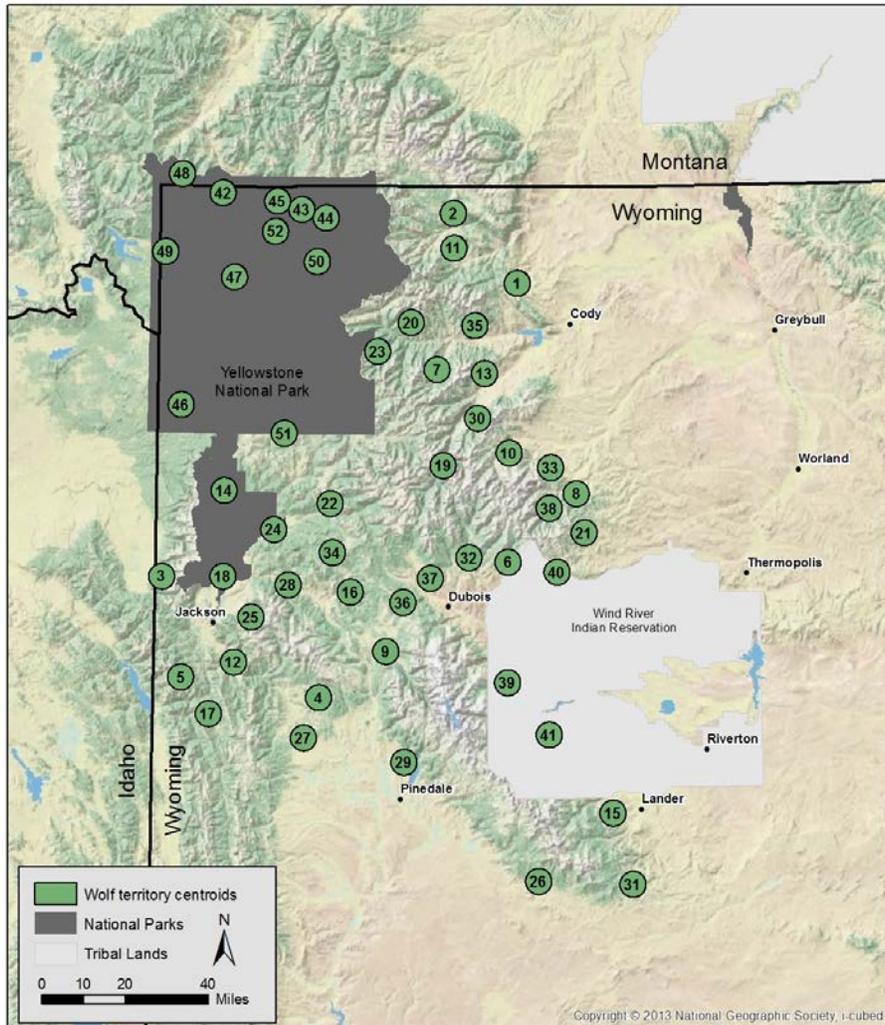


WYOMING WOLF RECOVERY 2016 ANNUAL REPORT

A cooperative effort by the U.S. Fish and Wildlife Service, National Park Service, Wyoming Game and Fish Department, Eastern Shoshone Tribe, Northern Arapaho Tribe, and USDA Wildlife Services



This cooperative report presents information on the status, distribution, and management of wolves in Wyoming, including Yellowstone National Park and the Wind River Reservation, from January 1, 2016 through December 31, 2016.

This report may be copied and distributed as needed.

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EXECUTIVE SUMMARY

After exceeding recovery goals for the Northern Rocky Mountains since 2002, wolves (*Canis lupus*) were delisted in Wyoming (WY) in 2012. However, on September 24, 2014, U.S. District Court for the District of Columbia vacated the U.S. Fish and Wildlife Service's (USFWS) 2012 delisting rule and reinstated the USFWS April 2, 2009 final rule to govern management of gray wolves in Wyoming pursuant to the Endangered Species Act. On December 1, 2014, the Department of Justice, on behalf of the USFWS, appealed the District Court's decision to the U.S. Court of Appeals for the District of Columbia Circuit. On March 3, 2017, the U.S. Court of Appeals, in a unanimous opinion, reversed the ruling of the U.S. District Court and on April 26, 2017 issued a final mandate delisting wolves in Wyoming giving management authority for wolves back to the State.

In 2016, gray wolves remained listed under the Endangered Species Act throughout all of WY and were managed by the USFWS. A minimum of 377 wolves in ≥ 52 packs (including ≥ 25 breeding pairs) inhabited the entirety of the state of WY, including Yellowstone National Park (YNP) and the Wind River Indian Reservation (WRIR).

WY (outside YNP): In 2016, the minimum known number of wolves in WY decreased slightly (4.9% decrease) while the number of known packs increased slightly (7.3% increase) when compared to 2015 minimum known numbers. As of 31 December 2016, the WY wolf population was composed of a minimum of 269 wolves in ≥ 41 packs including ≥ 18 breeding pairs. This minimum number includes at least 13 miscellaneous and lone wolves that were documented throughout the western and central portion of the state. Mean pack size was 6.2 wolves per pack. A total of 128 wolf mortalities were documented (~32% of the minimum known Wyoming population). Causes of mortality included agency removal ($n = 113$), natural causes ($n = 5$), other human-caused ($n = 5$), and unknown ($n = 5$).

The USFWS managed wolf population growth and distribution in WY to minimize chronic loss of livestock from wolves and promote wolf conservation by maintaining the WY wolf population well above recovery objectives. A total of 243 livestock deaths (154 cattle, 88 sheep, and 1 horse) were confirmed as wolf-kills. In addition, 24 cattle, 2 sheep, and 1 horse were injured by wolves, but survived. Twenty-five packs (56% of known WY packs that existed at some point during 2016) were involved in ≥ 1 confirmed livestock depredation. Seven depredating packs were involved in ≥ 10 livestock depredations; 2 of the 7 were responsible for 89% of all confirmed sheep depredations while the remaining 5 were responsible for 44% of all confirmed cattle depredations. Wildlife Services spent \$152,341.01 to remove 113 depredating wolves (~28% of the minimum known WY population) to minimize livestock losses caused by wolves in 2016. The State of WY paid \$315,062 to compensate cattle and sheep producers who lost livestock to, or had livestock injured by, wolves in 2016.

