



YELLOWSTONE WOLFE PROJECT



ANNUAL REPORT
1 9 9 7

Suggested citation: Smith, D.W. 1998. Yellowstone Wolf Project: Annual Report, 1997. National Park Service, Yellowstone Center for Resources, Yellowstone National Park, Wyoming, YCR-NR-98-2.

Yellowstone Wolf Project

Annual Report
1997



Douglas W. Smith
National Park Service
Yellowstone Center for Resources
Yellowstone National Park, Wyoming

YCR-NR-98-2

BACKGROUND

Although wolf packs once roamed from the Arctic tundra to Mexico, they were regarded as dangerous predators, and gradual loss of habitat and deliberate extermination programs led to their demise throughout most of the United States. By 1926 when the National Park Service (NPS) ended its predator control efforts, Yellowstone had no wolf packs left.

In the decades that followed, the importance of the wolf as part of a naturally functioning ecosystem came to be better understood, and the gray wolf (*Canis lupus*) was eventually listed as an endangered species in all of its traditional range except Alaska. NPS policy calls for restoring native species that have been eliminated as a result of human activity if adequate habitat exists to support them and the species can be managed so as not to pose a serious threat to people or property outside the park. Because of its size and the abundant prey that existed here, Yellowstone was an obvious choice as a place where wolf restoration would have a good chance of succeeding. The designated recovery area includes the entire Greater Yellowstone Area.

The goal of the wolf restoration program is to maintain at least 10 breeding wolf pairs in Greater Yellowstone as it is for the other two recovery areas in central Idaho and northwestern Montana. Once ten pairs are established and reproduce in all three recovery areas for three successive years, the gray wolf can be removed from the list of endangered species in Idaho, Montana, and Wyoming. The U.S. Fish and Wildlife Service, which has the primary responsibility for ensuring compliance with the Endangered Species Act, oversees the program. In Yellowstone, two park wildlife biologists are dedicated full-time to the project with one assistant and from two to six volunteers.

Following an extended period of public planning and input, wolf restoration to Yellowstone began in 1995, when 14 wolves were brought to the park from Alberta, Canada, held in acclimation pens for 10 weeks, then released into the park. Initial founder wolves, named for the geographic locales at which they were acclimated, were the Crystal Creek, Rose Creek, and Soda Butte packs on Yellowstone's northern range. In 1996, an additional 17 wolves were transplanted from British Columbia and released in more widespread locations throughout the park. In 1995-96, a companion effort to restore wolves to central Idaho occurred, using a simpler technique without acclimation. Although the original plan, outlined in *The Reintroduction of Gray Wolves to Yellowstone and Central Idaho, Final Environmental Impact Statement* (1994), called for annual translocations from Canada for up to five years, additional transplants were deemed unnecessary by 1997 because the founder wolves had higher reproduction, lower mortality, and less movement from the Greater Yellowstone Area (GYA) than was originally expected.

Wolves reintroduced into Yellowstone were classified by the U.S. Fish and Wildlife Service as "non-essential experimental" under section 10(j) of the Endangered Species Act and were to be managed under special rules that permitted managers flexibility in addressing wolf conflicts with livestock and other wildlife management goals. It was anticipated that as the wolf packs established their territories, some would leave the park occasionally or permanently and travel across or inhabit private land, and that some of the 412,000 livestock in the GYA would be preyed upon. In some cases, wolves have had to be captured and penned temporarily for their own welfare or to reduce the possibility of conflicts with livestock.

To facilitate monitoring and research, all of the wolves brought from Canada were radio-collared before release, and the intention is to collar up to half of the wolves born here after they have grown large enough to be safely captured and handled. Wolf project staff monitor the population dispersal and distribution, reproduction, mortality, and predation on ungulates. Monitoring and management activities for the first two years of the project are documented in *The Yellowstone Wolf Project, Biennial Report 1995-96*. Subsequent project activities are presented in annual reports, including this one.

TABLE OF CONTENTS

Background.....	ii	Food Habits.....	12
Summary.....	iv	Winter Study.....	13
The Yellowstone Wolf Population	1	Elk Counts	14
Population Status	1	Wolf Management	16
Population Movements and Territories	1	Captive Wolves	16
Reproduction	2	Livestock Predation	16
Denning Ecology	2	1997 Incidents.....	17
Mortality	6	Public Involvement	18
Pack Summaries	7	Legal Issues	18
Crystal Creek Pack	7	Media Interest	18
Soda Butte Pack	7	Volunteer Program	18
Rose Creek Pack	8	Visiting Scholars Program	18
Leopold Pack	8	Interpretation and Education	19
Druid Peak Pack	8	Acknowledgments	19
Chief Joseph Pack.....	9	Appendix I. Volunteers	19
Thorofare Pack	9	Appendix II. Publications	20
Washakie Pack	9	Appendix III. Non-Profit Organizations Supporting Yellowstone Wolf Restoration	20
The Saga of the Chief Joseph Pack.....	10		
Nez Perce Pack	12		

SUMMARY

The winter of 1996–1997 was an exceptionally severe winter for the Greater Yellowstone Area (GYA), especially for ungulates; in fact, it was arguably one of the most difficult of the century. Rain shortly after New Year’s Day created several ice layers in the snow that impeded grazing. Many ungulates migrated out of the park, and nearly 1,100 bison died as a result of management actions, while another 300 to 400 died from winterkill. A record winterkill of elk was recorded. Wolf kill rates in late winter were high, and elk were again the primary prey of wolves, although moose, mule deer, and bison were also killed.

In the spring, 67 wolf pups were born to 13 litters in 9 packs; 49 of these pups survived to the end of the year. Included in the 1997 population were 10 wolves, brought to the park in 1996 as pups sent from a pack in northwest Montana which had been split up after preying on livestock. By December 1997, an estimated 86 wolves were believed to inhabit the GYA, including 61 wolves in 7 packs that had a breeding pair. Eight other wolves were in 2 groups that were not considered packs because each was without an adult male. The remaining 16 wolves included 2 loners, 5 that were temporarily confined in the park because of livestock depredation, and 9 whose status was unconfirmed.

Wolves from several different packs were involved in livestock predation that resulted in the death of 68 sheep and 6 cows in 1997. The 32 wolves known to have died during the year included 16 pups that did not survive their first six months, 7 that were legally killed because of their livestock predations, 3 that were illegally shot, and 2 traffic fatalities.

On December 12, 1997, U.S. District Court Judge William Downes ruled against the U.S. Fish and Wildlife Service on three consolidated lawsuits contesting the wolf reintroduction program filed by the American Farm Bureau Federation, the Audubon Society and Earth Justice, and a Wyoming couple. The judge found that all the proper administrative procedures had been followed and the reintroduction itself was legal. However, due to the lack of geographic separation between fully protected wolves already present in Montana and the reintroduction areas in which special rules for wolf management apply, individual “endangered” wolves from northwestern Montana that might naturally disperse into the experimental reintroduction areas were receiving reduced protection. However, Judge Downes immediately stayed his order to remove the reintroduced wolves and their offspring, and the U.S. Fish and Wildlife Service asked the Department of Justice to appeal the ruling. A decision on the appeal could be issued in 1999. Until a final court order is issued, wolves in the experimental areas will continue to be managed under the existing rules.

In May, Michael Phillips left his position as leader of the Yellowstone Wolf Project to become executive director of the Turner Endangered Species Fund, where he was to be involved with endangered species recovery on all of Mr. Turner’s lands. Although a major benefit to those lands and life forms, this was a loss to the Yellowstone Wolf Project. Mike’s enthusiasm and expertise will be sorely missed. All of us in Yellowstone wish Mike and his family well in future endeavors.



THE YELLOWSTONE WOLF POPULATION

Population Status

Although the total number of wolves in the GYA increased during 1997 from 52 to 86, the number of packs with breeding pairs dropped from nine in the spring of the year to seven by December 1997 (see Table 1 and Figure 1). Two new pairs that had formed in late 1996 had pups in 1997 and were named the Thorofare and Washakie packs. However, in 1997 the alpha males in the Washakie and Soda Butte packs died and had not been replaced by year end.

The Nez Perce Pack was absent its alpha female and nearly all members were confined to a pen. At the end of 1996, two Nez Perce wolves that had been harassing livestock were being held in a pen with the 10 Sawtooth pups that had been brought to the GYA recovery area from Augusta, Montana. In early 1997 they were joined by two other wolves from the Nez Perce Pack, and in April, four pups were born in the pen. By summer, all of these wolves had been released and were considered part of the Nez Perce Pack. Although they initially resided in Hayden Valley, they did not remain together and many became involved in livestock depredations, causing most of them to be recaptured in the autumn of 1997.

