Endangered Species Act
Section 7(a)(2) Consultation Biological Opinion
and Section 7(a)(4) Conference Opinion

Action Agency: National Marine Fisheries Service’s Office of Protected Resources - Permits and Conservation Division (NMFS PR1)

Activities Considered: Issuance of Incidental Harassment Authorization under section 101(a)(5)(a) of the Marine Mammal Protection Act to Shell Gulf of Mexico and Shell Offshore Inc. (Shell) for Aviation Operations Associated with Ice Condition Monitoring over the Beaufort and Chukchi Seas From May 2015 through April 2016

Consultation Conducted By: National Marine Fisheries Service, Alaska Region

Consultation Number: AKR-2015-9448

Date Issued: 5-20-15

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1.0 Introduction

Section 7(a)(2) of the Endangered Species Act (ESA) requires each federal agency to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a federal agency’s action “may affect” a protected species or its critical habitat, that agency is required to consult with the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS), depending upon the endangered species, threatened species, or designated critical habitat that may be affected by the action (50 CFR §402.14(a)). An action agency may also confer with NMFS or USFWS under section 7(a)(4) of the ESA regarding species that have been proposed for listing or critical habitat that has been proposed for designation (50 CFR §402.10).

Under the Marine Mammal Protection Act (MMPA), Level B harassment is defined as: “any act of pursuit, torment, or annoyance which . . . has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.” Sections 101(a)(5)(A) and (D) of the MMPA direct the Secretary of Commerce to allow, upon request, the incidental (not intentional) taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review. An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

The action that is the subject of this consultation is NMFS Office of Protected Resources – Permits and Conservation Division’s (NMFS PR1) proposed issuance of an Incidental Harassment Authorization (IHA) to take marine mammals by harassment under the MMPA incidental to the Planned Ice Overflight Survey Program in the Chukchi and Beaufort Seas from May 2015 to April 2016. These activities are a subset of the activities that tier off the broader, overarching activities considered in the NMFS 2013 biological opinion on Oil and Gas Leasing and Exploration Activities in the U.S. Beaufort and Chukchi Seas, Alaska (NMFS Consultation Number F/AKR/2011/0647) (NMFS 2013) (available at http://alaskafisheries.noaa.gov/protectedresources/esa/section7/arcticbiop2013.pdf). This biological opinion incorporates several sections of that opinion’s analysis by reference, as indicated throughout this document.

This opinion evaluates the effects of the proposed action on the threatened Arctic ringed seal (Phoca hispida hispida), the Beringia distinct population segment (DPS) of the bearded seal (Erignathus barbatus nautica)\(^1\), and proposed critical habitat for the Arctic ringed seal. NMFS

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\(^1\) On July 25, 2014, the U.S. District Court for the District of Alaska issued a decision vacating NMFS’s December 28, 2012, listing of the Beringia DPS of bearded seals as threatened (Alaska Oil and Gas Association v. Pritzker, Case No. 4:13-cv-00018-RPB). NMFS has appealed the district court's decision to the U.S. Court of Appeals for the Ninth Circuit. While the litigation is pending, our Biological Opinions under section 7(a)(2) of the ESA will
PR1 determined that this proposed action will not affect ESA-listed cetaceans (Shane Guan, NMFS PR1 Pers. Comm. May 6, 2015) because whales are unlikely to be present in the vicinity of ice-coring activities (and associated helicopter landings) and are unlikely to be disturbed by passing fixed-wing aircraft associated with this project. Therefore, NMFS PR1 has not included any cetacean species in its proposed action and no take of such species is authorized.

NMFS Alaska Region (NMFS AKR) is the consulting agency for this proposed action. This opinion and incidental take statement were prepared by NMFS AKR in accordance with section 7(b) of the ESA and implementing regulations at 50 CFR 402.

The opinion is in compliance with section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-544) (“Data Quality Act”) and underwent pre-dissemination review.

2.0 Consultation History

In April 2013, NMFS issued a biological opinion analyzing all foreseeable impacts of oil and gas leasing and exploration activities in the U.S. Beaufort and Chukchi Seas, Alaska (NMFS 2013).

In December of 2014, Shell submitted to NMFS PR1 an Application for Incidental Harassment Authorization (IHA) for the Non-Lethal Taking of Whales and Seals in Conjunction with a Planned Ice Overflight Survey Program in the Chukchi and Beaufort Seas, Alaska May 2015 – April 2016 (IHA Application) and a Marine Mammal Monitoring and Mitigation Plan (4MP)(Shell 2014) intended to minimize effects of the 2015-2016 ice monitoring activities. These ice surveys characterize ice thickness, type, and movement during the fall, winter and spring seasons, and identify locations of possible strudel scour events. They are characterized as industry-standard, scientific surveys. Following discussions and comments, the IHA Application was modified and re-submitted to NMFS in January, 2015.

In January 2015, NMFS PR1 submitted a letter to NMFS AKR requesting initiation of formal ESA Section 7 consultation on the effects of issuance of the subject IHA to bowhead whales (Balaena mysticetus) and ringed and bearded seals (NMFS 2015a). This request letter reflected Shell's analysis, indicating that aircraft noise and helicopter landings associated with the proposed ice surveys could result in MMPA Level B harassment (in this case, non-injurious disruption of behavioral patterns, including breathing, nursing, breeding, feeding, or sheltering) for up to 793 ringed seals, 11 bearded seals, and 2 bowhead whales. (As explained below, NMFS PR1 subsequently determined that this activity will not affect bowhead whales or other cetaceans and therefore has not authorized any take of that species.)

In February 2015, NMFS PR1 completed a Draft Environmental Assessment for the Issuance of an Incidental Harassment Authorization for the Take of Marine Mammals by Harassment Incidental to Conducting Ice Overflight Surveys in the U.S. Chukchi and Beaufort Seas (DEA). In the DEA, NMFS PR1 determined:

continue to address effects to bearded seals so that action agencies have the benefit of NMFS's analysis of the consequences of proposed actions on this DPS, even though the listing of the species is not in effect.
"the proposed Shell ice overflight surveys in the Chukchi and Beaufort Seas in 2015/2016 would not be expected to add significant impacts to overall cumulative effects on marine mammals from past, present, and future activities. The potential impacts to marine mammals and their habitat are expected to be minimal based on the limited noise footprint, and temporal or spatial separation between occurrences of disturbance from the activities analyzed above. In addition, the mitigation and monitoring measures [outlined in the 4MP] are expected to further reduce any potential adverse effects."

In March 2015, NMFS PR1 published in the Federal Register a Notice of Proposed Issuance of an IHA (80 FR 11398). Three comments were received on this notice, from the Marine Mammal Commission, the Alaska Eskimo Whaling Commission, and Shell.

