

**WISCONSIN GRAY WOLF MONITORING REPORT  
15 APRIL 2018 THROUGH 14 APRIL 2019**

Jane E. Wiedenhoef, Scott Walter, Nathan Kluge, and Marie Ericksen-Pilch

BUREAU OF WILDLIFE MANAGEMENT  
Wisconsin Department of Natural Resources  
P.O. Box 7921  
Madison, Wisconsin 53707

## Introduction

This report describes wolf management and monitoring activities conducted in Wisconsin during the wolf monitoring year, April 15<sup>th</sup>, 2018 to April 14<sup>th</sup>, 2019. Gray wolves (*Canis lupus*) reverted to federally endangered status in the Western Great Lakes region as the 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 those used during the previous year.

Observation reports were collected from the public and agency staff. A total of 231 reports of wolf or wolf sign observations were recorded. This is a decrease from the 256 reports recorded the previous year (Wiedenhoeft et.al. 2018). Additional reports were received but lacked sufficient information on date, location, or circumstances for recording. Seventy reports (30%) were verified as wolves by submitted evidence or field checks. Seventy-two reports (31%) were considered to be "probable" wolves. Photos or videos were submitted for 7 of these reports and were inconclusive but considered to be probable wolves or wolf tracks. Descriptions provided for the remainder of these reports supported a designation of probable wolf. Fifty-nine reports (26%) lacked adequate evidence or descriptions to determine species and were designated as indeterminate. Some of these reports were likely mis-identifications. Photos were submitted for 2 of these reports but were inconclusive. Thirty reports (13%) were confirmed as not wolves based on submitted evidence or the description being inconsistent with wolf. Photos or videos were submitted for 23 of these reports. Species found included coyotes (12), domestic dogs (4), domestic dog tracks (6), and wolf-dog hybrid (1). Verified, probable, and indeterminate wolf observations are shown in Table 1, and verified and probable observations are shown in 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.

For the period 17 April 2018 to 17 January 2019, 818 photo sequences from the Snapshot Wisconsin program were identified as wolves by participants. After photos were examined by wolf program personnel, 542 (66%) were verified to be wolves, 76 (9%) were considered probable wolves, 70 (9%) were considered possible wolves, and 130 (16%) were confirmed to be not wolves or were unidentifiable. Photos in this last category included 3 probable bobcats, 103 coyotes, 2 deer, 6 dogs, and 16 that were unidentifiable. Verified and probable wolves from Snapshot Wisconsin photos are included in Figure 1.

During summer 2018, 114 howl surveys were conducted in 121 pack territories (Table 2). Eighty-nine packs (74%) were detected by howl responses. Pups were detected in 73% of the detected packs. This is higher than the pup detection rate of 63% in summer 2017 (Wiedenhoeft et.al. 2018) and is somewhat higher than the average of 71.7% since 2013 (Figure 2).

During winter 2018-19, WDNR personnel, volunteers, and tribes conducted a total of 14,746 miles of track surveys for which survey forms were received. An average of 3.1 surveys were conducted per pack or area surveyed. Of the 166 active survey blocks, survey forms were received for 156 (94%) (Figures 3 & 4). Survey forms were also received for 1 de-activated survey block. Of the 10 active blocks for which survey forms were not received, 1 block was tracked by a tribe and count information was provided to WDNR, all packs in 3 blocks were counted by aerial monitoring of collared wolves, packs in 2 blocks were counted through observation reports, 1 block contained only packs believed to reside primarily in Michigan, packs in 1 block were counted in adjacent blocks, and 2 blocks were low priority blocks with no reported wolf pack activity. A total of 243 packs were detected in Wisconsin (Figure 5), an increase of 5 packs from last winter. Of the 238 packs detected in winter 2017-18, 11 (5%) were either not detected at all or were considered to have combined with an adjacent pack in 2018-2019. Nine packs (4%) detected in 2017-18 were detected as loners in winter 2018-19. Twenty-five of the 243 packs detected in winter 2018-19 had not been detected the previous winter. Of these packs, 8 (3%) had been detected previous to the winter of 2017-2018, 8 (3%) had been detected as loners in 2017-18, and 9 (4%) had not been previously detected.

During the 2018-2019 monitoring period 77 wolves were monitored using a combination of aerial telemetry and GPS transmitted locations, 3 of which were outside of Wisconsin for the monitoring period (Table 3). Average pack territory size was 60.5 mi<sup>2</sup> for 60 packs with ≥20 telemetry locations. This included 50 territories (83%) determined from satellite and VHF locations (avg. = 64.3 mi<sup>2</sup>) and 10 territories (17%) determined from only VHF locations (avg. = 41.8 mi<sup>2</sup>). As we continue to transition from using VHF collars to GPS collars, average territory size continues to increase. Research trapping resulted in telemetry GPS/VHF collars being placed on 31 wolves during the monitoring period. WDNR personnel responded to an additional 9 wolves that were incidentally captured by recreational trappers, including 2 recaptured wolves (one was recollared, the other was released without recollaring) and 7 new wolves, 6 of which were collared before release (Table 4). GPS collars were deployed on a total of 39 wolves captured during the monitoring period including 12 adult and 5 yearling females, 18 adult and 3 yearling males, and 1 unrecorded gender adult.

In April 2019 the statewide minimum wolf population count was 914-978 wolves, a 1% increase from the previous year (Table 3 & Figure 6). This included increases in 2 management units and decreases in 4 units, ranging from -7.9% in WMU 4 to +26.2% in WMU 3. The count included 889-953 wolves living in 243 packs, or an average of 3.8 wolves per pack. An additional 25 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 2019 was 885-946 wolves. More detailed information on the 2018-2019 wolf count can be found on the Wisconsin DNR website, <https://dnr.wi.gov/topic/wildlifehabitat/wolf/documents/2019WolfCountDetails.pdf>.

