

**WISCONSIN GRAY WOLF MONITORING REPORT  
15 APRIL 2016 THROUGH 14 APRIL 2017**

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## Introduction

This report describes wolf management and monitoring activities conducted in Wisconsin during the wolf monitoring year, April 15<sup>th</sup>, 2016 to April 14<sup>th</sup>, 2017. Gray wolves (*Canis lupus*) reverted to federally endangered status in the Western Great Lakes region as a result of a federal court decision in December 2014. They have been in this status for the entire monitoring period.

## 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 management units (WMU's) 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 269 reports of wolf or wolf sign observations were recorded. This is similar to the 279 reports recorded the previous year (Wiedenhoeft et.al. 2016). Additional reports were received but lacked sufficient information on date, location, or circumstances for recording. Fifty-four reports (20%) were verified as wolves by submitted evidence or field checks. One hundred two reports (38%) were considered to be "probable" wolves. Photos were submitted for 9 of these reports and were inconclusive but considered to be probable wolves. One report was field checked and was 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. Eighty-four reports (31%) lacked adequate evidence or descriptions to determine species and were designated as possible wolves. Some reports were likely mis-identifications. Photos were submitted for 4 of these reports, but were inconclusive. Photos were requested, but not received, for an additional 5 of these reports. Twenty-nine reports (11%) were considered to be "not likely" wolves. Photos were submitted for 8 of these reports. Species found included coyotes (3 photos), domestic dog tracks (3 photos), other tracks too small for wolf (1 photo), and fox pups (1 photo). Photos were requested, but not received, for 1 additional report. Twenty 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 forwarded to the biologist responsible for the geographic area for further monitoring 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, verified and probable reports within the winter count period were incorporated into count data.

During summer 2016, 233 howl surveys were conducted with 53 packs detected (Table 2). Pups were detected in 77% of the detected packs. This compares with a pup detection rate of 65% of 54 packs responding during howl surveys in summer 2015 (Wiedenhoeft et.al. 2016), and an average of 73.3% of packs with pups over the past 4 summers. A more thorough analysis of wolf howl data is in process.

During winter 2016-17, a total of 14,156 miles of track surveys were conducted by WDNR and volunteers, with 155 of 163 active survey blocks tracked (Figures 2 & 3). Tribes tracked an additional 2 survey blocks. In 4 blocks, counts were obtained by other methods or their packs were detected in an adjacent block. Tracking conditions were unsuitable in 2 blocks with no known wolf

pack activity. A total of 232 packs were detected in Wisconsin (Figure 4), an increase of 10 packs from last winter. Thirteen to fourteen wolves from 4 packs considered to be primarily in Minnesota and Michigan and 1 lone wolf considered to be from a primarily Michigan pack were also detected (Table 3). Of the 222 packs detected in winter 2015-16, 18 (8%) were either not detected at all or were considered to have combined with an adjacent pack in 2016-2017. Seven packs (3%) detected in 2015-16 were detected as loners in winter 2016-17. One pack counted in Wisconsin in 2015-16 was considered a Michigan pack in 2016-2017. Thirty-four of the 232 packs detected in winter 2016-17 had not been detected the previous winter. Of these packs, 13 (6%) had been detected previous to winter 2015-2016, 9 (4%) had been detected as loners in 2015-16, and 12 (5%) had not been previously detected. An average of 3.1 surveys were conducted per pack or area surveyed.

During the 2016-2017 monitoring period 66 wolves were monitored by telemetry (Table 3). Average pack territory size was 54.4 mi<sup>2</sup> for 53 packs with ≥20 telemetry locations. This included 32 territories determined from satellite and VHF locations (avg. = 63.0 mi<sup>2</sup>) and 21 territories with only VHF locations (avg. = 41.2 mi<sup>2</sup>). Average territory size was largest in WMU 2 (69.1 mi<sup>2</sup> n=14). Research trapping resulted in capture of 19 wolves and telemetry collars were placed on all of them. Two wolves were trapped in relation to depredation control activities and telemetry collars were placed on them before release. Two wolves were trapped and collared with telemetry collars on tribal lands. Recreational trappers reported an additional 10 wolves incidentally captured. DNR personnel were also able to place collars on 9 of them before release. Telemetry collars were deployed on a total of 32 of 33 wolves captured during the monitoring period (Table 4), including 9 adult, 5 yearling, and 2 unknown age females, and 13 adult, 2 yearling, and 1 unknown age males.

In April, 2017 the statewide minimum wolf population count was 925-952 wolves, an increase of 6.8% from the previous year (Table 3 & Figure 5). This included increases in 4 of the 6 management units and decreases in 2 units, ranging from -28.8% in WMU 4 to +71.9% in WMU 6. The count included 897-924 wolves living in 232 packs, or an average of 3.9 wolves per pack. An additional 28 non-pack associated wolves were detected. State wolf management is based on the minimum count off Native American reservations. The off reservation minimum count in April 2017 was 906-933 wolves. More detailed information on the 2016-2017 wolf count can be found on the Wisconsin DNR website, [http://dnr.wi.gov/topic/wildlifehabitat/documents/Carn\\_Track\\_Blocks\\_Results.pdf](http://dnr.wi.gov/topic/wildlifehabitat/documents/Carn_Track_Blocks_Results.pdf).

