

**From:** Nate Turner  
**Sent:** Friday, February 27, 2015 4:23 PM  
**To:** Dale, Bruce W (DFG); 'Ted Spraker'; Tibbles, Kristy R (DFG)  
**Subject:**

Hi All,

I recently attended the Denali SRC meeting – which was held in Fairbanks this time. Steve Arthur, the Denali head scientist gave an update on wolf populations and had provided some documentation for the SRC to review. I have attached these NPS documents for your review, since we will be addressing a request for emergency closures at the March Southcentral meeting. Mr. Arthur noted that human harvest is low and infrequent near Denali boundaries, and that their most viable and healthy populations continue in the Northeast sections – where the findings of emergency are requested by the Alaska Wildlife Alliance. He has recently documented some wolf losses that appear to be related to starvation – a theory that previously was not confirmed - in the Northwest portion of the park, and believes this correlates to low prey populations and also unfavorable hunting conditions for wolves in recent years.

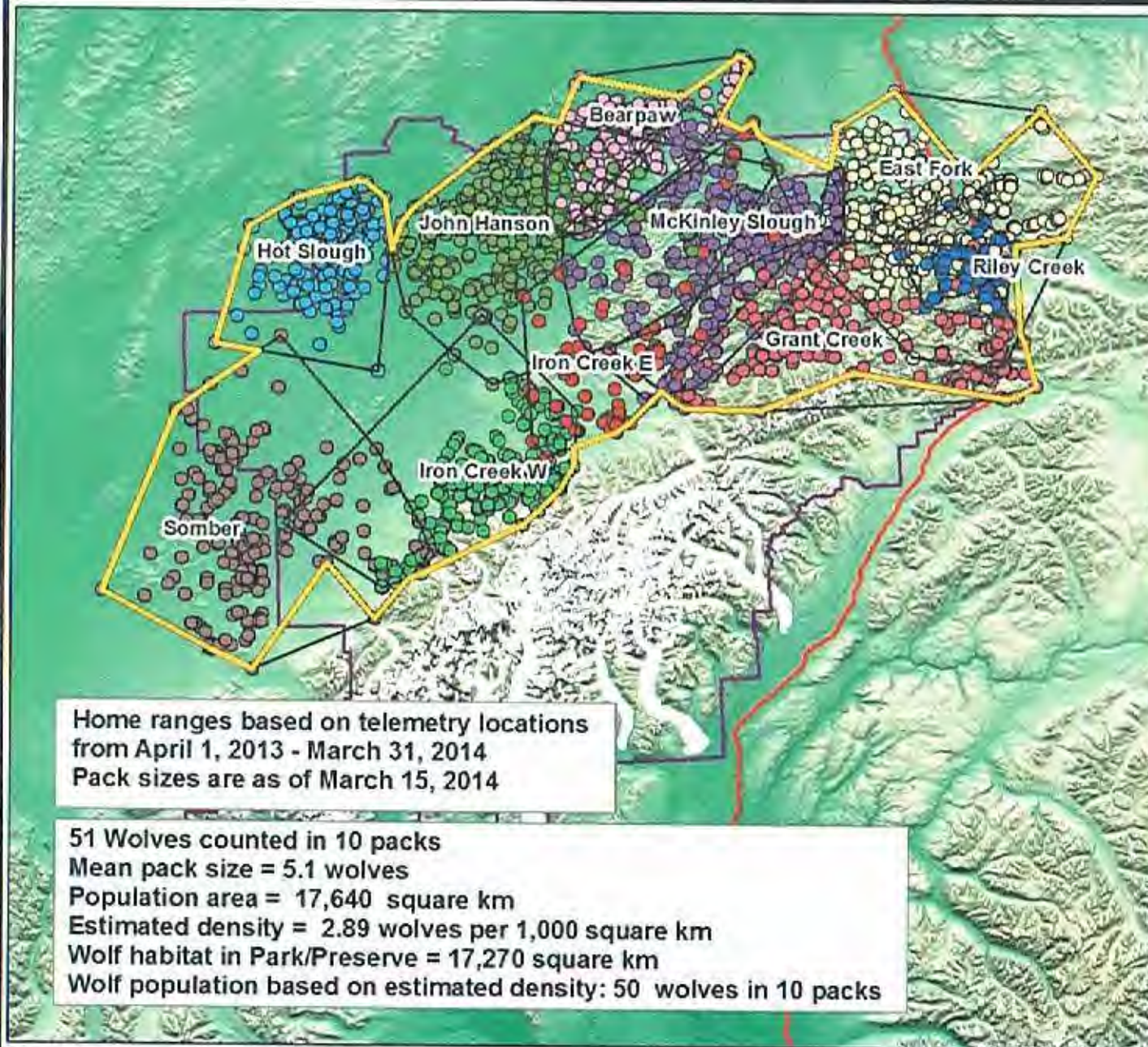
Steve Arthur also referenced a recent study, which indicates that specific removals of certain wolves can and has caused temporary pack disruptions, which have recovered by the next breeding season each time, and that these disruptions very likely did have a temporary and limited effect of viewing potential for the affected packs. The Park did not seem to be concerned by these random disruptions, especially since they were related to legal harvests on state lands.