Population Movements and Territories

The eight free-ranging packs (Nez Perce not included) generally remained within their established territories during 1997 (Figure 2). The Chief Joseph Pack, which covered a large area after its release in April 1996 (700 square miles), restricted its movements this year to a

much smaller territory in the northwest corner of the park (320 square miles). In 1996, the Leopold Pack inhabited only about 77 square miles, relatively small for wolf territories in North America. It also occupied the smallest of the GYA territories in 1997, but expanded beyond the Blacktail Deer Plateau to cover about 135 square miles.

The only wolves known to travel outside the GYA during 1997 were Nez Perce and Sawtooth wolves that were released from their pen. One yearling that was released in April was shot for livestock depredation in Leadore, Idaho, in July. Most of the eight wolves that were released in June had to be recaptured after they killed sheep near Dillon, Montana, in October, but they escaped and returned to Dillon, where they were again captured and returned to a fortified pen. (See Nez Perce Pack summary, page 12.)

Elk are the primary prey of wolves in the Yellowstone area. Where moose occur they are sometimes preyed upon. In this case the Crystal Creek Pack chases a cow and calf moose near Pelican Valley in a burn from 1988. Note the calf is ahead of the cow, and the wolves ran in the trail the moose made through two feet of snow. The cow whirled around and charged the wolves six times in the ten minutes this encounter was observed, each time causing the wolves to stop and retreat a short distance. The wolves were unable to kill either the cow or the calf moose. Photo by Douglas Smith.

Table 1. Wolves in the GYA as of December 31.

	1997				1996
	Pups	Yearlings	Adults	Total	Total
Free-Ranging Wolves					
Crystal Creek Pack	6	0	2	8*	2*
Rose Creek Pack	9	3	3	15*	10*
Chief Joseph Pack	5	0	3	8*	2*
Druid Peak Pack	5	0	3	8*	5*
Leopold Pack	5	2	2	9*	5*
Thorofare Pack	6	0	2	8*	2*
Soda Butte Pack	4	2	2	8***	5*
Washakie Pack	5	0	1	6	2*
Nez Perce	—	—	—	—	2
Lone wolves	0	0	2	2	2
Unknown status	3	5	1	9	3
Captive Wolves					
Nez Perce/Sawtooth	1	3	1**	5	12
Total Population	49	15	22	86	52

*Packs that include an alpha pair.

**This wolf had escaped from the pen, but was remaining nearby.

***Counted as a breeding pair as a mature male was present.

Reproduction

In the spring of 1997, 9 packs produced 13 litters ranging in size from 4 to 11 pups, with an average litter size of 5.2 pups. The Rose Creek Pack had three litters; the Druid Peak and Chief Joseph packs both had two litters; the other packs each had one litter. Of the 67 known pup births, 49 of the pups were believed to be still alive at the end of the year. In many cases, pup count estimates were made at dens as soon as two weeks after birth, which means the pup mortality includes the first few months of life. Pup survival was comparable to the previous year; when of the 14 pups reported born in 1996 11 (78.5%) were alive at year end (Table 2, Figure 3).

Denning Ecology

As in 1996, the wolf packs' denning activities were intensively monitored in the spring of 1997. Volunteers were situated at observation points a safe distance from the dens (usually more than one mile) to record numbers and

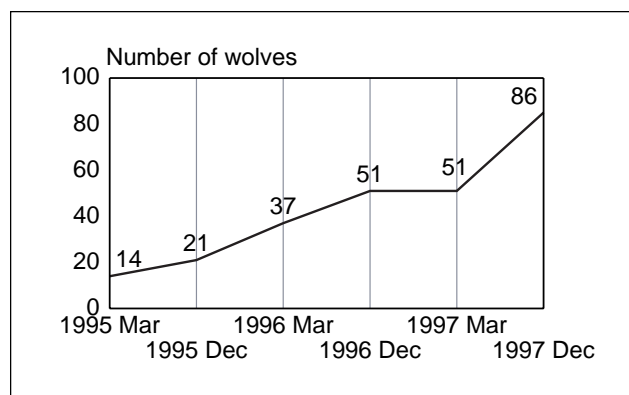


Figure 1. Starting with 14 reintroduced wolves in 1995, the Yellowstone wolf population has grown rapidly.

behavior of pups, den attendance by pack members, rates of food delivery, and interactions with other wildlife. Because of the difficulty of access, the Chief Joseph, Crystal Creek, Soda Butte, and Thorofare packs could be monitored only by air, but the Leopold, Rose Creek, and Druid Peak packs

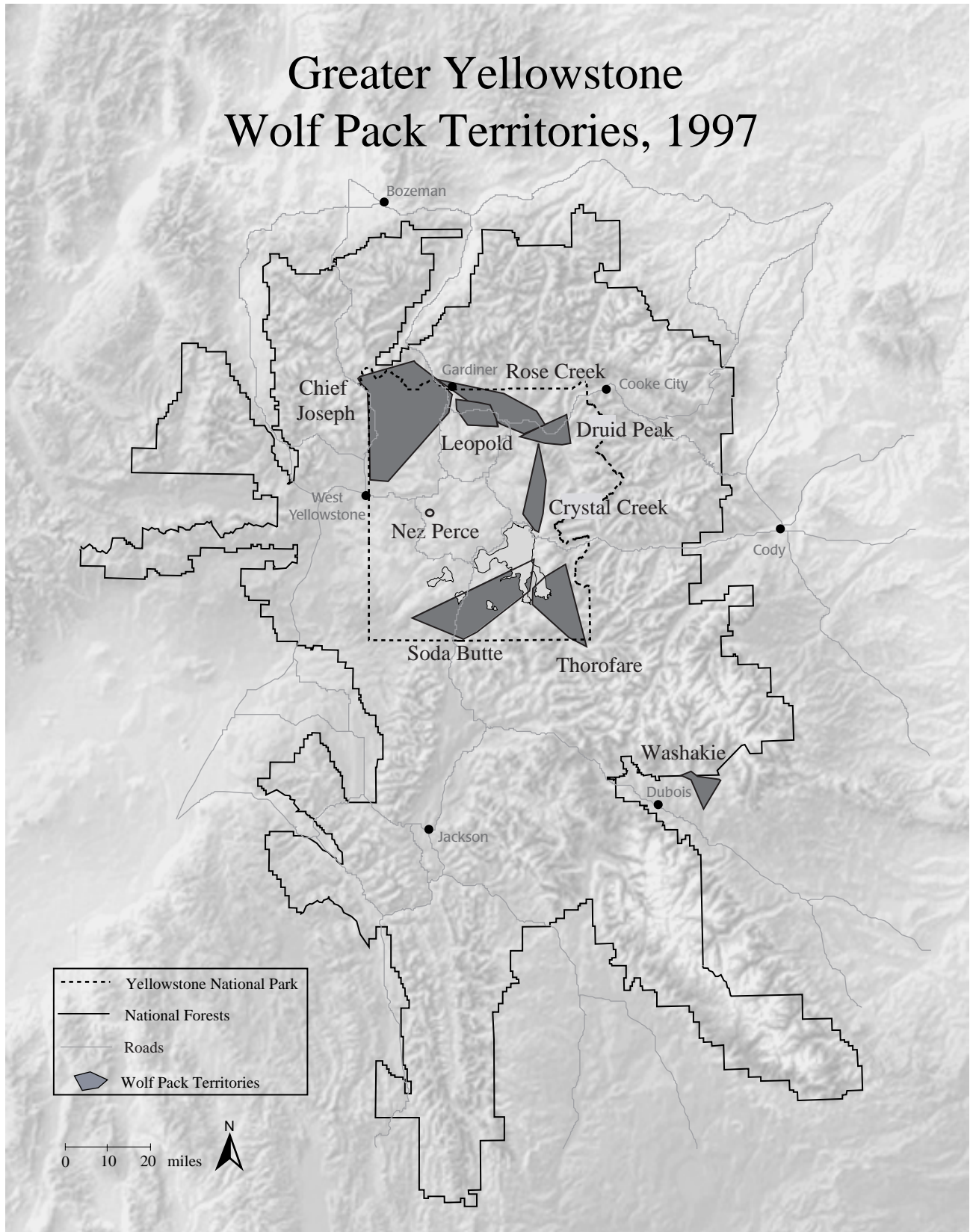


Figure 2. Nine groups of wolves including seven packs and several loners for a total of 86 wolves occupied the GYA at the end of 1997.

