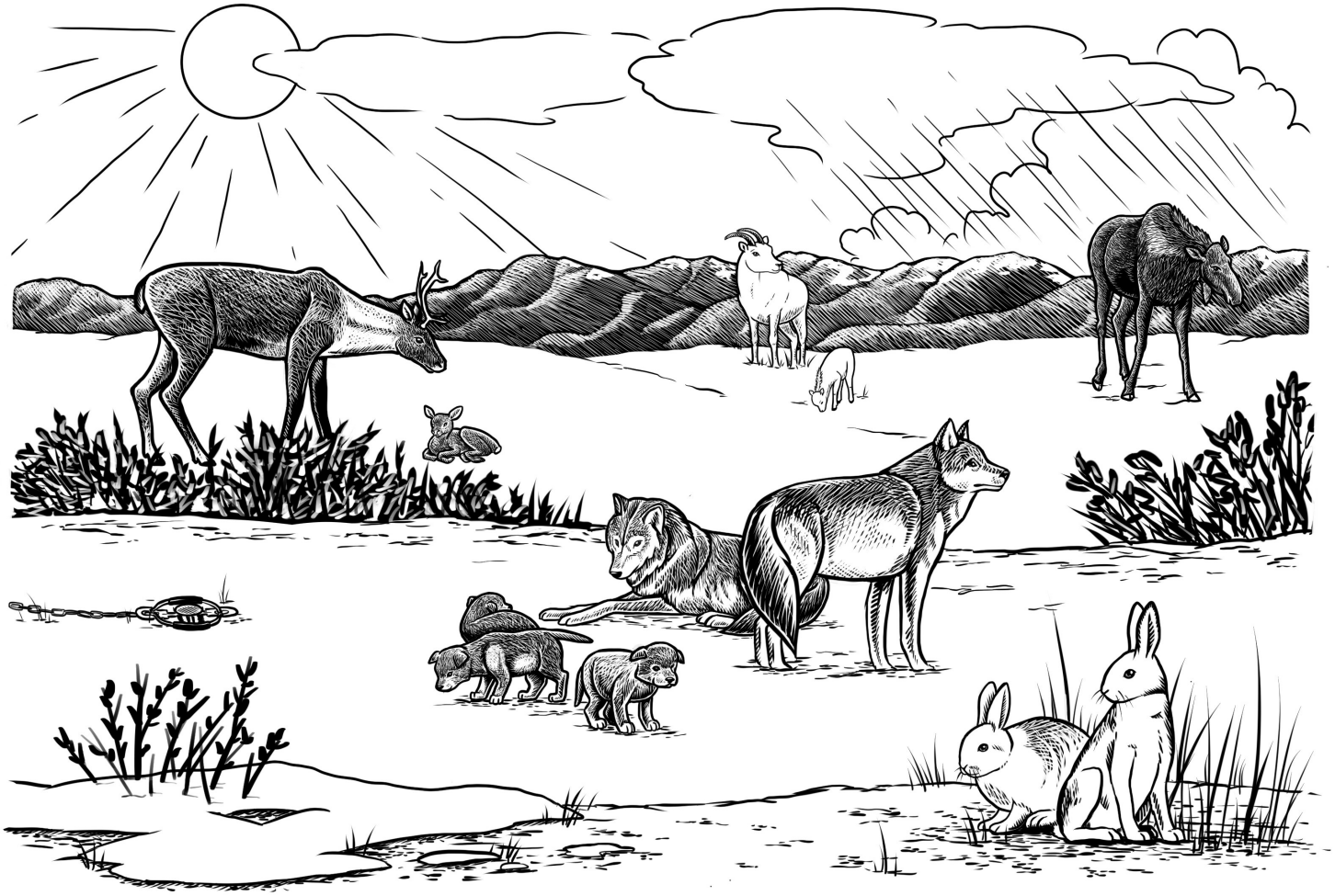
National Park Service
U.S. Department of the Interior

Denali National Park and Preserve

2018 Annual Wolf Report



DENALI
Wolf Project

On The Cover: Wolves live in a complex network of animals, seasons, and weather. *NPS Illustration/Laurel Mundy*

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Riley Creek West 1601GM chases a caribou in the Toklat River. *Photo courtesy Christopher Cline*



Riley Creek West pups greet one of their parents. *Photo courtesy Fred Hennig*



A wolf chases a magpie away from an old carcass. *NPS Photo*

Background

Wolves are one of six keystone large mammal species in interior Alaska, along with grizzly bears, black bears, moose, caribou, and Dall sheep. Wolves are important to people and to the ecosystem as a whole. As a top predator, wolves may play a key role in influencing ungulate populations, such as caribou. This may also influence vegetation patterns and promote species diversity .

Wolves are found in all three parks of the Central Alaska Monitoring Network (CAKN): Denali National Park and Preserve (Denali), Yukon-Charley Rivers National Preserve, and Wrangell-St. Elias National Park and Preserve. Indeed, wolves are specifically identified in the enabling legislation and management objectives of all three CAKN parks.

This report summarizes efforts to monitor wolves in Denali National Park and Preserve through December 2018. The main goal of monitoring is to track how many wolves there are and where they're moving. However, a variety of additional data is obtained in the monitoring process. This information can help future wildlife management and research, and can also help develop scientific models of predator/prey systems.

