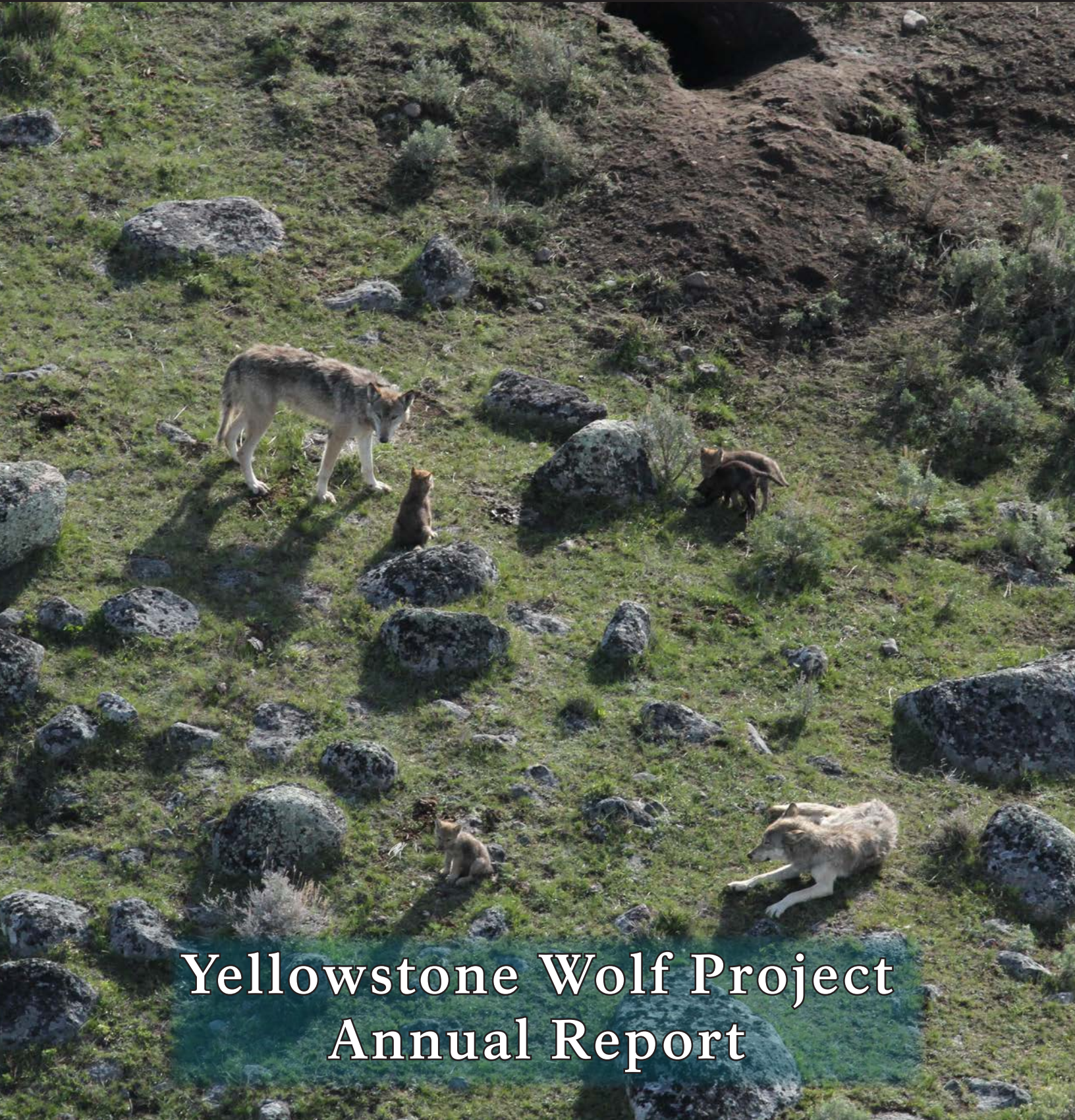


Yellowstone National Park  
Yellowstone Wolf Project 2022  
Wyoming, Montana, Idaho

Yellowstone Center for Resources  
National Park Service  
Department of the Interior



# Yellowstone Wolf Project Annual Report

# 2022

## Summary

At the end of December 2022 there were at least 108 wolves in ten packs (seven breeding pairs) living primarily in Yellowstone National Park (YNP). Pack size ranged from four to 25, averaging 10.7 members. Throughout YNP, at least 58 pups were produced, with an additional three or more litters that were born but died before they could be counted. Forty pups survived (69%) to the end of the year with 28 in the five northern YNP packs and 12 in the five interior packs. At the end of 2022, pups comprised 37% of the wolves living in YNP.

Two packs dissolved (Phantom Lake and Bechler) and four new packs formed this year (Shrimp Lake, Firehole River, Willow Creek, and Lupine Creek). On average, about one pack dissolves and one new pack forms in YNP each year. The explanation for this year's shift in population and pack dynamics may be related to multiple factors: several years of successful pup production; the large 2019 and 2020 cohorts reaching dispersal age; shifting prey dynamics with elk and bison; and other factors. In addition, approximately 19% of the wolves living primarily in YNP were harvested in surrounding states during the 2021-2022 wolf hunting season. This changed inter-pack and intra-pack dynamics, as well as lowered pack sizes overall.

## Wolf-Prey Relationships

Project staff detected 192 kills definitely, probably, or possibly made by wolves in 2022: 112 elk (58.3%), 36 bison (18.8%), 10 mule deer (5.2%), five coyotes (2.6%), five deer of undetermined species (2.6%), four wolves (2.1%), three moose (1.6%), one beaver (0.5%), one pronghorn (0.5%), one swan (0.5%), and 14 unidentifiable species (7.3%, almost all were likely ungulates). The composition of wolf-killed elk was 26% calves, 3% yearlings, 26% adult females, 37% adult males, 3% adults of unknown sex, and 5% of unknown age and sex. The composition of wolf-killed bison was 28% calves, 11% yearlings, 36% adult females, 17% adult males, 5% adults of unknown sex, and 3% of unknown age and sex.

