

Wolf Monitoring In Denali National Park and Preserve, 2014 - 2015

By Steve Arthur

Denali National Park and Preserve's wolves have been studied by researchers since 1939. Population estimates were not very accurate until 1986, when a large-scale wolf research project was initiated by David Mech and others. This project provided basic information necessary for effective wolf management. The current monitoring program consists of maintaining one or two radio-collared wolves in each known pack inhabiting the park north of the Alaska Range. Radio-collared wolves are located about twice per month, with additional locations during late September to early October to determine fall pack sizes and to count pups, and during March to determine late winter pack sizes. Telemetry locations acquired over one year (April—March) are used to determine the area of each pack territory. Counts of wolves in these packs and the area encompassed by the combined pack territories are used to estimate abundance and density of wolves. In addition, monitoring data are used to determine wolf movements, den locations, mortality factors, behavior, and population dynamics.

During 2014 – 2015, we monitored a total of 20 radio-collared wolves from 10 packs with territories at least partly within Denali (Figure 1). Two types of collars were used. Four wolves wore conventional VHF radio collars. Another 16 wolves carried GPS collars that determine the animal's location one or more times per day and transmit the data through the ARGOS satellite system.

In March 2015, the 10 marked packs included 47 wolves, and their combined territories covered an area of 18,820 square kilometers. An additional lone wolf was collared in March 2015, and tracks of an uncollared pack of at least 4 wolves were also detected. The total of 52 wolves (including the uncollared pack) counted in March 2015 produced an estimated density of 2.8 wolves per 1,000 square kilometers, which is the lowest density estimate since monitoring began in 1986 (Table 1). The increased use of GPS collars during the past 10 years has improved our ability to estimate territory size, and consequently the estimate of the combined area occupied by wolves in our study area has generally increased. This partly explains why the current density estimate is low. However, the number of wolves actually counted each year has also declined, despite similar levels of monitoring effort, so it appears that the population has declined from levels seen during 2001 – 2003 (5.6 – 6.4 wolves per 1,000 square kilometers). Causes of the population decline are unknown, although several factors may be involved. These include low snowfall during the past several winters, which has reduced the vulnerability of caribou and moose to wolf predation, relatively poor pup recruitment, and mortality of wolves from both human and natural causes.

In 2014, at least 6 of the 10 collared packs denned and produced a minimum of 14 pups that survived until fall. One young male wolf from the East Fork pack, collared in December 2013, dispersed over 200 miles from Denali, eventually settling down in Yukon-Charlie National Preserve. Details of this trip were posted on the Murie Science and Learning Center's Research Highlights web site at: <http://www.nps.gov/articles/wolf-dispersal.htm>. Nine collared adult wolves died during 2014 – 2015; two were killed by other wolves, one died of apparent old age, one drowned, one starved, and one was legally shot by a trapper outside the park. Cause of death could not be determined for two wolves, although there was no evidence of human involvement. One young male wolf died during late February 2015, after becoming caught in a snare set

outside the park. The wolf was able to break free from the snare's anchor wire and return to the park, but subsequently died due to blood loss caused by the snare. The Iron Creek East pack disappeared after both collared adult wolves died in September 2014. The breeding female died of starvation and her mate subsequently dispersed eastward. He evidently drowned while crossing the Toklat River, which was swollen from recent heavy rains. A new pair was located and radiocollared in the range previously occupied by this pack during March 2015. This pair was dubbed the Myrtle pack.

During early March 2015 we captured and radiocollared 13 wolves. These included 11 new wolves and 2 collared wolves that were recaptured to replace their radiocollars. Five of the new wolves were young males. These were equipped with newly-developed collars that include three-dimensional accelerometers, which enable researchers to determine the animals' activity (e.g., running, walking, resting) as well as their locations. One of the new captures, a lone male wolf, exhibited an abnormal condition known as follicular dysplasia, also known as "poodle coat". This condition is characterized by loss of the long guard hairs from much of the wolf's body, resulting in a wooly appearance due to the dense, short underfur that remains. This wolf died approximately March 31, evidently due to starvation. As of early May 2015, 3 additional wolves were known to have died. One of these was a collared male that was killed by other wolves. The others were a collared male and an uncollared female from the East Fork pack that were legally shot by a hunter outside of the park near the Stampede Trail. GPS data provided by the male wolf's collar indicated that he had spent most of the week before his death scavenging at a bait station established by a bear hunter within a mile of the location where he was shot.

