

**WISCONSIN GRAY WOLF POST-DELISTING MONITORING
15 APRIL 2013 THROUGH 14 APRIL 2014**

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Introduction

This report describes wolf management and monitoring activities conducted in Wisconsin during the wolf monitoring year, April 15th, 2013 to April 14th, 2014. This represents the second full year of post delisting monitoring as specified in the U.S. Fish and Wildlife Service Post Delisting Monitoring Plan (U.S. Fish and Wildlife Service 2008). Gray wolves (*Canis lupus*) were listed as Endangered in the Great Lakes region in 1967 and 1974 by the U.S. Fish and Wildlife Service (U.S. Fish and Wildlife Service 1992). Wolves were removed from the Federal endangered species list on January 27th, 2012 and management authority was returned to the states.

Wolf Population Monitoring

Wolf population monitoring was conducted using a territory mapping with telemetry technique, summer howl surveys, winter snow track surveys, recovery of dead wolves, depredation investigations, and collection of public observation reports. A full description of methods is provided by Wydeven et. al (2009). Data are reported by wolf harvest zones established in 2012 (Figure 1). Wolf monitoring methods were unchanged from the previous year with the exception of additional howl surveys conducted to assess impact of increased mortality on reproduction. Also, the state continued to increase the use of contracted trackers through USDA –Wildlife Services to supplement ongoing volunteer efforts.

A total of 178 confirmed, probable, and possible wolf observations were reported during the monitoring period (Table 1, Figure 1). Reports of packs outside known occupied pack range were followed up with field investigations to attempt to verify pack presence. Some of these reports were likely mis-identifications. Reports from outside the winter count period were used to help direct winter tracking effort. Consistent with our historic methodology, confirmed and probable reports within the winter count period were incorporated into count data.

During summer 2013, 201 howl surveys were conducted with 59 packs detected (Table 2). Pups were detected in 78% of the detected packs. A more thorough analysis of wolf howl data is in process.

During winter 2013-14, over 15,000 miles of track surveys were conducted by WDNR and volunteers, with 129 of 134 survey blocks with evidence of wolf activity being tracked (Figures 2 & 3). A total of 197 packs were detected (Table 3), with 27 packs from the previous winter (13%) undetected, and 17 packs detected that had not been found the previous winter. An average of 4.3 surveys were conducted per pack.

During the 2013-2014 monitoring period 43 wolves were monitored by radio telemetry (Table 3). Average pack territory size was 46.7 mi² for 28 packs with ≥ 20 radiolocations. Average territory sizes were larger in northern zones (52.9 mi² n=14 in WHZ 1, and 60.9 mi² n=7 in WHZ 2) than central zones (25.4 mi² n=3 in WHZ 3, 16.3 mi² n=4 in WHZ 5). Radio telemetry collars were deployed on 17 wolves during the monitoring period (Table 4), including 3 adult, 2 yearling, and 1 pup females, and 10 adult, and 1 pup males.

In April, 2014 the statewide minimum wolf population count was 660-689 wolves, a decline of 18.4% from the previous year (Table 3), and the first substantial decline in the state wolf population since 1993 (Figure 4). This included declines in each of the 6 zones, ranging from a decline of 12.5% in WHZ 2 to a decline of 28% in WHZ 4. The count included 638-667 wolves living in 197 packs, or an average of 3.2 to 3.4 wolves per pack, plus 22 non-pack associated

animals. This represents a decline in average pack size, which had previously stabilized at approximately 3.8 wolves per pack. State wolf management is based on the minimum count off Native American reservations. The off reservation minimum count in April 2014 was 634-663 wolves.

Statewide Wolf Distribution

Contiguous wolf range was estimated to be 22,755 mi² distributed through the northern (20,374 mi²) and central (2,255 mi²) forested regions of Wisconsin and an area containing 1 pack in Dunn County (126 mi²) in April 2014 (Figure 1). Using the 2014 minimum population count of 660-689 wolves, wolf density is estimated to be 1 wolf per 33.0 to 34.5 mi² of contiguous wolf range, calculated by dividing contiguous wolf range by the minimum population count range.

Wolf Mortality

Mortality was monitored through field observation and mandatory reporting of harvest and depredation control mortalities. Cause of death for wolves reported dead in the field was determined through field investigation or by necropsy when illegal activity was suspected or where cause of death was not evident during field investigation. A total of 364 wolf mortalities were detected during the monitoring period (Table 5). Detected mortalities represented 44 to 45% of the minimum 2012-2013 late winter count of 809-834 wolves (MacFarland & Wiedenhoft 2013).

