

IDAHO DEPARTMENT OF FISH AND GAME

Jim Fredericks, Director

Surveys and Inventories

Statewide Report



WOLF

July 1, 2019 to June 30, 2020

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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, 2019 to June 30, 2020

Statewide

Summary

Wolves (*Canis lupus*) were reintroduced into central Idaho in 1995, and after rapid population growth were delisted from the endangered species list in 2011. With the wolf population level securely above state and federal population requirements for over two decades, Idaho Department of Fish and Game (IDFG) wolf program continues to adapt and adjust resources and management actions as needed. During this reporting period, IDFG implements the management direction from the 2002 Idaho Wolf Conservations and Management Plan (2002 Wolf Plan) to guide population monitoring, regulate harvest, coordinate and authorize research, and address wolf-caused depredation and predation issues.

In the early years, most wolf packs had radio-collared individuals and intensive monitoring was achievable when the wolf population was small and recovering. As Idaho's wolf population continued to grow, it became increasingly difficult to monitor the population because of the extensive effort and cost of radio-collaring wolves. In addition, after delisting, federal money was no longer available to monitor wolves. Idaho took over wolf management and hunters and trappers began harvesting wolves, which made keeping radio collars on wolves more difficult and costly. As a result, wolf population monitoring methods changed from radio-collaring individuals and aerial tracking to count packs, to using remote trail camera traps to develop an abundance estimate. The Department also assesses population trends through genetic analyses from samples collected during mandatory harvest checks and other documented mortalities.

Despite lengthy seasons and ample hunting and trapping opportunities, annual statewide summer population surveys estimate approximately 1,500 wolves in Idaho; indicating that wolves remain well above recovery levels and widely distributed across the state.

From 1995 through 2015 wolf data were summarized by calendar year (January 1 – December 31) relative to Environmental Species Act (ESA) delisting criteria. However, the initiation of harvest seasons made it more useful to shift summaries to biological year (BY) starting with birth pulse, which occurs around May 1. In addition, this also allowed a more informative interpretation of harvest and its effect on wolf populations. Unless otherwise stated, mortality data in this report are summarized through BY2019 (**May 1, 2019 to April 30, 2020**).

Management Objectives

IDFG's wolf management goals outlined in the 2002 Wolf Plan are to reduce conflicts with livestock, ensure a self-sustaining wolf population, maintain wolf numbers commensurate with healthy and abundant ungulate populations, and maintain state management authority. See link for the 2002 Wolf Plan: <https://idfg.idaho.gov/old-web/docs/wolves/plan02.pdf>.

Wolves are classified as a big game animal. Harvest has been authorized by the Fish and Game Commission (Commission) by hunting since 2009 and by trapping since 2011. IDFG monitors mandatory harvest reporting and other sources of wolf mortality and population monitoring data to ensure the population stays above the U.S Fish and Wildlife Service 2009 delisting criteria of >150 wolves and >15 breeding pairs (USFWS 2009). The Commission has continued to expand wolf hunting and trapping opportunities over time because Idaho's wolf population has remained well above recovery levels and impacts to ungulates and livestock have persisted.

The Commission sets big game seasons every two years, but is updated on wolf population metrics throughout the year. The Commission has the authority to adjust bag limits, seasons, and methods of take as necessary to reach wolf population goals. If mortality is determined excessive, the Commission and the Director have the authority to adopt emergency closures or restrictions at any time for preservation, protection, or management of wildlife (Idaho Code 36-104 and 36-106).

Population Surveys and Monitoring

Prior to May 2016, wolf monitoring was focused on assessing population characteristics relative to ESA delisting criteria. Since then, wolf monitoring has been focused on assessing the population relative to criteria in the 2002 Wolf Plan and to inform harvest and other management decisions. Where wolf densities are high, management need not be very restrictive, and population monitoring may be limited, and evaluate the population primarily for broad-scale changes. Most monitoring tools can be used at different levels of intensity, but practical and financial considerations typically dictate the extent to which a given tool is used.

The 2002 Wolf Plan identified a wolf population of more than 15 packs as a criterion for wolf management, depredation control, and monitoring under Commission authority. Below 15 packs, monitoring would be heavily reliant upon radio-collaring. When more than 15 packs are present, monitoring will primarily be by indirect management indicators using a variety of population monitoring tools (Idaho Legislative Wolf Oversight Committee 2002). Idaho documented at least 15 packs by 2003.

