June 16, 2025

Ms. Kelly Hammerle
Attn: Docket No. BOEM-2025-0015-0003
Bureau of Ocean Energy Management (VAM-LD)
45600 Woodland Road,
Sterling, VA 20166-9216

Submitted via www.regulations.gov (Docket No. BOEM-2025-0015-0003)

Request for Information: National Outer Continental Shelf Oil and Gas Leasing Program

Dear Bureau of Ocean Energy Management,

Alaska is home to two populations of polar bears: the Southern Beaufort Sea and the Chukchi Sea. Polar bears are marine mammals, dependent upon Arctic sea ice to hunt, breed, travel, and sometimes den. Sea ice loss from climate change is the polar bears' primary threat, and the species is protected under the U.S. Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). During your preparation of the National OCS Oil and Gas Leasing Program, the following research should be considered with regards to how plans in the Chukchi Sea, Beaufort Sea, and the High Arctic may impact polar bear habitat and an already threatened species. Below is a summary of the research as well as full citations for your further exploration.

Disturbance & Detection

Andersen, E. M., Wilson, R. R., Rode, K. D., Durner, G. M., Atwood, T. C., & Gustine, D. D. (2024). The post-emergence period for Denning Polar Bears: Phenology and influence on Cub Survival. *Journal of Mammalogy, 105(3), 490–501*. https://doi.org/10.1093/jmammal/gyae010

> Pregnant polar bears enter maternity dens in late autumn and emerge in the spring. Polar bears typically remain at their den for up to a month before heading to the sea ice to hunt. Research shows a correlation between cub survival and increased time at the den site post-emergence, highlighting the importance of the post-emergence period in contributing to reproductive success.

Larson, W., Smith, T., York, G. (2020). Human Interaction and Disturbance of Denning Polar Bears on Alaska's North Slope. *Arctic Institute of North America, Vol. 73, No. 2, pp. 195 - 205*. https://www.jstor.org/stable/26974892

> As sea ice decreases, more pregnant Southern Beaufort Sea polar bears are denning on land. Land-denning bears are more susceptible to anthropogenic stressors, including disturbance from energy development. 30 years of data about denning polar bears' responses to varying degrees of human activity shows significant probabilities for disturbance among all stimulus classes, with aircraft showing the highest potential for initiating den abandonment. This data indicates that the current guideline of a 1.6 km (1 mile) buffer zone effectively minimizes disturbance to denning polar bears.

Owen, M. A., Pagano, A. M., Wisdom, S. S., Kirschhoffer, B., Bowles, A. E., & O'Neill, C. (2020). Estimating the Audibility of industrial noise to Denning Polar Bears. *The Journal of Wildlife Management*, *85*(2), 384–396. https://doi.org/10.1002/jwmg.21977

> Oil and gas activities on Alaska's North Slope overlap with polar bear maternal denning habitat and the den emergence period. This research evaluated noise circulation from nine sources used to support industrial activities at artificial snow dens. Findings indicate that although polar bear snow dens reduce acoustic sound pressure levels, noise from some industrial support vehicles was likely to be detected farther from dens than previously documented—reinforcing the importance of maintaining buffer zones around polar bear dens to minimize the potential for den disturbance.

Quigley, G., Brinkman, T. J., Wilson, R., & Christ, A. (2024). Behavioral response of polar bears to aircraft activity on the northern coast of Alaska. *The Journal of Wildlife Management*, *88*(3). https://doi.org/10.1002/jwmg.22554

> The Marine Mammal Protection Act (MMPA) protects polar bears from incidental disturbance (or "take") from human activities, including from aircraft activity. Research shows that probability of take increases with a decrease in flight altitude starting at 450 meters for helicopters and 300 meters for fixed-wing aircraft, and that active bears on barrier-island landscapes were more likely to experience take than inactive bears on mainland landscapes.

Smith, T. S., Amstrup, S. C., Kirschhoffer, B. J., & York, G. (2020). Efficacy of aerial forward-looking infrared surveys for detecting polar bear maternal dens. *PLOS ONE*, *15*(2). https://doi.org/10.1371/journal.pone.0222744

> Denned polar bears are invisible under the snow, placing them at risk to industrial development. This research evaluated the efficacy of a tool commonly used for detecting polar bear dens—forward looking infrared (FLIR) surveys. Findings showed that surveys conducted

by oil-field operators from 2004–2016 missed over half of known dens in the area, and the accuracy of FLIR surveys is likely to decline as global warming continues and weather becomes more unpredictable.