Two hundred fifty-seven wolves were taken during the hunting/trapping season (Tables 5 and 6, Figure 5), which accounted for 71% of known cause mortalities during the monitoring period. Fifty-two percent of harvested wolves were males and 48 % were females.

Hunters and trappers were required to submit biological samples to WDNR. One hundred eighty-six submitted carcasses were visually inspected and age categories (pup, yearling, adult) were recorded based on dentition and tooth wear. Teeth were also collected and aged via cementum annuli by Matson's Laboratory, Milltown, MT. Results from the 2 aging methods varied substantially, with visual inspection resulting in a much higher percentage of carcasses classified as adults (Table 7). Forty-one percent of wolves classified as adults by visual inspection were classified as pups by cementum annuli aging. Additional evaluation of aging techniques is necessary to report the age structure of harvested wolves with confidence.

Reproductive tracts from 105 harvested females were collected and inspected for evidence of reproduction. Placental scars were found in 22 samples (21%), with an average of 6 scars per wolf in the 22 positive samples.

Depredation control was the second highest cause of detected mortality, accounting for 18% of known cause detected mortality (66 wolves; Table 5 and Figure 5). Human caused mortality represented 98% of known cause detected mortalities overall.

Twelve radio collared wolves died during the monitoring period (Table 5). Cause of death could not be determined for 1 collared wolf. For the 11 where cause of death could be determined, 7 (64%) were illegally killed, 2 (18%) were taken during the hunting/trapping season, 1 (9%) was killed by vehicle collision, and 1 (9%) died from symptoms consistent with mange. Consistent with our historic monitoring reports, we present only detected mortalities. A thorough analysis of Wisconsin wolf mortality and survival, including estimated rates of undetected mortality, was

recently conducted by researchers at the University of Wisconsin – Madison in collaboration with the Wisconsin Department of Natural Resources (Stenglein, J. 2014).

Disease / Parasite Occurrence in Wolves

Monitoring for mange was conducted by inspection of 17 wolves live-captured for research monitoring, and inspection of 107 non-harvest wolf mortalities (Table 4). Symptoms consistent with mange were noted in 2 captured wolves (11.8%) and 5 dead wolves (4.7%). Cause of death for 1 wolf was listed as mange based on field examination. Ticks were monitored by inspection of live-captured wolves. Ticks were noted on 10 (58.8%) captured wolves. Average weight of 6 live-captured males was 85 lbs. (range 75 to 90 lbs.), and average weight of 2 adult females was 60 lbs. (55 and 65 lbs.).

Wolf Depredation Management

Wolf depredation incidents were investigated by United States Department of Agriculture – Wildlife Services. Thirty-four incidents of wolf depredation to livestock and 12 incidents of wolf threat to livestock were confirmed on 36 different farms during the monitoring period (Table 8). This included 19 of 41 farms classified as chronic wolf depredation farms (46%). Livestock depredations included 33 cattle killed and 3 injured, 2 lambs/sheep killed, and 6 captive white-tailed deer killed. Livestock depredations decreased approximately 16% from the previous year when 48 depredation incidents and 15 threat incidents were confirmed on 43 different farms.

Thirty incidents of non-livestock depredation and 7 incidents of non-livestock threats were confirmed during the monitoring period. This included 26 dogs killed and 2 injured while actively engaged in hunting activities, and 4 dogs killed outside of hunting situations.

In livestock and threat to human safety cases, USDA-WS can initiate wolf trapping and lethal control. Forty-nine wolves were euthanized by USDA-WS during depredation control activities during the monitoring period. Ninety-nine landowners held shooting permits as a result of verified depredation concerns. This was a 22% decline from the previous year when 127 landowners held permits. Wisconsin authorizes the use of lethal means without permit when a wolf is in the act of depredating a domestic animal. Seventeen wolves were killed under landowner permit or in the act of depredating. A total of 66 wolves were killed in conflict situations within the reporting period. This was similar to the 64 wolves killed in conflict situations during the same period in 2012-13.

Regulatory Changes Affecting Wolf Management

The Wisconsin Natural Resources Board established a 2014-15 wolf quota of 156 (Wisconsin DNR 2014). This represents a 43% reduction from the 2013-14 wolf quota of 275. To allow for the exercise of tribal treaty rights, the state-licensed quota was reduced to 150.

