

**WISCONSIN GRAY WOLF MONITORING REPORT
15 APRIL 2014 THROUGH 14 APRIL 2015**

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Introduction

This report describes wolf management and monitoring activities conducted in Wisconsin during the wolf monitoring year, April 15th, 2014 to April 14th, 2015. This represents a partial year of post delisting monitoring as specified in the U.S. Fish and Wildlife Service Post De-listing Monitoring Plan (U.S. Fish and Wildlife Service 2008), up to December 19th when gray wolves (*Canis lupus*) reverted to endangered status in the Western Great Lakes region as a result of a federal court decision.

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 similar to the previous year.

Observation reports were collected from the public and agency staff. A total of 334 reports of wolf or wolf sign observations were recorded. Additional reports were received but lacked sufficient information on date, location, or circumstances for recording. Fifty-three reports (16%) were verified as wolves by submitted photos. Ninety-six reports (29%) were considered to be “probable” wolves. Photos were submitted for 8 of these reports and were inconclusive but considered to be probable wolves. Photos were requested, but not received, for an additional 3 reports. Descriptions provided for the remainder of these reports supported a designation of probable wolf. One hundred thirty-three reports (40%) lacked adequate evidence or descriptions to determine species and were designated as possible wolves. Some reports were likely misidentifications. Photos were submitted for 13 of these reports, but were inconclusive. Photos were requested, but not received, for an additional 5 of these reports. Fifty-two reports (16%) were considered “not likely” to be wolves. Photos were submitted for 21 of these reports. Species found included coyotes (15 photos), domestic dogs (5 photos), and unidentified tracks inconsistent with wolf (1 photo). Thirty-one additional reports were considered not likely wolf based on the descriptions provided. Verified, probable, and possible wolf observations are shown in Table 1 and Figure 1. Reports of packs outside known occupied pack range were followed up with field investigations to attempt to verify pack presence. 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 2014, 119 howl surveys were conducted with 52 packs detected (Table 2). Pups were detected in 73% of the detected packs. A more thorough analysis of wolf howl data is in process.

During winter 2014-15, a total of 16,730 miles of track surveys were conducted by WDNR and volunteers, with 160 of 161 survey blocks tracked (Figures 2 & 3). A total of 208 packs were detected in Wisconsin and 4 packs considered to be primarily Michigan packs were also detected (Table 3). Of the 197 packs detected in winter 2013-14, 16 (8%) were not detected in winter 2014-15. Twenty-eight packs detected in winter 2014-15 had not been detected the previous winter. An average of 3.4 surveys were conducted per pack or area surveyed.

During the 2014-2015 monitoring period 50 wolves were monitored by telemetry (Table 3). In addition to VHF based telemetry, we began testing satellite based collars for wolf monitoring. Average pack territory size was 51.4 mi² for 30 packs with ≥ 20 telemetry locations. This included 5 territories determined from satellite and VHF locations (avg. = 88.2 mi²) and 25 territories with only VHF locations (avg. = 44.1 mi²). Average territory sizes were larger in northern zones (52.3 mi² n=15 in WHZ 1, and 60.6 mi² n=8 in WHZ 2) than central zones (37.3 mi² n=1 in WHZ 3, 39.2 mi² n=1 in WHZ 4, 39.7 mi² n=5 in WHZ 5). Research trapping resulted in capture of 22 wolves (Table 4), and telemetry collars were placed on 19. Recreational trappers reported an additional 5 wolves incidentally captured that DNR personnel were also able to place collars on before release. Telemetry collars were deployed on a total 24 wolves during the monitoring period, including 6 adult, 6 yearling, and 1 pup females, and 8 adult and 3 yearling males. These totals include seven GPS collars deployed during the monitoring period.

In April, 2015 the statewide minimum wolf population count was 746-771 wolves, an increase of 12.5% from the previous year (Table 3 & Figure 4). This included increases in each of the 6 zones with more moderate increases in zones 1, 2, and 3 ranging from 2.4% to 9.8%, and higher increases in zone 4, 5, and 6 ranging from 21.4% to 70.3%. The count included 716-741 wolves living in 208 packs, or an average of 3.4 to 3.6 wolves per pack, plus 30 non-pack associated animals. This represents an increase in average pack size from last winter (3.2-3.4), but is below the previous stabilized level of 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 2015 was 717-742 wolves.