For example, scientists use data obtained from wolf monitoring to help protect wolf dens as part of the Denali Wolf-Human Conflict Management Plan. In heavily visited portions of the park, managers want to know where active wolf dens and rendezvous sites (pup rearing areas) are so that they can be protected from disturbance.

Additionally, data on the genetic, physical, and immunological characteristics of wolves, obtained in the course of wolf capture, will be important in evaluating long-term changes in wolf populations in Alaska.

Information gathered through wolf monitoring can also help scientists determine whether the park packs are being impacted by activities happening outside of the parks, such as intensive wolf harvest or wolf control.



NPS Photo

Wolves are important to people in Alaska. Some value the opportunity to hunt or trap wolves while others value their existence or the opportunity to see a wolf. Wolves are of great significance to Denali's visitors because of the exceptional opportunities to view wolves in Denali. The unique long-tenured research project in Denali allows scientists around the world to understand how wolves live in a relatively intact ecosystem, and will be invaluable for years to come.

Park-wide monitoring of wolves in Denali was initiated by Resource Management Ranger John Dalle -Molle in 1986, with principal investigators L. David Mech and Layne Adams. Field work and project management from 1986 to 2016 was conducted by Dr. Layne Adams, Dr. Steve Arthur, Dr. Bridget Borg, John Burch, and Tom Meier. In 2018, Dr. Bridget Borg oversaw the program, and field work and program support was conducted by biological technician Kaija Klauder.

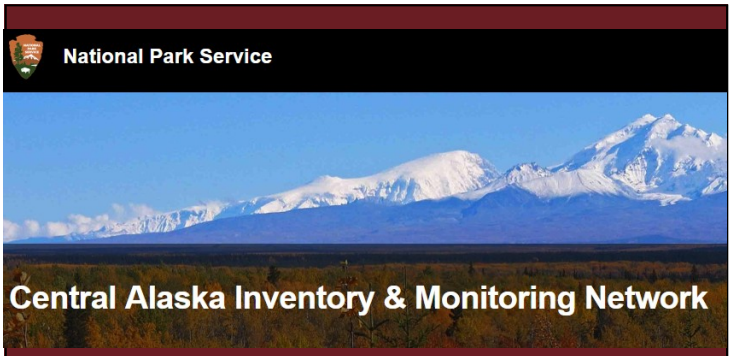
Wolf Project Goals

Wolf management in Denali isn't just about Denali — the National Park Service looks at the big picture when it comes to data collection. Parks across the country are grouped into Inventory and Monitoring Networks, and all the parks in a network work together to accomplish long term research and monitoring goals. One key element of this process is that all the parks make sure to collect specific types of data the same way, so that it is comparable across parks. Alaska is part of the Central Alaskan Network (CAKN), along with Wrangell-St. Elias National Park and Preserve, and Yukon-Charley Rivers National Preserve. The following are some of the measurable objectives for wolf monitoring programs across CAKN (Meier et al. 2009, see sidebar).

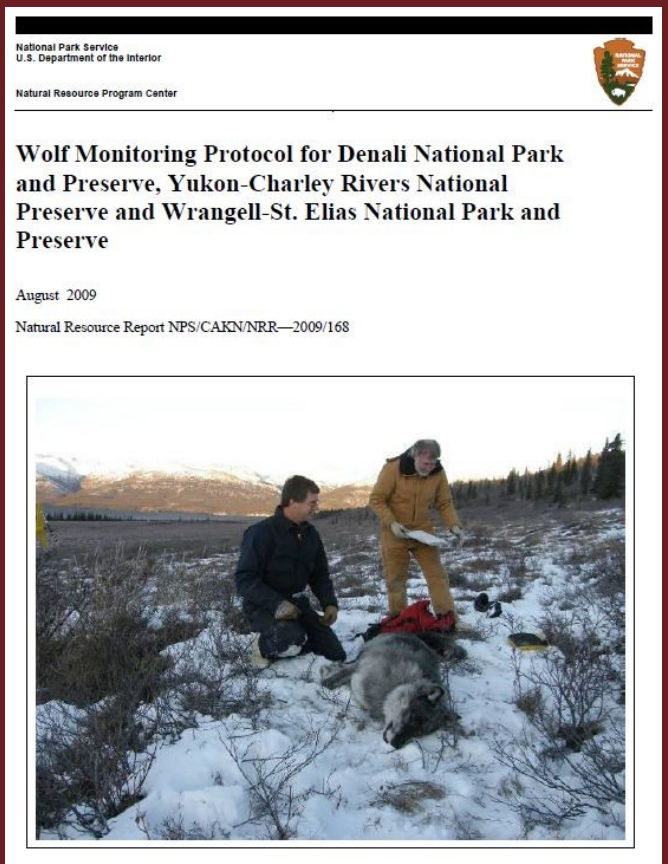
- Capture and radio-collar 1-3 individuals in each wolf pack identified in the study area.
- Determine the demography (numbers, colors, age structure) of monitored wolf packs.
- Obtain genetic samples from captured wolves.
- Determine pack size for each collared pack in fall (early winter) and spring (late winter).
- Detect pack extinction and pack formation events in the population.
- Locate non-radio-collared wolf packs on Park and Preserve lands using aerial snow tracking.
- Detect changes in wolf density, pack size, and home range size over time.
- Monitor and detect changes in the physical, immunological, and genetic makeup of the wolf population over time.

