Alaska Eskimo Whaling Commission
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December 6, 2011

VIA ELECTRONIC MAIL TO ITP.Nachman@noaaa.gov

Mr. Michael Payne
Chief
Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Springs, MD 20910

Re: Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to an Exploration Drilling Program Near Camden Bay, Beaufort Sea, AK (76 Fed. Reg. 68984 (November 7, 2011))

Dear Mr. Payne:

Thank you for the opportunity to comment on the application of Shell Offshore, Inc. (Shell) to the National Marine Fisheries Service (NMFS) for an Incidental Harassment Authorization (IHA) pursuant to the Marine Mammal Protection Act (MMPA) for oil and gas related activities near Camden Bay in the Beaufort Sea. *See* 76 Fed. Reg. 68974 (November 7, 2011). These comments are submitted on behalf of the Alaska Eskimo Whaling Commission ("AEWC"). The AEWC represents the eleven bowhead whale subsistence hunting villages of Barrow, Nuiqsut, Kaktovik, Pt. Hope, Pt. Lay, Wainwright, Kivalina, Wales, Savoonga, Gambell, and Little Diomede.

The AEWC was formed by the whaling captains of our constituent villages in 1980 for the purpose of protecting our bowhead whale resource and subsistence hunt. We carry out responsibilities through locally delegated tribal authority and through federal authority delegated pursuant to the NOAA-AEWC cooperative agreement. Alaskan Native subsistence takes of marine mammals are exempt from the Marine Mammal Protection Act's (MMPA) moratorium on the take of marine mammals. 16 U.S.C. § 1371(b)(1). In addition, Congress has given our subsistence livelihood priority over other uses of the marine environment, requiring that other users mitigate the impacts

of any activities with the potential to adversely affect the availability of our subsistence resource. 16 U.S.C. §§ 1371(b), (a)(5)(A)(i)(I), (a)(5)(D)(i)(II).

Each year the AEWC devotes considerable resources toward negotiating a Conflict Avoidance Agreement (CAA) with oil and gas companies to mitigate the adverse impacts of oil and gas exploration on our subsistence hunt for the bowhead whale. The bowhead whale subsistence hunt is the most important subsistence activity carried out by our communities, and through the subsistence hunt we provide irreplaceable food for our communities and continue our ancient traditions and culture. The CAA process has proved to be essential in striking the important balance between the protection of existing, subsistence-based uses of the Arctic and the more recent interest in the energy resources of the Outer Continental Shelf. The CAA process provides the means for the whaling captains to agree on how OCS activities should be conducted in order to protect the bowhead whale and its habitat for the benefit of our communities, who have been in the Arctic since time immemorial.

Without careful management and the input of the local whaling captains and their traditional knowledge, OCS activities threaten to disrupt our subsistence hunts, potentially pollute the pristine Arctic waters from which we harvest our subsistence food, and interfere with the bowhead whale migration. Our whaling captains have expressed concerns about direct impacts to the subsistence hunt resulting from deflection of bowhead whales by vessel traffic and underwater noise. They have also expressed concerns about direct impacts to bowhead whales from icebreaking, vessel traffic, and geophysical exploration. Direct and indirect threats to our hunting and our whales arise from discharge and associated impacts on water quality, the threats posed by the risk of an oil spill, and the cumulative impacts from the sum of all commercial and industrial activities occurring in our waters.

In 2011, AEWC and Shell were able to reach agreement on a CAA, which included specific mitigation measures designed to protect our subsistence hunting activities from adverse impacts associated with offshore oil and gas exploration work. We commend Shell on its continued involvement with our local community, recognizing the central role that the local whaling captains must play in order to protect existing subsistence uses given the increasing presence of industrial activity in the OCS waters. We have attached the 2011 CAA to our comments.

AEWC regularly holds its meeting on the annual CAA each February, and at that time the whaling captains will come together, discuss proposals and agree on a set of mitigation measures that will protect the subsistence hunt and the bowhead whale. Because that meeting has not yet happened, we do not know, at this time, whether AEWC and Shell will reach agreement on a CAA for 2012. We will provide that information to NMFS as soon as it becomes available.

That said, we are encouraged by the proposed mitigation measures and monitoring plan discussed in the public notice. In particular, the proposed plan includes the following issues that our whaling captains have previously requested:

1. A shut down period for the subsistence hunt of Nuiqsut and Kaktovik;
2. Limited discharge technologies;
3. Sound source verification of the for the drilling vessel, support vessels, and airgun array;
4. Aerial monitoring; and
5. Acoustic recorders.

With respect to sound source verification, we request that NMFS include in the IHA a date by which the verification must be completed. As currently written, there is no date by which Shell must complete this work. It is possible, therefore, that Shell could commence and carry out a substantial portion of its proposed drilling program before it conducts the SSV. We therefore request that Section 10(c)(i) of the IHA include a date certain for Shell to carry out the SSV, e.g. within 5 days of arriving at the drill site.[1]

Our whaling captains have also expressed concern about potential impacts to the subsistence hunt in Chukchi and Bering Sea communities resulting from the transit of vessels after the end of the drilling season. We ask that NMFS address this issue in its response to comments, determining whether vessel transit could impact the fall subsistence hunt in Wainright, Point Lay and Point Hope as well as our Bering Sea communities. In that regard, we also that NMFS and Shell amend the Communications Plan in a way that allows our Chukchi and Bering Sea communities to be notified when Shell's vessel are approaching subsistence use areas. We believe, moving forward, it is important to establish a predictable method of communication between Shell and our communities that addresses potential conflicts resulting from vessel traffic at the end of the drilling season, and we also ask that NMFS begin to consider this issue in assessing applications for IHAs. In the past, our whaling captains have asked that Shell begin to transit out of the Chukchi by October 31st for vessels heading to Dutch Harbor or points south. This would go a long way towards alleviating our concerns in this regard.

We also ask that NMFS require Shell to disclose through the Communications Plan the location of its oil spill response fleet and oil spill tanker. We are particularly concerned about potential impacts to the fall subsistence hunt for Barrow after Shell's vessels have returned to the Camden Bay drillsites following the conclusion of the Nuiqsut and Kaktovik hunts. We need to ensure that Shell does not station the vessels in a location that could potentially interfere with the fall hunt in Barrow, which often continues after the conclusion of the Nuiqsut and Kaktovik hunts. NMFS should be

[1] We note as well that, after many years of requests, NMFS has finally decided to publish the draft IHA in the Federal Register. This is a significant step forward and will assist AEWC and its whaling captains in working with NMFS to craft appropriate mitigation and monitoring measures.

addressing this issue – the location of the support vessels – in reaching its no unmitigable adverse impacts determination.

We remain concerned that, according to the information in the Federal Register notice, as many as 11,150 whales – or 73% - of the entire population could be exposed to sounds in excess of 120dB from operations involving the *Kulluk*. 76 Fed. Reg. at 69014. The *Discoverer* appears to generate substantially less underwater noise. NMFS and other agencies should therefore be encouraging Shell to employ the *Discoverer* over the *Kulluk*, as we understand there may also be associated issues regarding the *Kulluk*'s condition and preparedness for Arctic operations. We question whether the potential harassment of 11,150 whales is truly the "least practicable adverse impact" on the species pursuant to Section 101(a)(5)(D)(ii)(I). If the Discoverer results in a significant reduction in the exposure of bowhead whales to underwater noise, then it would seem that Shell is statutorily required to use this equipment in a location such as Camden Bay where the drilling operations will likely encounter thousands of whales during their fall migration. We ask that NMFS clarify how it is applying the statutory standard of "least practicable impact" to its decision to authorize operations with the *Kulluk* when the *Discoverer* would clearly impact far fewer whales.

Finally, as a part of the upcoming Environmental Assessment, we strongly encourage NMFS to give close consideration to the direct, indirect and cumulative impacts to the bowhead whale, its habitat and our subsistence activities. While the Federal Register notice provides information on direct and potentially some indirect effects, it lacks any discussion of cumulative impacts. Given Shell's proposal to drill in both the Beaufort and Chukchi Seas over multiple years, we remain concerned about the cumulative impacts to bowhead whales. If, for example, 11,150 whales are excluded from feeding opportunities in the Beaufort Sea and then encounter another drilling operation in the Chukchi, what will be the combined impact to the whales, including mothers and calves, during their migration. While one drill site in the Beaufort may not seem significant in isolation, when combined with operations of Shell, ConocoPhillips, Statoil and others in the Chukchi over multiple years, a greater risk to bowhead whales may exist. We are asking that NMFS develop a method for assessing the total combined impact to bowhead whales from multiple drilling operations in both seas over several years. That analysis should also consider reasonably foreseeable operations in Canadian and Russian waters as well. Moreover, NMFS should take into consideration these other drilling operations when determining whether the harassment proposed by Shell complies with the statutory "negligible impacts" standard. We continue to believe it is arbitrary for NMFS to analyze each proposal in isolation when it knows full well that Shell and other oil companies are seeking permission to operate concurrently over multiple years in both seas.

Thank you again for the opportunity to provide comments on the proposed IHA and the Federal Register Notice. Please do not hesitate to contact me if you have any questions regarding this information.

Sincerely,

Johnny L. Aiken
Executive Director

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF THE COMMISSIONER

SEAN PARNELL, GOVERNOR

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December 7, 2011

Michael Payne, Chief
Permits, Conservation and Education Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910

Dear Mr. Payne,

The State of Alaska has reviewed the Application Shell Offshore Inc. (Shell) for an Incidental Harassment Authorization (IHA) for its planned exploration in the Beaufort Sea. Notice of the application and the proposed authorization from the National Marine Fisheries Service (NMFS) was published in the November 7, 2011 issue of the *Federal Register*.

Shell has made a very substantial investment in time and money to obtain authorizations to conduct exploration in the Beaufort Sea (as well as the Chukchi Sea). As reported on the front page of yesterday's Anchorage Daily News, a Shell contractor is nearing the completion of a $200 million U.S.-made icebreaker that Shell intends to employ in support of its Arctic Outer Continental Shelf (OCS) exploration.

Alaska's Arctic OCS is the state's and country's best hope for stemming the declining throughput in The Alaska Pipeline System (TAPS). Minerals Management Service 2006 estimates for the Arctic OCS range from 410 million (P95) to 23 billion (P05) barrels of oil with a mean of 8.2 billion barrels and 0.65 Trillion Cubic Feet (TCF) (P95) to 72 TCF (P05) of natural gas with a mean of 27.6 TCF.

In its application for IHA, Shell provides extensive detail on the proposed conduct of its exploration activities, the marine mammals that might be impacted and mitigation measures to reduce impacts to those species and to subsistence. Those mitigation measures include temporary suspension of activities to avoid interference with whale hunting; use of a transit route that will avoid, as much as possible, the polyna zone; speed restrictions; consultation with subsistence advisors; and many other operational procedures designed to minimize negative impacts on marine mammals.

The State supports NMFS's proposal to issue a Level B harassment only IHA to Shell for its proposed Arctic OCS exploration activities and urges NMFS to complete its decision making process as soon as possible.

Sincerely,

FOR

Daniel S. Sullivan
Commissioner

cc: Joseph Balash, Deputy Commissioner, Department of Natural Resources
Ed Fogels, Deputy Commissioner, Department of Natural Resources
Thomas Crafford, Director DNR, Office of Project Management and Permitting
Sara Longan, Large Project Manager, Office of Project Management and Permitting
William Barron, Director DNR, Division of Oil and Gas
Jonne Slemons, Deputy Director, Division of Oil and Gas

ALASKA WILDERNESS LEAGUE—AUDUBON ALASKA
CENTER FOR BIOLOGICAL DIVERSITY—DEFENDERS OF WILDLIFE
EARTHJUSTICE—NATURAL RESOURCES DEFENSE COUNCIL
NORTHERN ALASKA ENVIRONMENTAL CENTER—OCEANA
PACIFIC ENVIRONMENT—RESISTING ENVIRONMENTAL DESTRUCTION ON INDIGENOUS LANDS (REDOIL)—SIERRA CLUB
THE WILDERNESS SOCIETY—WORLD WILDLIFE FUND

Dec. 7, 2011

VIA EMAIL

Michael Payne, Chief
Permits, Conservation, and Education Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

Re: Taking Marine Mammals Incidental to an Exploration Drilling Program Near Camden Bay, Beaufort Sea, AK, 76 Fed. Reg. 68,974 (Nov. 7, 2011)

Dear Mr. Payne:

The undersigned groups submit the following comments on the National Marine Fisheries Service's (NMFS) November 7, 2011, issuance of a proposed incidental harassment authorization (IHA) pursuant to the Marine Mammal Protection Act (MMPA). NMFS proposes to allow the incidental take of eight marine mammal species resulting from Shell Offshore Inc.'s exploration drilling activities in the Beaufort Sea that are scheduled to begin in July 2012. NMFS should deny Shell's application.

Shell's exploration plan is one portion of the largest Arctic Ocean drilling proposal ever contemplated in this country. Shell intends to conduct simultaneous drilling in the Chukchi and Beaufort seas over multiple years using separate drilling units and accompanying vessel and aircraft fleets. Yet nowhere is the need for better science, oversight, and planning more evident than the Arctic. There is a recognized dearth of scientific information about the marine environment of the Beaufort Sea and a complete lack of demonstrated response and rescue capability. NMFS has repeatedly warned in the past that the lack of information inhibits its ability to meet its MMPA obligations, and the United States Geological Survey's (USGS) recent report has further reinforced the need for additional data in order to adequately evaluate the potential impacts from industrial activities.

Even based on the information that does exist, the impacts of the proposed exploration drilling on marine mammals, including bowhead and beluga whales and ice seals, exceed the protective standards imposed by the MMPA. The proposed IHA does not meet the regulatory prohibition on the issuance of an authorization that creates even the "potential" for the death of,

or serious injury to, a marine mammal. The proposal also does not fully assess the effects of the noise and disturbance that would be produced by Shell's activities and does not adequately consider appropriate noise thresholds for potential harassment. Nor does the proposed IHA include sufficient mitigation to reduce impacts to the "least practicable." Each of these points is discussed in more detail below.

I. MARINE MAMMAL PROTECTION ACT

NMFS's proposed authorization to Shell 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[.]"[1] 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."[2] The primary mechanism by which the MMPA protects marine mammals is through a moratorium on takings.[3] 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."[4] "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."[5]

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.[6] 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.[7] Finally, an activity in the Arctic cannot have the "potential to result in serious injury or mortality[.]"[8]

A. Uncertainty

In determining whether to proceed with Shell's request, NMFS must first consider the extent of missing information as to both the environmental baseline in the Arctic and marine

[1] 16 U.S.C. § 1361(1).
[2] H. Rep. No. 92-707, at 11 (1971), reprinted in 1972 U.S.C.C.A.N., pp. 4144, 4154.
[3] 16 U.S.C. § 1371(a).
[4] *Id.* §1362(13).
[5] *Id.* § 1362(18); *see also* 50 C.F.R. § 216.3 (defining "Level A" and "Level B" harassment).
[6] *See* 16 U.S.C. § 1371(a)(5)(D)(i).
[7] *Id.* § 1371(a)(5)(D)(ii)(I).
[8] 50 C.F.R. § 216.107(a).

mammal responses to noise in general. Both counsel in favor of extreme caution in implementing NMFS's statutory responsibilities.[9]

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."[10] 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."[11] These same observations have been echoed by others.[12] 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.[13] The need for this baseline information is apparent even for bowhead whales, one of the better studied species in the Arctic.[14] 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.[15]

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.[16] We agree. The lack of adequate information precludes NMFS from ensuring compliance with the demanding standards of the MMPA and should compel NMFS defer all oil and gas-related marine mammal harassment authorizations while the necessary information is gathered.

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[9] 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.

[10] 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).

[11] National Oceanic and Atmospheric Administration (NOAA), 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. 9, 2009).

[12] *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); National Commission 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 Commission, Offshore Drilling in the Arctic: Background and Issues for the Future Consideration of Oil and Gas Activities, Staff Working Paper No. 13 at 19 (listing acoustics research on impacts to marine mammals as a "high priority"). The uncertainty extends to other species as well, particularly fish, which are an important part of the diet for some marine mammals. NMFS Multi-Sale Cmts at 16.

[13] 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.

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

[15] *Id*. at 176.

[16] NMFS Multi-Sale Cmts at 3-5.

B. Potential for Serious Injury

In 1994, Congress amended the MMPA to add provisions that allow for the incidental harassment of marine mammals through IHAs, as has been proposed for Shell's exploration drilling. All IHAs are limited to activities that will result in only the "taking by harassment" of marine mammals.[17] For those activities that could result in "taking" other than harassment, interested parties must continue to use the pre-existing procedures for authorization through specific regulations, often referred to as "five-year regulations."[18]

In 1996, NMFS issued "interim final" regulations implementing the 1994 amendments to the MMPA.[19] The regulations emphasize that an IHA in the Arctic cannot be used for "activities that have the *potential* to result in serious injury or mortality[.]"[20] In the preamble to the proposed regulations, NMFS explained that if there is a potential for serious injury or death, it must either be "negated" through mitigation requirements or the applicant must instead seek approval through five-year regulations.[21]

The caution exhibited by NMFS in promulgating the 1996 regulations is consistent with the MMPA's general approach to marine mammal protections. Legislative history confirms that at the time of the MMPA's original passage Congress intended to build in a "conservative bias" that would avoid adverse or irreversible effects "until more is known."[22] The committee report that accompanied the House version of the 1994 amendments emphasizes that the IHA provisions were not intended to "weaken any of the existing standards which protect marine mammals and their habitats from incidental takes[.]"[23] When Congress created an alternate route for authorizing marine mammal takes in 1994, it did so only for take by harassment and it simultaneously added a definition of "harassment" to include activities with even the "potential" to injure or the "potential" to disturb marine mammals.[24]

Consequently, although Congress in 1994 expressly brought a great number of activities within the jurisdiction of the MMPA with an expansive statutory definition of harassment, those applicants would often benefit from a streamlined IHA procedure. The existing five-year regulation process was preserved for activities that risked more serious marine mammal take.

The proposed IHA, however, indicates that to meet the "potential" threshold a proposed activity must be "reasonably expected or likely" to result in serious injury or mortality.[25] This approach conflates two very different regulatory provisions that govern the issuance of IHAs. A "negligible impact" determination expressly includes only those adverse effects that are "reasonably expected" and "reasonably likely" to occur.[26] The proposed IHA has imported this

[17] 16 U.S.C. § 1371(a)(5)(D)(i).
[18] *See id*. § 1371(a)(5)(A).
[19] 61 Fed. Reg. 15,884 (April 10, 1996).
[20] 50 C.F.R. § 216.107 (emphasis added).
[21] 60 Fed. Reg. 28,379, 28,380-81 (May 31, 1995).
[22] H.R. Rep. 92-707, at 5 (1971) *reprinted in* 1972 U.S.C.C.A.N. 4144, 4148.
[23] H.R. Rep. 103-439, at 37 (1994).
[24] 16 U.S.C. § 1362(18).
[25] 76 Fed. Reg. at 68,993; *see also id*. ("reasonably expected to occur").
[26] *See* 50 C.F.R. § 216.103.

standard despite the clear choice of an entirely different term ("potential") in § 216.107; a term that is commonly defined much more broadly to include even those things "existing in possibility[.]"[27] Moreover, NMFS has recognized that even when applying the MMPA's "negligible impact" standard the "probability of occurrence of impacts must be balanced with the potential severity of harm to the species[.]"[28] There is no indication that NMFS considered the dire consequences of a spill when determining whether the "potential" for serious harm exists.

