Environmental Studies Program: Ongoing Studies

Study Area(s): Beaufort Sea, Chukchi Sea

Administered By: Alaska OCS Region

Title: Demography and Behavior of Polar Bears Summering on Shore in Alaska (AK-09-05a; AK-09-05b)

BOEM Information Need(s) to be Addressed: This jointly-funded study addresses information needs identified in a 2005 MMS funded workshop hosted by the USFWS, "Beaufort Sea Polar Bear Monitoring Workshop." It will provide useful information on the sub-population of polar bears summering in areas of oil and gas-related activities along the Arctic coastline. New information will support NEPA analysis and documentation for lease sales, EPs, DPPs, ESA consultations, MMPA permitting by USFWS, and development of related mitigation.

Total BOEM Cost: $960,767 plus Joint Funding (~$1,490,000) **Period of Performance:** FY 2009-2017

Conducting Organization: USGS Alaska Science Center; USFWS Marine Mammals Management

Principal Investigator(s): Todd Atwood; Eric Regehr/Michelle St. Martin

BOEM Contact: Carol Fairfield

Description:

Background: Polar bear use of terrestrial habitat along the Beaufort and Chukchi Sea coastlines of Alaska has increased in recent years, with up to 10% of the polar bears inhabiting the southern Beaufort Sea remaining on land during the open water period. The remaining bears continue to summer on the pack ice, but now find themselves far north of the productive waters over the continental shelf. Neither situation seems favorable for polar bear foraging, and recent observations of starvation, cannibalism, drowning, and poor survival of young, suggest that polar bears in this region are increasingly subject to nutritional stresses. Although future survival of polar bears will depend on the strategies adopted in the diminishing ice environment; relative advantages and consequences of summering on land or Arctic sea ice over deep waters are unknown. Simultaneously, long-term expansion of oil and gas-related development is being contemplated in the southern Beaufort Sea. Polar bear-human interactions may increase because areas of importance to polar bears for resting, feeding, and traveling are becoming coincident with areas of high interest for oil and gas-related development.

Results from aerial surveys as well as a recent study monitoring polar bears feeding on bowhead whale carcasses at Barter Island and Cross Island indicates that all age/sex classes of polar bears are present along shore during the fall open water period and that approximately 50 percent of the bears are represented by family groups. Large numbers of bears have been observed near Barter Island, Cross Island, and Barrow. Industrial

operators in the Prudhoe Bay area report an increasing trend in the numbers, frequency, and duration of polar bear use during the open water period.

Objectives:

- Estimate the demographic composition and inter-annual patterns of use of coastal areas by the sub-population of polar bears summering on land in Alaska.
- Evaluate the implications of extended use of land during the open water period to polar bear health, behavior, and population status.
- Estimate the potential for the health and behavior of polar bears summering along the Beaufort Sea and Chukchi Sea coastlines to be influenced by oil- and gas-related activities.
- Develop draft conservation recommendations to reduce the possibility that industrial activity and changing environmental conditions will interact to the detriment of the polar bear population.

Methods: The investigator will conduct a thorough literature review and develop hypotheses about implications 1) to the management and stability of the polar bear population, and 2) to the health and behavior of individual bears in specific demographic groups of increasing numbers of polar bears remaining on land for extended periods during the open water period. Behavioral observations supported by application of appropriate technology (e.g. satellite tags, radio-frequency tags, and similar tags) will be used to monitor representative polar bears in Alaska that show a tendency to remain on land during the open water period. Movements, site fidelity, and limited life history data will be used to test specific hypotheses. Physical exams will be used to evaluate the health and physical condition of representative bears to test specific hypotheses. Hypotheses and observations will be reconciled and a plan developed to reduce the possibility of negative interactions between polar bears and oil and gas-related activities in a changing physical environment.

Current Status: Completed

Final Report Due: October 2017

Publications Completed:

Atwood, T., E. Peacock, M. McKinney, K. Lillie, R. Wilson, D. Douglas, S. Miller, and P. Terletzky. 2016. Rapid environmental change drives increased land use by an Arctic marine predator. PLoS ONE 11(6):e0155932.doi:10.1371/journal.pone.0155932.

Herreman, J. and E. Peacock. 2013. Polar bear use of a persistent food subsidy: Insights from non-invasive genetic sampling in Alaska. Ursus 24(2):148-163.

McKinney, M. A., T. Atwood, R. Dietz, C. Sonne, S. J. Iverson and E. Peacock. 2014. Validation of adipose lipid content as a body condition index for polar bears. Ecology and Evolution 4(4):516-527.

Pagano, A. M. and E. Peacock. 2014. Remote biopsy darting and marking of polar bears. Marine Mammal Science 30(1):169-183.

Regehr, E.V., M. St. Martin, C. Perham, R.R. Wilson, and S. Miller. 2017. Demography and Behavior of Polar Bears Summering on Shore in Alaska. Final Report, OCS Study BOEM 2017-020. U.S. Fish and Wildlife Service, Marine Mammals Management, 1011 East Tudor Road, Anchorage, Alaska, USA. 71 pp.

Wiig, Ø., E.W. Born, K.L. Laidre, R. Dietz, M.V. Jensen, G.M. Durner, A.M. Pagano, E. Regeher, M.St. Martin, S. Atkinson, and M. Dyck. 2017. Performance and retention of lightweigh satellite radio tags applied to the ears of polar bears (*Ursus maritimus*). Animal Biotelemery 5:9.

Wilson, R.R., E.V. Regehr, M.St. Martin, T.C. Atwood, E. Peacock, S. Miller, and G. Divoky. 2017. Relative influences of climate change and human activity on the onshore distribution of polar bears. Biological Conservation 214(2017)288-294.

Affiliated WWW Sites: http://www.boem.gov/akstudies/
https://marinecadastre.gov/espis/#/search/study/26818

Revised Date: August 17, 2018