Hunting with the aid of dogs is an approved method by state statute. Legal action resulted in a court injunction on hunting and training with the aid of dogs in the 2012-13 wolf season. The injunction on hunting with the aid of dogs was removed prior to the 2013-14 wolf season, 35 wolves were harvested with the aid of dogs. In July 2014 the injunction on dog training was removed.

Law Enforcement

Population monitoring and law enforcement efforts detected 12 wolves illegally harvested and 15 wolves illegally killed outside the hunting season for a total of 27 illegally killed wolves detected within the monitoring period. Law enforcement staff conducted 31 investigations and issued 21 citations during the 2013-14 wolf season (Table 9). At the time of report writing, only investigation and citation data for the 2013-14 wolf hunting and trapping season were available. This report will be updated with law enforcement data for the remainder of the reporting period when it becomes available.

Other Information on the Status of Wolves

Wisconsin's management actions continue to be guided by the 1999 wolf management plan (Wisconsin DNR 1999). The Wisconsin Natural Resources Board directed the Department of Natural Resources to update the state's wolf management plan. The Department created a wolf advisory committee which began wolf plan discussions in June, 2013. A public attitudes survey was completed to help inform decision making. A draft report is available on the WDNR website (<http://dnr.wi.gov/topic/WildlifeHabitat/wolf/documents/WolfAttitudeSurveyReportDRAFT.pdf>). Wolf management plan finalization and approval is anticipated in early 2015.

Information on Wolf Prey Species

White-tailed deer are the primary prey species for wolves in Wisconsin. White-tailed deer density estimates declined 12% statewide from the previous year estimate (Rolley 2013, Rolley 2014) (Table 10). Changes in deer management, including reduced antlerless harvest, should not negatively impact wolf prey availability.

Literature cited

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Table 1. Confirmed, probable and possible wolf observations reported by natural resource agency personnel and private citizens in Wisconsin, 15 April 2013 to 14 April 2014.

Zone	Number of Sightings	Wolves Seen	Track or Sign Observations	Total Wolf Observations
1	24	59	14	38
2	32	45	4	36
3	6	6	3	9
4	7	14	6	13
5	11	16	11	22
6	55	73	5	60
Statewide	135	213	43	178

Table 2. 2013 Wisconsin wolf howl survey data.

Wolf Harvest Zone	Howl Surveys	Packs Detected	Detected Packs with Pups	% Detected Packs with Pups
ZONE 1	32	14	12	86
ZONE 2	35	12	6	50
ZONE 3	38	6	3	50
ZONE 4	2	0	0	NA
ZONE 5	83	23	21	91
ZONE 6	11	4	4	100
TOTAL	201	59	46	78

Table 3. Pack and lone wolf summaries for Wisconsin in winter 2013-2014.

Harvest Zone		# of Packs	# of Wolves in Packs	Loners	Total # of Wolves	Change from 2012-2013	# of radio monitored Wolves	Average annual pack territory ^a (mi ²)
1	Off Reservations	78	267-277	3	270-280		19	
	On Reservations	3	11	0	11		2	
	Total	81	278-288	3	281-291	-16.7%	21	52.9 (n=14) ^b
2	Off Reservations	37	132-140	3	135-143		11	
	On Reservations	5	14	1	15		1	
	Total	42	146-154	4	150-158	-12.5%	12	60.9 (n=7)
3	Off Reservations	28	75-79	5	80-84		3	
	On Reservations	0	0	0	0		0	
	Total	28	75-79	5	80-84	-23.1%	3	25.4 (n=3)
4	Off Reservations	7	17-18	1	18-19		0	
	On Reservations	0	0	0	0		0	
	Total	7	17-18	1	18-19	-28.0%	0	-
5	Off Reservations	32	102-108	1	103-109		7	
	On Reservations	0	0	0	0		0	
	Total	32	102-108	1	103-109	-25.4%	7	16.3 (n=4)
6	Off Reservations	7	20	8	28		2	
	On Reservations	0	0	0	0		0	
	Total	7	20	8	28	-15.2%	2	-
Statewide	Off Reservations	189	613-642	21	634-663		42	
	On Reservations	8	25	1	26		3	
	Total	197	638-667	22	660-689	-18.4%	43 ^c	46.7 (n=28) ^b
Outside WI		2	7-8	1	8-9			

^a Pack territory size is only calculated for packs with ≥ 20 radiolocations for the period 15 April 2013 to 14 April 2014.

^b Includes 2 territories based on satellite collared wolf locations.

^c Two wolves dispersed from one harvest zone to another during the monitoring period and were counted in both zones.

