UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

September 14, 2012

Colonel Christopher D. Lestochi
Commander
Alaska District U.S. Army Corps of Engineers
Regulatory Division
Post Office Box 6898
JBER, Alaska 99506-6898

Re: Point Thomson project, POA-2001-1082-M1

Dear Colonel Lestochi:

National Marine Fisheries Service (NMFS) has completed informal Endangered Species Act (ESA) Section 7 consultation regarding the U.S. Army Corps of Engineers' (Corps) proposal to issue a permit under Section 404 of the Clean Water Act of 1972, as amended, and Section 10 of the Rivers and Harbors Act for construction activities in wetlands and waters of the United States. At their Point Thomson site, Exxon Mobil Corporation and PTE Pipeline LLC (ExxonMobil) propose to: 1) construct infrastructure that will produce liquid hydrocarbons; and 2) further delineate the Thomson Sand and Brookian Sandstone Reservoirs, located mostly offshore, by directional drilling. ExxonMobil would construct three onshore gravel pads, connecting gravel roads, above ground pipelines, a gravel mine site, airstrip, ice roads, a marine barging facility, and would conduct barging operations during ice free periods using a sealift bulkhead (sheet pile in an open cell design, with a gravel backfill transition to the central pad surface). Based on our analysis of the information provided to us (Corps' letter dated January 24, 2012 and Biological Assessment dated November 2011), NMFS concurs with your determination that the Point Thomson project may affect, but is not likely to adversely affect, the 1) endangered bowhead whale (*Balaena mysticetus*), 2) proposed threatened Beringia distinct population segment (DPS) of bearded seals (*Erignathus barbatus*), and 3) proposed threatened Arctic subspecies of ringed seals (*Phoca hispida hispida*). Critical habitat has not been designated for any of these species.

A complete administrative record of this consultation is on file in this office. While the proposed action may affect the bowhead whale, bearded seal, and ringed seal, our assessment finds any such effects are insignificant (such effects could not be meaningfully measured or detected) or discountable (such effects would not reasonably be expected to occur). The rationale for this determination is discussed below.

On January 24, 2012, the Corps sent NMFS a letter of request for concurrence under section 7(a)(2) of the ESA [16 USC § 1536(a); 50 CFR 402.14]. NMFS also received the Biological Assessment (November 2011) for review. The Corps determined that ExxonMobil's in-water activities may affect, but are not likely to adversely affect, the bowhead whale, bearded seal, and ringed seal. Therefore, the Corps is required to consult with NMFS under section 7(a) of the ESA.

Listed Species and Critical Habitat Affected by the Action

The endangered bowhead whale, the proposed threatened Beringia DPS of bearded seals, and the proposed threatened Arctic subspecies of ringed seals may occur in the action area (Table 1).

Species	Division	Status	Listing	Critical Habitat
Bowhead Whale	*Balanea mysticetus*	Endangered	NMFS 1970, 35 FR 18319	Not designated
Beringia DPS of Bearded Seal	*Erignathus barbatus nauticus*	Proposed Listing	NMFS 2010, 75 FR 77496	Not proposed
Arctic Subspecies of Ringed Seal	*Phoca hispida hispida*	Proposed Listing	NMFS 2010 75 FR 77476	Not proposed

Table 1. Listing status and critical habitat designation for marine mammal species considered in this opinion

Bowhead Whale

The bowhead whale was historically found in all Arctic waters of the northern hemisphere. Five populations are currently recognized by the International Whaling Commission and they occur in: eastern Russia (Sea of Okhotsk subpopulation); Bering, Chukchi, and Beaufort seas (Western Arctic stock); Canadian Arctic and western Greenland (Baffin Bay- Davis stock and Hudson Bay-Foxe Basin stock);and from Spitzbergen westward to eastern Greenland (Svalbard population). The Western Arctic bowhead whale, which is the largest of the genetically distinct stocks, is the only stock that inhabits U.S. waters, including the action area.

Population Size and Status

The Western Arctic bowhead whales were estimated at 10,400-23,000 animals in 1848, before commercial whaling decreased the stock to between 1,000-3,000 animals by 1914 (Woodby and Botkin 1993). This stock has increased since 1921, when commercial whaling ended, and now is estimated at 11,836 whales, an estimate that is consistent with trends in abundance estimates made from ice-based counts (Allen and Angliss 2011). George et al. (2004) reported that the Western Arctic bowhead whale stock has increased at a rate of 3.4 percent from 1978-2001, during which time abundance doubled from approximately 5,000 whales to 10,000 whales. The increase in the estimated population size most likely is due to a combination of improved data and better census techniques, along with an actual increase in the population. This steady recovery is likely due to low anthropogenic mortality, a relatively pristine habitat, and a well-managed subsistence hunt (George et al. 2004).

Seasonal Distribution, Habitat, and Biology

The Western Arctic stock winters in the central and western Bering Sea, and largely summers in the Canadian Beaufort Sea (Quakenbush et al. 2010; Moore and Reeves 1993; Brueggeman 1982). Spring migration from the Bering Sea follows the eastern coast of the Chukchi Sea to Point Barrow in nearshore leads from mid-March to mid-June, before continuing through the Alaska Beaufort Sea through offshore ice leads (Braham et al. 1984; Moore and Reeves 1993). The annual leads occur a considerable distance offshore of the construction site. Some bowhead whales arrive in coastal areas of the eastern Canadian Beaufort Sea and Amundsen Gulf in late May and June, but most may remain among the offshore pack ice in the Beaufort Sea until mid-summer. Bowhead whales calve during spring in both the Bering Sea and during migration in the Beaufort Sea.

After leaving the Canadian Beaufort Sea, bowhead whales migrate westward through the Alaska Beaufort Sea, primarily during September and October (Quakenbush et al. 2010). In recent years bowhead whales have been seen or heard offshore from Point Barrow to Kaktovik during summer and early fall (Greene et al. 1999; Blackwell et al. 2004; Funk et al. 2009; Goetz et al. 2009). Nuiqsut whalers have stated that a small number of the earliest arriving bowhead whales have reached the Cross Island area earlier (late August) than in past years. Although some whales summer in the Alaska Beaufort Sea, they likely represent only a small proportion of the total population based on past research and historic accounts (Moore et al. 2010a). It is not clear if this represents a new trend or is due to increased numbers of whaling crews and researchers in the Beaufort Sea that detect more bowhead whales and other marine mammals. Bowhead whales are not known to winter in the Beaufort Sea (Moore et al. 2010a).

The U.S. Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEM), formerly Minerals Management Service, has conducted or funded late-summer/autumn aerial surveys for bowhead whales in the Alaska Beaufort Sea since 1982 (Ljungblad et al. 1986, 1987; Moore et al. 1989; Treacy et al. 2006), representing a comprehensive 30 year record of bowhead whale distribution in the Beaufort Sea. During the fall migration, most bowhead whales migrate west in waters ranging from 15-200 meters (m) (50-650 ft.) deep (Richardson and Thomson 2002, Treacy et al. 2006). Some individuals enter shallower water, particularly in light ice years (Moore 2000; Treacy et al. 2006), but very few whales have been observed shoreward of the barrier islands where water depths are largely too shallow (less than 5 m [16 ft.] deep) to support bowhead whales, generally within 8 m (5 miles [mi]) of the shoreline. Average offshore distance for fall migrating whales recorded during 1982-2000 was 31.2 kilometers (km [19 mi]) or more depending on ice conditions (Treacy et al. 2006; Clark et al. 2011). Satellite tagging studies of bowhead whales and acoustic studies of their vocalizations show seasonal movements occur outside the barrier islands in the Beaufort Sea (Quakenbush et al. 2010; Blackwell et al. 2007). Survey coverage far offshore in deep water is usually limited, and offshore movements may be underestimated (Treacy et al. 2006). However, regardless of inshore or offshore shifts, the main migration corridor is widespread over the continental shelf, north of the barrier islands, including those off Point Thomson.

Marine waters within the barrier islands around Point Thomson are shallow lagoons and bays. While bowhead whales have on occasion been observed to migrate south of some barrier islands that are further offshore, such as Cross, Reindeer, and Argo islands (NMFS 2008), it is unlikely that whales enter the shallow water areas near Point Thomson.

Communication and Hearing

Bowhead whales communicate by producing various sounds that transmit through the water. Most sounds are low-frequency, generally below 1 kilohertz (kHz). Bowhead whales hear sounds with dominant components in the 50-500 hertz (Hz) range (Richardson et al. 1995). Communication is primarily for interacting with other whales because bowhead whales do not have sonar (echolocation), like toothed whales, which make the high frequency sounds (greater than 1 kHz). The science for understanding associations between underwater sounds and specific social or biological functions for bowhead whales is weak to non-existent (Richardson et al. 1995). Sounds may be used to breed, coordinate foraging and other activities, interact socially, recognize individuals, and establish/maintain bonds between mother and calf (Richardson et al. 1995). The sound frequencies may vary by season and the transmission may be affected by natural (sea state, sea ice, etc.) and anthropogenic (seismic, vessels, etc.) events or activities (Greene et al. 1999; Blackwell et al. 2009). The concern about anthropogenic events is because they may mask calling bowhead whales and interfere with communication (Richardson et al. 1995). However, such an effect has not been demonstrated to occur to bowhead whales even in the presence of seismic activity, which produces some of the loudest underwater sounds in the Arctic (Greene et al. 1999; Blackwell et al. 2009).