These two goals are specific to Dena;o:

- Investigate the effects of wildlife management activities on the natural and healthy character of wolves in Denali.
- Investigate the biological and social characteristics of wolf viewing by visitors in Dena;o, and factors that may affect wolf viewing opportunities.



The 2009 wolf monitoring protocol, one of the first protocols approved for the Central Alaska Network's Inventory and Monitoring Program, identifies the long term monitoring objectives for Denali's Wolf Project . It also lays out procedures that parks use to collect the data.


National Park Service
U.S. Department of the Interior

Natural Resource Program Center

Wolf Monitoring Protocol for Denali National Park and Preserve, Yukon-Charley Rivers National Preserve and Wrangell-St. Elias National Park and Preserve

August 2009

Natural Resource Report NPS/CAKN/NRR—2009/168

2018 Summary



In 2018, 10 wolf packs were monitored in the Denali study area and 80 aerial tracking flights were flown to observe wolf pack locations, obtain pack counts, locate den sites, and provide estimates of pups produced. Information from these flights also documented wolves feeding at kills 61 times comprised of 18 caribou, 37 moose, 2 sheep and 4 unknown kill species.

In 2018, staff captured and collared 26 wolves, including 9 recaptures of wolves collared in previous years to replace aging or failed collars. In March, 3 new packs were located in the western area of park: Sesui, Roosevelt, Wolf Creek; and 2 uncollared packs in east. The spring population estimate for the entire study area was 75 wolves. There was evidence that 8 packs denned in 2018, and 5 packs recruited an estimated 23 pups to the population. Twelve collared wolves died in 2018: 1 died from hypothermia following capture, 5 were harvested, 4 were killed by wolves, 2 died of unknown natural causes. The fall population estimate was 85 wolves in 11 packs, reflecting the addition of a new pack, the John Hansen North pack, which budded off from John Hansen pack .

An index of wolf viewing in 2018 was similar to 2017, with sightings driven primarily by the Riley Creek West pack, who denned along the Toklat River and later moved to rendezvous sites not far from the road, near the Toklat River and nearby drainages.

In addition to addressing our long-term monitoring goals, the Denali Wolf Project worked with regional, national, and international collaborators on four research projects.