Table 4. Detection of ectoparasites in captured wolves and non-harvest mortalities in Wisconsin from 15 April 2013 to 14 April 2014.

	n	# (%) w/Mange	# (%) w/Ticks
Zone 1			
Research captures	8	1 (12%)	6 (75%)
Non-harvest mortalities	49	3 (6%)	
Zone 2			
Research captures	5	1 (20%)	1 (20%)
Non-harvest mortalities	19	0	
Zone 3			
Non-harvest mortalities	16	1 (7%)	
Zone 4			
Non-harvest mortalities	5	1 (20%)	
Zone 5			
Research captures	3	0	2 (67%)
Non-harvest mortalities	7	0	
Zone 6			
Research captures	1	0	1 (100%)
Non-harvest mortalities	11	0	
STATEWIDE AVERAGES			
Research captures	17	2 (11.8%)	10 (58.8%)
Non-harvest mortalities	107	5 (4.7%)	

Table 5. Detected Wolf mortality in Wisconsin 15 April 2013 to 14 April 2014.

Cause of Death	Wolf Harvest Zones						State Total	% of Total
	1	2	3	4	5	6		
Human Caused Mortality								
Agency Control	26	9	9	2	3	0	49	
Landowner Control	9	4	1		1	2	17	
Total Depredation Control	35	13	10	2	4	2	66	18%
Harvested	77 ^b	29	75	12	35	29	257	71%
Vehicle collision	5 ^a	4	3	2	1	5	20	5%
Illegally killed	5 ^b	2 ^b	2 ^a	1	2 ^a	3 ^a	15	4%
Capture related							0	
Unknown human caused							0	
<i>Total human caused</i>	<i>122</i>	<i>48</i>	<i>90</i>	<i>17</i>	<i>42</i>	<i>39</i>	358	98%
Natural Mortality								
Disease / Injury	1 ^a						1	<1%
Intra-specific aggression							0	
Euthanized (non-control)							0	
Unknown natural causes							0	
<i>Total natural causes</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	1	<1%
<i>Unknown causes</i>	<i>3</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>1^a</i>	5	1%
Total Detected Mortality	126	48	91	17	42	40	364	

^aIncludes 1 radio collared wolf

^bIncludes 2 radio collared wolves
12 radio collared wolf mortalities

Table 6. Wolf harvest in 2013.

Zone	2011-2012 off-reservation population mid-point	% Harvest Goal	Total Quota	State Licensed Quota	# Harvested	Days Open to Harvest
1	333.5	25%	85	76	77	16
2	153.5	20%	31	28	29	9
3	105.5	75%	79	71	75	70
4	25	50%	12	12	12	22
5	141	25%	35	34	35	16
6	33	100%	33	30	29	24
Statewide	791.5	32%	275	251	257	70

Table 7. Age categories of wolves harvested in 2013, determined by two different methods.

Age Category	% of Harvest	
	Visual Inspection Aging	Tooth Cementum Aging
Pup	14.5%	56%
Yearlings	28.5%	21%
Adults	57%	23%

Table 8. Wolf depredation management in Wisconsin, 15 April 2013 to 14 April 2014.

	Wolf Harvest Zones						STATE TOTAL
	1	2	3	4	5	6	
Livestock cases							
Depredation	18	3	7	2		4	34
Threat	3	1	4		1	3	12
Chronic farms affected	15	2	2				19 of 41 (46%)
Total Farms affected	19	2	6	2	1	6	36
Cattle killed/ injured	17 / 1	4	5 / 2	3		4	33 / 3
Lambs/Sheep	2						2
Captive Deer			6				6
Non-livestock cases							
Depredation	19	8	1	1	1		30
Threat	2	2	1	1	1		7
Dogs killed/ injured while actively engaged in hunting activities	16	8 / 2	1		1		26 / 2
Dogs killed/ injured while not engaged in hunting activities	3			1			4
Control Actions							
Wolves euthanized for control	26	9	9	2	3		49
Wolves killed on permit or in the act	9	4	1		1	2	17
<i>Total Wolves killed for control</i>	35	13	10	2	4	2	66
Shooting permits issued for control	47	9	10	4	9	20	99

Table 9. Summary of law enforcement activity during the 2013 wolf hunting and trapping season.