Monitoring Tools

Several monitoring tools were used during the reporting period to provide insight into Idaho's wolf population including:

1. A statewide array of remote cameras to document distribution, pack demographics, and wolf abundance in an occupancy-abundance model framework (Ausband et al. 2014, Moeller et al. 2018, Thompson et al. 2021, Ausband et al. 2023);
2. Analysis of wolf genetic information and ages collected from checked wolves to identify the minimum number of reproductive packs (Stansbury et al. 2014, Struthers et al. 2022, Delomas et al. 2023);

3. A mandatory, physical check of all harvested and salvaged wolves to help determine population composition and distribution;
4. Incidental observations of wolves by department staff and members of the public to help verify distribution;
5. Monitoring of predation impacts on ungulate populations relative to their management objectives;
6. Monitoring of wolf-caused livestock depredations and subsequent control actions authorized by IDFG; and,
7. Radio-collared wolves.

Capture, Radio-mark and or Telemetry

Eight wolves fitted with GPS radio collars were monitored at the beginning of BY2019. During the reporting period, 10 additional wolves were captured and radio-collared. Three of the wolves were captured and radio-collared in the Lolo Elk Zone to assist in wolf removals authorized under the Lolo Predation Management Plan. Under IDFG authority, 7 wolves were radio-collared by USDA Wildlife Services to facilitate removal activities that will reduce levels of gray wolf predation on livestock. Ten collared wolves remained available for monitoring at the end of the BY2019 (Table 1). Harvest was the primary cause of collar loss (37% of the total collars).

Wolf Distribution and Monitoring

Wolf abundance and distribution was closely monitored through several monitoring techniques including: camera-based occupancy-abundance modeling, non-invasive genetic sampling, and locations of radio-collared wolves. IDFG used the combination of multiple data sources such as: rendezvous site scat collection, occupancy modeling, high-density camera grids, harvest totals and supporting data such as litter size and DNA collected from harvested animals, to produce reliable annual estimates of wolf populations and pack productivity and document population trends.

Statewide Occupancy

In 2015, IDFG research staff developed a monitoring framework for wolves based on occupancy modeling and pictures of wolves captured from trail cameras. Wolf population trends can be inferred using measures of occupancy over time. Since 2016, IDFG systematically surveys wolf habitat for wolf presence north of the Snake River Plain with remote cameras to improve wolf occupancy models. This portion of the state was divided into 222 grid cells of 686 km² (approximating the size of an average wolf territory in Idaho). One remote camera was placed in modeled predicted wolf rendezvous site habitat within each cell (Figure 1; Ausband et al. 2010). In 2019, IDFG personnel deployed 209 occupancy cameras along roads and trails within 500m of predicted wolf rendezvous site habitat in each non-wilderness cell. Cameras were deployed by July 1 and retrieved after September 30.

Statewide abundance estimate with high intensity camera grid

Additional information was desired to provide a statewide estimate of abundance. To achieve this level of monitoring, research staff proposed a more intensive trail camera effort to examine the feasibility of using remotely triggered cameras as a data source for estimating wolf abundance. Newly developed time-to-event (TTE) and space-to-event (STE) models showed promise for estimating abundance of rare animals (Moeller et al. 2018).

To account for the variability of wolf density throughout the state, sampling effort was needed from high to low density areas. Three strata (high, medium, and low) were created from the mean estimates of wolf occupancy; in other words, each state cell was assigned a low, medium, or high stratum. Within 37 occupancy cells (26,200 meters resolution), a grid of 16 smaller, focal cells that are much higher in resolution (6,550 meters) was created (Figure 2). IDFG personnel deployed an additional 571 abundance cameras.

The STE analysis was used to estimate the number of wolves by stratum (Moeller et al. 2018). Wolves were detected at 259 out of 540 abundance cameras deployed in the study (Figure 3). Approximately 10.7 million pictures were taken. Cameras recorded 6,168 images of wolves across the July – August deployment. Two cameras were considered outliers and excluded from the STE analysis. The most reliable estimate of wolf abundance uses both motion detected and time-lapse photos with 30-second intervals. Thus, the estimated wolf abundance was 1,545 (95% CI: 1,175–2,040) in BY2019 (Thompson et al. 2022). Using only time-lapse photos there were fewer detections and observation snapshots and therefore the estimate is much less precise ($\hat{N} = 3,484$, SE = 1,559, 95% CI: 429–6,540).

Minimum number of reproductive packs.

IDFG collects wolf teeth and/or tissue samples from documented wolf mortalities, including all hunting or trapping harvest, which is subject to mandatory check with the agency. Samples analyzed the unique genotype of each wolf mortality that was determined through tooth cementum analysis to be a Young of the Year (YOY). Genotypes are generated using nuclear DNA microsatellite loci (Stansbury et al. 2014) for individuals designated as YOY through tooth analysis. In addition, samples from BY2017 – 2019 will be screened with single nucleotide polymorphic (SNP) markers and microhaplotype markers combined in a single panel (Struthers et al. 2022, Delomas et al. 2023). These assignments are based on genotyped tissue samples from wolf samples previously collected in Idaho. Full sibling relationships for samples from BY2017, BY2018 and BY2019 were analyzed and reconstructed using the software COLONY2. COLONY identified a minimum of 59 litters produced in 2017, 76 litters in 2018, and 97 litters in 2019 (Struthers et al. 2022).

