

IDAHO DEPARTMENT OF FISH AND GAME

Virgil Moore, Director

Surveys and Inventories

Statewide Report



WOLF

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STATEWIDE REPORT SURVEYS AND INVENTORY

JOB TITLE: Wolf Surveys and Inventories
STUDY NAME: Wolf Population Status and Trend Studies
PERIOD COVERED: July 1, 2015 to June 30, 2017

Executive Summary

Wolves are typically born in a single annual birth pulse during late April and early May. To better allow interpretation of management on Idaho's wolf population, harvest data will now be reported on a biological year (BY) basis (nominally set May through April of the following year) rather than a calendar year (CY). For example, BY2016 includes data from May 1, 2016 – April 30, 2017.

Most wolves taken by hunting are taken incidental to the fall deer and elk hunting seasons, while wolves taken by trapping are spread relatively evenly throughout the trapping season. The majority of successful hunters and trappers take only a single wolf despite a multiple-wolf bag limit. During BY2016, 226 wolves were harvested in Idaho, 16% below the BY2015 harvest and the lowest since both hunting and trapping were authorized in 2011. Based on genotyping of harvested wolves, reproduction was detected in 53 packs during BY2016.

Two major issues surrounding wolf management are depredations on livestock, and impact of predation on elk, moose, and other ungulates.

Wolf-caused livestock depredations are summarized by CY. Seventy wolves were killed to alleviate depredations on domestic animals in CY2016, nearly identical to the previous 5-year average. Twenty wolves were killed during February 2016 to address wolf predation on elk in the Lolo Elk Zone.

Statewide, instantaneous annual survival of cow elk was 88.9% during 2014-2016. Of the 11.1% mortality, hunting-related elk mortality was 4.2%, predation 3.6%, and other or unknown causes 3.2%. In those elk zones identified in the IDFG Elk Management Plan as having the highest intensity of predation impacts, survival was 91.0%. Of the 9% mortality, 1.6% was hunter harvest, 4.8% was predation, and 2.7% mortality by other or unknown causes. Predation of cow elk by wolves was second to that of cougars.

Six-month survival of calf elk collared during winter was 59.0% statewide during 2014-2017, with 0.3% taken by hunters, 23.3% by predation, 10.5% malnutrition, and 7.2% from other or unknown causes. In those units identified in the elk plan as having the highest intensity of predation impacts, six-month calf elk survival was 52.7%, with 31.0% taken by predation, 8.5% malnutrition, and 7.8% by other and unknown causes. Predation of calf elk by wolves was second to that of cougars during this period. Considering prior research on fates of radio-collared neonate elk, calf predation by wolves is likely exceeded by that of both cougars and black bears on an annual basis.

Background

During 1979, wolves were found to be colonizing northwestern Montana from Canada, and a den was located in 1986 (Ream et al. 1989). By 1994, the wolf population in northwestern Montana consisted of at least 23 wolves (pre-denning), and abundance was increasing at an average of 20% annually (Pletscher et al. 1997). Dispersers from Montana were documented moving through northern Idaho, northeastern Washington, and British Columbia by the early 1990s (Boyd et al. 1995). Through natural processes, Idaho's wolf population was expected to reach recovery levels by about 2015 (U.S. Fish and Wildlife Service 1994).

The United States Fish and Wildlife Service (USFWS) completed an Environmental Impact Statement for the reintroduction of wolves into central Idaho and Yellowstone National Park in 1995. During 1995 and 1996, the USFWS, working under authority of the Endangered Species Act (ESA), captured 66 wolves in Alberta and British Columbia, Canada, and released 35 wolves in central Idaho and 31 in Yellowstone National Park. By 2002 Idaho's wolf population had met all metrics for delisting, and the State of Idaho adopted a state delisting plan (2002 Plan; Idaho Legislative Wolf Oversight Committee 2002) for gray wolf conservation and management pursuant to Idaho Code Title 36, Chapter 24.

Wolves were removed from the ESA endangered species list in 2011. Wolves in Idaho are currently managed under the 2002 Idaho Wolf Conservation and Management Plan and are classified as a big game animal with harvest authorized for both hunting (2009) and trapping (2011).

Current Management Approach

1. Keep state management authority by maintaining a well-distributed, self-sustaining wolf population.

Strategies

1. Use public hunting and trapping as a preferred means of managing wolves;
 2. Annually monitor whether at least 15 wolf packs are extant in Idaho;
 3. Annually monitor changes in trend of Idaho's wolf population and in its distribution; and,
 4. Prioritize management to respond quickly, decisively, and effectively should monitoring indicate the need.
2. Prioritize agency actions and resources to aggressively address areas of recurring depredation on livestock and other domestic animals.

Strategies

1. Cooperate with livestock interests, the Idaho State Animal Damage Control Board, the Idaho Wolf Depredation Control Board, and USDA APHIS Wildlife Services to reduce and document wolf depredations on livestock;
2. Take additional, aggressive action to reduce depredations in areas with frequent and abundant livestock depredations;
 - a. Provide liberal opportunities for sport harvest of wolves;

- b. Authorize and encourage full pack removal in response to confirmed wolf depredations in chronic depredation areas; and,
 - c. Provide liberal private kill authorizations near chronic depredation areas.
- 3. Determine the extent of wolf predation in ungulate populations not meeting management objectives and reduce wolf predation impacts where appropriate.