Last year's *Deepwater Horizon* disaster underscored the inherent risks of exploration drilling in frontier environments. Indeed, the risk of well-control incidents is substantially *higher* during exploration drilling activities than it is during development, as recently acknowledged by the Bureau of Ocean Energy Management (BOEM).[29] More accurately, as NMFS has recognized, no amount of regulatory oversight can alter the fact that spills are an inevitable byproduct of oil and gas operations.[30] NMFS must carefully consider these risks and apply the appropriate MMPA standard.[31]

C. Counting Marine Mammals

The number of marine mammals that will be harassed by Shell's proposed oil and gas exploration activities is necessary to determine not only whether a proposed IHA exceeds the

[27] *See* Merriam Webster's New Collegiate Dictionary 900 (1974); *see also id*. ("capable of development into actuality"). The Supreme Court has observed that the concept is "inherently probabilistic[.]" *James v. U.S*., 550 U.S. 192, 207 (2007) (reviewing the terms "potential" and "risk"); *see also Forest Conservation Council v. Rosboro Lumber Co*., 50 F.3d 781, 784-85 (9th Cir. 1995) (noting that a "potential injury" is one that "may or may not occur"). *Cf.* 59 Fed Reg. 50,372, 50,373 (Oct. 3, 1994) (concluding that although "most" population surveys do not result in injury to marine mammals, a 1,000 foot threshold for aerial surveys is required to qualify for a general authorization based on the assumption that a stampede in a pinniped haul out area would occur with the "potential" to injure pups).

[28] 54 Fed. Reg. 40,338, 40,343 (Sept. 29, 1989).

[29] BOEMRE, Final Supplemental EIS, Chukchi Sea Planning Area, Oil and Gas Lease Sale 193 in the Chukchi Sea, Alaska, OCS EIS/EA BOEMRE 2011-041, Appendix B at B2-B3 (Aug. 2011). *See also* Pew Environment Group, Oil Spill Prevention and Response in the U.S. Arctic Ocean: Unexamined Risks, Unacceptable Consequences at 37 (2010) (noting that from 1992 to 2006, the rate in the United States "was one blowout for every 387 wells drilled, for 39 total blowouts through the end of the 1990s"); WWF-Canada Arctic Offshore Drilling Review, NEB File: OF-EP-Gen-AODR 01 Suggested Studies and Preliminary Response to CFI #1 and CFI #2 at 9 (Nov. 29, 2010) (noting information indicating 4 blowouts from a total of 647 wells in Canadian offshore waters, or one in every 162 wells drilled").

[30] 75 Fed. Reg. 77,476, 77,487 (Dec. 10, 2010) ("Although planning, management, and use of best practices can help reduce risks and impacts, the history of oil and gas activities, including recent events, indicates that accidents cannot be eliminated. Tanker spills, pipeline leaks, and oil blowouts are likely to occur in the future, even under the most stringent regulatory and safety systems").

[31] NMFS cites a 2008 report for its calculation of the risks of an oil spill from exploration drilling. 76 Fed. Reg. at 68,993 (citing Bercha 2008). The report shows that blowouts that could spill large quantities of oil occur during exploration drilling. For example, it states that 3.5 out of every 10,000 exploration wells drilled in water between 30 and 60 meters deep, as here, would result in a well blowout equal to or greater than 150,000 barrels of oil. Bercha Group. 2008. Alternative Oil Spill Occurrence Estimators and their Variability for the Beaufort Sea—Fault Tree Method. OCS Study MMS 2008-035 at 4.30 (Table 4.17). More than six out of every 10,000 would result in a blowout spill between 10,000 and 149,999 barrels of oil. *Id.* Another table in the report indicates that spills are over two and a half times more likely to occur during exploration well drilling than during development well drilling. *Id.* at 2.9 (table 2.9) (compare exploration well overall spill frequency of 25.05 with development well overall spill frequency of 9.15).

MMPA's "small numbers" limitation but also whether there will be a non-negligible impact.[32] The estimates of take in the proposed IHA raise a number of concerns.

1. Density

With the exception of fall migrating bowhead whales, the proposed IHA adopts a strict density approach to counting harassed marine mammals. This approach, however, does not accurately account for the number of affected marine mammals because the method does not consider the animals' natural movements or the time period over which the activity occurs.

For example, NMFS has determined that the noise produced by the *Kulluk* could result in 1,245 square kilometers of the ocean ensonified to 120 dB for each well to be drilled (one in the summer and one in the fall).[33] Consequently, the proposed IHA calculates the number of exposed marine mammals by multiplying their expected seasonal densities by 1,245. This method ignores that the two wells are projected to require 78 days of drilling.[34] Marine mammals will inevitably move in and out of the disturbance zone – or will be deflected away from the disturbance zone – and potentially suffer MMPA harassment as a result. The MMPA definition of harassment is focused on "potential" harassment.[35] There is no indication that the proposed IHA considered marine mammal movement for time period over which the activities will occur.[36]

2. Drilling Noise

Based on modeling results from the *Kulluk*'s drilling in the Beaufort Sea in 1986, NMFS determined that noise levels of 120 dB could extend as far as 13.3 kilometers from the source.[37] NMFS applied a 1.5 multiplier, resulting in a distance of just under 20 kilometers.[38] As NMFS previously acknowledged, however, a more recent 1994 study determined that the *Kulluk*'s operations, combined with associated ice management activities, resulted in the 120-dB threshold reaching over 100 kilometers from the source.[39] For Shell's proposed 2007 drilling in the Beaufort Sea, NMFS adopted a "reasonably conservative distance" of 30 kilometers when calculating the number of marine mammals potentially exposed the 120 dB.[40] Even this was not conservative enough: the study reveals that the *Kulluk* alone produced noise in excess of 120 dB beyond 100 kilometers at 20 meters below the surface.[41] NMFS's modeling of noise levels fails

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[32] *See* 76 Fed. Reg. at 69,019 (noting that the negligible impact analysis depends in part on the "number, nature, intensity, and duration of Level B harassment").
[33] *Id*. at 69,011.
[34] *Id*. at 68,977.
[35] *Natural Res. Def. Council v. Evans*, 279 F. Supp. 2d 1129, 1157 (N.D. Cal. 2003) (observing that the MMPA language appears to support 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").
[36] *See also* Statement of Dr. David Bain, attached as Ex. 1. The estimations of take from ice management and seismic surveying appear to suffer from a similar flaw. 76 Fed. Reg. at 69,012-13.
[37] *Id*. at 69,011.
[38] *Id*.
[39] 72 Fed. Reg. 17,864, 17,868 (April 10, 2007).
[40] *Id*.
[41] Hall, *et al*., 1993 Kuvlum Exploration Project Site Specific Monitoring Program Final Report at 102-04 (May 20, 1994).

to address these issues and therefore understates the potential adverse impacts to marine mammals.[42]

The proposed IHA is also inadequate because it relies on modeling for the Sivulliq prospect to estimate the *Kulluk*'s drilling noise despite the fact that sounds are "expected to propagate shorter distances at the Sivulliq site[.]"[43] In contrast, NMFS took a "precautionary approach" when estimating the effects of drilling with the *Discoverer*, using the greater Torpedo site distance.[44]

NMFS must also consider whether the distance to the 120 dB contour for the *Discoverer* is accurate. The proposed IHA asserts that the estimated source levels for the *Discoverer* and the *Kulluk* are extremely close, and yet NMFS calculates very different disturbance zones for each. This issue requires additional explanation in any final IHA.[45]

3. Ice Management and Ice Breaking

The proposed IHA does not fully consider the marine mammal harassment that could arise from ice management and ice breaking activities. As noted, NMFS must first account for the movement of marine mammals during the time over which ice management and ice breaking will occur. Equally important, any final IHA must also accurately assess exactly when Shell's ice management and ice breaking will occur.[46]

Based on 2003-2005 ice presence at the drill site, Shell anticipates that the ice management vessels will be active for 38 percent of the 120-day drilling season, or approximately 45 days.[47] This issue is particularly critical for bowhead whales. Although Shell maintains that ice management will be limited to early July and late October, the sheer number of days in which Shell estimates that ice could be present indicates that there will be overlap with the peak of the fall migration, which occurs in mid-September through mid-October.[48] Moreover, it cannot be assumed that ice management will be neatly confined to be beginning and end of Shell's operations. As Shell recognizes, ice floes and pack ice "usually can be found

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[42] As detailed in the attached statement, the modeling relies on an inaccurate source level for the *Kulluk* and does not capture the efficiency of the propagation at the drill sites, as demonstrated in the 1994 study. *See* Ex. 1.
[43] 76 Fed. Reg. at 69,011.
[44] *Id.*
[45] *See* Lindow, Emily, NOAA, Email to Joseph C. Talbott, BOEMRE, Re. 1001-03b and 1101-02a(2) Camden Bay EP – Draft EA Review at pdf pg. 14 (July 28, 2011), attached as Ex. 2, (noting the similar source levels). This issue will be further discussed in comments to be submitted to NMFS on December 9 for the Shell's Chukchi Sea proposed IHA.
[46] Although the proposed IHA assumes that during ice management the "propeller is rotating at approximately 15-20 percent" of the vessel's propeller rotation capacity, resulting in reduced cavitation effects in the water, it does not provide any citation for the claim. 76 Fed. Reg. at 68,978. Even when vessels are limited to pushing ice they will be operating at either "relatively high" speed or with the continual use of "higher power," resulting in elevated noise levels. Air Sciences, Inc., Supplement to EPA Outer Continental Shelf Operating Permit Application at 32-33 (Feb. 28, 2011) (*Kulluk* Air App. Supp.).
[47] 76 Fed. Reg. at 68,976; *Kulluk* Air App. Supp. at 20-21.
[48] NMFS, Biological Opinion for Oil and Gas Leasing and Exploration Activities in the U.S. Beaufort and Chukchi Seas, Alaska and Authorization for Small Takes Under the Marine Mammal Protection Act, at 13-14 (July 17, 2008) (2008 BiOp). The proposed IHA's assumption that ice breaking "is not expected to occur during the bowhead migration" is contrary to Shell's own estimates. 76 Fed. Reg. at 69,012.

anywhere offshore in the Beaufort," and ice can be blown in "during any part of the drilling season."[49] The proposed IHA must also consider the effects of both ice management vessels operating simultaneously but at some distance apart.

4. Harassment Thresholds

The proposed IHA for Shell's exploration activities calculates harassment based on the exposure of marine mammals to impulse sounds (airgun surveying) at or above 160 dB and non-impulse sounds (drilling and ice breaking) at or above 120 dB. NMFS's uniform marine mammal harassment thresholds, however, do not consider the documented reactions of specific species found in the Arctic to much lower received levels. Critically, the generic thresholds do not reflect the MMPA definition of harassment to include even those actions with the "potential" to disturb marine mammals, 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."[50]

For example, studies confirm that migrating bowhead whales react to impulse sounds well below 160 dB. A 2007 comprehensive review of existing literature found that for migrating bowheads "the onset of *significant behavioral disturbance* from multiple pulses occurred at [received levels] around 120 dB re: 1 µPa[.]"[51] Migrating bowheads may respond to non-impulsive noise below the 120-dB threshold as well: the recent USGS report notes reactions to drillship noise at 110-115 dB.[52] Migrating bowheads may avoid icebreaking at distances of up to 25 kilometers.[53] The USGS report recognizes the well-documented phenomenon of beluga whales responding to icebreakers at great distances, considered "among the most cited and dramatic in the literature."[54] Reactions have been detected as far as 80 kilometers away.[55] Drilling noise has also provoked reactions in beluga whales below the 120-dB threshold.[56]

As it has expressly stated in response to previous comments, NMFS may be seeking a sound level that can be applied uniformly to all marine species in the Arctic by using generic

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[49] Shell, Revised Outer Continental Shelf Lease Exploration Plan, Camden Bay, Beaufort Sea, Alaska, Flaxman Island Blocks 6559, 6610 & 6658, Beaufort Sea Lease Sales 195 & 202, Appendix F – Environmental Impact Analysis at 3-10 (May 2011) (Beaufort EIA), available at http://boem.gov/Oil-and-Gas-Energy-Program/Plans/Regional-Plans/Alaska-Exploration-Plans/2012-Shell-Beaufort-EP/Index.aspx. *See also* Shell, Letter to U.S. Coast Guard, District 18, Re. Revised Request for the Establishment of Safety Zones for the Frontier Discoverer Drill Ship and the Semi Submersible Drill Unit *Kulluk* in the Beaufort Sea, Alaska at 2 (March 30, 2007) (noting that ice conditions similar to those in 2006 for Camden Bay would require that the drill rigs be "constantly ice managed"); Shell, Application for Incidental Harassment Authorization for the Non-Lethal Taking of Whales and Seals in Conjunction with Planned Exploration Drilling Program During 2012 Near Camden Bay in the Beaufort Sea, Alaska at 16 (Aug. 2011) (noting that ice floe frequency and intensity are "unpredictable").

[50] *Natural Res. Def. Council*, 279 F. Supp. at 1157 (emphasis added).

[51] Southall, et al., Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations, 33(4) Aquat. Mamm. 446, 452 (2007) (Southall 2007) (emphasis added). *See also* 76 Fed. Reg. at 68,988 (noting "strong" avoidance reactions).

[52] USGS Report at 181; *see also* National Research Council, Ocean Noise and Marine Mammals at 92 (2003) (NRC Report).

[53] 2008 BiOp at 82.

[54] USGS Report at 183.

[55] *Id.*

[56] Southall 2007 at 464 (Table 16); 466 (Table 17).

harassment thresholds.[57] This approach is undoubtedly more efficient, but it is not scientifically sound. Indeed, in other contexts, NMFS has recognized that a more nuanced approach is appropriate. For military exercises, NMFS now uses "behavior risk functions" designed to capture the potential for responses at a range of thresholds. At a minimum, the proposed IHA cannot apply thresholds that fail to accurately capture potential marine mammal harassment, as required by the standards imposed by the MMPA.[58]

5. Vessel Noise

During the 2012 exploration drilling, the *Kulluk* will be accompanied by eleven additional vessels. The presence of these vessels and the noise that they produce are another source of marine mammal harassment. As with other sources of non-impulsive noise, NMFS applies a 120-dB harassment threshold to determine harassment. In the proposed IHA, NMFS recognizes that vessels can be the source of significant noise: a 2008 study estimated sound pressure levels of 120 dB from a seismic vessel out to a distance of 21 kilometers.[59] Moreover, marine mammals, such as bowhead whales, have been shown to react to moving vessels at substantial distances.[60] The proposed IHA nevertheless states simply that "normal" vessel traffic is "not anticipated to impact marine mammals in a manner that would rise to the level of a taking[.]"[61] This blanket dismissal is unjustified. To satisfy the MMPA, NMFS must determine whether the projected increase in vessel presence and vessel noise around the drill sites and during transit across the Arctic have the "potential" to disturb marine mammals.

D. Specific Marine Mammals

1. Bowhead Whales

For the *Kulluk*, NMFS estimates close to 5,600 migrating bowhead whales would be potentially exposed to sounds at or above 120 dB in the first year of the drilling program alone.[62] As a result, a large percentage of the Western Arctic bowhead population could be affected each year.[63] Over 5,600 whales, or just over 35% of the Western Arctic bowhead population (as estimated in the proposed IHA), does not represent 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'

[57] 75 Fed. Reg. 49,710, 49,716 (Aug. 13, 2010) (responding to the comment that marine mammals react to lower sound levels, NMFS stated that it "believes that it cannot scientifically support adopting any single SPL value below 160 dB and apply it across the board for all species and in all circumstances").
[58] NMFS can refer to Ex. 1 for further discussion on this point.
[59] 76 Fed. Reg. at 68,978.
[60] BOEM, Environmental Assessment, 2012 Revised Outer Continental Shelf Lease Exploration Plan Camden Bay, Beaufort Sea, Alaska Flaxman Island Blocks 6559, 6610 & 6658 Beaufort Sea Lease Sales 195 & 202 at 86 (Aug. 2011); *see also* 2008 BiOp at 82 (noting predicted responses by bowheads to an icebreaker in open water).
[61] *Id*. at 68,979.
[62] *Id*. at 69,019 (Table 13).
[63] If Shell is unable to commence its Chukchi Sea drilling program, allowing for the use of the *Discoverer* in the Beaufort Sea, Shell estimates approximately 1,400 potentially affected whales in the first year. *Id*. Even in the scenario in which only the *Discoverer* is used in the Beaufort Sea in 2012, a large percentage of the bowhead whale population could be affected. For the purposes of this MMPA review, however, NMFS should assume that the *Kulluk* is used in the Beaufort Sea in order to capture the full extent of the potential effects.

intent."[64] The proposed authorization, as written, is contrary to the MMPA small numbers limitation.[65]

Moreover, Shell proposes to drill near an established feeding location for bowheads. NMFS has cautioned that loud noise and disturbance during the open water period "have the potential to cause large numbers of these whales to avoid using areas for resting and feeding for long periods of time (days to months) while the noise producing activities continue."[66] Consequences would be "of particular concern if [inaccessible] areas included those used for feeding or resting by large numbers of individuals or by females and calves."[67] Because of the "potential for noise disturbance to displace whales from important feeding areas, special scrutiny should be given to seismic and drilling operations that may impact those areas."[68]

Shell intends to drill two wells west of Camden Bay, near Flaxman Island and Brownlow Point. In a 2010 biological opinion, based on the best available information, NMFS identified the areas west and east of Camden Bay as having "special significance" to bowhead whales.[69] NMFS identifies the area near Camden Bay as one of three "key" feeding sites, along with Point Barrow and the eastern Beaufort Sea.[70] BWASP surveys have "long shown that areas within and on both sides of Camden Bay including, but not limited to, areas off Kaktovik and Brownlow Point were, in many years, areas of high use by bowhead whales."[71] The BWASP data are further bolstered by industry sightings of feeding whales near Camden Bay in 2007 and 2008.[72] Nuiqsut hunters have reported bowheads feeding and resting in Camden Bay, and industry surveys in the area sighted a high percentage of resting bowheads in 2006 as well.[73]

As NMFS and MMS previously recognized, "protective measures should be designed to reduce the potential for disruption of biologically significant behaviors or help ensure that whales do not avoid important key habitat areas (*and thus potentially negate a negligible impact*

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[64] *Natural Res. Def. Council*, 279 F. Supp. 2d at 1152.
[65] 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). Tellingly, the proposed IHA does not include a specific "small numbers" finding for bowhead whales. *But see* 50 C.F.R. § 216.107(b) (noting that issuance of an IHA is to be based on a "determination" that the number of taken marine mammals will be small).
[66] 2008 BiOp at 89.
[67] *Id*. at 86.
[68] *Id*. at 99; *see also id*. at 68 (stating that "[s]mall deflections in individual bowhead swimming paths and a reduction in use of possible feeding areas near exploration units may result in adverse effects on the species").
[69] NMFS, 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 24 (July 13, 2010) (2010 BiOp); *see also id*. (stating that "[l]arge numbers" of whales "have been documented feeding in the area in multiple years").
[70] *Id*. at 25.
[71] *Id*. at 24; *see also id.* at 67 (noting that BWASP surveys indicate that aggregations of bowhead whales, including feeding aggregations, "more likely" to be encountered in some areas, listing Brownlow Point among others); Ferguson et al., A Tale of Two Seas: Lessons from Multi-decadal Aerial Surveys for Cetaceans in the Beaufort and Chukchi Seas (2011 powerpoint) (slide 15, showing feeding and milling bowhead whales around Camden Bay); A larger version of the slide is attached as Ex. 3.
[72] Beaufort EIA at 3-79.
[73] Declaration of Dr. Robert Suydam in Support of Nos. 09-73944 and 10-70368 at 8 ¶ 19; LGL Alaska Research Assoc. Inc., Joint Monitoring Program in the Chukchi and Beaufort Seas July-November 2006 at 8-14 (Table 8.3) (Nov. 2007).

finding under the MMPA)[.]"[74] The proposed IHA, however, disregards this warning – and those in the biological opinions – by simply assuming that whales can find an alternative feeding ground if unable to use the Camden Bay site.[75]

Shell's proposed drilling is also likely to affect bowhead cows and calves. Bowhead whales are a long-lived, late-maturing species with relatively low reproductive rates and extremely high maternal investment in their young. Any potential impacts on females and calves merit "special consideration."[76] The ability of the female bowhead whale to provide adequate care to her offspring during its period of dependency is "critical to the continued recovery and the long-term viability of the population."[77] In the past, NMFS has consistently required "safety zones" for multiple migrating cow-calf pairs in the Beaufort Sea when issuing harassment authorizations pursuant to the MMPA.[78]

As noted, migrating bowhead whales are known to feed and rest near the drill sites, and the noise from Shell's activities may result in thousands of whales, including cows and calves, deflecting away from the area.[79] Further, Shell's activities may disproportionately affect cows and calves. Bowhead cow-calf pairs are thought to be more sensitive to noise, and are thus more likely to respond to disturbances at lower thresholds.[80] Cows and calves are also known to favor the tail end of the spring and fall migrations.[81] Cows and calves from the spring migration could be subjected to disturbance both from Shell's vessels as they transit to the Beaufort and Chukchi sea drilling sites in July and from Shell's Beaufort Sea summer operations. In the fall, most cows and calves are likely to migrate past the drill sites after Shell resumes its operations following the subsistence hunts.[82]

The proposed IHA's failure to adequately address these concerns undermines its conclusions as to the degree of impact that Shell's proposal will have on bowhead whales.