YNP: In 2016, the YNP wolf population contained at least 108 wolves from 11 known packs of which 7 packs were considered breeding pairs. Pack size averaged 9.8 wolves per pack. Four wolves died of natural causes inside YNP.

ACKNOWLEDGEMENTS

In 2016, the USFWS monitored and managed wolves in Wyoming (outside of Yellowstone National Park) with assistance from Wildlife Services, Grand Teton National Park (GTNP), as well as tribal and USFWS biologists from the Wind River Indian Reservation (WRIR). USFWS personnel included Project Leader Mike Jimenez (retired); Wyoming Ecological Services Field Supervisor Tyler Abbott; biological technician Andy Johnson; and law enforcement agents Terry Thibeault (Resident Agent-in-Charge, Billings, MT), Steve Stoinski (Special Agent, Lander), and Bo Stone (Special Agent, Cody).

Wildlife Services personnel involved with wolf management in Wyoming during 2016 were: Mike Foster (State Director), Craig Acres, Mike Burrell, Grant Belden, Dan Braig, Arnold Debock, David Fowler, Tracy Frye, Jeff Hansen, Miles Hausner, Ted Jensen, Rod Merrell, Steve Moyles, Steve Richins, and Bob Wells.

Numerous agencies and agency personnel have contributed to the recovery program and we thank Pat Hnilicka and Laurie Connel (USFWS in Lander); USFS Dale Deiter and Kerry Murphy at Bridger-Teton National Forest; Shoshone National Forest; Sarah Dewey and John Stephenson from Grand Teton National Park; Steve Kallin, and Eric Cole at the National Elk Refuge; Ben Snyder, Art Lawson, and Western Thayer from the Eastern Shoshone and Northern Arapaho Tribal Fish and Game; Bureau of Land Management; and the Wyoming Game and Fish Department. We also appreciate safe piloting from Mark Packila, Dave Stinson, and Bob Hawkins of Sky Aviation, and Native Range Capture Services. We are indebted to the strong base of support provided by all of the individuals and partners noted above who made possible the implementation of a safe and successful program in 2016.

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MONITORING

Wyoming Outside of Yellowstone National Park

Monitoring Techniques

Wolf monitoring activities occur year-round and may include direct observational counts either from the ground or the air, winter track surveys, remote camera surveys, and reliable reports of repetitive wolf sightings from other agency personnel and the general public. Biologists use a variety of monitoring techniques to evaluate pack size and reproductive success, identify pack territories, monitor movements and dispersal events, identify new areas of possible wolf activity, and mitigate conflicts with livestock.

As with all wildlife, counting the total number of wolves on the landscape can be challenging, so biologists use a combination of the above techniques to derive a minimum number that is known to exist at the end of each calendar year. Thus, our estimates of total wolf numbers and reproductive success (e.g., breeding pair status) are likely conservative and the actual number of wolves in Wyoming may be slightly higher. Lone wolves are accounted for when reliable information is available.

Population Status and Distribution

The minimum known number of wolves in Wyoming decreased slightly (4.9% decrease) while the number of known packs increased slightly (7.3% increase) when compared to the 2015 minimum known numbers. As of December 31, 2016, the Wyoming wolf population was composed of at least 269 wolves (Figure 1) in 41 known packs (Figure 2) of which at least 18 packs met the USFWS definition of a breeding pair (≥ 1 adult male and ≥ 1 adult female with ≥ 2 pups that survived through 31 December of that year; Table 1, Figure 3). Pack sizes ranged from 2 to 14 and averaged 6.2 wolves per pack (Figure 4).

The distribution of known wolf packs in Wyoming has continued to expand into areas where packs have not been known to be present in recent history (Figure 5).

Wolf Captures and Monitoring

In 2016, biologists captured 33 wolves (30 new wolves and 3 recaptures) from 18 different packs. Captures were comprised of 19 males and 14 females. All captured wolves were fitted with very high frequency (VHF) radio collars and released on site.

Biologists monitored a total of 81 unique radio collared wolves (approximately 20% of the minimum known population) from 29 different packs (64% of known packs) at some point in 2016. Due to known mortalities, dispersals, planned and unplanned collar releases, and radio collar failures, biologists were actively monitoring 51 radio-collared wolves from 21 different packs in Wyoming as of December 31, 2016.