Strategies

- 1. Strongly encourage public harvest of wolves; and,
 - 2. Where harvest cannot be expected to resolve the effects of excessive wolf predation, implement area-specific Predation Management Plans.
- 4. Improve data used to inform wolf management decisions.

Strategies

- 1. Continue the mandatory harvest check for wolves;
 - 2. Prioritize research that improves wolf monitoring techniques; and,
 - 3. Use a defined experimental design to examine population effects of harvest to better inform management decisions.
- 5. Provide a report summarizing wolf management activities on an annual basis.

Monitoring

Prior to May 2016, the primary objective for monitoring of wolves in Idaho was to assess population characteristics relative to delisting criteria. Monitoring is now designed to assess the population relative to criteria in the 2002 Wolf Plan and to inform harvest and other management decisions.

Through 2015, data were summarized on a calendar year (CY) basis for monitoring relative to delisting criteria. However, with initiation of harvest seasons, it became more useful to shift summaries to a biological year (BY) basis, starting with the birth pulse (approximately May 1). This allowed a more informative interpretation of the harvest characteristics and impacts on the wolf population. Unless otherwise stated, data in this report are summarized on a BY basis, May 1 – April 30.

In areas where wolf densities are high, management need not be very restrictive, and population monitoring will primarily evaluate broad-scale changes. Most monitoring tools can be used at different levels of monitoring intensity but practical and financial considerations typically dictate the extent to which a given tool is used. Monitoring will be more intensive at low population densities than at high densities.

Available Monitoring Tools

Several monitoring tools are currently used to provide insight into Idaho's wolf population including:

1. A statewide array of remote cameras to document wolf distribution and pack demographics in an occupancy model framework (Ausband, et al. 2014);
2. Genetic identification of individual wolves through sampling of scats at rendezvous sites (Stansbury et al. 2014) to determine pack characteristics and trend in abundance;
3. A mandatory, physical check of all harvested wolves to help determine population composition and distribution;
4. Incidental observations of wolves by members of the public to help determine distribution;
5. Direct observation during big game aerial survey flights;
6. Monitoring of lethal control actions authorized by IDFG; and,
7. Radio-collared wolves.

Population Characteristics

Packs

The 2002 Wolf Plan identified a wolf population of more than 15 packs as a criterion for wolf management, depredation control, and monitoring under Idaho Fish and Game Commission authority. Below 15 packs, monitoring is heavily reliant upon radio-collaring. Above 15 packs, monitoring is done primarily by indirect management indicators (Idaho Legislative Wolf Oversight Committee 2002).

Wolf distribution and pack numbers were monitored across Idaho through multiple detection state and method occupancy models 2009-2014 using non-invasive genetic sampling in predicted rendezvous site habitat, locations of radio-collared wolves, a survey of wolf observations by hunters, and up to nine covariates such as slope, elevation, and forest cover (Ausband et al. 2014).

During 2016, a wolf distribution survey using remote cameras was added for model refinement. IDFG deployed 196 remote wolf monitoring cameras on random grid cells of 686 km² overlaid on suitable wolf habitat from southeastern Idaho to the Canadian border (Figure 1). Photos were analyzed from a total of 17,140 camera trap-nights between June 15 and September 30. Wolves were detected during this period on 68 of the 196 cameras. Following Ausband et al. 2014, an estimated 81 wolf packs (95% CI 78-85 packs) were extant in Idaho during summer 2016.

Population Size

After peaking in 2008 at 849 wolves, Idaho's estimated number of wolves in documented packs, other documented groups, and lone wolves at year-end stabilized between 684 and 786 wolves during 2010-2015 (Figure 2). Subsequent to CY2015, monitoring has shifted to estimating the number of wolf packs rather than establishing a number of wolves in documented packs.

Reproduction

A minimum number of litters was estimated for BY2014 and BY2015 through genetic analysis of harvest data (H. Clendenin, University of Idaho, unpublished report). Ages were established by tooth morphology or cementum analysis to determine young of the year (YOY) wolf mortalities, and genotypes were generated for each sample at 18 neutral nuclear DNA microsatellite loci. Consensus genotypes were established for 121 YOY for BY2014 and 162

YOY for BY2015. Sibling relationships were determined using Colony2 (Wang 2004), resulting in assignment to 52 litters putatively extant during summer BY2014 and 63 litters putatively extant during summer BY2015. We know that not all packs are represented in the samples, so this is the minimum number of litters confirmed, not estimates of the number of litters produced in the state.

Harvest Characteristics

Seasons

Hunting seasons vary across the state depending on management objectives and social considerations with most wolf hunting seasons currently occurring August 30–March 31. Year-round seasons are used in 25 of Idaho’s 99 GMUs to help address conflicts between wolves and livestock or elk populations. The majority of hunted wolves are taken during October, concurrent with rifle deer and elk hunting seasons (Figure 3). A small number of hunters specifically pursue wolves using a variety of methods including calling, and spot-and-stalk hunting.

Most wolf trapping seasons currently run November 15–March 31. An earlier opening date of October 10 is used to help address elk management conflicts in 10 GMUs. Trapped wolves are taken relatively uniformly from mid-November through the end of March (Figure 4).

Bag Limits

Hunters may take up to five wolves annually. Trappers may take up to 10 wolves annually, using five wolf trapping tags and five wolf hunting tags (which are also valid for trapping). Despite bag limits allowing multiple wolves, few individuals actually take more than one in a year (Figure 5).