Reproduction and Mortality

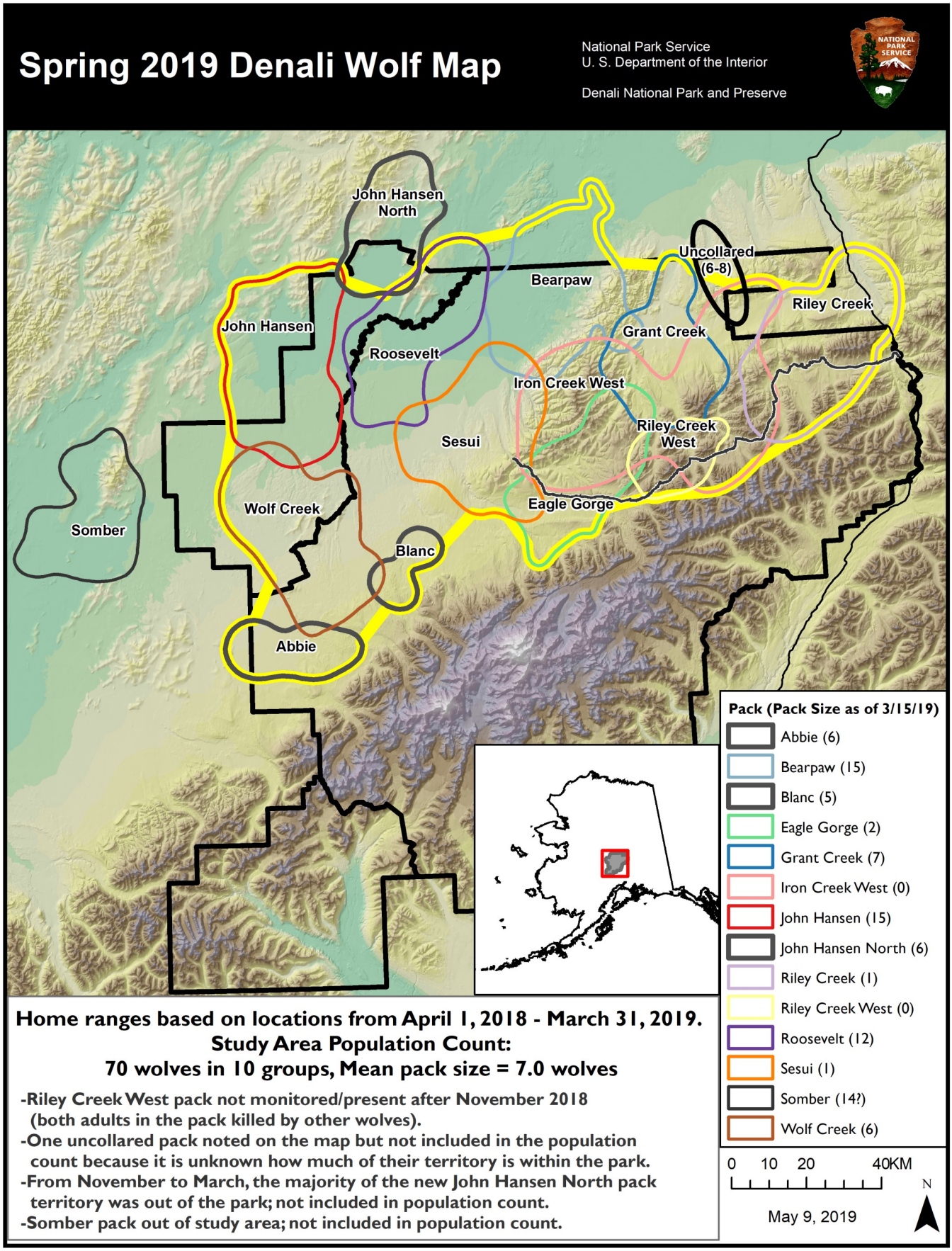
2018

	Reproduction		Mortality		
PACK	**Denned**	**Fall Pup Count**	**Natural**	**Human-Caused**	**Description**
Eastern Region					
Comb	-	-	1	2	Two harvested, one killed by wolves
Grant Creek	Yes	7	1		Natural unknown
Eagle Gorge	Yes	Unknown		1	Harvested
Iron Creek West	No		1	1	One harvested, one killed by wolves
Riley Creek	Yes	0		1	Harvested
Riley Creek West	Yes	5	2		Two killed by wolves
Western Region					
Bearpaw	Yes	3	1		Natural unknown
John Hansen	Yes	7			
Roosevelt	Suspected	Unknown		1	Capture-related
Sesui	Unknown				
Wolf Creek	Yes	1			
Out of Study Area					
Somber	Yes	Unknown			
TOTALS		**23**	**6**	**6**	



1202BF facing off against a wolverine, which is lying in a defensive posture on the ground next to the moose carcass. For more about the life of this wolf, see feature on the following page. *NPS Photo*

Spring 2019 Population Map



1202

A look into the life of one wolf in Denali

In May 2009, a small black pup was born in a den along the Teklanika River. Her mother was a large gray wolf, 0618GF, who was a very successful matriarch who led East Fork pack for 10 years, raising at least 20 offspring to adulthood. This black pup grew into a resilient and well-muscled female wolf in her own right, weighing 84 pounds by March 2012 when she was first collared and assigned the number 1202.

In the fall of 2013, 1202 dispersed from her natal pack to start her own family just to the south, which was dubbed the Riley Creek pack. By now her natal East Fork pack had shifted north, using the state land in the Stampede Corridor and the park land beyond, as well as the Mt. Healy ridge area. In the summer of 2014, 1202 denned near Hines Creek. In her first year as a matriarch, she raised 4 pups. That fall her mate was collared, a black male labeled 1406. He was 3 years old at the time, 2 years the junior of 1202. In 2015, 1202 again denned at the same site near the road, and raised 5 pups. The pack chose a rendezvous site that was visible from the road, and many visitors were able to see the pups and adults. By late fall, her pack numbered 9 animals.

In 2016, the pack shifted their denning area to a more remote location on the Sanctuary River. This year there were 8 pups still alive in September, a very successful litter. The pack had now expanded to 14 animals. This large pack became a powerful force. In the winter of 2016-2017, they challenged the neighboring Grant Creek pack, which at 12 strong was no push-over (although 6 pack members were pups). A series of skirmishes and chases left at least two Grant Creek females dead, including their matriarch, and the remaining members splintered apart.

In the summer of 2017, 1202 returned to her natal den on the Teklanika. This has been one of the most productive of the known den sites in Denali. 1202 and her family often traveled along the river bar near the park road and were seen by many visitors. That summer 1202 recruited 5 or 6 pups, and by the fall the pack numbered 17. It seemed that the pack was at its prime, but 1202 was now 8 years old, and her coat was very silvery indeed.

In January of 2018 , 1202's mate, 1406, died along a trapline. However, 1202's leadership remained strong: a trail camera deployed on a moose kill captured a video of 1202 successfully chasing a wolverine away from her pack's kill (photo on previous page.) Another trail camera at the Teklanika den showed a heavily pregnant 1202 inspecting den holes in the spring of 2018, in the company of several



other adults/yearlings, and later photos showed 4 pups playing together. However, by August the pups were nowhere to be found, and 1202 was mostly seen alone, with a slight limp.

In early November, 1202's son 1601GM, the male founder of the Riley Creek West pack, was killed in a conflict with the Eagle Gorge pack. The remaining Riley Creek West adult, 1701GF, took off and traveled east to the upper Savage River, where she was seen alone feeding on a moose kill. Interestingly, at the same time, 1202 headed west and was seen in a flat open bench above the Toklat River, with 4 gray wolves that appeared to be pups. The 4 grays were very "docile" and did not stand up when the plane passed low overhead. Indeed, they acted like the docile pups of Riley Creek West, which had not been seen since the death of 1601GM. Could these have been the Riley Creek West pups, or perhaps the 4 missing Riley Creek pups from Teklanika den? The next day, 1202 and the pups were seen again together, but had moved on to Cabin Divide to scrounge on remnants of old kill.

Then, in another intriguing twist, GPS data from their collars showed that 1202 and 1701GF met up near the East Fork canyon a few days later, and together moved towards the upper Sushana River, where 1707GF was killed, perhaps by 1202. Only the head and a severed foreleg of 1701GF remained following her death. The 4 pups were not seen again.

Although 1202 ranged widely throughout winter 2018, she was often spotted by residents in the area as she was comfortable using roads, including the parks Highway and the Park Road. Her limp continued to be pronounced and her injury might have driven her use of the roads, where travel is easier. 1202 ended the year alive, as a remarkably tough survivor.