Wolf predation was monitored for two months of the year—one month in late winter (March) and one month in early winter (mid-November to mid-December). The summer predation study period (normally May through July) was not conducted in 2022.

## Winter Studies

During the 30-day March 2022 late winter study period, three teams (air, ground, and Global Positioning System [GPS] cluster-search crew) discovered 44 ungulate carcasses fed on by wolves. In addition, wolves were suspected to have killed one swan and injured one bison that died, froze under ice, and could not be consumed. The air crew was able to fly on 15 of the 30 days and tracked all packs in YNP. The ground crew focused on the Junction Butte pack and observed them on 26 of 30 days. The GPS cluster-crew investigated 136 GPS clusters (locations a collared wolf spent at least one hour) for two wolves in the Junction Butte pack and 55 clusters for two cougars. The crew hiked or skied 594 kilometers (369 miles). Thirty-one (71%) of the ungulates were killed by wolves, including 24 elk, four bison, two deer, and one ungulate of undetermined species. Of the elk, five were calves (21%), four were adult females (17%), 13 were adult males (54%), one was an adult of unknown sex (4%), and one was of unknown

sex and age (4%). The wolves also scavenged on nine bison, three elk (one female adult, one male adult, and one adult of unknown sex), and one bighorn sheep they did not kill.

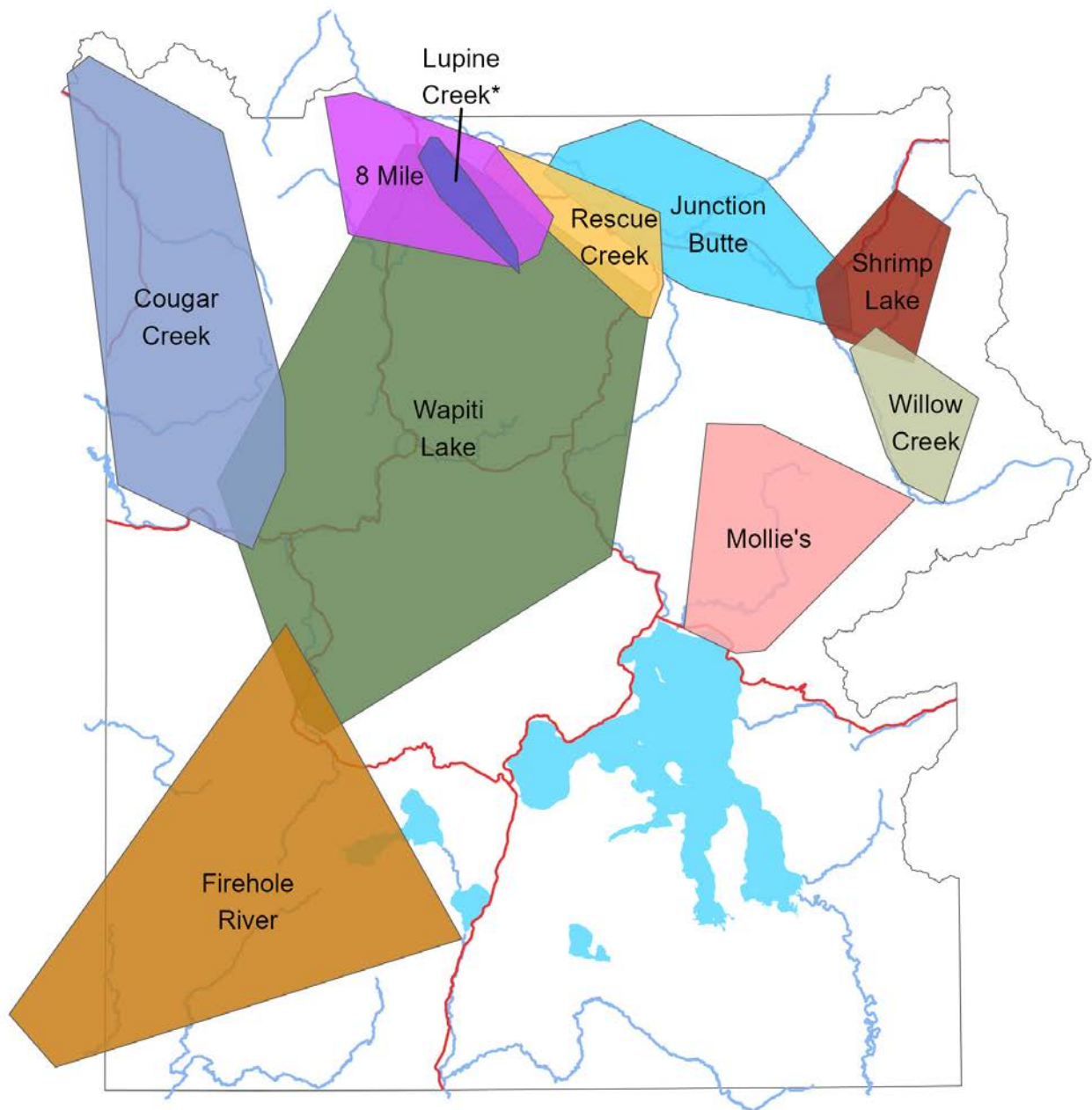
During the November-December 2022 early winter study period, the three teams discovered 85 ungulate carcasses fed on by wolves. In addition, wolves were found at, but could not consume, two bison frozen under ice. The air crew was able to fly on 18 of the 30 days and tracked all packs in YNP. The two ground crews focused on Junction Butte (observed for 25 of 30 days) and Rescue Creek (observed for 22 of 30 days). This month the GPS cluster-search crew searched 153 GPS clusters for two wolves (one from Junction Butte and one from Rescue Creek) and 26 clusters from two cougars. The crew hiked and skied over 620 kilometers (385 miles). Sixty-eight (80%) of the ungulates were killed by wolves, including 47 elk, eight bison, nine deer, two moose, and two ungulates of undetermined species. Of the elk, 18 were calves (38%), seven were adult females (15%), 19 were adult males (40%), two were adults of unknown sex (4%), and one was of unknown sex and age (2%). The wolves also scavenged on seven bison, nine elk (eight male adult and one adult of unknown sex), and one deer that they did not kill.