Scientific Studies in the Action Area

Broad scale aerial surveys in the Beaufort Sea conducted by Shell Exploration and Production Company (Shell) and BOEMRE overlapped the action area. Aerial surveys conducted by Shell Western between 2006-2008 shows that bowhead whales occur north of the barrier islands, near the Point Thomson area, from late August to early October. Survey effort did not extend south of the barrier islands to the shoreline, although whales were observed near the barrier islands, most were much farther north (offshore). Aerial surveys conducted annually by BOEMRE during late summer through fall from 1982-2010 similarly show bowhead whales north, but not inside of the barrier islands near Point Thomson (Treacy et al. 2006). More bowhead whales would likely occur closer, but still north of the barrier islands, during light ice years than heavy ice years. Their occurrence would be highest during September and October, when most bowhead whales migrate westward across the Beaufort Sea; while the spring migration is far offshore in ice leads. During the aerial survey programs, whales were observed feeding, but neither study identified the specific locations. Satellite tagging studies of bowhead whales and acoustic studies of their vocalizations show seasonal movements occur outside the barrier islands in the Beaufort Sea (Quakenbush et al. 2010; Blackwell et al. 2007).

Bearded Seal

Bearded seals, the second most common seal in the Arctic, are associated with sea ice and have a circumpolar distribution (Burns 1981). During the open-water season, bearded seals occur mainly in relatively shallow areas, because they are predominantly benthic feeders (Burns 1981). They prefer waters less than 200 m deep (656 ft.) (Harwood et al. 2005; Funk et al. 2009).

Population Size and Status

Bearded seals occur over the continental shelves of the Bering, Chukchi, and, to a lesser extent, the Beaufort seas (Burns 1981). Reliable estimates for bearded seal abundance in Alaska waters are unavailable (Allen and Angliss 2010), however, Cameron et al. (2010)

did estimate that the Beringia DPS contained approximately 155,000 bearded seals. Bengtson et al. (2005) estimated the average density for the eastern Chukchi Sea to be 0.07-0.14 seals/kilometers squared (km²[0.4 mi^2]) between Barrow and Shishmaref (west coast of Alaska) from surveys conducted in 1999 and 2000. While they did not adjust the density for animals missed in the water during the surveys to estimate abundance, they did state that actual densities could be of a magnitude of 12.5 times higher or 0.87-1.75 seals/km² (0.4 mi^2). Without any correction for missed seals, a crude estimate based on the area surveyed and the observed density, the abundance is estimated at 13,600 bearded seals (Cameron et al. 2010). Assuming the Russian side of the Chukchi Sea supports a similar number of bearded seals, the combined total equals 27,000 seals (Cameron et al. 2010). Adding in a very crude estimate for the Beaufort Sea of 3,150 bearded seals, based on earlier surveys, the total number for both the Chukchi and Beaufort seas is 30,150 bearded seals (Cameron et al. 2010). This estimate likely grossly underestimates the actual number of bearded seals in this region (Cameron et al. 2010).

Seasonal Distribution, Habitat, and Biology

Seasonal movements of bearded seals are directly related to water depth and the advance and retreat of sea ice (Kelly 1988). During winter, most bearded seals are in the Bering Sea (Kelly 1988; Burns 1981). In the Chukchi and Beaufort seas, favorable conditions are more limited, and consequently, bearded seals are scarce there during winter (Burns 1981). From mid-April to June, as the ice recedes, some bearded seals overwintering in the Bering Sea migrate northward through the Bering Strait (Burns 1981; Frost et al. 2005). During summer they occur near the widely fragmented margin of multi-year ice that covers the continental shelf of the Chukchi Sea, and to a lesser degree in the Beaufort Sea (Funk et al. 2009). In the Beaufort Sea, bearded seals are most numerous in a narrow flaw zone, which is an area where drifting pack ice interacts with fast ice, creating leads and other openings (Burns and Frost 1979).

In some areas, bearded seals are associated with the ice year round; however, they usually move shoreward into open-water areas when the pack ice retreats to areas with water depths deeper than 200 m (656 ft.) (Burns 1981). During summer, when the Bering Sea is ice-free, the most favorable bearded seal habitat is found in the central or northern Chukchi Sea along the margin of the pack ice (Bengston et al. 2005; Burns 1981). Suitable habitat is more limited in the Beaufort Sea where the continental shelf is narrower and the pack ice edge frequently occurs seaward of the shelf, and over water too deep for benthic feeding (Kelly 1988). Vessel surveys suggest bearded seal densities over the shelf, including the area surveyed off Point Thomson, during the open water season are highly variable between years and between months, indicating no predictable trends in occurrence (Funk et al. 2009).

Pupping takes place on top of the ice less than 1 m from open water, during late March through May, mainly in the Bering and Chukchi seas, although some takes place in the Beaufort Sea (MMS 2003). These seals do not form herds but sometimes do form loose groups (Cameron et al. 2010). Bearded seals feed on a variety of primarily benthic prey: decapod crustacean (crabs and shrimp), mollusk (clams); and other food organisms, including Arctic and saffron cod, flounder, sculpin, and octopus (Kelly 1988; MMS 2003).

Communication and Hearing

Bearded seal calls are a prominent element of the ambient noise in the Arctic Ocean during spring (Richardson et al. 1995). The call is thought to be a territorial or mating call by the male (Richardson et al. 1995). Underwater audiograms for phocids suggest that they have very little hearing sensitivity below 1 kHz, though they can hear underwater sounds at frequencies up to 60 kHz and make calls between 90 Hz-16 kHz (Richardson et al. 1995). A more recent review suggests that the auditory bandwidth for pinnipeds in water should be considered to be 75 Hz-75 kHz (Southall et al. 2007).

Ringed Seal

Ringed seals, the most common seal in the Arctic, have a circumpolar distribution that is closely associated with sea ice. Ringed seals are found throughout the Bering, Chukchi, and Beaufort seas (Allen and Angliss 2011). They are the most abundant and widely distributed seal in the Chukchi and Beaufort Seas (King 1983).

Population Size and Status

Although there is currently no reliable population abundance estimate available for the Alaska Arctic, Bengtson et al. (2005) estimated ringed seal abundance from Barrow south to Shishmaref in the Chukchi Sea to be 252,488 seals for 1999 and 208,857 in 2000 for an average of 230,673 seals. Frost et al. (2002) estimated a density of 0.98/square km^2 (0.4 mi^2) seals for 18,000 km^2 (6,950 mi^2) surveyed in the Beaufort Sea, which Allen and Angliss (2010) combined with the average estimate from Bengtson et al. (2005) for a total minimum estimate of 249,000 ringed seals in the Beaufort and Chukchi seas. This is a minimum estimate, since Frost et al. (2002) and Bengtson et al. (2005) surveyed small parts of the total ringed seal habitat in the Beaufort and Chukchi seas, and Frost et al. (2002) did not correct for missed seals. Considering the effect of these factors that underestimate the population size, and adding at least 50,000 seals from the eastern Beaufort Sea and Amundsen Gulf, a reasonable estimate for the total ringed seal population in the Chukchi and Beaufort seas is one million seals (Kelly et al. 2010).

Seasonal Distribution, Habitat, and Biology

Results from surveys by Bengtson et al. (2005) indicated ringed seal densities are higher in nearshore fast ice and pack ice, and lower in offshore pack ice, which is less stable and extensive. Frost et al. (2004) reported slightly higher ringed seal densities in the pack ice (0.92-1.33 seals/km^2 [0.4 mi^2]) than in the shorefast ice (0.57-1.14 seals/km^2 [0.4 mi^2]) in the central Beaufort Sea, which overlaps the Point Thomson area, during late May and early June of 1996-1999; when seals are most commonly hauled out on the ice. Ringed seal densities during this time period were highest in water at 5-25 m deep (16.4-82 ft.) (Frost et al. 2004). During summer, high densities of ringed seals are closely associated with the offshore pack ice and ice remnants (Burns et al. 1980; Smith 1987; Kelly et al. 2010). Funk et al. (2009) reported ringed seal densities in open water were low and varied among years, but they were higher in the fall than summer, probably due to their association with the advancing sea ice. In winter, ringed seals occupy land-fast or shore ice, and in other seasons they migrate with the annual advance and retreat of the pack-ice (MacDonald and Cook 2009). Moulton et al. (2002) found seals widely distributed on landfast ice in the central Beaufort Sea, but more seals occurred near the ice-edge during ice breakup. Ringed seals depend on sea ice; they use it to rest, give birth, and molt. Their diet includes shrimps, amphipods, euphausiids, squids, arctic cods, and sculpin (Kelly et al. 2010).