In April 2015, NMFS AKR received information that, upon further analysis, NMFS PR1 determined that noise from the aircraft overflights associated with this action will not be sufficiently loud to harass cetaceans, which may be present along the ice edges, but are not likely to be present around the patches of thick multi-year ice sought for ice core samples (and associated helicopter landings). Aircraft flyovers are not heard underwater for very long, especially when compared to how long they are heard in air as the aircraft approaches an observer. Very few cetaceans, including the species in the proposed ice overflight survey areas, are expected to be encountered during ice overflights due to the low density of cetacean species in the winter survey area and small area to be flown over open water during spring. Most of these effects are expected in open-water where limited aircraft noise could penetrate into the water column. For cetaceans under the ice, the noise levels from the aircraft are expected to be dramatically reduced by floating ice (80 FR 11398). Therefore, NMFS PR1 determined that Shell's proposed ice overflight surveys will have no effect upon cetaceans, including the bowhead. NMFS PR1 does not intend to include cetaceans in the IHA (Shane Guan, NMFS PR1 Pers. Comm. May 6, 2015). Therefore, NMFS AKR did not consider cetaceans in our analysis of effects of this action.

3.0 Information Basis
This biological opinion is based on information provided in Shell's IHA Application (January 2015) and 4MP (December 2014), the DEA (February 2015), the March 2015 Federal Register Notice of Shell’s IHA application, information in the species' status reviews, Federal Register proposed and final rules for listing the species and designating critical habitat, previously completed consultations, and other sources of available information.

4.0 Proposed Action and Action Area
Shell intends to conduct ice overflight surveys in the Chukchi and Beaufort Seas (Figure 1) during the spring (May–July) break-up and winter (November–April) freeze-up periods. These surveys will be conducted from May 31, 2015, through May 30, 2016, using an Aero Commander (or similar) fixed winged aircraft and a Bell 412, AW 139, EC 145 (or similar) helicopter. The surveys will be conducted during daylight hours.

The proposed “break-up” ice surveys will occur between June and July, and will include up to five fixed-wing flights of approximately 1,500 nm total for up to approximately 13 hours, and one helicopter flight of approximately 200 nm total for up to approximately 3 hours. The “freeze-up”
ice surveys will occur from November 2015 - March 2016 and will include up to seven fixed-wing flights of approximately 2,500 nautical miles (nm) total for up to approximately 21 hours, and one helicopter flight in the Beaufort of approximately 200 nm for up to approximately 3 hours. Helicopter activity for the freeze-up surveys will also include approximately 4 landings to collect ice measurements during late freeze-up, including sampling with a battery powered ice auger for up to approximately 3 hours.

Except when encountering marine mammals (see below), altitudes for all fixed wing flights will mostly be at or above 152 m (500 ft.) and range from 30 to 610 m (100 to 2,000 ft.). For helicopter flights, the altitude will mostly be at or above 61 m (200 ft.) with a range of 15 to 152 m (50 to 500 ft.).

Shell will also have a dedicated helicopter for Search and Rescue (SAR) for the spring 2015 surveys. The SAR helicopter is expected to be a Sikorsky S-92 (or similar). This aircraft will stay grounded at the Barrow base location except during training drills, emergencies, and other non-routine events. All flights will operate out of land-based airports in Barrow and Deadhorse, Alaska.

![Figure 1. Location Map for Break-Up and Freeze-Up Overflight Surveys.](image-url)

The 4MP, which is incorporated as part of the Shell project, includes using one trained protected species observer (PSO) onboard to record all marine mammal sightings during ice overflights and collect data on the behavior and potential reaction of each individual marine mammal. The 4MP indicates that Shell will maintain a buffer of 1.6 km (1 mi) or greater when flying over areas where seals are concentrated in groups of 5 or more. Further, Shell will avoid landing on ice within 1400 m of hauled out seals (modified from 800 m in Shell’s IHA application) and
avoid flying over polynyas and along adjacent ice margins to minimize disturbance of cetaceans. Data collected by the PSO will be analyzed following ice overflights to assess the observed level of behavioral disturbance resulting from the proposed activity. Shell's 4MP for this project (Shell 2014) provides additional detail.

The action area is defined in the ESA regulations (50 CFR 402.02) as the area within which all direct and indirect effects of the project will occur. The action area is distinct from and larger than the project footprint because some elements of the project may affect listed species some distance from the project footprint. The action area, therefore, extends out to a point where no measurable effects from the project are expected to occur.

The proposed flight operations will occur within the Chukchi Sea Study Area and Beaufort Sea Study Area depicted in Figure 1. All of the effects of the surveys are expected to occur within the two study areas, so those areas constitute the action area for this consultation. A detailed description of the Beaufort and Chukchi Sea areas can be found in NMFS’s 2013 Biological Opinion on Oil and Gas Leasing and Exploration Activities in the U.S. Beaufort and Chukchi Seas, Alaska (NMFS 2013) and is incorporated herein by reference. No substantive changes to that information have occurred since it was written in 2013.

5.0 Status of the Species and Proposed Critical Habitat

The NMFS biological opinion on Oil and Gas Leasing and Exploration Activities in the U.S. Beaufort and Chukchi Seas, Alaska (NMFS Consultation Number F/AKR/2011/0647) provides a comprehensive analysis of the status of ringed and bearded seals (sections 2.2.3.5 and 2.2.3.6), and the threats to these species through March 2013 (section 2.4), and we incorporate that text herein by reference (NMFS 2013). We are aware of no substantive changes to that information that have emerged since it was written in 2013.

5.1 Arctic Ringed Seal

A single Alaskan stock of ringed seal is currently recognized in U.S. waters. This stock is part of the Arctic ringed seal subspecies. The genetic structuring of the Arctic subspecies has yet to be thoroughly investigated, and Kelly et al. (2010) cautioned that it may prove to be composed of multiple distinct populations. While current, comprehensive, and reliable abundance estimates and trends for the Alaska ringed seal population are not available, the most recent stock assessment (Allen and Angliss 2014) indicates at least 300,000 ringed seals in the Beaufort and Chukchi Seas, which is likely an underestimate since the Beaufort surveys, which formed a portion of the estimate, were limited to within 40 km of shore. NMFS listed the Arctic ringed seal as a threatened species effective February 26, 2013 (77 FR 76706; December 28, 2012).

5.1.1 Distribution

Arctic ringed seals have a circumpolar distribution. They occur in all seas of the Arctic Ocean, and range seasonally into adjacent seas including the Bering Sea. In the Chukchi and Beaufort Seas, where they are year-round residents, they are the most widespread seal species.