# of wolf hunting related complaints received:	15
# of wolf trapping related complaints received:	31
# of wolf related investigations conducted	31
# of hunting related citations issued:	3
# of trapping related citations issued:	18
# of verbal warnings issued:	22
# of incidentally trapped wolves recovered:	2
# of illegally harvested wolves recovered:	12
# of shot & unrecovered wolves found:	1
# of unknown cause of death wolves found:	3
# of other dead/injured wolves recovered: (car-kills, etc.)	3

Table 10. White-tailed deer density estimate in wolf harvest zones in 2012 & 2013.

Wolf Harvest Zone	# of DMUs	Deer Range (mi²)	2012 Deer Density Goal (Deer/mi²)	2012 Post-hunt deer density (Deer/mi²)	2013 Post-hunt deer density (Deer/mi²)	% Change
1	16	5,953	18.1	20.1	14.9	-26%
2	15	5,264	20.3	18.7	17.9	-4%
3	10	3,435	22.2	29.4	22.9	-22%
4	6	1,830	21.5	32.2	28.2	-12%
5	6	2,492	25.7	31.5	27.5	-13%
6	66	17,099	23.5	48.3	43.6	-10%
TOTAL	119	36,073	22.1	35.6	31.3	-12%

Based on data on deer population estimates in Robert Rolley, 2013, Final Sex-Age-Kill 2012 Deer Population Estimates, WDNR unpublished data, and Robert Rolley, 2014, Final 2013 Deer Population Estimates for Deer Management Units, WDNR unpublished data.