These results suggest that ringed seal use is widespread in sea ice, but the use was somewhat higher in nearshore than offshore ice during spring. After which ringed seals use offshore pack ice and ice remnants, and to a much lesser degree open water, during the open-water season from approximately late June to late October.

Ringed seals are a polygamous species (Burns 1970). When sexually mature, they establish territories during the fall and maintain them during the pupping season (Burns 1970). Pups are born in late March and April in lairs that seals excavate in snowdrifts and pressure ridges on shorefast ice and pack ice where sufficient open water exists to provide underwater access to the lair (Burns 1970; Burns and Harbo 1972; Bengtson et al. 2005). During the breeding and pupping season, adults on shorefast ice (floating fast-ice zone) usually move less than individuals in other habitats; they depend on a relatively small number of holes and cracks in the ice for breathing and foraging (Kelly et al. 2010). During nursing (4-6 weeks), pups usually stay in the birth lair (Kelly et al. 2010). Alternate snow lairs provide physical and thermal protection when the pups are being pursued by their primary predators, polar bears and Arctic foxes (MMS 2003). Ringed seals are an important resource that subsistence hunters harvest in Alaska (MMS 2003).

<u>Communication and Hearing</u>

Ringed seal calls are presumably associated with establishment of territory and courtship (Richardson et al. 1995), however, since most relevant behaviors occur underwater or under ice, it has not been possible to link specific behaviors and call types (Richardson et al. 1995). In-air vocal behavior has not been studied (Richardson et al. 1995). Underwater audiograms for phocids suggest that they have very little hearing sensitivity below 1 kHz, though they can hear underwater sounds at frequencies up to 60 kHz and make calls between 90 Hz-16 kHz (Richardson et al. 1995). A more recent review suggests that the auditory bandwidth for pinnipeds in water should be 75 Hz-75 kHz (Southall et al. 2007).

<u>Bearded and Ringed Seals Scientific Studies in the Action Area</u>

Scientific studies on bowhead whales incidentally recorded bearded and ringed seals. These were broad-scale aerial surveys conducted outside the barrier islands during the open-water season, including the Point Thomson area. Bearded and ringed seals were found to be widespread and present throughout the open-water season. Ringed seals were far more common than bearded seals. The only species-specific recent studies (within 10 years) close to Point Thomson have targeted ringed seals associated with BP Exploration Alaska's Northstar project. These studies examined impacts from pile driving, drilling, and construction sounds specifically on ringed seal density, abundance, distribution, and lair use (Blackwell et al. 2003; Moulton et al. 2003; Moulton et al. 2005; Williams et al. 2006). All studies concluded that noise from the Northstar project had no more than a slight effect on ringed seals, which when compared to natural environmental factors, was small. Acoustic studies have recorded bearded and ringed seal calls incidental to bowhead whales, but these studies occurred outside of the barrier islands, primarily from Prudhoe Bay westward into the Chukchi Sea (Moore et al. 2010a; Blackwell et al. 2009).

Critical habitat has not been designated for any of the listed or proposed listed species considered under this concurrence. As a result, we conclude that the proposed activities will not affect designated critical habitat. Therefore, critical habitat will not be considered further in this letter.

Action Area

The Point Thomson project will be located along the Beaufort Sea coast, on the eastern North Slope of Alaska, in an area generally between the Staines River (the western boundary of the Arctic National Wildlife Refuge) on the east and the Sagavanirktok River on the west (Figure 1). The main Project facilities will be located onshore, approximately 9.7 km (6 mi) west of the Staines River, and approximately 35 km (22 mi) east of the Badami Development. An export pipeline will extend 35 km (22 mi) west from the Central Pad to the Badami Development, occupying a narrow corridor 1.6-4.8 km (1-3 mi) inland. Sea ice roads, when constructed, will occur on or very near the sea ice along the coastline between Point Thomson and the Endicott Development road, with occasional short inland spurs to water source lakes or to avoid suspected polar bear dens with a one-mile buffer.

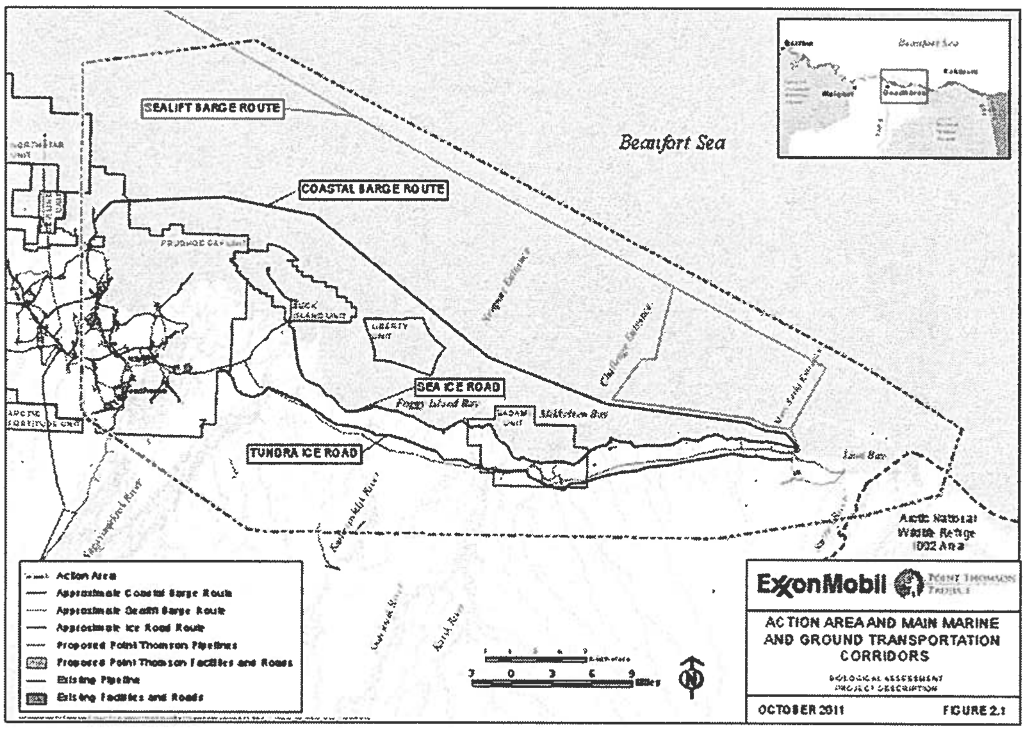

Figure 1. Point Thomson action area with main marine and ground transportation corridors.

The project includes three pads (Central, East, and West Pads) to produce five production wells. The Central Pad (55 acres), located to access the core of the reservoir, will be constructed along the shoreline and includes the barging facilities. The East Pad (15 acres), located to access the eastern extent of the reservoir, has two parts: 1) the old existing exploration pad by Phillips Petroleum Company, which is about 25 ft. (8 m) from shore, would be upgraded; and 2) a proposed addition, which would be 250 ft. (76 m) set back from the shore. The West Pad (17 acres), located to access the western extent of the reservoir, would be about 450-500 ft. (137-152 m) from the marine shoreline.

The action area will also include nearshore marine transportation corridors used by coastal resupply barges between the project site and Prudhoe Bay, generally inside the barrier islands. Offshore marine corridors will be used as sealift routes between off site docks and the project site (Figure 1). The marine sealift routes will use established marine shipping routes from the manufacturing sites away from the North Slope, then traverse around Point Barrow to Prudhoe Bay. These routes will then approach Point Thomson at the Challenge or Mary Sachs Entrances.

The actual reservoir, within state waters, generally extends about four miles offshore, just beyond the barrier islands, under the Beaufort Sea toward the east. The Point Thomson Field is a high-pressure gas reservoir with a thin oil rim. At 12,000 ft. deep and under pressures more than 10,000 pounds per square inch (psi), the Point Thomson Reservoir is deeper and under much higher pressure than the other North Slope oil and gas reservoirs (for example, Prudhoe Bay is less than 5,000 psi [White 2011]). Gas reserves are estimated at 8 trillion cubic feet. The Point Thomson natural gas is a "wet gas," which means that it contains liquid in vapor form. This liquid condenses out when the gas is brought to the surface and pressure and temperature are reduced. The Point Thomson Field has two layers of oil. The larger oil layer lies under the natural gas. The smaller oil layer is closer to the surface in the Brookian sandstones and is discontinuous (White 2011).

The standard for delineating the action area is the farthest extent to which measurable effects may be observed. NMFS has been using generic sound exposure thresholds to determine when an activity produces sound that might result in impacts to a marine mammal such that a take by harassment might occur (70 FR 1871, January 11, 2005). The current threshold for continuous noise is 120 decibel (dB) re 1 μPa. The action area will be defined as the area that may be affected by project related sounds equal to or above 120 dB re 1 μPa.