#### Model-based estimates of wolf population size in Wisconsin

WDNR scientists incorporated track survey data into an occupancy modelling framework subsequent to the 2017 – 2018 tracking season, in order to develop an independent estimate of wolf population size. This method allows the precision of population estimates to be described via the calculation of confidence intervals and hence enhances the interpretation of results. Initial results are encouraging, as the minimum population count (905) fell within the confidence interval of the modeled estimate (820 – 1316) in 2017 – 2018. This both validated the historic track survey with territory mapping technique as an effective means of monitoring wolves in Wisconsin and suggested further assessment

of occupancy modeling is warranted. WDNR staff will continue to explore this technique using future track survey data.

### Statewide Wolf Distribution

Contiguous wolf pack range was estimated to be 23,471 mi<sup>2</sup> in northern and central forested regions of Wisconsin and a 328 mi<sup>2</sup> area on the Door County peninsula (Figure 1), or a total of 23,799 mi<sup>2</sup>. Using the 2019 minimum population count of 914-978 wolves, wolf density is estimated to be 1 wolf per 24.3 to 26.0 mi<sup>2</sup> of wolf pack range, calculated by dividing probable wolf pack 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 41 wolf mortalities were detected during the monitoring period (Table 5, Figure 1). Detected mortalities represented 4-5% of the minimum 2017-2018 late winter count of 905-944 wolves (Wiedenhoeft et.al. 2018).

Once again, vehicle collisions (44%) and illegal kills (24%) were the leading causes of death for detected mortalities and were slightly higher than rates detected the previous year. Human caused mortality represented 94% of known cause detected mortalities overall.

Six percent of known cause mortalities were due to natural causes. This is similar to 2015-2017 when natural mortality averaged 5%, and a considerable decrease from 2017-2018 when natural mortality accounted for 28% of known cause mortalities.

Cause of mortality could not be determined for 10 (24%) of the cases.

Fourteen collared wolves died during the monitoring period, of which 13 were being actively monitored at the time of death (Table 5). Cause of death could not be determined for 4 actively monitored collared wolves. For the 9 where cause of death could be determined, 6 (67%) were illegally killed, 2 (22%) were killed by vehicle collision, and 1 (11%) died as a result of a severe heartworm infestation. For an analysis of estimated rates of undetected mortality in Wisconsin wolves see Stenglein et al. 2015.

Spatial variation in mortality may in part explain the apparent leveling off of Wisconsin's wolf population over the past 3 years (Figure 6). Analyzing data from 501 radio-collared wolves, Stenglein et al. (2018) found lower wolf survival and elevated human-caused mortality along the margins of Wisconsin's established wolf range, where the landscape is increasingly dominated by human activities. This suggests that further increase and expansion of Wisconsin's wolf population into southern Wisconsin may be limited by human-caused mortality as the landscape transitions to human-dominated uses (agriculture, etc.). Estimates of midwinter pack size among zones also seem to support elevated mortality rates in peripheral areas: average pack size in 2018 – 2019 was 3.9 – 4.1 wolves in zones 1, 2, and 5 (considered the core of wolf range in Wisconsin) but only 3.3 – 3.4 wolves in peripheral zones 3, 4, and 6 (Figure 1). Wisconsin's

wolf population may hence be at or nearing cultural carrying capacity, defined by human-caused mortality pressures along the forest-agriculture interface.

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

General body condition was reported for 40 wolves that were captured during the monitoring period (Table 4). Thirty-three (82%) were reported to be in good, very good, or excellent body condition, 4 (10%) were reported to be in fair body condition, and 3 (8%) were reported to be in below average or thin condition. Average weight of 15 live-captured adult males was 84 lbs. (range 60 to 103 lbs.), and average weight of 11 adult females was 65 lbs. (range 50 to 75 lbs.). Monitoring for mange was conducted by inspection of 40 wolves live-captured for research monitoring, and inspection of 41 wolf mortalities (Table 4). Symptoms consistent with mange were not noted for any of the wolves inspected. Ticks were monitored by inspection of live-captured wolves. Ticks were noted on 23 (58%) of captured wolves. Two of 29 detected wolf mortalities where cause of death could be determined were due to natural causes. One mortality was due to starvation, and 1 was due to heartworm infection.

Necropsy reports were received for 10 wolves that died in Wisconsin during the monitoring period. Other reports are still pending. Body condition noted on necropsy were as follows – 3 good, 3 fair, 1 poor, 1 slightly thin, 1 thin, and 1 extremely thin. Heartworms were detected in 4 necropsied wolves, with 1 wolf apparently dying as a result of the infestation. Tapeworms were noted in 2 necropsy reports with 1 of the infected wolves apparently dying as a result of starvation, though this animal also had a pituitary gland tumor that may have contributed to its poor condition. While canine distemper virus was suspected in a few cases, only 1 wolf tested weakly positive for CDV and this was not believed to be the cause of death.

### Wolf Depredation Management

Wisconsin DNR contracts with the United States Department of Agriculture – Wildlife Services to investigate wildlife damage complaints, including wolf depredation complaints. During the monitoring period, Wildlife Services confirmed 68 wolf complaints of the 121 investigated (Figure 7). Unconfirmed complaints were either confirmed to be due to causes other than wolves or lacked sufficient evidence to attribute a cause.

Thirty-six incidents of wolf depredation to livestock and 5 incidents of wolf threat to livestock were confirmed on 25 different farms during the monitoring period (Table 6). While the number of confirmed livestock incidents increased from 37 in 2017-2018, the number of farms affected decreased from 31 the past 2 years (Figure 8a). Farms with confirmed incidents in 2018-2019 included 8 of 33 farms classified as chronic wolf depredation farms (24%). Livestock depredations included 30 cattle killed and 8 injured, 2 goats killed and 1 injured, 1 colt injured and later euthanized, and 2 miniature donkeys injured. Predictably, livestock depredations show a seasonal pattern (Figure 8b). Confirmed livestock related complaints averaged 4.9 per month per year for the 10-year period 2008-2018. However, the months of May, July, August, and September accounted for 370 of 588 (63%) of confirmed livestock related complaints over the 10-year period.