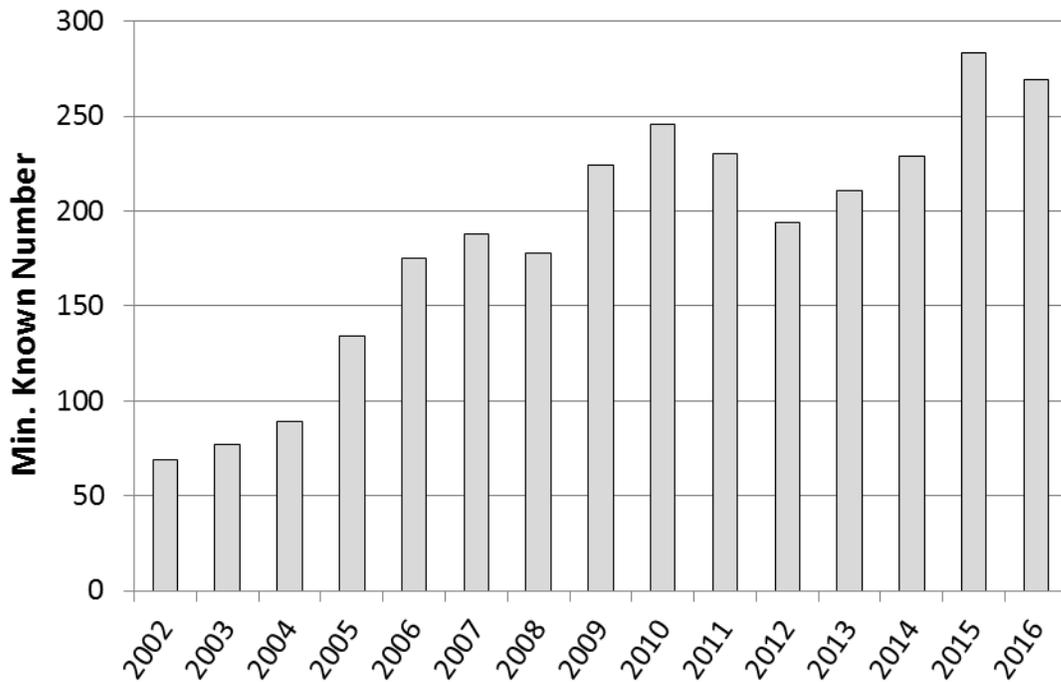


Figure 1. Minimum known number of wolves in Wyoming (outside YNP), 2002-2016.

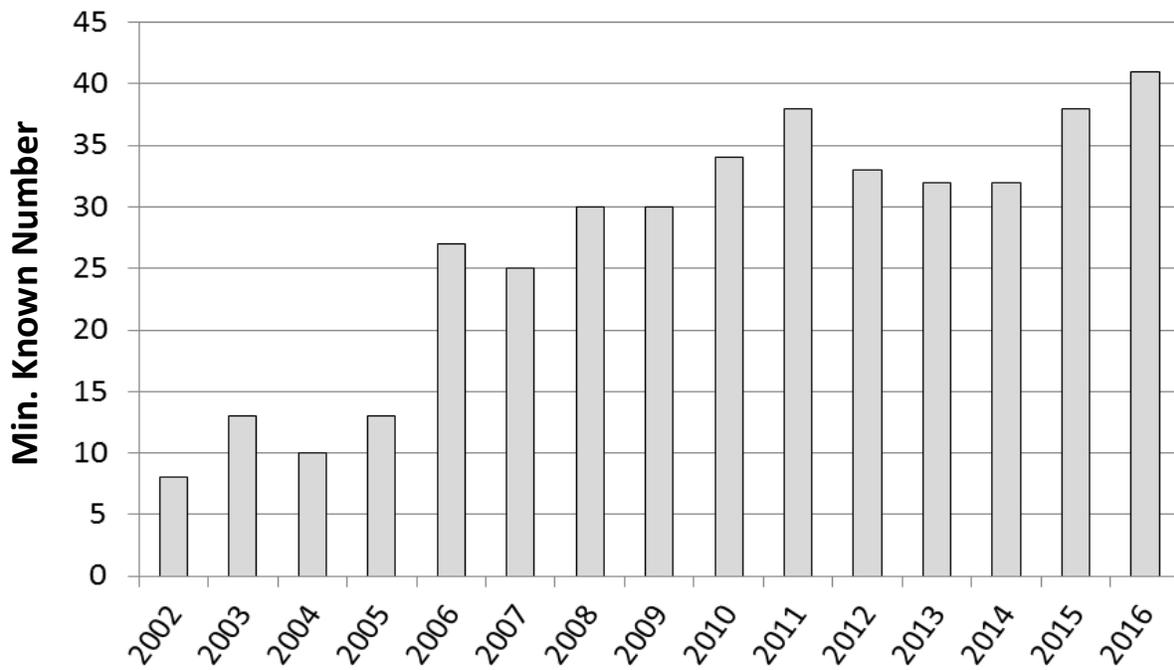


Figure 2. Minimum known number of wolf packs in Wyoming (outside YNP), 2002-2016.

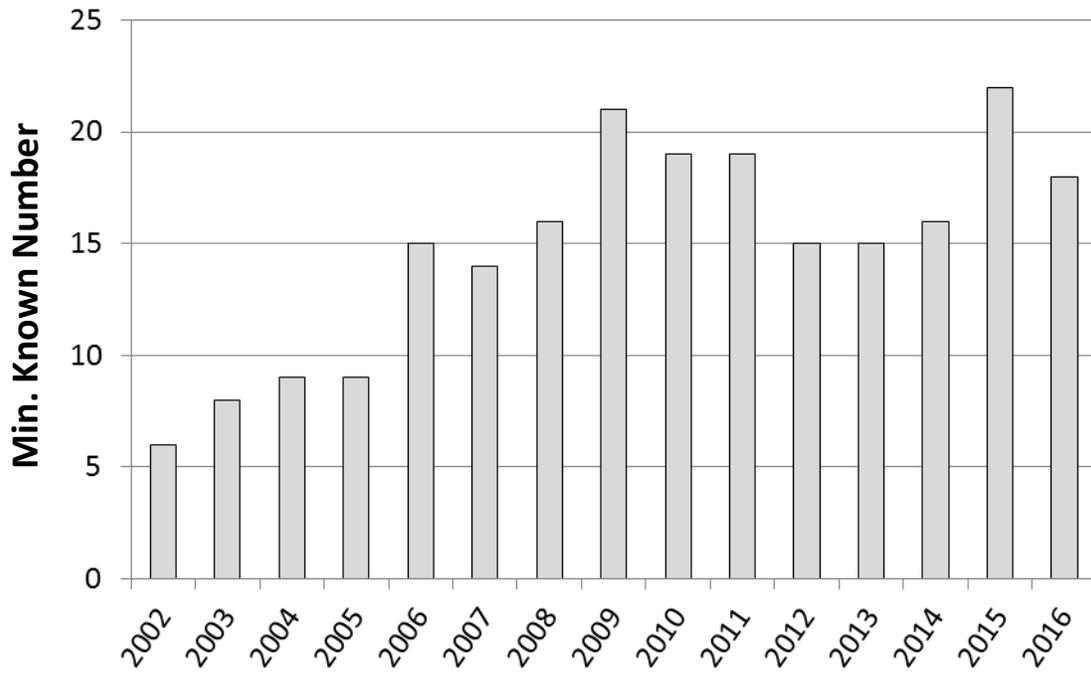


Figure 3. Minimum known number of breeding pairs in Wyoming (outside YNP), 2002-2016.

