

PROPOSAL: - 5 AAC 92.510. Areas closed to hunting; and 5 AAC 92.550. Areas closed to trapping. Prohibit the taking of wolf in a portion of Unit 20C as follows:

Within Game Management Unit 20C; those portions of UCU 0607 and 0605 west of George Parks Highway and bounded by Denali National Park on three sides, is closed to the taking of wolves by hunting from February 1 to July 31 and by trapping from February 1 to October 31 (Figure 1).

ISSUE:

In Alaska, wolves are among the most desired species for viewing (Shea & Tankersley 1991), and state wildlife management includes mandates to provide for multiple uses, including non-consumptive uses such as wildlife viewing (Alaska Department of Fish and Game 2006). Wildlife viewing also brings an important socio-economic benefit to the state of Alaska, with wildlife viewing activities in Alaska supporting over \$2.7 billion dollars in economic activity in 2011. Forty percent of visitors to Alaska reported hoping to view wild wolves during their visit. (ECONorthwest 2012).

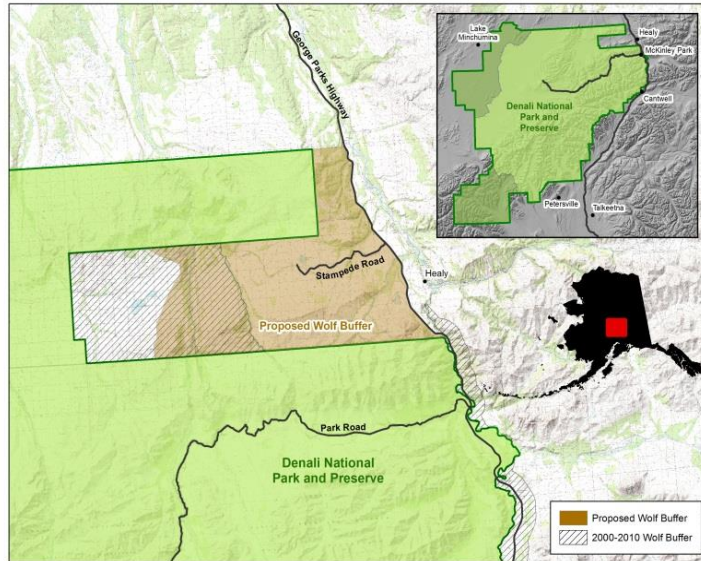


Figure 1. Location of the proposed seasonal closure to wolf trapping and hunting in GMU 20 adjacent to Denali National Park, the former (2000-2010) buffer is displayed for comparison).

More than anywhere else in Alaska, wolves in the eastern region of Denali National Park (Denali), provide significant wolf viewing opportunities as visitors travel along the Park Road. Denali is recognized as one of the best places in the world for people to see wolves in the wild and several thousand park visitors may see wolves in a given year. In addition, viewing large carnivores, particularly wolves and grizzly bears, is a main indicator of a satisfying visitor experience in Denali National Park (Manning & Hallo 2010).

Wolf viewing opportunities in Denali are primarily provided by one to three packs of wolves that center their activity near the Park Road during the summer months (Figure 2). Analysis of 12 years of data from the National Park Service GPS radio collars shows that these same wolf packs that provide the majority of wolf sightings during the visitor season show a seasonal shift in habitat use, increasing their use of areas just outside of the boundary of the park during the winter and spring (Figure 2). Wolves that frequent the Park Road are accustomed to the presence of humans and may be particularly vulnerable to harvest and even older breeding wolves are more susceptible to being trapped or shot. Harvest of wolves, particularly breeding wolves, has the potential to decrease wolf numbers, alter wolf behavior, and decrease opportunities for wolf viewing by park visitors. Borg et al. (2016) documented that the probability for wolf sighting during the period a buffer was in place was twice that of the periods when the buffer was absent. While wolf harvest just outside the northeastern boundary of the park may have little effect on

regional scale wolf populations, it can have significant effects on wolf packs whose territories intersect the Park Road and on the experience of Denali’s visitors.