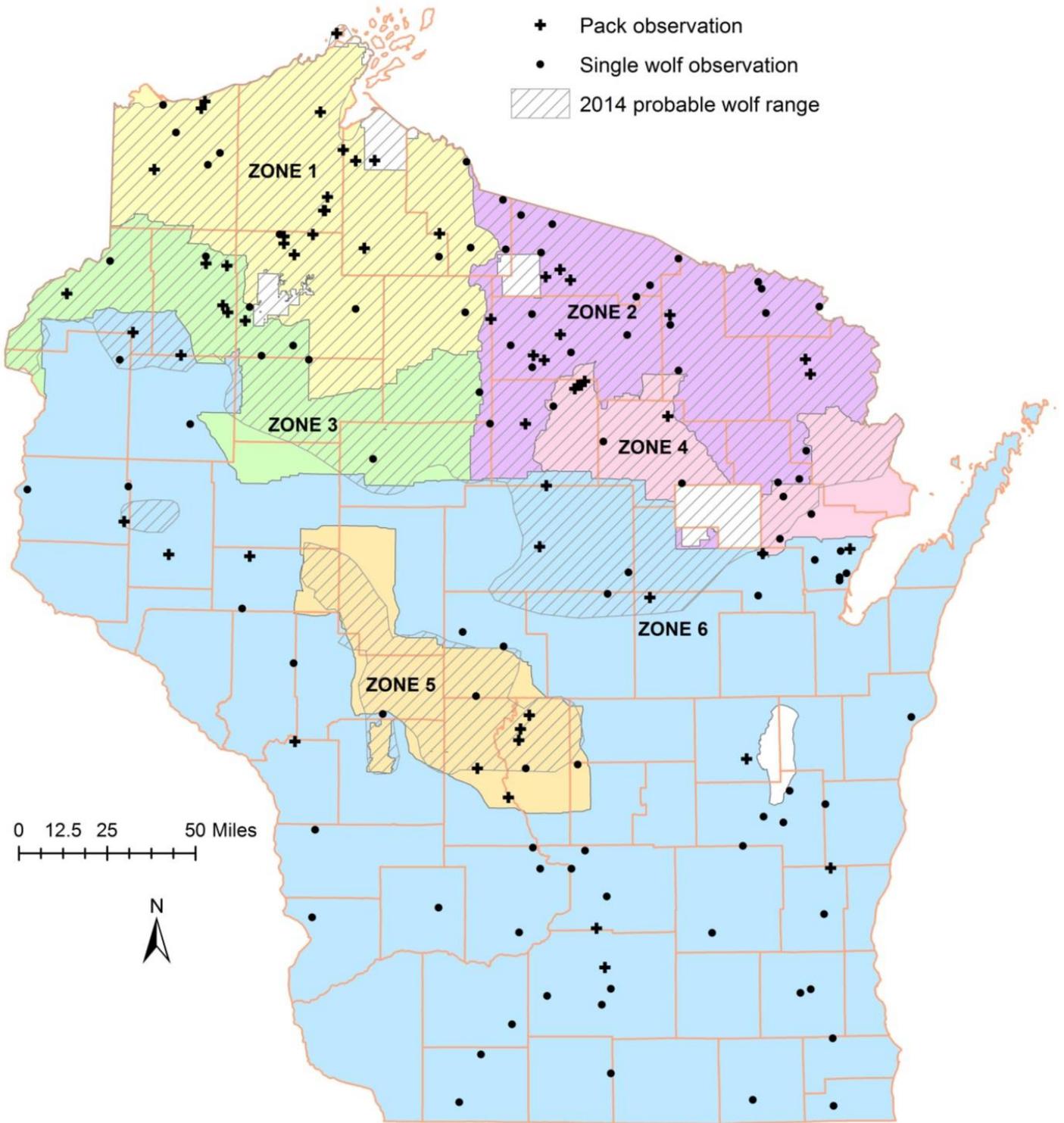


Figure 1. Wolf pack distribution in Wisconsin and verified, probable and possible wolf observation reports, 15 April 2013 to 14 April 2014.

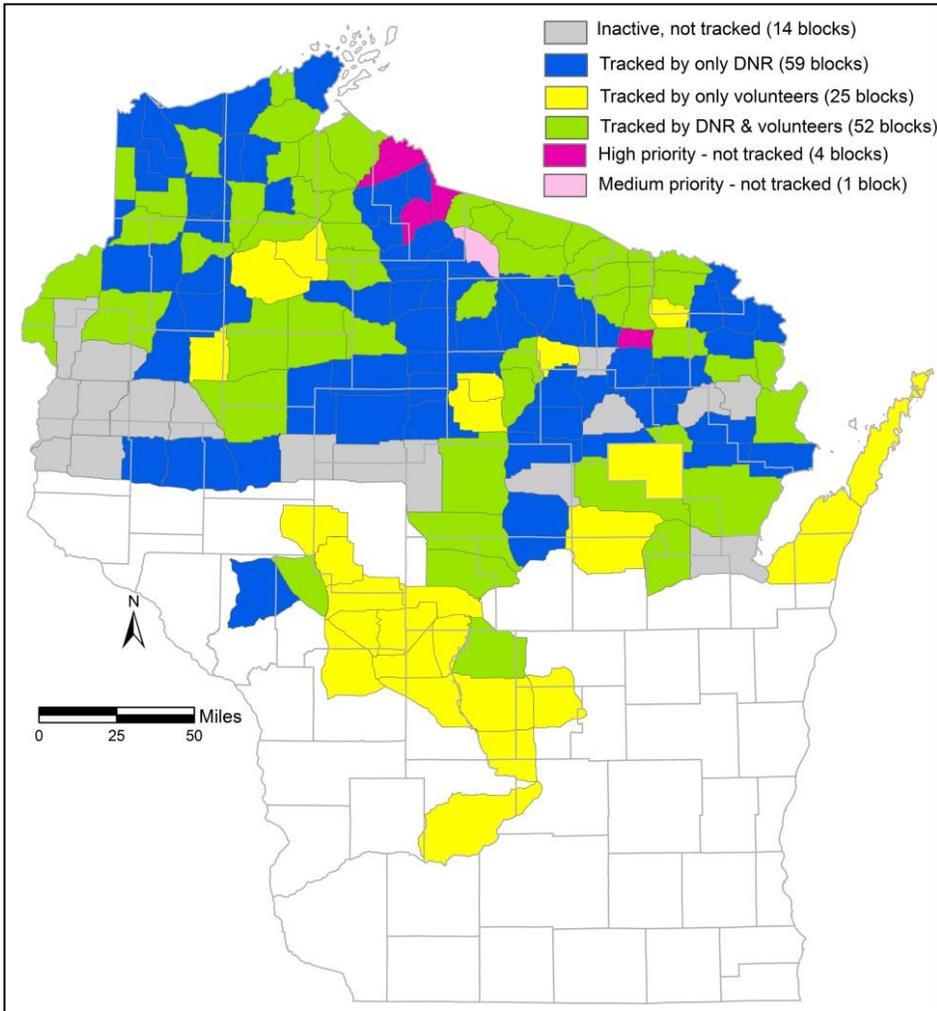


Figure 2. Wisconsin carnivore survey blocks tracked: winter 2013-2014.

