



2020 Annual Wolf Report



On The Cover: Clockwise from top left: A black wolf. *NPS Photo/Emily Mesner*; Wolf and raven tracks near a kill site. *NPS Photo/Kaija Klauder*; Dr. Bridget Borg appreciates a clear view during spring capture operations. *NPS Photo/Troy Cambier*; A gray wolf. *Photo courtesy Kent Miller*

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A wolf pauses in front of a trail cam. *NPS Photo*



A wolf crosses a braided river. *NPS Photo*



Fall aspen leaves near a den. *NPS Photo /Kajja Klaunder*

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 2020. 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.



Wolf tracks. *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 2020, Dr. Bridget Borg oversaw the program, and field work and program support was conducted by biological technician Kaija Klauer.


Wolf Project Goals

Wolf research and monitoring in Denali occurs annually to meet the following measurable objectives:

- 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.
- 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 Denali, and factors that may affect wolf viewing opportunities.




National Park Service




Central Alaska Inventory & Monitoring Network

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



2020 Summary



In 2020, 14 wolf packs were monitored in the Denali study area and 37 aerial tracking flights were conducted 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 50 times, comprised of 12 caribou, 36 moose, 2 sheep and 1 unknown kill species. Reduced project funding (due to COVID-19 decreasing park revenue) meant fewer monitoring flights than usual in 2020.

In 2020, staff captured and collared 16 wolves during two capture efforts, including 2 recaptures of wolves collared in previous years to replace aging or failed collars. Wolves were monitored to estimate survival, pack size, den locations, and denning success. In November, 2 new packs were located and collared in the eastern area of the park (Cantwell Creek and Erratics). The number of wolves counted in the study area in spring 2020 was 68 wolves in 12 packs. There was evidence that 11 packs denned in the park in 2020, and 8 packs recruited an estimated total 34 pups to the population. 10 collared resident wolves died in 2020: 3 were legally harvested, 1 was illegally harvested, 3 were killed by wolves, 3 died of other natural causes. The fall 2020 population estimate was 95 wolves in 12 packs. See territory map for Spring 2021 estimates.

Due to Covid-19 changing the nature of park visitation, bus traffic, and wildlife sighting data collection protocols, an index of wolf viewing was not calculated in 2020.