Hunting, Trapping, and Harvest Characteristics

Bag Limits

During calendar year 2019, IDFG sold 46,033 wolf tags, including 45,517 hunting tags and 516 trapping tags. This number includes hunting and trapping tags purchased individually and those wolf hunting tags included in the Sportsman's Package. It is unknown how many of the individuals who purchased tags hunted specifically for wolves.

Bag limit increased from 10 to 15 wolf hunting tags and from 10 to 15 wolf trapping tags across the state. Individuals could harvest up to 15 wolves with hunting tags per calendar year and certified wolf trappers could purchase an additional 15 trapping tags per trapping season (valid July 1 – June 30 rather than for a calendar year). Wolf hunting tags are valid for trapped wolves.

Changes in Harvest Seasons

In February 2020, the Idaho Fish and Game Commission adopted changes to wolf harvest seasons during the reporting period, including:

- Extended the wolf hunting seasons on public land to Aug. 1 – June 30 in Units 1, 2, 3, 4, 4A, 5, 6, 7, 8, 8A, 9, 10A, 11, 11A, 13, 14, 21A, 30, 30A, 36, and 37A.
- Extended wolf hunting season on both public and private land to July 1 – June 30 in units 38, 40, 41, 42, 46, 47, 53, 54, 55, 56, and 57.
- Extended the wolf hunting season on both public and private land to Aug. 1 – June 30 in Units 19A, 20A, 21, 25, 26, 27, 34, 35, 45, 48, 49, 52, and 52A.
- Extended wolf hunting season to year-round on private land and Aug. 1 – June 30 on public land in Units 51, 58, 59, 59A, 60, 60A, 61, 62A, 63, 63A, 64, 65, 66, 66A, 67, 68, 68A, 69, 70, 71, 72, 73, 73A, 74, 75, 76, 77, and 78.
- Extended wolf hunting season to year-round on both private and public land in units with chronic wolf depredations on livestock: Units 15, 18, 22, 23, 24, 28, 29, 31, 32, 32A, 33, 36A, 36B, 37, 39, 43, 44, 50, and 62.
- Opened a new wolf trapping season on public land Oct 10 – March 31 in units 52, 52A, 53, 63, 63A, 66A, 68, 68A, 70, 71, 72, 73, 73A, 74, 75, 76, 77 and 78, but limit wolf trapping to foothold traps only on public land from Oct 10 – Nov 14.
- Modify the wolf trapping season from November 15 – March 31 in GMU 45 on public land to allow the use of snares.

Most trapping seasons now open October 10 instead of November 15, except in GMUs 1, 60, 61, 62, and 62A, where there is potential for conflicts with grizzly bears.

Harvest

The Department requires all wolves harvested and salvaged undergo mandatory check of the skull and hide by IDFG staff within 10 days of kill (Big Game Mortality Report, BGMR). IDFG staff collects biological data such as age, sex, method of take, harvest location, and DNA. Managers use this information to assess harvest demographics and distribution, and population dynamics to inform management decisions. Harvest primarily occurs incidentally during elk and deer hunting seasons and during winter trapping season (Figure 4).

During BY2019, a total of 566 wolves were checked. Hunters and trappers took 444 wolves, 50% above the previous three-year average (Table 2). Trappers took 234 wolves, twice as much the previous three-year average of 115 wolves. Hunters took 210 wolves, 18% above the previous three-year average of 177 wolves. During the reporting period, 6 sportsmen took 10 wolves or more, and one sportsman took 20 wolves. Despite the increased bag limits, few individuals take more than one wolf in a year (Figure 5). Non-harvest related mortality totaled 123 wolves.

Wolf harvest density (number of wolves harvested per 100 square miles) is greatest in the northern half of the state, particularly in well-roaded areas close to population centers (Figure 6). Wolf mortality outside of harvest (i.e., predator control, Wildlife Services, depredation kill, roadkill) is greatest in areas that are heavily-roaded, experience higher livestock depredations, or where ungulates populations are below objectives (Figure 5). The Panhandle, Clearwater, and

Southwest Regions comprised 70-80% of the total statewide wolf harvest during BY2017–2019. Wolf harvest density provides information on the comparative differences in harvest, but does not provides information on harvest rates between units.

Wolf Related Livestock Conflicts

Wolf recovery has had negative financial impacts on individual livestock producers. Management to reduce wolf depredation on livestock remains a top priority. Livestock depredations occur largely south of lower Clearwater County and east to Bonneville County (Figure 6). The relatively low frequency of depredations in northern Idaho is associated with lower livestock grazing and production. The low frequency of wolf-caused livestock depredations south of the Snake River is associated with minimal wolf activity.

