Open Letter to Secretary Sally Jewell, Secretary of the Department of the Interior, and Dan Ashe, Director of the U.S. Fish and Wildlife Service
Conserve Alaska's Wildlife on its National Refuges
March 28, 2016

We, the 31 undersigned biologists and scientists support the U.S. Fish and Wildlife Service's (USFWS's) proposed changes to regulations governing non-subsistence hunting on Alaska National Wildlife Refuges – proposed changes that are designed to uphold the mandates of the refuge system to conserve species and habitats in their natural diversity; to ensure the biological integrity, diversity and environmental health of the National Wildlife Refuge system; and to benefit present and future generations (USFWS 2016). While the USFWS's proposed rule would not alter federal subsistence regulations, it would uphold wildlife conservation on national refuges for some of the most iconic, yet persecuted species in North America: grizzly bears, black bears and wolves.

The Need for Regulatory Change is Clear

Because of a combination of severe winters in the late 1960s and early 1970s and high levels of hunter kills, moose and caribou numbers plummeted, leading the Alaska Board of Game (BOG) to adopt its "Intensive Management" policy, which privileges the human use of ungulates such as moose, caribou and deer over all other considerations—including maintaining sustainable wildlife populations (Miller et al. 2011, USFWS). The BOG's Intensive Management regulations require that entire populations of wolves, black bears, grizzly bears be reduced in "predator control areas", some of which occur on USFWS's public refuge lands. The predator control methods permitted by the BOG starting in 1994 include aerial gunning of wolves and bears by state agents; wolf trapping by paid agents; airborne hunting of wolves and bears by members of the public; baiting, trapping and snaring of bears; and killing wolves, coyotes and black bears and their young at den sites (USFWS 2016).

BOG's policies have resulted in widespread removals of native carnivores. According to former Alaska state biologists, the mean annual number of grizzly bears killed between 1976-1980 equaled 387 but that number jumped to 827 annually for the years 2004-2008 (Miller et al. 2011), a 113% increase. Miller et al. (2011) strongly suggest that the BOG's management is politically, not scientifically, driven and could result in widespread reductions of Alaska's grizzly bear populations. Similarly, Alaska wolf biologist Gordon Haber (1996: 1076) decried the widespread persecution of Alaska's wolves under these draconian policies and admonished the state not to forget that Aldo Leopold, a founding father of wildlife management and conservation, never "hesitate[d] to venture into the areas of overlap between biology and ethics, to distinguish between right and wrong in advocating improved management of natural systems."

Predator-Prey Ecology: Killing Predators Doesn't Boost Prey Populations for the Long Term

The best available science indicates that widespread elimination of bears, coyotes and wolves will quite unlikely make ungulate herds magically re-appear (e.g., National Research Council 1997, Bishop et al. 2009, Hurley et al. 2011, Mitchell et al. 2015). Recent Alaska-specific studies uphold this notion:

Prugh and Arthur (2015) found that wolf control in their Alaska study area led to the decline of Dall's sheep. With the loss of wolves, coyote numbers increased and they preyed upon young Dall's sheep (Prugh and Arthur 2015). This phenomenon has been documented many times in several ecosystems. Top carnivores limit the population size of smaller carnivores, which reduces overall predation pressures (Crooks and Soule 1999, Ripple et al. 2014, Wallach et al. 2015), and this natural regulation is especially important for survival of neonate ungulates such as moose and caribou (Berger et al. 2008, Prugh and Arthur 2015).

Mitchell et al. (2015) found that heavy persecution of both wolves *and* coyotes initially increased the number of Dall's sheep in their study area, but when the sheep population approached or exceeded the carrying capacity, which is a maximum population size set by the amount of forage available or "K", a severe winter (with deep snows and heavy crusting) counteracted population increases (Mitchell et al. 2015). Meanwhile in the reference area (where no predator control measures were implemented), the Dall's sheep population remained constant (Mitchell et al. 2015). In other words, natural predation on Dall's sheep was "compensatory," meaning it merely replaced mortality from weather and

starvation. These biologists caution against predator control policies as a means of increasing prey herds. Mitchell et al. (2015: 26) write:

> We note that biologists have previously attempted to manipulate moose and caribou populations in central Alaska using harvest and predator control (Boertje et al. 1996, 2009), without considering *K* (Bowyer et al. 2005). This strategy had negative results, not only for moose populations and harvest, but also for agency credibility (Young and Boertje 2011).

The newest science, including one new Alaska study, indicates that prey populations generally far exceed the biomass of their predators; the number of prey sets predator numbers (Hatton et al. 2015, Lake et al. 2015). On the other hand, the role of native carnivores is to hold prey numbers at lower levels so that they do not irrupt and then subsequently die from starvation, weather or other stochastic events (Vucetich et al. 2005, Wright et al. 2006, Mitchell et al. 2015). Yet, the effect of human persecution on carnivores is often "super additive" meaning that hunter kill rates on wolves, grizzly bears and other carnivores have a multiplier effect on the ultimate increase in total mortality over what would occur in nature due to breeder loss and pack disruption and its indirect effects including increased infanticide and decreased pup recruitment (Creel and Rotella 2010, Ausband et al. 2015, Darimont et al. 2015). With the loss of top carnivores, ecosystem structure and function is disrupted, resulting in the "trophic downgrading of planet earth" (Estes et al. 2011).