### Statewide Wolf Distribution

Contiguous wolf pack range was estimated to be 23,833 mi<sup>2</sup> in northern and central forested regions of Wisconsin (Figure 1). Using the 2017 minimum population count of 925-952 wolves, wolf density is estimated to be 1 wolf per 25.0 to 25.8 mi<sup>2</sup> 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 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 44 wolf mortalities were detected during the monitoring period (Table 5, Figure 1). Detected mortalities represented 5% of the minimum 2015-2016 late winter count of 866-897 wolves (Wiedenhoeft et.al. 2016).

Vehicle collisions (39%) and illegal kills (20%) were the leading causes of death for detected mortalities. Capture related mortalities accounted for 9% of detected mortalities. Human caused mortality represented 97% of known cause detected mortalities overall.

One injured and/or sick wolf in poor condition (2%) was euthanized. This was the only mortality detected due to natural causes. Mortalities due to natural causes are difficult to detect unless the animal is wearing an active telemetry collar.

Cause of mortality could not be determined for 13 (30%) of the cases.

Sixteen collared wolves died during the monitoring period, 15 of which were being actively monitored at the time of death (Table 5). Of those being actively monitored, cause of death could not be determined for 8 collared wolves. For the 7 where cause of death could be determined, 4 (57%) died due to capture related myopathy or injury, 2 (29%) were illegally killed, and 1 (14%) was killed by vehicle collision. For an analysis of estimated rates of undetected mortality in Wisconsin wolves see Stenglein et al. 2015.

#### Disease / Parasite Occurrence in Wolves & Body Condition

General body condition was reported for 33 wolves that were captured (Table 4). Twenty-nine (88%) were reported to be in good or excellent body condition, 2 (6%) were reported to be in fair body condition, and 2 (6%) were reported to be in poor condition. Average weight of 10 live-captured adult males was 85 lbs. (range 75 to 100 lbs.), and average weight of 6 adult females was 69 lbs. (range 57 to 80 lbs.). Monitoring for mange was conducted by inspection of 33 wolves live-captured for research monitoring, and inspection of 44 wolf mortalities (Table 4). Symptoms consistent with mange were noted in 1 captured wolf (3%) and 1 dead wolf (2%). Ticks were monitored by inspection of live-captured wolves. Ticks were noted on 19 (58%) of captured wolves.

#### Wolf Depredation Management

Wolf depredation incidents were investigated by United States Department of Agriculture – Wildlife Services. During the monitoring period, Wildlife Services confirmed 92 wolf complaints of the 155 investigated (Figure 6). Unconfirmed complaints were either confirmed to be due to causes other than wolves or lacked sufficient evidence to attribute a cause. Thirty-seven incidents of wolf depredation to livestock and 11 incidents of wolf threat to livestock were confirmed on 31 different farms during the monitoring period (Table 6). This included 8 of 34 farms classified as chronic wolf depredation farms (24%). Livestock depredations included 33 cattle killed and 6 injured, 27 sheep killed, and 2 miniature donkeys killed and 1 injured. The number of farms affected decreased slightly from 2015-16 when 34 farms were affected (Figure 7). The number of incidents decreased 29% from 2015-16 when 52 incidents of depredation to livestock were confirmed.

Forty-three incidents of non-livestock depredation and no incidents of non-livestock threats were confirmed during the monitoring period. This included 40 dogs killed and 11 injured while actively engaged in hunting activities, and 4 dogs killed and 1 injured outside of hunting situations (Figure 8). This was a 72% increase from 2015-16 when 25 incidents of non-livestock depredation were confirmed. The majority of hunting dog incidents (36 of 39, 92%) occurred between July 5<sup>th</sup> and

October 1<sup>st</sup>. The other 3 incidents of depredations to hunting dogs occurred between mid-December and mid-January.

### Regulatory Changes Affecting Wolf Management

There were no significant regulatory changes during the reporting period.

### Law Enforcement

Population monitoring and law enforcement efforts detected 9 wolves illegally killed within the monitoring period. Law enforcement staff conducted 8 wolf related investigations and issued 1 citation during the reporting period (Table 7).

### Information on Wolf Prey Species

White-tailed deer are the primary prey species for wolves in Wisconsin. Units used for monitoring Wisconsin deer are counties, or in some cases, partial counties. Counties were assigned to the wolf management units that the majority of the county falls in to compare deer density changes in the wolf management units (Table 8). White-tailed deer density estimates increased 13% statewide from the previous year estimate (Stenglein, 2017). Recommendations from the County Deer Advisory Council and approved by the Natural Resources Board are to increase deer populations in counties in wolf management units 1 through 5 and maintain the deer population density in most counties in unit 6. There is no indication that prey density is negatively impacting the wolf population.