During calendar year 2019, USDA Wildlife Services conducted 136 investigations classified as confirmed and probable wolf-caused livestock depredations (Table 3). A total of 237 confirmed and probable livestock losses were wolf-caused; of those, 130 cattle were mortalities and 98 sheep mortalities. Total livestock losses in 2019 declined, with more than 100 fewer losses compared to CY2017 (340) and CY2018 (354). During the same time frame (CY2019), 62 wolves were removed in response to livestock depredations or by livestock producers/landowners in defense of property.

Idaho Governor’s Office of Species Conservation (OSC) implements a federally funded program to compensate livestock owners for their losses. OSC also implements a federally funded prevention program to help willing landowners implement measures to decrease the risk of wolf-livestock interactions and reduce the extent of livestock losses caused by wolves. In Grazing Year 2019 (follows the calendar year), \$90,000 was allocated to 40 producers for 97 verified livestock losses (Table 4). Compensation funding for 2019 was prorated because demand was higher than supply. Full value requested was \$108,618.80.

Predation Management

Management of wolf-caused predation on ungulates is a priority for the Department (Idaho Department of Fish and Game 2014). The impact of wolf predation on ungulate populations likely varies with the species of prey, their abundance and recent population trends, the influence of habitat condition/characteristics, the type and abundance of other predators, and the types and abundance of other prey. Changes in weather patterns and precipitation can also affect the relative role of habitat and predators.

Elk are the primary ungulate prey of wolves in most of Idaho. Across the state, 774 radio-collared elk were monitored throughout the winter. Adult cow survival was 96% and calf survival was 69%. Leading cause of mortality for both adult cow elk and calves was mountain lions (Idaho Department of Fish and Game, Elk Statewide Report FY2019).

Predation is identified as a prominent factor limiting 5 elk populations, located primarily in central Idaho (IDFG Predation Management Plans: Panhandle, Lolo, Selway, Middle Fork, Sawtooth; IDFG 2023). Predation management occurs in areas where predators are limiting game populations and where regulated harvest of predators is not adequate. In these zones, IDFG

has developed and implemented predation management plans under IDFG's Policy for Avian and Mammalian Predation Management (IDFG 2000). From May 2019 through April 2020, 17 wolves were killed to address wolf predation on elk in the Lolo Elk Zone. These operations were conducted under the guidance of Idaho Fish and Game's Elk Management Plan (IDFG 2014) and Lolo/Selway Predation Management Plan (IDFG 2023).

Management Discussion

As wolf population monitoring needs have shifted from federal delisting needs to state management needs, IDFG has shifted its wolf monitoring focus from telemetry-based methods to methods based on remote cameras and non-invasive genetic sampling. Data collected from occupancy and abundance modeling, genetic analysis, and wolf harvest patterns indicate Idaho's wolf population remains well-distributed and self-sustaining within the state.

Conflict resolution remains a top agency priority. Wolf depredations on livestock will likely remain a difficult issue where wolves and livestock share the landscape. Some relief can be obtained through measures to reduce wolf-livestock interactions through harvest, focused wolf control, changes to animal husbandry practices, and through non-lethal deterrents. USDA Wildlife Service agents will continue to radio-collar wolves in high depredation areas under IDFG oversight.

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Tables

Table 1. Status of radio-collared wolves during BY2019 (May 1, 2019 – Apr 30, 2020).

Time Period	Collared wolves	Fate at end of BY2019						
		Harvested		Depredation removal (Livestock)	Dispersed from Idaho	Unknown mortality	Unknown fate (lost tracking)	Alive
		Hunting	Trapping					
Available at start of BY2019	8	3			1	1	1	2
Collared during BY2019	10			2				8

Table 2. Idaho wolf mortality, BY2011 – BY2019 (BY: May 1 – Apr 30).

Mortality Type*	BY2011	BY2012	BY2013	BY2014	BY2015	BY2016	BY2017	BY2018	BY2019
General Season Harvest	376	316	291	258	272	233	331	313	444
Predator Control	22	6	34	21	20	0	9	7	17
Depredation Kill	13	4	13	5	1	2	13	2	3
Wildlife Services	56	42	70	35	63	54	62	61	95
Other	26	13	16	13	23	8	11	4	8
Unknown	13	6	17	17	8	6	1	1	0
Total	506	387	441	349	387	303	427	388	567

* General Season Harvest: general hunting and trapping harvest

Predator Control: wolves harvested to address elk populations below objectives

Depredation Kills: a landowners harvests a wolf protecting their property

Wildlife Services: control actions implemented after a confirmed livestock depredations that resulted in a harvested wolf

Other: includes capture mortality, illegal kill, roadkill, pick up and other minimal harvest categories

Table 3. Confirmed and probable and wolf-caused livestock depredation incidents and losses in Idaho, as reported by Wildlife Services for CY2014 – CY2019.