Arctic ringed seals have an affinity for ice-covered waters and are able to occupy areas of even continuous ice cover by abrading breathing holes in that ice (Hall 1865, Bailey and Hendee 1926; McLaren 1958a). Throughout most of their range, Arctic ringed seals do not come ashore
and use sea ice as a substrate for resting, pupping, and molting (Kelly et al. 1986, Kelly et al. 2010). Outside the breeding and molting seasons, they are distributed in waters of nearly any depth; their distribution is strongly correlated with seasonally and permanently ice-covered waters and food availability (e.g. Simpkins et al. 2003, Freitas et al. 2008).

The seasonality of ice cover strongly influences ringed seal movements, foraging, reproductive behavior, and vulnerability to predation. Three ecological seasons have been described as important to ringed seals: the “open-water” or “foraging” period when ringed seals forage most intensively, the subnivean period in early winter through spring when seals rest primarily in subnivean lairs on the ice, and the basking period between lair abandonment and ice break-up (Born et al. 2004, Kelly et al. 2010).

Overall, the record from satellite tracking indicates that during the foraging period, ringed seals breeding in shorefast ice either forage within 100 km of their shorefast breeding habitat or they make extensive movements of hundreds or thousands of kilometers to forage in highly productive areas and along the pack ice edge (Freitas et al. 2008 in Kelly et al. 2010). Movements during the foraging period by ringed seals that breed in the pack ice are unknown. During the winter subnivean period, ringed seals excavate lairs in the snow above breathing holes where the snow depth is sufficient. These lairs are occupied for resting, pupping, and nursing young in annual shorefast and pack ice. Movements during the subnivean period are typically limited, especially when ice cover is extensive. During the (late) spring basking period, ringed seals haul out on the surface of the ice for their annual molt.

Because Arctic ringed seals are most readily observed during the spring basking period, aerial surveys to assess abundance are conducted during this period. Frost et al. (2004) reported that water depth, location relative to the fast ice edge, and ice deformation showed substantial and consistent effects on ringed seal densities during May and June in their central Beaufort Sea study area—densities were highest in relatively flat ice and near the fast ice edge, as well as at depths between 5 and 35 m. Bengtson et al. (2005) found that in their eastern Chukchi Sea study area during May and June, ringed seals were four to ten times more abundant in nearshore fast and pack ice than in offshore pack ice, and that ringed seal preference for nearshore or offshore habitat was independent of water depth. They observed higher densities of ringed seals in the southern region of the study area south of Kivalina and near Kotzebue Sound.

5.1.2 Threats to Ringed Seals
The principal threat to Arctic ringed seals is climate change-driven reduction in sea ice and snow cover. Other threats include ocean acidification, predation, parasites and disease, harvest, commercial fisheries, shipping, contamination, and research. These threats are described in detail the species Status Review (Kelly et al. 2010) and the proposed listing rule (75 FR 77476), and are summarized in NMFS (2013).

5.2 Arctic Ringed Seal Critical Habitat
NMFS proposed critical habitat for the Arctic ringed seal on December 9, 2014 (79 FR 73010) (Figure 2). Based on the best available information, we determined that the physical and biological features essential to the conservation of the Arctic ringed seal in the U.S. include:
1. Sea ice habitat suitable for the formation and maintenance of subnivean birth lairs used for sheltering pups during whelping and nursing, which is defined as seasonal landfast (shorefast) ice, except for any bottomfast ice extending seaward from the coast line in waters less than 2 m deep, or dense, stable pack ice, that has undergone deformation and contains snowdrifts at least 54 cm deep.

2. Sea ice habitat suitable as a platform for basking and molting, which is defined as sea ice of 15 percent or more concentration, except for any bottom-fast ice extending seaward from the coast line in waters less than 2 m deep.

3. Primary prey resources to support Arctic ringed seals, which are defined to be Arctic cod, saffron cod, shrimps, and amphipods.

NMFS is currently addressing public comments on the proposed critical habitat designation and expects to develop a final rule by the end of 2015.

Figure 2. Proposed Arctic ringed seal critical habitat.

5.3 Beringia Bearded Seal
There are two recognized subspecies of the bearded seal: *E. b. barbatus*, often described as inhabiting the Atlantic sector (Laptev, Kara, and Barents seas, North Atlantic Ocean, and Hudson Bay; Rice 1998); and *E. b. nauticus*, which inhabits the Pacific sector (remaining
portions of the Arctic Ocean and the Bering and Okhotsk seas; Ognev 1935, Scheffer 1958, Manning 1974, Heptner et al. 1976). The geographic distributions of these subspecies are not separated by conspicuous gaps. There are regions of intergrading generally described as somewhere along the northern Russian and central Canadian coasts (Burns 1981, Kelly et al. 1986, Rice 1998). Consequently, geographic boundaries for the divisions between the two subspecies are subject to the strong caveat that distinct boundaries do not appear to exist in the actual populations; and therefore, there is considerable uncertainty about the best locations for the boundaries. Two distinct population segments (DPS) were identified for the *E. b. nauticus* subspecies—the Okhotsk DPS in the Sea of Okhotsk, and the Beringia DPS, encompassing the remainder of the range of this subspecies. Only the Beringia DPS of bearded seals is found in U.S. waters (and the action area), and these are of a single recognized Alaska stock.

A precise population estimate for the Beringia DPS of bearded seal is currently not available (Allen and Angliss 2014). However, based on previous studies, Cameron et al. (2010) estimated about 125,000 bearded seals in the Bering Sea and 27,000 bearded seals in the Chukchi Sea, and estimated that the Beringia DPS contained approximately 155,000 bearded seals. NMFS listed the Beringia DPS bearded seal as a threatened species effective February 26, 2013 (77 FR 76740; December 28, 2012). Following a legal challenge, the U.S. District Court for the District of Alaska vacated the listing on July 25, 2014. The case is currently on appeal before the U.S. Court of Appeals for the Ninth Circuit.

### 5.3.1 Distribution

Bearded seals are a boreoarctic species with a circumpolar distribution (Fedoseev 1965; Johnson *et al.* 1966; Burns 1967; Burns and Frost 1979; Burns 1981; Smith 1981; Kelly 1988). Their normal range extends from the Arctic Ocean (85°N) south to Sakhalin Island (45°N) in the Pacific, and south to Hudson Bay (55°N) in the Atlantic (Allen 1880; Ognev 1935; King 1983). The range of the Beringia DPS of the bearded seal is defined as extending from an east-west Eurasian dividing line at Novosibirskiye in the East Siberian Sea, south into the Bering Sea (Kamchatka Peninsula and 157°E division between the Beringia and Okhotsk DOSs), and to a north American dividing line (between the Beringia DPS of the E. b. nauticus subspecies and the E. B. barbatus subspecies) at 122°W (midpoint between the Beaufort Sea and Pelly Bay).