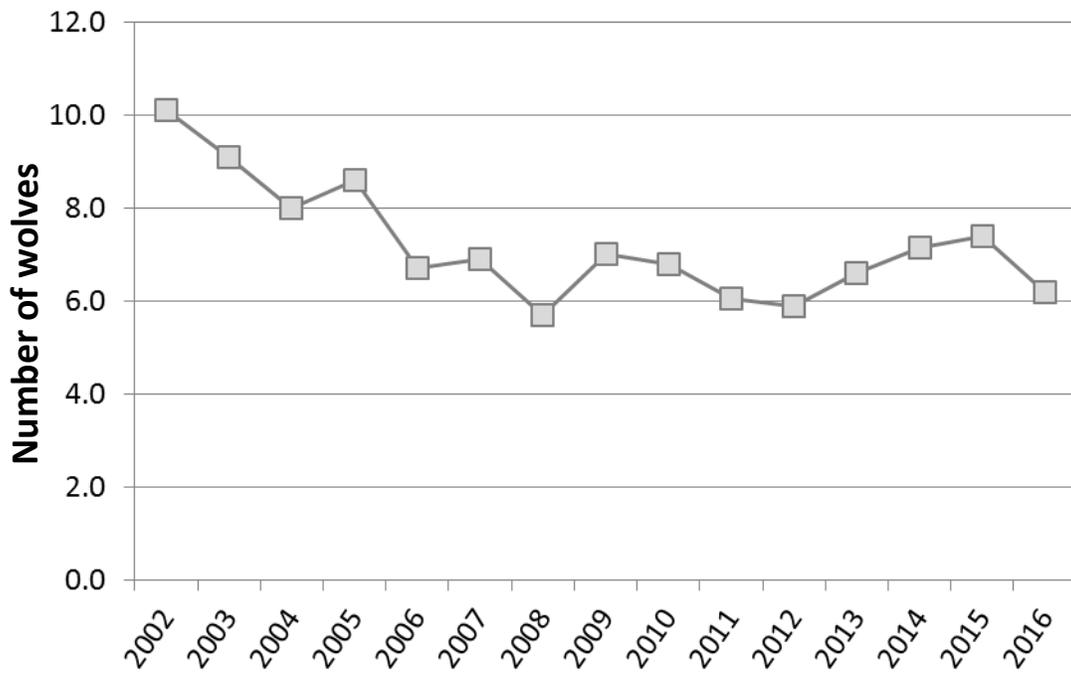


Figure 4. Mean size of Wyoming wolf packs (outside YNP), 2002-2016.

Table 1. Known wolf packs in Wyoming (outside of YNP), minimum known pack size, documented mortalities, number of known wolves that dispersed and went missing, and confirmed livestock losses caused by wolves in 2016. Underlined packs were counted as breeding pairs. Strikethrough packs did not exist in Wyoming at the end of the calendar year.

REF #	WOLF PACK ^{1,2}	RECOV AREA	STATE	MIN. ESTIMATED PACK SIZE DEC 2016	DOCUMENTED MORTALITIES					KNOWN DISPERSED	MISSING ⁷	CONFIRMED LOSSES ⁸			
					NATURAL	HUMAN ³	UNKN ⁴	HARVEST ⁵	CONTROL ⁶			CATTLE	SHEEP	DOGS	OTHER
<u>Wyoming Outside Yellowstone National Park and the Wind River Reservation (WYO)</u>															
1	Absaroka	GYA	WY	4					11	1		20			
	Anchor	GYA	WY												
2	<u>Beartooth</u>	GYA	WY	9	1	1				1		2			
	Carter Mountain	GYA	WY						14			11			
3	Chagrin River	GYA	WY	6											
	Daniel	GYA	WY												
4	Dell Creek	GYA	WY	11					8			9			
5	Dog Creek	GYA	WY	2									5		
6	<u>East Fork</u>	GYA	WY	9					5			4			
7	<u>Elk Fork Creek</u>	GYA	WY	12			1			1					
8	Gooseberry	GYA	WY	4					2	1		2			
9	Green River	GYA	WY	6			1		3			17			
10	Greybull River	GYA	WY	4								1			
11	Hoodoo	GYA	WY	3											
12	Horse Creek	GYA	WY	4			1			1					
13	<u>Houlihan</u>	GYA	WY	8					1	1		10			
14	<u>Huckleberry</u>	GYA	WY	13											
15	<u>Lander</u>	GYA	WY	10					2			4			
16	<u>Lava Mountain</u>	GYA	WY	13	1				10		1	9			
17	Little Greys	GYA	WY	2					2				37		
18	<u>Low er Gros Ventre</u>	GYA	WY	7	1										
	Low er Slide Lake	GYA	WY							3					
19	<u>Needle Creek</u>	GYA	WY	9											
20	North Fork	GYA	WY	2											
21	Ow I Creek	GYA	WY	6					6		1	5	5		
22	<u>Pacific Creek</u>	GYA	WY	7											
23	<u>Pahaska</u>	GYA	WY	11											
24	Phantom Springs	GYA	WY	4											
25	<u>Pinnacle Peak</u>	GYA	WY	13	1				11	1		8			
26	Prospect Mtns.	GYA	WY	3			1								
27	Rim	GYA	WY	4					11			10			
28	<u>Slate Creek</u>	GYA	WY	14			1					5			
29	<u>Soda Lake</u>	GYA	WY	9								2			
30	<u>South Fork</u>	GYA	WY	7					5	1		3			
31	South Pass	GYA	WY	4									36		
32	<u>Spring Mountain</u>	GYA	WY	3					1			4			
33	Sunshine	GYA	WY	4					6			3			
34	<u>Togwotee</u>	GYA	WY	6											
35	Wapiti	GYA	WY	4											
36	Warm Springs	GYA	WY	3			1		10			8			
37	Washakie	GYA	WY	5					3			7			
38	Wood River	GYA	WY	2											
	Misc/Lone w olves	GYA	WY	13	1	2	1		2		2	7	5	1	
	WYO Total	GYA	WY	260	5	5	5	0	113	13	4	151	88	0	1
<u>Wind River Reservation (WRR)</u>															
39	Bobs Creek	GYA	WY	2								2			
40	Cherry Creek	GYA	WY	2											
41	St. Lawrence	GYA	WY	5											
	Misc/Lone w olves	GYA	WY	0								1			
	WRR Total	GYA	WY	9	0	0	0	0	0	0	0	3	0	0	0
WYOMING TOTAL (OUTSIDE YNP)				269	5	5	5	0	113	13	4	154	88	0	1

