



The Lamar Canyon pack along Soda Butte Creek. - NPS photo

Yellowstone Wolf Project Annual Report

2014

Summary

There were at least 104 wolves in 11 packs (figure 1), including nine breeding pairs, living primarily in Yellowstone National Park during December 2014. From 2009 to 2014, wolf numbers have fluctuated between 83 and 104 wolves, and 6 to 9 breeding pairs. Pack size in 2014 averaged 9 wolves (range = 2 to 14). Forty pups survived to year-end, including 17 in northern Yellowstone and 23 in the interior of the park. An average of 4.4 pups per pack (82%) survived in the nine packs that had pups (figure 2). For the first time, the size of a wolf pack was estimated via genetic sampling methodology, using scat samples from a den site.

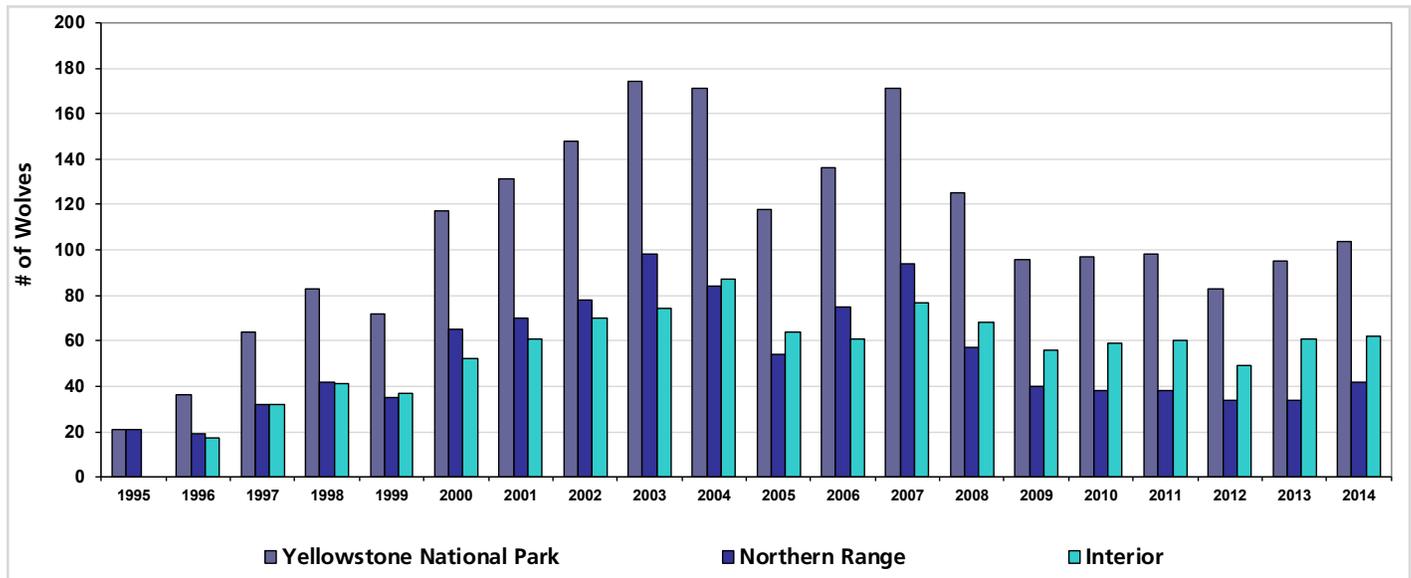


Figure 1. Yellowstone National Park early winter wolf numbers, 1995-2014.

Wolf-Prey Relationships

Wolf predation was monitored for one month in early winter (mid-November to mid-December), one month in late winter (March), and two months in spring (May and June). Project staff detected 227 kills that were definitely, probably, or possibly made by wolves during 2014, including 148 elk (65%), 20 bison (9%), 13 mule deer (5%), 10 deer of unknown species (4%, probably mule deer), five coyotes (2%), three moose (1%), three wolves (1%), one badger (<1%), one beaver (<1%), one bighorn sheep (<1%), one goose (<1%), one raven (<1%), one pronghorn (<1%), and 19 unidentified animals (8%). The composition of elk kills was 30% calves, 2% yearlings, 33% adult females (cows), 22% adult males (bulls), 10% adults of unknown sex, and 3% of unknown sex and age. Wolves still preferred elk, but predation on bison and mule deer appear to be increasing (figure 3).