Pack Narratives

EASTERN PACKS

Comb

Pack Counts: Spring – 0 |
Collared Wolves: 1702BM, 1705GM, 1706GF

In mid-February 1706GF, the matriarch of the Comb pack, was killed by other wolves from an unknown pack. Less than a week later yearling 1705GM was trapped on state land. The only remaining collared wolf in the pack, 1702BM, had been traveling by himself north of the park. He returned to the pack's territory in late February and was trapped at the beginning of March. No further monitoring of the Comb pack was possible in 2018 and the fate of the remaining members is unknown. We do not have evidence that any remaining members of the Comb pack are present in their former territory.

Eagle Gorge

Pack Counts: Spring – 7| Fall – 6
Collared Wolves: 1506GM, 1604GF, 1802GM

HOW TO NAME A COLLARED WOLF:

1. Last two digits of the year
2. The order of wolves collared that year
3. One letter for the color of the wolf (G = gray, B = black)
4. One letter for the sex of the wolf (F = female, M = male)

How would you name this wolf? A gray female that was the 7th wolf collared in 2017.

Breeding male 1506GM had been traveling alone and left the pack's territory in November of 2017. In January he was trapped on state land north of the park. In March, adult 1802GM was collared. The pack denned at the Myrtle Ridge Den between the Clearwater and Boundary Creek, and two pups were seen in late summer. The pack was 6 members strong October through December 2018. 1604GF is distinctively white and often seen at the head of the pack as they travel.

Grant Creek

Pack Counts: Spring – 3 | Fall – 10
Collared Wolves: 1402GF, 1501GM

Grant Creek again maintained a territory in Wigand Flats. In summer 2018, 1402GF denned along Wigand Creek and it appeared that another uncollared female in the pack denned as well, possibly using a den site along Toklat River. The Grant Creek pack produced a total of 7 pups and from October through November 2018, the pack numbered 10 wolves: 7 pups and 3 adults. We replaced the collar on 1402GF and collared one large male pup in November 2018: 1812GM. In December 1812GM died of unknown natural causes.

Riley Creek

Pack Counts: Spring – 6 | Fall – 1
Collared Wolves: 1202BF, 1406BM, 1801GF

In January the Riley Creek breeding male, 1406BM, was trapped on state land. In March female 1801GF was collared. In May, 1801GF dispersed, traveling southwestward along the Alaska Range, crossing to the south, and roaming widely north and west of Lake Clark National Preserve. The pack denned on the Teklanika as they had the previous year, and trail cameras at the den site captured photos of several adults during the winter and spring, and 4 pups during the summer. The pack was not often seen along the road as they had been in



A Riley Creek West wolf runs along the Toklat River /*Christopher Cline*

previous years. By September, 1202BF was traveling alone. Through the end of the year, she often traveled along road corridors including the parks Highway and the Park Road. She was often seen by residents in the area, traveling with a pronounced limp on her right rear leg.

Riley Creek West

Pack Counts: Spring – 2| Fall – 7
Collared Wolves: 1601GM, 1701GF

Riley Creek West made a name for themselves in 2018, denning along the Toklat north of the road and producing 5 pups, which spent considerable time on or near the road at Toklat, to the delight of visitors.

In early November, 1601GM, the male founder of the Riley Creek West pack, was killed in a conflict with the Eagle Gorge pack. The remaining Riley Creek West adult, 1701GF, took off after the fight and traveled east to the upper Savage River, where she was seen alone on November 14, feeding on a moose kill. At the same time, Riley Creek's 1202BF was in a flat open bench above the Toklat River, with 4 gray wolves that appeared to be pups. The 4 grays were very "docile" and wouldn't even stand up out of beds with low passes of a plane overhead. Indeed, they acted like the docile pups of Riley Creek West, which hadn't been seen since the death of 1601GM. Could these have been the Riley Creek West pups, or perhaps the 4 missing Riley Creek pups from Teklanika den? We do not know. GPS data from their collars showed that 1202BF and 1701GF then met up near the East Fork canyon on November 18th and together moved towards the upper Sushana River, where 1707GF was killed, mostly likely by 1202BF. Only the head and a severed foreleg of 1701GF remained following her death. There are no remaining collared wolves in the pack. We do not currently know the fate of the remaining 5 pack members, all of which were pups.



Riley Creek 1202BF and an uncollared wolf walk along the Park Road. *NPS Photo/ Jake Gaposchkin*

WESTERN PACKS

Bearpaw

Pack Counts: Spring – 18 | Fall – 17
Collared Wolves: 1006BF, 1502GM, 1606GM, 1813GF

All 3 collared wolves in the Bearpaw pack were recollared in March 2018 to replace non-functioning GPS collars and replace a VHF-only collar with a GPS collar. The Bearpaw pack continued to be a large pack in spring 2018, numbering 17 wolves. The Bearpaw pack denned near the Sandless and Flume Creek area in summer 2018 and produced at least 5 pups (3 black and 2 gray pups seen in September 2018). 1502GM died July 2018 of unknown natural causes. A new pack member, an adult female, 1813GF, was collared November 2018.

Iron Creek West

Pack Counts: Spring – 3 | Fall – 2
Collared Wolves: 1704GF, 1804GM

In mid-March 2018, 1704GF was seen with 2 other wolves in the Wyoming Hills. In March 2018, we collared a 2 year old male 1804GM that was traveling with 1704GF. The 3 wolves continued to travel in the Wyoming Hills during the spring.