## Mortality

Six radio-collared wolves died in 2022. Four of the wolves were killed during the wolf hunting seasons—1234M from Wapiti Lake in January, 1233M from 8 Mile in January, 1337F from Firehole River in September, and 1325M from 8 Mile in December. Wolf 1154F was killed by other wolves in late May, and 1265F was hit by a car on July 17 and found badly injured in the Gibbon River the next morning. As it was determined she had been mortality wounded, she was euthanized by park staff. Wolf 1265F had been one of the most habituated wolves in the park and attempts to aversively condition her in early 2022 were only partially successful as we had difficulty catching her near the road in a teachable moment. At other times she was seen by visitors traveling the park roads with

# 2022 Yellowstone Wolf Pack Territories

(95% minimum convex polygons of aerial locations)

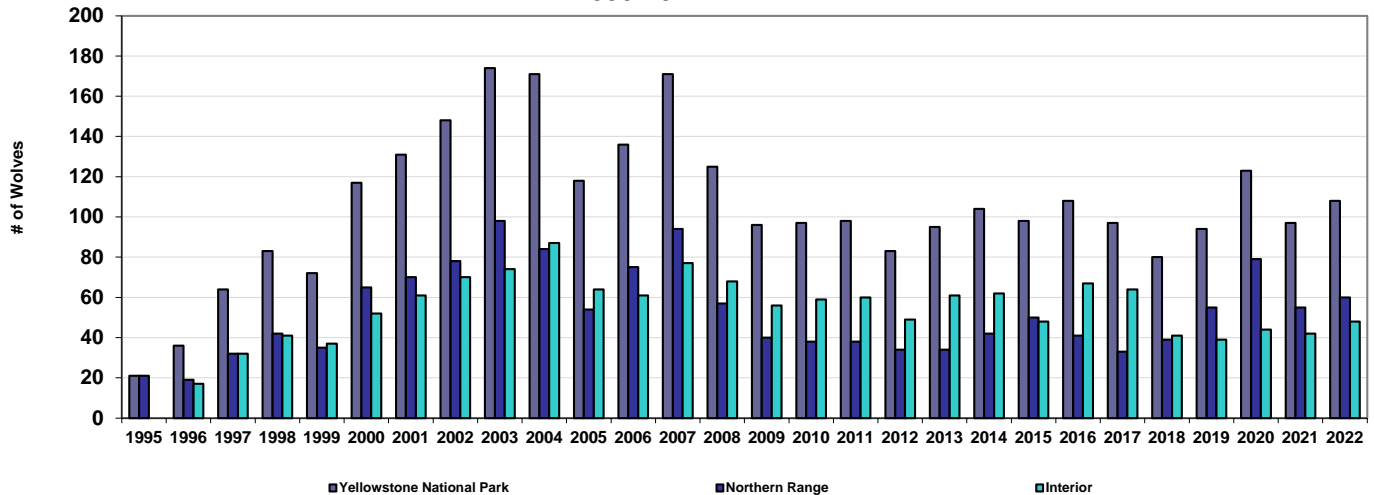


\* Pack formed mid-year

Note: Aerial locations are not obtained during wolf hunting seasons outside of the park. Some wolf pack territories do not represent all transboundary space use. Generally, less than 5% of annual space use is outside of the park for Yellowstone packs.

Front cover: Two adult members of the Junction Butte Pack are on pupsitting duty at the den. With a total of 15 surviving pups born to multiple females in this pack in 2022, a lot of caregiving was required. NPS Photo: J. SunderRaj

## Yellowstone National Park Wolf Population 1995-2022



## 2022 Yellowstone National Park Wolf Capture

Wolf #/sex	Date of Capture	Age	Color	Pack	Collar Type
1235F	1/24/2022	adult	black	Wapiti Lake/Firehole River	GPS
1336M	1/24/2022	yearling	black	Wapiti Lake/Firehole River	VHF
1337F	1/24/2022	yearling	black	Wapiti Lake/Firehole River	GPS
1090F	1/25/2022	old adult	black	Mollie's	VHF
1237M	1/25/2022	adult	gray	Mollie's	GPS
1239F	1/25/2022	adult	gray	Mollie's	GPS
1338F	1/25/2022	yearling	black	Mollie's	VHF
907F	1/26/2022	old adult	gray	Junction Butte	VHF
1339M	1/26/2022	yearling	gray	Junction Butte	VHF
1340M	1/26/2022	yearling	gray	Junction Butte	GPS
1341F	1/26/2022	yearling	gray	Junction Butte	GPS
1342M	1/26/2022	adult	black	Cougar Creek	VHF
1343F	1/26/2022	pup	black	Cougar Creek	GPS
1344M	1/26/2022	pup	gray	Cougar Creek	VHF

vehicles following closely. These patterns likely led directly to her death: extreme comfort around vehicles and roads.

In addition to the radio-collared wolves, staff recorded ten deaths of uncollared wolves. Five of the mortalities were wolves killed by hunters outside the park (three in January in Montana, one in Wyoming in October and one in December in Montana), three were killed by other wolves during inter-pack conflicts, one was killed by a grizzly bear, and one died of unknown natural causes.