Winter Studies

During early winter (November-December), a total of 24 ungulate carcasses fed on by wolves were discovered by air and ground teams. Seventeen (71%) of these ungulates were killed by wolves, which included fifteen elk, one deer, and

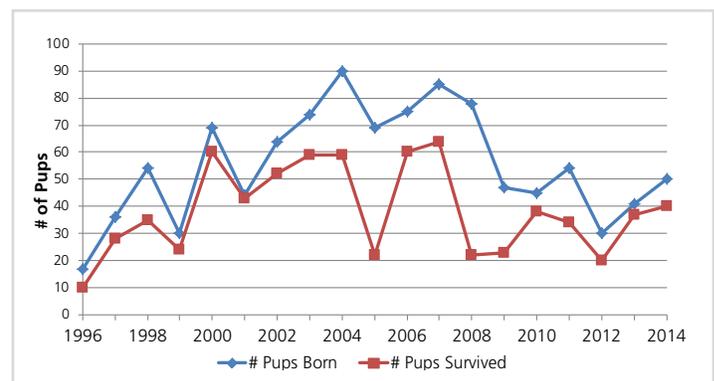


Figure 2. Wolf pups born and survived in Yellowstone National Park, 1996-2014.

one unknown species. Seven of the elk (47%) were calves, three (20%) were cows, four (27%) were bulls, and one (7%) was an adult of unknown sex. Wolves also fed on five bison and two bull elk that they did not kill. The proportion of carcasses that wolves scavenged was high compared to previous years. In addition, one coyote was killed by wolves.

During late winter (March), a total of 37 ungulate carcasses fed on by wolves were discovered by air and ground teams. Twenty-six (70%) of these ungulates were killed by wolves,

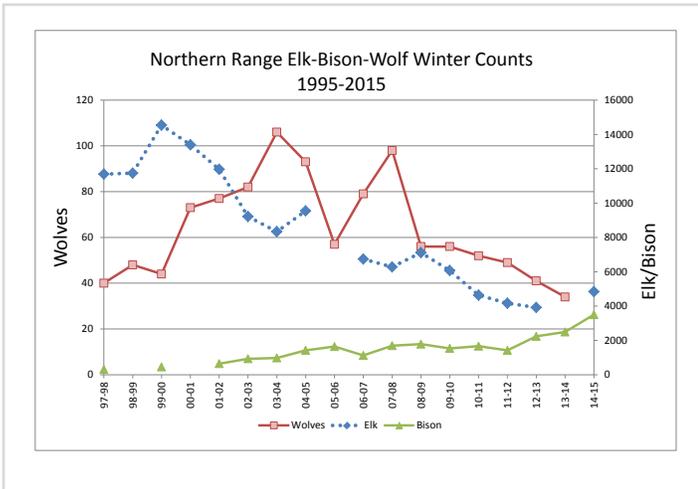


Figure 3. Northern Range elk/bison-wolf winter counts, 1997-2014. Note: official elk counts were not recorded for all years due to poor counting conditions.

including twenty-three elk, two deer, and one bison. Eight of the elk (35%) were calves, two (9%) were yearlings, seven (30%) were cows, five (22%) were bulls, and one (4%) was an adult of unknown sex. Wolves also fed on nine bison they did not kill. The proportion of wolf-killed elk that were bulls was low compared to previous years.

Winter Study Global Positioning System (GPS) Cluster Searches

To locate additional kills, biologists searched the locations of wolves wearing GPS collars that clustered around one spot for more than 60 minutes. In March 2014, kills by the Junction Butte pack with two wolves wearing GPS collars (#890M and #907F) were monitored using air and ground surveys, as well as GPS cluster searches. The cluster searches accounted for 100% of the discovered kills; whereas air and ground surveys accounted for only 45% of discovered kills. These three methods will be used to estimate the true kill rate.