Table 2. Known pup births in the GYA in 1997.

Pack	Breeding		Pups Born	Pups Surviving 12/31/97
	Female	Est. Birth Date		
Crystal Creek	#5F	April 26	6	6
Leopold	#7F	April 12	5	5
Chief Joseph I	#17F	April 12-18	5	4
Chief Joseph II	#16F	April 22	5	1
Rose Creek	#9F	April 6	7	0
	#18F	April 6-10	11	9
	#19F	April 6-8	4	0
Druid Peak	#41F	April 20	?	0
	#42F	April 9	5?	5
Thorofare	#30F	May 3	6	6
Washakie	#26F	May 3	5	5
Soda Butte	#14F	April 13	4	4
Nez Perce	#37F	April 16	4	1
Unknown Status				3
Total	13		67	49

were also observed from the ground, which provides more accurate estimates of birth dates and other denning information.

Pups were born from April 6 to May 3. Because #18F of the Rose Creek Pack took over a den that had been dug under a boulder in 1996 by her mother, #9F, who dug a new den in 1997, it is believed that #18F was the first to give birth. All four of the females born to #9F in 1995 (#16F, #17F, #18F, #19F) produced litters in 1997, and at least three used dens constructed under or around a rock; #16's den was not examined. This is interesting because these females were raised in a rock den.

The Soda Butte den was in a cave near a thermal area; other whelping females dug holes into the side of a hill or under tree roots. The Thorofare Pack moved its pups from their den site in May because of high water along the Yellowstone River, so the site was not examined. Three den sites were located near paved roads, and two of them became visitor attractions.

Radio-telemetry locations indicated that the wolf considered the alpha female in the Druid Peak Pack did not

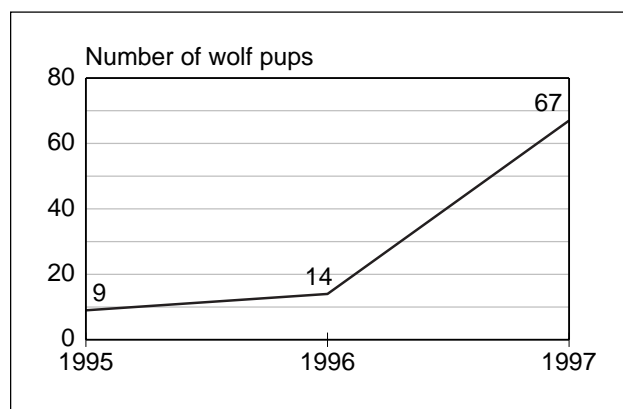


Figure 3. Much of the population growth from 1995 through 1997 was due to exceptional reproduction. Four of seven acclimated groups bred inside of pens, litter sizes were generally large, and three packs had more than one litter of pups.

Joel Sartore



William Campbell



Douglas Smith



Above left: Reintroduction of wolves by definition involves intensive management, like holding and vaccinating pups. Above: One litter of four pups was born inside the Nez Perce pen in 1997. They were held until about two months of age and then released with the adults. The pups stayed in the pen for about another month while the adults moved freely in and out of the pen but always returned. Eventually the whole group left and moved to Hayden Valley where they spent the remainder of the summer. Left: A close look at the Rose Creek den underneath a large boulder. This den was used in 1996 and 1997.

produce a litter, but two other Druid Peak females did (#41F and #42F), both fathered by #38M. They apparently used a communal den near a road where, in a pullout within sight of the closed area surrounding the den, more than 100 people sometimes gathered looking for wolves. Rangers monitoring the area reported 35 occasions on which people attempted to trespass into the closed area; two people walked all the way to the den and saw some pups.

Wolf #8M was presumed to have bred females #9F and #18F. Two of the three Rose Creek litters apparently perished. When #19F, who denned alone near the eastern edge of the Rose Creek territory, was killed by the Druid Peak wolves, her four pups were less than two weeks old and they died from exposure and starvation. After denning within a quarter-mile of the road, where many cars were attracted to the nearest pullout area, #9F moved her seven pups to another den in May, probably because of the human disturbance. But this second den was still within view of the road and visitor attention grew. In late May, #9F attempted to cross the road with her pups, probably to take them to #18F's den, where she and the other Rose

Creek wolves spent most of their time. But when some visitors among the 20 parked cars sighted the pups, frenzied people jumped out hoping for a glimpse or a photograph. As a result of the commotion, #9F was separated from her pups, who then retreated toward the den. Although #9F was eventually able to move at least some of her pups across the road and down to the Lamar River, the pups had great difficulty swimming the flood-stage river. One pup was found dead at #9F's crossing point, and it is unlikely any of the others survived.

Other Rose Creek females, #16F and #17F, dispersed and were bred by the Chief Joseph male #34M. They denned about 20 miles apart on opposite sides of the Gallatin Mountains, but he tended only #17F and her litter, leaving #16F to raise her pups alone. Although #16F's den was only a quarter-mile from Highway 191, it did not receive much attention from visitors. After #17F died from an accidental injury in July, #34M took the pups to #16's den, but no association formed and the two groups remained separate, hence the staff's use of the nomenclature Chief Joseph I and II. (See the Chief Joseph Story on page 10.)

Table 3. Known wolf mortalities in the GYA during 1997.

Wolf	Pack	Age	Cause of Death
13M	Soda Butte	adult	probably died of natural causes in the Heart Lake area, YNP
15M	Washakie	adult	management action
17F	Chief Joseph I	2 years	natural causes in the Fawn Creek area, YNP
19F	Rose Creek	2 years	probably intra-pack conflict on the northern range, YNP
27F	Nez Perce	adult	management action—killed livestock west of YNP
28M	Nez Perce	adult	illegally shot west of Bozeman, Montana
31M	Druid Peak	adult	illegally shot east of YNP
37F	Nez Perce	2 years	management action
38M	Druid Peak	adult	illegally shot east of YNP
63F	Sawtooth	1 year	management action—killed livestock north of YNP
64F	Sawtooth	1 year	legally shot for livestock predation north of YNP
66M	Sawtooth	1 year	vehicle—hit and run in central YNP
68F	Sawtooth	1 year	management action—killed livestock south of YNP
69M	Sawtooth	1 year	legally shot for livestock predation in Idaho
71F	Sawtooth	1 year	killed with ADC coyote M44 trap northwest of YNP
73-76	Rose Creek	12 days	malnutrition and exposure on the northern range
86-90	Rose Creek	pups	probably died of natural causes on the northern range, YNP
91F	Nez Perce pen	5 weeks	probably died of natural causes in the pen
100	Rose Creek	3 months	probably died of natural causes on the northern range
101, 102	Rose Creek	pups	probably died of natural causes on the northern range
108M	Chief Joseph II	5 months	vehicle—hit and run, western edge of YNP
110, 112	Chief Joseph II	pups	probably died of natural causes, western edge of YNP
140	Rose Creek	pup	probably died of natural causes on the northern range, YNP

Except for the Thorofare and Rose Creek pups whose mothers relocated them to new dens, all of the litters remained at their den sites until at least July, and in one case until September (Chief Joseph II). Neither Chief Joseph II nor the Washakie Pack established a rendezvous site, and no pack was documented as having more than one rendezvous site.

Mortality

Of the 32 (Table 3, Figure 4) wolves that died in 1997, 17 were pups. Except for one pup that was hit on Highway 191 in September, all of the pup mortalities were due to natural causes. Of the 15 adults and yearlings that died, seven were killed because of livestock depredation, three wolves were illegally shot, three died of natural causes, one was hit by a vehicle, and one was inadvertently killed in a trap set for coyotes by federal Wildlife Services agents (Figure 5).

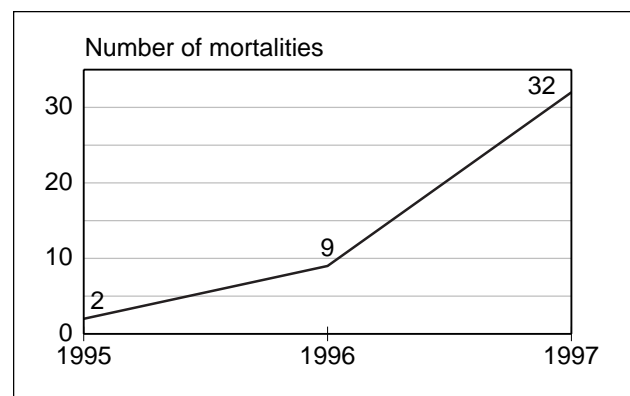


Figure 4. Wolf mortality rose sharply from 1995 through 1997, but the mortalities did not impede population growth. About half of the wolf mortalities were pups of the year.