### Disease

There was no indication of widespread disease outbreak this year. Both litters of pups produced by the Firehole Lake pack died prior to den emergence and it was unknown if the mortalities were related to disease or some other cause. The pups may have been killed by a predator or died while being



Technicians Jeremy SundeRaj and Taylor Rabe reflect on the life of Rescue Creek Pack's 1154F upon discovering her body after tracking a mortality signal. In previous days, she was likely attacked by 8 Mile pack and subsequently died from her wounds. NPS Photo: D. Stahlner

<b>Yellowstone Wolf Population as of 12/31/2022</b>	<b>Adults</b>	<b>Pups</b>	<b>Total</b>
<b>Northern Range</b>			
<u>8 Mile</u>	8	3	11
<u>Lupine Creek</u>	5	3	8
<u>Rescue Creek</u>	7	5	12
<u>Junction Butte</u>	10	15	25
<u>Shrimp Lake</u>	2	2	4
<b>Northern Range Totals</b>	<b>32</b>	<b>28</b>	<b>60</b>
<b>Non-Northern Range</b>			
<u>Cougar Creek</u>	9	6	15
Mollie's	8	1	9
Wapiti Lake	9	1	10
Firehole River	5		5
<u>Willow Creek</u>	4	4	8
loners	1		1
<b>Non-Northern Range Totals</b>	<b>36</b>	<b>12</b>	<b>48</b>
<b>YNP Total</b>	<b>68</b>	<b>40</b>	<b>108</b>
* <u>Underlined</u> pack names denote breeding pairs			

## 2022 Yellowstone National Park Mortality

<b>Wolf #/sex</b>	<b>Date of Death</b>	<b>Age</b>	<b>Pack</b>	<b>Cause of Death</b>
1234M	1/1/2022	adult	Wapiti Lake	Hunter-killed (MT)
uncollared	approx 1/15/2022	adult	Cougar Creek	unknown natural
uncollared	1/20/2022	pup	8 Mile	Hunter-killed (MT)
uncollared	1/20/2022	old adult	8 Mile	Hunter-killed (MT)
uncollared	1/25/2022	pup	Bechler	intraspecific
uncollared	1/26/2022	pup	Junction Butte	Hunter-killed (MT)
1233M	1/30/2022	adult	8 Mile	Hunter-killed (MT)
uncollared	2/25/2022	pup	probably Wapiti Lake	intraspecific
uncollared	3/4/2022	adult	Wapiti Lake	intraspecific
1154F	5/27/2022	adult	Rescue Creek	intraspecific
1265F	7/18/2022	adult	Wapiti Lake	vehicle strike
uncollared	9/13/2022	adult	Wapiti Lake	interspecific (bear)
1337F	9/23/2022	adult	Firehole River	Hunter-killed (ID)
uncollared	10/1/2022	adult	Shrimp Lake	Hunter-killed (WY)
uncollared	12/5/2022	adult	Rescue Creek	Hunter-killed (MT)
1325M	12/31/2022	adult	8 Mile	Hunter-killed (MT)

moved to a different den by the adults. Most of the other packs had typical pup production and survival rates.

Several members of the Junction Butte, Rescue Creek, and 8 Mile packs have been recorded for the last year or more with slightly discolored, thinning fur in the belly and groin area. After examining a few of these wolves during capture, it seems likely that the wolves had very mild cases of mange infection. After widespread, sometimes severe, infection in most packs from 2009 to about 2013, mange seems to be rare and only causing minor infection in the wolves currently living in YNP.

## Reproduction

Prior to the 2022 pups being born, there were approximately 80 adult wolves alive in April in YNP. At least 58 pups were born to nine packs. Three packs produced multiple litters this year: Rescue Creek (six pups in one litter and an unknown number in another); Firehole River (an unknown number of pups from two litters all died by late May); and the Junction Butte pack (21 pups from four litters). The 8 Mile, Lupine Creek, Shrimp Lake, Willow Creek, Mollie's, and Cougar Creek packs had one litter each. The Wapiti Lake pack had at least one litter but may

have had another that died early. Of the minimum 58 pups produced in all packs, 40 (69%) survived to the end of the year.

## Capture

Fourteen wolves from four packs were captured and collared in 2022. New collars were deployed on two pups, six yearlings, and one older adult. Older collars were replaced on five adult or elderly wolves, including 907F from Junction Butte and both Mollie's leaders: 1090F and 1237M. In addition to fitting the radio collar, staff took blood samples for disease screening, a whisker for isotopic diet analysis, body and tooth measurements, and weights. A uniquely-identifying pit-tag was inserted under the skin near the shoulder in case a collar is dropped or chewed off and the wolf is recaptured in the future. Seven of the collars were GPS (Global Positioning System) which send data and can be programmed remotely, and are used to evaluate habitat selection, movement patterns, prey selection, biomass consumption, and multi-species interactions during specific seasons. These collars typically last for two years and are programmed to record locations every thirty minutes or up to six hours, depending on the time of year and study objectives. The other seven collars were VHF (Very High Frequency) which just emit a tracking beacon but are less expensive than GPS collars and have a battery life lasting over five years in some cases. The Yellowstone Wolf Project goal is to have approximately 25%-30% of the wolves collared in each pack to maintain contact for a wide variety of monitoring and research objectives. At the end of 2022, there were 25 collars on 108 wolves (23%).

## Wolf Management

Wolf management in YNP included temporary closures around the Junction Butte, Rescue Creek, and Wapiti Lake den areas to protect the young pups from disturbance and allow the adult wolves to travel to and from the den unimpeded. The Junction Butte pack denned in two different locations, both visible from the Slough Creek road. However, in early June the adult wolves moved all the pups to the Lamar Valley. After the park road into the Lamar Valley closed on June 13th due to extensive damage from a flood, the Junction Butte pack was generally not visible until the road reopened on October 14th. The Rescue Creek and Wapiti Lake packs both moved their pups further into the backcountry by midsummer and closures were lifted.

Several members of the Wapiti Lake and Junction Butte packs exhibited habituated behavior and, when possible, were aversively conditioned by park staff. Aversive conditioning is performed only during a teachable moment

when a wolf is in proximity to humans or vehicles and showing nonchalance or interest in them. Generally, aversive conditioning can be successful in changing a wolf's behavior but can be difficult to perform unless monitoring the wolf daily for many hours. Visitors can help prevent habituation by refraining from approaching or following wolves with their vehicle. Visitors must maintain at least 100 yards distance from wolves (like bears and cougars), even when near or on the road and pullouts. If a wolf is traveling on the roadway, it is best to leave the area and notify park staff of the wolf's behavior.