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[74] MMS/NOAA, Draft Programmatic EIS, Seismic Surveys in the Beaufort and Chukchi Seas, Alaska, OCS EIS/EA MMS 2007-001 at II-8 (Feb. 2007) (emphasis added).

[75] *See* 76 Fed. Reg. at 69,019. NMFS in fact cautioned against ignoring bowhead feeding near the drill sites in its comments to BOEM's draft EA for Shell's Beaufort Sea exploration plan. *See* Ex. 2 at pdf pgs. 27 ("vital to note the importance of the area as a feeding ground for bowhead whales); 40 ("impacts of noise on feeding bowhead whales need to be discussed").

[76] MMS, Final Programmatic Environmental Assessment, Arctic Outer Continental Shelf Seismic Surveys – 2006 at 110 (June 2006) (2006 PEA).

[77] *Id*.

[78] *See, e.g*., NMFS, Finding of No Significant Impact for the Issuance of an Incidental Harassment Authorization for Shell Offshore Inc., to Take Marine Mammals Incidental to Conducting an Offshore Drilling Program in the Beaufort Sea off Alaska at 3-4 (Oct. 24, 2007) (2007 FONSI).

[79] 2010 BiOp at 24 (observing that "females with calves have been documented using the area in approximately the same proportions as they exist in the population").

[80] *See* 2008 BiOp at 86 (noting that in other species "females with young are more responsive to noise and human disturbance than other segments of the population"); 2006 PEA at 111 (noting heightened response of female baleen whales accompanied by calves).

[81] 2010 BiOp at 19 (In the spring, the "last whales to pass Barrow tend to be females that are accompanied by calves[.]"); 76 Fed. Reg. at 69,020 ("Cow/calf pairs typically migrate through the area later in the season (i.e., late September/October[.])").

[82] NMFS should further examine the potential impacts of a major spill on bowhead whales. For example, although the proposed IHA notes that a late-season spill could contaminate the spring lead system, it does not appear to consider whether a spill in October could affect both fall and spring migrants. *See* 76 Fed. Reg. at 68,995.

Indeed, any IHA allowing for a large-scale disruption of feeding near Camden Bay would exceed the negligible impact standard of the MMPA.

2. Beluga Whales

As noted, *supra*, beluga whales are known to be extraordinarily sensitive to noise. Beluga reactions to icebreakers are well documented, and although responses vary, belugas have been shown to flee from vessel noises as well.[83] Belugas may react to drilling noise at thresholds as low as 110 dB.[84] There is likely to be some degree of ice management during Shell's drilling and a considerable number of support vessels are included in the operation. Despite the fact that belugas – like bowhead whales – will be migrating in the area, the proposed IHA does not consider their movement when calculating take, citing to the lower beluga densities and a lack of detailed data.[85] This, however, does not eliminate the need to consider belugas' migratory movements.[86] Furthermore, the lack of detailed data should justify a conservative approach to the potential for harm. As confirmed in the recent USGS report, information on the essential spatial and temporal habitat needs of beluga whales is limited, severely compromising the ability to assess the impacts of Shell's proposal.[87]

3. Ice Seals

Any final IHA must analyze the potential effects of all of Shell's operations on ribbon, ringed, spotted, and bearded seals and must do so considering the distinct habitats and life histories for each. NMFS should apply a cautionary approach given the recognition that "[t]here is a basic lack of information about ice seals."[88]

A recent outbreak of skin lesions and sores among ringed seals, accompanied by higher than normal levels of mortality, complicates this analysis.[89] To date, most reports have come from around Barrow, and the weakened state of the population should be considered as part of NMFS's analysis.[90]

Even if all the seal populations were robust, allowing additional offshore industrial activity risks harm. Low-frequency noise can mask biologically significant sounds, and Shell's

[83] NRC Report at 94-95.
[84] *See* Southall 2007 at 464 (Table 16); 466 (Table 17).
[85] 76 Fed. Reg. at 69,008.
[86] *See also* Ex. 1.
[87] USGS Report at 184. NMFS should also revisit the proposed IHA's conclusions as to the effects of an oil spill on beluga whales. It is unclear why the Beaufort stock's migration into the Beaufort Sea in the spring results in the conclusion that a oil spill in the summer would "not be expected to have major impacts[.]" 76 Fed. Reg. at 68,995.
[88] USGS Report at 187; *see also id*. ("Key information about the abundance, distribution, and vital aspects of ice seals is incomplete"); Ex. 2 at pdf pg. 50 (NMFS's "lack of understanding about ice seal stock structure in general means we are unsure about what stock is potentially being impacted in a specific area"). As noted, *infra*, portions of the ringed and bearded seal populations have also been proposed for listing pursuant to the ESA. The ribbon seal is considered a ''species of concern'' under the ESA. The proposed listings were prompted, in part, by the effects of climate change on ice seal habitat, and the added stress of diminishing habitat should be considered in NMFS's analysis here. *See* 76 Fed. Reg. at 77,511-12 (discussing sea ice losses); 76 Fed. Reg. at 77,492 (same).
[89] NOAA, 2011 Arctic Seal Disease Outbreak Fact Sheet (updated Nov. 22, 2011). Some spotted and bearded seals have shown symptoms as well.
[90] *Id.*

operations – including drilling, ice breaking, vessel movements, and low-flying aircraft – could also disrupt normal behavior, causing seals not only to flee preferred habitat but expend extra energy in doing so.[91] NMFS also should consider whether Shell's ice management efforts have the potential to seriously injure or kill ringed seals resting on pack ice.[92]

E. Cumulative Effects

The proposed IHA cannot assure that permitted activities will have no more than negligible impacts on marine mammals without looking at both the activities scheduled to take place this summer in the Arctic Ocean and the activities planned for the near future.

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.[93] 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.[94] 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-occurring in time and space[.]"[95] Courts have sensibly applied the same principle in other contexts when confronted with an agency's failure to evaluate the effects of multiple activities.[96]

It is essential that NMFS consider the multiple years of drilling in the Beaufort Sea along with the impacts of Shell's related proposal to simultaneously drill in the Chukchi Sea.[97] Moreover, both ConocoPhillips and Statoil have indicated that they are preparing for exploratory drilling in the Chukchi Sea beginning in 2013, which – combined with Shell's efforts – could result in three drilling operations in close proximity to one another.[98] The State of Alaska recently expressed a strong interest in exploiting oil and gas reservoirs that can be accessed in state waters. The State's decision could prompt seismic surveying as companies determine

[91] MMS, Draft Environmental Impact Statement, Beaufort Sea and Chukchi Sea Planning Areas, Oil and Gas Lease Sales 209, 212, 217, and 221,OCS EIS/EA MMS 2008-0055 at 4-185-86 (2008).
[92] *Id*. at 4-181; *cf*. 76 Fed. Reg. at 69,001 (discussing seals and ice management).
[93] 16 U.S.C. § 1371(a)(5)(D)(i).
[94] *See*, *e.g.*, 2008 BiOp at 86.
[95] 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 9 (March 2010) (2010 Expert Panel Review). *See also* 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 (March 9, 2011). The issue is also discussed extensively in the recent USGS report on the Arctic.
[96] *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.").
[97] The effects of the marine mammal harassment associated with Shell's Chukchi Sea drilling plans are detailed in comments to be submitted to NMFS on December 9.
[98] ConocoPhillips has already submitted its exploration plan to BOEM. *See* http://alaska.boemre.gov/ref/ProjectHistory/2011_Chukchi_COP/draftEP/draftEPx.HTM.

potential locations for exploration. NMFS has indicated that ION Geophysical intends to conduct its Beaufort Sea 2D surveying in 2012, and Shell may soon propose exploration drilling on its leases in Harrison Bay.[99] To comply with the MMPA, NMFS must also determine what industrial activities are planned in Canadian and Russian waters for 2012 and beyond.[100] NMFS cannot accurately assess the potential for harm from Shell's proposed marine mammal harassment in the Beaufort Sea without considering effects in the context of these other activities occurring throughout the Arctic

F. Least Practicable Impact/Monitoring Requirements

Pursuant to the MMPA, an IHA must prescribe "means of effecting the least practicable impact" on a species or stock and its habitat.[101] As is clear from the language chosen by Congress, the emphasis is on reducing effects to the lowest level possible.[102] The MMPA also requires measures to ensure the monitoring and reporting of marine mammal takes.[103]

There is general consensus that time and place restrictions designed to protect high-value habitat are one of the most effective means to reduce the potential impacts of noise and disturbance, including noise from oil and gas exploration.[104] NMFS should require such measures in order to limit the harmful effects on bowhead whales. Requiring Shell to end its drilling earlier in the season would reduce the overlap of the operations with the peak of the fall migration. NMFS should also consider and impose limits on the location of the drilling to ensure that impacts are reduced. NMFS itself, for example, recommended to BOEM that it consider an alternative that would require drilling the Torpedo sites in the first year, potentially placing the disturbances on the northern edge of the bowhead migratory corridor and allowing for monitoring that would inform later drilling.[105]

NMFS should also consider and impose conditions restricting late-season drilling in order to avoid an oil spill when offshore conditions will hinder clean up and containment efforts. The proposed IHA observes that a spill late in the year could remain trapped in the ice until the spring, re-emerging in the lead system and threatening more significant harm to migrating beluga

[99] Ex. 2 pdf pg. 65. Interested parties will likely soon begin submitting IHA applications to NMFS in advance of the 2012 Open Water Meeting. NMFS should review these as well in advance of making a determination on Shell's IHA application.
[100] After a lull of two decades, activity is once again increasing in Canadian waters. Several companies have purchased exploration rights for areas in the Beaufort Sea. For example, Imperial Oil has committed to spending $585 million on drilling there. CBC News, Offshore Oil Drilling Debated at Arctic Meetings (Sept. 12, 2011), available at: http://www.cbc.ca/news/business/story/2011/09/12/north-national-energy-board-roundtable-offshore-oil.html. The largest potential future development in the region is the Mackenzie Gas Project, a pipeline through the Mackenzie River corridor to transport natural gas to market.
[101] 16 U.S.C. § 1371(a)(5)(D)(ii)(I).
[102] *See Natural Res. Def. Council*, 279 F. Supp. 2d at 1159 (noting that the language imposes a "stringent" standard).
[103] 16 U.S.C. § 1371(a)(5)(D)(III). Although the proposed IHA includes provisions for aerial monitoring, the 2010 Open Water Meeting expert panel included a number of comments on how it should be conducted. 2010 Expert Panel Review at 4-5. NMFS should also require that any resulting monitoring data should be made freely available to the public.
[104] *See, e.g.*, Letter from Dr. Jane Lubchenco, Undersecretary of Commerce for Oceans and Atmosphere, to Nancy Sutley, Chair, Council on Environmental Quality at 2 (Jan. 19, 2010).
[105] Ex. 2 at pdf pg. 6.

and bowhead whales.[106] Were a spill to occur in the fall, it is virtually assured that clean-up methods – unproven in the harsh Arctic environment – will be inadequate to the task. Moreover, conditions could result in a spill continuing unchecked through the winter months. NMFS and others have recognized that the difficulties experienced in stopping and containing the oil blowout at the *Deepwater Horizon*, "where environmental conditions and response preparedness [we]re comparatively good, point toward even greater challenges of attempting a similar feat in a much more environmentally severe and geographically remote location."[107]

In the past, NMFS has typically required multiple safety zones through the IHA process to protect marine mammals in the Beaufort Sea from the harmful effects of exploration activities. Previous IHAs required shut downs/power downs based on the presence of multiple whales engaging in biologically significant behavior (such as feeding) or the presence of cow-calf pairs.[108] Although spatial-temporal based exclusions are generally preferable given the difficulties of real-time marine mammal monitoring, these measures attempt to address the frequently expressed concerns of both NMFS and BOEM that, in order to avoid population level effects, activities should avoid disrupting biologically significant activities, particularly when cow-calf pairs are present.[109]

Finally, particularly in light of the issues raised, *supra*, with regard to the proposed IHA's modeling and the noise produced by the *Kulluk*, NMFS should strongly consider whether different drilling equipment should be required. Allowing for the use of a drilling vessel that will disturb a substantial portion of the bowhead population does not ensure that effects are reduced to the least practicable.

G. Subsistence

The MMPA also requires that any incidental take authorized will not have "an unmitigable adverse impact on the availability of such species or stock for taking for subsistence uses" by Alaska Natives.[110] NMFS must ensure that Shell's activities do not reduce the availability of any affected population or species to a level insufficient to meet subsistence needs.[111] In addition to the issues already noted in these comments, NMFS should also evaluate the potential impacts of future activities in both oceans and the acknowledged uncertainty regarding the effects of noise in the marine environment in the context of subsistence hunting. The importance of marine mammals to coastal communities strongly favor a precautionary approach.[112]

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[106] 76 Fed. Reg. at 68,995. NMFS has previously warned that "[s]pecial precautions should be taken" to ensure that any spilled oil does not reach areas in or near the spring lead system, the fall migration corridor, or whale feeding areas. 2008 BiOp at 116-17. *See also* Ex. 2 at pdf pg. 17 (noting that a worst-case discharge is a spill just before ice formation).

[107] 76 Red. Reg. 77,496, 77,509 (Dec. 10, 2010).

[108] *See* 72 Fed. Reg. 17,864, 17,870 (Apr. 10, 2007) (proposed drilling IHA); 2007 FONSI at 3-4.

[109] *See* 2006 PEA at 110-111 (noting sensitivity of baleen whale cow-calf pairs and as well as potential effects when key habitat is affected).

[110] 16 U.S.C. § 1371(a)(5)(D)(i)(II).

[111] 50 C.F.R. § 216.102.

[112] *See* 50 C.F.R. § 216.104(c) (requiring best available science standard for subsistence finding).

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. 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 (EIS) in order to assess seismic survey permitting throughout the Beaufort and Chukchi seas.[113] That effort resulted in a 2009 draft EIS, 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[.]"[114] A new process was then initiated with NMFS announcing in 2010 its intent to prepare an EIS to analyze the environmental impacts of issuing take authorizations incidental to all exploration activities, including both seismic surveys and exploratory drilling.[115]

As our groups have repeatedly brought to NMFS's attention, NEPA regulations make clear that agencies should not proceed with authorizations for individual projects like the Shell drilling proposals until an ongoing programmatic EIS is complete.[116] Shell's Arctic plans are unprecedented in scope, with two drilling fleets operating simultaneously in both seas over multiple years, resulting in 10 new exploration wells. The project will include 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 Shell'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.[117]

B. Endangered Species Act

The proposed IHA indicates that NMFS will initiate self-consultation for three listed marine mammal species.[118] 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 be finalized long before Shell proposes to begin its drilling program.[119]

For endangered bowhead whales, NMFS issued a regional biological opinion in July 2008 for oil and gas leasing and exploration. Although it concludes that jeopardy is not likely to occur

[113] 71 Fed. Reg. 66,912 (Nov. 17, 2006).
[114] 74 Fed. Reg. 55,539 (Oct. 28, 2009).
[115] 75 Fed. Reg. 6,175 (Feb. 8, 2010).
[116] *See* 40 C.F.R. § 1506.1(c).
[117] The EIS may also illuminate issues such as necessary mitigation measures and important time and place restrictions.
[118] 76 Fed. Reg. at 70,007.
[119] *See* 76 Fed. Reg. at 77,476 (ringed); 76 Fed. Reg. at 77,496 (bearded).

based on a consideration of potential effects at the programmatic level, it also notes that there is the possibility of greater harm from site-specific exploration activities. For example, consequences "would be of particular concern" were whales to avoid areas used for feeding or resting by large numbers of individuals or by females and calves.[120] As detailed, *supra*, NMFS has found that the area around Camden Bay is in fact an important bowhead whale feeding area.

NMFS must also reconsider the potential effects of a major oil spill. The recent 2010 biological opinion for Shell's Arctic surveying did not independently consider the effects of an oil spill, instead relying on the analysis contained in the 2008 regional biological opinion.[121] That approach would be inappropriate here. NMFS's 2008 review lacks a site-specific oil spill analysis based on the known parameters of Shell's existing proposal. With Shell's proposed drilling to take place in the whales' migration corridor, during a period that will overlap with the fall migration, and proximate to an important feeding area, the 2008 biological opinion's conclusions as to the potential for harm must be reconsidered. Further, the difficulties in mounting an effective spill response have been starkly illustrated by the Gulf of Mexico disaster and should be taken into account as applied to the Arctic, a considerably more remote and more challenging environment in which to operate.[122]

Respectfully,

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[120] 2008 BiOp at 86.
[121] 2010 BiOp at 2.
[122] 75 Red. Reg. at 77,509.