In November-December 2014, GPS clusters were searched for #907F of the Junction Butte pack and #SW763M of the Prospect Peak pack. Both of these packs were also monitored by ground and air crews. For the Junction Butte

pack, 90% of discovered carcasses were detected through GPS clusters, while ground and air surveys found 65% of carcasses. For the Prospect Peak pack, 95% of carcasses were detected through GPS clusters, while ground and air surveys found 30% of the carcasses.

Summer Predation

The locations of GPS clusters were also searched for prey remains during May and June. Fifty-eight suspected kills or fresh carcasses of ungulate prey were located, including: 35 elk (60%), 19 bison (33%), 3 deer (5%), and 1 pronghorn (2%). Continuing a recent trend, bison comprised a larger percentage of carcasses than in most previous summers during which we searched wolf GPS clusters.

Mortalities

Five radio-collared wolves died in 2014 (table 1): two were harvested outside of the park, one was killed in an avalanche, one was killed by other wolves, and one was a capture-related mortality. One wolf was an old adult (>6 years old), two were adults (2-5 years old), and two were pups (<12 months of age).

Disease

There was no evidence of any major disease mortality. Although still present, mange did not affect many wolves nor was hair loss on the affected wolves significant.

Wolf Capture

Sixteen wolves in eight packs were captured and collared in 2014 (table 2). A number of measurements and biological samples were also taken. Nine females and seven males were captured: one was an old adult (>6 years old), seven were adults (2-5 years old), one was a yearling, and seven were pups (<12 months).

Wolf Management

Wolf management activities included den site closures and several hazing events. Staff continued to manage wolf

Table 1. Confirmed mortalities of collared Yellowstone National Park wolves, 2014.

Wolf #/Sex	Age Class	Pack	Date of Death	Cause of Death
924F	Pup	Mollie's	1/17/2014	Capture mortality
908F	Pup	8 Mile	2/14/2014	Killed in avalanche
871M	Adult	8 Mile	10/31/2014	Intraspecific
689M	Old Adult	Cougar Creek	11/5/2014	Harvest
889F	Adult	Unknown	11/5/2014	Harvest

Table 2. Wolves captured and handled in 2014.

Capture Date	Wolf #/Sex	Age	Color	Pack
1/17/2014	755M	adult	black	755M Group
1/17/2014	779F	adult	black	Mollie's
1/17/2014	924F	pup	black	Mollie's
1/17/2014	925M	adult	gray	Lamar Canyon
1/17/2014	926F	adult	black	Lamar Canyon
3/8/2014	478F	old adult	black	Cougar Creek
3/8/2014	953F	pup	gray	Cougar Creek
12/15/2014	962M	adult	black	8 Mile
12/15/2014	963F	pup	gray	8 Mile
12/15/2014	964M	pup	gray	Prospect Peak
12/15/2014	965M	adult	gray	Prospect Peak
12/15/2014	966M	pup	gray	Prospect Peak
12/16/2014	967M	pup	black	Lamar Canyon
12/16/2014	968F	pup	black	Junction Butte
12/16/2014	969F	yearling	gray	Junction Butte
12/17/2014	970F	adult	black	911M Group

viewing areas in Slough Creek, Lamar Valley, Hayden Valley, and other areas where wolves were frequently observed (figure 4).

There were seven instances when behavior of wolves was considered habituated or they closely approached humans. These seven instances involved four different wolves: two of

known sex and age (one adult male and one adult female) and two others of unknown sex, but probably adults. Hazing occurred five times, with four instances directed at one wolf – a lone adult (3-year-old), female #889. The other hazing event was directed at an unknown gray adult. Hazing included yelling, clapping hands, honking the horn, paint balls, bean bags, and cracker shells. Hazing at the unknown gray adult was considered successful. Four attempts at hazing wolf #899 were unsuccessful. She was eventually shot outside the park near a human residence by a licensed hunter. A necropsy revealed a wound that likely occurred a year earlier during the previous wolf hunting season and could have led to her habituated behavior. Locations of the habituated wolves were Blacktail Deer Plateau, Little America, and Lamar Valley.

