

water season would result in more than temporary behavioral disturbance to polar bears. Polar bears normally swim with their heads above the surface, where underwater noises are weak or undetectable.

Noise and vibrations produced by oil and gas exploration and production activities during the ice-covered season could potentially result in impacts on polar bears. During this time of year, denning female bears as well as mobile, non-denning bears could be exposed to and affected differently by potential impacts from oil and gas activities. Disturbances to denning females, either on land or on ice, are of particular concern. As part of the LOA application for seismic surveys during denning season, Industry provides us with the proposed seismic survey routes. To minimize the likelihood of disturbance to denning females, we evaluate these routes along with information about known polar bear dens, historic denning sites, and probable denning habitat.

A standard condition of LOAs requires Industry to maintain a 1-mile buffer between survey activities and known denning sites. In addition, we may require Industry to avoid denning habitat until bears have left their dens. To further reduce the potential for disturbance to denning females, we have conducted research, in cooperation with Industry, to enable us to accurately detect active polar bear dens. We have evaluated the use of remote sensing techniques, such as Forward Looking Infrared (FLIR) imagery and the use of scent-trained dogs to locate dens. Based on these methodologies, the use of FLIR technology coupled with using trained dogs to locate occupied polar bear dens as a verification is a viable technique that could help to minimize impacts from oil and gas industry activities on denning polar bears. These techniques will be included as conditions of LOAs as appropriate. In addition, Industry has sponsored cooperative research evaluating noise and vibration propagation through substrates and the received levels of noise and vibration in polar bear dens. This information will be used to refine site-specific mitigation measures.

2. Physical Obstructions

There is little chance that Industry facilities would act as physical barriers to movements of polar bears. Most facilities are located onshore where polar bears are only occasionally found. The offshore and coastal facilities are most likely to be approached by polar bears. The Endicott Causeway and West Dock facilities have the greatest potential to act as barriers to movements

of polar bears because they extend continuously from the coastline to the offshore facility. Yet, because polar bears appear to have little or no fear of man-made structures and can easily climb and cross gravel roads and causeways, bears have frequently been observed crossing existing roads and causeways in the Prudhoe Bay oilfields. Offshore production facilities, such as Northstar, may be approached by polar bears, but due to their layout (*i.e.*, continuous sheet pile walls around the perimeter) the bears may not gain access to the facility itself. This situation may present a small scale, local obstruction to the bears' movement, but also minimizes the likelihood of human-bear encounters.

3. Human-Polar Bear Encounters

Encounters with humans can result in the harassment or (rarely) the death of polar bears. Unlike most mammals, polar bears typically do not fear humans and are extremely curious. Polar bears are most likely to encounter humans during the ice-covered season, when both humans and bears are found on the land-fast ice and adjacent coastline. Polar bears can also come in contact with humans along the coast or on islands, particularly near locations where subsistence whalers haul bowhead whales on shore to butcher them.

Depending upon the circumstances, bears can be either repelled from or attracted to sounds, smells, or sights associated with Industry activities. In the past, such interactions have been addressed through the LOA process which requires the applicant to develop a polar bear interaction plan for each operation. These plans outline the steps the applicant will take, such as garbage disposal procedures, to minimize impacts to polar bears by reducing the attraction of Industry activities to polar bears. Interaction plans also outline the chain of command for responding to a polar bear sighting. In addition to interaction plans, Industry personnel participate in polar bear interaction training while on site. Employee training programs are designed to educate field personnel about the dangers of bear encounters and to implement safety procedures in the event of a bear sighting. The result of these polar bear interaction plans and training allows personnel on site to detect bears and respond appropriately. Most often, this response involves deterring the bear from the site. Personnel are instructed to leave an area where bears are seen. If it is not possible to leave, in most cases bears can be displaced by using pyrotechnics (*e.g.*,

cracker shells) or other forms of deterrents (*e.g.*, the vehicle itself, vehicle horn, vehicle siren, vehicle lights, spot lights, etc.). The purpose of these plans and training is to eliminate the potential for lethal takes of bears in defense of human life. No bears have been killed and no Industry personnel have been injured as a result of Industry activities since regulations have been in place. Therefore, we believe, such mitigation measures have minimized polar bear/human interactions and will continue to be requirements of future LOAs as appropriate.

Although very unlikely, it is possible that on-ice vehicle traffic could physically run over an unidentified polar bear den. Known dens around the oilfield are monitored by the Service and Industry. The oil and gas industry communicates with the Service to determine the location of Industry's activities relative to known dens. General LOA provisions require Industry operations to avoid known polar bear dens by 1 mile. There is the possibility that an unknown den may be encountered during Industry activities. If a previously unknown den is identified, communication between Industry and the Service and the implementation of mitigation measures, such as the 1-mile exclusion area around the den, help ensure that disturbance is minimized.

Contact With Oil or Waste Products by Pacific Walrus and Polar Bears

The discharge of oil or waste products into the environment could potentially impact polar bears and walrus depending on the location (*i.e.*, onshore or offshore), size of the spill, environmental conditions, and success of cleanup measures. Spills of crude oil and petroleum products associated with onshore production facilities during ice-covered and open-water seasons are usually minor spills (*i.e.*, 1 to 50 barrels per incident) that are contained and cleaned up immediately. They can occur during normal operations (*e.g.*, transfer of fuel, handling of lubricants and liquid products, and general maintenance of equipment). Fueling crews have personnel that are trained to handle operational spills. If a small offshore spill occurs, spill response vessels are stationed in close proximity and respond immediately. Production related spills, generally larger, could occur at any production facility or pipeline connecting wells to the Trans-Alaska Pipeline System. These large spills have been modeled to examine potential impacts on marine mammals.