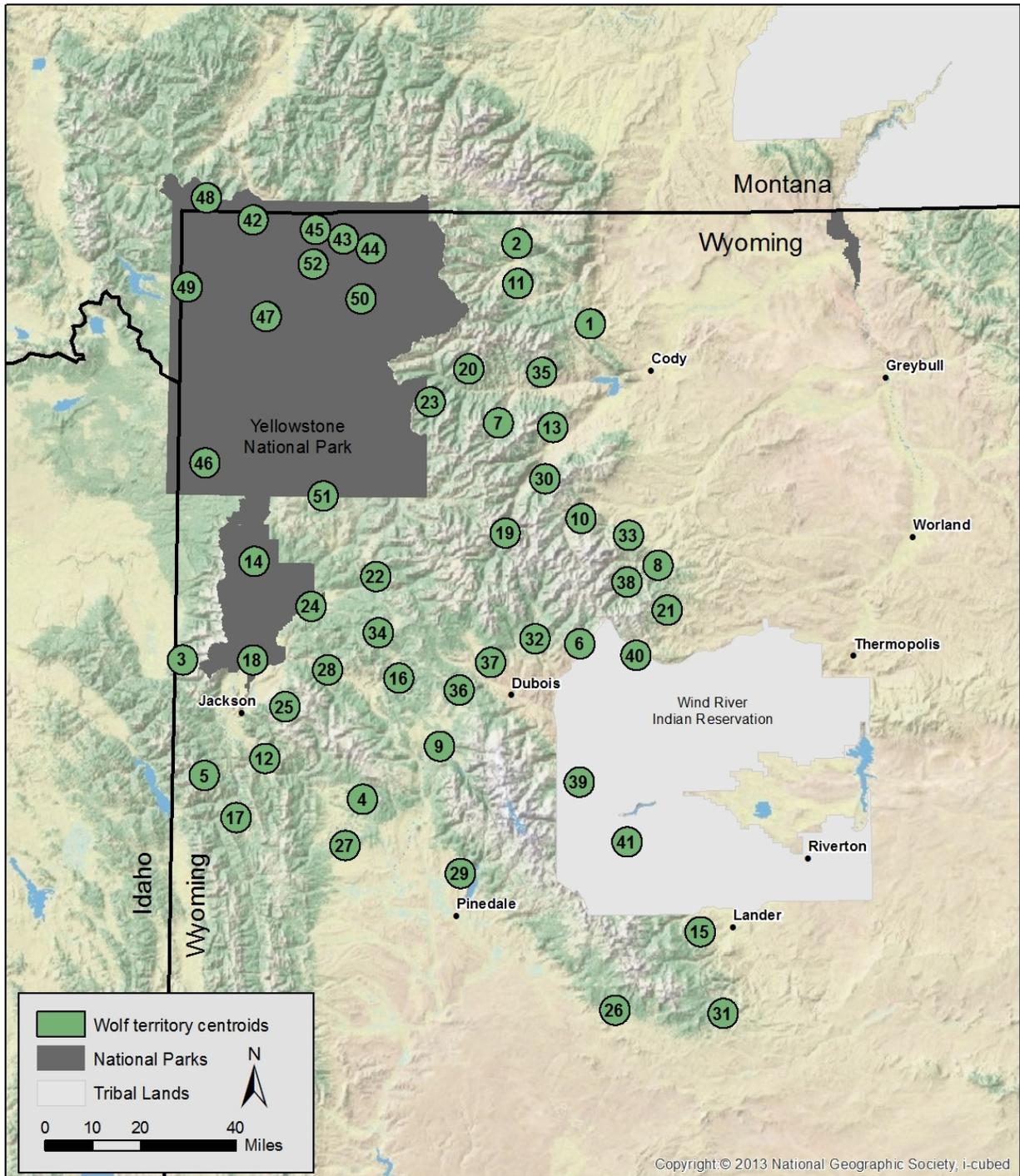


Figure 5. Known wolf packs and pack territory centroids in Wyoming, 2016. See Table 1 and Table 2 for pack names associated with reference numbers.

Mortalities

A total of 128 wolves were known to have died in Wyoming during 2016 (Table 1). Causes of mortality included agency removal ($n = 113$), natural causes ($n = 5$), other human-caused ($n = 5$), and unknown ($n = 5$). When all forms of human-caused mortality (e.g., agency removal and other human-caused) were combined, 118 wolves died from human causes (~30% of the minimum known Wyoming population in 2016).

Yellowstone National Park

Population Status

As of December 31, 2016 the YNP wolf population was comprised of at least 108 wolves (Figure 6) in 11 known packs of which 7 packs met the USFWS definition of a breeding pair (≥ 1 adult male and ≥ 1 adult female with ≥ 2 pups that survived through 31 December of that year; Table 2). Pack sizes ranged from 3 to 18 and averaged 9.8 wolves per pack.

Mortalities

Four wolves died of natural causes inside YNP during 2016. One additional wolf that dispersed from YNP was removed during agency control actions outside of YNP.