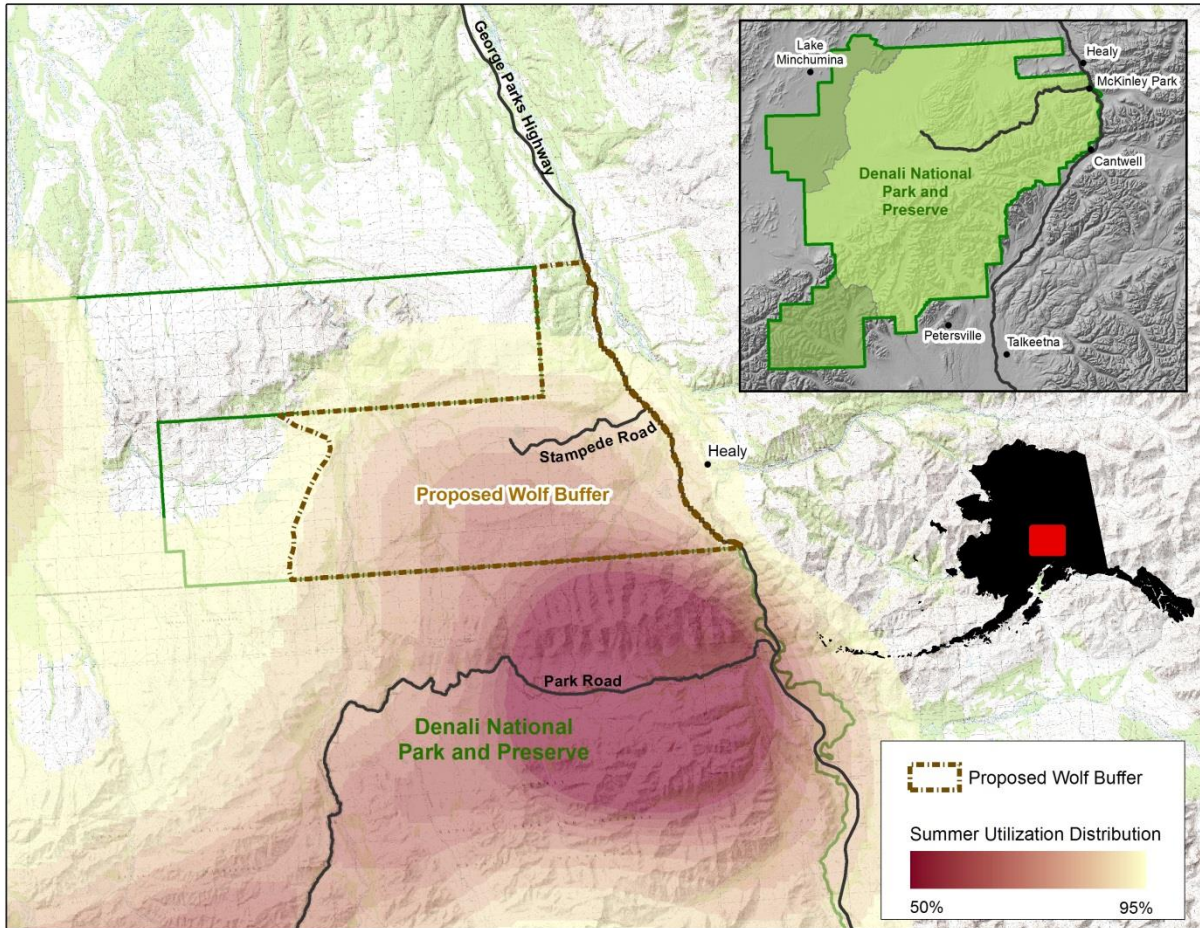


Figure 2. Density of radio collared wolf locations during May - September, 2004-2015 in the northeast corner of Denali National Park and Preserve in interior Alaska, USA.

From 2000 to 2010, the Alaska Board of Game (AKBOG) approved the closure of certain areas adjacent in the Stampede Corridor to the park boundary to wolf hunting and trapping year round in order to protect wolf viewing opportunities in the park (Figure 1). In 2010, members of the AKBOG requested more information and research into the relationship between harvest of wolves in the Stampede corridor and wolf sightings within DNPP (“Unit 20C Wolf Closure Proposals” 2010). In September 2010, the National Park Service, with collaboration from the Alaska Department of Fish and Game embarked on a 5 year study of the relationship of wolf harvest adjacent to the park boundaries on wolf population and pack dynamics and on wolf viewing opportunities (Borg 2015).