William Campbell

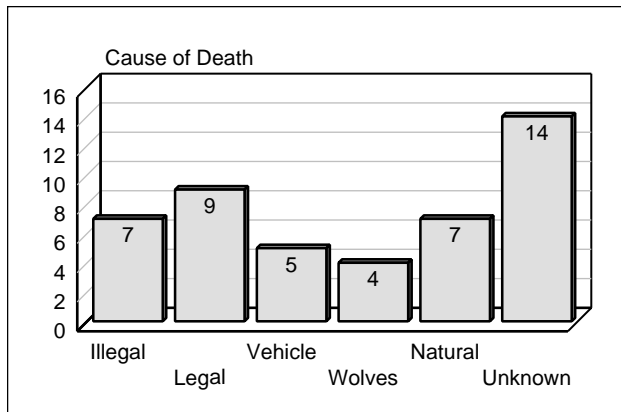


Figure 5. Cause of wolf mortalities from 1995 through 1997. Specific assignment of cause of death in many cases was not possible, as many of the wolves that died were pups and the carcasses were not recovered. Other causes of mortality were legal take because of livestock depredations, starvation and/or exposure (natural), other wolves, car strikes, and poaching.

Of the 46 known wolf mortalities that have occurred since wolves were reintroduced in 1995, 21 (46%) were human caused (Table 3, Figure 5). For yearling and adult wolves, the leading cause of mortality has been legal killings due to control actions related to livestock predation. (See Livestock Predation, page 16.)



PACK SUMMARIES

Crystal Creek Pack

After being displaced from the Lamar Valley by the Druid Peak Pack in 1996, the remaining pair (#5F and #6M) from the original Crystal Creek Pack of six moved to Pelican Valley where they resided during 1997. (Their pack name was assigned according to their original release site and will remain the same regardless of where the wolves establish a territory.)

In April, members of the Crystal Creek Pack killed an adult cow bison on Pelican Creek, the first known bison kill by Yellowstone wolves. The severe winter likely contributed to the vulnerability of bison, which otherwise have appeared immune to wolf predation. But the next day a grizzly bear usurped possession of the carcass, guarding it until it was consumed. Another bison calf was killed in April by the Nez Perce wolves. Reports indicate that this



Wolf #63 was a pup brought to Yellowstone from Augusta, Montana. She was one of 10 pups from the Sawtooth Pack brought to Yellowstone because their parents killed livestock. These young wolves were in turn responsible for two-thirds of the livestock depredation in the Yellowstone ecosystem. She was legally killed in October 1997 for killing sheep on two occasions.

animal was also made vulnerable by the severe winter.

The Crystal Creek pair denned in Pelican Valley and had a litter of six pups. This was the first surviving litter produced by #5F in the GYA. Although her exact age is unknown, she was classified as an adult upon her arrival in Yellowstone in 1995 when she experienced a pseudopregnancy (see Mech, L.D., M.K. Phillips, D.W. Smith, and T.J. Kreeger. 1996. Denning behaviour of non-gravid wolves, *Canis lupus*. Canadian Field Naturalist 110:343-345), and probably lost a litter of pups in 1996 because of an inter-pack trespass by the Druid Peak Pack. The alpha male #6M was three years old in 1997 and is possibly her son; DNA tests are pending.

Soda Butte Pack

After being moved from private land in June 1996, the Soda Butte Pack was released from a pen near Yellowstone Lake in October of that year; they took up residence in the Heart Lake region of the park. During the winter of 1996-1997, they lived in a small area influenced by thermal activity around Witch Creek near Heart Lake. This area typically supports an estimated 40 to 70 elk during the winter because it accumulates less snow and provides green grass much earlier in spring than areas outside the realm of thermal influence. Because of the deep, crusted snow outside the geyser basin that winter, the

elk were largely restricted to thermally-affected areas where they could be preyed upon by the Soda Butte wolves. No elk were sighted outside of this area during wolf tracking flights until April, when the wolves killed one bull elk on the Snake River, about ten miles away.

The oldest wolf brought from Canada, #13M (often referred to as “Old Blue” because his black fur had turned gray with a bluish sheen), probably died of old age along Witch Creek in March. Because the other pack members did not leave this area until August, it was not searched until September, when only #13M’s well-chewed collar remained. In addition to the four other pack members (his adult mate, their two-year old daughter, and two yearlings [one male and one female]), #13M left behind four pups (three gray and one black) that were born to his mate, #14F, in April 1997.

The Soda Butte wolves, lacking an apparent breeding male, began the winter of 1997–1998 in this same Witch Creek thermal area, where 52 elk were counted in December. How long this unique situation will continue is unknown.

Rose Creek Pack

The Rose Creek Pack is the largest wolf pack in the GYA. Three females bred in 1997, producing at least 22 pups, of which only 9 survived; it is likely that all of them belonged to #18F. (See Reproduction, page 2.) As of December 31, the pack included one adult male (#8M), two adult females (#9F and her daughter #18F, born in 1995), three yearlings (#51–#53, two females and one male), and nine pups (#77–#85). These wolves range from the Lamar Valley west along the Yellowstone River valley.

Number 9F’s contribution to wolf restoration in the GYA is remarkable. She has bred three times, with two of those litters surviving. All four females from her first litter (#16F, #17F, #18F, and #19F) bred in 1997, with pups from three of those 1997 litters surviving. Her son #21M, also born to the first Yellowstone litter in 1995, became the alpha male of the Druid Peak Pack in December 1997. The daughter who arrived with her from Canada, #7F, became the alpha female of the Leopold Pack in 1996, and produced litters in 1996 and 1997. Her other son, #23M, an uncollared black male born in 1995, dispersed in October 1996, and he could be the black wolf reported north of the park, sometimes in company with a gray wolf.

Leopold Pack

In January 1996, when 22-month-old female #7F—originally from the Rose Creek Pack—paired up with a male of the same age, #2M, who had dispersed from the Crystal Creek Pack, they became the first naturally forming wolf pack in the greater Yellowstone in more than 60 years. They had three pups in 1996 and five in 1997 (three black and two gray), of which seven are still with the Leopold Pack. The eighth one, an uncollared gray yearling, dispersed in October of 1997, and it could be the gray wolf reported north of the park with a black wolf.

The Leopold Pack occupies the Blacktail Deer Plateau, which has abundant elk throughout most of the year, especially in winter. This may be why they have the smallest territory of any of the GYA packs (77 square miles). In December, however, they expanded their movements to include the area around Swan Lake Flats and Gardners Hole. They spent about three weeks there, killing several elk, before returning to Blacktail. If they continue to use this area their new territory would cover about 135 square miles.

Druid Peak Pack

The Druid Peak Pack, which lives in the Lamar Valley, began 1997 with five members. Two females, #41F and #42F, had pups in the spring, apparently using a communal den. The alpha or dominant female, #40F, apparently did not produce pups. In May, after being a lone wolf for about 10 months, #39F, a former pack member, returned, became a subordinate wolf, and assisted raising the pups over the summer. But both #39F and #41F, who were subordinate to #40F and #42F, dispersed in November.

In December, the pack traveled north up the South Fork of Cache Creek and into the Crandall Creek area of the North Absaroka Wilderness east of Yellowstone National Park. During this trip, both of the pack’s adult males #31M and #38M, were shot. The incident was under investigation at year end.

Within a week after the remaining pack members returned to Lamar, #21M, who had associated briefly with #39F after dispersing from the Rose Creek Pack, assumed the alpha male position in the Druid Peak Pack. His initial encounter with the Druid females and pups happened to be visible from the road, where a Wolf Project field crew and

Jim Peaco



Mule driver Ben Cunningham, with mules Billy and Tack, transports six Sawtooth pups from the Rose Creek pen. Initially the mules did not like being around the wolves, but as with most things concerning mules, they quickly figured things out and became very reliable at moving wolves. The mule Billy became especially noted for his wolf-handling accomplishments.

filmmaker Bob Landis observed and recorded the six-hour sequence on film and dictaphone. It is likely that there is no other such footage of wild wolf behavior in existence.