The Park, as represented by comments by the “new” superintendent Don Striker, seems to be determined to maintain neutrality on these issues and did not express any concerns to the SRC related to human caused mortalities.

All the Best,  
Nate

# Spring 2014 Wolf Population Estimate

National Park Service  
U. S. Department of the Interior  
Denali National Park and Preserve



**Legend**

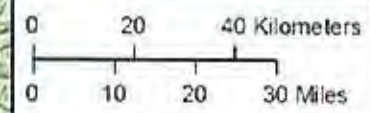
**Wolf locations (Pack size)**

- Bearpaw (1)
- East Fork (15)
- Grant Creek (7)
- Hot Slough (3)
- Iron Creek East (4)
- Iron Creek West (6)
- John Hansen (7)
- McKinley Slough (4)
- Riley Creek (2)
- Somber (2)

Population Area  
 Pack Territories  
 Park Boundary  
 George Parks Highway

Home ranges based on telemetry locations from April 1, 2013 - March 31, 2014  
Pack sizes are as of March 15, 2014

51 Wolves counted in 10 packs  
Mean pack size = 5.1 wolves  
Population area = 17,640 square km  
Estimated density = 2.89 wolves per 1,000 square km  
Wolf habitat in Park/Preserve = 17,270 square km  
Wolf population based on estimated density: 50 wolves in 10 packs



March 15, 2014



## Wolf Survey Data, Spring (approx. 15 March) and Fall (approx. 1 October), Denali National Park and Preserve, 1986-2014