Twenty-five incidents of non-livestock depredation and 2 incidents of non-livestock threats were confirmed during the monitoring period. This included 17 dogs killed and 13 injured while actively

engaged in hunting activities, and 1 dog killed and 1 injured outside of hunting situations (Figure 9a). This was a slight increase from 2017-2018 when a total of 30 dogs were confirmed killed or injured by wolves. Twenty-two of twenty-three (96%) hunting dog incidents occurred between July 7<sup>th</sup> and October 6<sup>th</sup>. One incident occurred in November. Confirmed hunting dog incidents have also shown strong seasonality over the 10-year period 2008-2018 during which confirmed complaints averaged 2.05 per month per year (Figure 9b). Of 246 confirmed hunting dog related wolf complaints for the 10-year period, 207 (84%) occurred in July, August, and September. For 243 incidents where the type of animal being hunted could be determined, 214 incidents (88%) involved dogs pursuing bear, 12 incidents (5%) involved dogs pursuing coyote, 10 incidents (4%) involved dogs pursuing bobcat, 3 incidents (1%) involved dogs pursuing hare or rabbits, 3 incidents (1%) involved dogs hunting grouse, and 1 incident (<1%) involved dogs pursuing raccoon. Pet dog incidents have not shown strong seasonality, but a somewhat higher rate of incidents have occurred in May and July (23 of 70, or 33%). Pet dog incidents have averaged 0.6 per month per year.

### Regulatory Changes Affecting Wolf Management

Two efforts were initiated during the monitoring period to remove the gray wolf from the federal list of endangered species:

- 1) The Manage Our Wolves Act (HR 6784) was introduced by the 115<sup>th</sup> Congress and passed the House of Representatives on November 16<sup>th</sup>, 2018. This bill would have removed federal protections for gray wolves in the Great Lakes Region within 60 days of publication, and across the lower 48 states by the end of FY19. However, the bill died in session as it was not passed by the Senate.
- 2) On March 15<sup>th</sup>, 2019, the U.S. Fish & Wildlife Service published a proposed rule in the Federal Register that would remove the gray wolf from the federal list of endangered species across the lower 48 states. The Service solicited comments from the public through July 15<sup>th</sup>, 2019, and has until March 15<sup>th</sup>, 2020 to respond to these comments and publish a final rule.

### Law Enforcement

Law enforcement efforts detected 2 wolves illegally killed, 1 vehicle killed wolf, and 1 wolf mortality from unknown causes within the monitoring period. Law enforcement staff conducted 6 wolf related investigations and issued no citations and 1 verbal warning 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 unit 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 7% statewide from the previous year estimate (Stenglein, 2019), but the majority of that increase was in wolf management unit 6 considered to be mostly unsuitable for wolf pack development. Wolf management units 1, 2, and 5, considered to be primary wolf range, contain 76% of the minimum winter wolf count. Deer density estimates remained stable at 25.3 deer / square mile of deer range in primary wolf range. Recommendations from the County Deer Advisory Councils for deer population objectives were

approved by the Natural Resources Board in 2018. The current recommendations are primarily to increase or maintain the deer population in each of the 6 wolf management units.

### Literature Cited

- Stenglein, J.L., Van Deelen, T.R., Wydeven, A.P., Mladenoff, D.J., Wiedenhoft, 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. 2019. Deer Population Estimates 2018. Wisconsin DNR unpublished data.
- Stenglein, J. L., Wydeven, A., and T. R. Van Deelen. 2018. Compensatory mortality in a recovering top carnivore: wolves in Wisconsin, USA (1979 – 2013). *Oecologia* 187(1):99-111.
- Wiedenhoft, J.E., Walter, S., Libal, N.S., and Ericksen-Pilch, M. 2018. Wisconsin Gray Wolf Monitoring Report 15 April 2017 through 14 April 2018. 17 pp.  
<https://dnr.wi.gov/topic/Wildlifehabitat/wolf/documents/wolfreport2018.pdf>.
- Wydeven, A.P., Wiedenhoft, 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 indeterminate wolf observations reported by natural resource agency personnel and private citizens in Wisconsin, 15 April 2018 to 14 April 2019.

Wolf Mgmt. Unit	Number of Sightings	Wolves Seen	Track or Sign Observations	Total Wolf Observations
1	14	24	35	49
2	18	32	10	28
3	12	20	5	17
4	5	10	2	7
5	25	50	3	28
6	61	78	11	72
<b>Statewide</b>	<b>135</b>	<b>214</b>	<b>66</b>	<b>201</b>

**Table 2.** 2018 Wisconsin wolf howl survey data.

Wolf Mgmt. Unit	Howl Surveys	Packs Surveyed	Packs Detected	Detected Packs with Pups	% Detected Packs with Pups
UNIT 1	41	43	31	23	74
UNIT 2	27	30	25	17	68
UNIT 3	8	11	5	4	80
UNIT 4	4	4	3	3	100
UNIT 5	25	26	20	15	75
UNIT 6	9	7	5	3	60
<b>TOTAL</b>	<b>114</b>	<b>121</b>	<b>89</b>	<b>65</b>	<b>73</b>