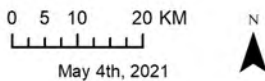
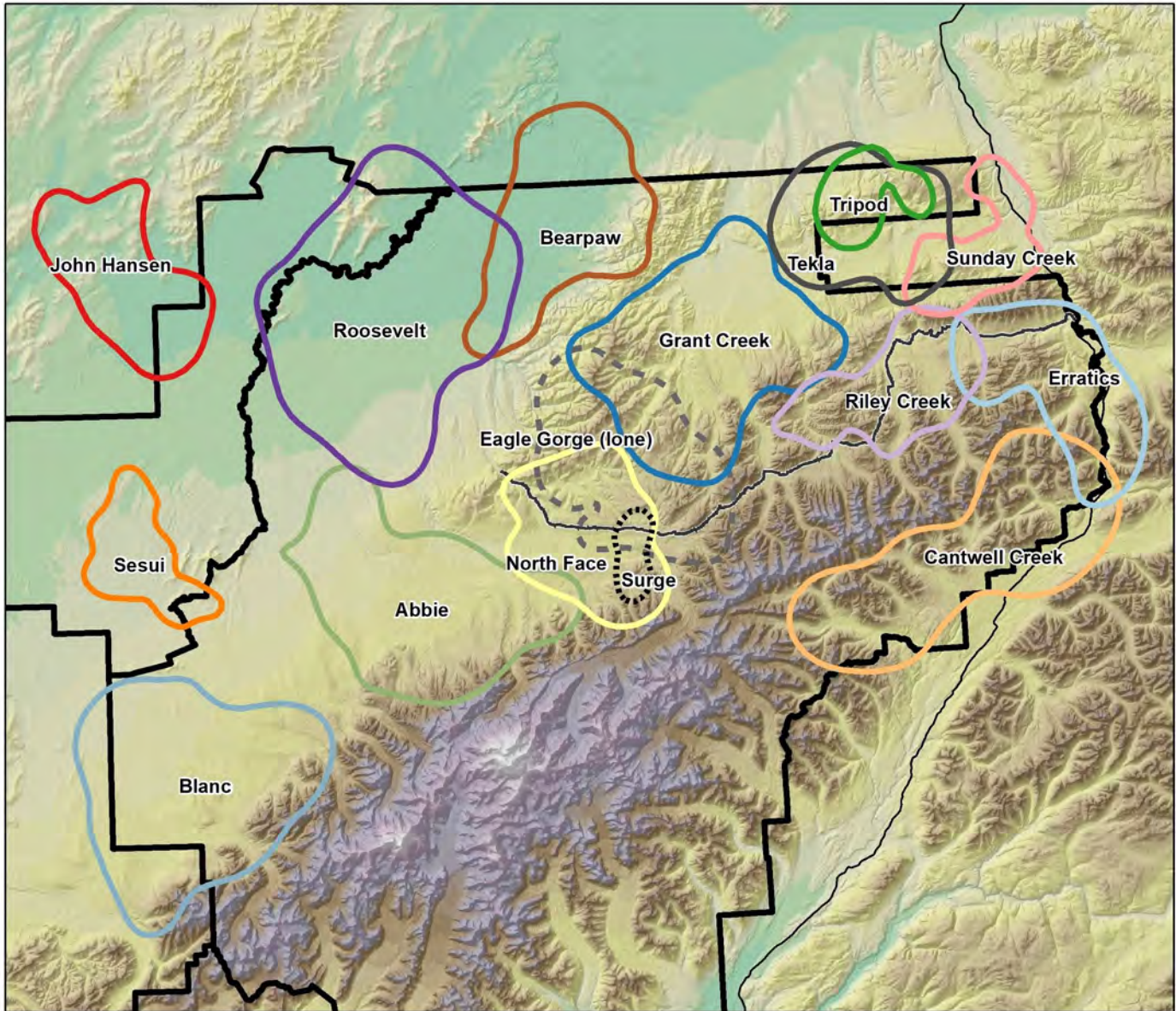
In addition to addressing our long-term monitoring goals, the Denali Wolf Project worked with regional, national, and international collaborators on several research projects.

Reproduction and Mortality

2020

PACK	Spring Pack Count	Fall Pack Count	Reproduction		Mortality		Description
			Dennded	Fall Pup Count	Natural	Human-Caused	
Eastern Region							
Eagle Gorge	1	1	No	—	2		Killed by wolves; Starved
Erratics	NA	12	NA	NA			
Grant Creek	14	13	Yes	4			
Riley Creek	3	7	Yes	4		1	Harvested
Sunday Creek	4	9	Yes	6		1	Illegally harvested
Tekla	6	3 (Out)	Yes	0		2	Harvested
Western Region							
Abbie	6	8	Yes	2	2		Killed by wolves; starved (disperser)
Bearpaw	4	6	Yes	3	1		Killed by wolves
Blanc	8	14	Yes	5			
John Hansen	6	4	Yes	0			
North Face	2	6	Yes	4			
Roosevelt	12	14	Yes	6			
Sesui	2	1	Yes	0	1		Starved
Out of Study Area							
Cantwell Creek	NA	12	NA	NA			
TOTALS	68	95		34	6	4	

Spring 2021 Population Map



Pack (Pack Size as of 3/15/21)	
Abbie (6)	Grant Creek (10)
Bearpaw (4)	John Hansen (4)
Blanc (14)	North Face (5)
Cantwell Creek (9)	Roosevelt (15)
Eagle Gorge (0)	Riley Creek (7)
Erratics (10)	Sesui (2)
	Sunday Creek (5)
	Tekla (1)
	Tripod (3)
	Surge (2)

Home ranges based on locations from April 1, 2020 - March 31, 2021.