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Exhibit 1

Comments on Planned Exploration Drilling Program Near Camden Bay in the Beaufort Sea, Alaska
By Dr. David Bain

Comments on Planned Exploration Drilling Program Near Camden Bay in the Beaufort Sea, Alaska
By Dr. David Bain

I am submitting this statement regarding the proposed exploration drilling program in the Beaufort and Chukchi Seas. I received my B.A. with majors in Biology and Psychobiology with Physics in 1980 and Ph.D. in Biology in 1989 from the University of California at Santa Cruz. I have authored over 30 peer-reviewed papers and reports on the behavioral ecology of marine mammals, especially of killer whales (*Orcinus*). A substantial portion of this work has been concerned with audition, sound production, and other aspects of the acoustic ecology of these species. I have conducted studies for the National Marine Mammal Laboratory and other branches of the National Marine Fisheries Service, Minerals Management Service, and U.S. Geological Survey on the impacts of acoustic disturbance on individuals and populations of marine mammals. Reports based on these and other disturbance related studies have been published in books and peer-reviewed journals and presented at scientific meetings of the International Whaling Commission, the Society for Marine Mammalogy, and the Acoustical Society of America. For this statement, I have reviewed NMFS's proposed incidental harassment authorization (IHA), Shell's exploration plan, IHA application, environmental impact assessment, and other related documents.

The drill sites are central to the migration route of bowhead whales. As a result, a large proportion of the population will be exposed to the drilling project. The Camden Bay sites are in a location where the migration corridor is narrow. This will require nearly all bowheads passing by a drill site while it is active to be exposed to biologically significant levels of noise.

Noise exposure is likely to result in stress. Stress can impair the immune system, resulting in an increase in mortality from disease (Rolland, R. M., P. K. Hamilton, S. D. Kraus, B. Davenport, R. M. Gillett, and S. K. Wasser. 2006. Faecal sampling using detection dogs to study reproduction and health in North Atlantic right whales (*Eubalaena glacialis*). J. Cetacean Res. Manage. 8:121–125 and Romano, T. A., M. J. Keogh, C. Kelly, P. Feng, L. Berk, C. E. Schlundt, D. A. Carder and J. J. Finneran. 2004. Anthropogenic sound and marine mammal health: measures of the nervous and immune systems before and after intense sound exposure. Can J. Fish. Aquat. Sci. 61:1124-1134).

The waters near the Camden Bay drill site include an important resting area. The noise associated with drilling and drilling support will likely divert whales away from this area. The loss of use of resting areas such as Camden Bay will require greater energy expenditure.

The waters near the Camden Bay drill site include an important feeding area (NMFS. 2010. Biological opinion on issuance of incidental harassment authorizations for oil and gas exploration activities in the Chukchi and Beaufort seas in 2010). Industrial noise associated with drilling will deflect whales away from this feeding area. Prey densities far above average are

needed to support feeding. That is, the shift of feeding areas from locations with high prey density to areas with low prey density will reduce food intake. Any assumption that displacement to another part of the range is harmless does not have a sound basis.

Taken together, loss of feeding and resting opportunities and an increase in travel distance will impair the energy balance of affected individuals (*see* Bain, D. E. 2002. A model linking energetic effects of whale watching to in killer whale (*Orcinus orca*) population dynamics. Contract report submitted to Orca Relief Citizens' Alliance).

Bowhead whales are a slow growing species (Allen, B. M., and R. P. Angliss. 2011. Alaska marine mammal stock assessments, 2010. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-223, 292 p.). Impairing the energy balance will slow growth further. In turn, this will lead to delayed onset of sexual maturity. A consequence of this will be reduced recruitment of calves to the population.

Lactation requires approximately twice as much energy expenditure by new mothers than by non-reproductive females (Oftedal, O.T. 1997. Lactation in whales and dolphins: evidence of divergence between baleen- and toothed-species. J. Mammary Gland Biol. Neoplasia 2:205-30). As a result, bowheads spend years storing the energy needed to reproduce successfully.

Impairing the energy balance will increase the interval between successful calf recruitment (Lockyer, C. 1984. Review of baleen whale (*Mysticeti*) reproduction and implications for management. Rep. Int. Whal. Commn (Spec. Iss. 6):27-50). In turn, this will result in a reduction in the number of calves recruited to the population.

Bowheads are a long-lived species, with some individuals living well over 100 years (George, J. C., J. Zeh, R. Suydam and C. Clark. 2004. Abundance and population trend (1978-2001) of Western Arctic bowhead whales surveyed near Barrow, Alaska. Marine Mammal Science, 20(4):755-773). Such a long lifespan requires successfully overcoming disease. Many diseases inhibit feeding until the immune system overcomes the infection.

To survive this period of non-feeding, individuals must have an adequate blubber layer. Impaired energy balance reduces the probability that an individual will survive an infection. In turn, this would lead to additional mortalities in the population. Further, females who die young will not produce as many calves as they would have if they lived a normal lifespan.

The distance at which individuals will avoid the drill site will vary with a number of factors. How much noise drilling operations will make will vary with conditions. In particular, managing ice requires production of high levels of noise (Richardson, W. J., Jr. C.R. Green., R. Malme and C. I. Thomson. 1995. Marine mammals and noise. Academic Press. San Diego). Some individuals are disturbed by low levels of noise, and will avoid the drill sites by many tens of kilometers.

Hearing loss or masking from exposure to high levels of noise would impair bowhead whales' ability to hear vocalizations. Vocalizations are important for finding mates. Failure to find mates could result in a reduction in calf recruitment. Echoes from vocalizations are likely to provide important information on ice thickness. Failure to correctly assess ice thickness could result in an increase in mortality (Ellison, W.T., C. W. Clark, and G. C. Bishop. 1987. Potential use of surface reverberation by bowhead whales, *Balaena mysticetus*, in under-ice navigation: preliminary considerations. Report of the International Whaling Commission 37:329-332).

Predators can be detected at greater distances acoustically than visually by healthy individuals. Hearing loss and masking would increase vulnerability to predation, which in turn could increase mortality. Hearing loss and masking may also increase vulnerability to ship strike.

Cumulative effects are of further concern. "The accumulation of impacts from vessels, seismic exploration, and drilling are of concern across the North Slope of Alaska," (Allen, B. M., and R. P. Angliss. 2011. Alaska marine mammal stock assessments, 2010. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-223, 292 p.). That is, when looking at the biological impact on bowhead whales, drilling in the Beaufort cannot be considered separately from other planned activities, including similar activities in the Chukchi Sea.

Drilling in both seas over two years is likely to result in a higher fraction of the population being exposed to disturbance, and some individuals being exposed multiple times for a longer total period of time, and a possible increase in stress due to repeated exposure. Further, if exploratory drilling results in future production, the cumulative effect of production in the core of the migration route needs to be considered.

Cumulative effects on the population are likely to increase at a steeper than linear rate. That is, doubling exposure to disturbance is likely to more than double population level effects, such as reductions in fecundity and increases in mortality, (Bain, D. E. 2002. A model linking energetic effects of whale watching to in killer whale (*Orcinus orca*) population dynamics. Contract report submitted to Orca Relief Citizens' Alliance).

The number of individuals that would be added to the population in the absence of disturbance can be estimated using the equation:

$$\Delta N / \Delta t = rN(1-(N/K)^{\theta}),$$

where N is the current population size, K is the carrying capacity, r is the intrinsic rate of increase (i.e., the rate at which the population would grow in the absence of intraspecific competition), and θ is a shape parameter that specifies how population consequences of intraspecific competition vary with population size (Olesiuk, P. F., G. M. Ellis and J. K.B. Ford. 2005. Life History and Population Dynamics of Northern Resident Killer Whales (*Orcinus orca*) in British Columbia. CSAS Research Document 2005/045. 1-81).

Excluding whales from feeding areas effectively reduces K. In turn, this reduces the rate of population increase. This is equivalent to removing individuals from the population.

Excluding whales from resting areas and extending migratory routes require individuals to expend more energy. Thus they need to eat more to survive. This effectively increases the amount of intraspecific competition, and hence reduces K. In turn, this reduces the rate of population increase. This is equivalent to removing individuals from the population. When the shape parameter is 1, the per capita growth rate peaks when the population is at 50% of carrying capacity.

However, for marine mammals, the shape parameter tends to be large. That is, intraspecific competition does not become important until the population size is closer to carrying capacity than 50%. However, intraspecific competition becomes much more important near carrying capacity when the shape parameter is large than when it is small.

Disturbance has the effect of causing the population to behave as though it is closer to carrying capacity than it would in the absence of disturbance. As a result, the population consequences of disturbance are much stronger when the population is near carrying capacity than when it is depleted.

As a result, a population that grows in the presence of disturbance is not a sign that disturbance is unimportant. Rather, depleted populations are capable of some growth in conditions that are obviously harmful to populations near carrying capacity (Bain, D. E. 2002. A model linking energetic effects of whale watching to in killer whale (*Orcinus orca*) population dynamics. Contract report submitted to Orca Relief Citizens' Alliance).

Bowheads may be near carrying capacity now, although they would have been depleted when the population was still growing in the presence of disturbance (Allen, B. M., and R. P. Angliss. 2011. Alaska marine mammal stock assessments, 2010. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-223, 292 p.).

That is, the depleted population was capable of growth in the presence of disturbance in the 1990s, but an increase in disturbance to the population now, while it appears to be near carrying capacity, could result in slowed growth or a loss of individuals.

This analysis suggests that there will be little difference in the effect on the population regardless of whether many individuals are affected a small number of times or a small number of individuals are affected many times or for a prolonged period of time.

The relative degree of exposure among individuals determines which individuals are likely to bear the burden of the population scale effects. That is, individuals extensively affected are less likely to be able to overcome the impact, whereas individuals little affected are more likely to be able to overcome the impact at the expense of non-exposed individuals as they more aggressively try to obtain the additional resources needed to offset short-term effects.

Individuals within a population near carrying capacity are more likely to die or experience reduced reproduction than individuals in populations well below carrying capacity, when exposed to disturbance (Bain, D. E. 2002. A model linking energetic effects of whale watching to in killer whale (*Orcinus orca*) population dynamics. Contract report submitted to Orca Relief Citizens' Alliance).

That is, individuals in this bowhead population are quite vulnerable to harm from disturbance due to the proposed drilling project. Based on materials submitted by the applicant, there is evidence that thousands of bowhead whales could be affected over the life of this project. But even those estimates may not fully capture the expected and maximum numbers.

Only individuals within the 120 dB contour were considered subject to harm. In fact, lower levels of noise have been shown to deflect migrating bowheads and exclude them from habitat (Miller, G. W., R. E. Elliott, W. R. Koski, V. D. Moulton and W. J. Richardson. 1999. Whales. In W. J. Richardson (ed.) Marine mammal and acoustical monitoring of Western Geophysical's open-water seismic program in the Alaskan Beaufort Sea, 1998. LGL Rep. TA2230-3. LGL Ltd. King City, Ontario. 390 pp.).

Further, there are questions about where the 120 dB contour will be located. Empirical measurements showed received levels from the Kulluk can be anywhere from about 120 dB at 10 km (Greene, C. R., Jr. 1987. Characteristics of oil industry dredge and drilling sounds in the Beaufort Sea. J. Acoust. Soc. Am. 82:1315-1324) to in excess of 130 dB at 75 km from the source (Hall, J. D., M. L. Gallagher, K. D. Brewer, P. R. Regos and P. E. Isert. 1994. 1993 Kuvlum exploration area site specific monitoring program. Coastal & Offshore Pacific Corporation. Walnut Creek, CA. 219 pp.).

There are two issues that may explain the failure of NMFS's calculations to align with the most recent empirical data for the Kulluk's operations in the Beaufort Sea. First, the 1994 study calculated the source level for the Kulluk as 191 dB, as compared to the proposed IHA's estimate of 185.5 dB based on Greene's data. As Hall *et al.* noted, differences in received level were found with depth (Hall, J. D., M. L. Gallagher, K. D. Brewer, P. R. Regos and P. E. Isert. 1994. 1993 Kuvlum exploration area site specific monitoring program. Coastal & Offshore Pacific Corporation. Walnut Creek, CA. 219 pp.). Only recordings made at a variety of depths will successfully detect maximal received levels at a given distance from the source. This can be critical in determining the appropriate received levels from which to back-propagate a source level. Depending on modeling assumptions as to attenuation (20 Log R versus 10 Log R, the latter preferred by both Greene and Hall), adding 6 dB to the source level could either roughly double or quadruple the distance to the 120 dB contour, respectively.

Second, the modeling used does not capture the most efficient mode of propagation. The proposed IHA indicates that the same acoustic propagation model was used to estimate the sound propagation from both the Kulluk and the Discoverer in Camden Bay. That model relies on GDEM data, which produces a single profile for each month (Warner, G. and D. Hannay. 2011.

Acoustic modeling of underwater noise from the Frontier Discoverer in the Chukchi and Beaufort Seas. Version 1.0. Technical report for Shell Exploration and Production Company by JASCO Applied Sciences). However, Chu *et al.* (Chu, P. C., Q. Wang, and R. H. Bourke. 1999. A geometric model for the Beaufort/Chukchi sea thermohaline structure. J. Atmos. Oceanic Tech. 16:613-632) found three discrete types of salinity temperature profiles that occur commonly in the shallow portion of the western Beaufort Sea. In approximately 20% of the summer-fall data reviewed, the water column was well mixed from surface to bottom. However, in the other ~80% of records, only a portion of the water column near the surface was mixed. The depth of this mixed layer and the amount of fresh water and ice present will alter sound propagation patterns. Necessarily, the GDEM model only captures one of the profiles, and misses variability within each profile. The correction factor of 1.5 applied to the distance to the 120 dB contour is inadequate to conservatively account for the variability.

Using the appropriate source level for the Kulluk and increasing propagation efficiency by less than 2 dB per tenfold increase in distance relative to Shell's model would approximate the distance to the 120 dB contour confirmed in the empirical data recorded by Hall *et al.* Similarly, the noise produced by ice breaking and seismic profiling could result in effects at greater distances than predicted by NMFS based on more efficient propagation as well. Thus it should not be uncommon for the 120 dB contour to be around 40-50 km from the drill site.

As a result of the likely much larger zone of influence, a much larger fraction of the population will face the 120 dB contour than NMFS predicts. In turn, bowheads and belugas avoiding the *Kulluk* to the 120 dB contour will be faced with different oceanographic conditions (shallower water inshore, more ice offshore). NMFS should consider the permit application in light of the high number of whales actually likely to be taken, and the larger magnitude of behavioral change needed to accommodate the stronger sound field.

The tendency of some bowheads to travel in groups (Moore, S. E., D. P. DeMaster, and P. K. Dayton. 2000. Cetacean habitat selection in the Alaskan Arctic during summer and autumn. Arctic. 53:432– 447) means that if a group approaches a drill site, the density will be far higher than estimates based on individual density.

Shell correctly notes that it is necessary to consider migration when calculating the number of takes (see Figure 1). However, it is also necessary to consider movement throughout the drilling season (see Figure 2). That is, density and ensonified area can be used to calculate the number of individuals present at any given moment, but different individuals will be present at different times.

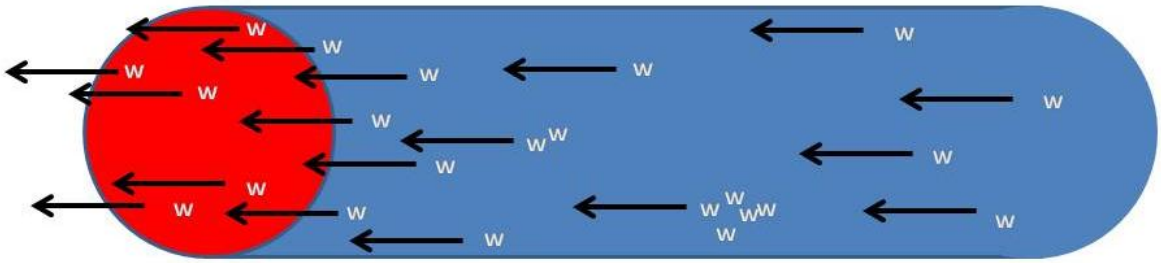

Figure 1. Schematic showing effects of migration on the number of whales exposed to noise. Red area shows where whales would be exposed at any given instant. W's represent initial whale positions. Arrows show direction of migration. They also indicate the distance that will be traveled in one day. This figure indicates that approximately 5 whales will be exposed at any given instant, but that an additional 5 whales will be exposed each day. Whales starting outside the blue or red areas would not be exposed.

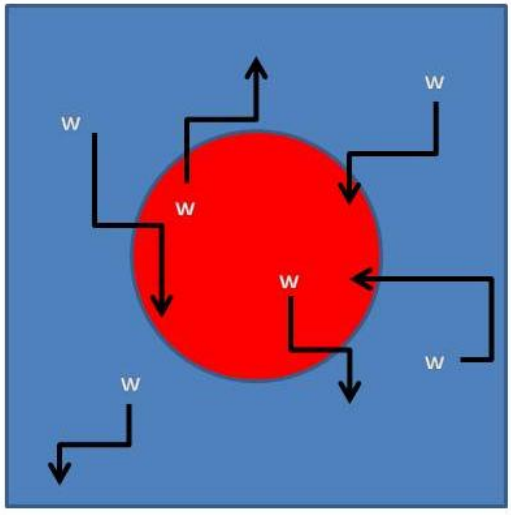

Figure 2. Schematic showing effects of non-directional movement on the number of whales exposed to noise. Red area shows where whales would be exposed at any given instant. W's represent initial whale positions. Arrows show paths of movement. Note that some nearby whales will be exposed to noise later in the season than those exposed at the start.

The increase in vessel traffic associated with this project increases the risk of ship strike. Bowheads are known to be struck by ships (Allen, B. M., and R. P. Angliss. 2011. Alaska marine mammal stock assessments, 2010. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-223, 292 p.), and ship strike has become a leading source of mortality in the closely related North Atlantic Right Whale (Waring GT, Josephson E, Fairfield-Walsh CP, Maze-Foley K, editors. 2009. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments -- 2008. NOAA Tech Memo NMFS NE 210; 440 pp.).

The recovery of the Bering-Chukchi-Beaufort stock (BCBS) is in contrast to the recovery of other stocks. There is no evidence that other bowhead stocks have increased, although data are limited (Reilly, S.B., Bannister, J.L., Best, P.B., Brown, M., Brownell Jr., R.L., Butterworth, D.S., Clapham, P.J., Cooke, J., Donovan, G.P., Urbán, J. & Zerbini, A.N. 2008. *Balaena mysticetus*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. <www.iucnredlist.org>. Downloaded on 06 December 2011).

The Sea of Okhotsk stock may have been exposed to excessive harvest as part of illegal Soviet whaling. All stocks face potential impact from entanglement, vessel collisions, and disturbance (Allen, B. M., and R. P. Angliss. 2011. Alaska marine mammal stock assessments, 2010. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-223, 292 p.).