Wolf Viewing Project

By Bridget Borg

From 2000 until 2010, the State of Alaska prohibited wolf hunting and trapping in two areas bordering the park, the Stampede and Nenana Canyon Closed Areas, in order to protect two of the park's three most-commonly viewed wolf packs. At the spring 2010 meeting of the Alaska Board of Game, the National Park Service submitted a proposal to extend the eastern boundary of the Stampede Closed Area. Instead, the Board of Game decided to eliminate both closed areas and allow hunting and trapping wolves in all areas bordering the park.

In 2010, Denali National Park and the University of Alaska Fairbanks, with the cooperation of the Alaska Department of Fish and Game, began a study of wolf movements, wolf survival, and wolf viewing opportunities along the Denali Park Road. This study is investigating a variety of factors that might influence sightings of wolves on the park road including;

- Wolf abundance
- Harvest of wolves outside of park boundaries
- Den location
- Pack size and composition (adults, pups, etc.)
- Individual behavior
- Pack social structure
- Pack proximity to the road

During the course of the study in 2012, the death of a breeding female from a pack that lived along the Denali Park Road was followed by a drop in wolf sightings. This was one of several instances where the death of an individual wolf, from legal trapping or hunting, sparked widespread media attention and concern in recent years. In order to improve our understanding of the implications of breeder mortality, we looked at changes in wolf pack fate, reproduction, and population growth following the death of breeders using data collected on 70 packs during the long-term study of wolves in Denali National Park. We published our findings in *Journal of Animal Ecology*:

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. *Journal of Animal Ecology*, 84, 177–187

We found that breeder loss preceded or coincided with most documented cases of wolf pack dissolution (when a pack disbanded or was no longer found). However, the death of a breeding individual did not always lead to the end of a pack. In approximately two out of three cases where a breeder died, the pack continued. The sex of the lost breeder and the pack size prior to loss were important factors explaining pack fate following the death of a breeder as the probability of a pack continuing was less if a female died or if the pack was small prior to the death. The analysis also suggested that the death of a breeder had a greater influence if the wolf died during the pre-breeding or breeding season. Human-caused mortality rates were highest during the winter and spring, which correspond to the pre-breeding and breeding seasons for wolves such that harvest may lower the odds of pack survival because of this timing, especially when pack sizes are small. However, higher rates of breeder mortality and pack dissolution did not correspond to lower population growth, indicating that the wolf population was resilient to the loss of breeding individuals at a population level. Wolves may compensate for the death of breeders in a variety of ways, such as rapid replacement of breeders or increased reproductive success the following year.

Additionally, as part of this study, we developed and report an annual wolf sighting index, which is a measure of how often observers on westbound trips to Eielson Visitor Center saw a wolf in a given year. We present the index in recent years using only trips by experienced observers (Table 1). We believe that changes in this index are a good indicator of how overall chances of seeing a wolf might change over time; however, these rates should not be interpreted as a direct estimate of a visitor's chances of seeing a wolf in any given year.

**Table 1. Wolf Survey Data, Spring (approx. 15 March)
Denali National Park and Preserve, 1986-2015**

YEAR	NUMBER OF PACKS MONITORED	TOTAL WOLVES IN PACKS MONITORED	MEAN PACK SIZE	COMBINED AREA OF MONITORED PACKS (KM ²)	ESTIMATED DENSITY: WOLVES / 1000 KM ²	POPULATION ESTIMATE INSIDE THE PARK*	WOLF VIEWING INDEX**
1986	4	26	6.5	7,380	3.523	61	
1987	8	37	4.6	12,125	3.052	53	
1988	14	69	4.9	15,355	4.494	78	
1989	13	98	7.5	16,810	5.830	101	
1990	10	106	10.6	13,930	7.609	131	
1991	13	111	8.5	14,275	7.776	134	
1992	15	103	6.9	13,620	7.562	131	
1993	12	68	5.7	9,900	6.869	119	
1994	10	61	6.1	11,145	5.473	95	
1995	12	59	4.9	12,120	4.868	84	
1996	11	69	6.3	12,640	5.459	94	
1997	11	78	7.1	13,080	5.963	103	
1998	12	61	5.1	13,121	4.649	80	
1999	13	69	5.3	12,699	5.433	94	
2000	17	71	4.2	14,378	4.938	85	
2001	16	87	5.4	13,802	6.303	109	
2002	15	73	4.9	13,026	5.604	97	
2003	18	75	4.2	11,682	6.420	111	
2004	14	78	5.6	16,061	4.856	84	
2005	15	66	4.4	14,630	4.511	78	
2006	15	103	6.9	15,367	6.703	116	
2007	16	93	5.8	17,439	5.333	92	
2008	20	99	5.0	17,757	5.575	96	
2009	16	65	4.1	16,607	3.914	68	
2010	12	59	4.9	17,061	3.458	60	0.45
2011	10	71	7.1	17,994	3.946	68	0.21
2012	10	70	7.0	18,340	3.817	66	0.12
2013	11	49	4.5	15,473	3.187	55	0.04
2014	10	51	5.1	17,640	2.891	50	0.06
2015	12	52	4.3	18,820	2.763	48	Unavailable

*Population estimate = wolf density x available habitat.

