Subject Area: Polar Bears

Lead (name and contact information): Dr. Patrick Lemons, Chief Marine Mammals Management, U.S. Fish and Wildlife Service, 1011 East Tudor Road, Anchorage, Alaska 99516. Phone: 907-786-3668. Email: patrick_lemons@fws.gov

Individuals Contacted: Todd Atwood (USGS), George Durner (USGS), James Wilder (FWS), Christopher Putnam (FWS), Ryan Wilson (FWS), Michelle St. Martin (FWS), and Mary Colligan (FWS).

What do we need to know and why (i.e. what decisions or determinations are required)(please address what we know about resources in the area (distribution, abundance, seasonal movements), how they may be impacted by oil and gas development, mitigation measures available and their effectiveness, subsistence activities)?

> **MMPA:** We can specify the incidental, but not intentional, taking of **small numbers** of polar bears by harassment if we can find that such harassment will have a **negligible impact** on the stock of polar bears and will not have an unmitigable adverse impact on the **availability of polar bears for subsistence uses** (emphasis added).
>
> **ESA:** Under Section 7 of the ESA we will have to conduct consultations on federal action(s) and will have to make a determination as to whether such actions would **jeopardize** the continued existence of polar bears or **adversely modify or destroy** designated critical habitat (emphasis added).

What information is currently available to address the information needs identified above (include citations)?

Information needed to make the above determinations includes population dynamics of the Southern Beaufort Sea (SBS) subpopulation of polar bears, habitat and denning ecology of polar bears in the 1002 area, the subsistence and cultural use of the 1002 Area, and information on human-bear interactions that will accompany oil and gas development. We briefly describe the current state of that information relative to our determinations below.

- Population Dynamics
    - Information on the population size and trend of SBS polar bears suggests that the population experienced a 40% decline between 2001 and 2010. However, this information also suggested that the population may have stabilized by the end of that time period. Given the current information is now 8 years old, and the uncertainty surrounding the trend of the population at the end of the time period, reliance on this information for management decisions is problematic.

- Habitat Ecology
    - Our current understanding of polar bear habitat use and denning in the 1002 area is primarily based on satellite radio collared bears from the larger SBS subpopulation. However, because we are reliant on satellite radio collars applied primarily to the western portion of the SBS, and the number of collared bears that then use is only a subset of this larger sampling effort, we generally lack an understanding of the

importance of the 1002 Area to the overall population of SBS bears. Therefore, reliance on the current information is problematic.

- Subsistence and Cultural Use
    - The only study conducted that included information concerning subsistence use and the cultural importance of polar bears in the 1002 Area was published in 1997. The information provided in that study pertaining to the 1002 Area is limited. Updated and more detailed information will be necessary as part of our determinations outlined above.

- Human-Bear Interactions
    - Because the 1002 Area was managed as a wildlife refuge in the past, no significant industrial activity and related human-bear interactions have occurred there in the last 35 years. Importantly, given the uniqueness of the habitat in this area and the importance of the 1002 Area to polar bears, reliance on mitigation measures used in the NPR-A and Prudhoe Bay may not comprehensively address potential human-bear interactions in the 1002 Area.

What are key information gaps?

- Population Dynamics
    - An accurate and current understanding of the population dynamics of the Southern Beaufort Sea subpopulation of polar bears is needed in order to estimate the impact of anticipated take (i.e. to determine small numbers and make negligible impact determinations under MMPA and jeopardy determinations under ESA).

- Habitat Ecology
    - Understanding the relationship between polar bears and environmental parameters helps us explain current habitat use patterns and make future predictions on how distribution and movement is likely to respond to predicted sea ice loss and other habitat changes. This understanding is needed in order to predict how many and how animals are likely to be impacted by proposed activities (small numbers and negligible impact determination under MMPA) and whether proposed actions are likely to adversely modify or destroy designated critical habitat (ESA determination).

- Subsistence and Cultural Use of Polar Bears
    - An activity or suite of actions can affect the availability of polar bears for subsistence use by decreasing the overall number of animals or by changing their movements.
    - Understanding polar bear movements and current hunting practices helps us understand the current availability of polar bears for subsistence hunting and predict the potential impact of proposed actions on the availability of polar bears for subsistence use (MMPA determination).
    - Maintaining clear and consistence communications and relationships with communities concerning ongoing research and development activities.

- Human-Polar Bear Interactions

- Understanding the potential spatial and temporal overlap between polar bears and oil and gas development and the factors influencing the likelihood and consequences of interactions between polar bears and those development activities is essential to our ability to determine the number of polar bears likely to be taken (small numbers determination under MMPA) and the consequences of that take to the individual animal and ultimately the stock (negligible impact determination under MMPA) and to the species (jeopardy determination under ESA).
- Identification of possible methods to avoid overlap and interactions between polar bears and Industry activities, and to reduce the potential for interactions, are essential tools to facilitating our ability to achieve a small numbers determination and reach a negligible impact determination (MMPA) as well as avoid jeopardy and adverse modification or destruction of critical habitat (ESA).

What studies/surveys need to be conducted to fill those information gaps? Please include duration (start and end), lead, and cost estimates.

- Population Dynamics
  - Estimation of abundance and population dynamics (i.e. demographic rates such as survival and reproduction). Surveys using mark-recapture methods are a more viable option than other non-invasive techniques (e.g., aerial survey).
  - Continue to evaluate emerging technologies (e.g., high-resolution satellite imagery, GPS collar reliability, collar drop off mechanism performance) for integration into existing monitoring plans.

- Habitat Ecology
  - Improve our understanding of the environmental and biological characteristics of important polar bear habitats, with a particular focus on denning habitat.
    i. Continue, expand, and improve den detection, mapping, and monitoring activities. We see higher use of habitat within the 1002 area and greater reproductive success for land-based dens.
    ii. Identify movement and land use patterns of polar bears in the 1002 area, and projected changes due to sea ice loss, especially given the increased proportion of the population coming on shore in that region. Identify potential for habitat use and behavioral patterns to be modified due to increased human activities.

- Assess Impacts to Subsistence and Cultural Use of Polar Bears
  - Periodically assess key community perspectives, values and needs regarding human-polar bear interactions and sustainable use of polar bears for subsistence purposes.

- Human-Polar Bear Interactions – Identify Current Methods and Develop New Methods to Avoid, Reduce and Mitigate impacts to Polar Bears from Oil and Gas Development Specific to the 1002 Area
  - Understand how polar bears respond to disturbance
    i. Use existing movement data to look at relationships with existing infrastructure (does it appear bears are avoiding those areas and if so what is the impact zone)
    ii. Monitor for potential disturbances at den sites

- Evaluate efficacy of mitigation measures currently used outside of the 1002 area to determine effectiveness and transferability to the 1002 area
    i. Comprehensive Review of Management Measures (e.g., season/area restrictions, den buffer zones, facility location/design)
    ii. Avoidance: Examine available data to identify areas of particularly high use or biological importance for seasonal or year round avoidance areas
- Develop new mitigation measures specific to the unique characteristics of the 1002 area to reduce the number of bears taken and the overall impact of Industry.