Maintaining the BCBS bowheads is the best way to ensure survival of the species as a whole. Protecting them from expanding threats, such as oil exploration and the associated activities that may have limited the recovery of other stocks, are important steps in sustaining this species.

In summary, there is serious risk of harm to bowheads due to consequences of disturbance and ship strike. Nearly 40% of the population is likely to be affected each year by this project alone under the applicant's assumptions, and perhaps a higher percentage if more efficient propagation occurs and bowheads are influenced by noise levels below 120 dB (both possibilities supported by data). Consequently, there is the potential for effects on population dynamics even if the amount of behavioral change (reduced feeding and rest replaced by increased travel) is small each time a whale is exposed.

Belugas also occur in both the Chukchi and Camden Bay drilling areas during summer and autumn. Mothers with young would be expected in greater numbers than older males in the habitat closest to the drill sites (Allen, B. M., and R. P. Angliss. 2011. Alaska marine mammal stock assessments, 2010. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-223, 292 p.).

Like bowheads, belugas rely on hearing for navigation, communication, and avoiding predation. In addition, belugas use echolocation to find prey (Au, W. W. L. 1993. The sonar of dolphins. Springer-Verlag, New York. 277 pp.). That is, masking of echolocation signals by noise, temporary threshold shifts, and permanent threshold shifts will impair the ability of belugas to find food. This mechanism for harm is in addition to impaired ability to find food due to displacement from high quality feeding areas (Southall, B.L., A. E. Bowles, W.T. Ellison, J. J. Finneran, R. L. Gentry, C. R. Greene Jr., D. Kastak, D. R. Ketten, J. H. Miller, P. E. Nachtigall, W. J. Richardson, J. A. Thomas, P. L. Tyack. 2007. Criteria for behavioral disturbance. Aquatic Mammals. 33:446-473 and Finneran, J. J., C. E. Schlundt, R. Dear, D. A. Carder and S. H. Ridgway. 2002. Temporary shift in masked hearing thresholds in odontocetes after exposure to single underwater impulses from a seismic watergun. J. Acoust. Soc. Amer. 111:2920-2940).

Belugas are known to be disturbed by icebreaker noise 80 km away (National Research Council. 2003. Ocean noise and marine mammals. National Academies Press. Washington, DC. 192 pp.), a point particularly important here due to higher densities of belugas 50 km offshore of the drill site. (*see* Moore, S. E., D. P. DeMaster, and P. K. Dayton. 2000. Cetacean habitat selection in the Alaskan Arctic during summer and autumn. Arctic. 53:432– 447). Belugas begin to show responses at received levels that are likely to be barely audible, in the range of 94-105 dB (Norman, S. A. 2011. Nonlethal anthropogenic and environmental stressors in Cook Inlet beluga whales (Delphinapterus leucas). Report prepared for NOAA Fisheries, NMFS, Anchorage, AK. Contract HA133F-10-SE-3639. 113 p.).

Masking of communication signals is also likely to be a problem at this distance. Although beluga communication signals contain high-frequency components that are less vulnerable to masking by low frequency noise than low-frequency components, the high-frequency components are directional and attenuate faster than low-frequency components. That is, the omni-directional low-frequency component used for long distance communication among widely spaced belugas is vulnerable to masking (*see* Miller, P. J. O. 2006. Diversity in sound pressure levels and estimated active space of resident killer whale vocalizations. J Comp Physiol A Neuroethol Sens Neural Behav Physiol. 192:449-59 and Bain, D. E. and M. E. Dahlheim. 1994. Effects of masking noise on detection thresholds of killer whales. In (T. R. Loughlin, ed.) Marine Mammals and The Exxon Valdez. Academic Press. N.Y. 243-256).

Support vessel traffic will be disturbing to the part of the beluga population using lagoons and other nearshore habitats.

Work will be underway during the peak of the beluga calving season (O'Corry-Crowe, G. (2002). "Beluga Whale *Delphinapterus leucas*". in Perrin, W., Würsig B. and Thewissen, J. *Encyclopedia of Marine Mammals*. Academic Press. p. 94–99). Beluga females are likely to require two to four times as much food while lactating to successfully rear a calf than while pregnant (Oftedal, O.T. 1997. Lactation in whales and dolphins: evidence of divergence between baleen- and toothed-species. J. Mammary Gland Biol. Neoplasia 2:205-30 and see Bain, D. E., and J. Olhiser. 1994. Factors affecting food intake of killer whales and dolphins. Paper presented to the International Marine Animal Trainers Association Conference. Tacoma, WA). Belugas cannot store sufficient blubber to successfully rear calves when food intake is reduced.

In addition to lactation, wake riding is an important mechanism for transferring energy from the mother to a calf. The energetic cost of this increases dramatically with increased swimming speed as may occur in the event of flight from disturbance.

Population censuses of the Eastern Chukchi and Beaufort stocks of belugas have not been conducted in the last 10 years. Therefore, population trends are unknown. In contrast to bowheads, no evidence of population growth was seen when censuses were still being conducted

(Allen, B. M., and R. P. Angliss. 2011. Alaska marine mammal stock assessments, 2010. U.S. Dep. Commer., NOAA Tech. Memo. NMFSAFSC-223, 292 p.).

In summary, drilling will not take place within the core of the beluga distribution or migration route, but the belugas most likely to occur near the drill sites, mothers with calves under 6 months of age, are the most vulnerable to harm from the project. The number of affected beluga will also increase when their summer and fall movements are taken into account. Propagation from the Kulluk comparable to that found in 1993 and ice breaking noise would allow biologically significant noise levels to reach the offshore areas where beluga density is high.

Sources in Support of Comments Submitted by Earthjustice on December 7, 2011 Regarding Taking Marine Mammals Incidental to an Exploration Drilling Program Near Camden Bay, Beaufort Sea, AK

Air Sciences, Inc., Supplement to EPA Outer Continental Shelf (OCS) Operating Permit Application (Feb. 28, 2011)

Bain, David E., A Model Linking Energetic Effects of Whale Watching to Killer Whale (*Orcinus orca*) population dynamics

Bain, David E., and Marilyn E. Dahlheim, Effects of Masking Noise on Detection Thresholds of Killer Whales (1994)

Bercha Group, Alternative Oil Spill Occurrence Estimators and their Variability for the Beaufort Sea – Fault Tree Method, Final Task 4A.1 Report, OCS Study MMS 2008-035 (Mar. 2008)

Bureau of Ocean Energy Management, Environmental Assessment, 2012 Revised Outer Continental Shelf Lease Exploration Plan Camden Bay, Beaufort Sea, Alaska Flaxman Island Blocks 6559, 6610 & 6658 Beaufort Sea Lease Sales 195 & 202 (Aug. 2011)

Bureau of Ocean Energy Management, Regulation and Enforcement, Chukchi Sea Planning Area, Oil and Gas Lease Sale 193 in the Chukchi Sea, Alaska, Final Supplemental EIS, OCS EIS/EA BOEMRE 2011-041, Appendix B (Aug. 2011)

Chu, Peter C., et al., A Geometric Model for the Beaufort/Chukchi Sea Thermohaline Structure, 16 J. Atmospheric and Oceanic Technology 16 (June 1999)

Declaration of Dr. Robert Suydam in Support of Nos. 09-73944 and 10-70368

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Michael Payne, Chief
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ITP.Nachman@noaa.gov

RE: Comments on Shell's Incidental Harassment Authorization (IHA) Application for Leases in the Beaufort Sea

Dear Mr. Payne:

On behalf of Consumer Energy Alliance, we strongly urge the National Marine Fisheries Service (NMFS) and the federal government to finalize Shell's application for an Incidental Harassment Authorization (IHA) for use during exploration of its leases near Camden Bay in the Beaufort Sea. As the application demonstrates, Shell has correctly evaluated the species present in the proposed drilling area and is prepared to exceed expectations for marine mammal and habitat protection.

CEA is a non-profit, non-partisan organization committed to working with elected leaders, affected stakeholders and consumers to help create sound energy policy and maintain stable energy prices. As part of a balanced energy policy, CEA advocates for expanded domestic production and use of all energy resources, including traditional fossil fuel resources, nuclear energy, renewable sources, and energy efficiency and conservation, as a means to provide price stability for consumers. CEA has more than 170 affiliated organizations, including energy suppliers and producers, manufacturers, farmers, small businesses and community organizations, as well as a nationwide network of almost 300,000 consumer-advocates.

NMFS's assessment of Shell's application confirms that Shell has taken the necessary precautions to protect marine mammals in the proposed drilling area. As stated by NMFS, "Shell's planned offshore drilling program incorporates both design features and operational procedures for minimizing potential impacts on marine mammals and on subsistence hunts." Part of these mitigation efforts includes maintaining Protected Species Observers, or marine mammal observers, who will be on-site to monitor marine mammals and who can implement mitigation efforts if necessary. Although the NMFS has determined that few of the citied marine mammals will be present in the area during the proposed drilling period, Shell has implemented practices and procured technologies that will minimize impact in the chance a marine mammal may become present.

Although the IHA did not need to evaluate the likely impacts from an oil spill on marine life, the assessment concluded that "there is no reasonable likelihood of serious injury or mortality from the 2012 Camden Bay exploration drilling program." Citing the historical improbability of a very large oil spill as well as Shell's extensive Oil Spill Response Plan, the NMFS remains confident that marine mammals are not in danger of a potential oil spill.

Clearly, Shell has taken all necessary precautions – if not exceeded them – and has proven it can proceed with drilling in the Beaufort Sea without causing significant or permanent damage to marine wildlife.

The NMFS has had ample time to evaluate Shell's application and clarify any outstanding issues. Now that the NMFS has issued the proposed IHA, we urge the NMFS to move quickly to finalize the authorization.

Energy development in the Beaufort and Chukchi Seas has tremendous potential to bolster U.S. energy security and grow the economy. With a conservative estimate of 27 billion barrels of oil and 132 trillion cubic feet of gas, these resources will go a long way to securing our energy future. The Trans-Alaska Pipeline System (TAPS) – one of the most critical energy infrastructures in the United States – is averaging only 640,000 barrels of oil throughput a day, down from a high of nearly 2 million barrels a day in 1988. Without a significant source of new oil coming online, low throughput could force the pipeline to close in the coming decade, leaving millions of U.S. consumers, mostly on the West Coast, without a stable supply of oil.

Furthermore, an annual average of 54,700 new jobs would be created and sustained nationwide for 50 years from Alaskan OCS exploration and production. These new jobs would lead to over $145 billion in new payroll and over $193 billion in tax revenue for federal, state and local governments. At a time of fiscal austerity and high unemployment, private development that boosts this level of jobs-and-revenue creation – without taxpayers' money – is critical.

Shell is prepared to bring its world-class expertise, equipment and technology to the Arctic. Through years of careful scientific study, it has advanced the practices and technologies capable of minimizing environmental impact from its operations. In fact, Shell's proposed operations in the Beaufort have spurred the scientific evaluation critical to understanding marine wildlife and ecosystems in the Alaskan Arctic, and its proposed plans for summer 2012 will help further our understanding of how to protect marine animals in an environment increasingly exposed to commercial and military traffic.

Shell and Alaska have taken great strides to protect their environment and have proven, time and again, the ability to safely develop natural resources while protecting the surrounding environment. In closing, we again urge the NMFS to swiftly approve the IHA for Shell's proposed operations and permit the sound exploration of the Beaufort Sea to move forward in summer 2012.

Sincerely,

David Holt
President

IÑUPIAT COMMUNITY of the ARCTIC SLOPE

an IRA Regional Tribal Government

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December 6, 2011

VIA ELECTRONIC MAIL TO ITP.Nachman@noaaa.gov

Mr. Michael Payne
Chief
Permits and Conservation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Springs, MD 20910

Re: Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to an Exploration Drilling Program Near Camden Bay, Beaufort Sea, AK (76 Fed. Reg. 68984 (November 7, 2011))

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to an Exploration Drilling Program in the Chukchi Sea, Alaska (76 Fed. Reg. 69958 (November 9, 2011)

Dear Mr. Payne:

Please accept these comments from the Inupiat Community of the Arctic Slope (ICAS) on the two proposed Incidental Harassment Authorizations for Shell's proposed activities in the Beaufort and Chukchi Seas. ICAS appreciates the opportunity to provide these comment to BOEMRE, on a government-to-government basis, with the goal of protecting the resources of the Arctic Ocean that support the Inupiat people. ICAS is a regional Native government organized in accordance with the Indian Reorganization Act of 1934. Pursuant to ICAS's Constitution and By-Laws, approved by the U.S. Department of Interior, ICAS's membership includes all person of Inupiat blood living within the Arctic Slope Borough in Alaska. We speak on behalf of the Inupiat people, who have relied upon marine mammals, birds, fish and other wildlife to carry on the subsistence traditions that have sustained our families and provided for our spiritual, mental and physical health since time immemorial.

The bowhead whale is our most important subsistence resource, which has sustained our communities since time immemorial. The bowhead whale provides irreplaceable subsistence foods to our people, and the hunt serves as the focal point of our ancient traditions and culture. Our people have expressed grave concerns that OCS activities may disrupt the subsistence hunts, pollute our pristine Arctic, and interfere with

the bowhead whale migration. We are also very concerned about the potential impacts of an oil spill as well as the cumulative effects of increasing commercial and industrial activity in our Arctic waters. Under the Marine Mammal Protection Act, NMFS has an obligation to ensure that any proposed activities do not have an unmitigable adverse impact on our subsistence activities.

Our whaling captains have worked on these issues through the Alaska Eskimo Whaling Commission (AEWC), which seeks to ensure that oil and gas activities protect the subsistence hunt, the bowhead whale, and its habitat through the annual Conflict Avoidance Agreement (CAA). We understand that AEWC has submitted comments on the two proposed IHAs, and we incorporate those comments by reference. We strongly urge NMFS to address the concerns of AEWC and its whaling captains, particularly as they result to potential impacts to the fall subsistence hunt in our Chukchi Sea villages, which are taking on increased importance because of deteriorating spring ice conditions. We also understand that the North Slope Borough's Department of Wildlife Management is submitting detailed comments on the scientific foundation for the proposed IHAs, and we also strongly urge NMFS to address their comments prior to finalizing the IHAs.

Thank you for considering our comments and for carrying out the federal government's legal obligation to safeguard and protect the subsistence traditions of the Inupiat people. Please do not hesitate to contact me if you have any questions about this information.

Sincerely,

George Edwardson

George Edwardson
President

MARINE MAMMAL COMMISSION

9 December 2011

Mr. P. Michael Payne, Chief
Permits, Conservation, and Education Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, Maryland 20910-3226

Dear Mr. Payne:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the application from Shell Offshore, Inc., seeking an incidental take authorization under section 101(a)(5)(D) of the Marine Mammal Protection Act. The applicant is seeking authorization to take small numbers of marine mammals by harassment incidental to offshore exploratory drilling at the Torpedo and Sivulliq prospects in Camden Bay, Beaufort Sea, Alaska, during the 2012 Arctic open-water season. The Commission also has reviewed the National Marine Fisheries Service's 7 November 2011 *Federal Register* notice (76 Fed. Reg. 68974) announcing receipt of the application and proposing to issue the authorization, subject to certain conditions.

RECOMMENDATIONS

The Marine Mammal Commission recommends that the National Marine Fisheries Service—

- issue the requested incidental harassment authorization contingent upon the successful negotiation of a conflict avoidance agreement between Shell and the Alaska Eskimo Whaling Commission and the bowhead whale hunters it represents;
- facilitate development of more comprehensive conflict avoidance agreements that involve other species and potentially affected communities and co-management organizations and take into account all potential adverse effects on all marine mammal species taken for subsistence purposes;
- require Shell to evaluate the source levels of the available drilling rigs at the proposed drilling locations, recalculate the 120-dB re 1μPa harassment zones and estimated takes as appropriate, and use the rig best suited for the proposed drilling locations based, in part, on consideration of the size of the harassment zones and the requirements of the Marine Mammal Protection Act to reduce impacts of the proposed activity to the least practicable level; Shell also should make the data associated with the monitoring program publicly available for evaluation by independent researchers;
- require Shell to develop and employ a more effective means to monitor the entire corrected 120-dB re 1μPa harassment zone associated with the drilling rig and support vessels for the presence and movements of bowhead whales and other marine mammals and for estimating the actual number of takes that occur;
- track and enforce Shell's implementation of mitigation and monitoring measures to ensure that they are executed as expected;

- require Shell to cease drilling operations in mid- to late-September to reduce the possibility of having to respond to a large oil spill in ice conditions; and
- require Shell to develop and implement a detailed, comprehensive and coordinated Wildlife Protection Plan that includes strategies and sufficient resources for minimizing contamination of sensitive marine mammal habitats and that provides a realistic description of the actions that Shell can take, if any, to respond to oiled or otherwise affected marine mammals; the plan should be developed in consultation with Alaska Native communities (including marine mammal co-management organizations), state and federal resource agencies, and experienced non-governmental organizations.

RATIONALE

Shell has proposed to drill one exploratory well at each of two locations near Camden Bay, Beaufort Sea, Alaska, during the 2012 Arctic open-water season (early July through late October). One of the two wells would be drilled at Shell's Torpedo prospect (either Torpedo "H" in Flaxman Island Lease Block 6610 or Torpedo "J" at Lease Block 6559). The other well would be drilled at Shell's Sivulliq prospect (either Sivulliq "N" or "G" – both in Flaxman Island Lease Block 6658). Shell would use one of two drilling rigs, the *Kulluk* or the *Discoverer*, with estimated broadband sound source levels of 185.5 dB re 1μPa at 1 m and 177–185 dB re 1μPa at 1 m, respectively. Shell also would deploy other vessels and aircraft for support purposes, including management of ice in the drilling areas. Drilling would occur 26.1 to 37.2 km from shore, in waters 32.6 to 37.8 m in depth. Shell would conduct geophysical surveys at the end of each drill hole using a zero-offset vertical seismic profile airgun array. A typical eight-airgun array consists of four 150-in^3 airguns and four 40-in^3 airguns, with source levels of 238 and 241 dB re 1μPa at 1 m, depending on source depth.

Drilling and associated activities could affect marine mammals in several ways. Sound emitted from drilling, ice management, and seismic profile surveys could cause marine mammals to change their behavior, modify habitat use patterns, or mask their calls. If received at sufficiently high levels, such sound also could affect marine mammals physically, including temporary or permanent hearing impairment. In addition, oil spills—albeit unlikely—have the potential to affect marine mammals through exposure to toxic contaminants either externally through contact with the oil or internally through ingestion of the oil or inhalation of oil fumes.