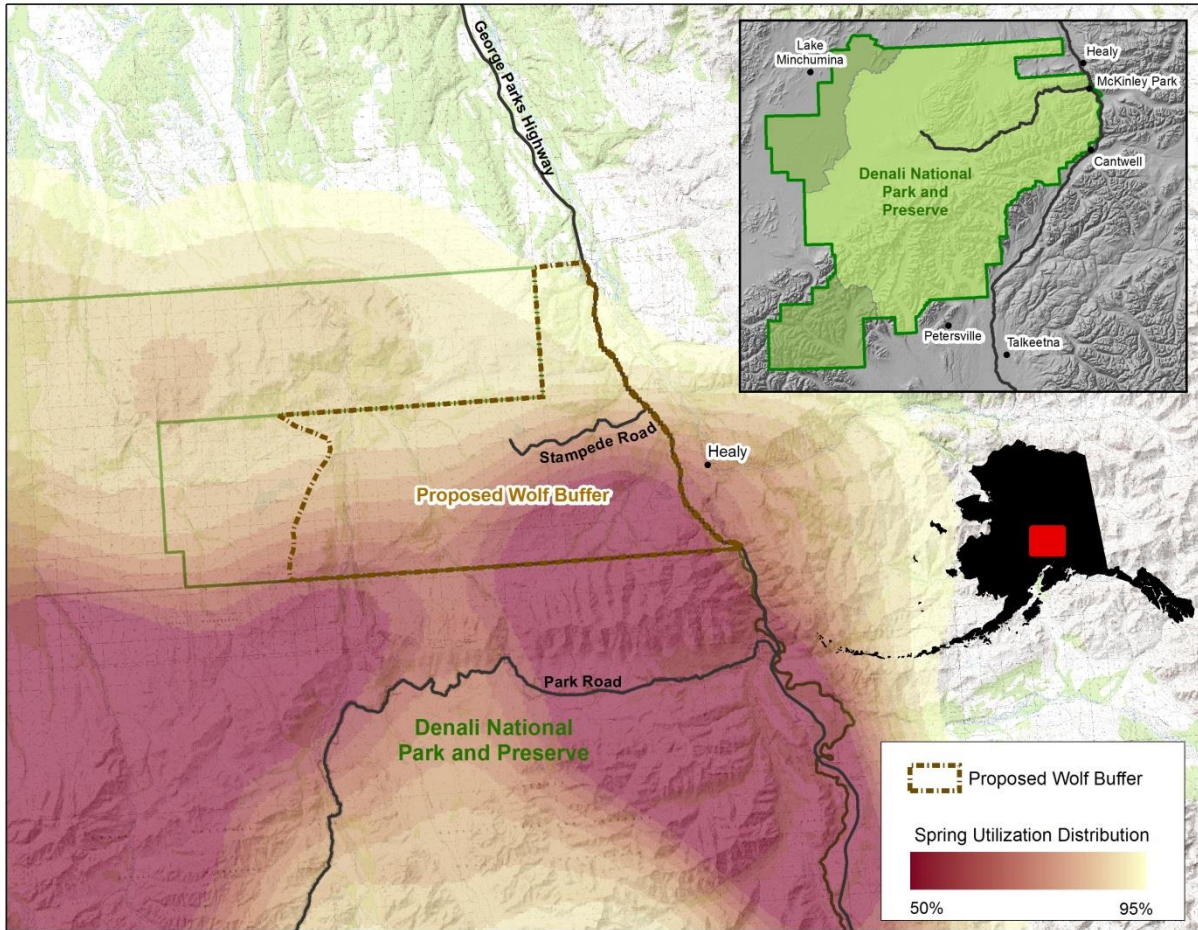


Figure 3. Density of radio collared wolf locations during February - April, 2004-2015.

Based on this research, we found that the presence of the trapping and hunting buffer zone during 2000-2010 was associated with increased wolf sightings in Denali National Park compared to 2011-2013 and 1997-2000 (Borg et al 2016). Both the wolf population size and an index measuring the number of wolves denning near the park road, which were strongly associated with increased wolf sightings, were also greater during the period when the buffer zone was in place. Thus, the presence of the buffer may have increased local population size and the likelihood that wolves would den near the park road. Alternatively, the increase in sightings may have been a result of coincidental peaks in population size or the number of wolves denning near the park road as a result of variables not measured or explicitly included in our analysis. However, we note that the two natural variables generally considered to be strong drivers of wolf population dynamics (prey density and snow conditions, which influence prey vulnerability to wolf predation (Mech *et al.* 1998) were relatively consistent during the period of our study with no statistically significant differences (Adams & Roffler 2010; Owen & Meier 2009; Schmidt & Rattenbury 2013; Western Regional Climate Center 2015).