The Druid Peak wolves have been continually aggressive in defending their territory. In 1996 they killed the original Crystal Creek Pack's alpha male, displaced the remaining wolves from the eastern Lamar Valley, and killed another yearling male from the Rose Creek Pack. This year they slayed #19F of the Rose Creek Pack in April. It will be interesting to record their behavior in the future, as their new male leader, #21M, is originally from the Druid Peak Pack's major nemesis, the

Rose Creek Pack, whose territory overlaps that of the Druids. Will interactions between the two packs be moderated?

Chief Joseph Pack

Although this pack began the year with just an adult pair, #33F and #34M, the male ventured into Rose Creek territory, returning with two sisters from that pack, #16F and #17F. (See the Saga of the Chief Joseph Pack on page 10.) Male #34M apparently did not mate with #33F in 1997 so she temporarily dispersed, but he bred both #16F and #17F. Perhaps because #17F whelped first, #34M assisted #17F with her litter of five gray pups, leaving #16F to raise her five (three black and two gray) pups on her own. Wolf #17F accidentally died from an injury in July, triggering a series of interesting events. Her mate, #34M, brought #17F's pups to #16F's den. In August, #33F reappeared and re-paired with #34M but no association formed between the two groups. Because the two groups have remained separate, biologists have described them as Chief Joseph I and II.

This pack initially ranged throughout the northwest corner of the park south to the Old Faithful area, but after the birth of the two litters, used only the extreme northwestern portion of the park and into Tom Miner Basin in the Gallatin National Forest. Chief Joseph II, consisting of #16F and one of her two surviving pups, #111F, ranged through the Gardiner Basin east to Hellroaring Creek.

Thorofare Pack

After the originally named Lone Star pair was released near Old Faithful in April 1996, the pregnant female soon died. By September the male, #35M, had paired with #30F, originally released from the Nez Perce pen (also in April 1996), and they formed a new pack. They had six pups, five black and one gray, in 1997, all of which were still alive at year end. More than any other pack, they relied on moose for food; during a 30-day period in March they killed three moose and one elk. Their territory was restricted to the Yellowstone River Valley, from the southeast arm of Yellowstone Lake to the Thorofare region, for which their new pack was named.

Washakie Pack

The Washakie Pack formed naturally in 1996, after a female that had dispersed from the Nez Perce Pack, #26F,

Joel Satore

THE SAGA OF THE CHIEF JOSEPH PACK

The Chief Joseph Pack was transplanted from British Columbia to Yellowstone in 1996. Four wolves, an adult female #32F, and two pups, a male (#31M) and a female (#33F)—probably hers—from the same pack in British Columbia, were introduced to an adult male #34M from a different pack in the Crystal Creek acclimation pen. They appeared to form a harmonious social unit inside the pen, but unlike some of the captive wolves, they did not breed while in the pen.

On April 11, 1996, the wolves were sedated and transferred to the Nez Perce pen because wolves released in 1995 were already occupying the Crystal Creek area. The penned wolves were named the Chief Joseph Pack after a nearby historical site. One panel was removed from the pen and the gate was left open. Two days later all four wolves exited and began free-ranging life in Yellowstone. Pup #31M dispersed immediately and joined the Druid Peak Pack in the Lamar Valley several months later. He was later found to be related to the Druid Peak alpha male, #38M, which likely contributed to his successful union with that pack. He remained with the Druid Peak wolves until both he and #38M were illegally shot in December 1997.

In June 1996, the Chief Joseph adult female, #32F, was hit and killed by a semi-truck on Highway 191. The two remaining Chief Joseph wolves, #34M and #33F, travelled together for the rest of 1996 in the northwest corner of Yellowstone National Park.

In January 1997, #34M made an out-of-territory foray across the northern range and through the territories of three other wolf packs. He was photographed on one occasion being attacked and badly injured by five of the Druid Peak wolves. It is interesting that he survived this encounter. It is likely that he also received wounds in an attack by the Rose Creek wolves. Not surprisingly, he retreated back to his former territory, but was accompanied by two 21-month-old sisters from the Rose Creek Pack (#16F and #17F). The three were located together with #33F in late January.

Wolf #34M bred with both #16F and #17F that spring, but he apparently did not breed with #33F, and she was not found with any of these wolves again until August. Aerial radio locations indicated that #17F likely whelped before #16F, which may be why #34M tended only #17F's litter of five gray pups at her den west of Mammoth. Female #16F's litter was a straight line distance of 20 miles away, across the Gallatin Mountain Range, where she also had five pups, two black and three gray.

On July 18, shortly after #17F and #34M had moved their pups to a rendezvous site, a tracking flight picked up a mortality signal from #17F's radio collar. She was picked up that day, and a necropsy later revealed that she had been gored in the chest by a stick. Foul play by humans was not suspected, so it was probable that the wound was sustained while the wolf was chasing an elk. The next tracking flight, on July 31, found #34M with his five pups at the same rendezvous site.

On August 11, #34M was found with #16F at her den site with what were probably all the pups from both litters; aerial observation of the den recorded eight wolves: two black and six gray. One of the black animals was recognizable as #16F, and since none of #17F's five pups were black, that meant that the other black wolf pup was from #16F's litter. At least one other gray pup also had to be #16F's.

Later that same day, #16F was hit by a car near the den site and a park ranger observed the wolf dragging her hindquarters as she fled the road. Ground tracking the next day determined that she was injured and able to travel, but apparently with difficulty. She did not return to her den site.

By August 15, #33F had returned to the pack, and was located with #34M at #16F's den site. After four to six days, they took what were assumed to be #17F's pups and headed back over the Gallatin Mountains to near the rendezvous site that #34M and #17F had established.

Still appearing injured, #16F continued to restrict her movements to an area about five miles north of her den site, and on August 22, she traveled about five miles east to the headwaters of Tom Miner Basin. Her five pups, which had been left to fend for themselves, foraged on old road-killed carcasses and traveled along the Gallatin River looking for fish remains left by fishermen. Starting on August 29, wolf project staff began receiving daily reports of four wolf pups, both black and gray, seen on Highway 191 near #16F's den site, endangering themselves and motorists.

On September 3, personnel from the Wolf Project and the U.S. Fish and Wildlife Service captured two pups, both in poor condition, to collar them for tracking purposes. They also placed food in the den area to draw the pups away from the road and keep them alive until the predicted return of #16F. On September 4, she was observed walking in Tom Miner Basin but not using one of her hind legs. One of her collared pups was hit by a car on September 8, and two of the uncollared pups apparently died of natural causes, probably a result of malnutrition. This left only one black and one gray pup from #16F's litter of five. One of #17F's pups was also assumed to have died of natural causes.

During the next month, #33F and #34M returned sporadically with his pups to #16F's den area. On one occasion, #34M was observed trying to kill an elk near the den, and it is likely that he succeeded in this effort at least once. A tracking flight on September 9 found #16F with two uncollared pups, one black and one gray, eating a deer that she had presumably killed. The surviving collared pup (#111F) remained at the old den site with an uncollared pup.

The pattern that emerged for the next month was that #16F was observed alone in the Tom Miner area, while #111F also appeared to be leading an independent existence. Another black pup was reported north of the den site. On October 15, all three wolves of the group now called Chief Joseph II were found near the den area feeding on a recently killed elk, but toward the end of the year, only #111F was seen traveling with #16F in the northwest portion of the park. The group called Chief Joseph I, which included #33F and #34M with four pups, traveled in the same area but were never located with #16F and her pup(s).

began hanging around the Nez Perce pen, where #15M had been temporarily re-confined after settling on land used for livestock operations. When it was surmised that the female was attracted to #15M, he was released in August 1996, and the wolves immediately paired. They worked their way south together and settled in the DuNoir Valley near Dubois, Wyoming, where they had five pups in 1997 (three black and two gray).

In the fall, after the death of two calves was attributed to wolf predation, #15M was shot by Wildlife Services agents. After #15M was killed, no other livestock predations were reported in the area for the rest of 1997. Because of #15M's death, the Washakie Pack was not considered to have a breeding pair at year end.

Nez Perce Pack

After their initial release from their acclimation pen in April 1996, this pack of six wolves fragmented and ranged widely. At the beginning of 1997, two of the siblings (#29M and #37F) that had been harassing livestock were being held in a pen with 10 pups (#63–#72) brought to the GYA recovery area from Augusta, Montana. The pups had been part of a litter of 12 in the Sawtooth Pack that had been split up because of livestock depredation. It was hoped that all of the wolves would become socialized to each other inside the pen and form a cohesive pack after release.