Description of the Action

The proposed Point Thomson project will initiate development and commercial hydrocarbon production from the Thomson Sand reservoir, which is located deep beneath the Beaufort Sea, about four miles from shore. ExxonMobil is proposing to produce gas from the Thomson Sand reservoir, recover liquid hydrocarbons, and re-inject the residual gas back into the Thomson Sand reservoir, with the injected gas saved (or *"available"*) for future production. The project will involve horizontal directional drilling beginning onshore and extending to an offshore reservoir under the Beaufort Sea. Long-reach directional drilling would be used for the Point Thomson Project to access the offshore reservoir while reducing the risk of adverse effects to offshore and coastal environments that as compared to drilling operations from offshore well pads.

The project's onshore activities are: 1) development wells; 2) infield gathering lines; 3) processing facilities; 4) support infrastructure; and 5) the Point Thomson export pipeline and ancillary facilities, which is a common carrier pipeline used to transport hydrocarbon liquids from Point Thomson to Badami.

The design life for the Point Thomson facilities is predicted to be approximately 30 years. Detailed facility abandonment procedures will be developed and subject to federal approval prior to terminating the operations. If necessary, ESA consultation will occur at that time.

This ESA Section 7 consultation with NMFS focuses on offshore facilities and associated activities, including marine transportation (Figure 2) and ice roads needed for ground transportation (Figure 1). These topics are discussed in detail below:

- Drilling and production operations
- Facilities located at the Central Pad used to support marine barge operations
- Sealift bulkhead
- Service pier
- Boat launch
- Dredging and screeding
- Tundra and sea ice roads

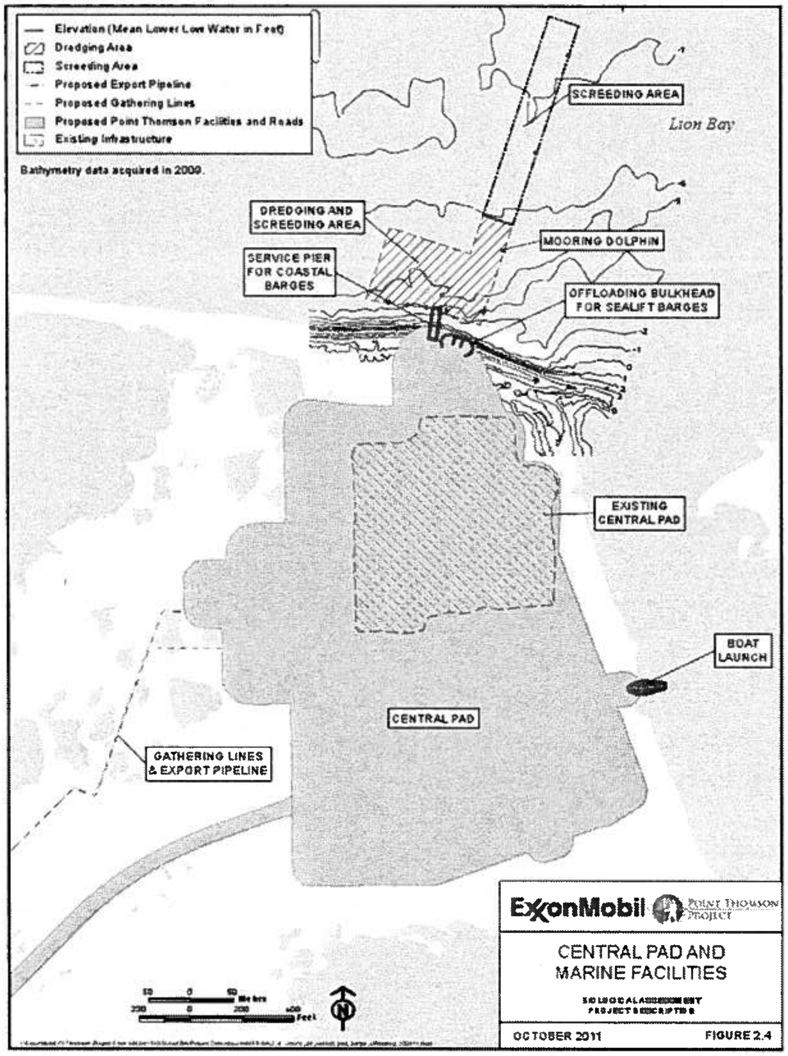

Figure 2. Marine transportation facilities.

Drilling and Production Operations

The project includes the necessary infrastructure to drill and develop five production wells from three pads (Central, East, and West Pads). The proposed three-pad configuration, combined with long-reach directional drilling technology, will allow ExxonMobil to evaluate and develop the hydrocarbon resource now and in the foreseeable future. The project configuration ensures that future field development scenarios (i.e. expanded gas cycling and/or gas sales) could occur with minimal expansion of the project footprint. The locations for the Central and East pads were also chosen to utilize existing exploration well pads, thereby reducing the need for additional gravel footprints. ExxonMobil plans to directionally drill within a 3,658 m. (2.3 mi) radius from the three onshore gravel pads.

Marine Transportation

<u>Sealift Bulkhead</u>

The project will require oceangoing barges supported by tugboats for sealift of large, pre-fabricated facility (production and camp) modules. Sealift barges will transport these large modules from locations outside of Alaska, generally using established marine shipping routes from those locations, with the highest level of traffic occurring during the construction phase. In the Beaufort Sea these routes will occur generally north of the barrier islands (offshore) and then pass through either Challenge or Mary Sachs Entrance to Point Thomson. These oceangoing barges are considerably larger than coastal barges and do not carry ballast from the port of origin; however, severe weather during transit may make it necessary to take on ballast. In such a case, this ballast will either be pumped out in international waters (before entering coastal waters and before entering the Beaufort Sea) at a distance of 321.9 km (200 mi.) or more from the nearest shore, or to an authorized disposal facility in accordance with federal ballast water discharge regulations.

For landing and securing oceangoing barges, an onshore (above mean high water) sealift bulkhead and four offshore mooring dolphins will be constructed. The sealift bulkhead will be made of sheet pile in an open cell design, with a gravel backfill transition to the Central Pad surface. Shore protection will consist of combining sheet piles on the seaward face of the abutment, and gravel bags on the east and west faces of the sealift bulkhead.

Modules will be offloaded via a barge bridge system, which is a configuration of up to three barges linked end-to-end and temporarily connected to this bulkhead by a ramp. The three barges making up the barge bridge system will be ballasted with local Point Thomson seawater and temporarily grounded in place during the offloading operations. This temporary grounded-barge offloading barge bridge system would be used during July or August, as soon as open water allows the sealift barges to access the Point Thomson site. It is expected that the large oceangoing barges will be in place at the Point Thomson site for approximately 2-4 weeks, providing adequate time to dock and offload cargo. A total of 10 sealift barges will use this method of access over the three construction seasons (2013-2015).

Dolphins for mooring/breasting the barges are needed to ensure the barges accurately align for offloading operations and will be left in place for future use. Dolphins will be installed in water depths approximately 1.2 m (4 ft.) closest to shore and in water depths approximately 2.3 m (7.5 ft.) farthest from shore, using typical North Slope methods (i.e., driving piles or drill and slurry, through the ice in winter). If additional structural support between the sealift abutment and the first grounded barge is deemed necessary to support the loading ramp, then up to six temporary piles parallel to the shore at a distance of 12.2 m (40 ft.) from the sealift abutment may be installed during the construction phase using typical North Slope methods. These will be cut off at 1.5 m (5 ft.) below the mudline or removed during the construction phase after all facility modules are transported to the Central Pad.

Service Pier

A service pier for offloading smaller coastal barges will be constructed adjacent to the sealift bulkhead. The service pier will support offloading the barges used to transport material, equipment, and supplies, and for the removal of wastes and excess equipment. North Slope based coastal barges supported by tugboats will be the primary vessels deployed for this purpose. Previous drilling activity at Point Thomson was supported by over-the-beach barge access during the open water season. This type of direct beach access limits the loads that can be delivered. The service pier will allow more fully loaded coastal barges (up to 800 tons) to access the site, which substantially decreases the number of seasonal coastal resupply barge trips. Over-the-beach barge access will occur until the service pier is constructed.

The docking facility will consist of a 36.6 m long (120 ft.) by 9.1 m wide (30 ft.) pier, extending approximately 21 m (70 ft.) offshore of the Central Pad shoreline. The service pier will have a concrete deck and be supported by nine vertical piles (six offshore and three onshore) which will be driven or drilled in the winter from grounded ice. Four mooring dolphins will be installed to extend docking options to assist in securing barges. The mooring dolphins will be driven or drilled into the seafloor through the ice in the winter in a line perpendicular to the dock. The deepest dolphin will be in water approximately 1.2 m (4 ft.) deep.

Two to four coastal barges could operate during the nominal July 15 to August 25 barging season, but may continue beyond this date, as required by operational requirements. Barges will traverse a route inside the barrier islands between Prudhoe Bay and Point Thomson.