In several studies of predator-prey interactions, biologists routinely have found that human hunters, weather and climate change represent the greatest negative affects on ungulates (Vucetich et al. 2005, Wright et al. 2006). Wolves actually keep ungulates healthy (by removing the sick, weak, and old animals) (e.g., Mech 2007), limit starvation and die-off by mediating stochastic events such as prolonged drought or too deep snow on ungulate populations (Wright et al. 2006). Alaska's Intensive Management regulations prevent managers from curtailing ungulate hunters even when stochastic events like severe winters reduce ungulate populations (Miller et al. 2011).

The scientific consensus for the last several decades has generally concluded that carnivores modulate prey populations and make them more vigorous (Murie 1940, Leopold 1949, Reprint 1977, Connolly 1980, Logan and Sweanor 2001, Peckarsky et al. 2008, Callan et al. 2013, Mitchell et al. 2015), including removing the sick and weak animals which would die of other natural causes anyway (Mech 2007, Krumm et al. 2009, Monteith et al. 2014). That is why predator-control schemes are an unreliable way to increase the abundance of ungulates (Bishop et al. 2009, Hurley et al. 2011).

Understanding Ecology is Key to Protecting Alaska's Ungulates and other Wildlife for future Generations

Nutritional ecology is the science of an animal in its environment relative to its nutritional interactions (Monteith et al. 2014). Nutritional availability to ungulates affects their behaviors (including reproduction and recruiting new members to the herd). Nutritional ecology also incorporates how climate (e.g., the amount of precipitation), stochastic weather events and predation effect ungulate demographics (Monteith et al. 2014).

The scientific literature is clear that food resources ultimately limit the numbers of large herbivores (e.g., Monteith et al. 2014, Mitchell et al. 2015). Ungulate survival is absolutely reliant on their ability to gain access to adequate nutrition—but that nutrition can be hindered by a myriad of causes. In Alaska, migration is an important means for ungulates to obtain better nutrition and avoid predation (White et al. 2014), but oil fields and roads inhibit connectivity between subpopulations of ungulate herds, creating genetic divisions and limiting reproduction (Haskell et al. 2006, Wilson et al. 2015). The oilfields in Alaska, with their constant vehicular movement and vehicle-animal collisions, are harmful to caribou reproduction (Haskell et al. 2006). A warming planet is leading to the decline of both caribou and reindeer, which harms northern indigenous peoples (Vors and Boyce 2009).

Ungulate populations in portions of the United States have experienced declines over the latter part of the last century because of habitat loss or fragmentation, changes in forage quality, competition with invasive ungulates, predation, disease, hunting, poaching, stochastic weather events, fire suppression, noxious weeds, competition with domestic livestock, energy development, and changes in hydrology caused by global warming—including changes in snow pack and temperature (e.g., Forrester and Wittmer 2013, Monteith et al. 2014). Ungulate declines are not unique to Alaska.

Alaska's Wildlife is Highly Valued by Majorities of Alaskans and the State's Visitors

In addition to their ecological value, recent research suggests that most people believe that wildlife possess intrinsic value (Bruskotter et al. 2015a, Vucetich et al. 2015). From a policy perspective, the notion that wildlife possess intrinsic value suggests that "wildlife deserve to be treated with regard for their own welfare, not just their utility (or lack thereof) for humans" (Bruskotter et al. 2015b).

A majority of the 1,399 statewide Alaskan voters polled by Remington Research Group (2016) from Feb. 24 to Feb. 25, 2016, showed that voters strongly support an end to methods used to kill Alaska wildlife: Voters opposed 1) bear baiting (50% oppose vs. 39% support); 2) the practice of killing wolves, coyotes and bears at den sites when they are with their dependent young (63% oppose vs. 30% support); 3) trapping of bears (58% oppose vs. 37% support); and 4) aerial gunning bears or using aircraft to scout bears from the air and then land and shoot them (59% oppose vs. 35% support) (Remington Research Group 2016).

Furthermore, data from the USFWS show that wildlife watchers outnumber hunters in Alaska by a factor of five (640,000 wildlife watchers vs. 125,000 hunters) and wildlife watchers spend much more money in their pursuits, too (over $2 billion vs. $4.3 million annually) (USFWS 2011). Wildlife-watching dollars benefit local economies (Duffield et al. 2008).

In conclusion, the most current and best available science is clear that predator control measures intended to restore ungulate herds such as moose and caribou are doomed to failure because herds need access to adequate nutrition—their main limiting factor. Alaska's many-decades program of statewide carnivore persecution has failed to yield more ungulates for human hunters. Furthermore, the methods of predator persecution are seen as problematic by a clear majority of Alaska's citizens. The USFWS must incorporate more humane values along with biological considerations, because in addition to being scientifically wrong, Alaska's Intensive Management scheme is the wrong approach to conserving natural systems. Alaska's wildlife need refuge from the BOG. For those reasons, we support the USFWS's proposal to restrict harmful predator control practices on the Alaska's treasured National Wildlife Refuges.

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