Bearded seals are closely associated with sea ice – particularly during the critical life history periods related to reproduction and molting – and can be found in a broad range of ice types. They generally prefer ice habitat that is in constant motion and produces natural openings and areas of open water such as leads, fractures, and polynyas, for breathing, hauling out on the ice, and access to water for foraging (Heptner *et al.* 1976, Fedoseev 1984, Nelson *et al.* 1984). The bearded seal’s effective range is generally restricted to areas where seasonal sea ice occurs over relatively shallow waters. Based on the best available data, Cameron *et al.* (2010) defined the core distribution of bearded seals as those areas over waters less than 500 m deep.

The region that includes the Bering and Chukchi seas is the largest area of continuous habitat for bearded seals (Burns 1981, Nelson *et al.* 1984). The Bering-Chukchi Platform is a shallow intercontinental shelf that encompasses half of the Bering Sea, spans the Bering Strait, and covers nearly all of the Chukchi Sea. Bearded seals can reach the bottom everywhere along the shallow shelf and so it provides them favorable foraging habitat (Burns 1967). The Bering and
Chukchi seas are generally covered by sea ice in late winter and spring and are then mostly ice free in late summer and fall, a process that helps to drive a seasonal pattern in the movements and distribution of bearded seals in this area (Burns 1967; Burns 1981; Nelson et al. 1984). During winter, most bearded seals in Alaskan waters are found in the Bering Sea, while smaller numbers of year-round residents remain in the Beaufort and Chukchi Seas, mostly around lead systems, and polynyas. From mid-April to June, as the ice recedes, many bearded seals that overwinter in the Bering Sea migrate northward through the Bering Strait into the Chukchi and Beaufort Seas, where they spend the summer and early fall at the southern edge of the Chukchi and Beaufort Sea pack ice at the wide, fragmented margins of multiyear ice. A small number of bearded seals, mostly juveniles, remain near the coasts of the Bering and Chukchi seas for the summer and early fall instead of moving with the ice edge. These seals are found in bays, brackish water estuaries, river mouths, and have been observed up some rivers (Burns 1967, Heptner et al. 1976, Burns 1981).

5.3.2 Threats to Beringia Bearded Seals

The principal threat to Beringia DPS bearded seals is climate-driven reduction in sea ice. Other threats include ocean acidification, predation, parasites and disease, harvest, commercial fisheries, shipping, contamination and research. The threats to the species are described in detail in the species Status Review (Cameron et al. 2010) and the final rule listing the Okhotsk and Beringia DPS of bearded seal as threatened (77 FR 76740), and are briefly summarized in NMFS (2013).

6.0 Environmental Baseline

The “environmental baseline” includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

The NMFS (2013) Biological Opinion on Oil and Gas Leasing and Exploration Activities in the U.S. Beaufort and Chukchi Seas, Alaska provides a comprehensive analysis of the environmental baseline for this region through March 2013 (section 2.3), and we incorporate that text herein by reference (NMFS 2013). Here, we describe new information that has emerged since March 2013.

Sources of anthropogenic sounds in the Beaufort and Chukchi Seas include those of vessels and aircraft, scientific and military equipment, oil and gas exploration and development, subsistence use, and human settlements. The acoustic effects attributable to Shell's proposed overflights and ice coring activities should be considered within the context of the natural and anthropogenic noise profile already existing within the action area.

Operational challenges that hampered Shell’s offshore exploration activities during 2012 contributed to suspension of drilling activities by Shell in 2013 and 2014. ConocoPhillips and Statoil both postponed offshore exploration activities such that no additional drilling has occurred since 2012 (Henderson and Loe 2014). On May 11, 2015, BOEM issued conditional approval of Shell Gulf of Mexico, Inc.’s revised multi-year exploration plan for the Chukchi Sea (http://www.boem.gov/shell-chukchi/, last accessed May 14, 2015).
Arctic sea ice extent in June and July, 2013 and 2014 was below the 1981-2010 average, but within 2 standard deviations of it, and was above the June and July sea ice extent of the previous three years (Figure 3).

7.0 Effects of the Action

“Effects of the action” means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

7.1 Effects to Ringed and Bearded Seals

For the purposes of this opinion, all of the proposed surveys and ice-coring activities are considered to be part of the action (i.e. disturbances caused by aircraft are direct effects of the action rather than indirect effects of the issuance of an IHA).

Figure 3. Arctic sea ice extent from June through October, 2010-2014, compared to the 1981-2010 average. From the National Snow and Ice Data Center website: http://nsidc.org/arcticsaicenews/2014/09/arctic-minimum-reached/, accessed on 5/7/2015.
The dominant tones in noise spectra from both helicopters and fixed-wing aircraft are generally below 500 Hz, well within the 75 Hz to 30 kHz functional hearing range for pinnipeds in air. (Southall et al. 2007 and Richardson et al. 1995, cited in NMFS 76 FR 13130). Shell's proposed aerial surveys are expected to result in some localized, short-term disturbance to both ringed and bearded seals from helicopters and fixed-wing aircraft flying primarily over areas covered by sea ice, with limited flight activity over open water and adjacent ice edges. Disturbance during fixed-wing ice surveys could be further mitigated through the use of unmanned aerial vehicles (UAVs) that produce only a small fraction of the acoustic output of manned aircraft, and have been successfully deployed and retrieved during the course of marine mammal surveys (Hodgson et al. 2013). Disturbance of ringed or bearded seals due to ice coring activities (and associated helicopter landings and take-offs) is unlikely due to project mitigation measures.

Observed reactions of hauled out pinnipeds to aircraft include looking up at the aircraft, moving on the ice or land, or entering the water. Seals hauled out on the ice have been observed diving into the water when approached by low-flying aircraft (Born et al. 1999; NMFS 2012). Such behavior could constitute "take," in the form of "harassment". Since 1997 NMFS has used generic sound exposure thresholds to determine whether an activity produces underwater sounds that might result in impacts to marine mammals (70 FR 1871). However, for this proposed project, we rely upon a de facto harassment threshold previously used by NMFS PR1 when they issued an IHA to FWS for polar bear research (76 FR 13130) in which a Bell 206 was prohibited from landing within 0.5 miles (800 m) of a hauled-out ringed seal. While many variables affect sound propagation in air (e.g. temperature, wind, terrain, humidity), the calculated received level from a Bell 206 at 0.5 miles is 33 dB\(^2\), roughly equivalent to a quiet rural area and quieter than a library (http://airportnoiselaw.org/dblevels.html).

It is unlikely that many bearded seals would be encountered during the proposed ice overflight surveys during winter as most would typically migrate south with the advancing pack ice into the southern Chukchi and Bering Seas outside of the action area. However, it is possible that a small number of bearded seals may remain in the Beaufort and northern Chukchi Seas through the winter, and could be encountered on the proposed November to March ice overflight surveys. More bearded seals likely would be encountered on the June and July surveys as they migrate northward from the Bering Sea into the Chukchi and Beaufort Seas.