In January, the original Nez Perce alpha male #28M, which had been traveling alone widely throughout the northwest part of the GYA, was illegally shot west of Bozeman, Montana. In February, two more Nez Perce wolves were captured and brought to the pen: the original alpha female (#27F), who had been responsible for the death of at least eight sheep near Fishtail, Montana, the previous summer, and a female pup (#48F), who had recently killed two sheep in the same area. But the pup soon escaped from the pen and roamed the GYA widely for the rest of the year.

In April, the Nez Perce siblings (#29M and #37F) in the pen produced a litter of four pups, one of which soon died. The 16 remaining captive wolves were released in two groups of eight, in April and June, in the hope that the first group would begin to establish a territory near the pen in order to remain near the confined wolves, and that they would then all stay in that area after release. Instead, they traveled widely and were responsible for most of the

livestock depredations by wolves that occurred in the GYA during 1997. (See *Captive Wolves*, page 16.)

One of the eight Sawtooth yearlings (#69M) released in April left the GYA and was shot in Leadore, Idaho, after killing one sheep and a cow. The group released in June, which included the two remaining Sawtooth yearlings, the three Nez Perce wolves and the three pups, traveled together and killed three calves near Dillon, Montana, in October. The older Nez Perce female, #27F, was shot by Wildlife Services because of her repeated depredations. Two of the pups were believed to have disappeared somewhere in the Gravelly Mountains, but the other five wolves were recaptured. After their return to the pen, #29M escaped over the fence, a trick apparently only he and his sister #37F have figured out, and dug a hole beneath it through which the other four wolves could escape. The wolves traveled again to the Dillon area, where they were recaptured and brought back to a re-fortified pen. By then, the deaths of three sheep had been discovered and attributed to them. A decision was made to release these five wolves again in the spring of 1998, but if they traveled west of Highway 287 or Highway 20, they will be removed permanently.

However, before 1997 came to a close, #29M (who probably cannot be held in a pen) had vaulted the fence again, accompanied by #37F. They headed west together, and headed back to the Gravelly Mountains in what may have been a search for #37F's two missing pups. After she moved west of Highway 287 in November, she was killed by Wildlife Services for her two previous livestock-killing offenses. Although #29M returned on his own to the pen, he was unable to set the other wolves free again by digging under the fence and was remaining near the pen at year end.



FOOD HABITS

Wolf kills were detected when wolves were observed at or near the site of a carcass. During 1997, project staff detected 257 known and probable wolf kills. Of these, 234 (91%) were elk. Other prey included 8 moose, 6 mule deer, 2 bison, 1 beaver, and 6 unidentified animals.

After the wolves had left their dens, project staff made brief visits to den sites to collect scats. Only 111 scats were collected from eight dens, apparently because

Table 4. Number of wolf kills counted during two 30-day monitoring periods in 1997.

Wolf Count	Pack	Elk			Other Prey	Total Kills
		Calves	Cows	Bulls		
<i>March-April Period</i>						
5	Druid Peak	0	5	6	2 ungulates	13
8	Rose Creek	0	7	5	2 unknown elk, 2 other ungulates	16
5	Leopold	2	7	3	0	12
2	Thorofare	0	0	1	1 unknown elk 3 other ungulates	5
4	Soda Butte	1	0	1	4 unknown elk	6
3	Chief Joseph	0	0	0	1 unknown species	1
2	Crystal Creek	0	0	0	1 unknown elk, 1 bison	2
29	Total	3	19	16	17	55
<i>November-December Period</i>						
8	Druid Peak	3	1	0	1 moose	5
15	Rose Creek	4	7	0	0	11
8	Leopold	5	3	2	1 mule deer	11
8	Thorofare	3	1	1	0	5
8	Soda Butte	2	1	0	1 unknown elk	4
7	Chief Joseph	1	0	0	0	1
8	Crystal Creek	2	2	0	0	4
62	Total	20	15	3	3	41

the scats were being consumed by ravens. Scat analysis confirmed that a high proportion of the prey were elk, but mule deer was discovered to also be an important food for the Soda Butte and Chief Joseph packs. The Soda Butte wolves also utilized moose, particularly calves. Remains of other species found in wolf scats were bison, vole, ground squirrel, snowshoe hare, beaver, coyote, bear, insect, and vegetation.

Winter Study

Twice during the winter, from mid-March to mid-April and again from mid-November to mid-December, project staff monitored the wolf packs intensively for a 30-

day period to detect kill rate (Table 4). The three packs on the northern range (Leopold, Rose Creek, and Druid Peak) were monitored both on the ground and from the air; the other packs (Chief Joseph, Crystal Creek, Soda Butte, and Thorofare) were monitored by plane as often as weather permitted. In addition to kills and daily locations, data was recorded to the extent detectable on prey species, age, and condition, length of time spent on each kill, and utilization of prey.

March-April study. Wolves were observed for 137 hours from the ground and for 19 of 30 days from the air. During this time, 55 wolf kills were detected: 46 elk, 1 bison, and 8 unknown species. Only 3 (7%) of the elk kills were calves, while 19 (41%) were cows and 16

(35%) were bulls; the other kills were either not classified or were not elk. The average number of days between wolf kills (calculated by dividing the number of kills by 30 days) was 2.9 for all packs, with a range from 1 to 6 days.

The kill rate was higher (2.0 days/kill) for packs on the northern range than it was for other packs (6.0 days/kill). This difference could be because the other packs were only monitored from the air, but it was also likely due to the greater abundance of prey found on the northern range. Most wolf-killed ungulates were not completely consumed, probably because of the high rate of winter-killed ungulates and the high kill rates. The average bone marrow fat was 26%, suggesting malnourished prey.

November-December study. Wolves were observed for 168 hours on the ground and for 16 of 30 days from the air. During this period, 41 wolf kills were detected: 39 elk, 1 moose, 1 mule deer, and 1 unknown. Forty-one percent of the elk kills were calves, while 38% were cows and 8% were bulls. The average number of days between wolf kills was 5.2, with a range of 1 to 9 among the packs. Northern range packs killed an average of every 3.8 days, while the other packs killed an average of every 6.5 days. All edible portions of these kills were consumed; it was not uncommon to visit a calf-kill site and find only hide and one or two bones remaining. The average bone marrow fat was 85% for the 18 adult elk tested and 88% for six calves.

Elk Counts

In conjunction with other elk monitoring done in the GYA by Yellowstone National Park and the Northern Range Wildlife Working Group, efforts were made in 1997 to better document elk availability, distribution, and herd

Joel Sartore



Jim Peaco



composition to help evaluate data on wolf predation.

Aerial surveys. Once during the November-December winter study period, all wolf territories within or partially within Yellowstone National Park were surveyed by air to count all ungulates, map locations of elk groups, and classify them (calf, cow, bull) (Table 5). All aerial surveys were done from fixed-wing aircraft (Supercub) and were completed by 11:00 A.M.

During the aerial counts, 7,229 elk, 721 bison, 25 moose, and 3 bighorn sheep were counted on wolf pack

Table 5. Aerial counts of elk in wolf pack territories, December 1997.

Wolf Pack	Elk			Total	Calves/ 100 Cows	Bulls/ 100 Cows	Other Ungulates
	Calves	Cows	Bulls				
Leopold	nc	nc	734	2,296	nc	nc	3
Rose Creek	137	3,514	739	4,390	4	21	503
Druid Peak	0	45	229	274	nc	nc	26
Crystal	1	6	2	9	17	33	188
Thorofare	16	170	22	208	10	13	50
Soda Butte	7	43	2	52	16	7	0

nc = not calculated

Joel Sartore



Joel Sartore



Top left: Wolves have killed only two bison, both in late winter when bison are weakened by winter and easier for wolves to kill. The Crystal Creek Pack lives amidst many bison in Pelican Valley during late winter and in April they killed an adult cow. The other bison killed was a calf, also in April, which was nearly dead because of the effects of the severe 1996–1997 winter. The recently released Nez Perce/Sawtooth pups made this kill.

Bottom left: Douglas Smith captures a Sawtooth pup with a salmon net for placement in another pen for later release. Each Sawtooth wolf also had to be handled for attachment of a radio collar to facilitate tracking.

Top right: A Sawtooth pup stretches shortly after release. These pups, traveling in a group after release, were able to kill elk calves on their own.