Woodruff, S. P., Blank, J. J., Wisdom, S. S., Wilson, R. R., Durner, G. M., Atwood, T. C., Perham, C. J., & Pohl, C. H. (2022). Evaluating the efficacy of aerial infrared surveys to detect artificial polar bear dens. *Wildlife Society Bulletin*, *46*(3). https://doi.org/10.1002/wsb.1324

Oil and gas activities on Alaska's North Slope overlap with polar bear maternal denning habitat and the den emergence period. To minimize disturbance of denning polar bear families, aerial infrared (AIR) surveys are used to look for dens in industry activity areas. AIR surveys target the heat signature coming off dens. This research evaluated the efficacy of AIR and the factors that impact its ability to detect den sites. Results suggest that AIR, as it is currently used, is unlikely to detect most polar bear dens in surveyed areas.

Other Threats to Polar Bears

Atwood, T. C., Marcot, B. G., Douglas, D. C., Bromaghin, J. F., & Pagano, A. M. (2025). Assessing the combined influence of biotic and anthropogenic stressors on polar bears to inform conservation planning. *Ecosphere*, *16*(6). https://doi.org/10.1002/ecs2.70316

This research evaluated the relative influence of environmental and anthropogenic stressors on four eco-regional polar bear populations. Arctic sea ice conditions and marine prey availability had the greatest influence on persistence for all polar bear populations. After that, hunting mortality was the greatest anthropogenic stressor in Archipelago and Seasonal Ice ecoregions, and quality of terrestrial refuge and industrial activity (like resource extraction and oil spills) were the greatest anthropogenic threats for bears in the Polar Basin Divergent Ice and Polar Basin Convergent Ice ecoregion. The areas being considered for offshore oil and gas development in Arctic Alaska lie within the Divergent Ice ecoregion.

Atwood, T. C., Marcot, B. G., Douglas, D. C., Amstrup, S. C., Rode, K. D., Durner, G. M., & Bromaghin, J. F. (2016). Forecasting the relative influence of environmental and anthropogenic stressors on polar bears. *Ecosphere*, *7*(6). https://doi.org/10.1002/ecs2.1370

This research evaluated the relative influence of environmental and anthropogenic stressors (including sea ice loss from climate change, marine prey availability, mortality from hunting and defense of life, trans-Atlantic shipping, oil and gas exploration, and contaminants) on polar bear persistence. Results showed that sea ice loss from climate change was the most influential determinant of polar bear population outcomes. Long-term conservation of polar bears would be best supported by holding global mean temperatures to $\leq 2°C$ above preindustrial levels.

Molnár, P. K., Bitz, C. M., Holland, M. M., Kay, J. E., Penk, S. R., & Amstrup, S. C. (2020). Fasting season length sets temporal limits for Global Polar Bear Persistence. *Nature Climate Change*, *10*(8), 732–738. https://doi.org/10.1038/s41558-020-0818-9

> Polar bears depend on sea ice to capture seals. This research establishes the timing and order of future demographic impacts of sea ice loss by estimating the threshold number of days that polar bears can fast before cub recruitment and adult survival decline. Results suggest that, with high greenhouse gas emissions, all but a few high-Arctic subpopulations of polar bears will survive by 2100. Moderate emissions mitigation prolongs persistence, but still some subpopulations will disappear within this century.

Stimmelmayr, R., SimsKayotuk, C., Pederson, M., Sheffield, G., Frantz, R., Nayakik, J., & Adams, B. (2023). Anthropogenic waste ingestion of southern Beaufort Sea Polar Bears, Alaska (2010–2020). *Ursus*, *2023*(34e5). https://doi.org/10.2192/ursus-d-22-00013.1

> This multiyear polar bear stomach-content analysis reported on anthropogenic waste ingestion in polar bears within the North Slope Borough, Alaska. Results showed that anthropogenic waste ingestion is common in polar bears of the Southern Beaufort Sea subpopulation, pointing to a need to engage in proactive human polar bear management by controlling access to anthropogenic foods (e.g., garbage dumps, stored wildlife resources).

Wilson, R. R., Horne, J. S., Rode, K. D., Regehr, E. V., & Durner, G. M. (2014). Identifying Polar Bear Resource selection patterns to inform offshore development in a dynamic and changing Arctic. *Ecosphere*, *5*(10), 1–24. https://doi.org/10.1890/es14-00193.1

> Sea ice loss from climate change is the primary threat to polar bears, and oil and gas development could exacerbate those impacts. This study estimated resource selection patterns for polar bears in the Chukchi Sea population to determine when bears were most likely to use the region where offshore oil and gas development is most likely to occur. Results showed that bears were most likely to use the offshore oil and gas planning area during ice retreat and growth with the highest predicted use occurring in the southern portion of the Chukchi Sea Planning Area.

