA).
[94] *See* 71 Fed. Reg. 66,912, 66,913 (Nov. 17, 2006) (noting that the 120-dB requirement was "essential" to NMFS's finding of no significant impact).

pairs because they typically migrate "later in the season." NMFS needs to consider these significant biological impacts in its "negligible impacts" analysis. The proposed IHA's failure to adequately address these concerns undermines its conclusions as to the degree of impact that ION's proposal will have on bowhead whales.

3. The effects of other activities in the Arctic combined with ION's surveying may harm marine mammals

NMFS cannot ensure that permitted activities will have no more than negligible impacts on the stocks of marine mammals without looking at all of the oil activities scheduled to take place in the Arctic Ocean. As a result of its failure to look beyond ION's proposed activities, NMFS understates the potential effect on marine mammals. Although NMFS has resisted considering cumulative effects in the past, the plain language of the MMPA's incidental take provisions requires affirmative findings that the resulting effects of authorized takings will have no more than "negligible" effects on marine mammals and no "unmitigable adverse impact" on subsistence uses.[95] Further, NMFS's implementing regulations recognize the need to consider cumulative effects under some circumstances. An incidental harassment authorization should be revoked if the authorized takings "individually or in combination with other authorizations" are having a more than negligible impact on the population or an unmitigable adverse impact on subsistence.[96] As a practical matter, if NMFS ignores all additional sources of noise and disturbance, its MMPA determinations will lack a rational basis. This is especially true given that NMFS has cautioned that multiple exploration activities (seismic surveying, ice management, drilling) can create a biologically significant risk to marine mammals.[97]

According to NMFS's Alaska Stock Assessment Report, the "accumulation of impacts from vessels, seismic exploration, and drilling are of concern across the North Slope of Alaska."[98] The National Research Council has advised agencies to assess cumulative effects to the population from multiple effects to multiple individuals:

> At the individual level, the biological significance of an effect must be judged by changes in the ability of an animal to grow, survive, and reproduce. The population effect involves the cumulative impact on all individuals affected. . . . Population consequences of behavioral change result from the accumulation of responses of individuals.[99]

The scientific review panel created for the Open Water Meeting has urged that there is a need "for better analysis of the potentially interacting influences of multiple oil and gas activities co-

[95] 16 U.S.C. § 1371(a)(5)(D)(i).
[96] 50 C.F.R. § 216.107(f)(2).
[97] *See, e.g.*, 2008 BiOp at 86.
[98] Allen, B. M. and R. P Angliss, *Alaska Marine Mammal Stock Assessments, 2011*, U.S. Dep't Commerce, NOAA Technical Mem., NMFS-AFSC-234 at 214 (May 2012).
[99] NRC, *Marine Mammal Populations and Ocean Noise* at 19-20.

occurring in time and space[.]"[100] Courts have sensibly applied the same principle in other contexts when confronted with an agency's failure to evaluate the effects of multiple activities.[101]

It is essential that NMFS consider ION's proposed surveying along with the impacts of Shell's related proposal to conduct exploratory drilling in the Beaufort and Chukchi seas.[102] Shell's drilling could deflect substantial numbers of migrating whales away from important feeding grounds.[103] ION's surveying would further stress the population.

Moreover, scientists have recognized that the potential impacts of sequential activities must be assessed in order to determine whether impacts from any activity will be negligible.[104] Both ConocoPhillips and Statoil have indicated that they are preparing for exploratory drilling in the Chukchi Sea in the coming years, which – combined with Shell's efforts – could result in three drilling operations in close proximity to one another.[105] The State of Alaska recently expressed a strong interest in exploiting oil and gas reservoirs that can be accessed in state waters.[106] The State's decision could prompt seismic surveying as companies determine potential locations for exploration. NMFS must also determine what industrial activities are planned in Canadian and Russian waters for 2012 and beyond. These activities, when viewed in combination, have the potential to impact marine mammals multiple times over a much greater time-scale.[107]

NMFS cannot accurately assess the potential for harm from ION's proposed marine mammal harassment without considering effects in the context of these other activities occurring throughout the Arctic. Without taking this into account, NMFS's negligible impact conclusions are inaccurate.