Harvest

A compulsory check of harvested wolves provides detailed harvest information for management. Wolf harvest peaked at 376 during BY2011, the first year where both hunting and trapping were offered. Since that time, harvest declined an average 9.7% annually (Figure 6). During BY2016, hunters took 143 wolves, nine percent below the previous three-year average (Table 1). During BY2016, trappers took 83 wolves, 28% below the previous three-year average.

Livestock Depredation Management

Management of wolf depredation on livestock remains an important issue. Livestock depredations occur largely southward and eastward of the lower Clearwater to Island Park (Figure 7). The scarcity of depredations in central and northern Idaho is associated with a lack of significant livestock grazing. The scarcity of depredations south of the Snake River Plain in southern Idaho is associated with minimal wolf activity.

During calendar year 2016, USDA APHIS Wildlife Services (WS) agents recorded 76 confirmed and probable depredations of domestic animals. Cattle were associated with 60 reports (79%), sheep with 13 reports (17%), and other animals with 3 reports (4%). Notably, depredations during 2016 were less than half those of peak years 2008 and 2009 (Table 2).

During CY2016, 70 wolves were killed in response to livestock depredations, or were killed by livestock producers/landowners in defense of property.

Elk Management

Management of predation is an important issue for elk managers in Idaho (Idaho Department of Fish and Game 2014). Elk herds in Idaho are limited by a variety of factors and it is the combination of habitat quality, predation, and other prominent influences such as hunting and climatic conditions that influence elk nutritional condition that determines the population dynamics of elk herds (Idaho Department of Fish and Game 2014). Predation is identified as a prominent factor limiting elk populations in 13 GMUs, located primarily in central Idaho (Figure 8). Given the generally remote nature of these GMUs, management of predation is challenging.

During February 2016, 20 wolves were killed to address wolf predation on elk in the Lolo Elk Zone.

Cow Elk Survival

During 2014-2016, 579 cow elk were captured and radio-collared to assess cause-specific mortality across 29 game management units. Cow survival averaged 88.9%, including an average 4.2% hunting-related mortality, 3.6% predation, 2.2% other causes, and 1.0% unknown causes. Predation by wolves ranged from 0% in elk zones identified in the IDFG Elk Management Plan as having low predation intensity, to 4.8% in zones identified as having high predation intensity (Table 3). Predation by wolves averaged 0.9% statewide, ranking second to that by cougars (2.2%).

Calf Elk Survival

Calves Captured as Neonates During June

No recent data are available for determination of cause-specific survival of neonates. Data from 2002-2009 are presented here for perspective on causes and extent of mortality during this time period (Table 4). Neonate survival for the first six months averaged 45.6%, with mortality dominated by predation. The most common source of predation during this period was by black bears (17.2%), followed by cougars (12.4%), and wolves (4.0%).

Calves Captured at 7 Months of Age

During 2014-2016, 638 calf elk were captured and radio-collared to assess cause-specific mortality across 25 game management units. Averaging 59.0% overall, six-month (winter/spring) calf elk survival ranged from 52.7% in elk zones classified as having high predation impacts, to 68.2% in zones classified as having low predation impacts. Total predation averaged 23.3% statewide, ranging from 15.2% to 31.0% across elk zone classifications. Similar to the case for cow elk, predation by wolves (6.1%) ranked second to that by cougars (14.5%).

Annual Calf Elk Survival

Neonate survival data are not available for 2014-2016, so calculation of *annual* survival and cause-specific mortality rates are not possible. Under the assumption that neonatal calf mortality patterns are similar to that in 2002-2009, the annual predation rate of calf elk by wolves would rank behind that of both cougars and black bears.

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Table 1. Idaho wolf harvest, BY 2009 - BY 2016.

Method	2009	2010	2011	2012	2013	2014	2015	2016
Hunting	181	0	253	195	187	138	145	143
Trapping	0	0	123	121	104	119	125	83
Harvest	181	0	376	316	291	257	270	226

Table 2. Reported confirmed and probable livestock depredation incidents by wolves, CY2007 - CY2016.

Type	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Cattle	61	114	95	78	77	91	43	57	44	60
Sheep	39	53	74	43	48	59	41	24	21	13
Dog	6	12	12	1	2	4	3	3	4	3
Other	2	1	2	2	5	1	1	2	2	0
Total	108	180	183	124	132	155	88	86	71	76

Table 3. Fates of radio-collared cow elk, 2014 - 2016.

Category	Predation Intensity Classification (2014 Elk Plan)			
	Low	Moderate	High	All Combined
Sample	290	489	189	968
Survival	82.1%	92.2%	91.0%	88.9%
Mortality	17.9%	7.8%	9.0%	11.1%
Hunting¹	10.7%	1.8%	1.6%	4.2%
Total Predation	1.7%	4.3%	4.8%	3.6%
Wolf	0.0%	1.6%	0.5%	0.9%
Cougar	1.4%	2.0%	3.7%	2.2%
Other Predator	0.0%	0.0%	0.0%	0.0%
Unknown Predator	0.3%	0.6%	0.5%	0.5%
Malnutrition	0.3%	0.0%	1.1%	0.3%
Other (known)	3.8%	0.8%	0.5%	1.9%
Unknown	1.4%	0.8%	1.1%	1.0%

¹ Includes wounding loss.

Table 4. Six-month fates of neonate elk, 2002 - 2009.

Category	All Combined
Sample	274
Survival	45.6%
Mortality	54.4%
Hunting¹	1.1%
Total Predation	43.8%
Wolf	4.0%
Cougar	12.4%
Bear	17.2%
Coyote	2.6%
Bobcat	0.4%
Unknown Predator	7.3%
Malnutrition	5.1%
Other (known)	1.8%
Unknown	2.6%

¹ Includes wounding loss.