1704GF was killed by other wolves June 16, 2018 near Cabin Divide. GPS location data indicates that the Grant Creek male was in the same area at that time and likely he or other members of the Grant Creek pack were responsible for the death of 1704GF. Following her death, 1804GM traveled alone throughout his former territory. He was seen with a mate, who was "spooked" by the plane conducting aerial tracking flights, suggesting she might be an immigrant who had not experienced this before. This female was collared in November 2018: 1814GF. However, by the end of 2018, these two were traveling independently, often 25 miles away or more from each other.

John Hansen

Pack Counts: Spring – 15 | Fall – 16
Collared Wolves: 1302GM, 1707BF

In summer 2018, the John Hansen pack denned near Doghouse Lake and produced at least 6 pups (3 black, 3 to 4 gray pups were seen in October). This pack roams the areas surrounding Lake Minchumina and is going strong with at least 16 wolves in the fall: 4 black, 10 gray, and 1 dark gray/charcoal, (1707BF) and 1 almost white (1302GM).

John Hansen North

Pack Counts: Spring – N/A| Fall – 7
Collared Wolves: 1605GM, 1816GM

By fall 2018, wolf 1605GM had split from his natal pack (John Hansen) and was seen with several other wolves primarily east or north of Lake Minchumina. Another wolf in this new pack, dubbed John Hansen North, was collared in November 2018 (1816GM). By early 2019, this pack had shifted its territory north, and was primarily outside of the boundary of the Preserve.

Sesui

Pack Counts: Spring – 3 | Fall – 3
Collared Wolves: 1807GM,1808GM

In March 2018, a new pack consisting of 3 wolves was

located on Brooker Hill. Two wolves were collared: 1807GM, a four year old male, and 1808GM, a 10 month old male. The name "Sesui" comes from Chief Sesui who used the area near Brooker Mountain.

Tracking this pack was hindered by technical issues with the GPS/radio collars. The collar on 1807GM failed mid-summer 2018 resulting in a loss of GPS locations as well as radio frequency transmission. The other collared wolf, 1808GM transmits GPS data infrequently and erratically and occasionally transmits false mortality signals over the VHF frequency. Tracking flights in mid-November confirmed that both collared wolves remain in this pack, which still numbers 3 individuals.

Roosevelt

Pack Counts: Spring – 10 | Fall – UNK
Collared Wolves: 1809BM, 1810BF, 1811GF

In March 2018, a new pack consisting of 11 uncollared wolves was located along the Birch River. The pack name "Roosevelt" comes from Roosevelt John who was a Chief and medicine man; many of the place names in the north section of the park were named through his use of the area.

We collared 3 wolves: a black male yearling 1809BM, a black female pup 1810BF and an adult gray female 1811GF. Unfortunately, the black female pup (1810BF) died near the capture site a few days after her capture. We were able to collect her carcass and provided it to the Alaska Department of Fish and Game for necropsy where it was determined that the female died of complications due to hypothermia following capture.

The remaining members of the pack, (6 gray and 4 black) ranged south of Chilchukabena and may be the same pack that was tracked in the McKinley Burn area in spring and fall 2017.

The Roosevelt pack appeared to den along Roosevelt Creek in summer 2018. The young black male, 1809BM dispersed in mid-May. Additionally, the adult female's collar abruptly stopped working near the den site in mid-June.

Investigation of the den site in November 2018 revealed that the den had been used the previous summer but there was no way to tell if pups were successfully raised or recruited to the pack. With the presumed failure of 1811GF's collar, there was no way to continue tracking this pack throughout the fall. However, snow tracking this winter indicates that there is indeed a pack of up to 16 wolves within the former territory of the Roosevelt pack. Tracks of wolves in the area were confirmed in February 2019, and at least 4 collared wolves were seen .

Wolf Creek

Pack Counts: Spring – 9 | Fall – 11
Collared Wolves: 1805GM, 1806GF, 1815GF

In March 2018, a pack consisting of 9 uncollared wolves was located along the Herron River. We collared 2 wolves from the pack, a yearling male, 1805GM and a female pup 1806GF. The wolves in this pack were all gray and based on their locations and colors, it is possible that they were members of the Iron Creek West pack that remained when 1704GF left the territory. This pack appeared to den along the lower Herron. In fall 2018, the Wolf Creek pack numbered 9 wolves. In November 2018, a pup from the pack was collared (1815GF), demonstrating that at least 1 pup was born and survived. Both collared females died in the winter: 1815GF died of starvation and 1806GF died of unknown natural causes, possibly killed by other wolves.



The eye of a wolf as it recovers from sedation. *NPS Photo*

Wolf Management

COLLARING

Denali has been collaring members of the wolf population since 1986 in order to track movements, estimate territory locations and sizes and estimate the population size and density. Current methods of wolf monitoring used in Denali follow the Wolf Monitoring Protocol for Denali National Park and Preserve, Yukon-Charley Rivers National Preserve and Wrangell-St. Elias National Park and Preserve, Alaska (Meier et al. 2009). In brief, this method involves capture and radio-collaring of one or two members of each wolf pack in the study area and locating and counting wolves during aerial tracking flights periodically through the year. Morphological data, including sex, weight, age and color, and blood and tissue samples for genetics and disease analysis, are gathered from captured wolves.