Statewide Wolf Distribution

Contiguous wolf pack range was estimated to be 23,750 mi². The main range encompassed 23,196 mi² and included northern and central forested regions of Wisconsin (Figure 1). Three smaller areas in Dunn, Columbia, and Crawford counties comprised the remainder of probable wolf pack range. Two of the areas had a single wolf detected during winter surveys, but have a history of pack habitation so were included in the probable pack range calculation. The third area had a wolf pack detected during winter surveys. Using the 2015 minimum population count of 746-771 wolves, wolf density is estimated to be 1 wolf per 30.8 to 31.8 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 222 wolf mortalities were detected during the monitoring period (Table 5). Detected mortalities represented 32 to 34% of the minimum 2013-2014 late winter count of 660-689 wolves (Wiedenhoef et al. 2014).

One hundred fifty-four wolves were harvested during the hunting/trapping season (Tables 5 and 6, Figure 5), which accounted for 69% of known cause detected mortalities during the monitoring period. Fifty-six percent of harvested wolves were males and 44 % were females.

Hunters and trappers were required to submit biological samples to WDNR. Teeth of 143 animals were collected and successfully aged via cementum annuli by Matson's Laboratory, Milltown, MT. The majority of harvested wolves were young of the year (62.9%) and yearlings (15.4%) with adults ≥ 2 years old making up 21.7% of successfully aged animals (Table 7). The WDNR continues to evaluate the accuracy of cementum annuli aging of wolves; we urge caution in the interpretation of these results.

Reproductive tracts from 59 harvested females were collected and inspected for evidence of reproduction. Placental scars were found in 9 samples (15.2%), with an average of 5.2 scars per wolf in the 9 positive samples (Table 8).

Depredation control was the second highest cause of detected mortality, accounting for 15% of known cause detected mortality (34 wolves; Table 5 and Figure 5). Human caused mortality represented 93% of known cause detected mortalities overall.

Twelve collared wolves died during the monitoring period (Table 5). Cause of death could not be determined for 4 collared wolves. For the 8 where cause of death could be determined, 4 (50%) were killed by vehicle collision, 2 (25%) were illegally killed, 1 (12.5%) died from symptoms consistent with mange, and 1 (12.5%) died from unknown natural causes. For an analysis of wolf mortality including estimated rates of undetected mortality in Wisconsin wolves see Stenglein et al. 2015.

Disease / Parasite Occurrence in Wolves

Monitoring for mange was conducted by inspection of 25 wolves live-captured for research monitoring, and inspection of 68 non-harvest wolf mortalities (Table 4). Symptoms consistent with mange were noted in 2 captured wolves (8.0%) and 2 dead wolves (2.9%). 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 17 (68.0%) captured wolves. Average weight of 9 live-captured males was 85 lbs. (range 70 to 99 lbs.), and average weight of 4 adult females was 73 lbs. (range 60 to 86 lbs.).

Wolf Depredation Management

Wolf depredation incidents were investigated by United States Department of Agriculture – Wildlife Services. Twenty-eight incidents of wolf depredation to livestock and 11 incidents of wolf threat to livestock were confirmed on 32 different farms during the monitoring period (Table 9). This included 11 of 38 farms classified as chronic wolf depredation farms (29%). Livestock depredations included 29 cattle killed and 2 injured, and 2 captive white-tailed deer killed. The number of farms affected decreased by 26% from 2012-13 when 43 farms were affected (MacFarland & Wiedenhoef 2013), and by 11% from 2013-14 when 36 farms were affected (Wiedenhoef et al. 2014).

Thirty-three incidents of non-livestock depredation and 5 incidents of non-livestock threats were confirmed during the monitoring period. This included 25 dogs killed and 9 injured while actively engaged in hunting activities, and 2 dogs killed and 1 injured outside of hunting situations.

From 15 April to 18 December 2014, WDNR contracted with USDA-WS to initiate wolf trapping and lethal control for livestock and threat to human safety cases. Thirty-two wolves were euthanized by USDA-WS during that time. Forty-seven landowners held shooting permits as a result of verified

depredation concerns. Two wolves were killed under landowner permit during the reporting period prior to permit revocations on 19 December 2014. Prior to relisting, Wisconsin also authorized the use of lethal means without permit when a wolf was in the act of depredating a domestic animal, no wolves were taken under this authority. A total of 34 wolves were killed in conflict situations within the reporting period. This was a decrease of 48% compared to the 66 wolves killed in conflict situations during the same period in 2013-14 (Wiedenhoeft et al. 2014). No wolves were killed in control actions from 19 December 2013 to 14 April 2014.

Regulatory Changes Affecting Wolf Management

Wolves were returned to the federal endangered species list on December 19th, 2014. Under this designation, a hunting and trapping season will not be held and conflict control measures may not include lethal tools except in defense of human life. Wisconsin has altered its livestock depredation control program to only use non-lethal mitigation tools. The compensation program for the loss of domestic animals is still in place with funds generated from the endangered resources fund.