Table 5. Six-month fates of calf elk radio-collared during mid-winter, 2014 - 2017.

Category	Predation Intensity (2014 Elk Plan)			
	Low	Moderate	High	All Combined
Sample	132	482	129	743
Survival	68.2%	57.9%	52.7%	59.0%
Mortality	31.8%	42.1%	47.3%	41.2%
Hunting¹	1.5%	0.0%	0.0%	0.3%
Total Predation	15.2%	23.7%	31.0%	23.3%
Wolf	0.8%	6.4%	10.1%	6.1%
Lion	13.6%	13.9%	17.8%	14.5%
Other Predator	0.0%	0.0%	0.8%	0.0%
Unknown Predator	0.8%	3.3%	2.3%	2.7%
Malnutrition	9.1%	11.4%	8.5%	10.5%
Other (known)	5.3%	3.7%	1.6%	3.8%
Unknown	0.8%	3.3%	6.2%	3.4%

¹ Includes legal harvest and wounding loss.

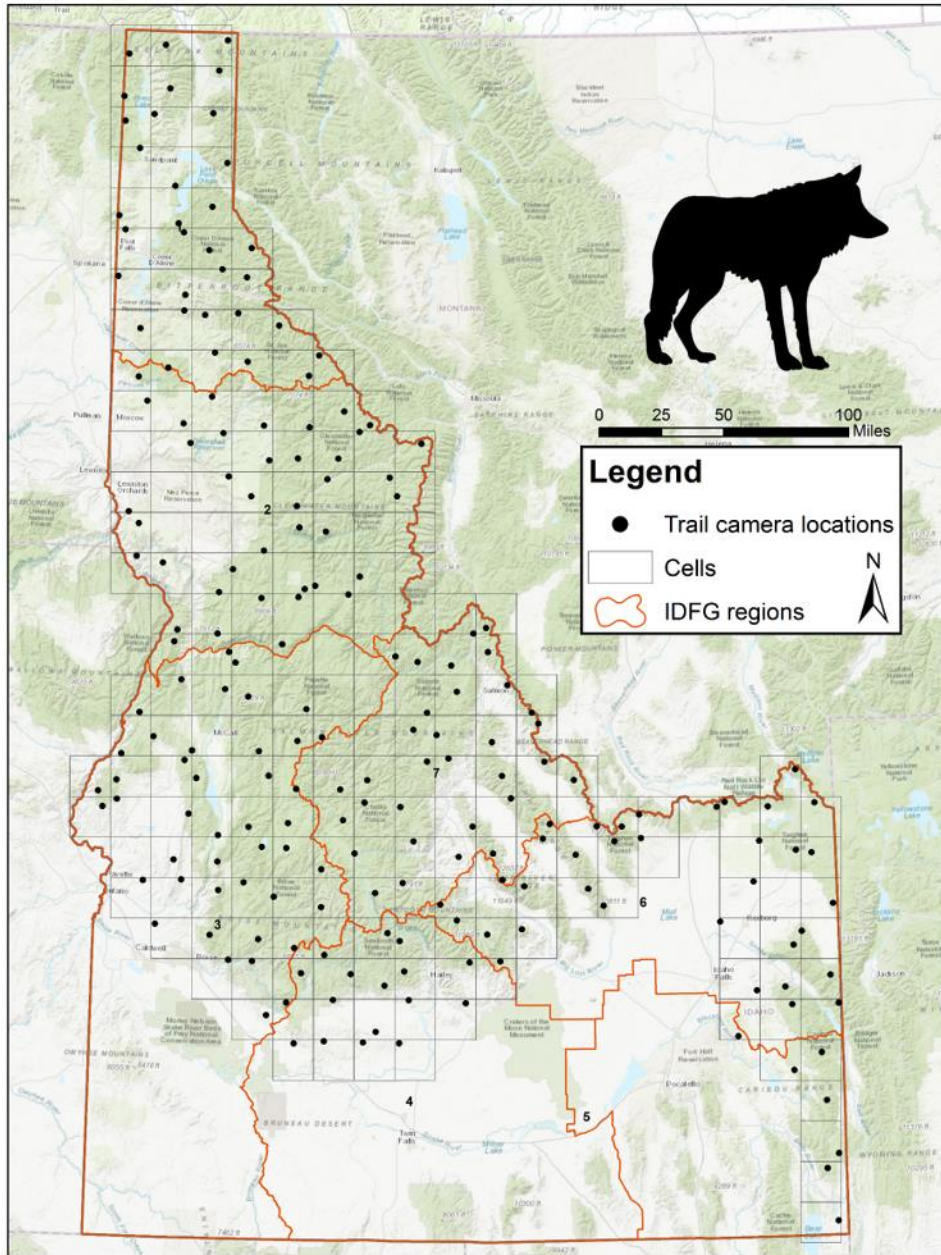


Figure 1. Sampling grid and remote camera locations used for 2016 occupancy modeling.