YEAR	NUMBER OF PACKS MONITORED		TOTAL WOLVES MONITORED		MEAN PACK SIZE		COMBINED AREA OF MONITORED PACKS		ESTIMATED DENSITY: WOLVES/1000KM2		POPULATION ESTIMATE INSIDE THE PARK*	
	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL
1986	4	4	26	22	6.5	5.5	7,380	8,180	3.52	2.69	61	46
1987	8	9	37	70	4.6	7.8	12,125	13,150	3.05	5.32	53	92
1988	14	14	69	121	4.9	8.6	15,355	14,670	4.49	8.25	78	142
1989	13	11	98	127	7.5	11.5	16,810	15,240	5.83	8.33	101	144
1990	10	11	106	136	10.6	12.4	13,930	13,930	7.61	9.76	131	169
1991	13	13	111	137	8.5	10.5	14,275	14,275	7.78	9.6	134	166
1992	15	15	103	120	6.9	8	13,620	13,620	7.56	8.81	131	152
1993	12	12	68	93	5.7	7.8	9,900	9,900	6.87	9.39	119	162
1994	10	12	61	72	6.1	6	11,145	11,145	5.47	6.46	95	112
1995	12	11	59	80	4.9	7.3	12,120	12,045	4.87	6.64	84	115
1996	11	11	69	104	6.3	9.5	12,640	12,775	5.46	8.14	94	141
1997	11	12	78	75	7.1	6.3	13,080	12,808	5.96	5.86	103	101
1998	12	12	61	68	5.1	5.7	13,121	12,578	4.65	5.41	80	93
1999	13	15	69	80	5.3	5.3	12,699	12,699	5.43	6.3	94	109
2000	17	18	71	112	4.2	6.2	14,378	14,554	4.94	7.7	85	133
2001	16	18	87	91	5.4	5.1	13,802	13,802	6.3	6.59	109	114
2002	15	14	73	86	4.9	6.1	13,026	12,226	5.6	7.03	97	121
2003	18	11	75	84	4.2	7.6	11,682	11,682	6.42	7.19	111	124
2004	14	14	78	78	5.6	5.6	16,061	14,630	4.86	5.33	84	92
2005	15	15	66	106	4.4	7.1	14,630	15,367	4.51	6.9	78	119
2006	15	17	103	111	6.9	6.5	15,367	17,439	6.7	6.37	116	110
2007	16	20	93	147	5.8	7.4	17,439	17,757	5.33	8.28	92	143
2008	20	14	99	86	5	6.1	17,757	16,607	5.58	5.18	95	89
2009	16	15	65	89	4.1	5.9	16,607	17,061	3.91	5.22	68	90
2010	12	11	59	88	4.9	8	17,061	17,994	3.46	4.89	60	84
2011	10	8	71	75	7.1	9.4	17,994	17,994	3.95	4.17	68	72
2012	10	9	70	57	7	6.3	18,340	18,340	3.82	3.11	65	54
2013	11	12	49	67	4.5	5.6	15,473	15,473	3.19	4.33	55	75
2014	10	10	51	51	5.1	5.1	17,640	17,640	2.89	2.89	50	50

\*Population estimate inside the park =calculated wolf density estimate across an estimated 17,270 square km of potential habitat within park boundaries, north of the Alaska Range





Wolves in Denali, like wolves everywhere, rely mostly on ungulates (hoofed animals) for their food, but also have other important food sources, including beavers in summer, snowshoe hares when they are plentiful, and, most surprisingly, salmon.



Three species of salmon (chum, silver, and king) are known to spawn in the northwestern part of the park after having traveled more than 1,000 miles from the ocean. Dr. Adams has calculated that the biomass of chum salmon equals the biomass of ungulates (moose and caribou) in that area.



Areas of upwelling, where rivers remain open in the winter, provide predictable sources of dead salmon for a wide variety of birds and mammals, including wolves. Some of the concentrations of wolf locations in remote parts of the park are at such areas. Salmon carcasses may be a food of last resort for hungry wolves. It is common to find packs and individual wolves traveling long distances to get to salmon springs and to find wolves being killed by other wolves as packs interact there.

#### Mortality of collared wolves

From 1986-2013, of 238 collared wolves that died, about 25 percent were killed by humans (mostly legal harvest when they ventured outside park boundaries). At least one-third were killed by neighboring wolf packs, generally in winter when packs roam beyond their usual territories. The remainder (about 42 percent) died of other unknown natural causes. Many of these remaining wolves were too decomposed or consumed to determine the cause of death, but, undoubtedly, some of these also were killed by wolves. Other known causes of natural mortality include avalanche, starvation, drowning, old age, and disease.

#### Wolf management

Wolf monitoring has had many benefits for park management, including achieving the original goal of assessing the causes of wolf mortality and the degree to which park wolves travel outside the park boundary. Another benefit has been knowledge of where active wolf dens and rendezvous sites are, so that closures can be created to protect wolf pups from human interference.

Biologists collar two or three wolves from each pack to maintain accurate estimates of population size (upper photo).

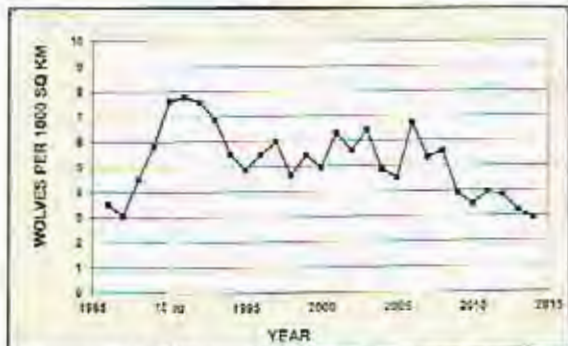
Observers in a plane can pick up the radio signal from collared wolves and are able to count other nearby wolves, and learn wolf food habits.