Ringed seals are abundant in the Chukchi and Beaufort Seas during all of the times when ice overflight surveys will occur. In a study of ringed seal responses to flyovers of fixed-wing airplanes and helicopters in Greenland, Born et al. (1999) found that 6% of the seals showed escape behavior in response to low altitude (ca. 152 m (500 ft)) fixed wing aircraft overflights and responded at an average distance of 370 m (1214 ft) in front of the aircraft. Maximum escape response was 600 m (1970 feet). In contrast, 50% of seals showed escape behavior in response to helicopters flying at this same altitude at 400 m (1640 feet) in front of the helicopter, and showed a maximum escape distance of 1450 m (4760 ft). Although the aircraft and helicopter surveys were conducted at different locations, the magnitude of these differences indicates that seals show a heightened response to helicopters versus fixed-wing aircraft.

\[ L_r = L_s - 20 \log R \]

For a Bell 206, \( L_r = 90.7 - 20 \log 800 = 32.63 \text{ dB} \) (received at 800 m)
In order to minimize effects to seals, Shell's 4MP (Shell 2014) indicates that aircraft will maintain "a 1 mile radius when flying over areas where seals appear to be concentrated in groups of ≥ 5 individuals," and the helicopter will not land on ice within 0.5 mi of hauled out pinnipeds. This landing disturbance radius was based upon an IHA issued to the US Fish and Wildlife Service in the course of conducting polar bear work using a Bell 206 helicopter. However, Shell proposes to use a larger Bell 412 or similar helicopter. The two airships have different sound source levels (Table 1).

**Table 1.** Noise levels of Bell helicopters certified under FAR part 36 Appendix H (from a 5/13/2015 e-mail from Greg Horner at Shell).

<table>
<thead>
<tr>
<th>MODEL</th>
<th>EFFECTIVE PERCEIVED NOISE LEVEL (EPNdB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FLYOVER</td>
</tr>
<tr>
<td>206L-4</td>
<td>85.2</td>
</tr>
<tr>
<td>427(^1)</td>
<td>89.1</td>
</tr>
<tr>
<td>427(^2)</td>
<td>89.0</td>
</tr>
<tr>
<td>230(^3)</td>
<td>90.8</td>
</tr>
<tr>
<td>230(^4)</td>
<td>90.5</td>
</tr>
<tr>
<td>430</td>
<td>91.6</td>
</tr>
<tr>
<td>412SP</td>
<td>93.4</td>
</tr>
<tr>
<td>412HP</td>
<td>93.4</td>
</tr>
<tr>
<td>412EP</td>
<td>93.4</td>
</tr>
</tbody>
</table>

Richardson et al. (1995) indicates peak helicopter output at a frequency of 10 to 100 Hz, so we can assume spherical spreading and a loss rate of 20 log R for helicopter noise. With those assumptions we can calculate maximum potential sound exposure by solving for distance R (in meters) where 800 m with source level of 90.7 dB equals R meters for source level of 95.6 dB, and using the equation:

\[ L_r = L_s - 20 \log R \]

Where \( L_r \) is the received level in dB re 20 microPA (in air)
\( L_s \) is the source level at 1m
\( R \) is range in meters (Richardson et al. 1995)

For FWS Bell 206, \( L_r = 90.7 - 20 \log 800 = 32.63 \) dB (received at 800 m)

For Shell’s Bell 412, we seek the range at which the received level = 32.63 dB, because that is equivalent to the received level from a Bell 206 at 0.5 miles (800 m), which was permitted by
PR1 to FWS for avoiding disturbance to ringed seals and NMFS believes is sufficient to determine whether a potential disturbance and thus take has occurred. The maximum source sound level of a Bell 412 is during approach, and is reported as 95.6 dB, therefore

\[
32.63 \text{dB} = 95.6 \text{dB} - 20 \log R \\
63 \text{dB} = 20 \log R \\
63 \text{dB}/20 \text{dB} = \log R \\
3.15 = \log R \\
R = 10^{3.15} \\
R = 1,412 \text{ m}.
\]

For the purposes of this biological opinion, a Bell 412 (or similar) landing radius of 1400 m that is free of seals would make it extremely unlikely that ringed or bearded seals would be acoustically harassed, and would provide equivalent acoustic protection as was afforded in the IHA granted to FWS requiring a 0.5 mile (800 m) radius of ice that was free of seals prior to landing. Shell therefore agreed to use the 1400 m radius, and NMFS PR1 modified its proposed action accordingly.

Based on the findings in Born et al. (1999), Shell (2015) used disturbance distances of 400 m for fixed-wing and 1600 m for helicopters to determine the potential on-the-ground width of the disturbance path for seals that would result from the overflights.

This on-the-ground disturbance width multiplied by transect length yielded an area estimate that was then multiplied by the average and maximum expected densities of seals in each season, extrapolating from information presented in Bengtson et al. (2005). This result was multiplied by the proportion of seals expected to react, based on the findings of Born et al. (1999). Based on these calculations, Shell (2015) derived a point estimate of 11 bearded seals and 793 ringed seals that are expected to be taken during the course of this action. There would be so few seals remaining in lairs at the time of these surveys that we have determined that the taking of seals in lairs will be so few in number (approaching zero) that it will not affect the estimated number of seals expected to be taken by this project. Kelly et al. (2006) indicate that ringed seal lair abandonment in the Beaufort begins in late April and early May, and is complete by late May to mid-June. All or nearly all of the flights associated with this action will occur in June and July, after lair abandonment is complete, or nearly so.

Based on minimum population estimates of ringed and bearded seals occupying the Beaufort and Chukchi Seas during the seasons when the proposed overflights would occur (Allen and Angliss 2014), the percentages of the populations that may be disturbed would be, at most, 0.26% of the Arctic ringed seal DPS and 0.007% of the Beringia DPS bearded seals. Disturbance of these small proportions of the populations would be temporary, limited to disrupting haul-out behavior, potentially causing seals to escape into water. Ice seals are well adapted to move between ice and water without injury, including “escape reactions” to avoid predators (Born et al. 1999).

