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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