In September 2014, wolves were relisted in Wyoming due to on-going litigation and resulted in no wolf hunt in Wyoming. Idaho and Montana conducted wolf hunts and at least two wolves (both radio-collared), and possibly three others that primarily used Yellowstone National Park, were legally harvested during these hunts (because these wolves were possibly harvested they are not included in the 'Mortalities' section). Harvested wolves were from three different packs: Cougar Creek (two wolves), Prospect Peak (one wolf), Junction Butte (one wolf), plus one lone wolf.



A female from the Junction Butte pack waits while a grizzly bear feeds on a winter-killed bison. - NPS photo

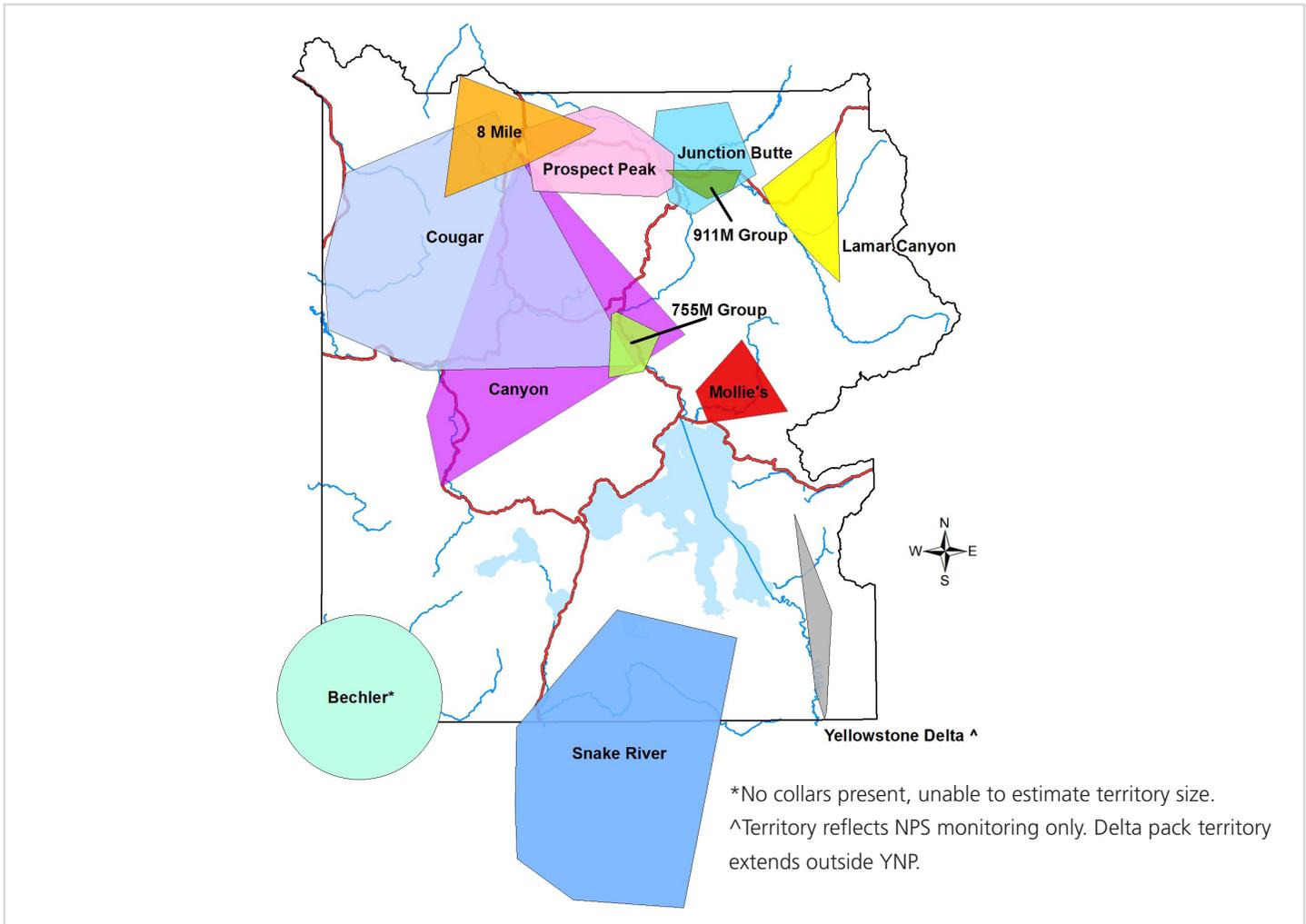


Figure 4. Wolf packs with some or all of their territory within Yellowstone National Park in 2014.