## Wolf Hunting Near YNP

Outside of the YNP boundary, Montana's wolf hunting regulations were changed to promote increased wolf killing during the 2021-2022 season by eliminating quotas that were previously in place adjacent to the park. Approximately 19% of the wolves primarily using YNP were killed between September 2021 and March 2022. The Montana Fish and Game Commission considered a reinstatement of a quota along the northern boundary of YNP in Montana to limit hunter-killed wolves based on rationale provided by YNP and other stakeholders with a request from the YNP Superintendent. The commission voted to combine Wolf Management Units 313 and 316 into one unit (called WMU 313) with a quota of six wolves, along with several other state-wide regulation changes. This same area recorded 21 hunter-killed wolves (19 of them from YNP packs) during the 2021-2022 season when no quotas were in place. Prior to 2021-2022, a quota of two to four total had been established for hunt units adjacent to the park since the 2015-2016 season.

Radio collars and subsequent intensive, year-round observation of individual wolves in park packs enabled us to accurately track which wolves were killed when packs traveled outside of YNP boundaries. This science-based information was critical to understanding transboundary wolf management issues.

After the 2021-2022 wolf hunting season, the wolf population could have decreased, increased (called a compensatory response), or remained the same. With 108 wolves at the end of the year, this equals an 11% increase from last year. However, this highlights the important difference between measuring wolves at the population level only and the additional consideration of pack-level dynamics. While the population slightly increased, we recorded changes within packs and between packs that were likely influenced by the 2021-2022 hunting season, notably the dissolution of two packs, the formation of four new packs, and the decrease in average pack size overall.



A member of the Cougar Creek Pack pauses for a short howl as the pack travels across the top of a snow cornice. NPS Photo: M. Metz

As hunter-killed wolves primarily using YNP were more limited for the 2022 portion of the 2022-2023 wolf season, we did not include a season-specific summary in this annual report. See the Mortality section for details on the nine wolves killed in 2022—five in January and four from September through the end of the calendar year.

## Outreach

Wolf Project staff gave 155 formal talks, 99 interviews, presented 6 conference posters and 23 conference presentations, and led 16 field trips. During the summer months, staff helped educate at least 14,110 people while viewing wolves and gave 64 informal talks in the field.

## Graduate Research

In addition to National Park Service (NPS) and Yellowstone Forever staff research, monitoring, and wolf management projects, the Yellowstone Wolf Project supports several graduate student collaborations. Current graduate students include Brenna Cassidy, a PhD candidate at the University of Montana advised by Dr. Mark Hebblewhite, whose projects are focused on gray wolf population dynamics, survival, and cause-specific mortality. Jack Rabe, PhD student at the

University of Minnesota, advised by Dr. Joseph Bump, has projects focusing on multi-carnivore predation dynamics on Yellowstone elk. Nicole Tatton is working on her Master of Science degree at the University of Minnesota and advised by Dr. L. David Mech. She is focused on gray wolf homesite selection. Wes Binder, a PhD student at Oregon State University and advised by Dr. Taal Levi is developing projects focused on the wolf, cougar, ungulate, and scavenger community dynamics in YNP, as well as fine-scale predator behavior using advanced GPS and accelerometer data. Brian Smith, PhD candidate at Utah State University and advised by Dr. Dan MacNulty is studying the demographic consequences of elk spatial response to predation risk from wolves and cougars, including how changes in elk population density modify the relationship between spatial response and predation risk. Lacy Smith and Lainie Brice both completed their PhD's under Dr. Dan MacNulty at Utah State University. Lacy evaluated how age of individual elk and fluctuations in age structure of the northern Yellowstone elk population influences the impact of wolf predation on elk population dynamics. Lainie's research linked long-term data on wolves, elk, human hunters and aspen in the northern portion of YNP to improve understanding of the cascading effects of wolves on patterns of aspen tree recruitment.

## The End of a 20-year Reign

Aaron Bott

During an autumn surveillance flight in 2002, biologist Dan Stahler discovered four wolves, two pups and two adults, in Yellowstone's remote southwest corner, generally referred to as Bechler Meadows. Dan's finding surprised the Wolf Project. Until then, the Bechler region had very little wolf use due to its considerable snowfall (Bechler receives eight times as much annual precipitation as Lamar Valley) and relatively low prey density (there are few elk and no bison).

One of the four wolves Dan spotted was a collared white male wolf identified as 192M who was initially from the Rose Creek pack along the park's northern boundary before he made an approximately 100 kilometer journey to establish a pack in the Bechler. The Wolf Project monitored 192M and the Bechler pack until his death in 2009 at the age of 12, the oldest known wolf in the park at the time. Unfortunately, this left the pack with no working radio collars, and unlike the park's northern range, the public rarely saw the Bechler's resident pack. Staff had to rely on trail cameras and the rare chance sighting on a flyover near the traditional denning areas to get any information about the remote Bechler pack.

In 2019, the Wolf Project initiated a multi-year field study to improve understanding of wolves' spatial persistence and reproduction in Bechler (see previous annual reports for efforts and findings by year). Over the next four years, the Bechler pack's perseverance always impressed us. As a transboundary pack, they tenaciously persisted on a



Members of the Bechler Pack in 2005 at a bull elk kill, including the white-colored founding male, 192M. NPS photo: D. Stahler

multijurisdictional landscape where anthropogenic risks are high, and the prey resources appear few.

After a 20-year legacy, during 2022, the Bechler Meadows pack dissolved. However, with the arrival of a new resident pack in Bechler by the end of the year, we recognize that as long as wolves inhabit Bechler, it will be essential to investigate their life histories. A better understanding of their challenges will help us wrestle with the growing complexity of human-wildlife interfaces in and around the world's first national park.