Confirmed and Probable						
Calendar Year	WS Investigations	Livestock Losses	Cattle	Sheep	Dog	Other
2015	71	191	49	134	6	
2016	76	186	85	92	9	
2017	142	340	133	204	3	
2018	217	354	205	136	8	4
2019	136	237	130	98	7	2
2020	118	215	100	107	3	5
2021	108	166	105	58	2	1

Table 4. Compensation summary for Idaho verified livestock losses 2014 – 2019 and the overall value they were compensated at between 2014 and 2019 through the State of Idaho’s Compensation Program.

Grazing Yr.	Calves	Cows	Bulls	Sheep	Dogs	Horses	Bison	Llamas	Verified Losses	Producers	Total Compensation
2014	20	4	0	17	2	0	0	0	43	16	\$36,475.00
2015	22	3	0	82	1	1	0	0	109	16	\$36,370.00
2016	23	12	1	85	3	0	0	0	124	22	\$54,305.00
2017	59	32	5	149	2	0	1	0	248	49	\$150,591.00
2018	55	58	1	90	5	1	0	3	213	44	\$123,498.00
2019	49	26	3	17	0	0	2	0	97	40	\$90,000.00
Total	228	135	10	440	13	6	3	3	834	187	\$491,239.00

Figures

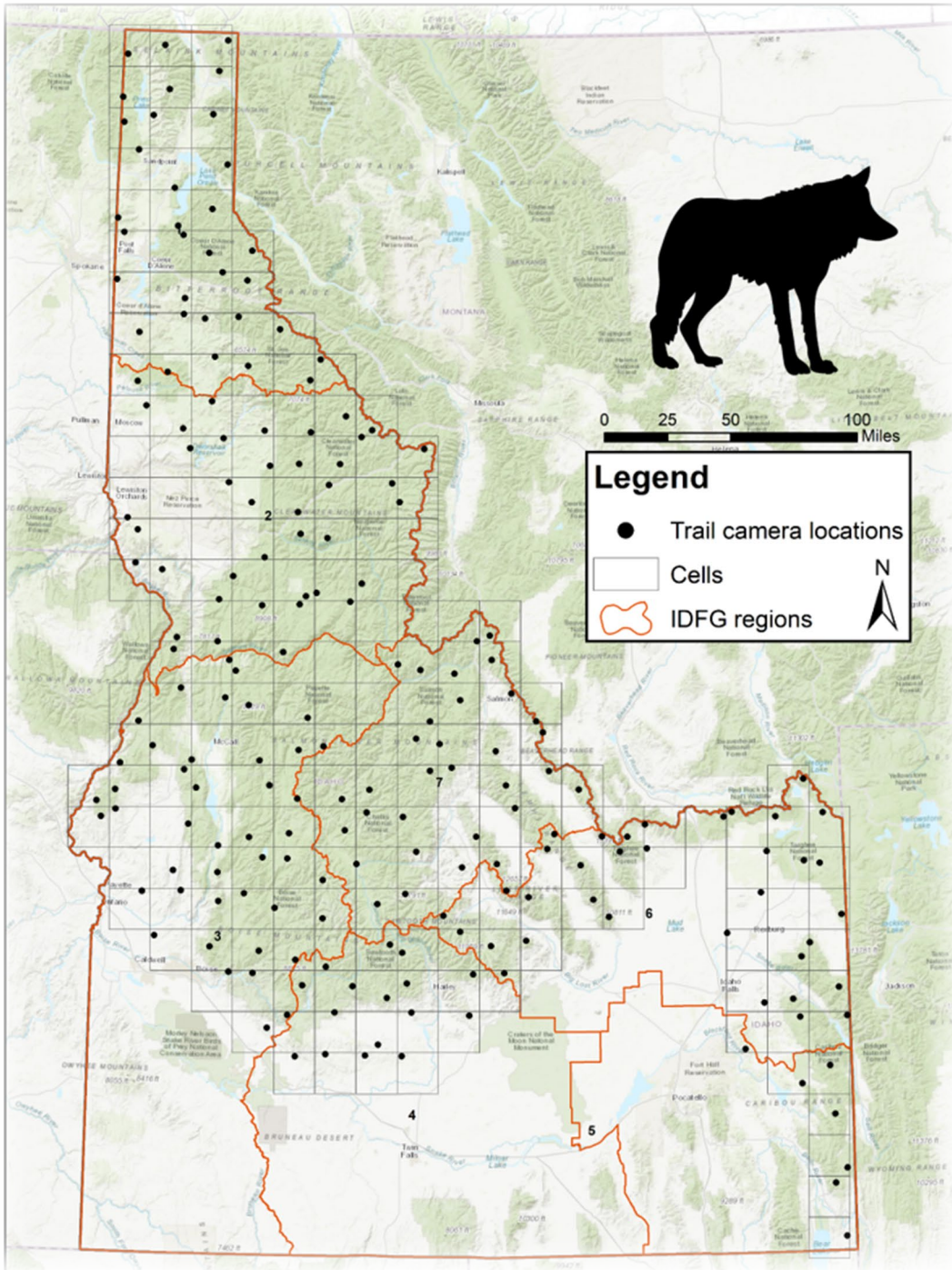


Figure 1. Sampling grid and remote camera locations used for 2016 – 2018 occupancy modeling.

