

September 16, 2009

The President  
The White House  
1600 Pennsylvania Avenue NW  
Washington, DC 20500

Dear President Obama,

The Department of the Interior will soon decide what level of offshore oil and gas activity to allow in the Chukchi and Beaufort Seas off Alaska. Until September 21, Secretary of the Interior Ken Salazar is taking public comment on the 5-year oil and gas leasing program that includes a significant increase in oil and gas leasing in the U.S. Arctic Ocean. In response, over 400 Ph.D.-level scientists have joined us in signing the attached letter, urging you to take a time out from offshore industrial activity to allow for a precautionary, science-based approach that better assesses the consequences of development in a rapidly changing ecosystem.

Sincerely,

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Dear President Obama,

The Arctic is home to vibrant communities of indigenous peoples, provides vital habitat for some of the world's most iconic wildlife species, and plays a critical role in regulating the planet's climate. Despite its importance, the Arctic Ocean is one of the least-understood regions on Earth, yet large swaths of the Chukchi and Beaufort seas in the United States have been made available for leasing to oil companies. These decisions were made without sufficient scientific understanding of the consequences for a rapidly changing ecosystem and without adequate consultation with Arctic residents. We recommend using the brief window of opportunity before us to transform a headlong rush to drill into a carefully considered plan for development in a rational, science-based manner that incorporates local and traditional knowledge.

The Arctic Ocean is undergoing profound physical and biological change. Summer sea ice cover is decreasing rapidly (Nghiem et al. 2007, Stroeve et al. 2007, Richter-Menge et al. 2008), bringing a host of biological changes to the ecosystem. The most visible impacts affect ice-dependent species such as walrus, ice seals, and polar bears, which are predicted to decline while other subarctic species such as Steller sea lions and gray whales move northwards (Moore and Huntington 2008). The distribution of fish, bottom-feeding mammals and seabirds is also changing along with the structure of food webs (Mueter and Litzow 2008). Sea ice modulates the proportion of the annual spring plankton bloom that feeds fishes, birds, and marine mammals in the water column at the expense of food for a rich seafloor ecosystem. As the ice recedes, marine mammals lose their platform for hunting and reproduction at the same time as ice-dependent algal growth falls to the inaccessible abyss instead of the continental shelf, depriving the shelf community of the nourishment needed to support the food these mammals, as well as a host of other species such as crabs and sea birds.

Associated changes in ocean circulation appear responsible for the first exchanges of phytoplankton between the North Pacific and North Atlantic regions in perhaps 800,000 years (Reid et al. 2007). Changes in distributions may also affect disease vectors in both directions, posing an additional threat to species already stressed by habitat loss and other impacts (Burek et al. 2008). These changes are likely to have far-reaching impacts on Arctic marine ecosystems (Bluhm and Gradinger 2008), leaving little time for adaptation by fish, wildlife, and humans to the new conditions they will soon experience.

The changes already underway have affected coastal indigenous peoples in the region, and will have even greater effects in the future. Marine mammal hunting opportunities may decrease or be lost, with profound effects on cultures that for thousands of years have been associated with the harvest and sharing of those foods (Hovelsrud et al. 2008). In addition, the retreat of sea ice makes possible new industrial activities, such as commercial fishing, oil and gas development, and marine shipping (PAME 2009), each of which brings additional impacts on coastal communities and cultures.

We believe that the environmental impacts of oil and gas development in the waters of the U. S. Arctic are not adequately assessed and cannot yet be accurately predicted. Offshore oil and gas activity poses risks to marine mammals, sea birds and fishes from oil spills and chronic habitat degradation through noise, bottom disturbance, and pollution (AMAP 2009). Adequate technology does not exist to clean up oil spills in broken ice, and the cumulative impacts of widespread industrial activity will only grow. Taking coordinated action can help preserve the ecosystems that exist today, retaining more options for the future. Before offshore oil and gas development can take place safely and appropriately, we must have a better understanding of the ecosystem, adequate consultation with

Alaska residents in the Arctic about their needs and concerns, and adequate prevention, mitigation, and response capacity and measures.