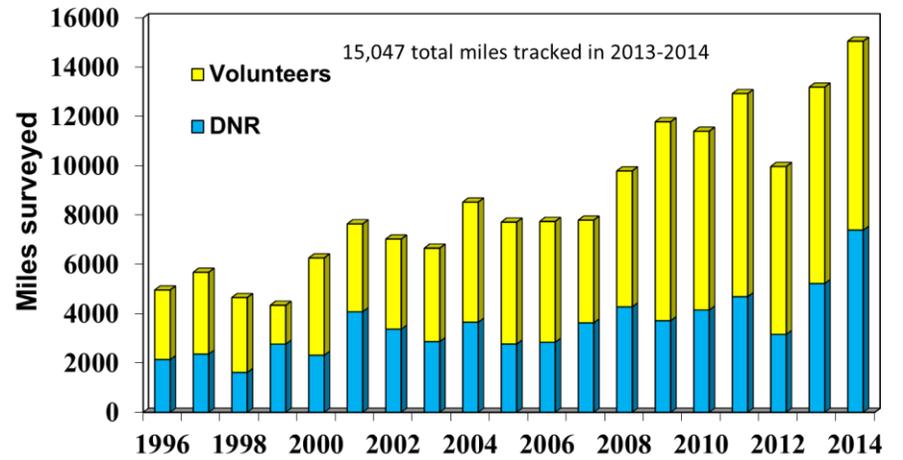


Figure 3 Winter track surveys in Wisconsin by WDNR & volunteers 1996-2014

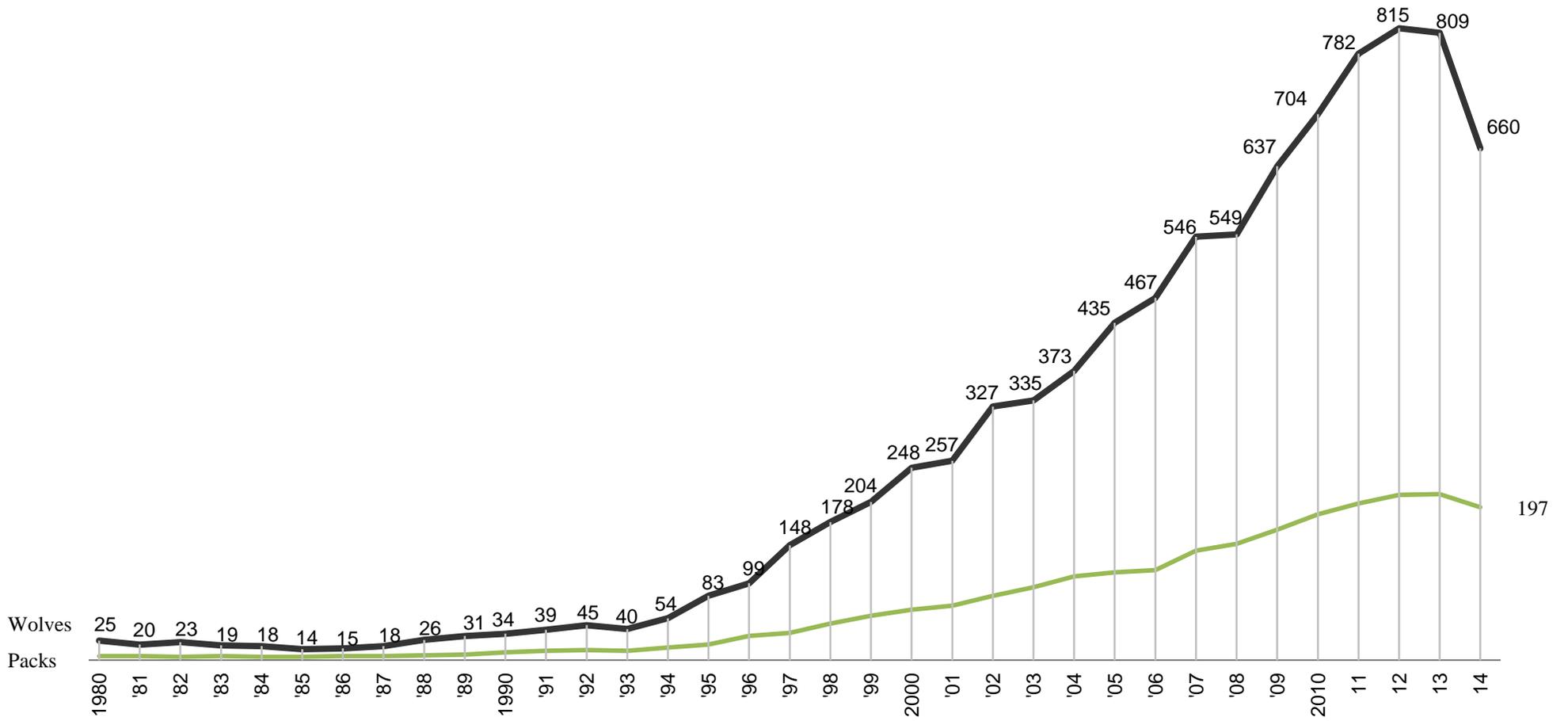


Figure 4. Changes in Wisconsin Gray Wolf Population: 1980-2014.