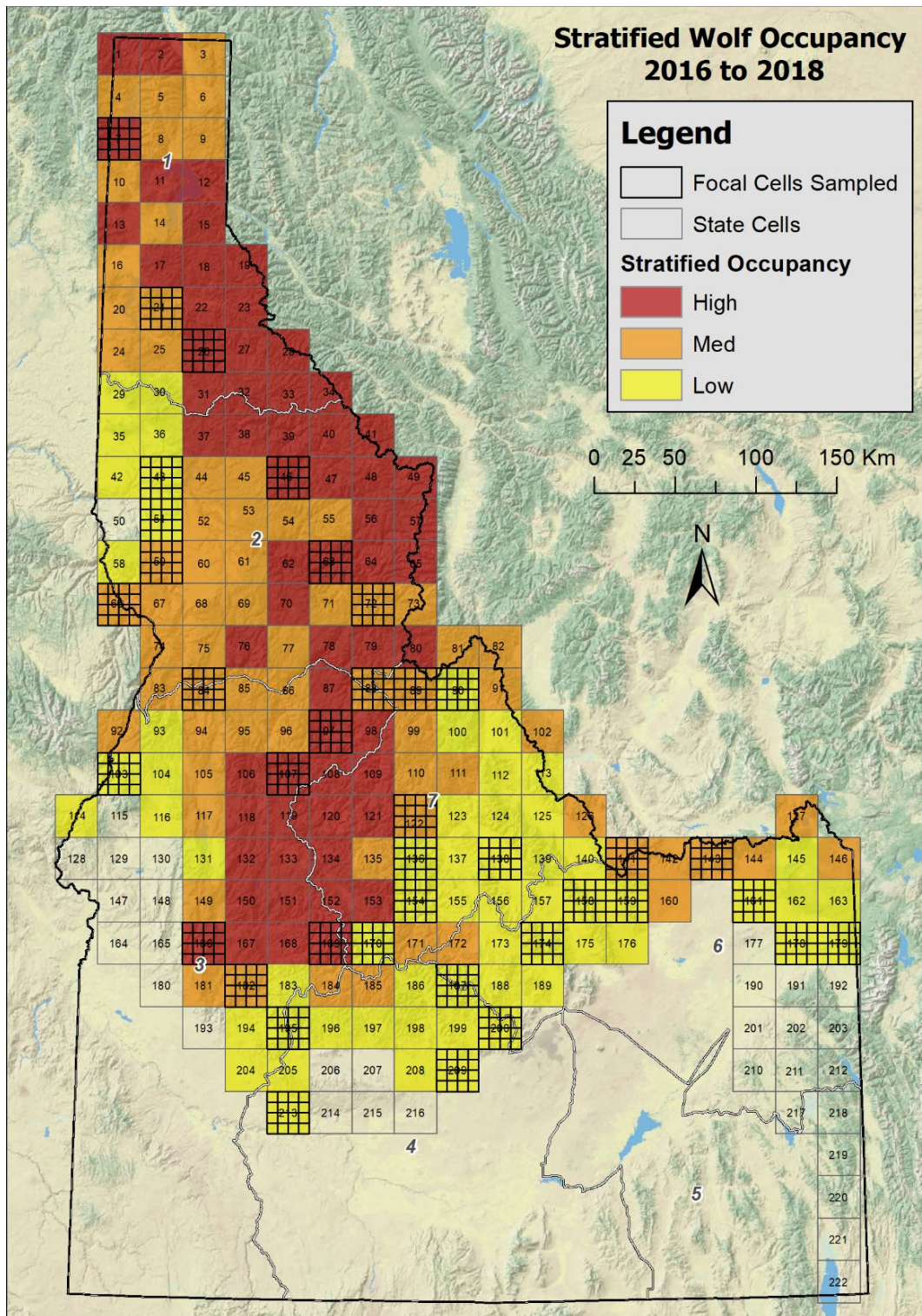


Figure 2. Example of stratified random sampling with focal cells nested within selected state cells. There are 16 focal cells within each state cell.