**Viewing index = proportion of westbound trips where wolves were observed.

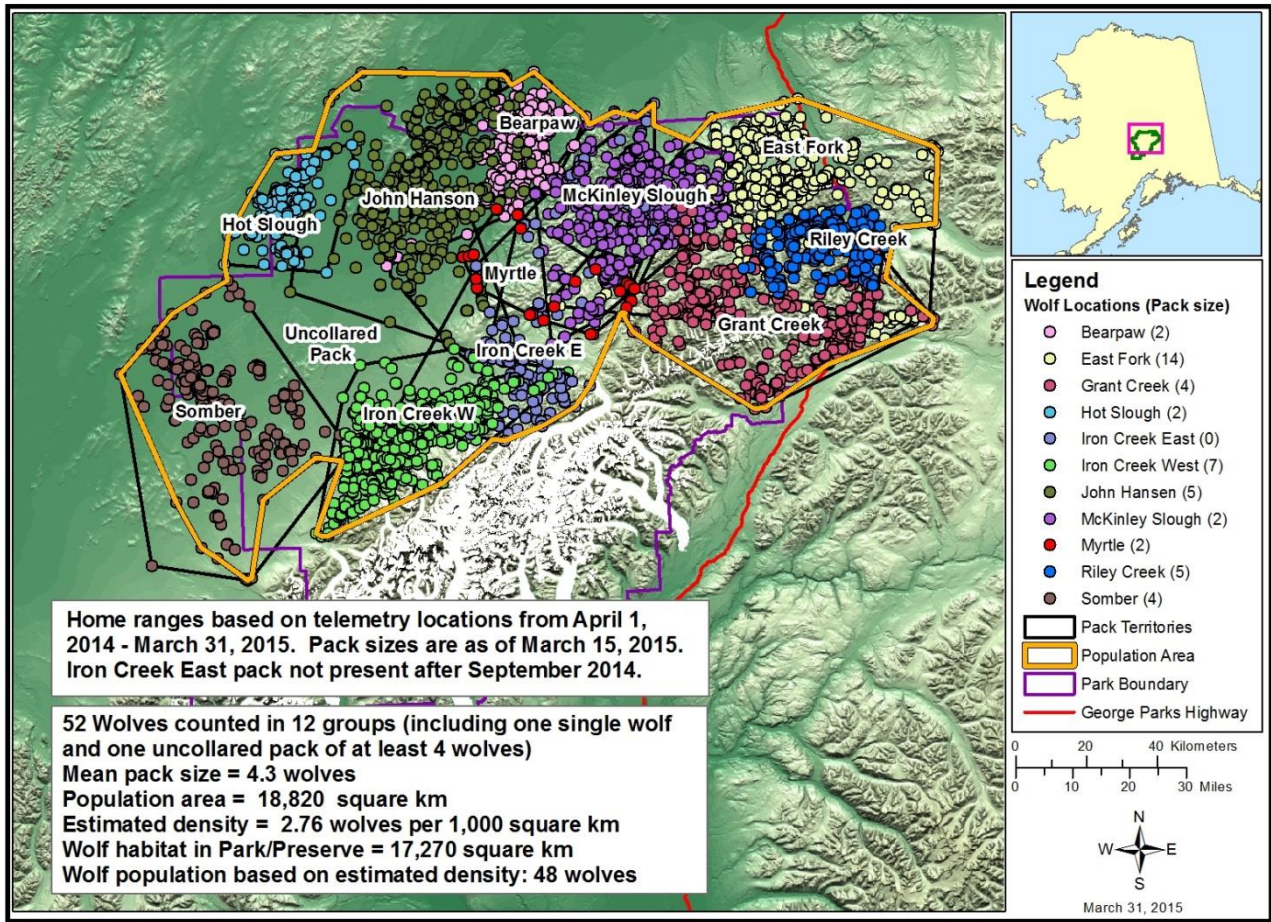


Figure 1. Wolf pack territories in Denali National Park and Preserve, March 2015.