Femur marrow samples from wolf-killed prey are prepped for drying in order to measure fat content. This data represents prey body condition, and thus vulnerability to predation, at the time of death. NPS photo: T. Rabe



## Wolf Pack Summaries

### **8 Mile (11 wolves: 8 adults, 3 pups)**

In January, the 8 Mile pack lost seven pack members: three were killed by hunters; two disappeared and were possibly poached; and two dispersed. One of the hunter-killed wolves was the uncollared lead female, nicknamed Brindle, who had led the pack for nearly five years. After the mortalities and dispersals, the pack seemed to have difficulty defending their territory from the Wapiti Lake pack, but during the denning season they were able to stabilize as the Wapiti Lake pack returned to their own summer territory in the interior of YNP. In past years the pack has had two litters at separate dens and joined the pups together in midsummer; however, this year the pack did not join the litters. By late summer, at least four adults including 1232M were clearly operating separate from the main 8 Mile pack and were named the Lupine Creek pack. The main 8 Mile pack had three pups to new lead female 1328F and raised all of them through the end of the year.

### **Lupine Creek (8 wolves: 5 adults, 3 pups)**

This new pack formed when the 8 Mile pack split and is a rare case of males and females from the same pack forming a new group together—as opposed to finding mates from other packs. It is unknown how closely related the Lupine Creek adults are to each other, but it is likely at least as distant as cousins, despite being born into the same pack. The pack established a territory in the eastern portion of the 8 Mile pack's traditional territory and produced four pups. A gray adult joined the pack in early winter, likely from 8 Mile, and a pup disappeared. Three pups survived the year.

### **Phantom Lake (lead male was a lone wolf, may have started a new pack, not using YNP)**

For the first half of 2022, the only sign of the Phantom Lake pack was the lead male 1106M observed on a trail camera alone. By the end of the year, 1106M may be with a few wolves but they do not seem to be using areas within YNP and are not considered a park pack.

### **Rescue Creek (12 wolves: 7 adults, 5 pups)**

The Rescue Creek pack, made up of 10 adult males and two adult females, had two separate dens in 2022. Lead female 1154F was found dead in late May with wounds from other wolves (she probably encountered the 8 Mile pack) and her litter of pups likely died. About 10 days later, the subordinate female moved her pups to the former leader's den and took on the leadership role. At least two males,

including 1272M, dispersed and joined the Mollie's pack in August, driving away the Mollie's lead male. Five out of the six confirmed pups survived to the end of the year, and all except one is male, again leaving the pack of twelve with only two females.

### **Junction Butte (25 wolves: 10 adults, 15 pups)**

The pack lost nearly one third of its members during the 2021-22 wolf hunting season. However, most of the mortalities were pups or yearlings and the losses may have been less disruptive to the pack than if they had lost the older, more experienced pack members. Similar to previous years, the pack had four denning females. Leadership switched from the uncollared black female back to nine-year-old 907F after a rare intra-pack fight between the two in the spring. A total of 21 pups were counted at den emergence but six were lost when two of the litters (11 pups) at the Slough Creek den were moved by several female adults across Slough Creek and the Lamar River to a new den. The pack raised the remaining 15 pups, rarely leaving their territory in Lamar Valley until fall. Eight-year-old beta 1048M dispersed to join the Rescue Creek pack and later the Mollie's pack. Despite being beta for years, 1048M has been reproductively very successful and is likely the father to many wolves in the Junction Butte pack. By the end of the year, 1229F and several other adults were also showing dispersal movements.

### **Shrimp Lake (4 wolves: 2 adults, 2 pups)**

Born into Junction Butte in 2019, wolf 1228F dispersed in early 2022 and met a male of unknown origin. The pair established a territory in the Soda Butte valley and produced three pups. The male was killed early in the 2022 wolf hunting season in Wyoming outside the park. Within a month of his death, 1228F found a new lead male and by the end of the year still had two pups. The pack travels in a similar territory as the former Lamar Canyon pack and even though there are few elk in the area after early winter, they seem to be persisting on finding the occasional deer as well as winter-killed bison and bull elk.

### **Willow Creek (8 wolves: 4 adults, 4 pups)**

Wolf 1239F was born into the Mollie's pack but occasionally left the pack for short periods before dispersing in spring 2022 to start her own pack. She denned up the Lamar River and by midsummer we recorded four pups and two other adult wolves with her. One of the adults was

11-year-old 916M, formerly the lead male of the Pahaska pack in Wyoming. His collar was later heard in mortality mode in a remote area in fall and could not be recovered before snowfall. It is presumed 916M died as he was not seen with the pack in early winter. Two other adults, including a new lead male, joined the pack and all four pups survived to the end of the year. We have never recorded a pack living solely in the upper Lamar River drainage all winter so it is unknown if the pack will shift their territory, and in which direction, as winter progresses.

### **Mollie's (9 wolves: 8 adults, 1 pup)**

Long-time leader, 1090F, produced a litter of seven pups, but around the time the pack moved them to a rendezvous site in late summer, Rescue Creek male 1272M was trying to join the pack and pushing out lead male 1237M in the process. Another Rescue Creek male joined the pack and, surprisingly, the Mollie's pups did not stay with their mother, older siblings, and new males. At only four months old, the pups could not survive on their own, but for some reason were not comfortable with the new males or were not welcomed by them in the pack. In early October, we observed five of the pups with their father 1237M and older sister 1338M at the edges of Mollie's territory. By mid-November one pup had joined the main group and seemed comfortable with the new males. The other four pups stayed with their older sister, 1338F, who seemed to be dispersing

out of YNP. Junction Butte wolf 1048M (and father to the Rescue Creek males) joined the pack as a subordinate near the end of the year. The official count includes only the main pack and not 1237M (unknown location or fate), 1338F, or the several pups who may have dispersed with her.