Law Enforcement

Population monitoring and law enforcement efforts detected 7 wolves illegally harvested within the monitoring period. Law enforcement staff conducted 19 investigations and issued 7 citations and 10 verbal warnings during the reporting period (Table 10).

Other Information on the Status of Wolves

In response to the relisting, the state halted efforts to revise the wolf management plan. Planning efforts will be re-initiated when there is greater certainty in the authority of the state to manage the wolf population. Management decisions continue to be based on the current wolf management plan (WDNR 1999).

Information on wolf prey species

White-tailed deer are the primary prey species for wolves in Wisconsin. Units used for monitoring Wisconsin deer have changed in the past year from smaller deer management units to county, or in some cases, partial county units. These larger units are somewhat less aligned with wolf harvest zones. Counties were assigned to the wolf harvest zone that the majority of the county falls in to compare deer density changes in the wolf harvest zones (Table 11). White-tailed deer density estimates declined 3% statewide from the previous year estimate (Rolley 2014, Rolley 2015). Recommendations from the County Deer Advisory Council and approved by the Natural Resources Board are to increase deer populations in counties in wolf harvest zones 1 through 5 and maintain the deer population density in most counties in zone 6. There is no indication that prey density is negatively impacting the wolf population.

Literature cited

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Table 1. Verified, probable and possible wolf observations reported by natural resource agency personnel and private citizens in Wisconsin, 15 April 2014 to 14 April 2015.

Zone	Number of Sightings	Wolves Seen	Track or Sign Observations	Total Wolf Observations
1	45	87	34	79
2	32	68	12	44
3	7	13	6	13
4	16	30	1	17
5	27	53	8	35
6	82	109	12	94
Statewide	209	360	73	282

Table 2. 2014 Wisconsin wolf howl survey data.

Wolf Harvest Zone	Howl Surveys	Packs Detected	Detected Packs with Pups	% Detected Packs with Pups
ZONE 1	33	12	7	58
ZONE 2	37	15	11	73
ZONE 3	10	4	3	75
ZONE 4	5	3	1	33
ZONE 5	32	17	15	88
ZONE 6	2	1	1	100
TOTAL	119	52	38	73

Table 3. Pack and lone wolf summaries for Wisconsin in winter 2014-2015.

Harvest Zone		# of Packs	# of Wolves in Packs	Loners	Total # of Wolves	Change from 2013-2014	# of telemetry monitored Wolves	Average annual pack territory ^a (mi ²)
1	Off Reservations	79	290-300	4	294-304		23	
	On Reservations	3	14	1	15		3	
	Total	82	304-314	5	309-319	9.8%	26	52.3 (n=15) ^b
2	Off Reservations	43	141-146	6	147-152		13	
	On Reservations	6	14	0	14		2	
	Total	49	155-160	6	161-166	6.2%	15	60.6 (n=8) ^b
3	Off Reservations	25	76-80	6	82-86		1	
	On Reservations	0	0	0	0		0	
	Total	25	76-80	6	82-86	2.4%	1	37.3 (n=1)
4	Off Reservations	9	26-27	5	31-32		1	
	On Reservations	0	0	0	0		0	
	Total	9	26-27	5	31-32	70.3%	1	39.2 (n=1) ^c
5	Off Reservations	32	128-133	1	129-134		7	
	On Reservations	0	0	0	0		0	
	Total	32	128-133	1	129-134	24.1%	7	39.7 (n=5)
6	Off Reservations	11	27	7	34		0	
	On Reservations	0	0	0	0		0	
	Total	11	27	7	34	21.4%	0	-
Statewide	Off Reservations	199	688-713	29	717-742		45	
	On Reservations	9	28	1	29		5	
	Total	208	716-741	30	746-771	12.5%	50	51.4 (n=30) ^d
Outside WI		4	9	0	9			

^a Pack territory size is only calculated for packs with ≥20 radiolocations for the period 15 April 2014 to 14 April 2015.

^bIncludes 2 territories based on satellite collared wolf locations.

^cIncludes 1 territory based on satellite collared wolf locations.

^dIncludes 5 territories based on satellite collared wolf locations.

Table 4. Research capture summary and detection of ectoparasites in captured wolves and non-harvest mortalities in Wisconsin from 15 April 2014 to 14 April 2015.

	n	# (%) w/Mange	# (%) w/Ticks
Zone 1			
Research captures	17	1 (6%)	11 (69%)
Non-harvest mortalities	41	1 (2%)	
Zone 2			
Research captures	6	0	3 (50%)
Non-harvest mortalities	6	0	
Zone 3			
Research captures	1	1 (100%)	1 (100%)
Non-harvest mortalities	5	0	
Zone 4			
Research captures	1	0	0
Non-harvest mortalities	2	1 (50%)	
Zone 5			
Research captures	2	0	2 (100%)
Non-harvest mortalities	6	0	
Zone 6			
Research captures	0	-	-
Non-harvest mortalities	8	0	
STATEWIDE AVERAGES			
Research captures	27	2 (7.4%)	17 (70.0%)
Non-harvest mortalities	68	2 (2.9%)	

Table 5. Detected Wolf mortality in Wisconsin 15 April 2014 to 14 April 2015.