The total anticipated number of round-trip coastal barge trips during construction and construction demobilization (2013-2016) is 170 trips. This number will drop to between 20-100 annually for drilling, and 15 per year during operations (2016 and beyond).

Boat Launch

A boat launch will be located on the east side of the Central Pad. The gravel/concrete panel ramp will be approximately 7.3 m (24 ft.) wide and extend approximately 50.3 m (165 ft.) from the Central Pad and into the bay to approximately 1.1 m (3.5 ft.) below the mean lower low water level. The boat launch will consist of a 32.9 m (108 ft.) long gravel ramp with concrete planks (7.3 m [24 ft.] wide and 17.3 m [57 ft.] long) extending into the water as a running surface. During construction, ice over the footprint will be removed, gravel fill will be placed in the excavation, the concrete planks will be put in place, and side slope armoring will be installed. This facility will be adequate for launching the smaller emergency response vessels that will be stationed at Point Thomson. This location is in a protected lagoon, which affords an ideal access to launch these vessels.

Dredging and Screeding

Barges transporting modules, equipment, materials or supplies to Point Thomson require a specified draft for offloading. Minor or shallow dredging, if needed, will be used to provide the required seabed depth profile. The actual dredging requirements can be expected to vary due to the changing coastal processes (sediment transport and storms) in the Beaufort Sea, and will be determined on an annual basis.

Sealift barges transporting modules to the sealift bulkhead will be grounded and require 1.8 m (6 ft.) of water depth for the barge closest to shore. The sealift barges require a level seabed to safeguard the structural integrity of the barges. Coastal re-supply barges that transport equipment, materials, or supplies to the service pier require a minimum 1.2 m (4 ft.) water depth to access the pier. The coastal barges typically will not be grounded; however, there may be a need to ground or ballast down the coastal barges delivering certain modules such as the camp and tank modules that may exceed 800 tons. In such cases the barges will use local water if ballasting and de-ballasting is required.

Dredging and screeding will be conducted during the first winter construction season (through the ice) and could occur during the following second and third winter construction seasons in front of the sealift bulkhead and, possibly, in front of the service pier. The area where screeding and/or shallow dredging could occur is approximately 14,307 square meters (m^2) (154,000 square feet [$ft.^2$]) and starts at a location approximately 12-18 m (40-60 ft.) from the sealift bulkhead seaward (north) to about 152 m (500 ft.), and in front of the service pier seaward (north) to about 91 m (300 ft.).

Not all of the ice in the designated dredge area can be removed at the same time. Therefore, dredging and screeding will be conducted sequentially in different areas. As a result, in order to achieve the needed seabed profile, some of the dredged material may be temporarily placed in an onshore dredge spoils placement area (described below). As another area of the seabed is exposed after ice removal, some of these dredge materials may be placed back in the dredge area to fill low spots if insufficient dredge material at the work site is available. Thus there may be some double handling of dredge materials. The maximum dredged volume requiring disposal after dredging is completed to establish the needed seabed profile is conservatively estimated to be 1,147 cubic meters (m^3; 1,500 cubic yards [cy^3]) during any construction season.

Following completion of construction, and throughout the operations phase, periodic screeding and, possibly, some dredging may be needed in the area in front of the service pier. If dredging is needed, it would likely be done in summer and the maximum dredged volume is conservatively estimated to be about half of that estimated for construction, or 611.6 m^3 (800 cy^3).

The seabed material remaining after dredging will be placed along nearby shoreline above mean high water in an area that is far enough away from the barge offloading facilities that the dredged area would not be refilled from the deposited material. The disposal location may vary based on dredging season and volume, but approval will be sought from the appropriate regulatory agencies prior to placement of spoils onshore.

Tundra and Sea Ice Roads

Ice roads will be constructed during the winter seasons as needed to connect Point Thomson locations to the existing gravel road system at Endicott, approximately 75 km (47 mi.) to the west. The ice road between Point Thomson and Endicott could either be on the sea ice or tundra, depending upon weather, operational requirements, and other factors. Spur ice roads, off of these ice roads, will be constructed to connect to onshore freshwater sources or to avoid polar bear dens by a 1 mi buffer. Tundra ice roads and ice pads will also be needed during construction to support infrastructure and pipelines, to mobilize and demobilize the drilling rig, and on an as-needed basis during operations to support operations and maintenance activities.

Ice road size and location will vary depending on seasonal ice conditions and bear-den locations, as well as the size and weight of the loads that need to be transported. Pull-out or passing areas may be constructed at various locations for safety or operational requirements. Ice road activities will be coordinated with the proper authorities and can begin as early as November, depending on weather conditions and permitting status. Seawater for sea ice roads will be withdrawn from locations along the road alignment by drilling through the sea ice and pumping the seawater across the surface of the ice. If needed, ice chips will be milled from the sea ice surface or from the surface of frozen freshwater lakes to provide a solid aggregate in place of liquid water. The ice roads will be capped with freshwater. This technique is used for increasing ice thickness in order to provide the required load-bearing capacity for vehicular travel.

Sea ice roads may be up to approximately 23 m wide (75 ft.) for large equipment access and safety, and will be constructed in shallow waters as close to the adjacent shoreline as practicable, and generally in less than approximately 3 m (10 ft.) of water. Water depths greater than 3 m (10 ft.) may be encountered in some areas, particularly off river mouths. Any road section over seawater will either be grounded to the sea floor or of sufficient thickness to support the expected vehicle weights traversing the route.

Ice roads and pads require maintenance throughout the winter season. At the season's end, the ice structures will be cleared of equipment and debris, and any residual contamination will be cleaned up. Ice roads may be breached or slotted at stream crossings and other locations to facilitate water flow during breakup.

<u>Effects of the Action</u>

The ESA section 7 implementing regulations (50 CFR 402.02) define "effects of the action" as:

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

There are three possible determinations of effects under the ESA:

<u>No Effect</u>: The proposed action or interrelated or interdependent actions will not affect (positively or negatively) listed species or their habitat.

May affect, not likely to adversely affect: The proposed action or interrelated or interdependent actions may affect listed species or their habitat, but the effects are expected to be insignificant, discountable, or entirely beneficial.

- *Insignificant effects* relate to the size of the impact and should never reach the scale where a take will occur.
- *Discountable effects* are those that are extremely unlikely to occur. Based on best judgment, one would not 1) be able to meaningfully measure, detect, or evaluate insignificant effects; or 2) expect discountable effects to occur.
- *Beneficial effects* are contemporaneous positive effects with no adverse effects to listed species.

May affect, likely to adversely affect: The proposed action or interrelated or interdependent actions may have measurable or significant adverse effects on listed species or their habitat. Such a determination requires formal ESA Section 7 consultation.

Determinations are also required of the effects from a federal action on any designated critical habitat for listed species. However, critical habitat has not been designated for any Arctic listed or proposed listed species, and therefore, critical habitat is not considered.

Noise and Harassment

The onset of behavioral disturbance from anthropogenic noise depends on both external factors (ex., characteristics of noise sources and their paths) and various attributes of the receiving animals (ex., hearing, motivation, experience, demography), and is also difficult to predict (Southall et al. 2007). NMFS currently uses a threshold of 160 dB re 1 μPa (root mean square [rms]) for the onset of Level B harassment of marine mammals from pulsed sound sources (65 FR 16374, March 28, 2000). It should also be noted that, unlike the impulsive noise associated with impact pile driving, some equipment would operate continuously at Point Thomson. NMFS uses a threshold of 120 dB re 1 μPa (rms) for the onset of Level B harassment from continuous sound sources[1].

Drilling

Five production wells are planned for Point Thomson. Drilling will occur on land and may occur year-round; however, drilling into hydrocarbon zones is limited to the winter season (November 1 to April 15). Drilling noise would be expected to spread both in air and underwater, even with the drilling rig located on land. However, the land-based location of drilling combined with: 1) modest noise levels associated with drilling, 2) the reservoir's depth (several thousand feet deeper than other North Slope hydrocarbon reservoirs), and 3) typically high ambient airborne noise levels from persistent winds, will prevent drilling noises from being transmitted little, if any, distance beyond the coastline (Blackwell and Greene 2004). Similarly, airborne noises from drilling will not reach locations occupied by bowhead whales, which are typically not affected by industrial airborne noises from oil and gas facilities (Richardson et al. 1995). A small number of ringed seals and, in rare instances bearded seals, may be near the airborne drilling noise. However, studies have demonstrated that there is no noticeable effect on ringed seals, and we expect the same to

[1] These acoustic thresholds relate to determinations of take under the Marine Mammal Protection Act (MMPA). The definition of harassment under the MMPA, 16 U.S.C. § 1362(18)(A), is slightly broader than the one the U.S. Fish and Wildlife Service promulgated under the ESA, 50 C.F.R. § 17.3.

be true for bearded seals, though their responses to airborne noise have not been studied due to their small numbers in nearshore areas of the Beaufort Sea (Moulton et al. 2003; Richardson and Williams 2004). This is also true for ringed seals occupying their lairs because airborne sounds from industrial activities on and above the surface would be attenuated by the strong dampening effect of snow (Blix and Lentfer 1992). Moreover, most bearded seals and ringed seals will be much farther offshore in the sea ice and not near the project (Cameron et al. 2010; Kelly et al. 2010).