Denning & Distribution

Chinn, S. M., Liston, G. E., & Wilson, R. R. (2023). Assessing past and future climatic influences on the availability of polar bear maternal Denning Habitat on Wrangel Island. *Ecological Modelling*, *484*, 110479. https://doi.org/10.1016/j.ecolmodel.2023.110479

> Female polar bears den in snowdrifts. For the Chukchi Sea subpopulation, 84% of dens have been reported on land and 68% of these are on Wrangel Island, Russia. Therefore, availability

of den habitat on Wrangel Island is critical for the long-term survival of the Chukchi Sea subpopulation. This research found that a projected 7.6 °C rise in temperature relative to current conditions resulted in a ~50% reduction of denning habitat. If temperatures increase ≥13.6 °C, 100% of denning habitat would be lost. Despite rising temperatures and sea ice loss, the climate of this area is cold enough that availability of denning habitat is not an immediate limiting factor for the population.

Fischbach, A. S., Amstrup, S. C., & Douglas, D. C. (2007). Landward and eastward shift of Alaskan Polar Bear Denning associated with recent sea ice changes. *Polar Biology*, *30*(11), 1395–1405. https://doi.org/10.1007/s00300-007-0300-4

Polar bears in Alaska den in coastal areas and on offshore drifting ice. Using satellite telemetry, this research explored changes in the distribution of polar bear maternal dens between 1985 and 2005. Results showed that changes in sea ice have likely reduced the availability and quality of pack ice denning habitat. As sea ice continues to decline, polar bear denning is expected to increase in coastal areas.

Olson, J., Rode, K., Eggett, D., Smith, T., Wilson, R., Durner, G., Fischbach, A., Atwood, T., & Douglas, D. (2017). Collar temperature sensor data reveal long-term patterns in southern Beaufort Sea Polar Bear Den distribution on pack ice and land. *Marine Ecology Progress Series*, *564*, 211–224. https://doi.org/10.3354/meps12000

This research used temperature sensor data collected by satellite-linked transmitters deployed on adult female polar bears between 1985 and 2013 to determine whether Southern Beaufort Sea polar bears have continued to increase denning on land with recent sea ice loss. It also examined whether sea ice conditions impact the distribution of dens between pack-ice and coastal substrates. Results showed an increase in land-based denning during this time period and a direct relationship between land denning and the distance that sea ice had retreated from the coast, suggesting that denning on land may continue to increase with further sea ice loss.

Pongracz, J. D., & Derocher, A. E. (2016). Summer Refugia of polar bears (Ursus Maritimus) in the southern Beaufort Sea. *Polar Biology*, *40*(4), 753–763. https://doi.org/10.1007/s00300-016-1997-8

Identifying critical habitats for the conservation and management of polar bears is important as climate change alters Arctic sea ice ecosystems. This research examined the distribution of polar bears tracked by satellite telemetry in the Southern Beaufort Sea, Canada to identify terrestrial and sea ice areas used as summer refugia when nearshore sea ice melted. Results showed bears made high use of ice over shallow waters, and bears that remained near

terrestrial areas used sea ice for hunting, when available. The majority of the bears remained on sea ice during summer and used the edge of the pack ice west of Banks Island, Canada.

Schliebe, S., Rode, K. D., Gleason, J. S., Wilder, J., Proffitt, K., Evans, T. J., & Miller, S. (2008). Effects of sea ice extent and food availability on spatial and temporal distribution of polar bears during the fall open-water period in the southern Beaufort Sea. *Polar Biology*, *31*(8), 999–1010. https://doi.org/10.1007/s00300-008-0439-7

Using weekly aerial surveys from 2000 - 2005, this research investigated the relationship between sea ice conditions, food availability, and the distribution of polar bears in the fall in the terrestrial habitats of the Southern Beaufort Sea. The number of bears on land increased when sea ice retreated furthest from shore, suggesting that long-term reductions in sea ice could result in an increasing proportion of the Southern Beaufort sea polar bears coming to land during open water periods.

Swimming

Durner, G. M., Whiteman, J. P., Harlow, H. J., Amstrup, S. C., Regehr, E. V., & Ben-David, M. (2011). Consequences of long-distance swimming and travel over deep-water pack ice for a female polar bear during a year of extreme sea ice retreat. *Polar Biology*, *34*(7), 975–984. https://doi.org/10.1007/s00300-010-0953-2

This research initiated the exploration of the impact of long-distance swims on polar bears. The study described the movement rate, hourly activity, and subcutaneous and external temperatures of a radio-collared adult female polar bear in the Southern Beaufort Sea during a long-distance swim. Results showed that long distance swimming in Arctic waters may result in high energetic costs and compromise reproductive fitness.