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3 Shell requested that their IHA reflect similar levels of ringed seal protection as PR1 had required of FWS for their polar bear research.
We expect the typical duration of take associated with overflights will last from seconds up to a few minutes. The maximum duration of disturbance associated with aircraft landings will be limited to the time required for a helicopter to approach an ice-coring site, land, obtain an ice core sample, and fly off. This will happen approximately 4 times and will likely last no more than one hour each time. Helicopter landings will not occur when hauled-out seals are observed within 0.8 km (0.5 mi). Should an undetected seal occur closer than 0.8 km to a landing helicopter, we expect that it will retreat into the water before the helicopter is close enough to cause any hearing threshold shift. Because helicopter landings and take-offs would be the loudest project-related event encountered by seals, and because we expect the seal’s behavioral reactions and the project’s mitigation measures to prevent acoustic harm, we expect no acoustic harm to seals from this action. Battery-powered ice coring activities are not expected to cause disturbance beyond the area already disturbed by the landing helicopter, and so acoustic effects of about four instances of ice coring are extremely unlikely to cause any disturbance and thus take.

No population level effects are expected as a result of this action. No injuries or mortalities of ringed or bearded seals are anticipated from the proposed action (80 FR 11398).

Shell’s 4MP for this project is incorporated into the proposed action. In addition to the flight distance and landing limitations mentioned above, Shell’s 4MP for this project (Shell 2014) requires that a trained Protected Species Observer (PSO) with marine mammal observation experience in the Chukchi and Beaufort Seas will be aboard each flight watching for and identifying marine mammals and recording all sightings/observations, including numbers, approximate age (when possible to determine), and distances from and potential reactions to the presence of the aircraft, as well as weather, air temperature, cloud and ice cover, visibility conditions, and wind speed. These data will be analyzed following ice overflights to assess the observed level of behavioral disturbance resulting from the proposed activity. The PSO will also work with the helicopter pilots to identify areas for landings on ice that are clear of marine mammals. All PSOs will be trained and familiar with the marine mammals of the area, data collection protocols, reporting procedures, and required mitigation measures.

Based on NMFS PR1’s evaluation of the applicant’s proposed measures, as well as other measures considered by NMFS PR1, they have preliminarily determined that the proposed mitigation measures provide the means of effecting the least practicable impact on marine mammals species or stocks and their habitat (80 FR 11398).

7.2 Effects to Arctic Ringed Seal Proposed Critical Habitat

In the proposed rule to designate critical habitat for the Arctic ringed seal (79 FR 73010), NMFS identified three physical and biological features essential for conservation of the species:

1. Sea ice habitat suitable for the formation and maintenance of subnivean birth lairs used for sheltering pups during whelping and nursing, which is defined as seasonal landfast (shorefast) ice, except for any bottomfast ice extending seaward from the coast line in waters less than 2 m deep, or dense, stable pack ice, that has undergone deformation and contains snowdrifts at least 54 cm deep.
The aerial overflights and occasional landings for ice coring are not expected to affect the quantity or quality of sea ice habitat suitable for the formation of subnivian birth lairs. Any associated disturbance may affect individual ringed seals but is extremely unlikely to affect habitat characteristics. We therefore conclude that any such effects are discountable.

2. **Sea ice habitat suitable as a platform for basking and molting, which is defined as sea ice of 15 percent or more concentration, except for any bottom-fast ice extending seaward from the coast line in waters less than 2 m deep.**

The aerial overflights and occasional landings for ice coring are not expected to affect the quantity or quality of sea ice habitat suitable for basking and molting. Any associated disturbance may affect individual ringed seals but is extremely unlikely to affect habitat characteristics. We therefore conclude that any such effects are discountable.

3. **Primary prey resources to support Arctic ringed seals, which are defined to be Arctic cod, saffron cod, shrimps, and amphipods.**

The aerial overflights and occasional landings for ice coring are not expected to affect the quantity or quality of ringed seal prey. Any associated disturbance may affect individual ringed seals but is extremely unlikely to affect habitat characteristics. We therefore conclude that any such effects are discountable.

8.0 Cumulative Effects

“Cumulative effects” are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.02). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

NMFS reviewed recent environmental reports, NEPA documents, NMFS’s Arctic Regional Biological Opinion (NMFS 2013), and other source documents to evaluate and identify actions that are anticipated to occur. Most of the action area includes federal waters, which will preclude the possibility of future state, tribal, or local action that will not require some form of federal funding or authorization. However, we determined that reasonably foreseeable future state, tribal, local or private actions include: oil and gas exploration, development, and production activities; mining exploration, development, and production; military facilities and training exercises; air and marine transportation; major community development projects; recreation and tourism.

NMFS (2013) provides a comprehensive analysis of the cumulative effects for this region (section 2.5), and we incorporate that text by reference. No substantive changes to that information have emerged since it was written in 2013.

9.0 Summary of Effects Determinations

The Draft EA for Shell's proposed ice overflights project (NMFS 2015b) indicates that:
Historically, there have been far greater levels of aviation activity in the offshore Chukchi and Beaufort Seas compared with that of the proposed ice overflights. None of this previous offshore aviation activity is believed to have resulted in long-term impacts to marine mammals, as demonstrated by results from a wide range of monitoring programs and scientific studies. Impacts to marine mammals from aviation activities in Arctic offshore habitats have been shown to be, at most, short-term and highly-localized in nature (e.g., Funk et al. 2013 and Born et al. 1999) (NMFS 2015b).

Long-term or population level effects are not expected to result from aircraft flyovers authorized by the proposed IHA. The majority of seals encountered by fixed wing aircraft will unlikely show any notable disturbance reaction, and approximately half of the seals encountered by helicopters may react by moving from ice into the water (Born et al. 1999), an activity that is within the range of their normal behavior patterns.

In summary, the impact of Shell's proposed ice overflights is expected to be minimal, due to:

- the short-term and highly-localized nature of the surveys;
- the small portion of the ringed and bearded seal populations to be disturbed by the proposed ice overflights;
- the overflight altitudes and flight and landing buffers that Shell will maintain during project activities;
- the expected response to disturbance being well within the range of the seals' normal behavior patterns; and
- the expectation, based on previous observations, that any seals temporarily disturbed will quickly resume normal behaviors following disturbance.

10.0 Integration and Synthesis

In this section, we add the effects of the environmental baseline (section 6.0), the effects of the action (section 7.0) and the cumulative effects (Section 8.0) to formulate NMFS AKR’s biological opinion as to whether the proposed action is likely to: (1) result in appreciable reductions in the likelihood of survival of the species in the wild by reducing its numbers, reproduction, or distribution; (2) or result in appreciable reductions in the likelihood of recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (3) result in the adverse modification or destruction of proposed critical habitat. These assessments are made in full consideration of the status of the species (Section 6.0).