At Point Thompson, the directional drilling will begin onshore in a vertical manner for the first 152 m (500 ft.). The drill kit will then "step out" or begin to proceed offshore under the sea bed and extend out to the reservoir to the bottom hole targets. These bottom hole targets are several thousand feet deep. The underwater sounds generated from onshore oil and gas facilities during production are lower than the sounds produced from man-made islands (ex., Northstar) and even lower than other types of offshore facilities, e.g. an oil platform (Richardson et al 2005). It is expected that poor conduction of sound through land and poor conduction of low frequency sound in shallow water will result in low levels of drilling noise in the sea. The best available scientific and commercial data available indicate they will be below 120 dB (Blackwell et al. 2004). Consequently, the in-water noise generated by the drilling operations at Point Thomson is not anticipated to reach take levels or result in any biologically significant effects on bowhead whales, bearded seals, or ringed seals.

Hydrocarbon and Other Spills

A potential indirect effect of the proposed Point Thomson activities is a hydrocarbon spill. As with any oil and gas operation, effects from any large spill, identified as more than 1,000 gallons (gal [24 barrels (bbl.)]), represent a major concern (Table 2). As explained below, in this instance, we concur with the Corps' conclusion that a large spill is an extremely low-probability event. If it were to occur, however, it has the potential to create long-term, if not permanent, damage to the environmental resources in the Beaufort Sea, along Point Thomson.

Source	Material	Spill Size				
		Very Small <10 gal <0.2 bbl.	Small 10-99 gal 0.2-2.4 bbl.	Medium 100-999 gal 2.4-24 bbl.	Large 1,000-100,000 gal 24-2381 bbl.	Very Large >100,000 gal >2381 bbl.

Table 2. Expected relative rate of occurrence for spills from main project sources.

Hydrocarbon spills and releases are generally the result of chance casualty. Spills are not a planned activity but they are a potential result of accidents, equipment failure, human error, and similar causes. Spills are generally unpredictable in cause, location, time, size, duration, and/or material type (Mach et al. 2000). The ability to respond to, contain, and recover spilled hydrocarbon can range from difficult-but-possible to impossible. It is dependent on many factors, including: location and nature of the event; type of hydrocarbon; amount spilled; weather conditions; availability of response equipment; number and availability of trained response personnel; and physical conditions present at the time of spill. There are different types of spill scenarios (ex., well blow out, pipe line leak, spill or leak from equipment) and at Point Thomson, there are different possible spill materials:

- Produced fluids: Fluids directly from the formation reservoir and composed predominately of gas condensate (similar to kerosene) and natural gas, but may also include crude oil, produced water, and formation sand.
- Produced water: Brine, seawater, and formation water separated from the produced fluids and re-injected in a Class 1 disposal well at the Central Pad.
- Export hydrocarbons: Gas condensate and potentially crude oil transported to the TAPS for shipment to market.
- Refined oil: Arctic diesel, aviation fuel, unleaded gasoline, hydraulic fluid, transmission oil, lubricating oil, grease, waste oil, mineral oil, transformer oil, and other petroleum hydrocarbon products.
- Other hazardous materials: Methanol, antifreeze (ethylene and propylene glycol), water-soluble chemicals, chlorine, corrosion and scale inhibitors, drag-reducing and emulsion-breaking agents, biocides, and possibly a small amount of hydrogen sulfide associated with the produced fluids and gas.

ExxonMobil developed a spill prevention plan for the initial wells they drilled in 2009 and 2010. The Oil Discharge Prevention and Contingency Plan (ODPCP) addressed oil spill prevention and response. The ODPCP included provisions for spill prevention and response contingencies that would be used in the unlikely event of a spill. The ODPCP follows the Alaska Department of Environmental Conservation (ADEC) ODPCP requirements of Title 18, Alaska Administrative Code Chapter 75, Part 425 (18 ACC 750425). ExxonMobil will submit a new ODPCP to ADEC for the proposed project.

The objective of the ODPCP is to establish strategies to:

- Prevent a hydrocarbon release and/or limit the spread of a spill
- Minimize potential environmental impacts
- Provide for the safety and health of personnel

ExxonMobil has contracted Alaska Clean Seas (ACS), which is certified as a U.S. Coast Guard Oil Spill Removal Organization and State of Alaska Primary Response Action Contractor serving the Alaska North Slope Crude Oil Producers and the first 167 miles of the Trans-Alaska Pipeline System. ExxonMobil will follow the procedures as outlined in Alaska Clean Seas Technical Manual.

During the past 40 years, the combination of stricter agency regulations, improved industry operating practices, and advancements in spill control technology have resulted in a reduction of the likelihood of spills on the North Slope. Although historical records show that spills are both possible and likely to occur during the life of the project, the vast majority of the crude and refined oil, produced fluids, saltwater, and other material spills that have occurred have been very small (fewer than 10 gal [0.2 bbl.]) and very few have been greater than 100,000 gal (2,381 bbl.) (Mach et al. 2000, NRC 2003b, MMS 2007). Based on spill record in the ADEC (2010) database, and consistent with the experience of oil field operations in the contiguous U.S., the likelihood of a large spill more than 1,000 gal (24 bbl.) would be low and the likelihood of a very large spill more than 100,000 (2,381 bbl.) would be extremely low. Furthermore, when spills have been detected, they have been met with a rapid response and proceed according to state, federal, and borough regulations (NRC 2003b).

Oil spill probabilities for Point Thomson project have been calculated based on historic oil spill data. Probabilities vary depending on assumptions and method of calculation. Very large spills (more than 100,000 gal [2,381 bbl.]) happen very infrequently, and there are limited data to use in statistical analysis and predictive efforts. Five of the six well control incident events (with more than 1,000 gal [24 bbl.]) in the Outer Continental Shelf (OSC) database occurred during 1964-1970. The sixth OCS well control incident that resulted in a large spill was the Deepwater Horizon (DWH) event (April 20, 2010). Although no official volume has been determined by BOEM, it is clear from the spill volume estimates that the DWH exceeds the threshold of a very large oil spill.

Directional drilling under the Beaufort Sea is unlikely to result in spill or blowout that would cause reservoir fluids to enter the marine environment. The gas cycling process at Point Thomson, where the produced gas is injected back into the sand to help produce more gas condensate, has been used around the world for more than 50 years. The wet gas is produced up one wellbore and the dry gas is injected down another wellbore. Both wellbores have been cased and cemented to very strict mechanical integrity requirements so that flow does not escape into the ground or the atmosphere.

The Alaska Oil and Gas Conservation Commission (AOGCC), in concert with the Environmental Protection Agency, requires constant monitoring of injection wells, including well pressure, to ensure that mechanical integrity is maintained. All wells are required to provide at least two competent barriers against release to the environment. Should any one of these barriers' mechanical integrity come into question, the AOGCC will be notified and the well will be shut in immediately. Since AOGCC would require the well to be shut in immediately upon breach of integrity of a single barrier, the remaining barrier or barriers would provide protection against a release.

The dry gas will not be injected above fracture pressure (the pressure required to cause a formation to fail or split) and thus a crack in the rock around the well is unlikely to occur. Even if the gas were to be injected at a pressure exceeding the fracture pressure of the reservoir, the reservoir depth and physics of rock and rock stresses would prevent such a crack from breaching both the onshore surface and the seabed. As a result, it is unlikely that an underground blowout would result in fluids from the reservoir reaching the marine environment from either onshore or seabed.
Another, but less likely scenario would be an oil spill from drilling operations reaching the marine environment during winter or spring. Oil spilled on solid ice during winter can be effectively recovered because it is restricted to the surface of the sea ice and the cold temperatures increase the viscosity and slow its movement. Oil would be more difficult to contain during spring when the ice is broken and moving; however, most bowhead whales would be well beyond the barrier islands at this time, since it would coincide with the spring migration when bowhead whales are widely distributed in time and space far offshore. Similarly, small numbers of bearded seals, and ringed seals would also be widespread as singles or pairs of seals, with most offshore in the pack ice or on remnant ice floes as discussed in previous sections. Consequently, in the event that a small to

medium spill (10-1,000 gal [0.2-24 bbl.]) occurred from drilling operations and reached the marine environment during winter or spring, we do not anticipate that it would have any biologically significant effect on the populations of bowhead whales, bearded seals, or ringed seals.

If a large to very large hydrocarbon spill (more than 1,000 gal [24 bbl.]) were to occur, there is likelihood that the effects would be catastrophic. However, historically, spills from offshore or coastal oil and gas facilities or barges in the Chukchi and Beaufort seas have involved only small amounts (less than 100 gal [2.4 bbl.]) of oil. The probability of a large or very large spill is very low (approaching zero); therefore, we conclude that the effects from a large to very large oil spill associated with the proposed drilling and production operations are discountable and thus not likely to adversely affect bowhead whales, bearded seals, ringed seals, their prey, and/or their habitats (Funk et al. 2009).