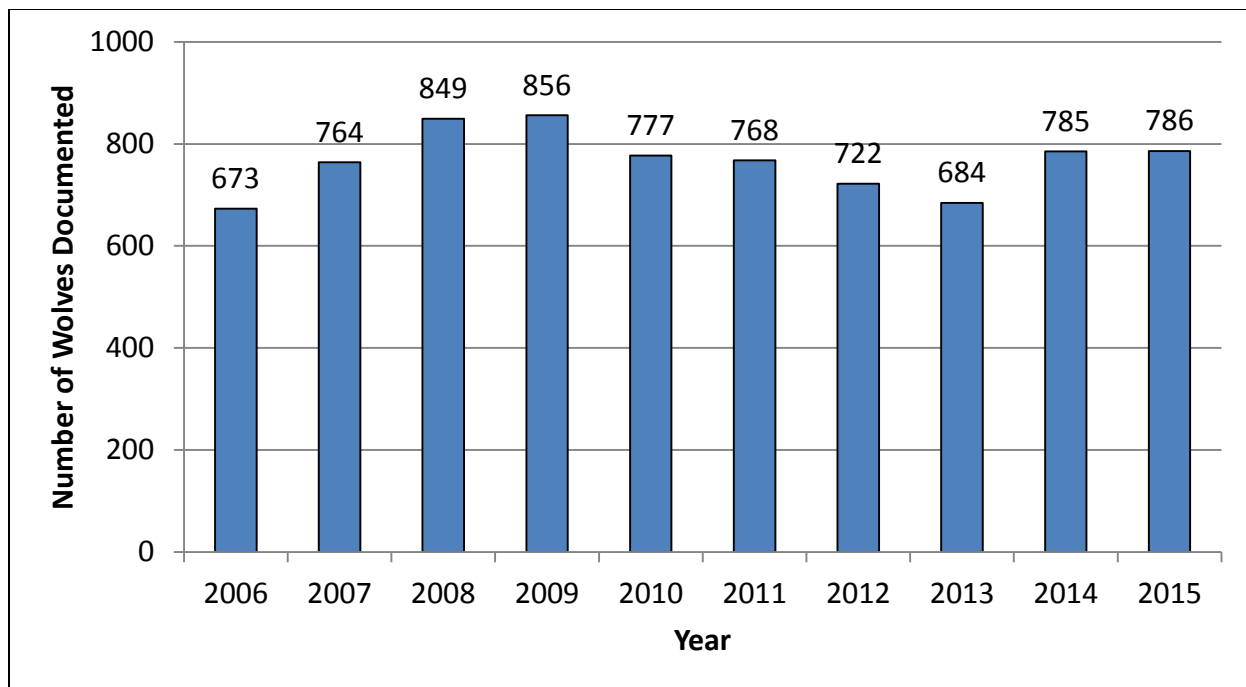


Figure 2. Estimated number of wolves in documented packs, other documented groups, and lone wolves in Idaho at year-end, CY2006 – CY2015. Annual numbers were based on best information available and were retroactively updated as new information was obtained.

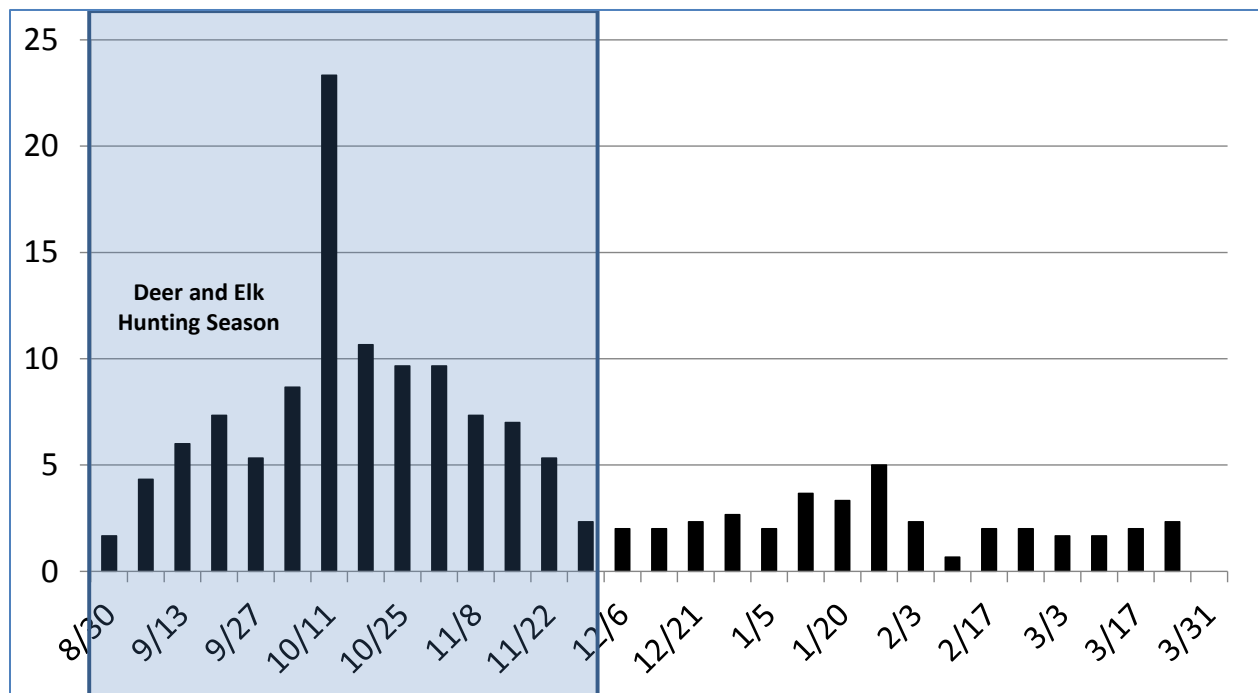


Figure 3. Average weekly harvest of wolves taken by hunters, August 30 - March 31, 2014-2016.