### **Wapiti Lake (10 wolves: 9 adults, 1 pup)**

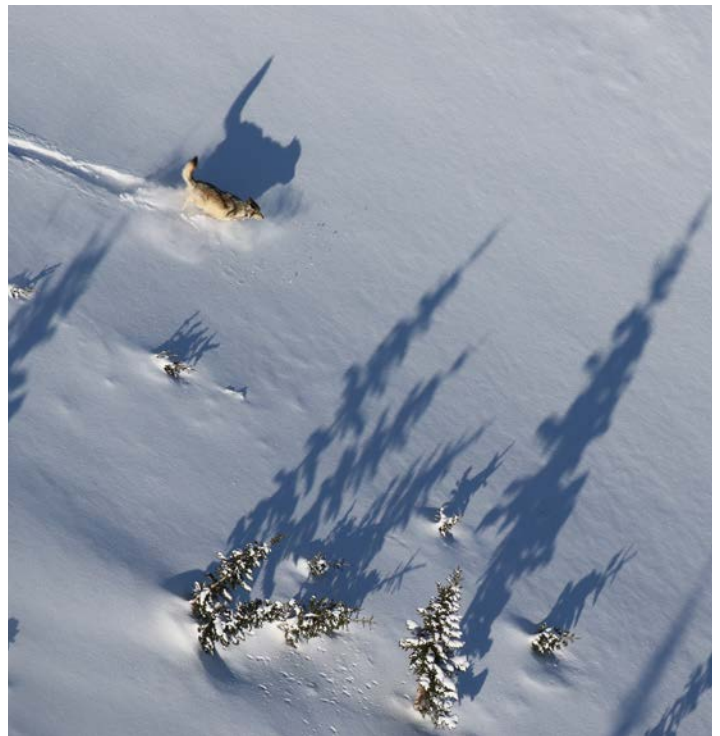
The Wapiti Lake pack experienced major changes in 2022. After the pack seemed to be splitting into three different groups in early 2022, all three groups came back together in early March with a new lead male, then-yearling 1270M from the 8 Mile pack. Both males from the other two groups became lone wolves: 1329M dispersed and was illegally trapped in southern Wyoming near the Utah border while 1336M stayed in YNP. The oldest gray female, born in 2016, was killed by the 8 Mile pack and several other adults and yearlings disappeared over the summer. In addition, three females split off to form the Firehole River pack, meeting back up with 1336M. Only four pups were seen over the summer and only one survived to the end of the year.

### **Firehole River (5 wolves: 5 adults, 0 pups)**

This new pack began when some Wapiti Lake females shifted to using the western part of their pack's territory. Pack members included 1203F, 1235F, 1265F, and 1336M. Several females from the Wapiti Lake pack (1337F and others) may have traveled back and forth between the two



A member of the Wapiti Lake pack sits near the road corridor outside of Mammoth Hot Springs during a winter wander from their typical interior territory. NPS photo : N. Tatton



Mollie's female 1239F seen traveling alone out of her natal pack's territory just before founding the new Willow Creek Pack. NPS photo: D. Stahler

groups over the summer. Both 1203F and 1235F denned and the pack attended an unknown number of pups for about one month. The pups must have died because the adults stopped attending the area and started to travel widely. By the end of the year, 1336M left the pack again and 1203F and 1235F were joined by three black wolves of unknown origin. They had by then shifted their territory to include the Bechler Meadows in the southwest corner of YNP.

### **Cougar Creek (15 wolves: 9 adults, 6 pups)**

In early 2022, pilot Mark Packila tracked the uncollared Cougar Creek pack's sign in the snow for over 20 miles to find them for capture operations. Three new collars were deployed but only one was working (one was chewed off and a second was chewed and damaged) by midsummer. The pack had at least one litter of six pups and all nine adults were still alive by the end of the year. This is the largest the Cougar Creek pack has been in its 22-year history.

### **Bechler (0 wolves)**

A wolf was found killed by other wolves in the Bechler territory in early 2022 and may have been one of the younger Bechler pack members. Two other pack members were observed on trail cameras over the next few months and then not seen again. By September, the Firehole River

pack shifted into the Bechler Meadows area, a reliable indication the 20-year reign of the Bechler pack, which began in 2002, was over.

### **Lone wolves (1 wolf)**

Wolf 1336M was collared with the Wapiti Lake/Firehole River pack females in early 2022. By mid-March, 8 Mile male 1270M joined the females and 1336M became a lone wolf. Two months later 1336M rejoined the few older females to form the Firehole River pack. By fall, 1336M was located separate from the females again and by the end of the year was considered a lone wolf. He traveled alone in areas overlapping the Wapiti Lake pack territory.

### **Transboundary pack and other wolves**

The Hawk's Rest (14 wolves-about 9 adults and 5 pups) and Pahaska (5 adult wolves) packs use eastern and southern portions of YNP in the late summer and fall. They are monitored by Wyoming Game and Fish Department.

Dispersing wolf from Wyoming, 1292F, met up with at least one other wolf and occasionally used YNP's northern range.

Wolf 1198F was a lone wolf for nearly three years before shifting her movements out of YNP into Montana in early 2022. She was killed by a hunter in Montana in October 2022.



Cougar Creek Pack alpha male 1342M, with a striking silverish black coat, wakes up from capture wearing a new radio collar. NPS photo: D. Stahler



Lone wolf 1336M rests on a rock perch on the edge of his former Wapiti Lake Pack territory. Despite his loner lifestyle, he travels far and wide, and keeps well-fed based on his appearance. NPS Photo: D. Stahler



The Rescue Creek Pack challenges a grizzly bear that has usurped their bull elk kill (top). The grizzly bear, once pushed off the kill, swats at the encroaching wolves in defense (bottom). Grizzly bears typically displace wolves from their kills, but wolves aren't quick to abandon if they sense the opportunity to continue benefiting from their hard-earned kill. NPS photos: J. SunderRaj

## Acknowledgments

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## Volunteer Hours

Name	Hours
Dylan Sanborn	820
Hannah Beroske	630
Cameron Ho	600
Mariah Hellebrandt	300
Claire Lacey	140
Nicole Mittman	300
Megan Petersohn	300
JJ Daniel	600
Kyle Dudgeon	300
Courtney Jones	300
Gordy Scott	300
Brad Morin	20
Lindsey Hanneken	20