The most likely spill scenario in the marine environment from this project would be a small (less than 100 gal [2.4 bbl.]) to medium (less than 1,000 [24 bbl.]) size spill at the barge offloading area, which we expect would be contained by booms or other containment equipment routinely placed around a barge as standard operating procedures. Any oil escaping from the containment equipment would likely be a small percentage and would rapidly disperse by currents and waves. Therefore, effects from a small to medium oil spill are expected to be insignificant.

Potential indirect effects from spills to bowhead whales, bearded seals, and ringed seals from the project include: 1) potential indirect habitat loss through displacement by avoiding areas during barging as a result of increased noise and human activity during the spill response (ex., days, weeks, or months); and 2) indirect effects through contamination of food resources resulting from potential oil spills.

Although the Point Thomson reservoir is deeper and under much higher pressure than other North Slope oil and gas reservoirs and the historic data may not be directly applicable, it is the best scientific and commercial data available. Further, ExxonMobil will have a spill response team highly trained in spill containment and recovery. Therefore, in light of the chance of a large to very large spill, and in light of the effective response to past small to medium spills, we conclude that the potential effects from a spill at Point Thomson would have no significant effect on bowhead whales, bearded seals, or ringed seals, their populations, or habitats.

Transportation

<u>Sealift Bulkhead, Service Pier, and Boat Launch</u>
Bowhead whales, bearded seals, and ringed seals may be potentially exposed to more marine traffic during construction than during the drilling phase. When the marine traffic occurs within the barrier islands, few if any bowhead whales, small numbers of ringed seals, and even smaller numbers of bearded seals would be exposed to the activities since, as previously stated, most of these marine mammals occur beyond these islands. Furthermore, even when outside the barrier islands, underwater noise from barging will be

near ambient noise levels and less than 160 dB, below take levels for bowhead whales and seals.

During the construction phase of the project, oceangoing barges will be used to transport modules and supplies. A total of 7-10 sealift barges are planned to transport modules to Point Thomson during the 2013-2015 construction seasons, generally during July 15-August 25, but may extend longer and involve moving materials and personnel from Prudhoe Bay to the Point Thomson area. Underwater noise from barging will be near ambient noise levels and less than 160 dB, below the take levels for bowhead whales and seals.

During the drilling phase of this project, barging using coastal resupply barges will occur inside the barrier islands, where barges are not likely to encounter bowhead whales but may encounter a few ringed seals and, in rare instances, a bearded seal. Any unplanned barging outside the barrier islands could encounter small numbers of bowhead whales and small numbers of ringed and bearded seals. Bowhead whales could be exposed to underwater noise in the presence of the tugs pushing barges (Richardson et al. 1995). However, the underwater noise from the barges will be near ambient noise and less than 160 dB levels (measured at the Northstar Project), which is below take level and therefore, unlikely to elicit reactions by bowhead whales. In addition, any subtle effects to the bowhead whales would be reduced by the low and steady engine noise levels, the straight-line movement of the tugs, the fact that bowhead whales normally occur a long distance from shore, high ambient noise levels of the water, and the timing of the fall migration in the Alaskan Beaufort Sea (typically September/ October), which is primarily after the cessation of the barge operations (Funk et al. 2009). Similarly, studies have shown that ringed and bearded seals show little reaction to passing vessels (Richardson et al. 1995; Brueggeman et al. 2009). The underwater noise levels will be less than 160 dB, below the take level for ringed and bearded seals. Moreover, most ringed and bearded seals move offshore to pack ice and remnant ice floes during summer and early fall, which are areas avoided by barges (Smith 1987). Thus, any effects from barges are expected to be insignificant to the potentially small numbers of bowhead whales, bearded seals, and ringed seals.

It is not likely that a barge would strike and injure a bowhead whale and even less likely for a seal. The slow-speed and straight-line movement of the tugs pushing a barge combined with the long period of daylight would enable the captains, crew, and onboard marine mammal observers to see and avoid striking a whale. All tug operators will be required to follow measures that protect whales whenever safety is not an issue. Barges that service Northstar, Oooguruk Drillsite, and ENI's Spy Island Drillsite in the Beaufort Sea made more than 400 trips from July-October, during 2006-2008, with no reported striking of a marine mammal (Funk et al. 2009). Correspondingly, the estimated distance traveled by barges for all activity in the Beaufort Sea during this same time period ranged from about 11,700 km (7,270 mi) to more than 25,000 km (15,534 mi), with no report of a collision with a marine mammal (Funk et al. 2009). The likelihood of a barge striking a bowhead whale, bearded seal, or ringed seal while servicing Point Thomson is very low because: 1) the absence or near absence of vessel strikes (and no documented reports of barge strikes) of bowhead whales, bearded seals, and/or ringed seals published in the scientific literature (George et al. 1994; Kelly et al. 2010; Cameron et al. 2010); 2) the absence of vessel strikes as a source of mortality in the NMFS stock assessment reports (Allen and Angliss 2012); 3) the absence of vessel strikes as a source of mortality in the NMFS marine mammal stranding database (NMFS unpublished data); 4) the characteristics of barge operation in the Arctic Ocean; and 5) the data on recent barge traffic in the Beaufort Sea. Therefore, the impacts of barge traffic during the Point Thomson activities are insignificant.

In conjunction with the use of marine transportation vessels, ExxonMobil will construct a sealift bulkhead and service pier with mooring dolphins installed to offload modules from the sealift barges and cargo from coastal barges. Pier and bulkhead construction (including pile driving, initial dredging and screeding) and dolphin placement will occur the first winter of the construction phase. At that time, bowhead whales are no longer in the Beaufort Sea. Bearded seals are not expected to be shoreward of the barrier islands in the vicinity of the construction site, and therefore, only insignificant effects from the construction noise are likely since any noise levels from the pile driving, dredging, and screeding would be below ambient noise levels at that distance. Further, while ringed seals may be within the barrier islands, any airborne noise associated with these activities would be greatly attenuated by the combined sea ice, shallow water depth, and snow cover on seal lairs. In addition, the activities will occur where water depths are less than 3 m (10 ft.), which is not suitable ringed seal habitat, so the seals would be far enough away such that the noise impacts (in water) would be minor (i.e., less than 120 dB).

The potential for noise impacts also arises in connection with barge grounding. Three barges will be temporarily grounded end-to-end in shallow water (less than 3 m deep [10 ft.]) at the terminal facility for unloading materials from barges during summer. Grounding of the barges, however, is expected to have no significant effect on bowhead whales, bearded seals, or ringed seals. Barge grounding would occur on- and nearshore, in shallow water, and sound transmission would be muted by the shallow-water location of the grounding (Richardson 1999) and not approach take levels. Noise levels would likely be below ambient levels and less than 160 dB (as measured at the Northstar Project) at the source or within a short distance from shore.

Finally, onshore construction-related noise at the site is expected to be primarily airborne noise, which is unlikely to have any biological significant or even noticeable effect on bowhead whales due to: their characteristic respiration cycle of brief surfacing followed by long dives; the distance of the site from offshore areas typically used by bowhead whale; and relatively high ambient noise levels caused by persistent winds. While small numbers of ringed seals and fewer bearded seals may occur offshore from the construction site, studies have shown that construction activity has no noticeable effect on ringed seals or, likely, bearded seals (Moulton et al. 2003; Richardson and Williams 2004; Williams et al. 2006). Moreover, during winter and early spring, ringed seals spend most of their time in snow lairs, where the snow's dampening effect on airborne sounds (e.g., pile driving) reduces the detectability of this noise so there is no effect on ringed seals and their pups (Blix and Lentfer 1992; Williams et al. 2006). We therefore conclude that any onshore construction will result in only insignificant effects and is unlikely to result in take of any marine mammal.

Tundra and Sea Ice Roads

In addition to barging, materials and personnel will be transported on ice roads during the winter, when bowhead whales are not present in the Beaufort Sea. Ice roads built over the sea ice will be located nearshore and within water depths generally ranging from 0-3 m (0-10 ft.); an area not used by bearded and ringed seals during winter to early spring because the ice thickness renders the area between the ice and the bottom substrate insufficient for use.

In late fall and winter, as ice begins to freeze up at the coasts and moves into bays, bearded seals are seen farther out to sea among areas of drifting, broken ice floes, and near open water (Heptner et al. 1976). In the Beaufort Sea, bearded seals are most numerous in a narrow flaw zone, which is an area where drifting pack ice interacts with fast ice, creating leads and other openings (Burns and Frost 1979). Although ringed seals are year round residents in the Beaufort Sea and most likely they will be the most frequently encountered seals species in the action area, ringed seals are not known to occur within this water-depth zone (Moulton et al. 2001). NMFS does not consider this area ringed seal winter habitat when issuing incidental take permits. Ice road construction, maintenance, and vehicle travel will have no significant effect on bowhead whales, bearded seals, or ringed seals.