10.1 Ringed Seal Exposure and Risk Analysis

As explained above, we expect 793 ringed seals (0.26\%\(^4\) of the Arctic ringed seal population) to be exposed to noise from this activity to the point where the animals may be temporarily disturbed. Any such disturbance will most commonly manifest itself as retreat from the ice surface to the aquatic environment, a behavior that is normal and frequent for this species. Young animals will be sufficiently old during the time period of the proposed surveys to not suffer adverse thermal effects from this behavioral response; they typically spend about 50\% of their time in the water during the nursing period (Kelly et al. 2010), and likely will have built up

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\(^4\) 793/300,000, where 300,000 is the minimum population estimate for Arctic ringed seals (Allen and Angliss, 2014)
sufficient stores of insulating blubber within the first few weeks of life (Taugbol 1984). Further, they are born with large amounts of brown adipose tissue (Taugbol 1984), which functions to generate body heat in animals that do not shiver. Ringed seals are not expected to be exposed to sound sufficient to cause temporary or permanent threshold shifts. Disturbance will typically be short lived (seconds up to a few minutes), except in the approximately 4 instances in which helicopters will land for the purpose of obtaining ice core samples. In these instances of longer (approximately 1 hour) disturbance, we expect animals will retreat to more distant ice openings or possibly remain in the water until the helicopter departs.

The aircraft traffic attributable to this action will not meaningfully increase the total amount of air traffic in the action area. Furthermore, air traffic is but a minor threat to ringed seals compared to the threats posed by climate change (the dominant threat) or even lesser threats such as seismic exploration, oil development (including oil spills), vessel traffic, and subsistence hunting. While 0.26% of Arctic ringed seals may experience disruptions in their normal behavioral patterns, none are expected to be killed, injured, or experience measurable reductions in their fitness or current or expected future reproductive success as a result of that exposure. We do not expect this action to have population-level effects on Arctic ringed seals.

10.2 Bearded Seal Exposure and Risk Analysis

As explained above, we expect 11 bearded seals (0.007%5 of the Beringia DPS bearded seal population) to be temporarily disturbed from noise from this activity. Any such disturbance will likely manifest itself as diving or retreat from the ice surface to the aquatic environment, behaviors that are normal and frequent for this species. Bearded seals are very unlikely to suffer any adverse thermal effects from this behavioral response. During break-up surveys, newborn animals (with incompletely developed thermoregulatory abilities due to low amounts of blubber) are unlikely to be in the project action area because bearded seals whelp primarily in the Bering or southern Chukchi Seas, such as in Bristol and Kuskokwim Bays, Norton and Kotzebue Sounds, and near Point Hope (Cameron et al. 2010). Young animals present in the Chukchi and Beaufort Seas during freeze-up surveys will be old enough to have built up sufficient stores of insulating blubber to maintain body heat during dives. This project is not expected to expose bearded seals to sound levels that will cause temporary or permanent threshold shifts. Disturbance will typically be short lived (seconds up to a few minutes), except in the approximately 4 instances in which helicopters will land for the purpose of obtaining ice core samples. In these instances of longer (approximately 1 hour) disturbance, we expect animals will retreat to more distant ice openings or possibly remain in the water until the helicopter departs.

The aircraft traffic attributable to this action will not meaningfully increase the amount of air traffic in the action area. Furthermore, air traffic is but a minor threat to bearded seals compared to the threats posed by climate change (the dominant threat) or even lesser threats such as seismic exploration, oil development (including oil spills), vessel traffic, and subsistence hunting. While 0.007% of bearded seals may experience disruptions in their normal behavioral patterns, none are expected to be killed, injured, or experience measurable reductions in their fitness or current or expected future reproductive success as a result of that exposure. We do not expect this action to have population-level effects on bearded seals.

5 11/155,000, where 155,000 is the Beringia DPS estimate from Cameron et al. (2010)
10.3 Ringed Seal Proposed Critical Habitat Exposure and Risk Analysis
As explained above, we do not expect the proposed surveys to affect any of the essential features of proposed ringed seal critical habitat.

10.4 Synthesis
Arctic ringed seals and the Beringia DPS bearded seals are not presently in danger of extinction but are likely to become so in the foreseeable future (77 FR 76706 and 77 FR 76740). In 2012 NMFS determined that the principal threat to the continued existence of these seals is the loss of habitat stemming from climate change. Ringed and bearded seals are vulnerable to habitat loss from changes in the extent or concentration of sea ice because they depend on this habitat for pupping, nursing, molting, and resting.

Shell’s proposed ice surveys are expected to result in take of 793 Arctic ringed seals and 11 Beringia DPS bearded seals. This non-lethal take is expected to be in the form of harassment, resulting only in temporary behavioral changes; injury (e.g., temporary threshold shift or disturbance-induced hypothermia among pups) is not expected. This proposed action will not cause any population-level effects for either species; its effects will be limited to temporary behavioral changes on the order of seconds to a few minutes (and in about 4 instances, behavioral changes lasting up to about an hour).

10.5 Conclusion
After reviewing the current status of the listed species and proposed critical habitat, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS AKR’s biological opinion that the proposed action is not likely to jeopardize the continued existence of the threatened Arctic ringed seal or Beringia DPS bearded seal, and it is not likely to destroy or adversely modify proposed ringed seal critical habitat.

NMFS has reached this conclusion because:
1. The surveys occur over an insignificantly small portion of the species’ total range for a short amount of time.
2. Shell’s cruising altitude and helicopter/seal landing buffers will reduce the disturbance effects of flights on seals.
3. We expect seal response to aircraft noise to be within their range of normal behavior with no measurable reductions in their fitness or current or expected future reproductive success.
4. We expect that any seals disturbed by aircraft noise will quickly resume normal behaviors following cessation of disturbance (disturbance duration will usually be seconds up to a few minutes, with about 4 instances of disturbance lasting about an hour each).

11.0 Reinitiation Notice
As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action on listed species in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that
causes an effect on the listed species or critical habitat not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, section 7 consultation must be reinitiated immediately.

12.0 Incidental Take Statement
Section 9 of the ESA prohibits the take of endangered species without special exemption. The ESA does not prohibit the taking of threatened species unless special regulations have been promulgated, pursuant to ESA Section 4(d), to promote the conservation of the species. ESA Section 4(d) rules have not been promulgated for Arctic ringed seals or the Beringia DPS bearded seal; therefore ESA section 9 take prohibitions do not apply; incidental take of these species is not prohibited. This incidental take statement includes numeric limits on taking of these species because this amount of take was analyzed in our jeopardy analysis. These numeric limits provide guidance to the action agency on its requirement to re-initiate consultation when the amount of take estimated in the jeopardy analysis of this biological opinion is exceeded. This ITS includes reasonable and prudent measures and terms and conditions designed to further minimize take of these threatened species.

12.1 Amount or Extent of Take
The section 7 regulations require NMFS to estimate the number of individuals that may be taken by proposed actions or the extent of land or marine area that may be affected by an action, if we cannot assign numerical limits for animals that could be incidentally taken during the course of an action (50 CFR § 402.14 (i)). This biological opinion analyzes, and this incidental take statement covers, the take associated with NMFS PR1 issuing IHA for the take of marine mammals incidental to Shell's ice overflight surveys in the U.S. Chukchi and Beaufort Seas, Alaska, May 2015 through April 2016.