**Table 3.** Pack and lone wolf summaries for Wisconsin in winter 2018-2019.

Wolf Mgmt. Unit		# of Packs	# of Wolves in Packs	Loners	Total # of Wolves	Change from 2016-2017	# of Telemetry Monitored Wolves <sup>a</sup>	Average Annual Pack Territory <sup>b</sup> (mi <sup>2</sup> )
1	Off Reservations	88	343-361	6	349-367		35	
	On Reservations	4	10-11	1	11-12		2	
	Total	92	353-372	7	360-379	3.2%	37	67.3 (n=22)
2	Off Reservations	52	197-214	5	202-219		17	
	On Reservations	6	18-20	0	18-20		2	
	Total	58	215-234	5	220-239	-4.3%	19	57.2 (n=16)
3	Off Reservations	32	102-107	4	106-111		4	
	On Reservations	0	0	0	0		0	
	Total	32	102-107	4	106-111	26.2%	4	26.2 (n=5)
4	Off Reservations	11	33-36	2	35-38		1	
	On Reservations	0	0	0	0		0	
	Total	11	33-36	2	35-38	-7.9%	1	24.1 (n=1)
5	Off Reservations	34	133-146	1	134-147		10	
	On Reservations	0	0	0	0		0	
	Total	34	133-146	1	134-147	-6.9%	10	45.8 (n=8)
6	Off Reservations	17	53-58	6	59-64		3	
	On Reservations	0	0	0	0		0	
	Total	17	53-58	6	59-64	-1.7%	3	126.3 (n=3)
Statewide	Off Reservations	<b>233</b>	<b>861-922</b>	<b>24</b>	<b>885-946</b>		70	
	On Reservations	10	28-31	1	29-32		4	
	Total	243	889-953	25	914-978	1.0%	74	60.5 (n=60)
Out of State							3	

<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 2018 to 14 April 2019.

**Table 4.** Research capture summary, body condition, and detection of ectoparasites in captured wolves and mortalities in Wisconsin from 15 April 2018 to 14 April 2019.

	n	Body Condition			# (%) w/Mange	# (%) w/Ticks
		Good	Fair	Poor		
<b>Unit 1</b>						
Research Captures	26	21 (81%)	2 (8%)	3 (14%)	0	18 (69%)
Mortalities	11				0	
<b>Unit 2</b>						
Research Captures	6	5 (83%)	1 (17%)		0	3 (50%)
Mortalities	9				0	
<b>Unit 3</b>						
Research Captures	1		1 (100%)		0	1 (100%)
Mortalities	2				0	
<b>Unit 4</b>						
Research Captures	2	2 (100%)			0	0
Mortalities	1				0	
<b>Unit 5</b>						
Research Captures	3	3 (100%)			0	0
Mortalities	9				0	
<b>Unit 6</b>						
Research Captures	2	2 (100%)			0	1 (50%)
Mortalities	9				0	
<b>STATEWIDE AVERAGES</b>						
<b>Research Captures</b>	<b>40</b>	<b>33 (82%)</b>	<b>4 (10%)</b>	<b>3 (8%)</b>	<b>0</b>	<b>23 (58%)</b>
<b>Mortalities</b>	<b>41</b>				<b>0</b>	

**Table 5.** Detected wolf mortality in Wisconsin 15 April 2018 to 14 April 2019.

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	4 <sup>a</sup>	4	2 <sup>a</sup>	1	3	4	18	44%
Illegally Killed	3 <sup>c</sup>	2 <sup>a</sup>			3 <sup>a</sup>	2 <sup>a</sup>	10	24%
Capture Related					1		1	2%
Unknown Human Caused							0	
<i>Total Human Caused</i>	<b>7</b>	<b>6</b>	<b>2</b>	<b>1</b>	<b>7</b>	<b>6</b>	<b>29</b>	<b>71%</b>
<b>Natural Mortality</b>								
Disease / Injury					2 <sup>a</sup>		2	5%
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>2</b>	<b>0</b>	<b>2</b>	<b>5%</b>
<i>Unknown Causes</i>	<b>4<sup>d</sup></b>	<b>3<sup>b</sup></b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>10</b>	<b>24%</b>
<b>Total Detected Mortality</b>	<b>11</b>	<b>9</b>	<b>2</b>	<b>1</b>	<b>9</b>	<b>9</b>	<b>41</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 3 radio collared wolves, 2 being monitored at time of death

14 radio collared wolf mortalities, 13 being monitored at time of death

**Table 6.** Wolf depredation management in Wisconsin, 15 April 2018 to 14 April 2019.

	Wolf Management Unit						State Total
	1	2	3	4	5	6	
<b>Livestock Cases</b>							
Depredation	11	0	6	0	7	12	<b>36</b>
Threat	0	0	3	0	2	0	<b>5</b>
Chronic Farms Affected	4	0	2	0	1	1	<b>8 of 33</b> (24%)
Total Farms Affected	7	0	5	0	4	10	<b>26</b>
Cattle Killed	10		5		4	11	<b>30</b>
Cattle Injured					7	1	<b>8</b>
Goats Killed			2				<b>2</b>
Goats Injured			1				<b>1</b>
Horses Killed						1	<b>1</b>
Donkeys Injured	2						<b>2</b>
<b>Non-Livestock Cases</b>							
Depredation	10	12	2	0	0	1	<b>25</b>
Threat	0	0	1	0	1	0	<b>2</b>
Dogs Killed While Actively Engaged in Hunting Activities	7	10					<b>17</b>
Dogs Injured While Actively Engaged in Hunting Activities	6	5	2				<b>13</b>
Dogs Killed While Not Engaged in Hunting Activities						1	<b>1</b>
Dogs Injured While Not Engaged in Hunting Activities	1						<b>1</b>