In 2018, staff captured and collared 26 wolves during two capture efforts, including 9 recaptures of wolves collared in previous years to replace aging or failed collars.



NPS Photo / Anna Kirk

CLOSURES

Five closures around den sites were put in place in 2018 following Denali's Wolf Human Management Plan.

Sanctuary Wolf Closure

The Sanctuary Wolf Closure was implemented on April 17, 2018 as per policy to close wolf denning areas used in the last two years until denning activity for the current year is determined. Wolves last denned in this location in 2016. The area closed encompasses the north portion of backcountry unit #5, bounded to the south by a line approximately 6.5 miles upstream of Sanctuary Campground. After it was confirmed that no wolves denned in this location in 2018, the closure was opened on June 7 2018.

Teklanika Wolf Closure

The Teklanika Wolf Closure was implemented on May 23, 2018. Denning activity had been observed in the area at the time of closure. The area closed encompassed areas south of the Teklanika bridge and along Igloo Creek. The Riley Creek pack was confirmed to be denning in this location. The closure was lifted on September 6, 2018, once it was confirmed that the wolves were no longer using the den site.

7 Mile Wolf Closure

The 7 Mile Wolf Closure was implemented on May 17, 2018 as per policy to close wolf denning areas used in the last two years until denning activity for the current year is determined. Wolves last denned in this location in 2015. The closure encompassed an area with approximately a ½ mile radius around the 7 Mile Pit. After it was confirmed that no wolves denned in this location in 2017, the closure was opened on May 31, 2018.

Wolf Management cont.

Toklat Wolf Closure

The Toklat Wolf Closure was implemented on May 24, 2018 as per policy due to wolf activity and denning in the area. The area closed was north of the park road along the east side of the river. The area was bounded by a small unnamed creek to the south, the first low peaks to the east and a shallow valley to the north. The western boundary was determined by the west edge of the Toklat River channels. After the wolves moved to a rendezvous site to the south, the closure was opened August 8, 2018.

Mile 57 Wolf Closure

The Mile 57 Wolf Rendezvous site was implemented July 18, 2018. The Riley Creek West wolves moved their pups to a rendezvous site very near the park road and within a popular hiking area. To minimize disturbance to the wolves and minimize the potential for a pack break-up, the area was closed until the wolves moved to a new area. The closure extended from mile 56 to mile 57.5 and south of the road. The closure was lifted August 13, 2018.



A wolf pup in Toklat road camp area. Visitors and staff were reminded to never feed or approach wildlife.
NPS Photo / Nick Virgil



A wolf pup crosses the road near Toklat.
NPS Photo / Anna Kirk



KEEP WILDLIFE WILD
Never Feed or Approach Wildlife

Active Research

EFFECT OF HARVEST ON WOLF SOCIAL STRUCTURE

In 2018, Denali National Park, Yellowstone National Park, and Grand Teton National Park received a grant from the Living With Wolves foundation to study the impacts of harvest adjacent to protected areas on wolf social structure. By combining data sets from these parks, as well as data from Yukon-Charley Rivers National Preserve, researchers could examine over 75 years of combined wolf monitoring.

In summer 2018, the main focus was on data preparation, planning the approach, and some preliminary analysis. Researchers began to examine what happens when a pack loses members, whether to a natural death, a dispersal, or a human-caused death. They also noted what time of year the loss occurred, and the social status, age, and gender of the lost wolf. The various combinations of these scenarios can then be compared to see what kind of loss is most impactful. Researchers will use this data to answer several questions: How does loss impact a pack's chances of sticking together and surviving? Is the chance that a pack produces pups each year influenced by losing animals from the pack? And if the pack does produce pups, is there any connection between losing pack members and how many pups can survive until their first winter?

This large data set may also offer the opportunity to answer other related questions about wolf social structure, such as whether working together to help raise pups makes a pack more likely to stick together and survive, and if breeding pairs that stay together longer are able to raise more pups than average.



Yellowstone National Park *NPS Photo*



Grand Teton National Park *NPS Photo*



Denali National Park *NPS Photo*



Yukon-Charley Rivers Preserve *NPS Photo*

Active Research cont.

NON-INVASIVE GENETIC SAMPLING

In 2016-2018, Denali ran a pilot study, in collaboration with the USGS Alaska Science Center, to investigate the feasibility and reliability of using non-invasive genetic samples to monitor the park's wolf population. Specifically, park staff hoped that genetic samples collected within the park would offer a means of monitoring wolf packs' size and membership, and would also help to track the loss of uncollared individuals to legal hunting outside the park. Park staff and volunteers collected and swabbed over 500 scats from wintertime kill sites, as well as abandoned den and rendezvous sites. They also collected 149 hair samples from den and rendezvous sites.

Samples from wintertime kill sites provided valuable genetic data, allowing scientists to distinguish individual wolves from the scat they leave behind. However, scat and hair samples collected in the summer were too degraded to genotype individual wolves, likely due to varying temperatures and rainfall during this time period. Winter volunteers and Denali Kennel's staff continue to collect wolf scat in wintertime, contributing to a growing database of individual wolf genotypes in the park.