**Study Area Population Count March 2021: 93 wolves in 14 groups,
Mean pack size = 6.6 wolves**

John Hansen pack not included in population count because majority outside the park.
Surge was a pair in spring 2021, dissolved soon after.

Disease in Wolves

The global pandemic of 2020 shone a spotlight on the profound effects that diseases can have. Although medical advances have protected humans from many forms of disease, the Covid-19 pandemic showed that diseases are far from a thing of the past. Although wolves are not documented as being susceptible to Covid-19, there are many diseases that can affect wolves and wolf populations. In this feature, we discuss some of the diseases and pathogens that might impact wolves in Denali, and highlight some recent research on diseases in wolves across North America.

Canine Distemper Virus

Dog owners may have heard of this disease, as it affects many carnivores including dogs, bears,

and cats. Canine distemper can result in the death of wolves, and severe outbreaks can dramatically affect wolf populations. Wolves with canine distemper may experience mild symptoms, or in severe cases suffer seizures and paralysis. Like Covid-19, canine distemper is spread primarily through respiratory emissions.

Rabies Virus

This fatal and sometimes frightening disease can affect many species, but in Alaska is most prevalent in Arctic foxes. Widespread rabies vaccination campaigns and education have greatly reduced the prevalence of rabies in both wild and domestic animals in North America, but it remains a serious issue in other parts of the world. There has not been a documented



Wolf project staff draw blood from an anesthetized wolf. NPS Photo

case of rabies in Denali's wolf population. Animals with rabies can show aberrant and sometimes aggressive behavior, and the disease is always deadly unless treated very early after exposure. Rabies is transmitted through saliva and other body tissues.

Canine Parvovirus

Canine parvovirus is generally only problematic in pups, whose immune systems are not fully developed. They suffer from diarrhea and lethargy, and may die if adequate hydration and nutrition are not maintained. Canine parvovirus can go between domestic dog and wild canid populations, and is spread by contact with the feces of an infected animal.

Parasites

Although not technically a disease, the presence of internal and external parasites can also cause wolves to fall ill. Many parasites, such as lice or intestinal worms, are unlikely to be fatal, but there are several that can have large effects, such as sarcoptic mange and heartworms.

What happens to wolves that get sick?

Unlike humans or pets, wolves who contract a disease do not receive medicine or care, and must rely on their immune systems alone to recover. Because wolves live in social groups, the other members may be able to offer some support as they continue to hunt and make food available for an individual who cannot provide for themselves while ill. However, living in a social group also means that if one wolf gets sick, others are likely to be exposed to the illness and may fall ill themselves.

Disease in Denali Wolves

A recent study looked for six different disease or parasite markers in blood samples from wolves all across North America, including Denali. This study found that greater human population density was the best predictor of greater disease exposure, suggesting that humans and their attendant pets may act as reservoirs for some of these diseases and parasites. Wolves from Denali were found to have low prevalence of the two parasites examined (*N. caninum* and *T. gondii*), as well as for canine distemper. They had about a 50% prevalence rate for exposure to canine parvovirus, and 80% or greater exposure to two mild viruses, canine adenovirus and canine herpesvirus. The low human density of the Denali area and the relatively low population densities of other carnivore species may help to protect Denali's wolves from high levels of exposure to some diseases and parasites.

Brandell, E. E., Cross, P. C., Craft, M. E., Smith, D. W., Dubovi, E. J., Gilbertson, M. L. J. J., Wheeldon, T., Stephenson, J. A., Barber-Meyer, S., Borg, B. L., Sorum, M., Stahler, D. R., Kelly, A., Anderson, M., Cluff, H. D., MacNulty, D. R., Watts, D. E., Roffler, G. H., Schwantje, H., ... Hudson, P. J. (2021). Patterns and processes in pathogen exposure in gray wolves across North America. *Scientific Reports*, **11**(1), 3722. <https://doi.org/https://doi.org/10.1038/s41598-021-81192-w>



Pack Narratives

EASTERN PACKS

Cantwell Creek

Pack Counts: Spring – NA | Fall – 12

Collared Wolves: 2008GF, 2009GF

This large new pack was collared in November, with adult female 2008GF and yearling 2009GF. The pack ranges along the north side of Broad Pass, in the Bull River, Cantwell Creek, and Windy Creek drainages.