Cause of Death	Wolf Harvest Zones						State Total	% of Total
	1	2	3	4	5	6		
Human Caused Mortality								
Agency Control	25	0	3	1	0	3	32	
Landowner Control	1	1					2	
Total Depredation Control	26	1	3	1	0	3	34	15%
Harvested	36	29	30	5	18	36	154	69%
Vehicle collision	4 ^c	2 ^a		1	2	3	12	5%
Illegally killed	3 ^a		1		1 ^a	2	7	3%
Capture related							0	
Unknown human caused							0	
<i>Total human caused</i>	<i>69</i>	<i>32</i>	<i>34</i>	<i>7</i>	<i>21</i>	<i>44</i>	<i>207</i>	<i>93%</i>
Natural Mortality								
Disease / Injury	1 ^a						1	<1%
Intra-specific aggression	1						1	<1%
Euthanized (non-control)	1	1			1		3	1%
Unknown natural causes	1 ^a						1	<1%
<i>Total natural causes</i>	<i>4</i>	<i>1</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>6</i>	<i>3%</i>
<i>Unknown causes</i>	<i>4^b</i>	<i>2</i>	<i>1^a</i>	<i>0</i>	<i>2^a</i>	<i>0</i>	<i>9</i>	<i>4%</i>
Total Detected Mortality	77	35	35	7	24	44	222	

^aIncludes 1 radio collared wolf

^bIncludes 2 radio collared wolves
12 radio collared wolf mortalities

Table 6. Wolf harvest in 2014.

Zone	2012-2013 off-reservation population mid-point	Total Quota	State Licensed Quota	# Harvested	Days Open to Harvest
1	275.0	33	32	36	5
2	139.0	16	15	29	4
3	82.0	41	40	30	52
4	18.5	9	8	5	5
5	106.0	21	20	18	6
6	28.0	36	35	36	52
Statewide	648.5	156	150	154	52

Table 7. Age of harvested wolves determined through analysis of cementum annuli

Age	Male		Female		Total	
	Number	Proportion	Number	Proportion	Number	Proportion
0	48	0.578	42	0.700	90	0.629
1	17	0.205	5	0.083	22	0.154
2	7	0.084	5	0.083	12	0.084
3	6	0.072	2	0.033	8	0.056
4	3	0.036	2	0.033	5	0.035
5	1	0.012	3	0.050	4	0.028
6	0	0.000	0	0.000	0	0.000
7	0	0.000	1	0.017	1	0.007
8	0	0.000	0	0.000	0	0.000
9	0	0.000	0	0.000	0	0.000
10	1	0.012	0	0.000	1	0.007
Total	83	1.000	60	1.000	143	1.000

Table 8: Placental scar analysis of reproductive tracts including average number of scars for samples with evidence of scarring

Age	Analyzed	Tracts with Scars Detected	Avg. # scars in positive samples
0	40	0	0.00
1	5	0	0.00
2	5	3	6.00
3	1	0	0.00
4	2	2	4.00
5	3	3	5.00
6	0	0	0.00
7	1	1	6.00
UK	2	0	0
Total	59	9	5.22

Table 9. Wolf depredation management in Wisconsin, 15 April 2014 to 14 April 2015.

	Wolf Harvest Zones						STATE TOTAL
	1	2	3	4	5	6	
Livestock cases							
Depredation	12	1	4	1	0	10	28
Threat	5	0	1	0	2	3	11
Chronic farms affected	7	0	3	0	0	1	11 of 38 (29%)
Total Farms affected	15	1	4	1	2	9	32
Cattle killed	13	0	4	1	0	11	29
Cattle injured	0	0	0	0	0	2	2
Captive Deer killed	1	1	0	0	0	0	2
Non-livestock cases							
Depredation	16	10	2	1	4	0	33
Threat	2	1	0	0	1	1	5
Dogs killed while actively engaged in hunting activities	14	6	1	1	3	0	25
Dogs injured while actively engaged in hunting activities	0	7	1	0	1	0	9
Dogs killed while not engaged in hunting activities	2	0	0	0	0	0	2
Dogs injured while not engaged in hunting activities	1	0	0	0	0	0	1
Control Actions							
Wolves euthanized for control	25	0	3	1	0	3	32
Wolves killed on permit or in the act	1	1	0	0	0	0	2
<i>Total Wolves killed for control</i>	26	1	3	1	0	3	34
Shooting permits issued for control	20	4	3	1	3	16	47

Table 10. Summary of law enforcement activity during the reporting period.