### Literature Cited

- Stenglein, J.L., Van Deelen, T.R., Wydeven, A.P., Mladenoff, D.J., Wiedenhoef, J.E., Businga, N.K., Langenberg, J.A., Thomas, N.J., and D.M. Heisey. 2015. Mortality patterns and detection bias from carcass data: An example from wolf recovery in Wisconsin. *The Journal of Wildlife Management*. doi: 10.1002/jwmg.922.
- Stenglein, J. 2017. Final 2016 Deer Population Estimates for Wisconsin Deer Management Units. Wisconsin DNR unpublished data.
- Wiedenhoef, J.E., MacFarland, D.M, Libal, N.S., and J. Bruner. 2016. Wisconsin Gray Wolf Monitoring Report 15 April 2015 through 14 April 2016. 14 pp.  
<http://dnr.wi.gov/topic/Wildlifehabitat/wolf/documents/Wolfreport2016.pdf>
- Wydeven, A.P., Wiedenhoef, J.E., Schultz, R.N., Thiel, R.P., Jurewicz, R.L., Kohn, B.E., and T.R. Van Deelen. 2009. History, population growth, and management of wolves in Wisconsin. Pp. 87-105 *in* Wydeven, A.P., Van Deelen, T.R., and E.J. Heske. *Recovery of Gray Wolves in the Great Lakes Region of the United States: An Endangered Species Success Story*. Springer, New York, NY, USA. 350 pp.

**Table 1.** Verified, probable and possible wolf observations reported by natural resource agency personnel and private citizens in Wisconsin, 15 April 2016 to 14 April 2017.

<b>Wolf Mgmt. Unit</b>	<b>Number of Sightings</b>	<b>Wolves Seen</b>	<b>Track or Sign Observations</b>	<b>Total Wolf Observations</b>
<b>1</b>	33	69	52	85
<b>2</b>	18	33	22	40
<b>3</b>	6	10	4	10
<b>4</b>	11	30	7	18
<b>5</b>	3	4	5	8
<b>6</b>	62	90	16	78
<b>Statewide</b>	<b>133</b>	<b>236</b>	<b>106</b>	<b>239</b>

**Table 2.** 2016 Wisconsin wolf howl survey data.

<b>Wolf Mgmt. Unit</b>	<b>Howl Surveys</b>	<b>Packs Surveyed</b>	<b>Packs Detected</b>	<b>Detected Packs with Pups</b>	<b>% Detected Packs with Pups</b>
<b>UNIT 1</b>	98	40	20	15	75
<b>UNIT 2</b>	72	34	16	11	69
<b>UNIT 3</b>	13	9	5	5	100
<b>UNIT 4</b>	13	8	2	1	50
<b>UNIT 5</b>	34	16	8	7	88
<b>UNIT 6</b>	3	3	2	2	100
<b>TOTAL</b>	<b>233</b>	<b>110</b>	<b>53</b>	<b>41</b>	<b>77</b>

**Table 3.** Pack and lone wolf summaries for Wisconsin in winter 2016-2017.

Wolf Mgmt. Unit		# of Packs	# of Wolves in Packs	Loners	Total # of Wolves	Change from 2015-2016	# of Telemetry Monitored Wolves <sup>a</sup>	Average Annual Pack Territory <sup>b</sup> (mi <sup>2</sup> )
1	Off Reservations	87	383-388	4	387-392		32	
	On Reservations	2	6	0	6		2	
	Total	89	389-394	4	393-398	15.9%	34	49.3 (n=26)
2	Off Reservations	50	189-197	4	193-201		19	
	On Reservations	4	11	2	13		0	
	Total	54	200-208	6	206-214	-15.2%	19	69.1 (n=14)
3	Off Reservations	33	116-119	1	117-120		2	
	On Reservations	0	0	0	0		0	
	Total	33	116-119	1	117-120	21.9%	2	41.4 (n=2)
4	Off Reservations	11	34-37	3	37-40		0	
	On Reservations	0	0	0	0		0	
	Total	11	34-37	3	37-40	-28.8%	0	
5	Off Reservations	30	114-120	3	117-123		9	
	On Reservations	0	0	0	0		0	
	Total	30	114-120	3	117-123	12.5%	9	50.1 (n=11)
6	Off Reservations	15	44-46	11	55-57		2	
	On Reservations	0	0	0	0		0	
	Total	15	44-46	11	55-57	71.9%	2	-
Statewide	Off Reservations	<b>226</b>	<b>880-907</b>	<b>26</b>	<b>906-933</b>		64	
	On Reservations	6	17	2	19		2	
	Total	232	897-924	28	925-952	6.8%	66	54.4 (n=53)
Outside WI		4	13-14	1	14-15		0	

<sup>a</sup>Wolves are counted in the primary WMU they were monitored in, though they may have been monitored in multiple WMUs.

<sup>b</sup> Pack territory size is only calculated for packs with  $\geq 20$  radiolocations for the period 15 April 2016 to 14 April 2017.

**Table 4.** Research capture summary, body condition, and detection of ectoparasites in captured wolves and mortalities in Wisconsin from 15 April 2016 to 14 April 2017.

	n	Body Condition			# (%) w/Mange	# (%) w/Ticks
		Good	Fair	Poor		
<b>Unit 1</b>						
Research Captures	17	16 (94%)		1 (6%)	0	8 (47%)
Mortalities	23				1 (4%)	
<b>Unit 2</b>						
Research Captures	13	10 (77%)	2 (15%)	1 (8%)	1 (8%)	9 (69%)
Mortalities	6				0	
<b>Unit 3</b>						
Research Captures	0					
Mortalities	1				0	
<b>Unit 4</b>						
Research Captures	1	1 (100%)			0	1 (100%)
Mortalities	1				0	
<b>Unit 5</b>						
Research Captures	1	1 (100%)			0	1 (100%)
Mortalities	6				0	
<b>Unit 6</b>						
Research Captures	1	1 (100%)			0	0
Mortalities	7				0	
<b>STATEWIDE AVERAGES</b>						
Research Captures	<b>33</b>	<b>29 (88%)</b>	<b>2 (6%)</b>	<b>2 (6%)</b>	<b>1 (3%)</b>	<b>19 (58%)</b>
Mortalities	<b>44</b>				<b>1 (2%)</b>	

