Bowhead Whale (Balaena mysticetus) Distribution and Relative Abundance in the Alaskan Arctic, Summer and Autumn 2011

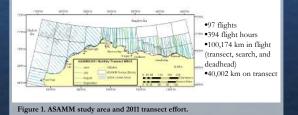
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Abstract

Aerial surveys for marine mammals were conducted in the western Beaufort and northeastern Chukchi Seas from mid-June to late October, 2011, as part of the Aerial Surveys of Arctic Marine Mammals project, funded by the Bureau of Ocean Energy Management. The study area for these line-transect surveys ranged from 140-169°W and 68-72°N, extending from the coast out to approximately 315 km offshore. The surveys were conducted in Twin Turbine Aero Commander aircraft with 5.5 hour flight endurance and a de Havilland Twin Otter with 4 hours of endurance. The 2011 surveys covered over 50,000 km of effort (excluding transits over land and in poor visibility), including approximately 40,000 km on transect, exceeding effort achieved in previous years. Bowhead whales were sighted during every month, including 2 sightings in late June and 1 in late September near leased blocks in the Chukchi Sea Planning Area. In addition, 17 bowhead whales, including milling and feeding animals (one with a muddy rostrum), were sighted on 14 July in a region north of Camden Bay, near the last known position of a satellite tagged bowhead whale. The westward autumn migration across the western Beaufort Sea began relatively late in 2011 compared to the previous three years. These surveys continue to provide broad-scale information about the distribution, relative abundance, and behavior of bowhead whales and other marine mammals in regions of renewed interest to the oil and gas industry in the Alaskan Arctic.

Aerial Surveys of Arctic Marine Mammals

- · The Aerial Surveys of Arctic Marine Mammals (ASAMM) project is a continuation of the Bowhead Whale Aerial Survey Project (BWASP; 1979-2010) in the western Beaufort Sea and Chukchi Offshore Monitoring in Drilling Area (COMIDA; 2008-2010) marine mammal aerial survey project and predecessors (1982-1991) in the northeastern Chukchi Sea. The ASAMM study area encompasses the northeastern Chukchi Sea and western Beaufort Sea (140-169º W, 68-72º N) (Figure 1), identical to the BWASP and COMIDA study areas.
- The ASAMM study area includes the Chukchi Sea Planning Area, a region where activities associated with the oil and natural gas industry have increased since 2008, when the Chukchi Sea Lease Sale 193 occurred. In addition, shipping traffic is likely to increase in the study area as vessels capitalize on the reduced extent of sea ice and expanded ice-free season that are predicted to continue to occur, and be exacerbated, in the future.
- The 2011 ASAMM surveys were based out of Barrow (17 June 25 October) and Deadhorse (20 August - 26 October), Alaska.
- · Standard line-transect protocols were used, including 2 primary marine mammal observers and 1 dedicated data recorder who collected data on a laptop with custom software interfaced to a GPS receiver.
- · All marine mammal sightings, in addition to current environmental conditions and automatic position updates, were recorded.
- Surveys were conducted at a target altitude of 1200-1500 ft (366-457 m) at 110 kts (127 mph) in 2 Twin Turbine Aero Commander 690 A aircraft with 5.5 hrs flight endurance and a de Havilland Twin Otter with 4 hrs endurance.



Relative Abundance



Figure 2. ASAMM 2011 bowhead whale transect (57 sightings of 78 whales) and search or circling (30 sightings of 34 whales) sightings, by month. The greatest number of whales were observed in September, although the highest encounter rate was in October (Table 1).

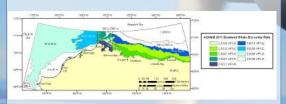
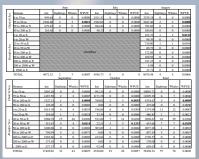
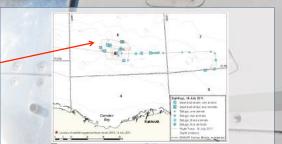


Figure 3. ASAMM 2011 bowhead whale encounter rate (whales per kilometer of transect effort, or WPUE) by depth zone.

Table 1. Relative bowhead whale encounter rates from the 2011 ASAMM surveys, unadjusted for detection probabilities. (Strata with the highest WPUE in each sea in each month are in bold font.) In the northeastern Chukchi Sea, encounter rate patterns in 2011 were similar to the 2008-2010 seasons, with the highest encounter rates in the 50-200 m N stratum, followed by the 35-50 m stratum. Compared to the 2007-2010 field seasons, bowhead whales in the western Beaufort Sea were encountered relatively less frequently in the 0-20 m W stratum, northeast of Barrow. Similar to the 2007-2010 field seasons, the highest bowhead whale encounter rate was in a depth stratum located northeast of Barrow. The bowhead whale migration appeared to occur later in 2011 compared to 2007-2010: the highest encounter rate in 2011 in the Beaufort Sea was in October, whereas it was in September during 2007-2010 (all years combined). Poor weather conditions severely limited survey effort during October 2011.





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Figure 4. Opportunistic survey on 14 July to the last known location of a satellite-tagged bowhead whale in the western Beaufort Sea. The survey aircraft flew an expanding box around the position of the tagged animal. In total, 17 bowhead whales (including a pair of possibly feeding whales, one of which was muddy) and 34 belugas were sighted.



Figure 5. A total of 4 bowhead whale calves were observed during the 2011 field season, 3 of which were observed only after the aircraft broke transect and circled the sighting.



Acknowledgments

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