

**STUDY TITLE:** Satellite Tracking of Western Arctic Bowhead Whales

**REPORT TITLE:** Satellite Tracking of Bowhead Whales – Movements and Analysis from 2006–2012

**CONTRACT NUMBER:** M10PC00085

**SPONSORING OCS REGION:** Alaska

**APPLICABLE PLANNING AREAS:** Beaufort and Chukchi

**COMPLETION DATE OF REPORT:** August 2013

**COST BY FISCAL YEAR:** FY 2010: \$100,000; FY 2011: \$350,000; FY 2012: \$250,000  
**CUMULATIVE PROJECT COST:** \$700,000

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**KEY WORDS:** Bowhead whale, Beaufort Sea, Chukchi Sea, Bering Sea, feeding, satellite telemetry, movements, migration, petroleum exploration areas

**BACKGROUND:** The western Arctic (or Bering-Chukchi-Beaufort) stock of bowhead whales (*Balaena mysticetus*) is of high importance due to the nutritional and cultural role of bowhead whales to coastal Alaska Natives of the Bering, Chukchi, and Beaufort seas, their role in the marine ecosystem, and because their range overlaps with areas identified for potential oil and gas development and shipping. Movement patterns and feeding areas of this stock of bowhead whales, however, are not well understood. Increasing our understanding of bowhead whale movements, habitat use, and behavior will aid in resource planning and bowhead conservation.

**OBJECTIVES:** The overall objective of this study was to work with subsistence whalers to deploy satellite transmitters on bowhead whales of different sex and age in order to document and describe the general pattern of year-round movements. Specific objectives included using satellite telemetry to document 1) the pattern of year-round movements, 2) behavior during migration relative to migration routes and the environmental characteristics along those routes (e.g., polynyas, leads, bathymetry, ice conditions, industrial disturbances), 3) document the timing of migration and the rate of travel, 4) determine whether bowhead whales found near Point Barrow in summer came from summering in the Chukchi Sea or were returning early from Canada, and 5) instrument other species to address movements and behavior.

**DESCRIPTION:** We worked with Native whalers from Alaska and marine mammal hunters from Canada to attach satellite transmitters to bowhead and gray whales during a three year period, 2010–2013 to document movements and identify important habitats during all seasons. This work is a continuation of a five year study from 2005 to 2010.

**SIGNIFICANT CONCLUSIONS:** We have documented bowhead movements within all oil and gas

lease sale areas in the Chukchi and Beaufort seas including their presence in the vicinity of active seismic and drilling operations. Based on movements and behavior of tagged bowhead whales from all years, the greatest potential for anthropogenic disturbances from industrial activities including shipping occur near Cape Bathurst in May and June, Tuktoyaktuk in late August to early September, Point Barrow in late August to late October, northern Chukotka/Bering Strait in October to early January and the outer Gulf of Anadyr in December through March. Ships traveling through the narrow area west of Little Diomedé Island from mid-November to the end of December would have high potential for encountering many bowhead whales. We have identified migratory corridors that bowheads use to travel between feeding areas. Both the spring migratory corridor between the Bering Strait and Cape Bathurst in Amundsen Gulf and the fall migratory corridor between Hershel Island and Barrow have been relatively distinct and consistent among years. The fall migratory corridor between Barrow and the Bering Strait, however, is more variable. We think this is related to whales responding to prey availability. Krill is concentrated by oceanographic factors, which vary in space and time. This results in complex movement patterns as individual whales travel to different feeding areas at different times.

We have documented areas where whales spend time, and are likely feeding. These areas include Cape Bathurst and Tuktoyaktuk in Canada; Point Barrow in Alaska; and Northern Chukotka and the Gulf of Anadyr in Russia; and Bering Strait and Anadyr Strait in Russia and Alaska

**STUDY RESULTS:** From 2010 to 2012 we worked with Native whalers from Alaska and marine mammal hunters from Canada to attach 17 satellite transmitters to bowhead whales (11 near Tuktoyaktuk, 3 near Barrow and 3 near St. Lawrence Island) for a total of 63 bowhead whales tagged since the project began in 2006. We combined information from all whales tagged to document movements and behavior. We documented the annual distribution of western Arctic bowhead whales, including summering and wintering areas, and the migratory routes that connect these areas. We have incorporated traditional knowledge information collected by us and others into our final report. We described how tagged bowhead whales move through Oil and Gas Lease Sale Areas in Canada and Alaska and in proposed areas of Russian waters in the spring and fall. Eight gray whales were tagged and five were photographed and added to photo-identification catalogs for the eastern Pacific stock.

**STUDY PRODUCTS:** We provided weekly e-mails of maps and updates on the State of Alaska website. We made presentations to the Alaska Eskimo Whaling Commission, the International Whaling Commission, and at scientific meetings including the Society for Marine Mammal Conference, Alaska Marine Science Symposium, and the U.S.-Canada Oil and Gas Conference. We produced annual reports, a publically available report to the International Whaling Commission, and four peer-reviewed publications.