**Table 5.** Detected wolf mortality in Wisconsin 15 April 2016 to 14 April 2017.

Cause of Death	Wolf Management Unit						State Total	% of Total
	1	2	3	4	5	6		
<b>Human Caused Mortality</b>								
Agency Control							0	
Vehicle Collision	10 <sup>a</sup>	2	1		3	1	17	39%
Illegally Killed	4 <sup>be</sup>				1	4	9	20%
Capture Related	2 <sup>b</sup>	1 <sup>a</sup>				1 <sup>a</sup>	4	9%
Unknown Human Caused							0	
<i>Total Human Caused</i>	<b>16</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>6</b>	<b>30</b>	<b>68%</b>
<b>Natural Mortality</b>								
Disease / Injury					1		1	2%
Intra-specific Aggression							0	
Euthanized (non-control)							0	
Unknown Natural Causes							0	
<i>Total Natural Causes</i>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2%</b>
<i>Unknown Causes</i>	<b>7<sup>d</sup></b>	<b>3<sup>c</sup></b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>13</b>	<b>30%</b>
<b>Total Detected Mortality</b>	<b>23</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>6</b>	<b>7</b>	<b>44</b>	

<sup>a</sup>Includes 1 radio collared wolf<sup>b</sup>Includes 2 radio collared wolves<sup>c</sup>Includes 3 radio collared wolves<sup>d</sup>Includes 5 radio collared wolves<sup>e</sup>Radio collared wolf unmonitored at time of death

16 radio collared wolf mortalities, including 1 unmonitored at time of death

**Table 6.** Wolf depredation management in Wisconsin, 15 April 2016 to 14 April 2017.

	Wolf Management Unit						State Total
	1	2	3	4	5	6	
<b>Livestock Cases</b>							
Depredation	19	1	2	0	2	13	<b>37</b>
Threat	9	0	1	0	0	1	<b>11</b>
Chronic Farms Affected	7	0	1	0	0	0	<b>8 of 34</b> (24%)
Total Farms Affected	17	1	3	0	1	9	<b>31</b>
Cattle Killed	18	1	2		2	10	<b>33</b>
Cattle Injured	3	3					<b>6</b>
Sheep Killed	17					10	<b>27</b>
Miniature donkeys Killed			2				<b>2</b>
Miniature donkeys Injured			1				<b>1</b>
<b>Non-Livestock Cases</b>							
Depredation	31	4	3	1	1	4	<b>44</b>
Threat	0	0	0	0	0	0	<b>0</b>
Dogs Killed While Actively Engaged in Hunting Activities	32	1	2	1	1	3	<b>40</b>
Dogs Injured While Actively Engaged in Hunting Activities	6	3	1			1	<b>11</b>
Dogs Killed While Not Engaged in Hunting Activities	1	2				1	<b>4</b>
Dogs Injured While Not Engaged in Hunting Activities	1						<b>1</b>