# of wolf hunting related complaints received:	6
# of wolf trapping related complaints received:	13
# of wolf related investigations conducted	19
# of hunting related citations issued:	3
# of trapping related citations issued:	4
# of verbal warnings issued:	10
# of incidentally trapped wolves recovered:	0
# of illegally harvested wolves recovered:	6
# of shot & unrecovered wolves found:	0
# of unknown cause of death wolves found:	1
# of other dead/injured wolves recovered: (car-kills, etc.)	7

Table 11. White-tailed deer density estimate in wolf harvest zones in 2013 & 2014.

Wolf Harvest Zone	# of Counties	Deer Range (mi ²)	2013 Post-hunt deer density (Deer/mi ²)	2014 Post-hunt deer density (Deer/mi ²)	% Change	2015-17 Deer Population Objective
1	6	6,494	14.9	12.0	-19%	Increase
2	5	4,236	17.9	16.0	-11%	Increase
3	4	3,141	22.9	23.0	0%	Increase
4	4	2,229	28.2	22.0	-22%	Increase
5	7	2,315	27.5	24.0	-13%	Increase
6	54	17,408	43.6	44.0	+1%	Maintain
TOTAL	80	35,823	31.3	30.5	-3%	

Deer range and post-hunt deer estimates based on Robert Rolley, 2014, Final 2013 Deer Population Estimates for Deer Management Units, WDNR unpublished data and Robert Rolley, 2015, Final 2014 Deer Population Estimates for Wisconsin Deer Management Units, WDNR unpublished data.

Deer population objectives from County Deer Advisory Council Final 2015 – 2017 Deer Population Objectives Approved by the Natural Resources Board, <http://dnr.wi.gov/topic/hunt/cdac.html>.