Bottom right: Wolves stare at a lone raven perched on a rock. Some studies have suggested that ravens follow wolves, capitalizing on the fresh meat they provide. Ravens visit all wolf kills as do other scavengers, which pick each kill completely clean of all edible material.

territories. The territory of the Rose Creek Pack in the Slough Creek area contained the most elk (4,390), while the Crystal Creek Pack in Pelican Valley had the fewest (9). The Rose Creek Pack territory also had the most bison (503), but several large herds (total 188) were counted in Crystal Creek territory. The only wolf pack territory in which moose (25) were recorded was that of the Thorofare Pack. All three bighorn sheep were counted in Druid Peak Pack territory. No ungulate counts were conducted for the Chief Joseph Pack territory. Average calf per cow ratios were 12 calves per 100 cows and bull per cow ratios were

19 bulls per 100 cows.

Ground surveys. In addition, ground surveys were conducted from standardized locations on the northern range only (from the Lamar Valley to Gardiner, Montana) once a week during the 30-day November–December study period to count, map, and classify elk (Table 6). All ground counts were completed by 9:00 A.M. Count units were organized to capture information from the upper, middle, and lower-elevation segments of the northern range.

During the ground surveys, a total of 4,993 elk were

Table 6. Average ungulate counts during four ground surveys on the northern range, Nov./Dec. 1997.

Count Unit	Area (km ²)	Cow Density (km ²)		Calf Density (km ²)		Calves Per 100		Bull Density (km ²)	Bulls Per 100 Cows	Total Density (km ²)	Other Ungulates
		Cows	Calves	Cows	Calves	Cows	Bulls				
Gardiner	5.2	29	5.6	4	0.8	15	3	0.6	7	6.7	4
South Butte	6.6	43	6.5	1	0.2	3	160	24.2	167	30.9	0
Little America	13.4	158	19.6	14	1.3	7	33	4.0	19	19.8	15
Slough Creek	9.9	92	11.6	3	0.3	3	27	2.0	26	13.9	39
Western Lamar	14.1	186	13.2	18	1.3	9	42	3.0	25	17.4	126
Eastern Lamar	8.9	205	23.0	18	2.0	9	68	7.6	29	32.1	1
Confluence	9.7	45	4.6	2	0.2	4	10	1.0	21	5.8	2

Table 7. Capture and release of GYA wolves during 1997.

Wolf	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
#48F	Free		Escaped									
#27F	Free	Captive				Released				Killed		
#29F	Captive					Released				C E	Escaped	
#37F	Captive					Released				C E	E	Killed
#66M	Captive					Released		Died in vehicle accident				
#70M	Captive					Released				C E	Captive	
#92M				Born		Released				Captive		
#93M				Born		Released				Missing		
#94M				Born		Released				Missing		
#91F				Born	Died							
#63F	Captive			Released						Killed		
#64F	Captive			Released			Killed					
#65F	Captive			Released						Missing		
#67F	Captive			Released						C E	Captive	
#68F	Captive			Released						Killed		
#69M	Captive			Released			Killed					
#71F	Captive			Released		Died						
#72M	Captive			Released						C E	Captive	

counted. The areas surveyed ranged from 5.2 to 14.1 km², with an average size of 9.7 km². Calf distribution was on a gradient with the ratio of calves to cows increasing from the upper northern range (4 calves:100 cows) to the lower northern range (15 calves:100 cows), with an overall average of 8 calves per 100 cows. The Gardiner count unit had the highest calf per cow ratio. The greatest number of bulls was on the Blacktail Deer Plateau, where the ratio was 167 bulls per 100 cows, compared to the average of 26 bulls per 100 cows across the northern range.



WOLF MANAGEMENT

Captive Wolves

Wolves in pens have been a magnet to free-ranging wolves and can keep their wayward movements to a minimum. The management objective for all the wolves is to maximize the chance that a cohesive pack will form. As in 1996, it was found to be in the best long-term interests of the wolf restoration program to keep some wolves confined in a pen within the park for various

periods during 1997 (Table 7).

All of the 18 wolves held in captivity at some point during 1997 were either members of the original Nez Perce Pack (translocated from Canada in 1996 and released in April of that year), its descendants, or from the litter of 10 pups that had been brought into the GYA from the Sawtooth Pack in northwestern Montana. Captive wolves were kept in one of the pens built for the original reintroduction effort in 1995–96 and fed twice weekly (see 1995–96 Wolf Project Biennial Report.) It was hoped that the wolves would become socialized to each other in the pen, form a cohesive pack, and remain in that area after their release in 1997. In short, as explained in the Nez Perce Pack summary (see page 12), that did not happen; the wolves often traveled alone and only one group formed.

Livestock Predation

There were 10 incidents of livestock predation attributed to GYA wolves during 1997 that caused the death of 68 sheep and 6 cattle. They also resulted in the killing of five wolves by federal Wildlife Services agents;

Table 8. Incidents of livestock predation attributed to GYA wolves during 1997.

Wolves Implicated	Location	Prey	Est. Date	Consequences
#48F, Nez Perce yearling	Ranch near Fishtail, Mont.	2 sheep	Feb	Confined to pen, but soon escaped to become free-ranging lone wolf
#64F, Sawtooth yearling	Ranch near Big Timber, Mont.	2 sheep	Jun	Legally killed by rancher
#69M, Sawtooth yearling	Ranch in Leadore, Id.	1 sheep, 1 cow	Jul	Legally killed by rancher
#68F, Sawtooth yearling	Forest Service allotment near Pinedale, Wyo.	41 sheep	Aug	Relocated near Lake development in park
		15 sheep	Sep	Shot by Wildlife Services
Nez Perce Pack	Ranch near Dillon, Mont.	3 calves	Oct	#27 shot by Wildlife Services; 5 other pack members returned to pen; #37 shot after escaping
		3 sheep	Oct	
#63F, Sawtooth yearling	Ranch north of the GYA	3 sheep	Oct	Relocated in Hayden Valley in park
		1 sheep	Oct	Shot by Wildlife Services
#15M, Washakie adult	near Dubois, Wyo.	2 cattle	Oct	Shot by Wildlife Services

another two wolves were legally shot by ranchers who caught them preying on their livestock. All but one of the incidents were attributed to Nez Perce and Sawtooth wolves, and 56 of the sheep were brought down by just one yearling. One incident took place outside the GYA by a wolf that had dispersed from the recovery area.

Although killing or harassing an endangered species is ordinarily illegal except in defense of human life, the controversy surrounding wolf reintroduction resulted in special rules for managing them. Livestock owners may harass a wolf found on their property or near livestock grazing on public rangeland; they are permitted to kill a wolf caught preying on livestock on their own land or to request that a federal agent do so. A wolf found preying on livestock that are legally grazing on public land may be relocated or killed by federal agents. With a smaller number of wolves in the GYA during 1995 and 1996, only 10 to 12 sheep deaths were attributed to them, and only one wolf was killed as a result of livestock depredation during the first two years of the restoration program.

1997 Incidents

1. February 1997. A yearling female wolf, #48F, born to the Nez Perce Pack in 1996 killed two sheep on private property near Fishtail, Montana. She was captured by Wildlife Services' agents and placed with her mother and 11 other wolves back into the Nez Perce pen. She

escaped shortly thereafter and roamed the rest of the GYA widely for the rest of 1997.

2. June 1997. A yearling female, #64F, from the Sawtooth/Nez Perce group was legally shot by a rancher for killed two sheep near Big Timber, Montana.

3. July 1997. A yearling male, #69M, from the Sawtooth/Nez Perce group dispersed outside the GYA to Leadore, Idaho, killed one cow and two sheep, and was legally shot by a rancher.

4. August 1997. A yearling female, #68F, from the Sawtooth/Nez Perce group killed 41 sheep on a Forest Service grazing allotment near Pinedale, Wyoming. She was removed from the spot, translocated back to Yellowstone National Park, and released.

5. August-September 1997. Within two weeks after being translocated, wolf #68F was back at the same location near Pinedale and preyed upon 15 more sheep. She was shot in the sheep band by Wildlife Services' agents.

6. September 1997. A group of Sawtooth/Nez Perce wolves (#27, #29, #37, #66, #77, and pups #90–92) that had formed a pack and summered in Hayden Valley in Yellowstone traveled west and killed three calves near

Dillon, Montana. Wolf #27 was shot by federal agents (this was her second offense) and the others were relocated back to the Nez Perce pen.