**Table 7.** Summary of law enforcement activity 15 April 2016 to 14 April 2017.

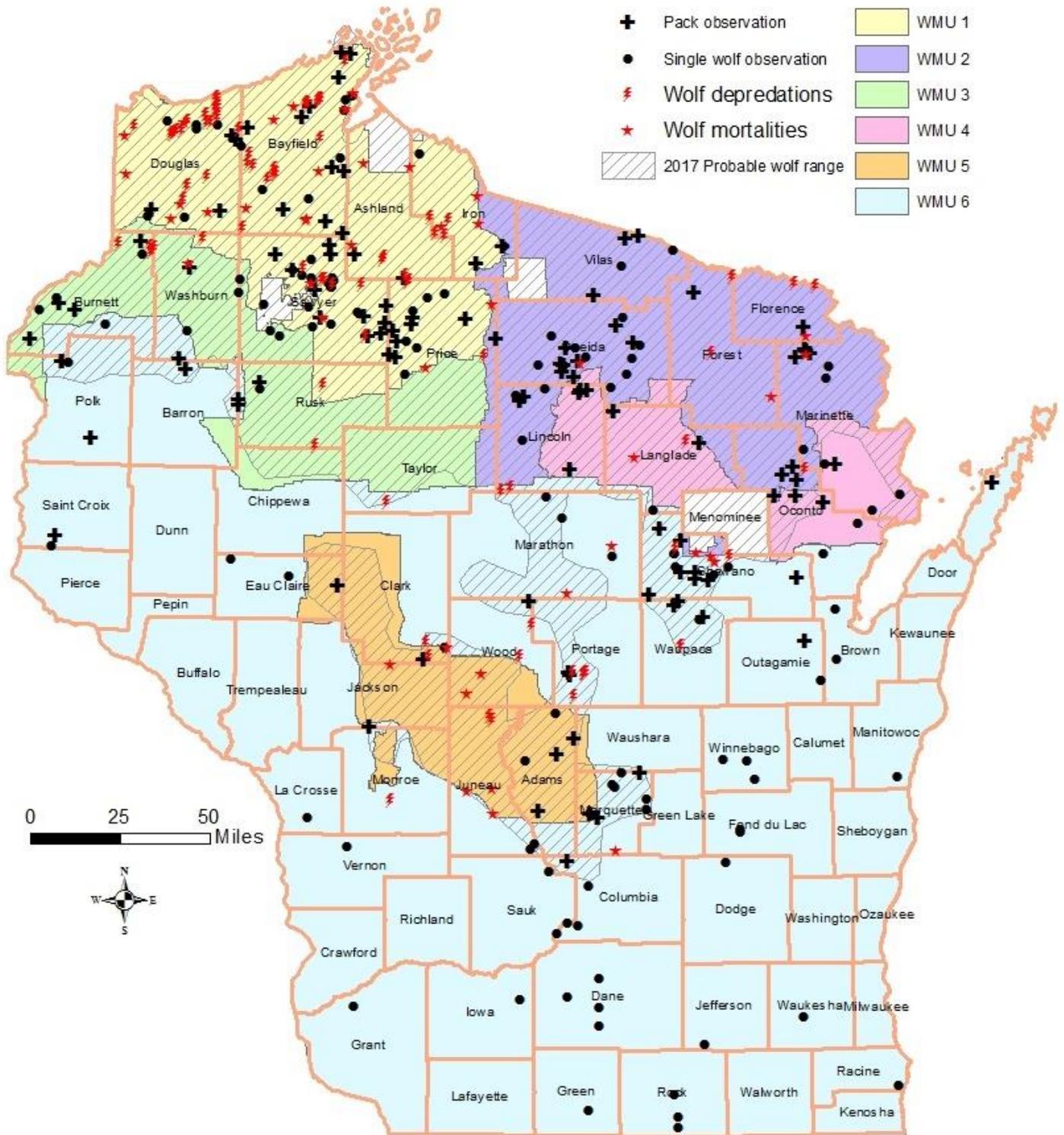
# of Wolf Hunting related complaints received:	0
# of Wolf Trapping related complaints received:	0
# of Wolf related Investigations conducted:	8
# of Hunting related citations issued:	1
# of Trapping related citations issued:	0
# of Verbal Warnings Issued:	0
<hr/>	
# of incidentally trapped wolves recovered:	0
# of Illegally harvested wolves recovered:	3
# of shot & unrecovered wolves:	1
# of Unknown cause of death wolves found:	3
# of Other dead/injured wolves recovered:	1
<b>Total Wolves Recovered</b>	<b>8</b>

**Table 8.** White-tailed deer density estimate in wolf management units in 2015 & 2016.

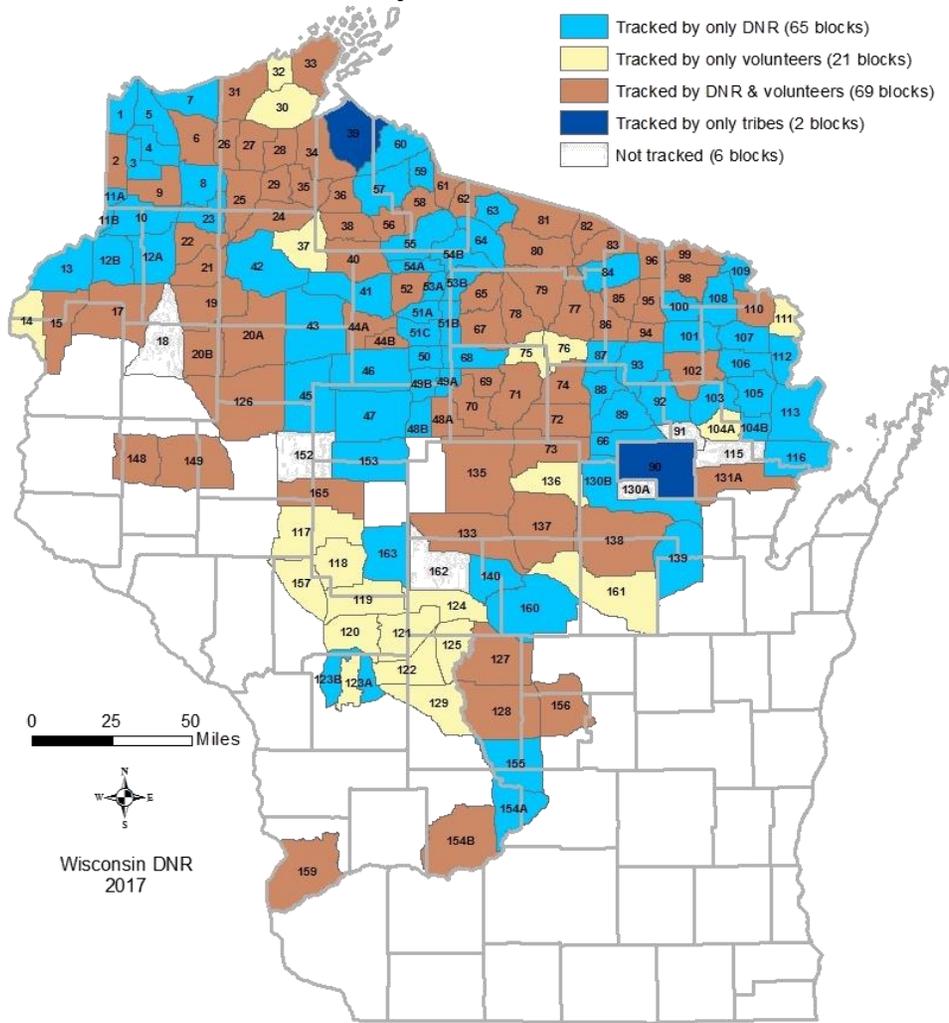
Wolf Mgmt. Unit	# of Deer Mgmt. Zones	Deer Range (mi <sup>2</sup> )	2015 Post-Hunt Deer Density (Deer/mi <sup>2</sup> )	2016 Post-Hunt Deer Density (Deer/mi <sup>2</sup> )	% Change	2015-17 Deer Population Objective
1	6	6,705	12.7	18.7	+47%	Increase
2	6	4,573	16.2	19.2	+19%	Increase
3	4	3,141	25.6	31.0	+21%	Increase
4	4	2,305	24.8	35.7	+44%	Increase
5	7	2,315	28.1	31.5	+12%	Increase
6	53	16995	48.3	51.7	+7%	Maintain
<b>TOTAL</b>	<b>80</b>	<b>36,034</b>	<b>33.0</b>	<b>37.3</b>	<b>+13%</b>	