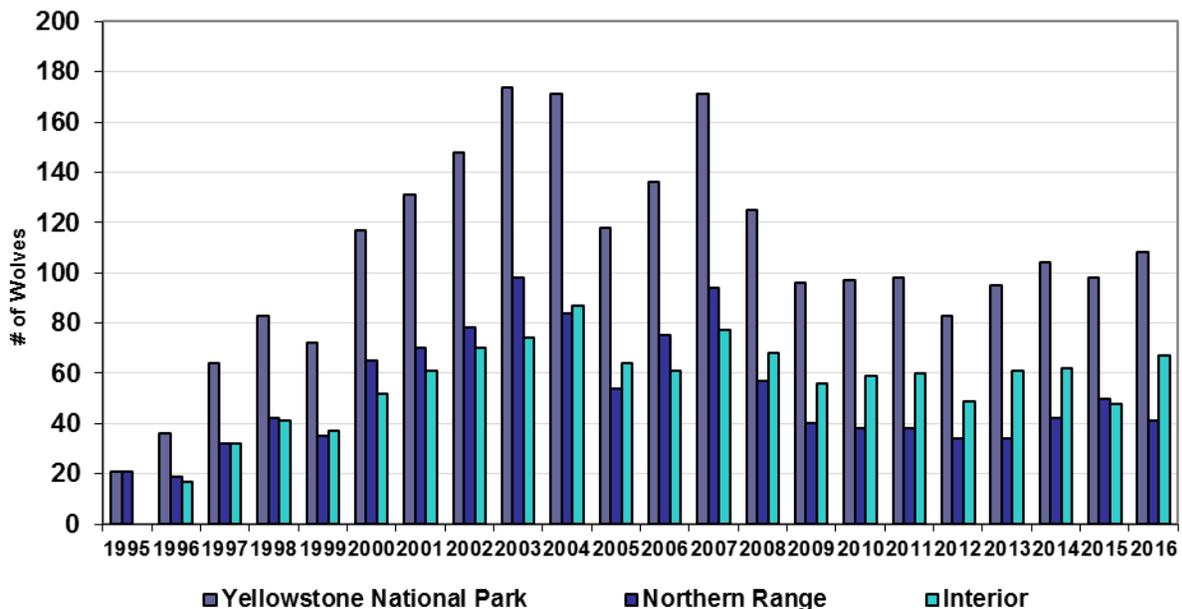


Figure 6. Yellowstone National Park wolf population trends, 1995-2016.

Table 2. Yellowstone National Park wolf packs and population information and Wyoming state totals in 2016. Underlined packs were counted as breeding pairs.

REF #	WOLF PACK ¹	RECOV		MIN. ESTIMATED PACK SIZE DEC 2016	DOCUMENTED MORTALITIES					KNOWN		CONFIRMED LOSSES ⁵			
		AREA	STATE		NATURAL	HUMAN ²	UNKN ³	HARVEST ⁴	CONTROL ⁵	DISPERSED	MISSING ⁶	CATTLE	SHEEP	DOGS	OTHER
<u>Yellowstone National Park Northern Range</u>															
42	<u>8 Mile</u>	GYA	WY/MT	18						1					
43	Junction Butte	GYA	WY	7	2					3					
44	Lamar Canyon	GYA	WY	5	1						1				
45	<u>Prospect Peak</u>	GYA	WY	11	1										
	Misc/Lone wolves	GYA	WY	0											
Northern Range Total				41	4	0	0	0	0	4	1	0	0	0	0
<u>Yellowstone National Park Non-Northern Range</u>															
46	<u>Bechler</u>	GYA	WY/ID	9											
47	Canyon	GYA	WY	6											
48	Cinnabar	GYA	WY	3											
49	<u>Cougar Creek</u>	GYA	WY	8											
50	<u>Mollie's</u>	GYA	WY	18						2					
51	<u>Snake River</u>	GYA	WY	14											
52	<u>Wapiti Lake</u>	GYA	WY	9						1					
	Misc/Lone wolves	GYA	WY	0											
Non-Northern Range Total				67	0	0	0	0	0	3	0	0	0	0	0
YNP Total in WY		GYA	WY	108	4	0	0	0	0	7	1	0	0	0	0
WY Total outside YNP		GYA	WY	269	5	5	5	0	113	13	4	154	88	0	1
WY STATE TOTAL		GYA	WY	377	9	5	5	0	113	20	5	154	88	0	1

WYOMING MANAGEMENT (OUTSIDE YNP)

Livestock Depredations

Potential livestock depredations in Wyoming were investigated by Wildlife Services, USFWS, and WGFD. Depredations were classified as confirmed, probable, or other based on specific criteria agreed upon by the USFWS and Wildlife Services. The following livestock depredation statistics were based on verified livestock losses and do not reflect lost or missing livestock.

In 2016, wolves in Wyoming were responsible for killing ≥ 243 livestock. Confirmed livestock depredations included 154 cattle, 88 sheep, and 1 horse (Table 3, Figure 7). In addition, 24 cattle, 2 sheep, and 1 horse were injured by wolves, but survived. Agency control efforts removed 113 depredating wolves to minimize livestock losses caused by wolves.

Table 3. Confirmed wolf-caused losses and number of wolves removed in Wyoming, 2006 - 2016.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Cattle	123	55	41	20	26	35	44	41	56	72	154
Sheep	38	16	26	195	33	30	112	33	6	62	88
Horses	0	1	0	0	1	1	1	1	0	0	1
Dogs	1	2	0	7	0	1	3	1	0	0	0
Wolves removed	44	63	46	31	40	36	43	33	37	54	113