*As scientists, we urge the President of the United States and his administration to take a science-based precautionary approach on decisions regarding the offshore oil and gas development of the U.S. Arctic Ocean. Prior to permitting any new oil and gas development, there must be thorough research, sustained monitoring, and comprehensive planning to better understand and avoid impacts and determine the best way to proceed in the U.S. waters of the Chukchi and Beaufort Seas.*

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## References

- AMAP. 2009. *Climate change updates*. Oslo: Arctic Monitoring and Assessment Program.
- Bluhm, B.A., and R. Gradinger. 2008. Regional variability in food availability for Arctic marine mammals. *Ecological Applications* 18(2) Supplement: S77-S96.
- Burek, K.A., F. Gulland, and T.M. O'Hara. 2008. Effects of climate change on Arctic marine mammal health. *Ecological Applications* 18(2) Supplement: S126-S134.
- Grebmeier, J.M., J.E. Overland, S.E. Moore, E.V. Farley, E.C. Carmack, L.W. Cooper, K.E. Frey, J.H. Helle, F.A. McLaughlin, and S.L. McNutt. 2006. A major ecosystem shift in the northern Bering Sea. *Science* 311(5766): 1461-1464.
- Harington, C.R. 2008. The evolution of Arctic marine mammals. *Ecological Applications* 18(2) Supplement: S23-S40.
- Hovelsrud, G.K., M. McKenna, and H.P. Huntington. 2008. Marine mammal harvests and other interactions with humans. *Ecological Applications* 18(2) Supplement: S135-S147.
- Laidre, K.L., I. Stirling, L.F. Lowry, Ø. Wiig, M.P. Heide-Jørgensen, and S.H. Ferguson. 2008. Quantifying the sensitivity of arctic marine mammals to climate-induced habitat change. *Ecological Applications* 18(2) Supplement: S97-S125.

- Moore, S.E., and H.P. Huntington. 2008. Arctic marine mammals and climate change: impacts and resilience. *Ecological Applications* 18(2) Supplement: S157-S165.
- Mueter, F.J., and M.A. Litzow. 2008. Sea ice retreat alters the biogeography of the Bering Sea continental shelf. *Ecological Applications* 18(2): 309-320.
- Nghiem, S.V., I.G. Rigor, D.K. Perovich, P. Clemente-Colon, J.W. Weatherly, and G. Neumann. 2007. Rapid reduction of Arctic perennial sea ice. *Geophysical Research Letters* 34: L19504.
- Overpeck, J.T., M. Sturm, J.A. Francis, D.K. Perovich, M.C. Serreze, R. Benner, E.C. Carmack, F.S. Chapin III, S.C. Gerlach, L.C. Hamilton, L.D. Hinzman, M. Holland, H.P. Huntington, J.R. Key, A.H. Lloyd, G.M. MacDonald, J. McFadden, D. Noone, T.D. Prowse, P. Schlosser, and C. Vörösmarty. 2005. Arctic system on trajectory to new state. *EOS* 86(34):309, 312-313.
- PAME. 2009. *Arctic marine shipping assessment*. Akureyri, Iceland: Protection of the Arctic Marine Environment.
- Reid, P. C., D. G. Johns, M. Edwards, M. Starr, M. Poulin, and P. Snoeijs. 2007. A biological consequence of reducing Arctic ice cover: arrival of the Pacific diatom *Neodenticula seminae* in the North Atlantic for the first time in 800,000 years. *Global Change Biology* 13:1910–1921.
- Richter-Menge, J., J. Comiso, W. Meier, S. Nghiem, and D. Perovich. 2008 Sea ice. *Arctic Report Cards*, <http://www.arctic.noaa.gov/reportcard/seaice.html>.
- Stroeve, J., M.M. Holland, W. Meier, T. Scambos and M. Serreze. 2007. Arctic sea ice decline: faster than forecast. *Geophysical Research Letters* 34: L09591.
- Walsh, J.E. 2008. Climate of the Arctic marine environment. *Ecological Applications* 18(2) Supplement: S3-S22.