Deer range and post-hunt deer estimates based on Jennifer Stenglein, 2017, Final 2016 Deer Population Estimates for Wisconsin Deer Management Units, WDNR unpublished data.

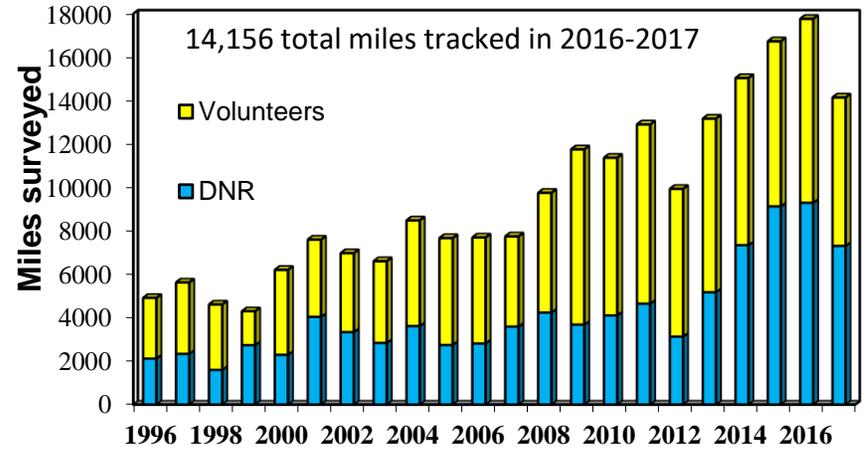
Deer population objectives from County Deer Advisory Council Final 2015 – 2017 Deer Population Objectives Approved by the Natural Resources Board, <http://dnr.wi.gov/topic/hunt/cdac.html>.