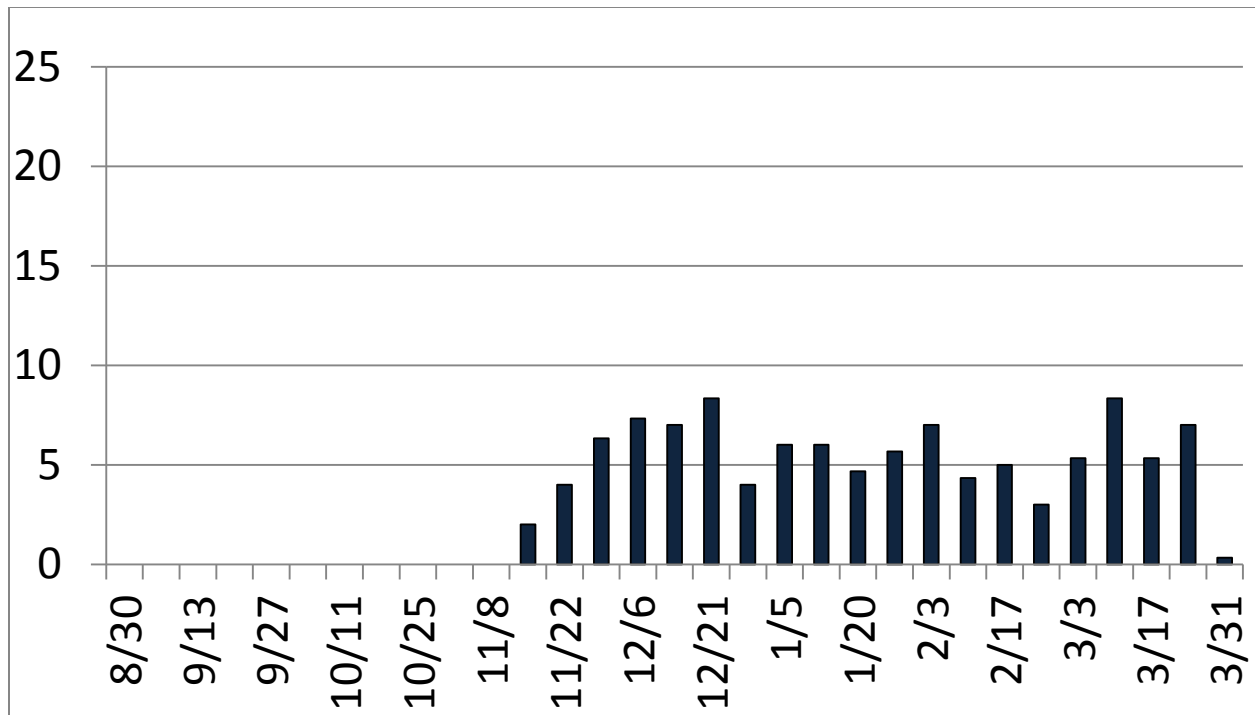


Figure 4. Average weekly harvest of wolves taken by trappers, August 30 - March 31, 2014-2016.

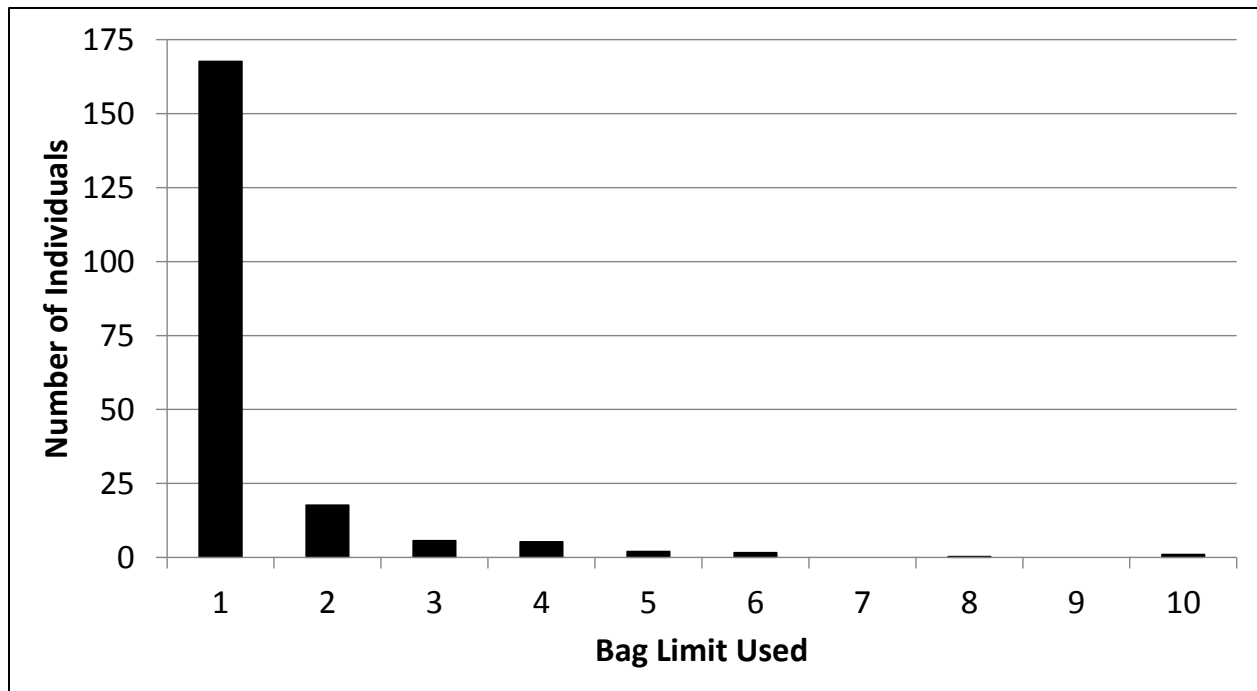


Figure 5. Bag limit use by successful wolf hunters and trappers, CY2012-2016.