NPS Drawing / Wikimedia Commons

WOLVES AND MESOCARNIVORES

In May of 2018, masters student Kaija Klauder completed her thesis studying the interactions between Denali's wolves and other smaller carnivore species. In the first chapter of her thesis, which focused on scavenging at winter carcass sites, she found that wolves are a dominant scavenger who use carcass sites extensively as a food resource — both by returning to their own kills and by locating carcasses that died of other causes. Despite the high levels of wolf activity, wolverines also regularly used carcass sites, allowing them to take advantage of this food. However, foxes and especially coyotes rarely visited carcass sites and generally didn't stay as long when they did. This means that wolves aren't providing a "free lunch" for these smaller species — on the contrary, they are hogging all the food!

The second chapter focused specifically on wolves and coyotes. Nine coyotes were fitted with GPS collars, and this allowed Kaija to investigate their survival, and how they used habitat when living in an area that's full of wolves. The coyotes had low survival rates, and their primary source of mortality was being killed by wolves and bears. They also maintained very large home ranges, which reflects the scarce resources available in Denali. She found that coyotes not only avoided wolves in real-time, but they also tended to avoid areas that wolves used more heavily — but, in a twist, coyotes did prefer these wolf-heavy areas in the wintertime. This is likely because deep snows in the winter force all animals into the most energy-efficient travel routes.

The complete thesis can be viewed online through the University of Washington at https://digital.lib.washington.edu/researchworks/bitstream/handle/1773/42362/Klauder_washington_0250O_18798.pdf?sequence=1&isAllowed=y

Outreach and Collaborations

TALKS

- "Between a Risk and a Hard Place: Scavenging Patterns and Habitat Selection of Carnivores in the Subarctic", thesis defense, University of Washington Wildlife Ecology Seminar Series — Kaija Klauder
- "Wolf Ecology and Research in Denali", MSLC Summer Speaker Series, Denali National Park, AK – Bridget Borg
- "Wildlife Updates", February 2018 Local Stakeholders Meeting Cantwell, AK – Bridget Borg
- "Wolf Updates", Resources Day, Denali National Park, May & June 2018– Bridget Borg

OUTREACH

- Science Fair Judging, March 2018– Bridget Borg
- Science Academy Field Days, 4 groups June– August 2018 – Bridget Borg and Kaija Klauder
- Intensives program field day, August 2018, Kaija Klauder
- Wolves of Denali Field Course August 2018 – Bridget Borg
- "A Denali, Alaska, royaume de loups… et de chasseurs" Article in Le Temps, Valérie de Graffenried, August 2018 https://www.letemps.ch/monde/denali-alaska-royaume-loups-chasseurs
- "Wolves matter. Technology shows us why" Article and video on Cnet, Megan Wollerton, November 2018. https://www.cnet.com/news/tracking-wolves-through-6-million-acres-of-denali-wilderness/
- Continued updates to wolf web page: https://www.nps.gov/dena/learn/nature/wolves.htm
- Wolf StoryMaps: https://www.nps.gov/gis/storymaps/mapseries/v2/index.html?appid=64c2271845e049058aeb59828b0a0187#

COLLABORATIONS

- Wolf Hunting adjacent to National Parks: measuring impacts to wolf populations, pack stability and long-term research. Collaboration with Yellowstone and Grand Teton National Parks and Yukon Charley National Preserve
- Scavenging dynamics of mesocarnivores, and habitat selection and movements of coyotes, Kaija Klauder, University of Washington
- Disease Screening of North American Wolves, Ellen Brandell, University of Pennsylvania
- Animals on the Move, University of Washington, NASA ABoVE project
- Dall Sheep Survival; University of Washington, NASA ABoVE project.
- Canid Cohesion Project, Dave Keiter and John Bensom, University of Nebraska.



Discovery Camp participants practice telemetry. *NPS Photo*

WOLF-HUMAN INTERACTIONS: WHAT IS THIS WOLF COMMUNICATING?

Interactions between wolves and humans are extremely rare. However, if you do see a wolf, it is helpful to understand their behavior when determining how you should respond.



NEUTRAL

A wolf that has its ears slightly forward or slightly back, is walking or trotting, and may only glance in your direction is neutral about your presence. Enjoy the lucky sighting and do not try to attract its attention.



CURIOUS



A wolf that fixes its gaze on you with its ears pricked might be curious about you. It may approach you slowly or walk around you to get a better look at you. Curious behavior usually results in the wolf leaving once it realizes that you are a human.



HOWLING

Wolves howl to communicate with pack members, often as a chorus. Wolves will howl before a hunt or to communicate with pups. Howls may also be used as a warning to other wolves to stay away.

PREDATORY / AGGRESSIVE



(c) Bio Expedition

When a wolf has its eyes fixed on you, ears forward, is standing tall, and has its tail up, it is acting aggressive or dominant. A predatory wolf will often rush at its prey with little stalking behavior.





Mech and Boitani 2003 and Coren 2001

FEAR / DEFENSIVE



wolf.org

A wolf with ears pinned back and down, hackles raised, crouching, and tail between its legs is acting out of fear or defense. The bigger the threat, the more defensive a wolf will be.





Mech and Boitani 2003 and Coren 2001

WHAT SHOULD I DO IF A WOLF APPROACHES ME?



Wolves are wild animals! Stay at least 25 yards away from wolves at all times. Never feed a wolf. **If a wolf approaches you, DO NOT RUN! Get tough!** To get it to leave:

- Shout aggressively
- Maintain eye contact
- Throw rocks



FOR MORE INFORMATION ON WOLVES IN DENALI, VISIT:
HTTPS://WWW.NPS.GOV/DENA/LEARN/NATURE/WOLVES.HTM