It should also be noted that the presence of the buffer did not decrease the average annual number of wolves harvested in UCUs overlapping the Stampede corridor (UCUs 502, 605, 607), in fact harvest was higher during the years the buffer was in place (Alaska Department of Fish & Game 2013); note the these UCUs extend beyond the buffer area. During the presence of the

buffer zone, harvest of wolves adjacent to DNPP (7 ± 11.25 SE) was on average greater than during the period without the presence of the buffer zone (2.6 ± 4.3). Simultaneously the buffer was associated with substantially increased wolf sightings (Borg et al 2016). Therefore, it is reasonable to conclude that closure of wolf hunting and trapping in an area within the Wolf Townships would present the optimal solution in meeting both consumptive and non-consumptive objectives of state and federal management agencies, and benefit about 400,000 visitors to Denali NPP with potentially a greater likelihood of observing wild wolves.

We recognize that it is possible that the higher wolf population size, higher harvest levels and increased sightings during the buffer years were coincidental and not related to the buffer itself but some other unknown factor(s). Resolving this uncertainty would require additional years of monitoring the response of the system with a new buffer zone in place. The NPS will continue to monitor the wolf population and wolf viewing index to assess several factors (including the efficacy of the buffer, if enacted) that may affect wolf viewing opportunities in the park.

It has been suggested that given the large number of Alaska's visitors that view wildlife along the Denali Park Road and the relatively small number of wolf trappers and hunters active in the Stampede Corridor, that the seasonal closure of the Corridor to wolf harvest is a negative impact for a few with a positive outcome for many (Mowry 2013). Indeed, annually well over 400,000 people visit DNPP (Fix, Ackerman & Fay 2012), while the numbers of active trappers in the Stampede Corridor is between 1-3 in any given year (Alaska Department of Fish and Game 2013). However, the NPS recognizes the impact of the closure to the lifestyle and livelihood of these trappers may represent a significant trade-off.

WHAT WILL HAPPEN IF NOTHING IS DONE?

Wolves from the most commonly viewed packs will continue to be trapped and hunted just outside of park boundaries, in places as close as four miles from the park road. This will result in continued disruption of wolf packs in the areas where wolves are seen by Alaska's visitors, a decrease in wolf numbers along the park road, possible loss of packs that frequent the park road (Borg 2015, Borg et al 2016) and decreased opportunities for wolf viewing.

WILL THE QUALITY OF THE RESOURCE HARVESTED OR THE PRODUCTS PRODUCED BE IMPROVED?

This proposal would help to protect and improve the opportunities for Alaskans and others to see wolves along the Denali Park Road. It would have a small effect on the number of wolves harvested in a portion of GMU 20C.

WHO IS LIKELY TO BENEFIT?

- Visitors who come to Alaska to see a diversity of wildlife (about 400,000 annually).
- Tour operators and the Alaska tourism industry that promote and provide wildlife viewing tour products.
- People who value the concept of conservation areas for wildlife.

WHO IS LIKELY TO SUFFER?

Trappers and hunters who wish to harvest wolves in the 152 square mile area that we are proposing to close within the Stampede Corridor. Over the last 20 years, the average number of

different individuals harvesting a wolf from this area is less than 2 people per year. This proposed change may impact the lifestyle or livelihood of a few trappers who use the area.

Within the proposed closed area, under this proposal, wolf hunting would be open from August 1 to January 31, and wolf trapping would be open from November 1 to January 31. Within the proposed buffer, this proposal curtails the wolf hunting season by 29% and the wolf trapping season by 50% of the days.

OTHER SOLUTIONS CONSIDERED?

Including UCU-502 in Game Management Area 20C was considered. Limiting harvest in a larger area that included the western most UCU within the Stampede Corridor, which has a much lower density of use by wolves than in UCUs 605 and 607 (over the last 12 years) was considered. This would have limited harvest opportunity with only a moderate reduction in risk to wolves.