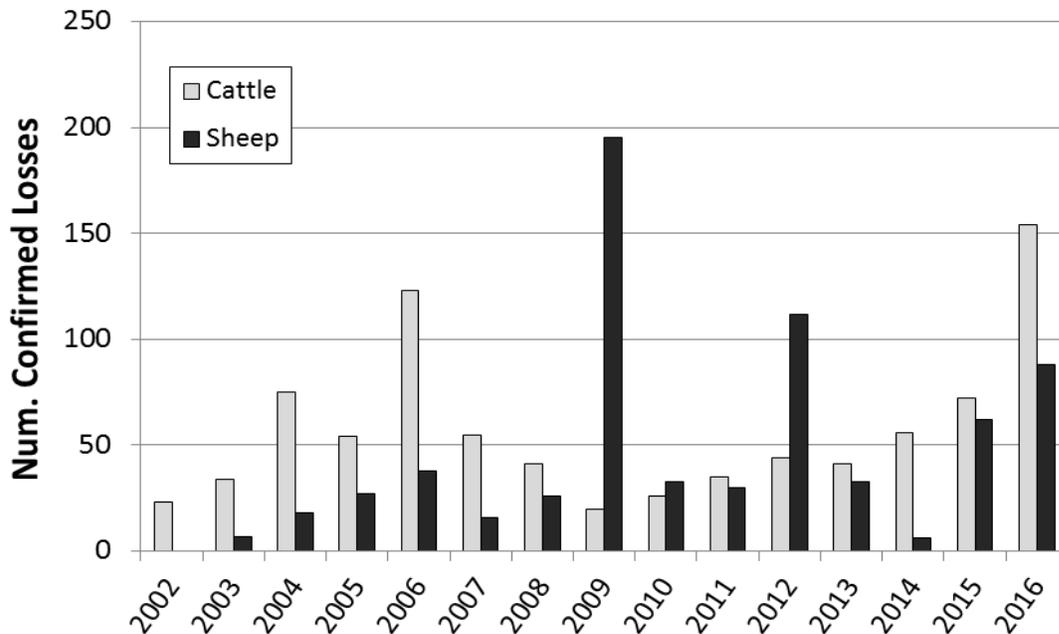


Figure 7. Total number of confirmed wolf-caused livestock losses in Wyoming, 2002-2016.

Number of Packs Involved in Depredations

As the Wyoming wolf population increased over the years, wolves have continued to recolonize new areas of the state. Wolves that recolonize areas with relatively high native ungulate densities and relatively low exposure to domestic livestock have caused fewer conflicts than wolves that recolonized areas where large numbers of livestock are present.

In 2016, 56% (25 of 45) of known Wyoming packs that existed at some point during the calendar year were involved in at least one confirmed livestock depredation (Table 1, Figure 8). Twenty-four of the known depredating packs were involved in ≥ 2 livestock depredations. Seven depredating packs were involved in ≥ 10 livestock depredations; 2 of the 7 were responsible for 89% of all confirmed sheep depredations while the remaining 5 were responsible for 44% of all confirmed cattle depredations. One pack killed both cattle and sheep while all other depredating packs killed either cattle or sheep.

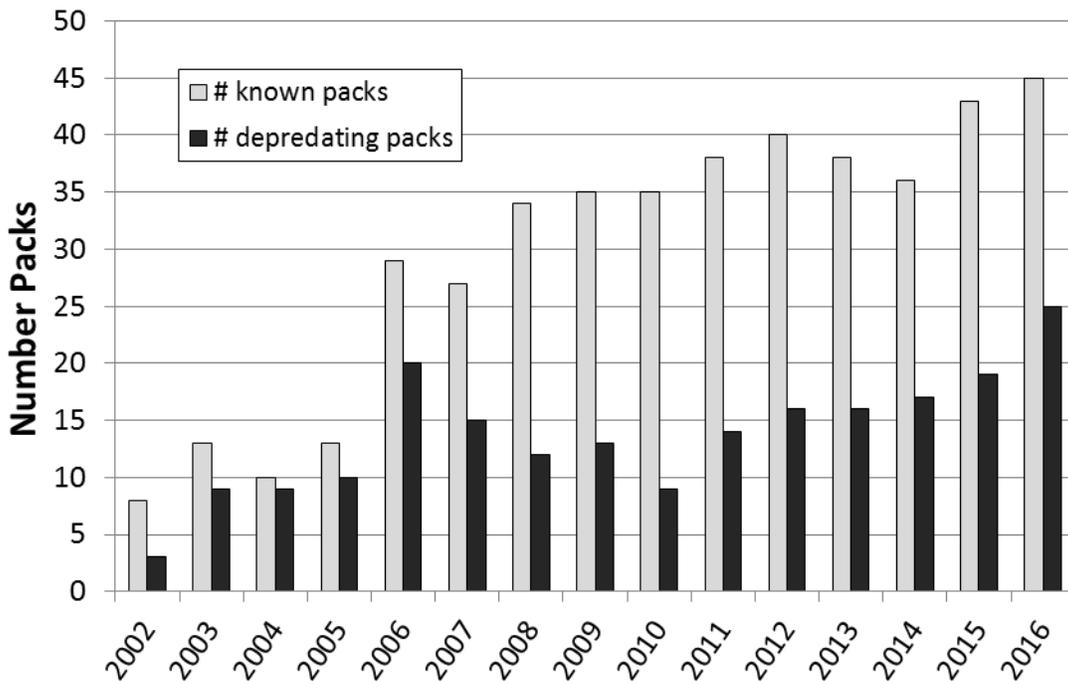


Figure 8. Minimum number of known packs that existed at some point during the calendar year and the number of known packs responsible for at least 1 livestock depredation in Wyoming, 2002-2016.

Time of Year of Livestock Depredations

The months of May, July, August, and September accounted for 72% ($n = 110$) of all confirmed cattle depredations in 2016 (Figure 9). Most confirmed sheep depredations occurred between July and September (Figure 9).