12.1.1 Ringed Seals
As described in Effects of the Action, the activities described and assessed in this opinion may expose 793 threatened Arctic ringed seal individuals to sound source levels that constitute take via harassment from Shell's proposed ice surveys. Methods used to estimate numbers of ringed seals potentially disturbed are described in the Effects of the Action section.

12.1.2 Bearded Seals
As described in Effects of the Action, the activities described and assessed in this opinion may expose 11 Beringia DPS bearded seal individuals to sound source levels that constitute take via harassment from Shell's proposed ice overflights. Methods used to estimate numbers of bearded seals potentially disturbed are described in the Effects of the Action section.

12.2 Effect of the Take
In the accompanying opinion, NMFS determined that the levels of anticipated incidental take associated with this proposed action are not likely to result in jeopardy to Arctic ringed seals or Beringia DPS bearded seals. The effect of the take to individuals is expected to be no greater than temporary behavioral changes to disturbances lasting from seconds to a few minutes, except for about four instances where helicopter landings associated with ice-coring activities may last about an hour. Normal behaviors are expected to resume shortly after cessation of disturbance.
12.3 Reasonable and Prudent Measures

“Reasonable and prudent measures” (RPMs) are nondiscretionary measures to minimize the amount or extent of incidental take (50 CFR 402.02). “Terms and conditions” implement the reasonable and prudent measures (50 CFR 402.14).

The RPMs included below, along with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. NMFS AKR concludes that the following RPMs are necessary and appropriate to minimize or to monitor the incidental take of ringed and bearded seals resulting from the proposed action. This ITS is valid only for the activities described in this biological opinion, and which have been authorized under section 101(a)(5) of the MMPA. The taking of ringed seals and bearded seals shall be by incidental harassment only. Other forms of take are not authorized by this ITS.

1. NMFS PR1 must ensure adequate and thorough monitoring of the effects of aircraft activities on ringed and bearded seals.

2. NMFS PR1 must minimize disturbance of marine mammals encountered throughout all portions of surveys.

12.4 Terms and Conditions

To minimize and monitor take effectively, NMFS PR1 will require the applicant to comply with the following Terms and Conditions, which implement the non-discretionary RPMs.

The following terms and conditions implement RPM 1 “Ensure adequate and thorough monitoring of the effects of aircraft activities on ringed and bearded seals.”

1.1. At least one passenger ice observer must assist the PSO by monitoring for marine mammals to the extent practicable, while seated on the opposite side of the aircraft from the PSO, and notifying the PSO of all marine mammal observations. This passenger ice observer will alert the PSO in a timely enough manner to allow the PSO to observe the animal and note the following: species; number; gender and age (if determinable); aircraft altitude and slant-line distance at which behavioral responses (if any) were observed; description of behavioral response; and coordinates of the animal(s).

1.2. Results of marine mammal monitoring during the ice surveys must be submitted to NMFS AKR and NMFS PR1 within 90 days of the conclusion of the final flight associated with this action. The 90-day report must address the requirements established by NMFS PR1 in the IHA, including:

1.2.1. Summaries of monitoring effort: Marine mammal observation start and stop times by date, total hours of monitoring, distances flown by date, and environmental conditions during surveys;

1.2.2. Summaries of marine mammal occurrence: coordinates of observations with data indicating date, time, observing conditions, observer name, species or species composition, number of individuals of each species, age/size/gender categories
(when discernible), group sizes, ice cover, indication of disturbance, reaction of animal to aircraft, slant-line distance from aircraft when disturbance is first observed, and aircraft altitude and coordinates when disturbance occurred.

1.2.3. Analyses of the potential effects of ice overflights on marine mammals and the number of ringed and bearded seals that may have been disturbed by aircraft.

1.3. If the taking of any marine mammal occurs in a manner other than that described in this biological opinion, that taking must be reported immediately to the Protected Resources Division, NMFS, Juneau office at 907-586-7012 and/or by email to: Jon.Kurland@noaa.gov, Greg.balogh@noaa.gov, Alicia.Bishop@noaa.gov, the Alaska Regional Stranding Coordinator at 907-586-7248 (Aleria.Jensen@noaa.gov). The report must include the following information:

- Time, date, and geographic coordinates of the incident;
- Number of individuals taken categorized by species, age, sex, and reproductive status (e.g., mother and pup), the type of the aircraft involved;
- Human activity immediately prior to the take, and human activity most likely to have caused the take, description of the incident;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Suspected fate of the animal(s); and
- Photographs or video footage of the animal (if it exists).

The following terms and conditions implement RPM 2 “Minimize disturbance of marine mammals encountered throughout all portions of surveys”.

2.1. Aircraft must maintain an altitude of at least 305 m (1,000 ft) until they reach the targeted survey area for that flight.

2.2. Shell’s Bell 412 or similar helicopters must not land on ice within 1.4 km (0.87 mi) of hauled-out ringed or bearded seals.

13.0 Conservation Recommendations
Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species, to help implement recovery plans, or to develop information (50 CFR 402.02).

1. Shell should use a video camera during ice surveys in an attempt to record marine mammal behavioral responses to aircraft. In obtaining this video data, a high resolution camera should be mounted at a forward facing angle that, in the opinion of the PSO, maximizes the likelihood of capturing the most pronounced behavioral reactions of ringed and bearded seal to the aircraft.

2. Shell should incorporate, to the extent practicable, the use of drones (which are quieter than manned aircraft) for ice surveys. This should only occur if FAA regulations at the time the surveys are conducted make drone use practical without danger of increasing marine mammal disturbance beyond what will be caused by the use of manned aircraft.
In order to keep NMFS AKR informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, NMFS PR1 should notify NMFS AKR of any conservation recommendations they implement in their final action.

14.0 Literature Cited


NMFS 2012. Final Environmental Assessment For the Issuance of Incidental Harassment Authorizations for the Take of Marine Mammals by Harassment Incidental to Conducting
Exploratory Drilling Programs in the U.S. Beaufort and Chukchi Seas. May 2012. 252 pp. Available online at:


NMFS 2015a. Memorandum: Request for Consultation Under Section 7 of the Endangered Species Act (ESA) for the Proposed Issuance of an Incidental Harassment Authorizations (IHAs) to Take Marine Mammals by Harassment Incidental to Ice Overflight Surveys by Shell Gulf of Mexico Inc. (Shell) in the Beaufort and Chukchi Seas. January 15, 2015.


Shell. 2014. Marine Mammal Monitoring and Mitigation Plan, Ice Overflight Surveys Program in the Chukchi and Beaufort Seas. Submitted to NMFS December 2014. 4pp