Wolf Pack Summaries

8 Mile (9 wolves; 7 adults, 2 pups)

The 8 Mile pack was the largest pack in northern Yellowstone for the majority of 2014 producing three litters totaling 16 total pups. After the death of alpha male 871M in October, at least seven wolves joined the Prospect Peak pack. At year's end, the 8 Mile pack numbered nine wolves and continued to be led by long-time alpha female 909F.

Prospect Peak (14 wolves; 8 adults, 6 pups)

The Prospect Peak pack formed in early 2014 when three subordinate pack members from the 8 Mile pack dispersed. Six-year-old SW763M bred both five-year-old females (including 821F) and likely both produced pups. In late October, at least seven members (adults and pups) from the 8 Mile pack joined Prospect Peak, making it the largest pack in northern Yellowstone.

Junction Butte (8 wolves; 5 adults, 3 pups)

After producing five pups and establishing a seemingly stable territory, the Junction Butte pack ended the year with uncertainty. Alpha female 870F was most likely injured by Prospect Peak wolves; one pup was killed by the Mollie's pack, and another pup disappeared in November. The six remaining Junction Butte pups and yearlings then started to spend time with 911M's group.

Lamar Canyon (8 wolves; 2 adults, 6 pups)

Starting with only a pair of wolves in early 2014, the Lamar Canyon pack increased in size when 926F produced a litter of seven pups, of which six lived through the end of the year. The pack's territory consists of eastern Lamar Valley, Soda Butte Valley, and the Lamar River drainage.



The Yellowstone Delta pack, released as the Soda Butte pack in 1995, produced at least five pups in 2014 but by the end of the year, had lost both radio collars and were untraceable in Yellowstone's most remote regions. - NPS photo

Mollie's (12 wolves; 6 adults, 6 pups)

The Mollie's pack continued to use Pelican Valley as their core territory, with only one known trip to northern Yellowstone. Alpha female 779F produced six pups, all of which survived to the end of the year.

Canyon (3 wolves; 3 adults)

For the first time since they formed in 2008, the Canyon pack's white alpha female did not produce pups. The small pack wandered widely, and several younger members dispersed.

755M Group (3 wolves; 3 adults)

Wolf 755M continued his wanderings, meeting up with a female from the Canyon pack in late summer and another uncollared female yearling. The trio remained together to the end of the year. The adult female is the fourth female associated with 755M since December 2012, when his long-time alpha female was harvested outside the park.

911M Group (2 wolves; 2 adults)

This pair's territory center included Specimen Ridge, Tower, and Mt. Washburn. Both adults had ties to the Junction Butte pack and occasionally spent time with that pack through the summer and fall. By the end of the year, many of the Junction Butte yearlings and pups were located with 911M and 970F.

Snake River (14 wolves; 9 adults, 5 pups)

Having trackable radio-collars for the first time in years, this pack spent much of their time in the south-central por-

tion of the park. They produced five pups in 2014, all of which lived through the end of the year.

Yellowstone Delta (10 wolves; 5 adults, 5 pups)

This pack began 2014 with 13 wolves and only two working radio-collars. They produced five pups; but by fall one collar was no longer functional and the other was located with a different pack in Wyoming. By the end of the year, tracking this pack was difficult; it is unknown if they still used their traditional territory in the Thorofare, the Yellowstone River Delta area.