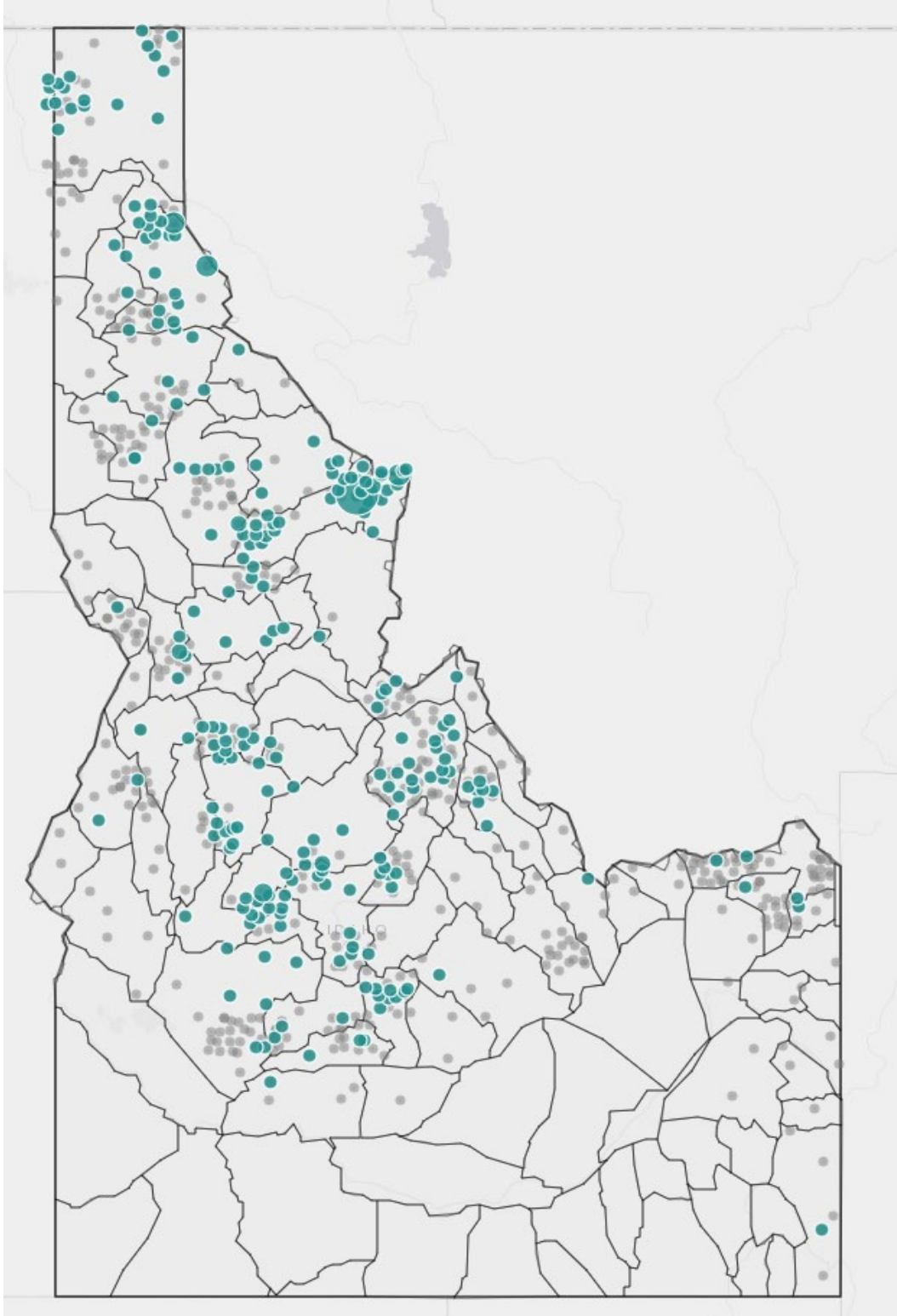


Figure 3. Comparative number of wolf pictures captured from statewide camera grid, 2019 summer wolf survey (blue circle means wolf pictures were taken, size of blue circle reflects relative number of pictures taken, gray circle means no pictures of wolves).