**Table 7.** Summary of law enforcement activity 15 April 2017 to 14 April 2018.

# of wolf hunting related complaints received:	0
# of wolf trapping related complaints received:	1
# of wolf related investigations conducted:	6
# of car killed wolves	1
# of hunting related citations issued:	0
# of trapping related citations issued:	0
# of verbal warnings issued:	1
<hr/>	
# of incidentally trapped wolves recovered:	0
# of Illegally harvested wolves recovered:	2
# of shot & unrecovered wolves:	0
# of unknown cause of death wolves found:	1
# of other dead/injured wolves recovered:	0
<b>Total Wolves Recovered</b>	<b>3</b>

**Table 8.** White-tailed deer post-hunt density estimates in wolf management units in 2017 & 2018.

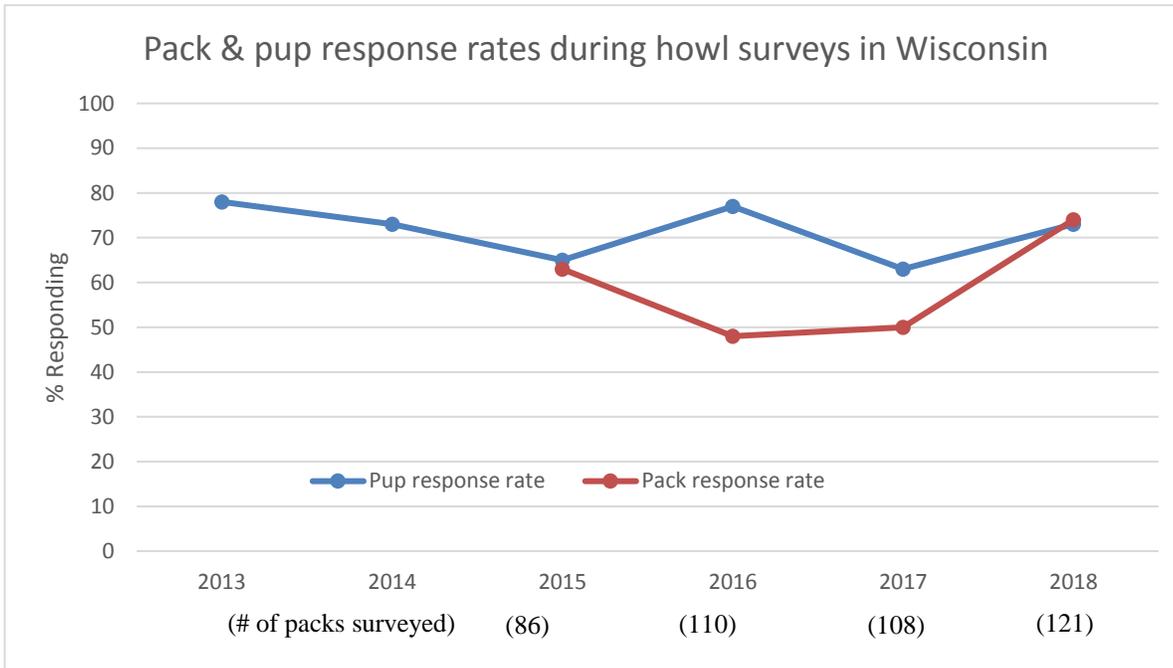
Wolf Mgmt. Unit	# of Deer Mgmt. Zones	Deer Range (mi <sup>2</sup> )	2017 Post-Hunt Mean Deer Density (Deer/mi <sup>2</sup> )	2018 Post-Hunt Mean Deer Density (Deer/mi <sup>2</sup> )	% Change	% Deer Range in each 2018-20 Deer Population Objective
1	7	6,477	21.3	22.2	+4%	43% Increase 36% Maintain 22% Decrease
2	6	4,401	26.6	25.5	-4%	49% Increase 51% Maintain
3	5	3,439	31.4	31.5	0%	26% Increase 74% Maintain
4	4	2,596	38.6	38.1	-1%	67% Maintain 33% Decrease
5	7	2,162	34.1	33.9	-1%	69% Increase 31% Maintain
6	53	17,592	50.0	55.3	+11%	3% Increase 68% Maintain 30% Decrease
<b>TOTAL</b>	<b>82</b>	<b>36,667</b>	<b>38.4</b>	<b>41.2</b>	<b>+7%</b>	

Deer range and post-hunt deer estimates based on Jennifer Stenglein, 2019, Deer Population Estimates 2018, WDNR unpublished data.