Monnett, C., & Gleason, J. S. (2006). Observations of mortality associated with extended open-water swimming by polar bears in the Alaskan Beaufort sea. *Polar Biology*, *29*(8), 681–687. https://doi.org/10.1007/s00300-005-0105-2

Aerial surveys in September 1987 - 2003 indicate that polar bear mortalities due to offshore swimming during late-ice years may be a notable and unaccounted source of natural mortality given the energetic demands of long-distance swims. This research suggests that drowning related deaths of polar bears may increase in the future if trends of sea ice decline continue.

Pagano, A. M., Durner, G. M., Amstrup, S. C., Simac, K. S., & York, G. S. (2012). Long-distance swimming by Polar Bears (Ursus maritimus) of the southern Beaufort Sea during years of extensive open water. *Canadian Journal of Zoology*, *90*(5), 663–676. https://doi.org/10.1139/z2012-033

Polar bears depend on sea ice to hunt their marine mammal prey. This research documented long-distance swims and their possible relationship to sea ice linked polar bear population declines. Results showed that moms and cubs are capable of swimming long distances during instances of extensive areas of open water, but these swims have higher energetic demands than moving over sea ice. Long distance swimming appears to be a behavioral response to declining summer sea ice conditions.

Population Dynamics of Southern Beaufort Sea & Chukchi Sea Polar Bears

Bromaghin, J. F., Douglas, D. C., Durner, G. M., Simac, K. S., & Atwood, T. C. (2021). Survival and abundance of polar bears in Alaska's Beaufort Sea, 2001–2016. *Ecology and Evolution*, *11*(20), 14250–14267. https://doi.org/10.1002/ece3.8139

In the Southern Beaufort Sea of Alaska and western Canada, sea ice extent has declined since satellite observations began in 1979, and evidence suggests that the carrying capacity of the Southern Beaufort Sea polar bears has trended lower for two decades. This study investigated the population dynamics of these polar bears from 2001 - 2016. Though polar bear abundance was comparatively stable and without sustained trend from 2006 to 2015, polar bears in the Alaska SBS were less abundant over that period than at any time since passage of the U.S. Marine Mammal Protection Act. Future reductions in carrying capacity are expected given current climate warming projections.

Regehr, E. V., Hunter, C. M., Caswell, H., Amstrup, S. C., & Stirling, I. (2009). Survival and breeding of polar bears in the southern Beaufort Sea in relation to sea ice. *Journal of Animal Ecology*, *79*(1), 117–127. https://doi.org/10.1111/j.1365-2656.2009.01603.x

Declines in Arctic sea ice impact marine mammals. This research evaluated the effects of sea ice conditions on vital rates (survival and breeding probabilities) for polar bears in the southern Beaufort Sea, finding that polar bear survival declined with an increasing number of days per year that waters over the continental shelf were ice free. Breeding rates and cub survival also declined with longer ice-free periods.

Rode, K. D., Wilson, R. R., Crawford, J. A., & Quakenbush, L. T. (2024). Identifying indicators of polar bear population status. *Ecological Indicators*, *159*, 111638. https://doi.org/10.1016/j.ecolind.2024.111638

While direct estimates of polar bear abundance are difficult to obtain due to their large home ranges in remote Arctic habitats, indicators that reflect trends in abundance can be valuable tools for supporting population monitoring. This research used relationships established from eight years (2008–2017) of data collected on 439 polar bears in the Chukchi Sea to predict

annual mean body condition and recruitment during 2018–2022. Findings suggest that the Chukchi Sea polar bear population was likely stable during this time.

Rode, K. D., Regehr, E. V., Douglas, D. C., Durner, G., Derocher, A. E., Thiemann, G. W., & Budge, S. M. (2013). Variation in the response of an Arctic top predator experiencing habitat loss: Feeding and reproductive ecology of two polar bear populations. *Global Change Biology*, *20*(1), 76–88. https://doi.org/10.1111/gcb.12339

This research compared metrics for the Chukchi Sea polar bear population in 2008–2011 with those of the Southern Beaufort Sea polar bear population, where sea ice has been associated with population declines. The study evaluated how variation in body condition and recruitment were related to feeding ecology between the two populations. The Chukchi Sea population, which experienced less sea ice loss, had better body condition and higher recruitment rates.

Please reach out to our team at info@pbears.org if you have questions about this body of research and how it relates to your offshore planning. Thank you for your consideration and for your service to our marine environments.

Sincerely,

Emily Ringer
Director of Policy
Polar Bears International
polarbearsinternational.org