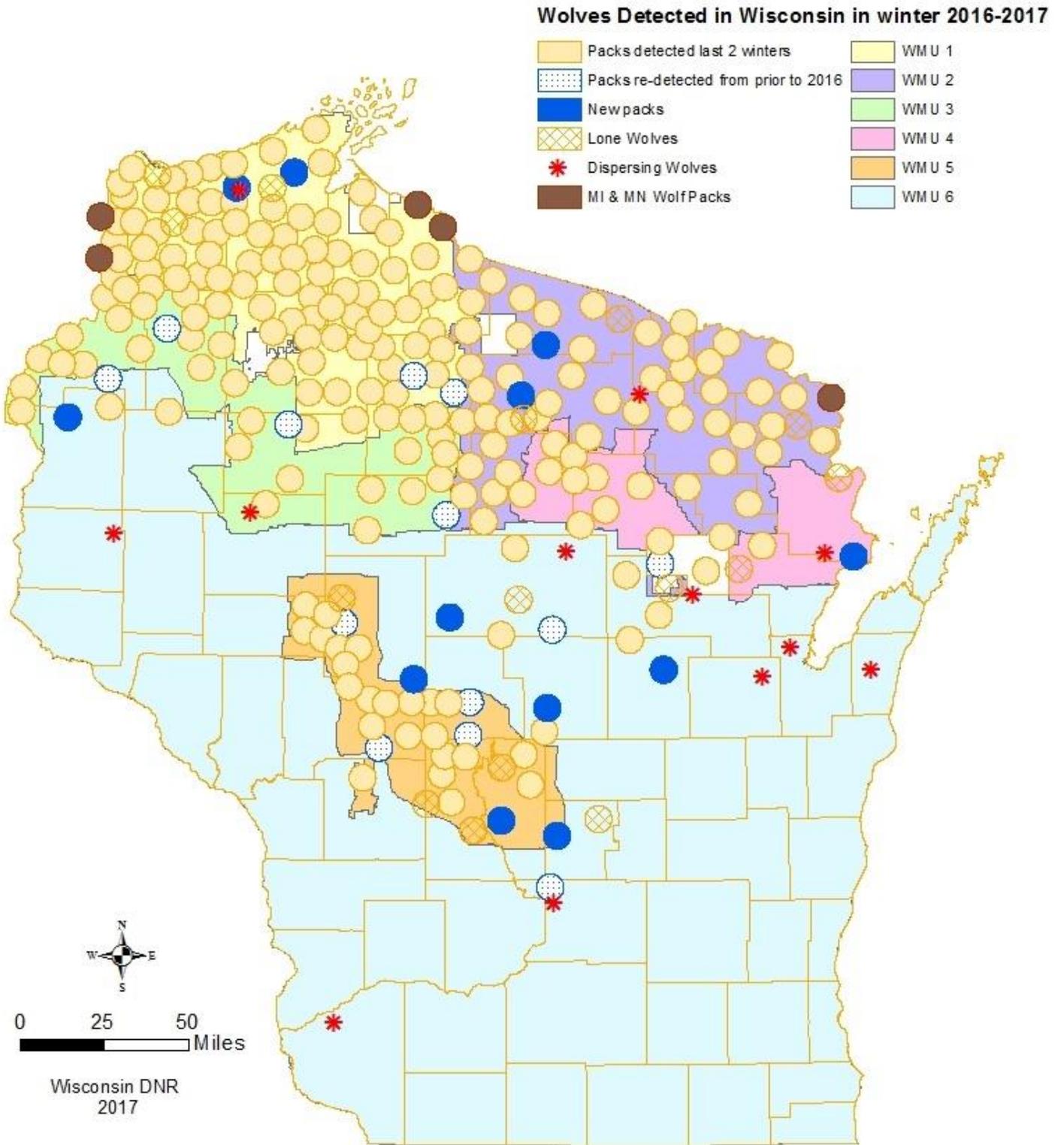
**Figure 1.** Probable wolf pack range, wolf mortalities, verified and probable wolf depredations, and verified, probable and possible wolf observation reports in Wisconsin 15 April 2016 to 14 April 2017.



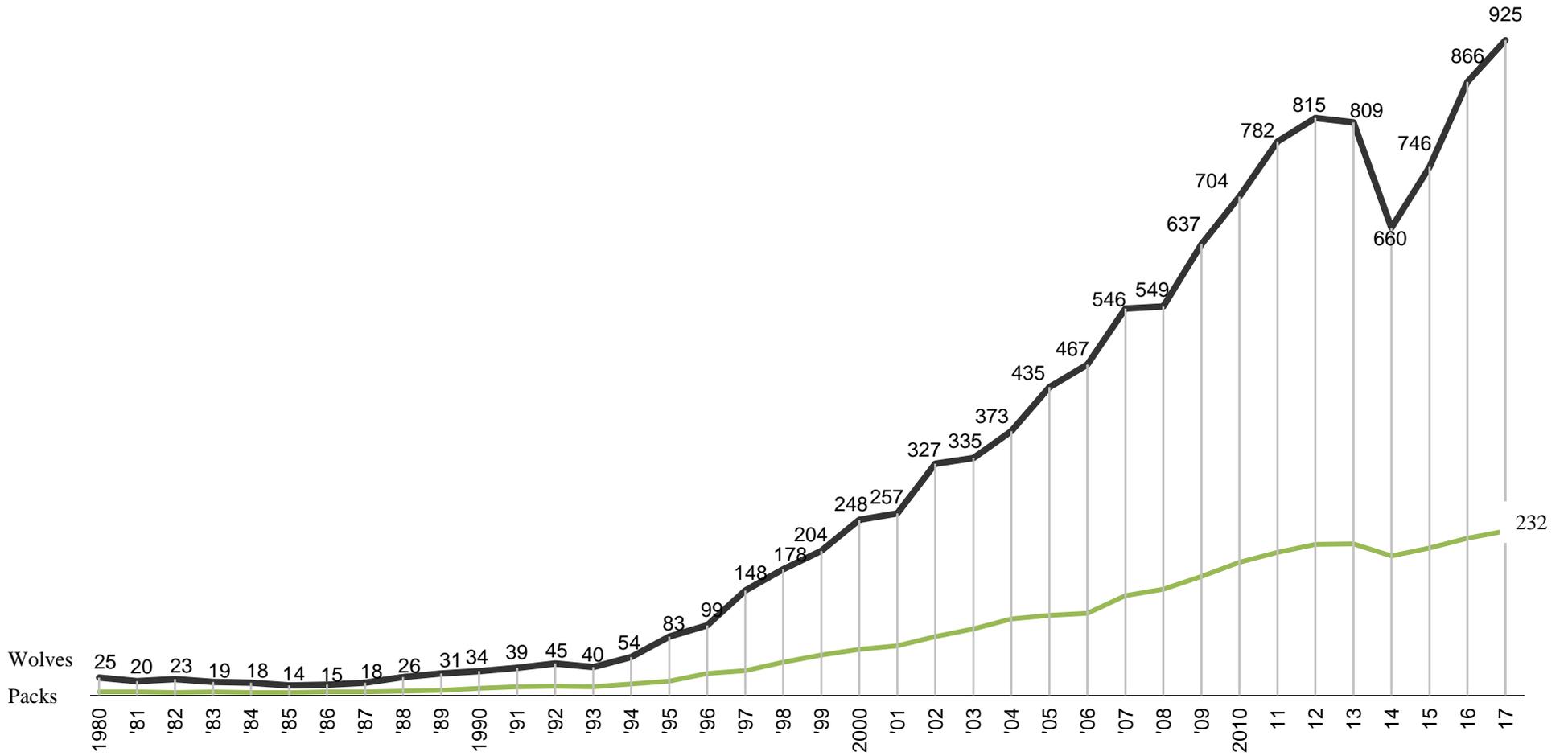
**Figure 2.** Wisconsin carnivore survey blocks tracked: winter 2016-2017.