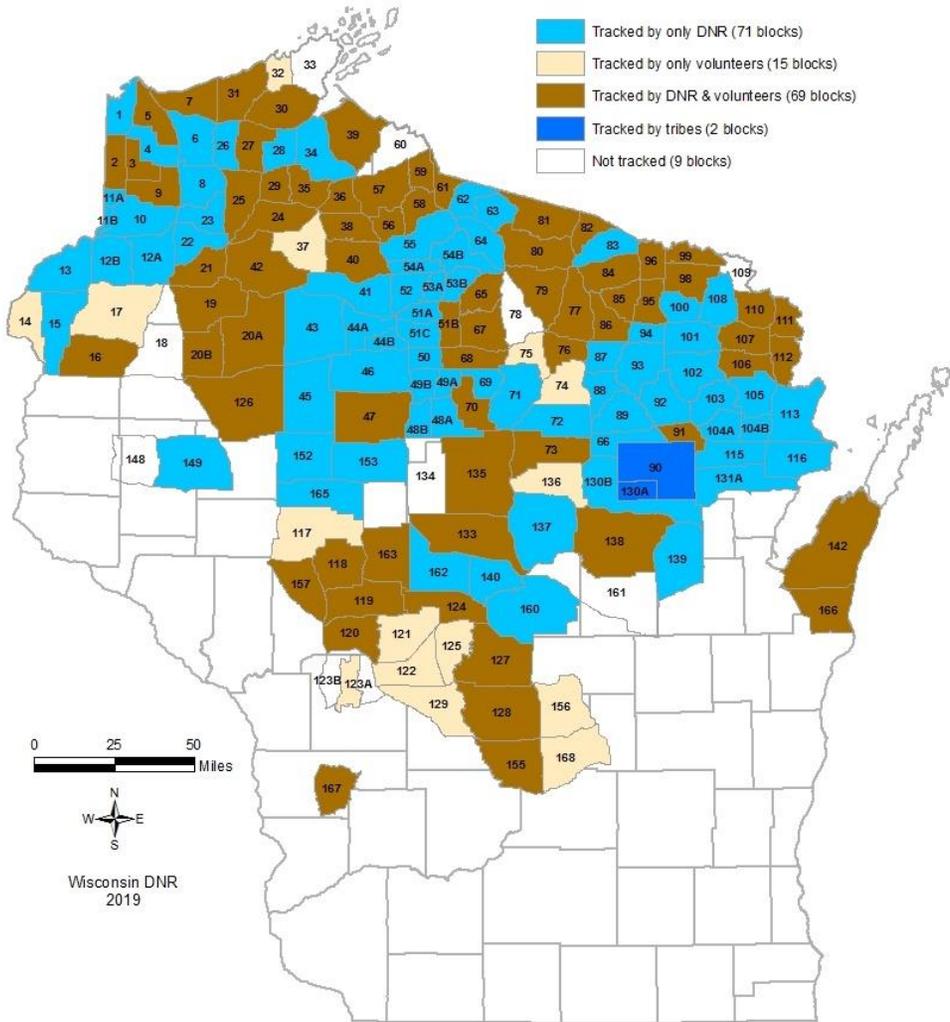
Deer population objectives from County Deer Advisory Council, NRB Approved Population Objectives, DMU and Zone Boundaries 2018-2020,

<https://dnr.wi.gov/topic/hunt/documents/NRBApprovedobjectives.pdf>.

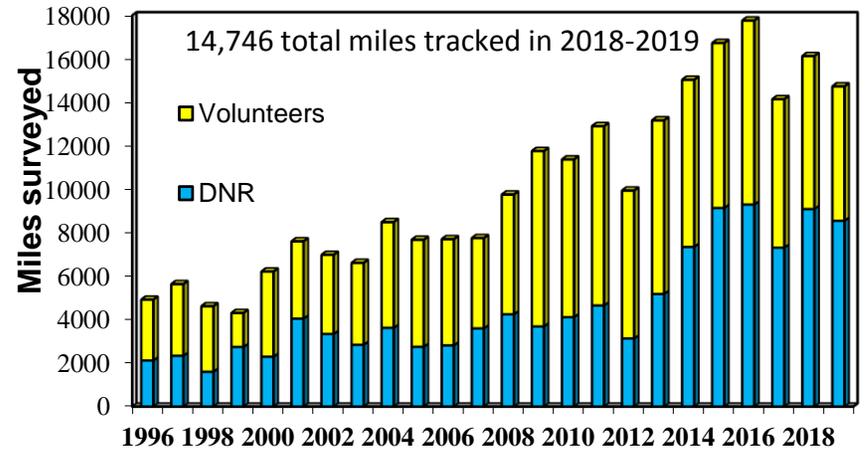




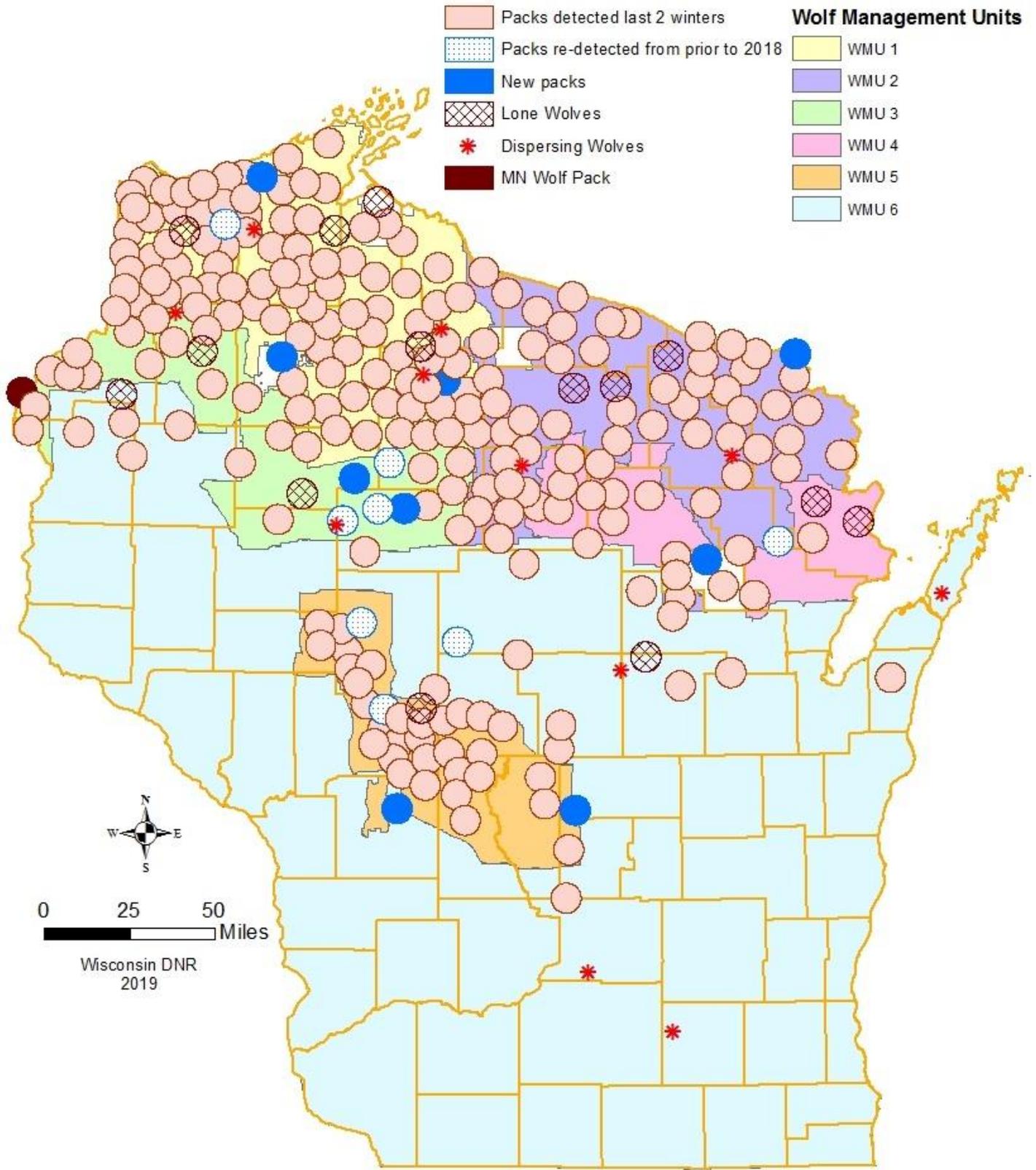
**Figure 2.** Percentage of packs responding and percentage of responding packs with pups during howl surveys in Wisconsin from 2013 to 2018.