7. October 1997. Wolf #29 escaped the Nez Perce pen and dug the other wolves out. They traveled back to the Dillon area where they were recaptured and once again penned. Later, three more sheep were found dead and attributed to these wolves, hence they were being held with two strikes against them. It was decided that the wolves would not be killed but that, once released, if they traveled west of Highway 287 or Highway 20 west of Yellowstone National Park after their release, they would be permanently removed from the wild. As of the end of 1997, all the wolves still resided in the pen except #29, who had again escaped but was restricting his movements around the pen.

8. October 1997. A yearling female, #63F, from the Sawtooth/Nez Perce group killed three sheep on private land north of the park. The wolf was captured and translocated to the central portion of Yellowstone National Park, where she was released.

9. October 1997. Wolf #63F immediately traveled north from Hayden Valley and within one week was back on the ranch where her first livestock depredation had occurred. She killed another sheep and was shot by a Wildlife Service agent.

10. October 1997. Adult male #15M from the Washakie Pack killed two cattle near Dubois, Wyoming. This was his second livestock offense, as he was associated with a sheep depredation in 1996. He was shot by a Wildlife Services agent; the adult female, #26, and five pups of the pack continued to occupy the area at the end of 1997.



PUBLIC INVOLVEMENT

Legal Issues

In accordance with approved wolf restoration plans for central Idaho and Yellowstone National Park, the U.S. Fish and Wildlife Service designated reintroduced wolves as “non-essential experimental populations” (provided for under section 10(j) of the Endangered Species Act) to allow more flexibility in wolf management, particularly

with regard to livestock depredations. Three lawsuits were initially filed by the American Farm Bureau, the Audubon Society and Earth Justice, and a Wyoming couple. These lawsuits were combined by U.S. District Judge William Downes, who heard various arguments to challenge the wolf reintroduction program. On December 12, 1997, Judge Downes ruled that although the administrative procedures had been followed and the reintroduction itself was legal, the special rules reduced protection of wolves that might disperse into the experimental areas from northwestern Montana, violating the intent of the Endangered Species Act. He therefore ordered the experimental rules be voided and the reintroduced wolves and their offspring be removed. However, he stayed his order pending an expected appeal which had not yet been filed by the end of 1997. Until a final court order is issued, wolves in the experimental areas will continue to be managed under the existing rules.

Media Interest

To the surprise of many people, media interest in the wolf restoration program did not subside in 1997. The wolves of Yellowstone were still routinely reported on in local, national, and international media. Footage of the wolves was still in great demand, and numerous film crews visited Yellowstone hoping to get their own footage. At least four documentaries were scheduled to be released within the next two years.

Volunteer Program

Wolf fieldwork continued to be largely powered by volunteer crews. The Wolf Project and the Yellowstone Foundation provided housing and a food stipend for volunteers. Although volunteers were required to make at least a three-month commitment to the program, positions were highly competitive, and several people who were able to work for more than three months became especially valuable to the project. A total of 17 volunteers (Appendix I) worked a total of 12,160 hours in 1997, worth \$127,680 at the GS-5 level.

Visiting Scholars Program

The visiting scholar program was initiated to encourage the exchange of ideas and expertise about wolf restoration and ecology by inviting an accomplished scientist in a related field to spend some time in

Yellowstone. Rolf Peterson from Michigan Technological University came in 1995, Todd Fuller from University of Massachusetts in 1996, and Thomas Drummer from Michigan Technological University in 1997. Dr. Drummer is a statistician who has consulted on numerous ecological studies and been involved with the wolf-moose study on Isle Royale since 1985. His contribution to Yellowstone wolves involved a rigorous evaluation of the project's sampling and analytical procedures, and included a preparation of a publication dealing with estimation and calculation of wolf kill rates and population estimation of moose in Yellowstone National Park.

Interpretation and Education

The number of presentations on wolf reintroduction given both inside and outside the park by park interpreters, Wolf Project staff, and other Yellowstone Center for resources staff remained high for the third consecutive year. The project leader, Douglas Smith gave 35 talks to approximately 1,000 people. Yellowstone rangers and interpreters estimated that 20,000 visitors have seen free-ranging wolves since they were released in 1995. The Wolf Project office fielded about 1,200 phone calls during 1997; additional information requests were handled by other YCR, public affairs, and interpretive staff.

Resource interpreter Norman A. Bishop retired in March 1997. His encyclopedic knowledge of wolves and dynamic personality did much to sell wolves to the West. The Wolf Project's education and outreach has suffered a setback that we have not yet recovered from. Our best wishes to Norm and his wife, Dorothy.



ACKNOWLEDGMENTS

Numerous individuals have helped with the job of wolf recovery. The Yellowstone Wolf Project is appreciative for their contributions. Program Assistant Debra Guernsey, numerous volunteers, and graduate students helped thanklessly throughout 1997 (Appendix I). To all of them we are thankful. Sarah Broadbent, Sue Consolo Murphy, Mary Ann Franke, and Renee Evanoff from the Yellowstone Center for Resources deserve special mention for the editing, layout, and production of this report. The artistic touch and readability are in a large part their doing. We deeply appreciate the contributions of all individuals, corporations, and foundations that donated a total of \$156,325 through the Yellowstone Wolf Recovery Fund to the Yellowstone Wolf Project in 1997.

APPENDIX I. VOLUNTEERS

Yellowstone Wolf Project Volunteer Roster, 1997

Name	Period of Involvement	Hours
Babcock, Isaac	11/10/97 - 12/20/97	280
Belmonte, Lisa	1/1/97 - 4/15/97 and 11/1/97 - 12/31/97	1,080
Campbell, Craig	11/14/97 - 12/31/97	240
Cayou, Joe	1/6/97 - 3/10/97	320
Fitzherbert, Emily	4/25/97 - 7/31/97	520
Hartsough, Matt	8/4/97 - 10/4/97	320
Honness, Kevin	4/1/97 - 4/30/97 and 11/3/97 - 12/31/97	560
Jacobs, Amy	1/6/97 - 4/19/97 and 11/10/97 - 12/31/97	960
MacNulty, Dan	1/1/97 - 12/31/97	2,400
Moore, Jeff	4/25/97 - 7/5/97	480
Sadoo, Tamara	6/10/97 - 7/31/97	280
Saunders, Melissa	1/1/97 - 4/18/97	680
Schaefer, Carrie	4/25/97 - 7/31/97 and 10/20/97 - 12/31/97	960
Stahler, Dan	4/25/97 - 7/8/97 and 11/4/97 - 12/31/97	760
Thurston, Linda	1/1/97 - 8/26/97	1,360
Varley, Nathan	3/16/97 - 3/31/97	120
Zieber, Tom	4/25/97 - 7/15/97 and 8/11/97 - 10/31/97	840
Total Volunteer Hours Worked		12,160

APPENDIX II. PUBLICATIONS

Smith, D.W. 1997. Naming wolf packs. *The Yellowstone Wolf Tracker* 1(1):6.

Smith, D.W. 1997. A wolf tracker in the sky. *The Yellowstone Wolf Tracker* 1(2):4-5.

APPENDIX III. NON-PROFIT ORGANIZATIONS SUPPORTING YELLOWSTONE WOLF RESTORATION

Wolf restoration to Yellowstone will continued to depend on the financial assistance of many individuals and organizations. Most or all of your contributions to the following organizations will provide direct funding to Yellowstone wolf restoration or help pay for needed professional services.

Non-Profit Government Affiliates for Direct Giving to Yellowstone Wolves

Yellowstone Wolf Restoration Fund
The Yellowstone Park Foundation
37 East Main Street, Suite #4
Bozeman, MT 59715
(406) 582-7525

National Park Foundation
1101 17th Street NW, Suite 1102
Washington, D.C. 20036
(202) 785-4500

National Fish and Wildlife Foundation
1120 Connecticut Avenue, NW
Suite 900
Washington, D.C. 20036

Non-Profit Organizations Working on Behalf of Yellowstone's Wolves

Defenders of Wildlife
Northern Rockies Regional Office
1534 Mansfield Avenue
Missoula, MT 59801
(406) 549-0761

International Wolf Center
5930 Brooklyn Boulevard
Minneapolis, MN 55429
(218) 365-4695

The Wildlife Science Center
5463 West Broadway
Forest Lake, MN 55025
(612) 464-3993

The Wolf Education and Research Center
P.O. Box 917
Boise, ID 83707
(208) 343-2248

The Wolf Recovery Foundation
P.O. Box 44236
Boise, ID 83711
(208) 321-0755

The Wolfstock Foundation
P.O. Box 17847
Salt Lake City, UT 84117
(801) 272-2981