Erratics

Pack Counts: Spring – NA | Fall – 12

Collared Wolves: 2013GF, 2014GM

Another sizeable new pack, the Erratics pack was collared on the Erratics Ridge just south of Park headquarters. Their territory ranges from the Park entrance area in the north to Cantwell in the south, and from the Savage drainage in the west to the highway corridor in the east.

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.

Eagle Gorge

Pack Counts: Spring – 1 | Fall – 1

Collared Wolves: 1604GF, 1501GM

1604GF, the lone member of this pack at the beginning of the year, continued to range in the southern Kantishna hills through spring. At the end of May, she was joined by 1501GM, the longtime breeding male of Grant Creek pack. Their partnership lasted until mid-August, when they separated. 1501GM, elderly and emaciated, died of starvation in mid-September. In mid-October, 1604GF was caught by Grant Creek pack and killed, marking the end of Eagle Gorge pack. When the skull of 1501GM was collected and cleaned, it revealed healing puncture wounds consistent with bites from another wolf, which could potentially have been incurred at about the time of his departure from Grant Creek pack.

Grant Creek

Pack Counts: Spring – 14 | Fall – 13

Collared Wolves: 1501GM, 1402GF, 1906GF, 1915GF

Grant Creek came through the winter with high counts. Right about the time pups would be born, long-time breeding male 1501GM left (or was ousted from) the pack (see Eagle Gorge). Grant Creek denned at the same den they used in 2018 and 2019 along Wigand Creek, with 1402GF, 1906GF, and 1915GF all attending the den. The pack produced at least 4 pups. Grant Creek maintained their traditional large territory encompassing Wigand flats, the western Kantishna Hills, and the northern Wyoming Hills. October counts for this pack numbered 13.

Riley Creek

Pack Counts: Spring – 4 | Fall – 7

Collared Wolves: 1202BF, 1911GM, 2001GM, 2007BF

Although 1202BF had regained companions by the end

of 2019, including 1911GM, by late winter 2020 she had separated from them and was again on her own, spending time in the Healy area. In early March she died, having sustained multiple gunshot wounds and ultimately drowning in the Nenana River. In March we collared 2001GM. Because the pack showed clear denning activity, we assumed that the remaining uncollared animal was a female, and indeed in November we collared 2007BF. The pack denned on the Teklanika but moved quickly to the Sanctuary drainage with their 4 pups. The fall count was 7.

Sunday Creek

Pack Counts: Spring – 4 | Fall – 9

Collared Wolves: 1921GF, 1922GF, 2012GM

Sunday Creek pack consisted of 4 wolves by March 2020. The pack denned in Dry Creek and used a late-summer rendezvous site near Ferry, producing 6 pups. In September, 1922GF was killed by an out-of-season snare north of Healy. In November we collared adult 2012GM. The fall count for Sunday Creek was 9 wolves.

Tekla

Pack Counts: Spring – 6 | Fall – 3

Collared Wolves: 1912GF, 1913BM, 2005BM, 2006BM, 2010GF

In early February, 1912GF was harvested. A month later, 1913GM met the same fate. This left no collared wolves in the pack. In March the pilot was able to locate with high confidence a den site in the core of the pack's territory, with the wolves nearby. This den was monitored throughout the summer and initially appeared active but appeared to fall into disuse, so we assume that no pups were successfully raised. In November we were able to collar three pack members: 2005BM and 2006BM, both adults, and 2010GF, an adult female whose distinctive markings were known from previous monitoring of the pack, making it certain that this is the same group of wolves. The fall pack count was 3.