---

[100] Expert Panel Review 2010 at 9; s*ee also* Expert Panel Review 2011. The issue is also discussed extensively in the recent USGS report on the Arctic, *infra* note 9.

[101] *See Or. Natural Res. Council Fund v. Goodman*, 505 F.3d 884, 893 (9th Cir. 2007) ("A particular action may seem unimportant in isolation, but that small action may have dire consequences when combined with other actions.").

[102] The effects of the marine mammal harassment associated with Shell's drilling plans in the Beaufort and Chukchi Seas are detailed in the final IHAs issued in association with those activities. 77 Fed. Reg. 27,284 (May 9, 2012); 77 Fed. Reg. 27,322 (May 9, 2012).

[103] NMFS notes that Shell's drilling activities could exclude bowhead whales from the important Camden Bay feeding area and may result in extra energy expenditure in order to find alternate feeding grounds. 77 Fed. Reg. 27,284, 27,314.

[104] *See* Clark, C., D. Mann, P. Miller, D. Nowacek, and B. Southall, Comments on Arctic Ocean Draft Environmental Impact Statement at 1-2 (Feb. 28, 2012); *see* 40 C.F.R. § 1502.22 (comments to agency on draft programmatic EIS which states there needs to be an adequate assessment of sequential oil and gas activities and their potential impacts in any negligible impact analysis); *supra* n. 99.

[105] ConocoPhillips has already submitted its exploration plan to BOEM. *See* http://alaska.boemre.gov/ref/ProjectHistory/2011_Chukchi_COP/draftEP/draftEPx.HTM.

[106] Alaska Governor Plans to Open Coast for Drilling, http://fuelfix.com/blog/2011/06/30/alaska-governor-plans-to-open-coast-for-drilling/ (June 30, 2011); Press Release, Governor Parnell Lauds Successful Lease Sale (Dec. 7, 2011), *available at* http://gov.alaska.gov/parnell/press-room/full-press-release.html?pr=5982.

[107] NRC, *Marine Mammal Populations and Ocean Noise* at 20 ("Population consequences of behavioral change result from the accumulation of responses of individuals. In some cases, thousands of behavioral effects accumulated over years may be necessary for any population consequences; in other cases, a single instance of behavioral response may have the potential for population consequences.").

D. Uncertainty Precludes Conclusions Regarding Potential Impacts

In determining whether to proceed with ION's request, NMFS must also consider the extent of missing information as to both the environmental baseline in the Arctic and marine mammal responses to noise in general. Both counsel in favor of extreme caution in implementing NMFS's statutory responsibilities.[108]

NMFS itself has recognized that data "to describe marine mammals and their habitat" in the Arctic "are lacking or inadequate to support impact assessment and mitigation planning."[109] Moreover, there "are gaps in our understanding of the biological significance of exposure to various levels of both continuous and impulsive oil and gas activity sounds."[110] These same observations have been echoed by others.[111] Most recently, the USGS found that baseline data for many marine mammal species in the Arctic are still needed, including information on current abundance, seasonal distribution, movements, population dynamics, foraging areas, sea-ice habitat relationships, and age-specific vital rates.[112] The need for this baseline information is apparent even for bowhead whales, one of the better studied species in the Arctic.[113] The report confirms that more research is also necessary to accurately assess marine mammal reactions to different types of noise and that more work is needed to characterize the seasonal and spatial levels of ambient noise in both the Beaufort and Chukchi seas.[114]

In the proposed IHA, NMFS has recognized the abundant lack of information on marine mammals and their activities during the fall and winter months, when ION's proposed activities would be occurring. In the Federal Register notice, NMFS granted that "few data (systematic or

[108] In fact, the passage of the MMPA was driven in part by a lack of adequate information about marine mammals. 16 U.S.C. § 1361(3) (noting that there is "inadequate knowledge" of marine mammals). *See also* Dr. Jane Lubchenco, Keynote Speech, Arctic Symposium (June 20, 2011) (stating "when in doubt, err on the side of caution"), *available at* http://www.noaanews.noaa.gov/stories2011/20110620_arcticice.html.