**Figure 3.** Carnivore track surveys in Wisconsin by WDNR & volunteers 1996-2017



**Figure 4.** Wolves detected in Wisconsin in winter 2016-2017.



**Figure 5.** Changes in Wisconsin Gray Wolf Population: 1980-2017.

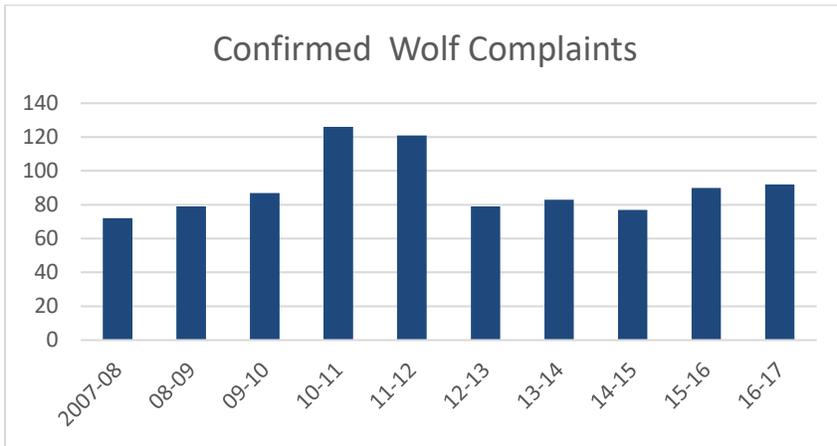


Figure 6: Total number of confirmed wolf complaints 2007-2016 wolf monitoring years

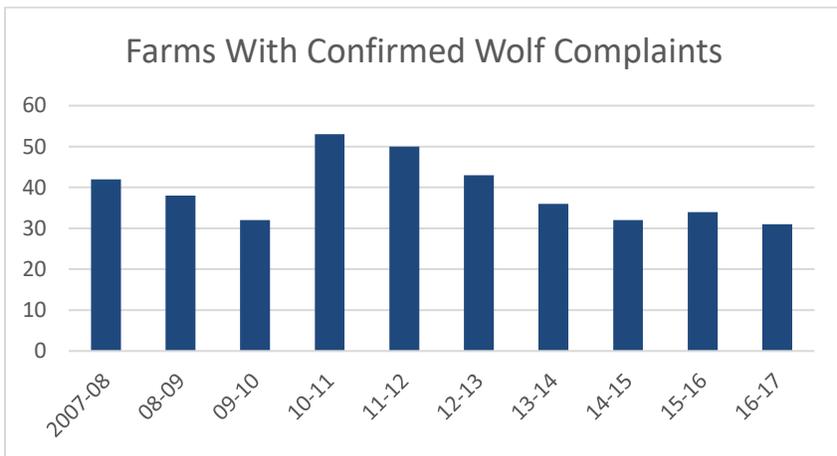


Figure 7: Farms with Confirmed Wolf Complaints 2007-2016 wolf monitoring years

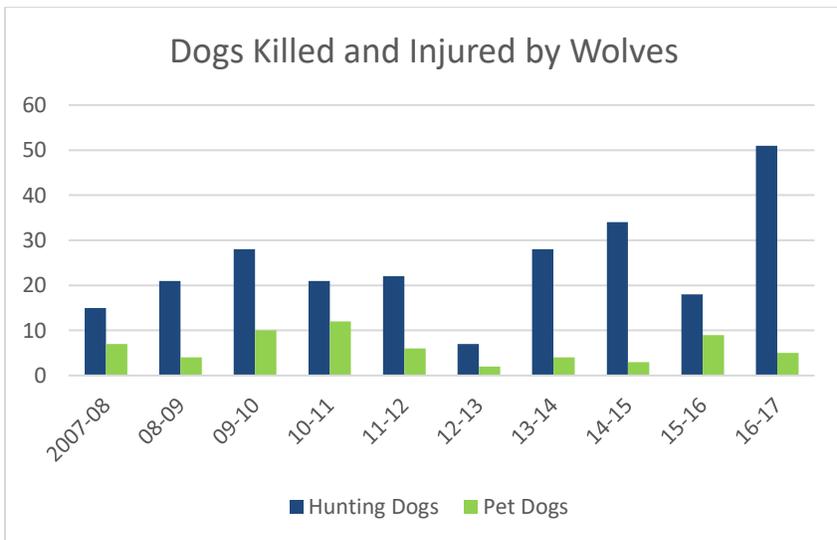


Figure 8: Dogs killed & injured by wolves 2007-2016 wolf monitoring years