

Identifying hotspots for bowhead whales of the western Arctic stock

Citta, John J.¹; Quakenbush, Lori T.¹; Okkonen, Stephen R.²; Druckenmiller, Matthew L.³; George, John C.⁴; Brower, Harry⁴; Small, Robert J.⁵; Harwood, Lois A.⁶; Heide-Jørgensen, Mads-Peter⁷

(1) Alaska Department of Fish & Game, 1300 College Road, Fairbanks, Alaska, 99701, USA

(2) Institute of Marine Sciences, University of Alaska, Fairbanks, Alaska, 99775, USA

(3) National Snow and Ice Data Center, CIRES, 449 UCB, Boulder, Colorado, 80309, USA

(4) North Slope Borough Department of Wildlife Management, PO Box 69, Barrow, Alaska, 99723, USA

(5) Alaska Department of Fish & Game, PO Box 115526, Juneau, Alaska, 99811, USA

(6) Department of Fisheries and Oceans, Box 1871, Inuvik, Northwest Territories, X0E 0T0, Canada

(7) Greenland Institute of Natural Resources, Strandgade 91, 3, Postboks 2151, DK-1016, Copenhagen, Denmark

Corresponding author: john.citta@alaska.gov

The western Arctic stock of bowhead whales (*Balaena mysticetus*) ranges across the seasonally ice-covered waters of the Bering, Chukchi, and Beaufort seas. Declining sea ice has opened Arctic shipping lanes, facilitated oil and gas development, may expand commercial fisheries, and may affect the foraging ecology and conservation of this stock. We identified areas of concentrated use by bowhead whales, termed “hotspots,” and describe the timing of use and associated physical characteristics (oceanography, sea ice, and winds). We used satellite locations from 55 bowhead whales, collected between 2006 and 2012, to map kernel densities across the stock’s range and defined hotspots as occurring within the 25% density isopleth; six primary hotspots were identified. In spring, most whales migrate through heavy sea ice far offshore to the Cape Bathurst polynya, Canada (Area 1), an area known to have high zooplankton production. Whales were present in the polynya between 3 May and 9 July, and then most moved west to shallow waters offshore of the Tuktoyaktuk Peninsula, Canada (Area 2), until 16 October, where wind-driven upwelling promotes the production and concentration of zooplankton. Between 22 August and 5 November, whales congregate near Point Barrow, Alaska (Area 3), where zooplankton aggregate when east winds are followed by south or weak winds. East winds promote upwelling and move zooplankton onto the Beaufort shelf, while other winds promote the aggregation of zooplankton. Between 1 November and 15 January, whales congregate along the northern shore of Chukotka, Russia (Area 4), where zooplankton likely concentrate along a coastal front. The two remaining hotspots occur in the Bering Sea: Anadyr Strait (Area 5), used between 1 December and 26 April, and the Gulf of Anadyr (Area 6), used between 17 December and 15 April; both areas have highly fractured sea ice and are dominated by the Navarin Current.

ABSTRACTS

20th BIENNIAL
CONFERENCE

— ON THE —

BIOLOGY OF
MARINE MAMMALS

2013

Dunedin, New Zealand
December 9-13