[109] NMFS, Comments on Minerals Management Service Draft Environmental Impact Statement for the Beaufort Sea and Chukchi Sea Planning Areas – Oil and Gas Lease Sales 209, 212, 217, and 221 at 3 (March 27, 2009) ("NMFS Multi-Sale Cmts.").

[110] National Oceanic and Atmospheric Administration, Comments on the U.S. Department of the Interior/MMS Draft Proposed Outer Continental Shelf (OCS) Oil and Gas Leasing Program for 2010-2015 at 9 (Sept. 21, 2009).

[111] *See, e.g.*, Joint Subcommittee on Ocean Science & Technology, Addressing the Effects of Human-Generated Sound on Marine Life: An Integrated Research Plan for U.S. Federal Agencies at 3 (Jan. 13, 2009) (stating that the current status of science as to noise effects "often results in estimates of potential adverse impacts that contain a high degree of uncertainty"); *id*. at 62-63 (noting the need for baseline information, particularly for Arctic marine species); Nat'l Comm'm on the BP *Deepwater Horizon* Oil Spill and Offshore Drilling (Nat'l Commission), Deep Water: The Gulf Oil Disaster and the Future of Offshore Drilling, Report to the President at vii (January 2011) (finding that "[s]cientific understanding of environmental conditions in sensitive environments . . . in areas proposed for more drilling, such as the Arctic, is inadequate"); Nat'l Comm'n, Offshore Drilling in the Arctic: Background and Issues for the Future Consideration of Oil and Gas Activities, Staff Working Paper No. 13 at 19 (finding "basic stock assessments and baseline data on Arctic marine mammal abundance, trends in abundance, stock structure, and distribution are inadequate" and listing acoustics research on impacts to marine mammals as a "high priority").

[112] United States Geological Survey, An Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf Energy Development in the Chukchi and Beaufort Seas, Alaska, Circular 1370 at 59, 179 (2011) ("USGS Report"), *available at* http://pubs.usgs.gov/circ/1370/. The proposed IHA does not refer to the USGS findings.

[113] USGS Report at 52, 179-182.

[114] *Id*. at 176.

otherwise) are available on the distribution and numbers of marine mammals during the early winter period of this survey, particularly in the Beaufort Sea."[115]

NMFS skirts the uncertainty associated with its conclusions by remarking that marine mammal population sizes and densities appear to be increasing in the face of past oil and gas activity.[116] Thus, NMFS concludes, there will probably not be any long-term population effects associated with ION's activities. However, the MMPA is precautionary. NMFS should not wait for detrimental effects to occur before taking action, but rather, should wait to authorize the harassment of marine mammals until the best available science demonstrates seismic surveys, like the one ION is proposing, will not result in long-term biological effects.

More pointedly, NMFS has warned that, without better data, it is difficult to make the findings that are legally required to authorize marine mammal harassment.[117] We agree. The lack of adequate information precludes NMFS from ensuring compliance with the demanding standards of the MMPA and should compel NMFS to defer oil and gas-related marine mammal harassment authorizations, particularly for large-scale activities like those ION proposes, while the necessary information is gathered.

II. COMPLIANCE WITH OTHER LAWS

A. National Environmental Policy Act

NMFS indicates that it is preparing an environmental assessment pursuant to the National Environmental Policy Act ("NEPA") but makes no mention of its long-standing effort to develop a programmatic review of oil and gas exploration.[118] In 2006, NMFS acknowledged the potential for cumulative, longer-term impacts to marine mammals resulting from expanded oil and gas activity in the Arctic. As a consequence, NMFS and BOEM's predecessor committed to address the issue, in part, by preparing a programmatic environmental impact statement ("PEIS") in order to assess seismic survey permitting throughout the Beaufort and Chukchi seas.[119] That effort resulted in a 2009 draft PEIS, but before it was finalized, the agencies announced that additional information had become available, in particular, "renewed interest in exploratory drilling in both the Chukchi and Beaufort seas[.]"[120] A new process was then initiated with NMFS announcing in 2010 its intent to prepare a PEIS to analyze the environmental impacts of issuing take authorizations incidental to all exploration activities, including both seismic surveys and exploratory drilling.[121] Although NMFS released a Draft PEIS in December of 2011, NMFS has most recently announced the further delay of a final PEIS because more analysis is needed to