Bechler (10 wolves; 6 adults, 4 pups)

In past years, counting the Bechler pack relied on chance observations because none of the wolves were collared. During 2014, we assessed pack size using genetic methods on scat samples collected at their den site after the wolves departed the area. This technique produced an estimate of 10 wolves: 6 adults and 4 pups. Efforts to collar and monitor this pack will continue.

Cougar Creek (11 wolves; 8 adults, 3 pups)

The Cougar Creek wolves made several extra-territorial movements outside their traditional range, including movement as far east as Hayden Valley and north to Sepulcher Mountain. The pack left the park in November, and 8-year-old alpha male 689M was harvested. Some pack members may have joined the 8 Mile pack as the year ended because numbers were greatly reduced from fall counts.



Other wolves

The long-time alpha male (778M) of the Blacktail pack started the year with at least one other wolf, but by year's end was only seen occasionally and usually alone.

Volunteers

Name	Dates Worked	Hours
Charlene Arney	1/1/14 - 4/15/14	632
Ellen Beller	11/12/14 - 12/19/14	304
Marcus Bianco	11/12/14 - 12/19/14	304
Wes Binder	11/12/14 - 12/19/14	304
Caitlin Brown	11/12/14 - 12/19/14	304
Christine Bubac	2/25/14 - 4/4/14	312
Lizzie Cato	11/12/14 - 12/19/14	304
Elizabeth Dowling	11/12/14 - 12/19/14	304
Shannon Forshee	2/25/14 - 4/4/14	312
Quinn Harrison	11/12/14 - 12/19/14	304
Julie Hower	2/25/14 - 4/4/14	312
Kaija Klauer	11/12/14 - 12/19/14	304
Ky Koitzsch	2/25/14 - 4/4/14, 12/7/14-31/14	512
Lisa Koitzsch	2/25/14 - 4/4/14	312
Chay Leinweber	2/25/14 - 4/4/14, 5/5/14-7/25/14	792
Hans Martin	2/25/14 - 4/4/14	312
Emil McCain	11/12/14 - 12/19/14	304
Jacob Mesler	5/19/14 - 7/18/14	360
Aaron Morris	11/12/14 - 12/19/14	304
Shawn O'Neil	2/25/14 - 4/4/14	312
Kameron Perenovich	2/25/14 - 4/4/14	312
Kira Powell	11/12/14 - 12/19/14	304
Brian Seneker	2/25/14 - 4/4/14	312
Jane Sheffer	11/12/14 - 12/19/14	304
Total		8440

Outreach

The Yellowstone Wolf Project staff gave 303 formal talks and 68 interviews. Staff assisted visitors in the field by helping an estimated 19,207 people view wolves, connecting with 12,250 visitors, and giving over 500 informal talks in the field.

Publications

- Cubaynes, S., D.R. MacNulty, D.R. Stahler, K.A. Quimby, D.W. Smith, and T. Coulson. 2014. Density-dependent intraspecific aggression regulates survival in northern Yellowstone wolves (*Canis lupus*). *Journal of Animal Ecology* 83:1344-1356.
- Hedrick, P.W., D.R. Stahler, and D. Dekker. 2014. Heterozygote advantage in a finite population: black color in wolves. *Journal of Heredity* 105:457-465.
- MacNulty, D.R., A. Tallian, D.R. Stahler, and D.W. Smith. 2014. Influence of group size on the success of wolves hunting bison. *PLoS ONE* 9: e112884. doi:10.1371/journal.pone.0112884.
- Peterson, R.O., J.A. Vucetich, J.M. Bump, and D.W. Smith. 2014. Trophic cascades in a multicausal world: Isle Royale and Yellowstone. *Annual Review of Ecology, Evolution, and Systematics* 45:325-345.
- Ripple, W.J., J.A. Estes, R.L. Beschta, C.C. Wilmers, E.G. Ritchie, M. Hebblewhite, J. Berger, B. Elmhagen, M. Lentic, M.P. Nelson, O.J. Schmitz, D.W. Smith, A.D. Wallach, and A.J. Wirsing. 2014. Status and ecological effects of the world's largest carnivores. *Science* 343:151-162.

A cow bison successfully protects her late-born calf in November from the 14-member Prospect Peak pack. - NPS photo



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