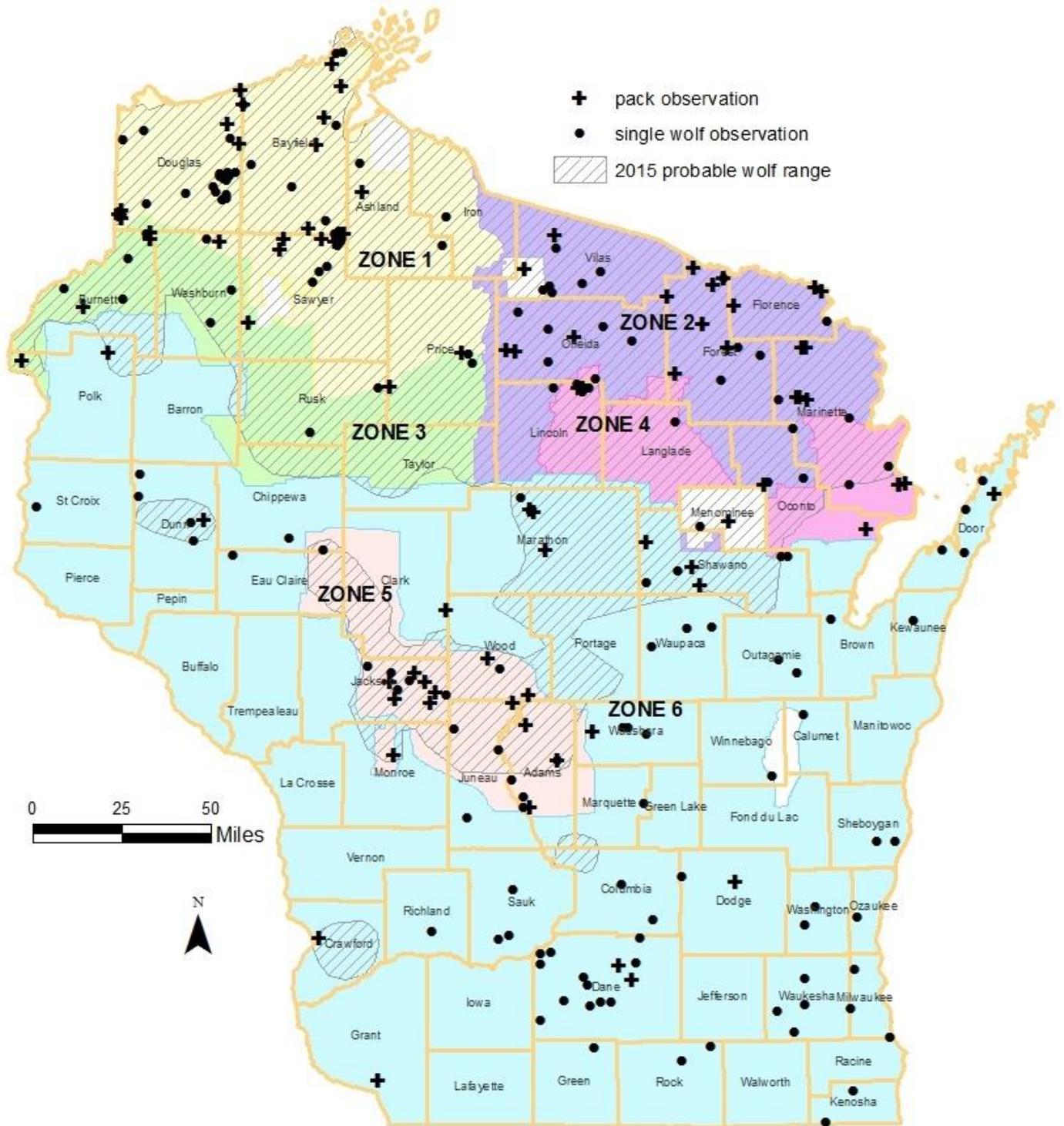


Figure 1. Wolf pack distribution in Wisconsin and verified, probable and possible wolf observation reports, 15 April 2014 to 14 April 2015.

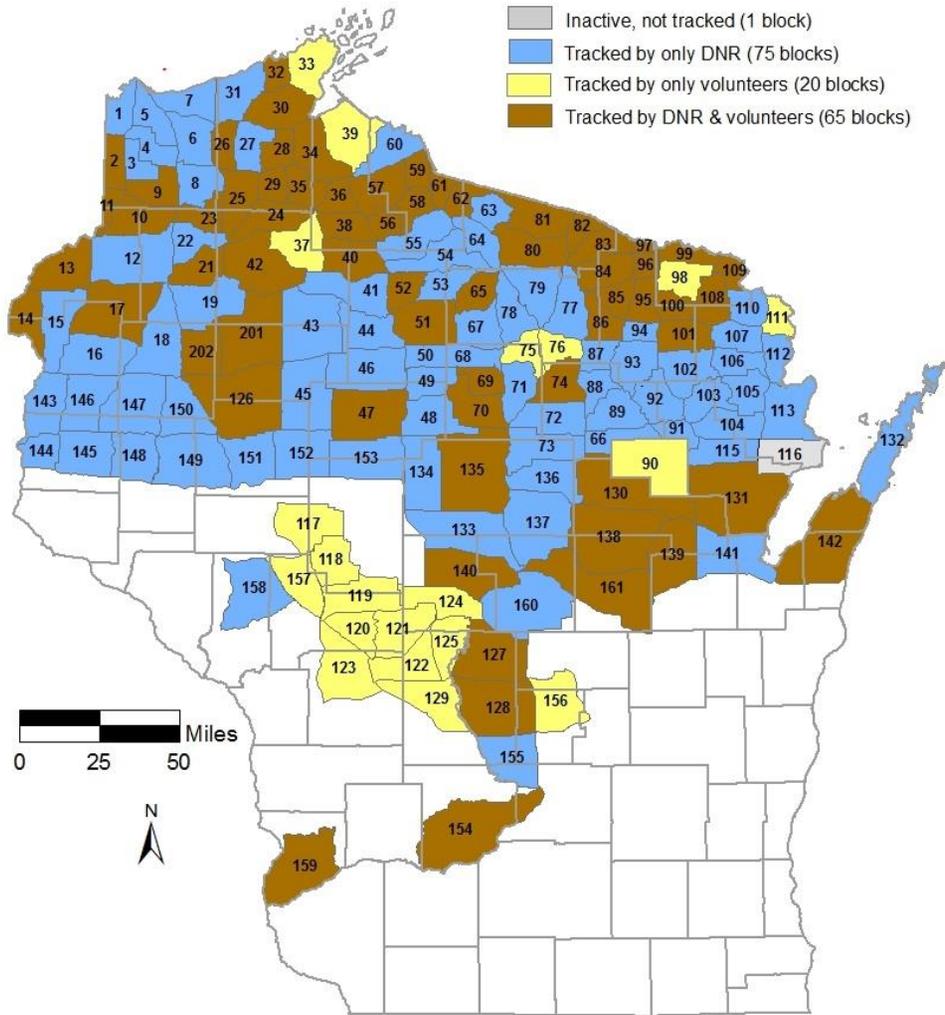


Figure 2. Wisconsin carnivore survey blocks tracked: winter 2014-2015.