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Maddy Jackson, Doug Smith, Nikki Tatton, Wes Binder, Claire Lacey, and Dylan Sanborn (left to right) get a predation cluster crew selfie at McBride Lake. NPS Photo: M. Jackson

## Restoring Nature

*Douglas W. Smith*



The sunrise departures from the Gardiner Airport for wolf tracking flights are always full of excitement for what will be discovered about the park and its wildlife. NPS Photo: J SunderRaj

Sometime late 1994, I just met Bill Chapman, we were flying around in his Supercub, just to start learning the park. Then early 1995, skiing Gardner's Hole doing the same thing, getting the feel of Yellowstone. But it didn't have the 'feel' I was used to. The funny thing about time is a lot of it can go by and it still seems like the other day. I write this because I remember what I was thinking for both those trips: wolf-less country feels tame, I might have thought boring. I had just finished a long stint working on Isle Royale, another national park in the middle of Lake Superior, and also a job in northeastern Minnesota where I was accustomed to the 'feel' of wolf inhabited landscapes. When I first got to Yellowstone, I was back to the wolf-less.

I went on to fly with many other pilots, thousands of hours with one named Roger Stradley; skied many more miles, hiked, paddled, and rode horseback too – which maybe I loved most of all because there is nothing better than a bond between human and horse and being off alone with them was special all those years. Thank you, Clyde, Buster, Amos, and Joker. All 'assigned' to me. We shared a lot together. But that was just part of it, I did a lot of other things too – the ones other people noticed and took note of, after all it was my job, and things get recorded. There were lots of people; people truly dedicated to a task they believed in. That was as inspiring as my times alone with the horses. The mission inspired me too, the National Park Service (NPS) one of preservation; it was my favorite line in the thousand or two talks I gave: "I believe in the National Park Service mission

of preservation – as the old cowboys say – don't work for an outfit unless you 'can ride the brand'. I could and I did.

Of course, there was the science. Skeptical of NPS science as I had been schooled on the Yellowstone wildlife wars of elk, bears, bison and natural regulation. Now wolves. Getting wolves restored was the job, but after that it was science, a chance for a better story. The peer-reviewed kind. I threw myself at that and so did everyone else. We worked through government processes, checked our methods, improved on them, hit the field, published findings. We talked to people both inside the park and out, as I had learned the outside view had been left out, or at least that was what was said. Warring scientists and angry locals were common fare, at times it went okay, other times not so much, but we tried. I was acutely aware that the park was an 'ivory tower' like, for sure to locals, but with others as well. I considered when they didn't believe how many wolves we counted putting them in the plane with Roger. The community grew. A phenomenon called 'wolf watching' sprung to life – a unique to Yellowstone thing in the wolf world and that took on a life of its own; we added it in as citizen science. It helped greatly. Again, being inclusive, collaborative.

All this exposure to others changed my thinking. Science was the foundation, but not the way to engage people, or to change them. Few read the actual science. Warming up to Yellowstone (I was still in love (and we love what we are intimate with) with where I had come from (north woods)



and the far north – the ‘true’ remote) a famous, legendary Yellowstone guy, Jerry Mernin, came up to me in 2000 and said I had it all wrong. No one cared about the science – or at least the way it was communicated. You had to take it to the customer. Spoon feed it. He would show me. We did three horse trips along the Yellowstone boundary during the hunting season with the purpose to visit outfitter camps. Elk hunters. We talked about wolves. This cured me of a lot of things. But love of a new place started to take hold. Those late autumn nights in those cabins, horses outside, talking with Jerry caused me to add Yellowstone to my list of precious places. When called upon to take the week-long NPS orientation class at the Grand Canyon, with a straight face I said I had already had the class. I had – from Jerry Mernin in the Yellowstone backcountry on horseback. I rode the boundaries of Yellowstone until 2021.

I got schooled by another guy: Roger Stradley. From a flying family, the business called Gallatin Flying Service, dad Jim a World War II flight instructor, brother Dave I flew with before Roger, but it was with Roger I shared the most. An old bush pilot once told me never fly with someone who doesn’t love to fly – oh my goodness did Roger love to fly. When he quit (he didn’t call it retiring as he didn’t want to stop, but he was forced to quit) I asked him if he wanted a party. He said no, flying all those years was reward enough. If there is one thing I wish I could share it was those thousands of hours with Roger flying over the great park, always with

wild nature in view, and always with animals to spy on – we were after wolves, birds, and elk, but we watched it all. It was stunning and magical. Life changing out alone in the park day after day, year after year. There were times I flew many days consecutively with the great pilot, and I began to sense the pulse of the park, the pace of nature, the wild moods, nature’s joys and anger. Roger knew it like no other and he never tired of it. He was a little kid up there until the last flight we did together. I came for the wolves, I did other things too, but my thousands of hours with Roger above Yellowstone were among the most precious.

It wasn’t wolf-less country anymore. The ‘feel’ was back. Hard to describe, and I hope you can be in both types of country to know what I mean, but a touch of the wild had been restored. Life apart from humans. We had carried out our mission: restoring nature. A lot of people helped, both inside and out of the government. Once in one of the many training classes I had, someone said ‘surround yourself with people smarter than yourself’. I did that a lot. I surrounded myself with wolves too, and that was what I was hired to do. Most of all, I fell in love with Yellowstone.

**Editor’s Note:** *Douglas W. Smith retired from the National Park Service in December 2022. He remains involved in the conservation of wild places and lives with his family in the ecosystem. We thank him for his service to Yellowstone National Park and wish him the very best. - CR*

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The wolf team skis across the edge of McBride Lake on the trail of iced-in wolf tracks left by the Junction Butte Pack in hopes it will lead them to a kill site.  
NPS photo: N. Tatton

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\*All photos are NPS unless noted.