

unlikely that a nursing female would abandon her pup given the normal levels of disturbance from the proposed activities and the typical movement patterns of ringed seal pups among different holes as reported by Lydersen and Hammill (1993), pup mortality is unlikely. Similarly, Kelly and Quakenbush (1990) observed that radio-tagged seals used as many as four lairs spaced as far as 3,437 m (11,276 ft) apart, with mean distances for males equaling 1,997 m (6,552 ft) and for females 634 m (2,080 ft). In addition, seals have multiple breathing holes. Pups may use more holes than adults (mean 8.7), but the holes are generally closer together (Lydersen and Hammill, 1993). Holes have been found as far apart as 0.9 km (0.56 mi). This pattern of use indicates that adult seals and pups can move away from seismic activities, particularly since the seismic equipment does not remain in any specific area for a prolonged time. Given the small proportion (<1 percent) of the population potentially disturbed by the proposed activity, impacts are expected to be negligible for the overall ringed and also bearded seal populations.

Masking effects on pinniped vocalizations and other natural sounds are expected to be limited. Although pulse repetition rates will be high during vibroseis surveys, the source levels of those pulses will be considerably lower than during open-water seismic surveys. This will considerably reduce the potential for masking.

Potential Effects on Subsistence

Residents of the village of Nuiqsut are the primary subsistence users in the activity area. The subsistence harvest during winter and spring is primarily ringed seals, but during the open-water period both ringed and bearded seals are taken. Nuiqsut hunters may hunt year round; however, in more recent years most of the harvest has been in open water instead of the more difficult hunting of seals at holes and lairs (McLaren, 1958; Nelson, 1969). The most important area for Nuiqsut hunters is off the Colville River Delta, between Fish Creek and Pingok Island, which corresponds to approximately the eastern half to the activity area. Seal hunting occurs in this area by snow machine before spring break-up and by boat during summer. Subsistence patterns may be reflected through the harvest data collected in 1992 where Nuiqsut hunters harvested 22 of 24 ringed seals and all 16 bearded seals during the open water season from July to October (Fuller and George, 1997). Only a small number of ringed seals was

harvested during the winter to early spring period, which corresponds to the time of the proposed on-ice seismic operations.

Based on harvest patterns and other factors, on-ice seismic operations in the activity area are not expected to have an unmitigable adverse impact on subsistence uses of ringed and bearded seals because:

(1) Operations would end before spring breakup, after which subsistence hunters harvest most of their seals.

(2) Operations would temporarily displace relatively few seals, since most of the habitat in the activity area is marginal to poor and supports relatively low densities of seals during winter. Displaced seals would likely move a short distance and remain in the area for potential harvest by native hunters (Frost and Lowry, 1988; Kelly *et al.*, 1988).

(3) The area where seismic operations would be conducted is small compared to the large Beaufort Sea subsistence hunting area associated with the extremely wide distribution of ringed seals.

In order to ensure the least practicable adverse impact on the species and the subsistence use of ringed seals, all activities will be conducted as far as practicable from any observed ringed seal structure, and crews will be required to avoid hunters and the locations of any seals being hunted in the activity area, whenever possible. Finally, the applicant will consult with subsistence hunters of Nuiqsut and provide the community, the North Slope Borough, and the Inupiat Community of the North Slope with information about its planned activities (timing and extent) before initiating any on-ice seismic activities.

Mitigation

Similar to work in previous years, NMFS expects the following mitigation will be undertaken by the applicant to ensure that any taking will be at the lowest level practicable. All activities will be required to be conducted in a manner that minimizes adverse effects on ringed and bearded seals and their habitat. Activities must be conducted as far as practicable from any observed ringed seals or ringed seal lair. For example, no energy source may be placed over an observed ringed seal lair and only vibrator-type energy-source equipment will be used. Seismic crews will receive training so that they can recognize potential ringed seal lairs and adjust their seismic operations. Furthermore, if seismic operations go beyond March 20, 2003 in waters ≥ 3 m (9.8 ft), a survey using trained dogs will

be completed in all areas where surface blading will be conducted. This survey will identify all active seal holes/birthing lairs or hole/lair habitats so they can be avoided by seismic and camp operations to the greatest extent practicable. If trained dogs are not available, then the NMFS Regional Administrator or his designee will be promptly notified to determine possible alternative monitoring that would identify potential ringed seal habitat by trained marine mammal biologists based on the characteristics of the ice (i.e., deformation, cracks, etc.).

Monitoring and Reporting

Ringed seal pupping occurs in lairs from late March to mid-to-late April (Smith and Hammill, 1981). Prior to commencing on-ice seismic surveys after March 20th, a survey using experienced field personnel and trained dogs will be conducted to identify potential seal structures along the planned on-ice seismic transmission routes. The seal structure survey will be conducted before selection of precise transit routes to ensure that seals, particularly pups, are not injured by equipment. The locations of all seal structures will be recorded by Global Positioning System (GPS), staked, and flagged with surveyor's tape. Surveys will be conducted 150 m (492 ft) to each side of the transit routes. Actual width of route may vary depending on wind speed and direction, which strongly influence the efficiency and effectiveness of dogs locating seal structures. Survey will only be conducted in the portions of the activity area where water depths exceed 3 m (9.8 ft). Few, if any, seals inhabit ice-covered waters below 3 m (9.8 ft) due to water freezing to the bottom or poor prey availability caused by the limited amount of ice-free water.

The level of take, while anticipated to be negligible, will be assessed by conducting a second seal structure survey immediately after the end of the seismic surveys. A single on-ice survey will be conducted by biologists on snowmachines using a GPS to relocate and determine the status of seal structures located during the initial survey. The status (active vs. inactive) of each structure will be determined to assess the level of incidental take by seismic operations. The number of active seal structures abandoned between the initial survey and the final survey will be the basis for enumerating take. If dogs are not available for the initial survey, take will be determined by using observed densities of seal on ice reported by Moulton *et al.* (2001) for the Northstar project, which is