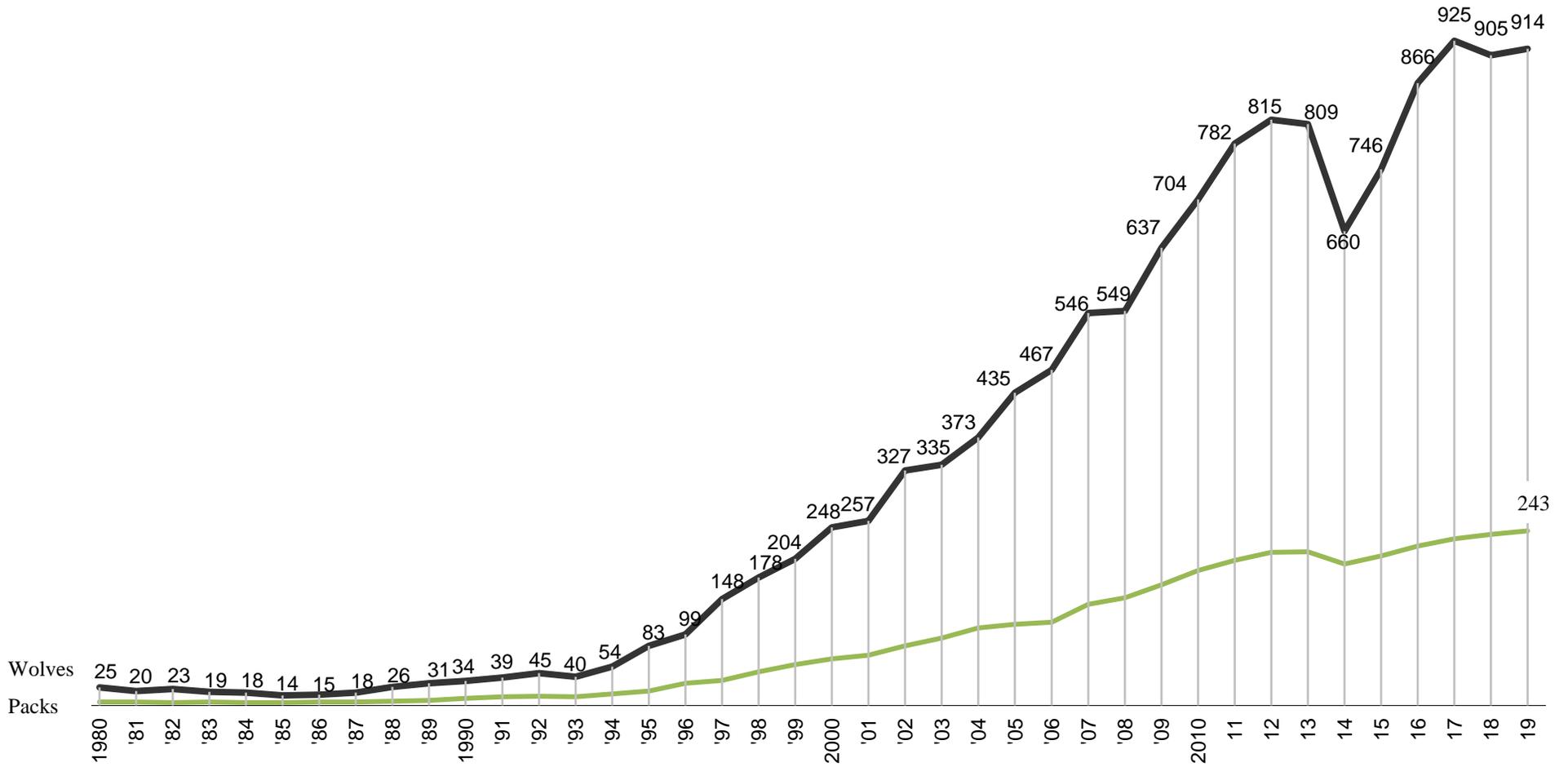
**Figure 3.** Wisconsin carnivore survey blocks tracked: winter 2018-2019.