Closing the entire wolf hunting and trapping season within the buffer was also considered. Wolves' reproductive capacity and pack structure is most vulnerable to disruption during the breeding season (Borg et al 2015). Packs that lose breeders during the breeding season are more likely to disband. Therefore, we chose to submit a proposal where the buffer is implemented during the proestrus and the breeding season. Wolves in DNPP typically come into oestrus in March (Mech et al. 1998) and give birth in early May following a 2 month gestation (Hayssen & van Tienhoven 1993). There is a prolonged period of proestrus in grey wolves of about 6 weeks (Asa & Valdespino 1998) during which the mated pair spends time together coordinating their activity, and this period appears important for the formation and maintenance of the pair bond (Mech & Knick 1978; Rothman & Mech 1979). We therefore define the breeding season and spring as February–April.

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LOG NUMBER:

References

Adams, L. G., & G. H. Roffler. 2010. Dynamics of the Denali Caribou Herd, Denali National Park, Alaska: progress report (October 2008 - September 2009).

Alaska Department of Fish and Game. Alaska Department of Fish and Game Hunting and Trapping data. Fairbanks, AK; 2013

Asa, C.S. and Valdespino, C., 1998. Canid reproductive biology: an integration of proximate mechanisms and ultimate causes. *American Zoologist*, 38(1), pp.251-259.

Borg B. L. 2015. Effects of harvest on wolf social structure, population dynamics and viewing opportunities in National Parks. Doctoral Dissertation. University of Fairbanks, Alaska.

Borg B. L., Brainerd S.M , Meier T. J., Prugh L. R. 2015. Impacts of breeder loss on social structure, reproduction and population growth in a social canid. *J Anim Ecol.* 84: 177–187. doi:10.1111/1365-2656.12256

Borg B. L., Arthur S. M., Bromen N. A., Cassidy K. A., McIntyre R., Smith D. W. 2016. Implications of Harvest on the Boundaries of Protected Areas for Large Carnivore Viewing Opportunities. *PLoS ONE* 11(4): e0153808. doi:10.1371/journal.pone.0153808

ECONorthwest 2014. The Economic Importance of Alaska's Wildlife in 2011: Summary Report, Alaska Department of Fish and Game.

Fix, P. J., Andrew Ackerman and Ginny Fay, 2013, 2011 Denali National Park and Preserve Visit Characteristics. Natural Resource Technical Report NPS/AKR/NRTR—2013/669. National Park Service, Fort Collins, Colorado.

Hayssen, V.D., Van Tienhoven, A. and Van Tienhoven, A., 1993. Asdell's patterns of mammalian reproduction: a compendium of species-specific data. Cornell University Press.

Manning, R. E., and J. C. Hallo. 2010. In Focus: Denali Park Road: The Denali Park Road experience: Indicators and standards of quality. *Park Science* 27(2):33–41.

Mech, L.D. and Knick, S.T., 1978. Sleeping distance in wolf pairs in relation to the breeding season. *Behavioral Biology*, 23(4), pp.521-525.

Mech, L. D. et al. 1998. *The Wolves of Denali*. Minneapolis, Minnesota: University of Minnesota Press.

Rothman, R.J. and Mech, L.D., 1979. Scent-marking in lone wolves and newly formed pairs. *Animal behaviour*, 27, pp.750-760.

Shea, L., & N. Tankersley. (1991). Wildlife watching and Alaska's tourism potential. *Alaska's Wildlife. Alaska Department of Fish & Game. Juneau*,23(2).

Mowry, T. 2013. Study: Wolf Viewing Down Sharply in Denali National Park. [Fairbanks Daily News Miner](#). Fairbanks, Alaska.

Owen, P. A. and Thomas J. Meier. 2009. 2008 Aerial Moose Survey, Denali National Park and Preserve.

Schmidt, J. H., & K.L. Rattenbury. 2013. Reducing Effort While Improving Inference: Estimating Dall's Sheep Abundance and Composition in Small Areas. *The Journal of Wildlife Management*, 77(5), 1048-1058. doi:10.1002/jwmg.557

Western Regional Climate Center. Cooperative Climatological Data Summaries [Internet]. 2015 [cited 5 Mar 2015]. Available: <http://www.wrcc.dri.edu/climatedata/climsum/>