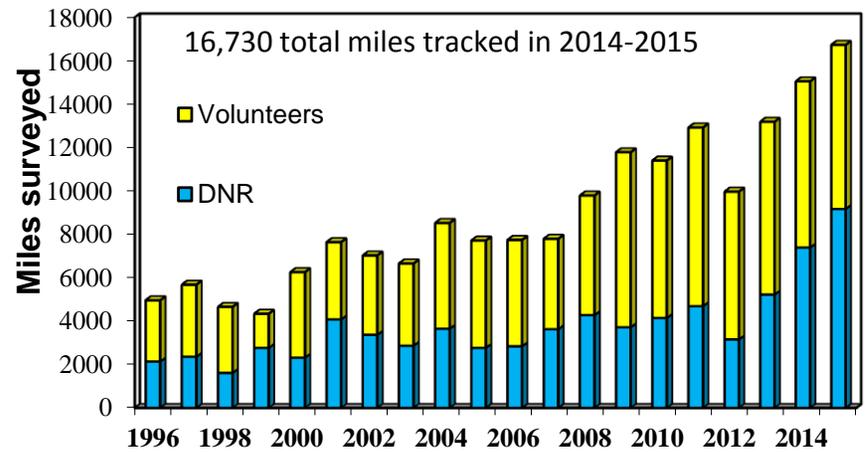


Figure 3 Carnivore track surveys in Wisconsin by WDNR & volunteers 1996-2015

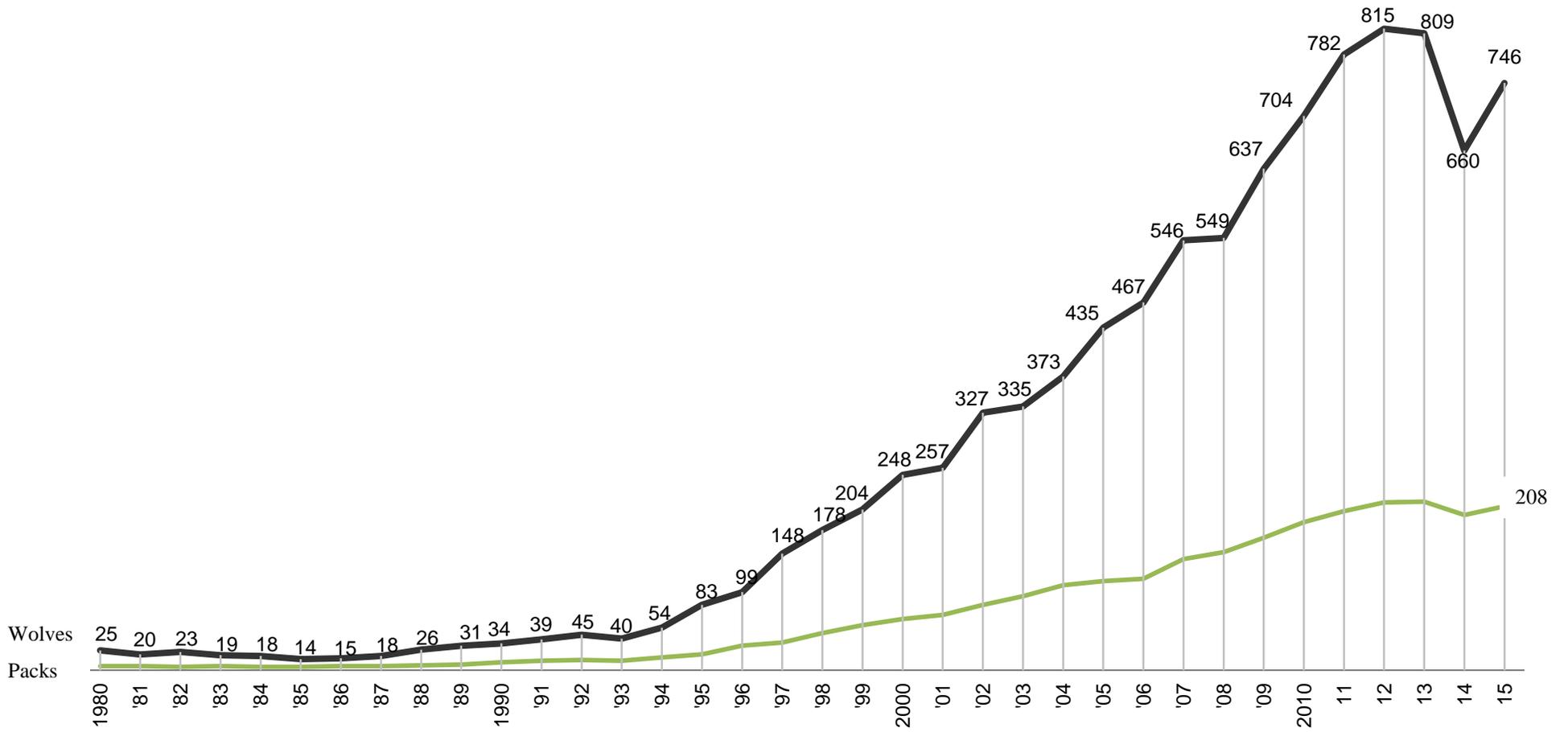


Figure 4. Changes in Wisconsin Gray Wolf Population: 1980-2015.