**Figure 4.** Carnivore track surveys in Wisconsin by WDNR & volunteers 1996-2019



**Figure 5.** Wolves detected in Wisconsin in winter 2018-2019.



**Figure 6.** Changes in Wisconsin Gray Wolf Population: 1980-2019.

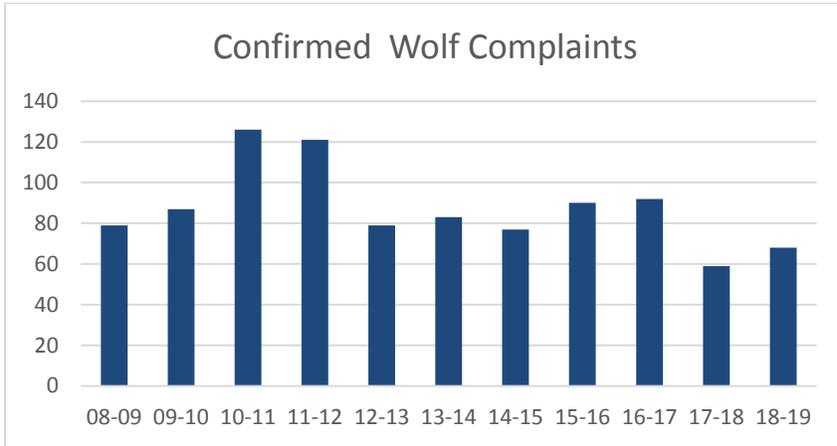


Figure 7: Total number of confirmed wolf complaints 2008-2018 wolf monitoring years

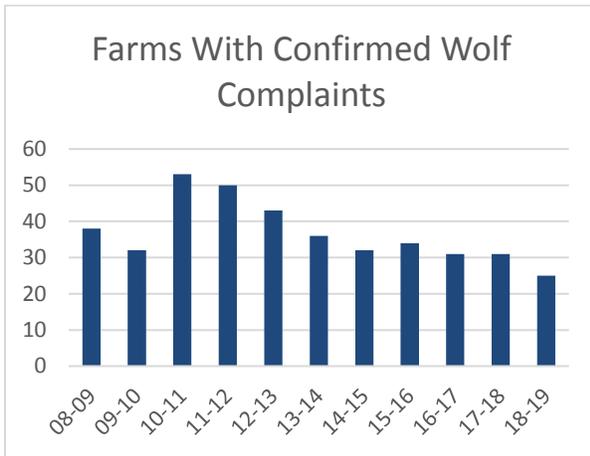


Figure 8a: Farms with Confirmed Wolf Complaints 2008-2018 wolf monitoring years

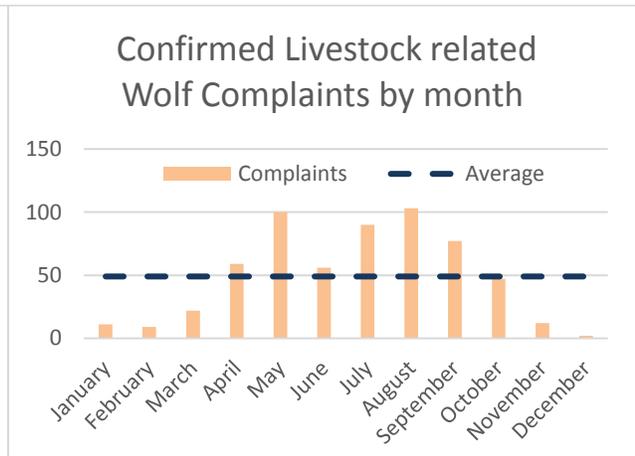


Figure 8b: Confirmed livestock related wolf complaints by month, 2008-2018 wolf monitoring years

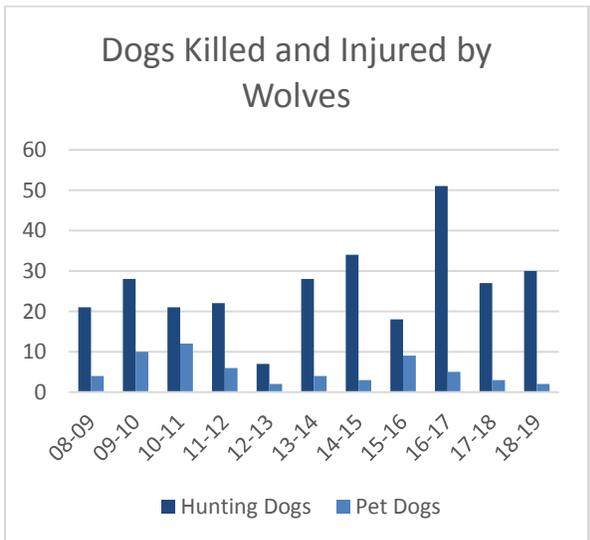


Figure 9a: Dogs killed & injured by wolves 2008-2018 wolf monitoring years

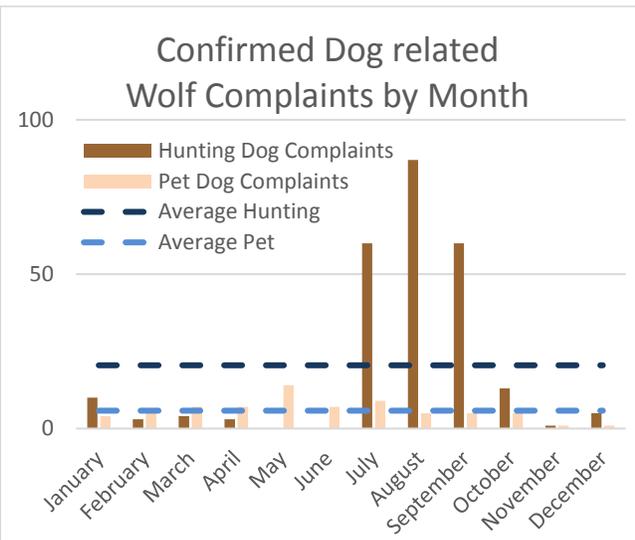


Figure 9b: Confirmed dog related wolf complaints by month, 2008-2018 wolf monitoring years