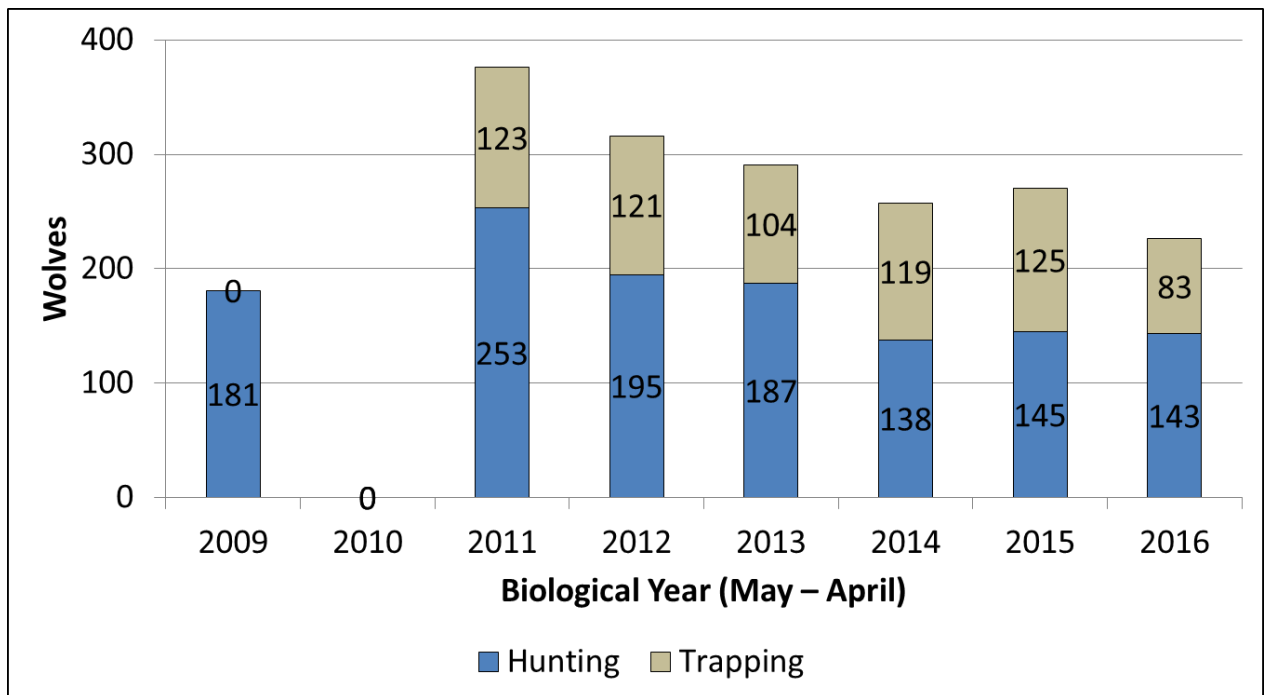


Figure 6. Number of wolves taken by hunting and trapping in Idaho, BY2009 - 2016.