The pretty coloration of 2010GF. NPS Photo/Bridget Borg

WESTERN PACKS

Abbie

Pack Counts: Spring – 6 | Fall – 8

Collared Wolves: 1909GM, 1910GF, 1916GM, 2011GF

By March 2020 this pack numbered 6 individuals. 1909GM, who had dispersed in late 2019, died of starvation in February. Abbie pack denned at the Slippery Creek den and recruited 2 pups. In November we re-captured 1916GM and replaced his failed collar, and also collared adult female 2011GF. The fall pack count was 8 wolves. The pack continued to maintain a territory between the Herron and Thorofare rivers. In late December 2020, 2011GF was killed in an encounter with the Roosevelt pack.

Bearpaw

Pack Counts: Spring – 4 | Fall – 6

Collared Wolves: 1006BF, 1805GM, 2002GM

The spring count for Bearpaw pack was 4. In March we re-captured 1805GM, and captured adult male 2002GM. Bearpaw pack again denned in the Sandless Lake-Flume

creek area, and again it was not clear if 1006BF, now age 10, whelped or was attending a younger female, but she did consistently attend the den site. The pack recruited 3 pups. In late October, matriarch 1006BF was killed by other wolves at an impressive 10.5 years of age. The fall count for Bearpaw was 6 wolves.

Blanc

Pack Counts: Spring – 8 | Fall – 14
Collared Wolves: 1908BF, 1918GF

In 2020 Blanc continued to range in the far southwestern corner of the Park, including the upper reaches of Highpower Creek and the Swift Fork River. The spring count was 8. The pack denned at a new site on the Swift Fork and recruited 5 pups. The GPS portion of 1918GF's collar failed for most of the summer and fall, although by the end of December it was transmitting more regularly again. In October the pack was 14 strong.

John Hansen

Pack Counts: Spring – 6 | Fall – 4
Collared Wolves: 2003GM, 2004GM.

After the failure of the collar of 1302GM in late 2019, the pack went uncollared until March 2020, when we were able to collar 2003GM and 2004GM. Based on continued reports of pack residence and the behavior and territory of the collared wolves, we are confident that it is the same pack. In May, 2004GM dispersed to the east, appearing to settle in a territory near Minto

Lake, where he was trapped in the first days of January 2021. John Hansen pack appeared to use both a den and rendezvous site, but by the fall no pups had survived. The fall pack count was 4.

North Face

Pack Counts: Spring – 2 | Fall – 6
Collared Wolves: 1917GM, 1920GF

The North Face pack continued to maintain a small territory centered around the Moose Creek drainage and the McKinley Bar. The pair denned at Pirate Creek den, and recruited 4 pups, for a fall pack count of 6 — a job well done for just two adults.

Roosevelt

Pack Counts: Spring – 12 | Fall – 14
Collared Wolves: 1811GF, 1904GF, 1903BF

We did not collar any new animals in the Roosevelt pack in 2020, nor did any of the collared animals die. The pack again denned along the Kantishna River and produced at least 6 pups. By fall they were 14 strong and continued patrolling a large territory along the greater McKinley River area. This large pack is a force to be reckoned with, and in the last several years has been responsible for the deaths of wolves from multiple other packs. However even a pack this large still has some challenges: a monitoring flight in August saw the pack scatter when a bear charged into the pack's kill site.

Sesui

Pack Counts: Spring – 2 | Fall – 1
Collared Wolves: 1808GM, 1919GF

This pack began the year as a pair, patrolling a territory west of Castle Rocks in the Herron River area. They denned near Castle Rocks lake and produced 4 pups. Unfortunately the pack struggled to find food, resulting in the death of 1919GF in mid-September due to starvation. The pups are presumed to have met the same fate, as 1808GM began traveling widely, alone. The pack ended the year with a count of 1.



The north face of Denali as seen from Wonder Lake. *NPS Photo*



A wolf on the Park road at sunset. *NPS Photo/Emily Mesner*

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, 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 2020, staff captured and collared 16 wolves during two capture efforts, including 2 recaptures

of wolves collared in previous years to replace aging or failed collars.