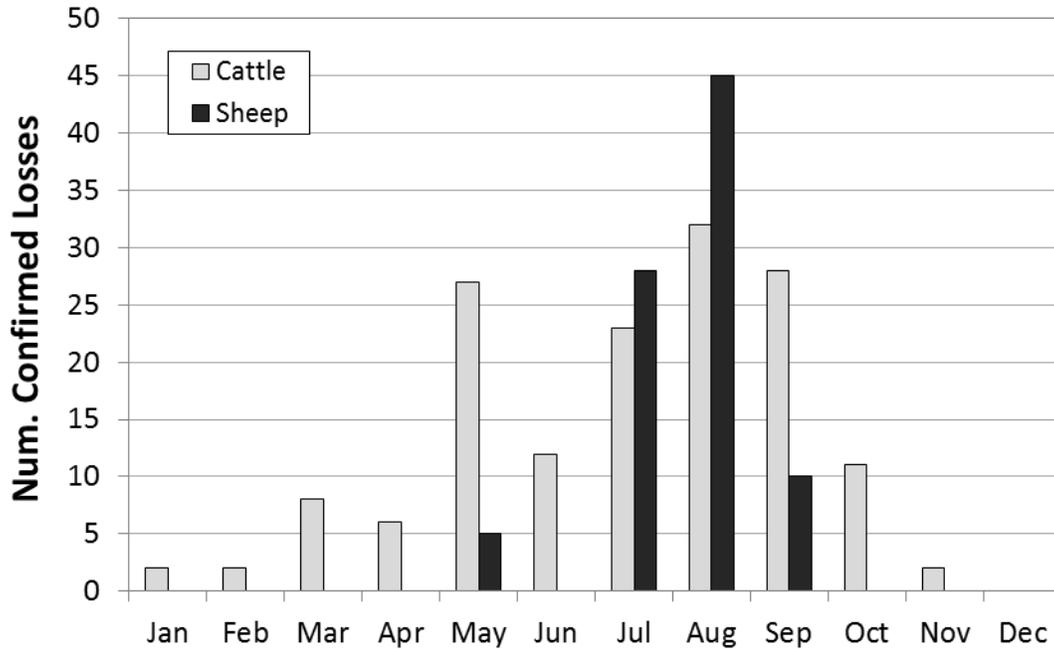


Figure 9. Number of confirmed wolf-caused livestock losses by month in Wyoming, 2016.

Location of Livestock Depredations

Sixty-five percent of confirmed cattle depredations occurred on private property and 35% occurred on public land. Ninety-four percent of confirmed sheep depredations occurred on public land and 6% on private property. When all cattle and sheep depredations were combined, 57% of all confirmed livestock depredations occurred on public land while 43% occurred on private land (Figure 10).

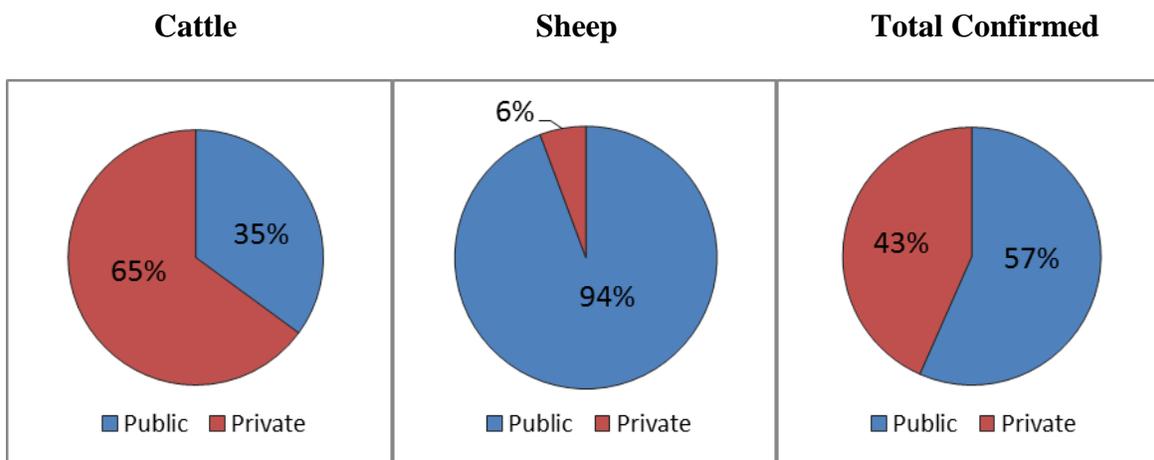


Figure 10. Land status where confirmed wolf depredations occurred in Wyoming, 2016.

Livestock Depredation Control Actions

The USFWS managed wolf population growth and wolf distribution to minimize chronic loss of livestock from wolves and promote wolf conservation by maintaining the Wyoming wolf population well above recovery objectives. In 2016, 113 depredating wolves (~28% of the minimum known Wyoming population) were removed to reduce livestock depredation.

Control actions in response to confirmed livestock depredations included trapping and radio collaring wolves in addition to intensive monitoring. Chronically depredating wolves were killed through agency control actions in an attempt to prevent further livestock losses. Non-lethal control was routinely considered but was often not applicable or cost effective in many areas of Wyoming due to: 1) specific wolf packs chronically killing livestock on an annual basis, 2) unpredictable travel patterns and movements by wolves, and 3) very large wolf home ranges that cover vast areas including public grazing allotments. Wildlife Services spent \$152, 341.01 to remove 113 problem wolves in Wyoming during 2016.

Compensation for Livestock Depredations

The WGFD paid \$315,062 to compensate cattle and sheep producers who lost livestock to, or had livestock injured by, wolves during the 2016 calendar year. Under Chapter 28, Section 3 of the Wyoming Game and Fish Commission (WGFC) Regulations, compensation for confirmed livestock depredations by wolves was authorized only in the northwest corner of Wyoming (approximately 12% of the state) where wolves are classified as trophy game animals.

- (iii) “Sheep in areas set forth by Commission regulations where gray wolves are classified as trophy game animals. To determine the amount of compensation due to a claimant for sheep believed to be missing as a result of being damaged by gray wolves, in areas occupied by wolves, the Department shall utilize the following formula:
 - (A) Number of individual sheep confirmed by the Department or its representative killed by gray wolf multiplied by seven (7) multiplied by the value of livestock equals the amount of compensation.”
- (iv) “Calves in areas set forth by Commission regulations.....the Department shall use the following formula:
 - (A) Number of individual calves confirmed by the Department or its representative killed by gray wolf multiplied by seven (7) multiplied by the value of livestock equals the amount of compensation.”

OUTREACH

Outreach in WY

In 2016, the USFWS WY wolf recovery program continued to give numerous formal presentations to public schools, universities, wildlife symposiums, State and federal management agencies, livestock association meetings, state legislature committees, and environmental groups. USFWS personnel were also interviewed for numerous magazine, newspaper, and television feature stories.

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