The Service preliminarily has determined that the proposed activities could result in a temporary modification in the behavior of small numbers of up to eight species of marine mammals, but that the total taking would have a negligible impact on the affected species or stocks. The Service does not anticipate any take of marine mammals by death or serious injury. The Service believes that the likelihood of an oil spill is extremely remote and therefore does not propose to authorize take from an oil spill. The Service also believes that the potential for temporary or permanent hearing impairment from drilling and other acoustic impacts would be at the least practicable level because of Shell's proposed mitigation and monitoring measures, as well as additional monitoring and mitigation measures proposed by the Service. Together, these include—

(1) using Service-approved vessel-based observers to monitor for marine mammals on the drillship and all support vessels, including the ice management vessels, throughout the exploration drilling period;
(2) using two observers to monitor the 190- and 180-dB re 1 μPa exclusion zones (for pinnipeds and cetaceans, respectively) and beyond during active drilling or airgun operations and before and during start-ups of airguns day or night;
(3) using ramp-up and shut-down procedures;
(4) prohibiting initiation of airgun operations during nighttime or low visibility conditions after an extended shutdown;
(5) reducing vessel speeds to 9 knots or less when transiting the Beaufort Sea;
(6) reducing vessel speed to 9 knots or less and avoiding multiple changes in vessel direction and speed within 274 m of whales;
(7) avoid injury to whales by reducing vessel speed and changing direction as necessary, especially when weather conditions diminish visibility;
(8) limiting aircraft overflights to an altitude of 457 m or higher and a horizontal distance of 305 m or greater when marine mammals are present (except during takeoff, landing, or an emergency situation);
(9) conducting aerial surveys before, during, and after operations at the exploration well sites;
(10) conducting in-situ measurements of sound propagation from the drilling vessel, support vessels, and the airgun array;
(11) deploying acoustic recorders along the bowhead whale migration path to record vocalizations of bowhead whales as they pass through the drilling area;
(12) reporting injured and dead marine mammals to the Service and local stranding network using the Service's phased approach and suspending activities, if appropriate; and
(13) submitting field and technical reports and a final comprehensive report to the Service.

Availability of marine mammals for subsistence

Shell has met, and plans to continue meeting, with various stakeholders to develop and implement a plan of cooperation. The plan specifies measures to minimize impacts to Alaska Natives who use marine mammals for subsistence purposes. As part of the plan, Shell would traverse north through the Bering Strait and Chukchi Sea offshore of the polynya zone and notify communication and call centers in local communities if it is necessary to move into the polynya zone. Shell also would implement a proposed communication plan with local subsistence users and village whaling associations before initiating exploratory drilling operations and maintain communication throughout the open-water season. Shell would suspend all drilling activities on 25 August to avoid disruption of the Kaktovik and Nuiqsut (Cross Island) fall bowhead whale hunts. Shell would employ local subsistence hunters from the Beaufort and Chukchi Sea villages to advise the company regarding the whale migration and subsistence hunt. Finally, Shell would collect (and cool as necessary) all drilling mud, cuttings with adhered mud, ballast water, and other waste water and other discharge for transport and disposal outside the Arctic, recycling all drilling mud to the extent practicable. Based on the timing and location of the proposed activities and these additional mitigation measures, the Service preliminarily has determined that the expected taking would not

have an unmitigable adverse impact on the availability of marine mammals for subsistence use by Alaska Natives. Shell should be acknowledged for its efforts to avoid such impacts.

However, it is not yet clear that those steps are sufficient. A determination of "no unmitigable adverse impact" on the availability of marine mammals for subsistence uses should be based, in part, on concurrence of those people who are the experts regarding the availability of marine mammals for subsistence hunts—the Alaska Native hunters themselves. Shell signed a conflict avoidance agreement in 2011 with the Alaska Eskimo Whaling Commission and intends to enter into negotiations again in 2012. Negotiating and completing a conflict avoidance agreement related to bowhead whales is useful but also prompts the question as to why such agreements are not being developed with subsistence hunters taking other species that might be affected by oil and gas operations. With that in mind, the Marine Mammal Commission recommends that the National Marine Fisheries Service issue the requested incidental harassment authorization contingent upon the successful negotiation of a conflict avoidance agreement between Shell and the Alaska Eskimo Whaling Commission and the bowhead whale hunters it represents. Such an agreement should help promote cooperation and communication among the parties involved and minimize potential conflicts between industry activity and bowhead whale subsistence hunts. Similarly, the Marine Mammal Commission recommends that the National Marine Fisheries Service facilitate development of more comprehensive conflict avoidance agreements that involve other species and potentially affected communities and co-management organizations and take into account all potential adverse effects on all marine mammal species taken for subsistence purposes.

Minimizing and monitoring responses to drilling activities

Studies indicate that bowhead whales are sensitive to low-frequency sounds produced by drilling activities, with observed behavioral responses to sounds as low as 115 dB re 1μPa at 1 m (Richardson et al. 1990, Wartzok et al. 1989). Richardson et al. (1987) hypothesized that a decrease in the number of bowhead whales in the Canadian Beaufort Sea during a five-year period might have been partly caused by increasing industrial activities associated with offshore oil and gas development (i.e., seismic, drilling, and construction activities) during the same timeframe. Although marine mammal behavioral responses to drilling, icebreaking, and seismic activities are expected to be temporary in nature, little is known about the potential for longer-term effects. To ensure the least practicable adverse impact, Shell should strive to reduce the number of animals potentially affected by drilling-related sounds.

Shell stated in its application that it would use either the *Kulluk* or the *Discoverer* to drill the two exploratory wells in the Beaufort Sea. Source levels from the *Kulluk* were measured in the Beaufort Sea in 1986 at 185.5 dB re 1μPa at 1 m, which included sound from a nearby support vessel. No sound measurements are available for the *Discoverer* in the Arctic; however, sound measurements of the *Discoverer* in the South China Sea were used to model the sound propagation of the *Discoverer* (including a nearby support vessel) at planned drilling locations in the Beaufort Sea. Broadband source levels varied by activity and direction from the ship but were generally between 177 and 185 dB re 1μPa at 1 m.

Shell used a 120-dB re 1μPa threshold to estimate the area in which whales and other marine mammals may be taken by Level B harassment. The company used the 120-dB re 1μPa threshold because drilling is considered a continuous sound source. Based on a 120-dB re 1μPa threshold, the estimated harassment zones modeled for the two drilling rigs differ considerably, with a "corrected" harassment zone (the Level B harassment zone multiplied by 1.5) of 19.91 km for the *Kulluk* and 4.98 km for the *Discoverer* (Table 4 in the *Federal Register* notice). Based on the average density of bowhead whales migrating past the proposed drilling site in the fall, Shell estimated that approximately 5,575 whales would be taken by harassment if the *Kulluk* were used, compared to approximately 1,387 whales if the *Discoverer* were used. Those estimates are in addition to takes from proposed icebreaking and seismic survey activities.

Those estimates of source levels, harassment zones, and takes raise several important questions:

- What are the actual source levels of the two drilling rigs in the areas identified for exploratory drilling? Do the source levels estimated for the *Discoverer,* derived from measurements taken in the South China Sea, provide a reliable basis for estimating their levels in the Camden Bay area? Do measurements taken for the *Kulluk* in the Beaufort Sea in 1986 provide a reliable basis for estimating current source levels, considering structural or mechanical changes that may have been made to the *Kulluk* since those measurements were taken?

- Are the differences in the corrected harassment zones for the two drilling rigs real? The corrected 120-dB re 1μPa harassment zone for the *Kulluk* is 19.91 km, which is based a point estimate of 185.5 dB re 1μPa at 1 m. The corrected 120-dB re 1μPa harassment zone for the *Discoverer* is 4.98 km, which is based on a range of 177–185 dB re 1μPa at 1 m. Summing across band levels gives a broadband source level for the *Discoverer* of 185.5 dB re 1μPa at 1 m (D. Hannay, JASCO, pers. comm.). If the broadband source levels for the two drilling rigs are the same, why is there a four-fold difference in the size of the corrected harassment zone for the two drilling rigs?

- If the differences in corrected harassment zones are real, why is the quieter rig not being used in this case, when noise reduction is such an important issue?

- How will Shell monitor the resulting large harassment zones to estimate actual numbers of takes? The corrected radius of the 120-dB re 1μPa harassment zone for the *Kulluk* could be as large as 20 km, which is too large to be monitored effectively using visual methods, especially in poor weather or low visibility conditions. Although Shell also would be required to monitor bowhead whale movements using acoustic recorders, recorders can detect only vocalizing whales. Actual numbers of whales in the area may be difficult to estimate based on acoustic recordings, as whales exposed to drilling sounds may vocalize at a lower rate than undisturbed whales (Richardson et al. 1985, Blackwell et al. 2011). In addition, acoustic recorders would not be able to monitor for the presence and movements of marine

mammals that do not vocalize (i.e., pinnipeds). The use of aerial surveys around the drill rig will help to alleviate this problem but only to the extent that the surveys can be flown given weather conditions in the Beaufort Sea. Sufficient aerial survey data combined with acoustic data will provide a more suitable means of monitoring impacts from drilling and associated operations.

- What is the basis for determining that the taking of an estimated 5,608 bowhead whales is consistent with the "small numbers" and "negligible impact" requirements of the Marine Mammal Protection Act, considering that the total population of bowhead whales numbers between 10,000 and 11,000 whales (Allen and Angliss 2011)? The proposed drilling activities near Camden Bay would occur during the peak of the westward migration of bowhead whales (Quakenbush 2010), in areas and at times that whales are feeding (Lowry et al. 2004, Huntington and Quakenbush 2009). Sounds from drilling and seismic activities may cause shifts in distribution that could affect feeding, socializing, resting, travel times, and migration routes. Although the Service discusses these impacts, the basis for assuming that the impacts would be negligible is not clear, especially considering uncertainties regarding how impacts of noise on individual animals may affect population reproduction or survival rates (Hutchinson and Ferrero 2011). In addition, if Shell uses the *Kulluk* instead of a quieter drilling rig and it results in a larger number of takes, how can the Service conclude that the company will have the least practicable impact?

For all these reasons, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Shell to evaluate the source levels of the available drilling rigs at the proposed drilling locations, recalculate the 120-dB re 1μPa harassment zones and estimated takes as appropriate, and use the rig best suited for the proposed drilling locations based, in part, on consideration of the size of the harassment zones and the requirements of the Marine Mammal Protection Act to reduce impacts of the proposed activity to the least practicable level. Shell also should make the data associated with the monitoring program publicly available for evaluation by independent researchers. The Marine Mammal Commission also recommends that the Service require Shell to develop and employ a more effective means to monitor the entire corrected 120-dB re 1μPa harassment zone for the presence and movements of bowhead whales and other marine mammals and for estimating the actual number of takes that occur. Monitoring only a portion of the harassment zone and then extrapolating to estimate the total number of takes is reasonable only if the company and Service have a basis for making assumptions about the composition and distribution of marine mammals throughout the areas potentially affected.

Finally, requiring certain mitigation and monitoring measures will mean little if the parties involved fail to implement them. In this case, Shell would be working under a tight schedule to drill its proposed wells, and its ability to meet that schedule would be determined in part by seasonal changes in weather and, particularly, ice conditions. Although Shell may recognize that the specified mitigation and monitoring measures are important, it may not deem these measures to be its highest priority if they conflict with operations considered essential to drilling progress. Under such conditions, mitigation and monitoring measures may not be implemented fully and their value

compromised. To avoid such situations, the Marine Mammal Commission recommends that the National Marine Fisheries Service track and enforce Shell's implementation of mitigation and monitoring measures to ensure that they are executed as expected.

Mitigation measures for potential oil spills

The *Federal Register* notice and Shell's application provided a summary of potential risks to marine mammals from oil spills, including contact with oil, ingestion of oil or contaminated prey, and inhalation of oil. Shell also notes that oil spill cleanup activities may have more of an impact than the oil itself. The Commission believes that Shell's summary of potential impacts under-represents the risks to marine mammals, and that information regarding the long-term effects of exposure to oil and oil spill cleanup activities is inadequate (Marine Mammal Commission 2011). Shell also concludes that there is a "very low likelihood of a large oil spill event," and that "even if a large spill were to occur, the impacts identified in the [Minerals Management Service] 2003 Multi-Sale Environmental Impact Statement [for the Beaufort Sea Planning Area, Oil and Gas Lease Sales 186, 195, and 202] would not necessarily follow because Shell's spill response capabilities would minimize the amount of oil reaching the environment." Here, too, the Commission believes that this statement both downplays the risks of an oil spill to marine mammals and overstates Shell's ability to respond to a large spill. The Commission also believes that the Service is being too dismissive of the potential for a large oil spill based on the conclusion that such a spill is not likely.

However, the risk of a spill is not simply a function of its probability of occurrence—it also must take into account the consequences if such a spill occurs. Those consequences are, in part, a function of the spill's characteristics and the ability of the industry and government to mount an effective response. In all areas, but particularly in the Arctic, the longstanding but still unresolved question is whether the responsible parties can mount an effective response. Having just witnessed the requirements for and difficulties of responding to a major spill in the much less harsh environment of the Gulf of Mexico, the Commission sees no basis for concluding that the necessary response capability exists in Arctic ice conditions. The assertion that Shell would be able to respond adequately to any kind of major spill is simply unsupported by all the available evidence. The Commission does not mean to dismiss Shell's efforts to develop response capabilities, but the reality is that the harsh conditions and lack of infrastructure, trained personnel, supplies, etc., could make it virtually impossible to respond effectively to a significant Arctic spill.

With regard to marine mammals that might be affected, impacts from a spill would be determined by the time of year, the species in or migrating through the area down-current from the facility (i.e, in the spill's path), and the amount of disruption to their natural behavior (e.g., reproduction, feeding). Given that marine mammals move through this area in large pulses, it may or may not be the case that few animals would be affected; actual effects would depend on the timing and circumstances, such as the size of the spill. It also is important to consider that some of the animals may already be in a compromised state as a result of climate disruption, stochastic variation in food resources, or variation in physiological state due to normal life history events (e.g., molting or reproduction in pinnipeds).

Shell's Oil Discharge Prevention and Contingency Plan outlines several measures for preventing and responding to a spill, as summarized in the incidental harassment authorization application. Although Shell revised the contingency plan in May 2011 in response to new Bureau of Ocean Energy Management safety and environmental requirements, the contingency plan is still inadequate for addressing a large oil spill in the Arctic. For example, the plan includes worst-case discharge scenarios, but they are based on an August spill rather than a late October spill, which would be a more appropriate worst-case. The plan does include a "response strategy" for a spill occurring on October 1, noting that as the response continues into its second week "the hours of daylight and average air temperatures continue to drop, making oil surveillance and tracking more difficult, along with the location, containment, and recovery of oil" and that "the formation of grease ice and nilas (e.g., a thin elastic crust of ice up to 10 centimeters thick that bends easily under pressure) make it increasingly difficult to work with booms as they begin to fill with ice, preventing the effective collection of oil." The plan goes on to state that "as freeze-up continues and blowing snow begins to accumulate on young ice, it becomes impossible to operate the physical containment and recovery systems safely and effectively." These statements all indicate that Shell has little chance of recovering oil that spills after October 1, when new ice is forming.

Even if a spill were to occur during summer, Shell's ability to contain the well and recover spilled oil is limited by the lack of adequate infrastructure. The contingency plan states that the preference is to use the original drilling rig to drill a relief well. However, if there is damage to the rig as a result of a blowout or other accident, Shell would need to move a second rig onsite, which may take several weeks considering that the second rig would likely be fully engaged in drilling activities in the Chukchi Sea. The plan proposes to use skimming and in-situ burning for recovery of oil—technologies that were effective in recovering only 8 percent of the oil spilled from the Gulf of Mexico Macondo well (NOAA 2010) and which have not been proven to be effective in Arctic conditions.

In the event of a spill, Shell has included provisions for wildlife protection in its contingency plan. However, the provisions of the "Wildlife Protection Plans" are limited to monitoring and deterrents at the spill site, placement of containment booms to prevent contamination of sensitive shoreline, and the designation of a facility to treat oiled animals. Based on experience gained from the Exxon Valdez, the Deepwater Horizon, and other small and large oil spills, a more detailed, comprehensive, and coordinated strategy would be needed to respond to, recover, and rehabilitate oiled wildlife. The Commission must question whether such response activities are realistic, given that the expertise and infrastructure needed to carry out these activities are simply not available in the Arctic, and Arctic conditions could restrict severely such activities because of human safety concerns.

For these and other reasons, the Commission must question whether Shell can respond effectively to a large spill under harsh Arctic conditions. At the same time, the impact of a spill on Arctic marine mammals could be significant and long-lasting. Therefore, the Marine Mammal Commission recommends that the National Marine Fisheries Service require Shell to cease drilling operations in mid- to late-September to reduce the possibility of having to respond to a large oil spill in ice conditions. The Marine Mammal Commission also recommends that the National Marine

Fisheries Service require Shell to develop and implement a detailed, comprehensive and coordinated Wildlife Protection Plan that includes strategies and sufficient resources for minimizing contamination of sensitive marine mammal habitats and that provides a realistic description of the actions that Shell can take, if any, to respond to oiled or otherwise affected marine mammals; the plan should be developed in consultation with Alaska Native communities (including marine mammal co-management organizations), state and federal resource agencies, and experienced non-governmental organizations.

Please contact me if you have questions regarding these recommendations.

Sincerely,

Timothy J. Ragen, Ph.D.
Executive Director

Cc: Kaja Brix, National Marine Fisheries Service Alaska Regional Office
Jim Kendall, Bureau of Ocean Energy Management Alaska Region

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North Slope Borough

OFFICE OF THE MAYOR

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Charlotte E. Brower, Mayor

December 7, 2011

P. Michael Payne, Chief
Permits, Conservation and Education Division
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National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

Submitted via email: ITP.Nachman@noaa.gov

Re: Comments on Shell Offshore Inc.' s application for an Incidental Harassment Authorization for an Exploratory Drilling Program near Camden Bay in the Beaufort Sea in 2012

Dear Mr. Payne:

Thank you for the opportunity to comment on Shell Offshore Inc.'s (Shell) Incidental Harassment Authorization (IHA) application for an exploratory drilling program near Camden Bay in the Beaufort Sea in 2012. As you know, the North Slope Borough (NSB) and its residents are extremely concerned about the increased oil and gas activity in the Chukchi and Beaufort Seas. Shell's drilling operation is just one among many industrial activities planned for 2012. The many different activities, including Shell's drilling plan (this IHA application), have the potential to harass many of the marine mammals that are vitally important to North Slope residents.

NSB has previously commented on Shell's IHA applications for seismic and drilling in the Beaufort Sea. Our previous comments are still applicable to the current application. We incorporate those previous comments by reference. For the previous IHA applications and other offshore activities, NSB has repeatedly expressed our concern that our Federal government allows oil and gas companies to conduct activities in our oceans. These activities have the potential to negatively affect our "garden". The foods that are most important to our coastal villages come from the ocean. We are greatly concerned that Shell's planned activities will affect the resources upon which we depend. The National Marine Fisheries Service (NMFS) can only issue an IHA for Shell's drilling plan if the agency is assured that enforceable mitigation measures will adequately protect our subsistence resources and harvesting. This pertains not only to bowhead whales but also to belugas, and ringed and bearded seals.

Below, are general comments, many of which NSB has made in the past.