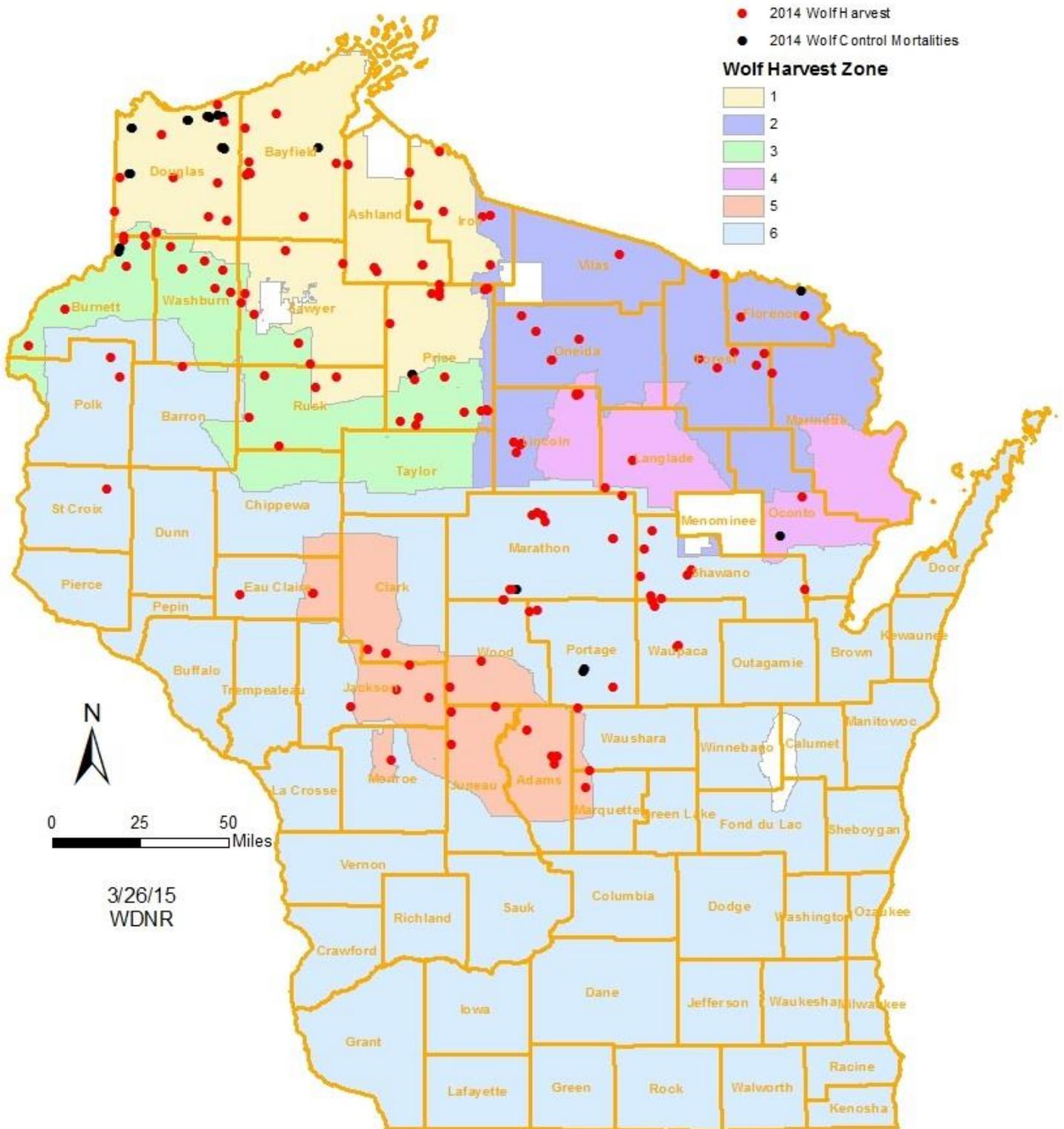


Figure 5. 2014 Wolf harvest and control mortalities.