Aircraft

Aircraft transporting workers and supplies to and from the site year round should not affect bowhead whales and bearded seals from spring through fall, and ringed seals year-round. The airstrip will be 5 km (3 mi) inland from the coast, and will be primarily used by aircraft approximately the size of a Beechcraft 1900D or a Twin Otter. The runway will be designed and constructed to provide landing and take-off capabilities for a Hercules C-130 plane, for emergency response or other special circumstances. All aircraft will generally fly inland routes, not over marine water or sea ice. Low-flying aircraft and helicopters have been demonstrated to cause temporary and short-term changes in bowhead whale, bearded seal, and ringed seal behavior (Richardson et al. 1995; Burns and Harbo 1972). If an emergency requires an aircraft to fly over water, proven mitigation measures can prevent aircraft effects on bowhead whales, ringed seals, and bearded seals (Richardson et al. 1995; Kelly et al. 2010; Cameron et al. 2010). These mitigation measures include: 1) avoid flying over water during spring to fall and/or 2) fly at altitudes scientifically demonstrated to not disturb bowhead whales (greater than 457 m [greater than 1,500 ft.]). Aircraft are not expected to affect bowhead whales, bearded seals, or ringed seals, since flights would generally occur inland from the coast.

Dredging and Screeding

Dredging and screeding (leveling) the seafloor would occur in the area in front of the sealift bulkhead and service pier during the winter through the ice, out to a depth of about 2 m (6 ft.). The volume of dredged material is conservatively estimated to be 1,147 m^3 (1,500 cy^3). Bowhead whales are not expected to be present during this period. Water depths within 10 m (33 ft.) are not considered denning habitat for ringed seals, nor is this winter habitat for bearded seals. Therefore, none of these species would be in the immediate area during winter dredging and screeding, and would not be affected by these operations. Should subsequent maintenance dredging and screeding be required during any of the three summer construction seasons to prepare for barge arrival, it would likely occur early during the open-water season, no later than mid-July. Bowhead whales would not have started their westward migration at this time and bearded seals would likely be further offshore near the ice edge. Neither of these two species would be affected by any noise and disturbance associated with summer maintenance dredging and screeding. Small numbers of ringed seals could be in the immediate area during these operations, and if so, would likely avoid the associated noise and disturbance. ExxonMobil will have marine mammal observers with the authority to immediately stop operations and/or lower noise levels (to less than 120dB) should ringed seals be visible within 1,000 m (0.6 mi) of the work site. Such noise effects would be transitory, occurring during the short period (a few days up to 2-3 weeks), while the dredging and screeding was occurring. These effects would also be limited to the immediate area of the dredging and screeding, a very small area relative to their total habitat. No long-term effects from these operations are anticipated.

Climate Change

Another concern in the Arctic is climate change, which has been most noticeable in high northern latitudes. There is evidence that during the last 10-15 years there has been a shift in regional weather patterns in the Arctic (Tynan and DeMaster 1997; Stroeve et al. 2008). Ice-associated animals, such as the bowhead whale, may be sensitive to changes in Arctic weather, sea-surface temperatures, or ice extent, and the concomitant effect on prey availability (Tynan and DeMaster 1997; Stroeve et al. 2008). Currently, there are insufficient data to make reliable predictions of the effects of Arctic climate change on bowhead whales; however, the increasing population trend suggests there have been no noticeable effects on bowhead whales (Allen and Angliss 2012). George et al. (2005) reported that landed bowheads had better body condition during years of light ice cover. This, together with high calf production in recent years, suggests that the stock is currently tolerating the recent ice retreat (Allen and Angliss 2012).

Ringed seals are dependent on sea ice year-round for resting, pupping, nursing, and molting (Kelly et al. 2010). Sea ice provides ringed seals a platform for inhabiting subnivian lairs to shelter themselves and their pups, molt during spring, and rest during summer and fall (Kelly et al. 2010). Ringed seals primarily occur in nearshore pack ice and shorefast ice during spring, after which they move to offshore pack ice and ice remnants until winter freeze-up when they become widely dispersed over the sea ice (Burns 1970; Bengston et al. 2005; Kelly et al. 2010). The area occupied by ringed seals in the Alaskan Arctic Ocean is considered generally high-quality habitat because there is very little development and essentially no human activity during winter to spring breakup (George et al. 2004). Moreover, the fish stocks preyed upon by ringed seals are protected from commercial exploitation, although the local residents harvest fish near their communities. Pollutants (polychlorinated biphenyls [PCBs], DDT, etc.) have been found in the Beaufort Sea, but concentrations have not been linked to a decline in the ringed seal populations or their prey (Kelly et al. 2010).

Ringed seal habitat has been affected by noise from oil and gas operations; however, as stated in the previous sections, studies have shown that noises from oil and gas exploration, construction, and operation have had a negligible effect on ringed seals and no biologically significant effect on the population. Correspondingly, there has been no reduction in the subsistence harvest associated with oil and gas operations (Kelly et al. 2010).

Climate change has the potential to impact ringed seals and their habitat. The biological rationale for the recent proposal to list ringed seals is almost entirely based on a reduction of sea ice caused by climate change (Kelly et al. 2010). There is undisputable evidence that sea ice cover has been reduced in the Arctic and breakup is occurring earlier in the spring and freeze-up later in the fall (Kelly et al. 2010). This has resulted in a corresponding reduction in ringed seal habitat (Kelly et al. 2010). If this trend continues unabated the resulting changes in habitat could affect the ringed seal population (Kelly et al. 2010).

Bearded seal habitat is similar to ringed seal habitat but restricted to the shallow outer continental shelf waters (Cameron et al. 2010). Bearded seals feed primarily on benthic organisms found on the substrate, preventing them from inhabiting the deeper waters off the outer continental shelf (Burns 1981; Kelly 1988). While they occupy a subset of the ringed seal habitat, the condition of the habitat is generally high-quality, as described for ringed seals. The response of bearded seals to habitat disturbance by oil and gas operations is also similar to that described for ringed seals, negligible to the individual bearded seals and biologically insignificant to the population. In addition, there has been no documented reduction in subsistence harvest in areas adjacent to oil and gas operations. As with ringed seals, the expected climate change effects on bearded seal habitat was the basis for proposing to list the species as threatened. As an ice-dependent seal, a continued reduction of sea ice will change the habitat and affect the bearded seal population (Cameron et al. 2010).

Mitigation

Although it is anticipated that whales and seals will not be in the area during the open water dredging and screeding, to mitigate the possibility of incidental harassment of the endangered bowhead whales, the proposed threatened bearded seals (Beringia DPS), and the proposed threatened ringed seals (Arctic subspecies), ExxonMobil will adopt mitigation measures, including:

- Marine mammal observers
    - Marine mammal observers will be employed during the open water maintenance dredging and screeding activities to identify any bowhead whales, bearded seals, and ringed seals that may come into proximity of the dredging and screeding activities.
    - Marine mammal observers will have the authority to immediately stop dredging and screeding operations and/or lower noise levels (to less than 120 dB) when bowhead whales, bearded seals, and ringed seals are visible within 1,000 m (0.6 mi) of the work site, which is unlikely.

Key mitigation measures related to the ESA listed and proposed species will include:

- Minimize offshore infrastructure

- Install mooring dolphins and the Service Pier in winter and in less than 2.4 m (8 ft.) of water
- Use marine mammal observers on barges, vessels, and convoys, as was done in 2008, 2009, and 2010
- Sealift barging planned to be completed prior to the main fall bowhead whale migration and subsistence whaling
- Route the coastal barging inside barrier islands
- Construct the Service Pier to reduce the number of coastal barging trips
- Implementing protective measures of the Conflict Avoidance Agreement with the Alaska Eskimo Whaling Commission
- Construct ice roads onshore or on the sea ice over shallow waters (grounded ice), avoiding seal habitat
- Dredge the barge landing area through the ice during the winters preceding open-water sealift to minimize disturbance to marine mammals.

Conclusion

We have considered the potential effects of the Point Thomson project on the bowhead whale, bearded seal, and ringed seal, and their habitats. The direct and indirect effects on these species and their habitats from each phase of the project were assessed: drilling, construction, and operations. Activities considered to potentially affect bowhead whales, bearded seals, and ringed seals include: 1) drilling and operations, including oil spills; 2) marine transportation; and 3) tundra and sea ice roads. This analysis found that all direct and indirect consequences from the project may affect, but are not likely to adversely affect bowhead whales, bearded seals, and ringed seals.

This concludes consultation for this action. Reinitiation of this consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) take of a listed species occurs, 2) new information reveals effects of the action that may affect listed species in a manner or to an extent not previously considered, 3) the action is subsequently modified in a manner that causes an effect to the listed species not previously considered, or 4) a new species is listed or critical habitat is designated that may be affected by the action.

If there are any questions please contact Barbara Mahoney in our Anchorage office at 907-271-3448.

Sincerely,

for JWB

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