

Movements of a tagged bowhead whale in the vicinity of a seismic survey in the Beaufort Sea

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The western Arctic stock of bowhead whales (*Balaena mysticetus*) are critical for the nutritional and cultural health of Alaska Natives and are important in the marine ecosystem as consumers of zooplankton. This stock winters in the Bering Sea and summers in the eastern Beaufort Sea where they are vulnerable to possible effects from oil and gas exploration, development, and production. Marine seismic surveys are commonly used during oil and gas exploration and have the potential to disrupt bowhead communication, feeding, and migration. Such surveys often include mitigation measures intended to minimize potential effects of seismic activity on marine mammals; however, the efficacy of such measures is unknown. In 2006, we documented movements of a satellite-tagged bowhead whale in the vicinity of an active seismic survey, north of the Mackenzie River Delta, Canada. The seismic survey consisted of one ship towing a 40-airgun array, of which a maximum of 36 airguns were active at any time. On this survey, specific mitigation measures included: 1) shutting down airguns when bowhead whales were observed within designated safety zones (areas where noise levels were predicted to be greater than 180 dB) and 2) following shutdowns, activating one airgun at a time to allow whales to move away as the sound levels increased slowly. The seismic survey lasted from 31 August to 4 October and the whale was within the survey area from 18 September until 7 October. We will present the whale's movement patterns in relation to the active seismic vessel, including an analysis of whale speed and change in direction as a function of distance from the active seismic vessel in order to determine if the whale's movements were affected by the survey.

Contents

Plenary

Oral

Poster

Contributors

Legal Notices

Help

Exit