Incidents of Wolf-Caused Livestock Depredations 2012 - 2016

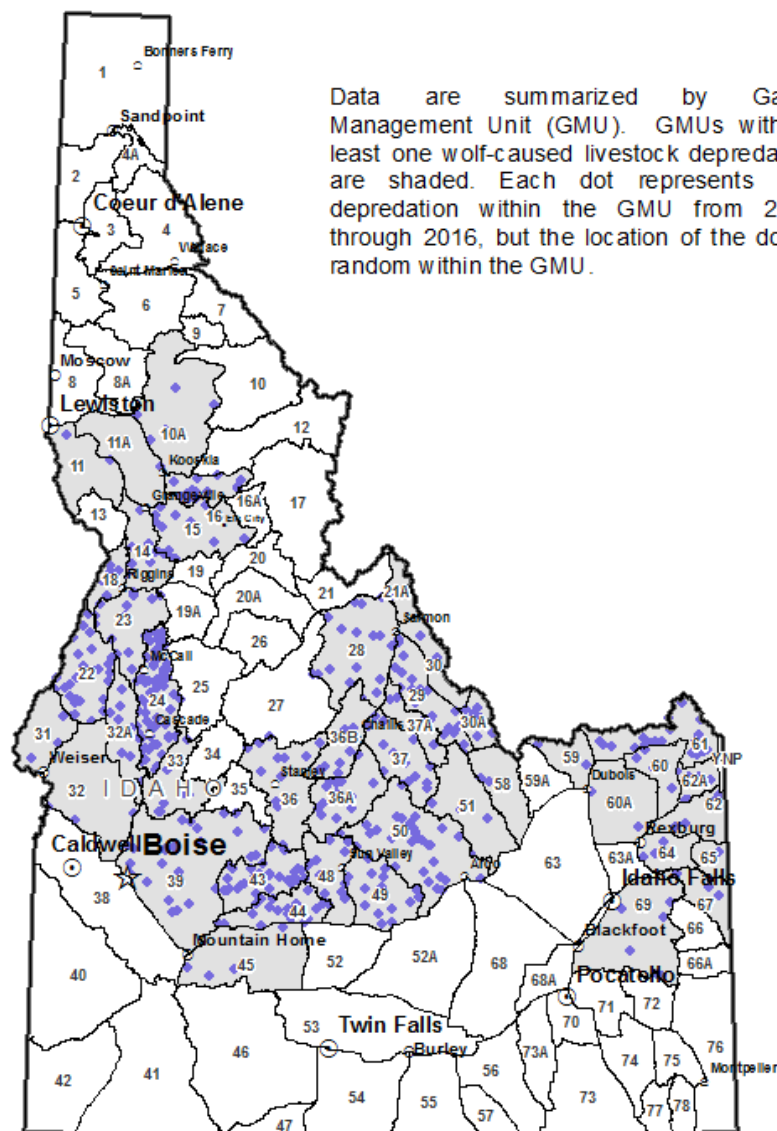


Figure 7. Livestock depredations incidents by Game Management Unit, CY2012 - 2016. Locations of dots within Game Management Units are to provide a visual representation of number depredations incidents within the unit, and do not indicate the actual location of the depredation.

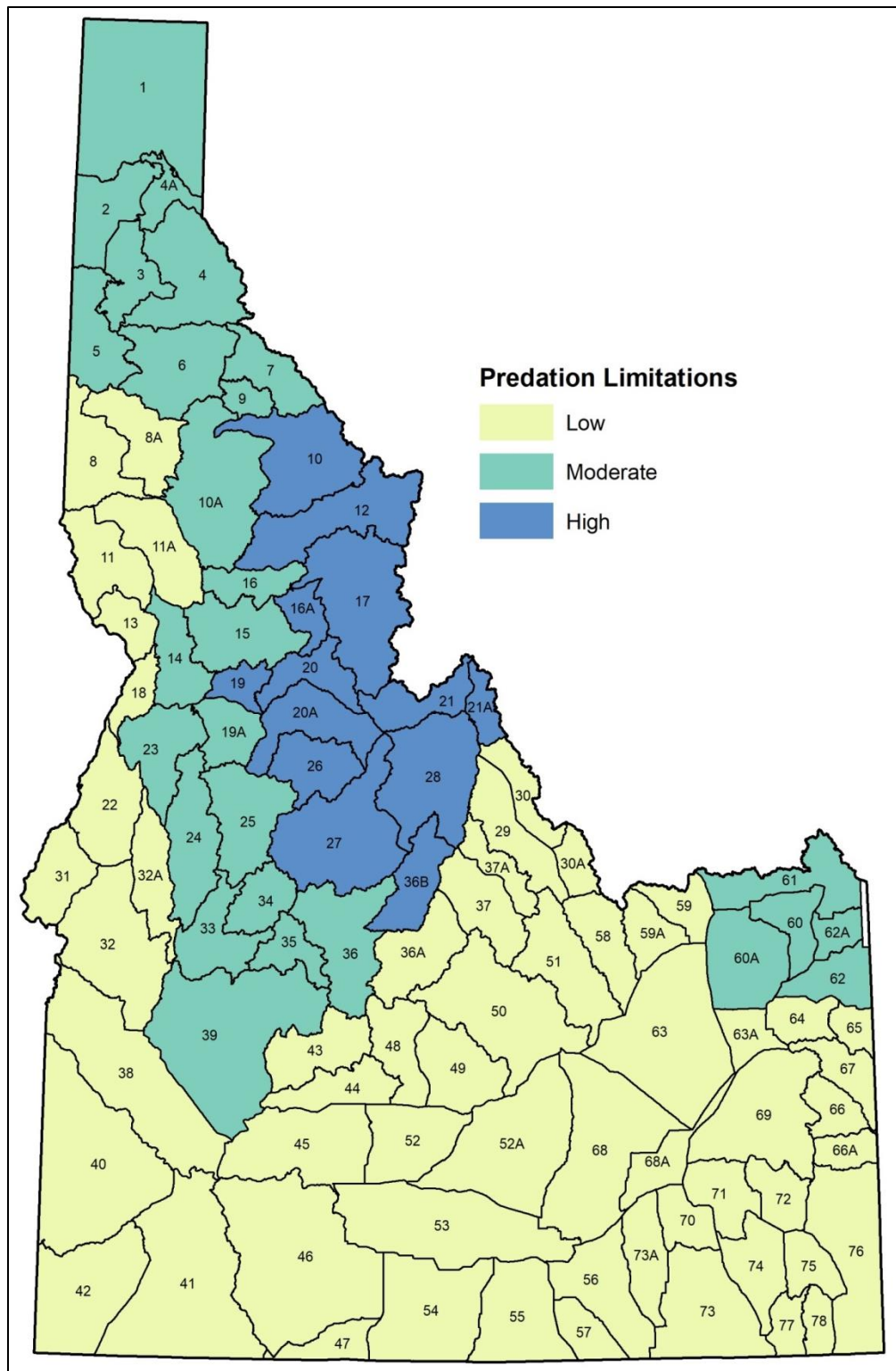


Figure 8. Intensity of predation limitations on Idaho elk populations identified in Idaho's Elk Management Plan (Idaho Department of Fish and Game 2014).