[115] 77 Fed. Reg. at 49,921.
[116] *See, e.g., id*. at 49,954.
[117] NMFS Multi-Sale Cmts. at 3-5.
[118] 77 Fed. Reg. at 49,961.
[119] 71 Fed. Reg. 66,912 (Nov. 17, 2006).
[120] 74 Fed. Reg. 55,539 (Oct. 28, 2009).
[121] 75 Fed. Reg. 6,175 (Feb. 8, 2010).

cover a broader range of exploratory drilling activities.[122] NMFS expects to finalize the PEIS in 2014.[123]

As our groups have repeatedly brought to NMFS's attention[124], NEPA regulations make clear that agencies should not proceed with authorizations for individual projects like the ION proposal until an ongoing programmatic EIS is complete.[125] ION's plans are broad in scope, including both seismic surveys and likely some degree of ice breaking and management. It would be unlawful for NMFS to approve the marine mammal harassment associated with ION's proposal without completing the EIS. Only by evaluating as a whole the cumulative, long-term impacts of noise associated with expanding levels of seismic exploration and exploratory drilling can the full and potentially synergistic effects of the various individual projects be understood and adequately protective mitigation measures put in place.[126] If the agency does go forward with the permitting before the completion of the ongoing PEIS process, it should prepare an EIS for the ION activity given the potential for the surveying to cause significant environmental impacts.

B. Endangered Species Act

The proposed IHA indicates that NMFS has initiated self-consultation for the bowhead whale.[127] NMFS, however, should not overlook bearded and ringed seals in its consultation. Portions of their populations have been proposed for listing, and those decisions will likely be finalized before ION proposes to begin its survey program.[128]

[122] Update: Draft Programmatic EIS Concerning Effects of Oil and Gas Activities in the Arctic Ocean, available at http://www.nmfs.noaa.gov/pr/permits/eis/arctic_statement2012.pdf.
[123] *Id*.
[124] *See*, *e.g.*, Alaska Wilderness League, et. al., Comments on Open Water Marine Survey Program in the Chukchi Sea, Alaska During 2009-2010 at 2-3 (July 1, 2009).
[125] *See* 40 C.F.R. § 1506.1(c).
[126] The EIS may also illuminate issues such as necessary mitigation measures and important time and place restrictions.
[127] 77 Fed. Reg. at 49,961.
[128] *See* 76 Fed. Reg. 77,466 (Dec. 13, 2011) (ringed); 76 Fed. Reg. 77,465 (Dec. 13, 2011) (bearded).

***

The IHA that NMFS is proposing to issue to ION threatens critical marine mammal stocks in the Beaufort and Chukchi seas in violation of the MMPA. As documented in the Federal Register notice, ION's activities have the potential to cause serious injury to marine mammals, will take far more than "small numbers" of marine mammals, and will have more than a negligible impact on the populations of marine mammals in the Arctic. For these reasons, NMFS should deny ION's IHA request.

Respectfully,

Leah Donahey
Western Arctic and Oceans Program Director
ALASKA WILDERNESS LEAGUE

Eric F. Myers
Policy Director
AUDUBON ALASKA

Rebecca Noblin
Alaska Director
CENTER FOR BIOLOGICAL DIVERSITY

Erik Grafe
Attorney
EARTHJUSTICE

Michael Jasny
Director, Marine Mammal Protection Project
NATURAL RESOURCES DEFENSE COUNCIL

Pamela A. Miller
Arctic Program Director
NORTHERN ALASKA ENVIRONMENTAL CENTER

Michael Stocker
Director
OCEAN CONSERVATION RESEARCH

Colleen Keane
Alaska Program Associate
PACIFIC ENVIRONMENT

Dan Ritzman
Alaska Program Director
SIERRA CLUB

Layla Hughes
Senior Program Officer for Arctic Oil, Gas, and Shipping Policy
WORLD WILDLIFE FUND