CLOSURES

Once closure around an active den site was put in place in 2020 following Denali's Wolf-Human Management Plan. The Wolf-Human Management plan stipulates that a closure will automatically be implemented around a den that was active in the previous two years, until it can be determined if the den is active or not.

Teklanika Wolf Closure

The Teklanika Wolf Closure was implemented on April 30th, 2020. The closure was lifted on August 27th 2020. The area closed encompassed areas south of the Teklanika bridge and along Igloo Creek.



Wolves are very hard on collars. These photos show damage sustained on retrieved collars. *NPS Photo / Kajja Klauder*

Outreach and Collaborations

TALKS

- Wolf Research in Denali, 2020 Resources Day Presentation, June 2020 — Bridget Borg
- Wolf Research History in Denali, Alaska BOG of Game Presentation, March 2020 — Bridget Borg
- Denali Wolves Field Seminar with Alaska Geographic, August 2020 — Bridget Borg
- “Wolf Updates” Resources Day, Denali National Park, May June 2020 — Bridget Borg

OUTREACH

- Wildland Studies, citizen science pellet plot survey, September – Kaija Klaunder
- Wolves of Denali Field Course August 2020 – Bridget Borg
- Continued updates to wolf web page: <https://www.nps.gov/dena/learn/nature/wolves.htm>
- Interview and field visit with independent filmmaker Ramey Newell on upcoming documentary “A Good Wolf.”

PUBLICATIONS

- Davidson, S. C., et al (2020). **Ecological insights from three decades of animal movement tracking across a changing Arctic.** *Science*, 370(6517), 712 LP – 715. <https://doi.org/10.1126/science.abb7080>
- Mahoney, P. J., et al. (2020). **Denning phenology and reproductive success of wolves in response to climate signals.** *Environmental Research Letters*, 15(125001). <https://doi.org/10.1088/1748-9326/abc0ba>
- Van de Kerk, M., et al. (2020). **Environmental**

Influences on Dall’s Sheep Survival. *Journal of Wildlife Management*, 84(6), 1127–1138. <https://doi.org/10.1002/jwmg.21873>

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
- Disease Screening of North American Wolves, Ellen Brandell, University of Pennsylvania
- Follicular Dysplasia and Lice Investigations, Dr. Kimberlee Beckmen, Mark Nelson, Alaska Department of Fish and Game



Technician Kaija Klaunder instructs students on data collection.
17 Photo courtesy Jenna Spackeen

READING WOLF BEHAVIOR: WHAT IS THIS WOLF COMMUNICATING?



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.

NPS Photo



Curious

A wolf that fixes its gaze on you with its ears up is curious. It may approach slowly or walk around you to get a better look. Curious behavior usually results in the wolf leaving once it realizes you are a human. If the wolf follows you or shows interest in tents or vehicles, encourage it to leave by shouting and waving your arms.

NPS Photo



Howling

Wolves howl to communicate with pack members, often as a chorus. Wolves will howl to gather the pack or to communicate with pups. Howls may also be used as a warning to other wolves to stay away. Enjoy this sound of the wild!

NPS Photo

Interactions between wolves and humans are very rare. If you do see a wolf, pay attention to its behavior to determine how to respond.



Fearful/Defensive

A wolf with its ears pinned, hackles up, crouching, with lips pulled back and tail between its legs is acting out of fear or defending itself. Back away quickly and give it space. Barking or bark-howling by wolves is also a sign that you are too close. Leave the area if you hear this.



Aggressive/Predatory

Aggressive or predatory attacks on humans are extremely rare. If a wolf has its eyes fixed on you, ears forward, is standing tall, and has its tail up, it is acting dominant and may become aggressive. A predatory wolf may stalk with head lowered and gaze fixed, or rush directly at its prey. **DO NOT RUN.** Shout, make noise, and be tough.

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 in a predatory or aggressive manner, or is curious and not leaving, **DO NOT RUN!** Get tough! Shout aggressively and make other loud noises, maintain eye contact, and throw rocks.

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