I. Shell's Proposed Activities will Create Cumulative Impacts and Require an Environmental Impact Statement (EIS).

In the Federal Register Notice, NMFS generally states that it is "currently preparing an Environmental Assessment" to determine whether Shell's activities may have a significant impact on the environment (75 Fed. Reg. at 20509). But pursuant to the National Environmental Policy Act (*See* 42 U.S.C. 4321-4347) and its accompanying regulations (For specific regulatory guidance on making a significance determination, *see* 40 C.F.R. § 1508.27), NMFS should prepare an environmental impact statement (EIS) to adequately consider the potentially significant impacts, including the cumulative impacts of Shell's proposed activities. In particular, Shell's proposed drilling activities combined with all other past, present and reasonably foreseeable future activities will create potentially significant cumulative impacts (40 C.F.R. § 1508.7). NMFS should consider the cumulative impacts of Shell's Camden Bay proposal in combination with the following proposals, all of which may be planned for the 2012 open water season:

1) Shell's Chukchi Sea Exploration Plan
2) ION's Beaufort Sea seismic surveys
3) Seismic surveys planned in the Canadian Arctic
4) Possible seismic surveys in the Russian Chukchi Sea
5) BP's production operations at Northstar
6) Barging operations for existing oil fields

If NMFS is in possession of applications and/or any other information regarding these activities, it should include it in the record for this action because that information is integral to a thorough, up-front analysis of cumulative impacts. NMFS must also consider the reasonably foreseeable drilling activities in future years. Future drilling is foreseeable for a number of reasons. First, Shell has sought authorization to drill a total of ten exploration wells – six in the Chukchi and four in the Beaufort. The Bureau of Ocean Energy Regulation and Enforcement (BOEMRE) conditionally approved Shell's Exploration Plan for Camden Bay, which sets out a multiple year, four well program. Shell's Exploration Plan and oil spill response plan for the Chukchi Sea, which present a multiple year plan for six exploration wells, are currently under review by the Department of Interior. Also, Shell has applied for a multi-year Clean Air Act permit from the Environmental Protection Agency (EPA) and has therefore already sought coverage for future drilling operations. ConocoPhillips plans to drill in the Chukchi Sea in 2013 and has begun its EPA and Department of Interior permitting process for that activity. Finally, Statoil has also expressed an intention to engage in exploratory drilling in the Chukchi Sea within the next few years.

In conducting a cumulative impact analysis, NMFS should ascertain the significance of multiple exposures to underwater noise, ocean discharge, air pollution and vessel traffic; all of which could impact bowhead whales and decrease survival rates or reproductive success. NMFS should consider how many bowhead whales would be exposed to underwater noise, where those exposures could take place, what impact the noise could have on bowhead whale behavior and the biological significance of these impacts. NMFS should also consider the cumulative impact of discharge and whether bioaccumulation

of contaminants could have lethal or sub-lethal effects on bowhead whales and other marine mammals. NMFS should then synthesize that information into a health impact assessment looking at the overall combined effect to the health of the local residents.

NMFS is currently in the process of preparing such an EIS in partnership with the Bureau of Ocean Energy Management (BOEM), assessing the potentially significant impacts of oil and gas exploration activities in the Arctic. In choosing this course, NMFS has recognized that these activities can have significant impacts on marine mammals and that a longer term, more comprehensive review needs to be taken of these activities. It would be shortsighted to allow Shell to proceed on a one-year IHA when the impact of those activities authorized by the IHA could negatively affect arctic resources and preclude options that could be developed in the forthcoming EIS. It would be best to take the opportunity to develop a robust long-term plan for balancing the needs of industry with Congress' mandate in the Marine Mammal Protection Act to prioritize the protection of our subsistence resources.

II. The Marine Mammal Protection Act (MMPA)

The MMPA imposes a "moratorium on the taking" of marine mammals. 16 U.S.C. § 1371(a). The MMPA provides several narrow exceptions to the moratorium on take. NMFS may authorize take in the form of harassment by an Incidental Harassment Authorization (IHA) provided certain conditions are met. To receive such take authorization, an activity (i) must be "specified" and limited to a "specified 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) will not have "an unmitigable adverse impact on the availability of such species or stock for taking for subsistence uses" by Alaska Natives. Furthermore, in issuing an authorization, NMFS (v) must provide for the monitoring and reporting of such takings and (vi) must prescribe methods and means of effecting the "least practicable impact" on the species or stock and its habitat. 16 U.S.C. §1371(a)(5)(D); 50 C.F.R. § 216.107. As discussed more fully below, NMFS has not demonstrated that the proposed IHA will meet these standards.

A. In previous applications, Shell's activities were not "specified" or limited to a specified geographic region. We are pleased to see in the current IHA application a specific plan for drilling at specific leases in the Camden Bay area, assuming that environmental conditions allow. This is an improvement over previous applications.

B. Shell does not provide adequate information about the level and effect of industrial sounds. The application generally discusses sounds produced by the drill rigs and vertical seismic profile, but provides little information about sounds produced by ice management vessels (i.e. icebreakers), oil spill response vessels, and other support vessels. It is likely that the icebreakers and re-supply vessels will contribute considerably more sound to the ocean than the drill rigs. At Northstar Development Island, the day-to-day operations of the island are relatively quiet. However, vessels that re-supply the island contribute the loudest sounds, and it is clear that sounds from these vessels affect bowhead whales. Vessels associated with Shell's drilling operation must be considered in the IHA application. Neither the NMFS nor the public can adequately review Shell's application without this information and assessment of additional takes associated with sounds from Shell's support vessels.

C. The proposed IHA does not demonstrate that Shell's activities will take only a small number and have only a negligible impact on the species or stock. NMFS can grant an IHA allowing for incidental take of marine mammals only if such take will be limited to "small numbers" and have a "negligible impact" on the species or stock. 16 U.S.C. § 1371(a)(5)(D)(i)(I); 50 C.F.R. § 206.107. These are separate and distinct statutory requirements. *Id. Natural Resources Defense Council v. Evans,*232 F.Supp.2d 1003, 1025 (N.D. Cal. 2002); *see also Natural Resources Defense Council* v. *Evans,* 364 F. Supp. 2d 1083 (N.D. Cal. 2003). The proposed IHA illegally fails to distinguish between these two standards.

Studies conducted by BP which were associated with drilling and production at Northstar Island show that bowheads are very sensitive to industrial sounds. The loudest sounds were created by vessels. Bowhead calls were located farther away from the island during times of the loudest but still relatively quiet activities. Previous studies conducted in Camden Bay also showed that bowheads were sensitive to industrial sounds from drilling and ice management. Bowheads showed a zone of avoidance that extended 15 to 25 km from the drill rig and in some cased appeared to begin deflection away from the sounds 32 km away (LGL and Greeneridge 1987; Brewer et al. 1993; Hall et al. 1994; Davies 1997) . It is likely that received levels of industrial sounds were below 120 dB. Therefore, Shell's estimates of take by harassment are likely biased low.

Shell requests to take 5,598 bowhead whales, 798 ringed seals and tens of belugas and bearded seals, if the preferred drill rig, the Kulluk, is used. Shell suggests that approximately one third of the population of bowhead whales may be harassed based on the point estimate of the 2001 population of bowhead whales, assuming the population has grown by 3.4% per year (for an estimate of approximately 15,000 whales in 2012). It is not clear how NMFS could reasonably justify that a small number of bowheads would be taken whether evaluated on the requested take of ~5,600 whales or one-third of the population. The requested take is large and cannot meet the MMPA standard of a "small number." *See Natural Resources Defense Council* v. *Evans,* 279 F. Supp. 2d 1129, 1152 (N.D.Cal. 2003), "[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.").

NMFS' determination that Shell's activities will have a "negligible impact" on various marine mammals is similarly problematic. Studies have concluded that bowhead and beluga whales will deflect away from anthropogenic sounds. Unfortunately, those studies are short-term. Information is generally lacking about behavior of animals that have previously been exposed to industrial sounds. Additionally, no studies have looked at longer term impacts on survival or reproduction. The limitation in available information makes a rational "negligible impact" finding by NMFS problematic.

D. The MMPA requires that any incidental take authorized will not have "an unmitigable adverse impact on the availability of such species or stock for taking for subsistence uses" by Alaska Natives. 16 U.S.C. § 1371 (a)(5)(D)(i)(II). Shell has worked closely with the Alaska Eskimo Whaling Commission (AEWC) and agreed to move its drill rig and support vessels out of the Beaufort Sea from 25 August until the subsistence harvest of bowhead whales is completed in Kaktovik and Nuiqsut. NSB appreciates this effort to mitigate impacts to the bowhead hunt. Unfortunately, Shell's proposed activities may adversely impact subsistence hunting of other species.

The transport of drill rigs, icebreakers and other support vessels through the Chukchi Sea during early July could have a significant impact on a large number of belugas. This is the time eastern Chukchi Sea beluga whales are moving toward coastal areas near Point Lay and Wainwright. It is at this time of year that subsistence hunters at these two villages occur. Residents of Point Lay are particularly concerned that belugas could be deflected away from coastal areas or become skittish and more difficult to hunt. Because Shell does not consider the effects of transporting its drill rig or the support vessels, the estimated number of belugas that may be taken is biased low. Many eastern Chukchi Sea belugas could be harassed even before Shell begins drilling in the Beaufort Sea. Mitigation measures are needed to protect eastern Chukchi Sea belugas and beluga hunters. Restricting transit through the Chukchi Sea until the hunt is completed at Point Lay would be an effective measure.

Shell has not provided any information and NMFS has not discussed the impacts to subsistence uses of bearded and ringed seals in early July. Seal hunting typically occurs in mid to late June and early July in North Slope villages, in both the Chukchi and Beaufort Seas. During the transit of the drill rig, icebreakers and other support vessels, there could be substantial impacts or disturbance to seals. This disturbance could make it more difficult for hunters to harvest seals. The IHA application must evaluate the impacts to seals from not only the drilling activities but also the transit of vessels associated with Shell's planned activities.

E. Shell's marine mammal monitoring plan is fairly complete. Shell intends to conduct aerial surveys around the drill rig, monitoring the acoustic environment, including bowhead whale call locations, to the east and west of the planned drill sites, and have protected species observers on board vessels. The combination of visual sightings, especially from the aerial survey, and acoustic locations provide a robust data set for assessing deflection of marine mammals away from the planned activities.

While the monitoring plan is robust, the data have not been publically available in the past. Because Shell is exposing marine mammals to industrial sounds and potentially deflecting them away from migration, feeding and resting areas, the NMFS should require that the monitoring data, including locations and activities of drill rigs, icebreakers and support vessels be made publically available. Previously, oil companies operating in the Beaufort and Chukchi Seas have claimed the monitoring data are proprietary. Because the marine mammal resources are public ones and because they are important for the cultural and nutritional well-being of North Slope communities, the monitoring data should be available to other entities for evaluation. Publically sharing data should be a requirement of the IHA.

III. NMFS and Shell Must Consider the Potential Impacts, including Site-Specific Impact Analysis, of a Blowout and/or Major Oil Spill.

Shell's application materials and NMFS' public notice appear to disregard the threat of an oil spill and the resulting takes of marine mammals and interference with subsistence activities that may consequently occur. In light of the recent Gulf of Mexico disaster, the application should be returned to the applicant for inclusion of this necessary site-specific detail.

Shell's application lacks any information about potential take resulting from a release of oil in any amount. The federal register notice for this proposed action does not include any mention of a possible release of oil and the potential harm to marine mammals and subsistence activities. There is no rationale for ignoring these potential impacts in the face of abundant evidence that marine mammals are vulnerable to the effects of exposure to oil.[1]

Given the project's proximity to Camden Bay, an area where thousands of bowhead whales congregate to feed and rest during their fall migration, the omission of oil spill analysis is a serious concern. This area is also near the subsistence hunting grounds for the villages of Nuiqsut and Kaktovik. A large oil spill in this habitat during the fall migration could expose thousands of whales and other marine mammals to oil, causing long-term interference with the subsistence activities of our residents and with the local culture, and long-term contamination of this relatively pristine arctic environment.

Armed with the knowledge of the Deepwater Horizon blowout, we must no longer assume that offshore oil and gas activities are risk-free.

For these reasons, NSB recommends that NMFS return the application to Shell. NSB also requests clarification from NMFS on whether and how the agency considers the risk of an oil spill when authorizing exploratory drilling activities pursuant to the Marine Mammal Protection Act, including a complete rationale for the agency's position. In regulating industrial activities pursuant to the Marine Mammal Protection Act, NMFS should consider the consequences of a major spill in Arctic waters.

I hope you carefully consider the comments of the North Slope Borough. Thank you again for the opportunity to comment on Shell's IHA application for the Beaufort Sea.

Sincerely,

Charlotte E. Brower
Mayor

cc Taqulik Hepa, Director, NSB Department of Wildlife Management
Rhoda Ahmaogak, Director, NSB Department of Planning & Community Services
Ethel Patkotak, NSB Attorney
Richard Camilleri, Advisor to Mayor Brower
Ian Young, Advisor to Mayor Brower
Andy Mack, Advisor to Mayor Brower

[1] See e.g. Geraci, J.R. and D.J. St.Aubin, Sea mammals and oil: confronting the risks (Academic Press Inc., San Diego) (1990); National Research Council, Cumulative environmental effects of oil and gas activities on the Alaska's North Slope, Chapter 8: Effects on Animals—Marine Mammals & Seals and Polar Bears, pp99-106 (The National Academies Press, Washington D.C.) (2003).

RESOURCE DEVELOPMENT COUNCIL

Growing Alaska Through Responsible Resource Development

December 1, 2011

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

RE: Comments on Shell's Incidental Harassment Authorization for the Beaufort Sea

Dear Mr. Payne:

The Resource Development Council (RDC) is writing to encourage the National Marine Fisheries Service (NMFS) and the federal government to finalize Shell's application for an Incidental Harassment Authorization (IHA) for exploration of its leases near Camden Bay in the Beaufort Sea. Shell has studied the species in the lease areas and will provide a high level of protection for marine mammal and their habitat.

RDC is an Alaskan business association comprised of individuals and companies from Alaska's oil and gas, mining, forest products, tourism, and fisheries industries. Our membership includes all of the Alaska Native Regional Corporations, local communities, organized labor, and industry support firms. RDC's purpose is to expand the state's economic base through the responsible development of our natural resources.

NMFS's assessment of Shell's application is correct in confirming the company has taken the appropriate steps in protecting marine mammals in the areas where drilling is to occur. In its assessment, NMFS noted, "Shell's planned offshore drilling program incorporates both design features and operational procedures for minimizing potential impacts on marine mammals and on subsistence hunts."

Shell's program will employ trained observers to monitor marine mammals and implement mitigation efforts if necessary. In the event marine mammals are present in the area during the proposed drilling period, Shell will deploy certain practices and technologies to minimize potential impacts.

RDC agrees with the NMFS that "there is no reasonable likelihood of serious injury or mortality from the 2012 Camden Bay exploration drilling program." We also agree that marine mammals are not in danger of a potential oil spill, given the improbability of a very large spill and Shell's extensive Oil Spill Response Plan.

Shell is ready to drill in the Arctic. It has spent years and billions of dollars in preparing for a robust and environmentally responsible exploration program. The company has taken all necessary precautions and has exceeded expectations in its goal of exploring the Beaufort Sea in a manner that causes no significant or permanent damage to marine wildlife. Given NMFS has issued the proposed IHA, I urge the NMFS to finalize the authorization.

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According to BOEM, the Alaska OCS constitutes one of the world's largest untapped energy resources with an estimated 27 billion barrels of oil and 132 trillion cubic feet of natural gas in place. By comparison, total production from the North Slope since 1977 has been approximately 15.5 billion barrels. Essentially, Alaska holds the eighth largest oil reserves in the world ahead of Nigeria, Libya, Russia and Norway.

The Alaska OCS could produce one to two million barrels per day, boosting current U.S. production by 20 to 40 percent. At today's oil prices, slashing imports that much would reduce the nation's trade deficit up to $65.7 billion a year. Last year, when oil averaged $78 a barrel, the U.S. sent $260 billion for imported crude, accounting for nearly half of the country's $500 billion trade deficit, according to the Institute for Energy Research.

The responsible development of potentially immense oil and gas deposits in the Arctic would significantly boost Alaska's economy, extend the life of the trans-Alaska Pipeline System (TAPS), improve the economic viability of the proposed natural gas pipeline from the North Slope to the Lower 48, reduce America's reliance on foreign energy, create tens of thousands of new jobs and generate hundreds of billions of dollars in federal, state, and local government revenues. Moreover, oil and natural gas production in the Arctic would enhance our nation's energy security and grow its economy.

The biggest threat to Alaska's economy is the sharp ongoing decline in TAPS throughput, which has fallen from 2.1 million barrels per day (bpd) in 1988 to an average of 574,000 bpd from January through October of this year. Both President Obama and Governor Sean Parnell have stated that increasing TAPS throughput is a national priority and in the nation's best interest. However, without a significant source of new oil, low throughput could force the premature shut down of the pipeline, leaving millions of West Coast consumers without a stable domestic supply of oil.

Shell stands ready to bring its world-class expertise, equipment and technology to the Alaska offshore. Through years of extensive scientific study and planning, it has advanced the practices and technologies to minimizing impact from its operations. In fact, Shell's proposed plans have advanced our understanding of how to protect marine animals in an area with increasing commercial and military traffic.

RDC has as high level of confidence in Shell. We believe the company is willing and ready to explore its leases in an environmentally-responsible manner. Shell has the ability to safely produce the potentially vast energy resources of the Arctic. I urge the NMFS to approve the IHA for Shell's proposed operations so that exploration in the Beaufort Sea can move forward in 2012.

Sincerely,

Carl Portman
Deputy Director

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December 7, 2011

Via U.S. Mail & Electronic Delivery (ITP.Nachman@noaa.gov)

Michael Payne
Chief, Permits and
Conservation Division, Office of
Protected Resources, NMFS
1315 East-West
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RE: Shell Offshore Inc. Comments on 2012 Proposed
Incidental Harassment Authorization, Exploration Drilling Program,
Outer Continental Shelf, Beaufort Sea, Near Camden Bay, Alaska

Dear Mr. Payne,

This is to convey to you the comments of Shell Offshore Inc. (Shell) on the notice published in the Federal Register by the National Marine Fisheries Service (NMFS) on November 7, 2011, regarding the issuance of an Incidental Harassment Authorization (IHA) for Shell's exploration drilling program near Camden Bay during the 2012 open water season. Enclosed herewith is a table with comments on certain sections of the draft IHA published with NMFS' notice on November 7, Federal Register Vol. 76, No. 215. In addition, given the importance of the subject, below is a narrative discussion regarding key features of Shell's Beaufort Sea Regional Oil Discharge Prevention and Contingency Plan (C-Plan).