This breeding female, seen near the park road scanning a rock outcrop (hunting for sheep), is wearing a GPS collar that signals a location daily.

Photo by Lucy Tyrrell



A map of over 21,000 wolf locations from the study. Areas where wolves are more likely to be found (concentrated wolf locations) might be dens, travel routes, or predictable food sources.



Estimate of Denali wolf population 1986 to 2014.



Monitoring wolves results in information about den and rendezvous sites, so park managers can post wildlife closures to protect pups from human interference.



A map showing wolf pack territories or home ranges (black lines) within the population area monitored based on telemetry locations April 2013 to March 2014. Numbers are pack sizes in spring 2014. Dots indicate locations of collared wolves.

Wolf numbers and distribution have been identified as a vital sign for long-term monitoring by the Central Alaska Network Monitoring Program. The wolf management goals are to maintain natural and healthy wolf populations, where predator/prey systems are intact, and to maintain opportunities for visitors to view wolves in their natural habitat.

#### For more information

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# Wolf Monitoring 1986 - 2014



NPS photo by Meier

More than 400 wolves have been collared for monitoring since 1986. The information gathered from tracking wolves as provided information on wolf population size, diet, mortality, and movements outside the park.

On spring days in 1985, Denali employees found the skinned carcasses of seven wolves in remote parts of the park. The resource manager at the time, John Dal le-Molle, concerned that little was known about the park's wolves, decided that a radio-collaring study of wolves would reveal how widespread such aerial poaching was, what caused most wolf mortality, and how commonly wolves traveled beyond park boundaries.

Researchers L. David Mech and Layne Adams (both now with the U. S. Geological Survey) initiated a wolf collaring project in early 1986. For the last 25 years, the effort has continued, with field work headed up at various times by Layne Adams, Tom Meier, John Burch, and Steve Arthur.

More than 400 wolves have been captured and collared. Collared wolves are monitored from antenna-equipped Supercub aircraft about twice per month. In recent years, wolf locations have also been monitored with GPS/ARGOS collars, which determine a wolf's location at least once each day and upload the data through the ARGOS satellite system.

### Wolf numbers

Each year in early spring, biologists produce a map of wolf pack territories from the telemetry data, and estimate the density and numbers of wolves in the park (see lower map on reverse). At the start of the wolf study in 1986, wolf density in the park was very low.

A series of mild winters had made it difficult for wolf packs to obtain food in winter, and poaching may also have lowered wolf numbers. A series of deep-snow winters benefited the wolf population, and numbers increased rapidly as many wolves were born and survived, and few left their packs. One pack, the East Fork Pack, increased from 6 to 29 wolves in three years. Since then, the density of wolves in the park has fluctuated between 2.9 and 9.8 wolves per 1000 square kilometers (7.4 to 25.4 per 1000 square miles), a low density when compared to more temperate climates with more abundant food.

### Wolf food habits

Following collared wolves has provided an opportunity to learn a great deal about wolf diets. When biologists locate wolves, they often find them interacting with prey animals or feeding on kills.

Researchers visited more than 850 kill sites between 1986 and 1993 to learn what prey animals wolves were selecting. Among the results: Wolves kill many very young animals (moose and caribou calves, Dall's sheep lambs), many older animals, but few young adults of the three major prey species. In winters without much snow, wolves feed mainly on moose, which make up the largest share of food available in the park. In winters with deep snow, wolves kill more caribou. Some wolf packs learn locations and techniques for killing Dall's sheep and obtain a large portion of their diet from them.

*In 1939...scarcely anything was known about the wolf's home life or its relationships to mountain sheep, caribou, moose, and other smaller species.*  
—Adolph Murie  
*A Naturalist in Alaska*