2013 Wolf Harvest & Wolf Control Mortalities

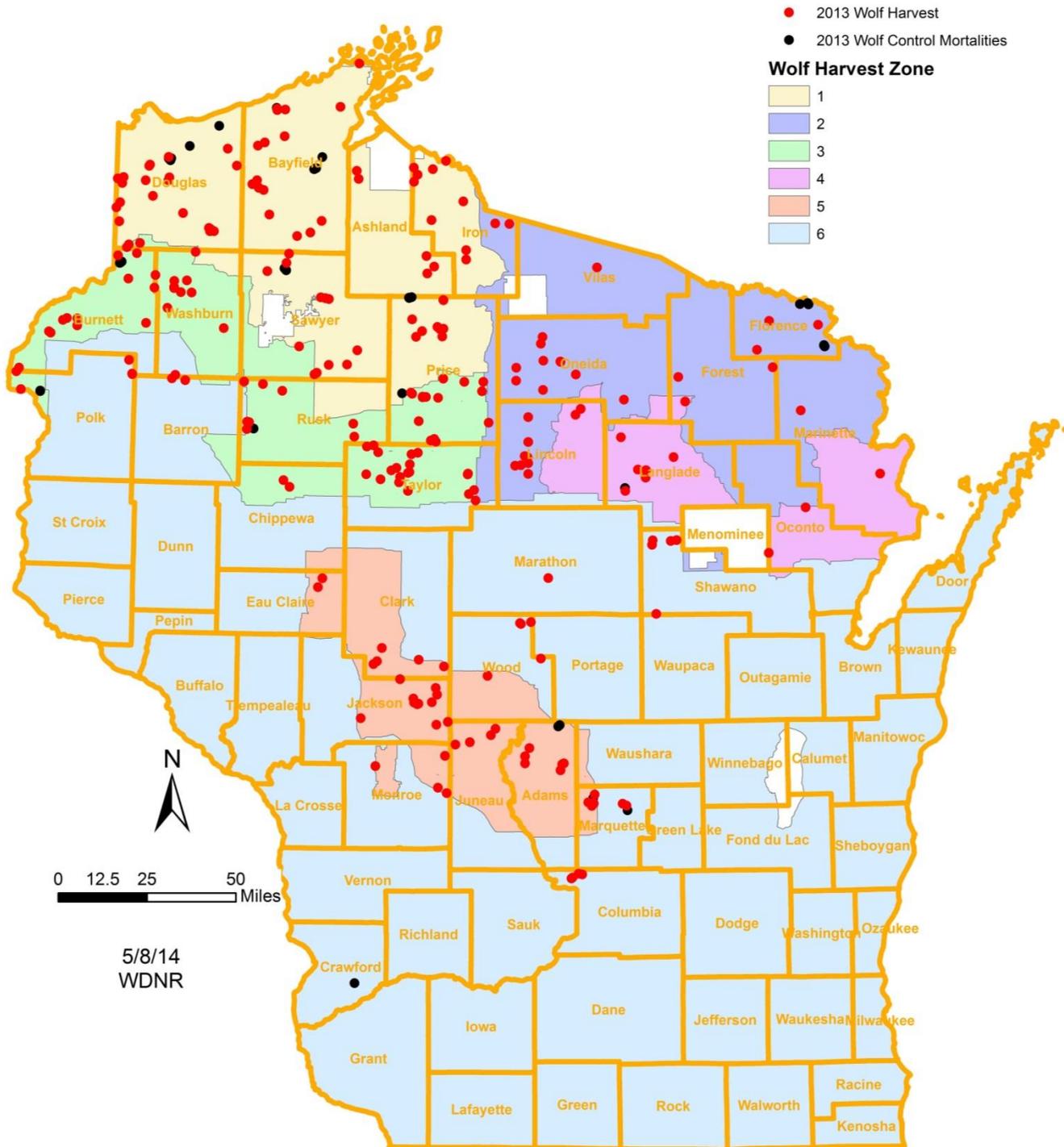


Figure 5. 2013 Wolf harvest and control mortalities.