Shell's C-Plan was originally prepared in May 2007, updated in March 2010 and approved by the Minerals Management Service on March 11, 2010 for Shell's planned 2010 exploration drilling program. The C-Plan was updated in May 2011 to conform with various changes made by the Department of Interior and the Bureau of Ocean Energy Management (BOEM) to the regulations and guidance governing offshore oil and gas exploration and development. Shell's C-Plan serves two purposes, as set forth in the governing federal and state regulations and guidance, including Notices to Lessees (NTLs). First, the C-Plan is a detailed planning document to help identify and establish the company's state-of-the-art oil spill prevention procedures. Second, the C-Plan estimates the potential discharges and describes the resources and steps that would be taken by Shell (and its contractors) to respond in the unlikely event of a spill. That response plan addresses a range of spill volumes, ranging from small operational spills to the worst case discharge (WCD) calculations required in the unlikely event of a blowout. To ensure the safety of its employees, the public and the environment, Shell has compiled a comprehensive, meaningful C-Plan that develops successful prevention tools and necessary response elements in great detail. Shell takes its responsibility seriously, and its C-Plan is not a stack of paper that sits on a manager's shelf. It is a living document that forms the basis for training its employees, and for determining and assembling the assets and equipment needed to respond to a spill.

An extensive set of federal and state regulations govern the elements that must be addressed in Shell's C-Plan, and the plan complies with all of those detailed requirements. That Shell's C-Plan complies with each required regulatory element is evidenced throughout the document, with each section cross-referencing the federal or state regulatory provision with which it complies. For example:

- Shell's compliance with each applicable subsection of BOEM's Response Plan Requirements, 30 C.F.R. 254, Subpart B (summarized in tabular form on pages BOEMRE-1 to BOEMRE-4);
- Shell's compliance with each applicable subsection of the U.S. Coast Guard's requirements for Response Plans for Oil Facilities and Transferring Oil or Hazardous Material in Bulk, 33 C.F.R. 154 (summarized in tabular form on pages USCG-1 to USCG-3); and
- Shell's compliance with each of the requirements imposed by the Alaska Department of Environmental Conservation (ADEC) under the Alaska Administrative Code (summarized in the Table of Contents for Sections 1 through 5 on pages T-i to T-iii, Tables 1-13, 1-14, 1-20, and 1-21).

Shell's top priority in its proposed exploration program in the Beaufort Sea, and all of its drilling projects, is safe operation and the ***prevention*** of oil spills. Its C-Plan includes multiple barriers designed to prevent oil spills, loss of well control and blowouts. As part of this effort, Shell relies upon the latest drilling technologies and techniques. Although the likelihood of a very large oil spill is highly unlikely, as BOEM and NMFS have repeatedly determined, Shell's biggest safety and operational advantage here is the shallower water and lower downhole pressure at its specified drilling locations. In particular, Shell's drill locations are in approximately 110-125 feet of water (compared with 5,500 feet at the Macondo well in the Gulf of Mexico) and with an estimated downhole pressure of only 4,000 psi (compared with 15,000 psi at the Macondo well). Shell's specific prevention measures are detailed at length in Part 2, Response Prevention Plan, and meet all the requirements required by BOEM and the Alaska Department of Environmental Conservation (ADEC). Shell's program includes prevention-focused personnel training programs and adherence to strict procedures and management practices to prevent spills. Training drills will be conducted periodically to familiarize personnel with on-site equipment, proper deployment techniques, and maintenance procedures. The C-Plan also focuses on prevention of oil pollution and spills by employing the best control mechanisms for fuel transfer protocols and blowout prevention; rigorous equipment maintenance programs that monitor mechanical integrity and ensure prompt repairs of malfunctioning or corroded materials; well control monitoring at all phases (*i.e.,* before, during and after drilling); and emergency shutdown procedures. Shell's C-Plan also reviews the procedures to employ when operational conditions increase the risk of a well control event, such as severe weather, ice conditions, structural icing, and light conditions.

Further, as part of spill prevention efforts, Shell's blow out preventer (BOP) has been and continues to be extensively maintained, inspected, and tested by third parties. Shell's BOP is one of its key prevention tools, and the plan includes significant enhancements to the BOP, including: more frequent subsea BOP hydrostatic tests (one every 7 days instead of every 14 days), installation of a second set of blind/shear rams in the BOP stack, and relocating the BOP stack remotely-operated vehicle (ROV) to improve accessibility.

In the event of a spill, Shell's C-Plan plans the deployment of oil spill response vessels and equipment "on the water," capable of providing an immediate response to oil spills in three discrete planning regimes: (1) a 30-day spill response scenario written in compliance with BOEM and ADEC regulations, based upon conditions likely to be encountered during the drilling season; (2) a 15-day spill response scenario written in compliance with ADEC regulations, based upon conditions likely to be encountered

during the drilling season; and (3) an associated response strategy that demonstrates regional response capability under different criteria and assumptions. Shell is capable of deploying on site oil spill response assets to the spill site within one hour of notification. The C-Plan details Shell's Response Action Plan (Part 1) that is used both for training purposes and as an important guide for personnel in an emergency discharge event. Shell has also adopted an unprecedented three-tier system to respond to a spill offshore, nearshore, and onshore/shoreline with trained personnel who routinely practice using spill response drills. Shell's response assets include offshore recovery vehicles with skimmer and boom, nearshore barges with skimmer and boom, shallow water vessels with skimmer and boom, and identified protection strategies and equipment for the protection of species and sensitive environmental and cultural areas. Response assets are staffed during operation around the clock.

Shell would also like to highlight the following aspects of its oil spill response efforts that go beyond the federal and state requirements:

- Shell will have a dedicated Oil-Spill Response Barge and tug staged in the vicinity of the drilling vessel during critical drilling operations. The Oil-Spill Response Barge and tug possesses sufficient capacity to provide containment, recovery, and storage for the initial spill period.
- Shell has committed to developing and delivering a surface and subsea capping and containment system. A key element of this collection system is the capture of oil flowing from a leaking well close to the source and then piping the oil to a dedicated separation/storage equipment barge that would properly and safely dispose of all collected hydrocarbons.
- A specific relief well drilling plan for each well that will allow the drilling of a relief well to start within a few days if the original drillship is incapable of drilling its own relief well.
- Assembling the chemical, equipment, training and logistics infrastructure in place to effectively use dispersants and in-situ burning as additional response options when appropriate to supplement mechanical recovery.
- Maintaining oil spill response equipment and personnel within a few miles of the well site so that response efforts may start within one hour of any event.
- Shell's recovery capacity of the on-site pre-staged equipment listed in the C-Plan plans for 16,000 barrels of oil per day, which exceeds the WCD volumes we have modeled and vastly exceeds the State of Alaska planning standard of 5,500 barrels per day.
- Shell's storage capacity for any recovered oil exceeds all contingency planning regulations. Shell would locate some storage at the drill site or have the ability to mobilize storage to the site within one or two days.
- Employment of on-site (or early access) remote oil sensing systems that are not visibility dependent and can be used in the dark and in all weather conditions (e.g., infra-red cameras and infra-red equipped aircraft, X-band radar, SLAR equipped satellite imagery).
- A wide-range of monitoring and forecasting tools, including a customized ice and weather forecasting system geared toward Shell's operations and operating area, a 24/7 vessel tracking and monitoring system, state-of-the art communications network, real-time monitoring of down-hole drilling conditions at multiple remote operating centers, and environmental monitoring of air, noise, and water impacts.
- Access to additional oil spill response resources, equipment and personnel, located world-wide, if necessary to respond to an actual event.

Shell is ready for exploration drilling during the open water season of 2012. Shell's comprehensive plans for exploration in the Beaufort Sea during 2012 exceed regulatory requirements, especially in regard to primary well control and oil spill response. This exploration plan, which reflects 60 years of experience

conducting exploration and development drilling in the offshore (including many wells in the Beaufort and Chukchi Seas), meets the highest operational and environmental standards.

Sincerely,

Susan Child

AK Venture Support Integrator, Manager

Enclosure: Comments Specific to the Content of *Proposed Incidental Harassment Authorization* for an Exploration Drilling Program near Camden Bay (pages 69024-69027; *Federal Register Vol. 76, No. 215, November 7, 2011) and* Comments on the Remainder of the Federal Register Notice for an Exploration Drilling Program near Camden Bay (pages 68974—69024); *Federal Register Vol. 76, No. 215, November 7, 2011)*

Comments Specific to the Content of *Proposed Incidental Harassment Authorization* for an Exploration Drilling Program near Camden Bay (pages 69024-69027; *Federal Register Vol. 76, No. 215, November 7, 2011)*				
Heading/Subheading	Page	Column	FR Notice Language	Comment
Proposed Incidental Harassment Authorization	69024	C	(1) This authorization is valid from July 10, 2012 through October 31, 2012.	Within the Summary of Request section of the proposed notice, NMFS' summarizes Shell's plans to drill on OCS leases offshore of Camden Bay during the 2012 Arctic open-water season. Given that Shell commits to not entering the Chukchi Sea before July 1, 2012, we could arrive at either the Sivulliq or Torpedo prospects, and initiate drilling activities prior to July 10th, therefore Shell asks that the timeframe for activation of the IHA begin at least on July 1st.
Proposed Incidental Harassment Authorization	69024	C	(2) This Authorization is valid only for activities associated with Shell's 2012 Camden Bay exploration drilling program. The specific areas where Shell's exploration drilling program will be conducted are within Shell lease holdings in the Outer Continental Shelf Lease Sale 195 and 202 areas in the Beaufort Sea.	The proposed authorization for takes by incidental harassment includes acoustic sources related to continuous drillship sounds, sounds due to ice management, and those from the air gun array for the ZVSP. Ice management may take place beyond the boundaries of Shell lease holdings in order to maintain the safety and security of the drillship during its operations on location. Also, the continuous drillship sounds (at 120 dB) may extend beyond the limit of Shell leas holdings. Therefore, Shell asks that the language of the IHA not limit the incidental takings from authorized sound sources to those made while only on Shell lease holdings.
Proposed Incidental Harassment Authorization	69024	C	(3)(a) The incidental taking of marine mammals, by Level B harassment only, is limited to the following species: Bowhead whale; gray whale; beluga whale; harbor porpoise; ringed seal; bearded seal; spotted seal; and ribbon seal.	Shell's IHHA also included a request for incidental take of the narwhal. Shell concedes this is a rare species; however, it is often that Shell hears from subsistence hunters in Alaska that they have seen a narwhal in the Arctic Ocean. Shell asks that the narwhal be included in the incidental take authorization in the off-chance that one is observed within the ensonified area of an activity authorized by this IHA.
Proposed Incidental Harassment Authorization	69024	C/R	(7)(a) All vessels shall reduce speed to at least 9 knots when within 300 yards (274 m) of whales. The reduction in speed will vary based on the situation but must be sufficient to avoid interfering with the whales. 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;	Shell asks whether the response we provided to NMFS on July 29, 2011 for a definition of "group" is consistent with the intent meant by NMFS in this FR notice. That response in its entirety is: **Shell's voluntary mitigation measure does not define the term in question. Shell echoes NMFS' use of the term "groups" that has been included in each IHA issued to Shell by NMFS for marine seismic surveys and exploration drilling since 2007, see under Section 6 Mitigation, (a) General Mitigation (i) and (ii). As a general practice, Shell will adopt a definition of a group as being three or more whales observed within a 500 meter area and displaying behaviors of directed or coordinated activity, e.g. group feeding.**
Proposed Incidental Harassment Authorization	69024	R	(7)(e) Aircraft shall not fly within 1,000 ft (305 m) of marine mammals or below 1,500 ft (457 m) altitude (except during takeoffs, landings, or in emergency situations) while over land or sea;	Shell asks that general mitigation (7)(e) be modified to apply to all "non-MMO" flights, thus allowing for MMO flights to fly lower as needed to afford the best possible marine mammal sightings and identification. Shell points out that in item (9) (e) of the proposed IHA language (page 69025), NMFS appropriately describes that this mitigation applies to aircraft, "unless engaged in marine mammal monitoring,".
Proposed Incidental Harassment Authorization	69024	R	(7)(f)…drillship **or support vessel**... PSO shifts shall last no longer than 4 hours at a time and shall not be on watch more than 12 hours in a 24-hour period…..	Shell's view is that this general mitigation and the length of daily duty restrictions included in this mitigation, applies only to the drilling vessel and ice management vessels. Given the operations of these vessel and length of daily duty restrictions, these vessels will have 5 MMOs on-board. Shell's view is that the remainder of support vessels, not included as "sound sources" will have fewer MMOs than either the drilling vessel or ice management vessels, which will be sufficient to cover marine mammal observations.

Proposed Incidental Harassment Authorization	69024	R	(7)(g)(iv) The ship's position, speed of support vessels, and **water temperature**,….	Shell asks what is the benefit and purpose for recording water temperature among the "sighting conditions" criteria? It will be difficult to obtain water temperature readings from some vessels, particularly at the frequency cited in the mitigation. Further, the depth of water temperature recording may vary significantly between vessels making comparison, if intended, of questionable value. Measurement of water temperature from some vessels may require variances from safety measures in force on vessels. Shell requests that the water temperature measurement be removed as a stipulation under this mitigation, given that it lacks a material value to the recording of marine observations and adherence to other more salient mitigation measures.
Proposed Incidental Harassment Authorization	69025	R	(e) Not operate aircraft below 1,500 ft (457 m) unless engaged in marine mammal monitoring, approaching, landing or taking off, or unless engaged in providing assistance to a whaler or in poor weather (low ceilings) or any other emergency situations;	NMFS appropriately describes that flight altitude restriction does not apply to aircraft involved in marine mammal monitoring
Proposed Incidental Harassment Authorization	69025	R	(9)(f) Collect all drilling mud and cuttings with adhered mud from all well sections below the 26-inch (20-inch casing) section, as well as treated sanitary waste water, domestic wastes, bilge water, and ballast water and transport them outside the Arctic for proper disposal in an Environmental Protection Agency licensed treatment/disposal site. These waste streams shall not be discharged into the ocean;	Shell acknowledges that we have voluntarily elected to institute the mitigation measure of collecting drilling mud and cuttings and certain other waste streams as a subsistence mitigation measure . However, we do not concur with the implied assertion in the heading of (9) *Subsistence Mitigation Measure,* that this measure is a necessity "To ensure no unmitigable adverse impact on subsistence uses of marine mammals.
Proposed Incidental Harassment Authorization	69026	L	(10)(c)(i) Holder of this Authorization is required to conduct sound source verification tests for the drilling vessel, support vessels, and the airgun array……. The test results shall be reported to NMFS within 5 days of completing the test. Also, (11)(a) *Reporting Requirements:* The Holder of this Authorization is required to: (a) Within 5 days of completing the sound source verification tests for the drillship, support vessels, and the airguns, the Holder shall submit a preliminary report of the results to NMFS.	Sound source verification for the drilling vessel will necessitate that recordings of the various sounds of the drilling program continue throughout the drilling season. Hence, all drilling program sounds will not be available within 5 days of initiating drilling. Instead, Shell volunteers to provide to NMFS a "rolling" transmission of recorded drilling program sounds throughout the drilling program. The frequency of this "rolling" transmission can be decided via further consultation with NMFS and perhaps with the input from peer review of the 4MP. Shell requests that the eventual IHA incorporate language that reflects the flexibility of providing the drilling sounds on this "rolling" basis.
Proposed Incidental Harassment Authorization	69026	L/C	(10) (ii) *Acoustic Study of Bowhead Deflections:* Deploy acoustic recorders at five sites along the bowhead whale migration path in order to record vocalizations of bowhead whales as they pass through the exploration drilling area. This program must be implemented as detailed in the 4MP.	Shell asks that the phrase, "To the extent practical, "precede the last sentence of this monitoring requirement. Shell fully intends to deploy and execute the study as designed; however, conditional temporal and spatial factors such as ice at the locations for deployment of acoustic recorders could cause some recorders to not be deployed, or to be deployed at alternate locations. As such, Shell asks that the eventual IHA note this flexibility around such an undesired outcome.
Proposed Incidental Harassment Authorization	69026	R	(11)(d) A draft comprehensive report describing the aerial, acoustic, and vessel-based monitoring programs will be prepared and submitted **within 240 days of the date of this Authorization**.	Shell asks that the eventual IHA not stipulate that the comprehensive report be due within 240 days from the date of the Authorization. It is Shell's hope that the Authorization will be received well in advance of the initiation of drilling related activities, so as to allow for needed planning and investment. If such is the case, such early approval would start the clock on the 240 days without an opportunity within that time to collect or process data. At a minimum, the due date for the comprehensive report should not start until the end of the 2012 exploration drilling program, at which time the data that will support the report will have been collected and are available for processing.

Comments on the Remainder of the Federal Register Notice for an Exploration Drilling Program near Camden Bay (pages 68974—69024); *Federal Register Vol. 76, No. 215, November 7, 2011)*				
Heading/Subheading	Page	Column	FR Notice Language	Comment
Exploration Drilling – (2) Support Vessels	68975	C	During the 2012 drilling season, the *Kulluk* or *Discoverer* will be **attended by 11 vessels** that will be used for ice management, anchor handling, oil spill response (OSR), refueling, resupply, drill mud/cuttings and wastewater transfer, equipment and waste holding, and servicing of the drilling operations.	Shell's revised Camden Bay exploration drilling program assumes 11 vessels will support either the *Kulluk* or *Discoverer*. Eleven is the number of vessels currently expected to be used, though the actual number of support vessels may vary due to operational needs. This is why Shell's IHA application states that… "Either drilling vessel would be attended by a minimum of 11 support vessels…" (pages 1 and 6 of the IHAA).
Exploratory Drilling Program and Potential for Oil Spill	68992-68996	L(68992) C(68996	Multiple Pages – not repeated here.	Shell appreciates NMFS' conclusion of no reasonable likelihood of serious injury or mortality to marine mammals from an oil spill during Shell's 2012 Camden Bay exploration drilling program. In this FR notice, NMFS conducts a thorough and thoughtful assessment of the low likelihood of a large or very large oil spill given the robust design standards and practices that Shell will implement during this drilling program, beyond the already low probability of an oil spill even occurring during the drilling of any offshore well. Within the FR notice NMFS also conducts an appropriate assessment of the impacts to its jurisdictional species from an oil spill, even despite its conclusion that the occurrence of an oil spill is extremely remote. Each of these items is thoroughly assessed by NMFS and the appropriate conclusions are drawn by NMFS in the FR notice.
Mitigation Measures Proposed by Shell	69003	L	…(3) implementing flight restrictions prohibiting aircraft from flying below 1,500 ft (457 m) altitude (except during takeoffs and landings or in emergency situations);…	Shell committed mitigation applies to all "non-MMO" flights, thus allowing for MMO flights to fly lower as needed to afford the best possible marine mammal sightings and identification.
Additional Mitigation Measures Proposed by NMFS	69003	L	In addition to the mitigation measures proposed by Shell, NMFS proposes the following measures (which apply to vessel operations) be included in the IHA, if issued, in order to ensure the least practicable impact on the affected species or stocks. NMFS proposes to require Shell to avoid multiple changes in direction or speed when within 300 yards (274 m) of whales.	This mitigation measure was committed to by Shell in the IHA application.
Estimated Take Conclusions	69018	C	…Therefore, for the 2012 Beaufort Sea drilling season, NMFS proposes to authorize the take of **38** beluga whales,….	The value of 38 as the maximum estimated take of beluga was incorrect in the IHA application. The maximum estimated take of beluga from the *Kulluk* drilling sounds should be 65, not 38. The miscalculation was a result of a cell reference error in the "Total" table (Table 12 in the IHAA).