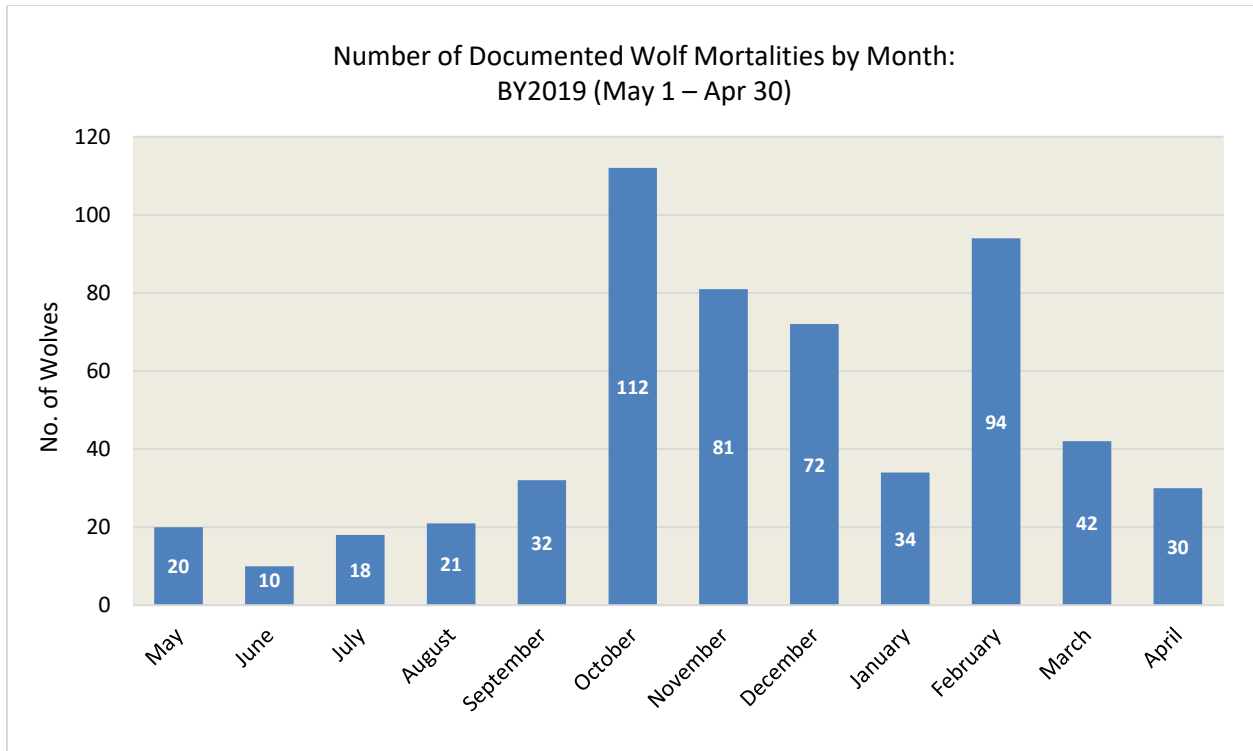


Figure 5. Distribution of wolf harvest (hunting and trapping) by month in Biological Year 2019 (May 1, 2019 – April 30, 2020).

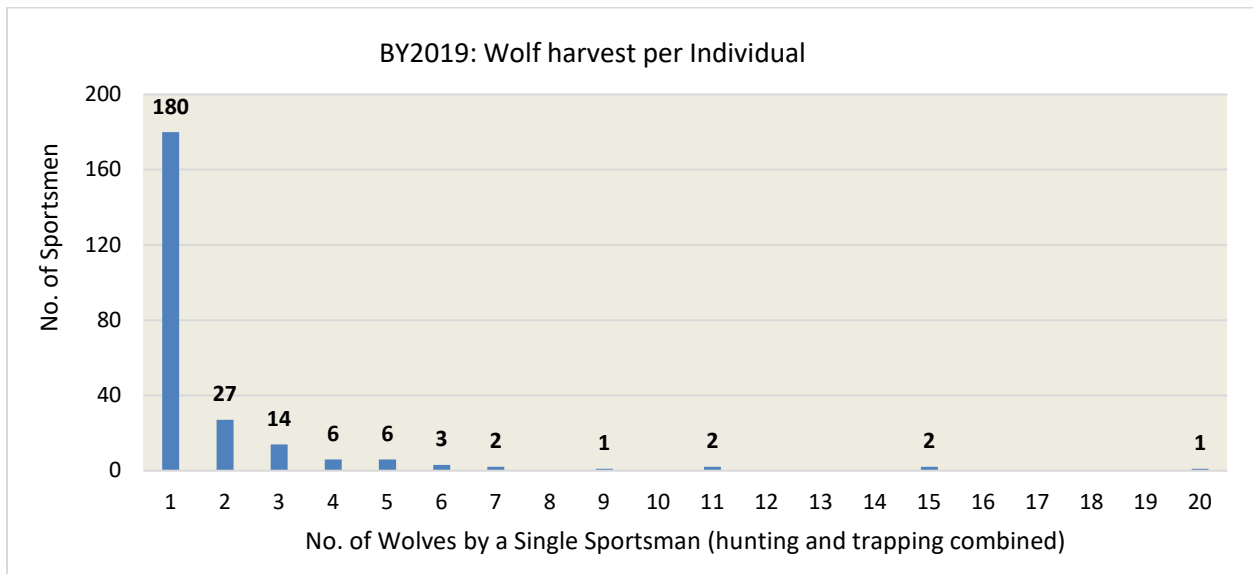


Figure 4. Distribution of wolf harvest (hunting and trapping) by individual in Biological Year 2019 (May 1, 2019 – April 30, 2020)

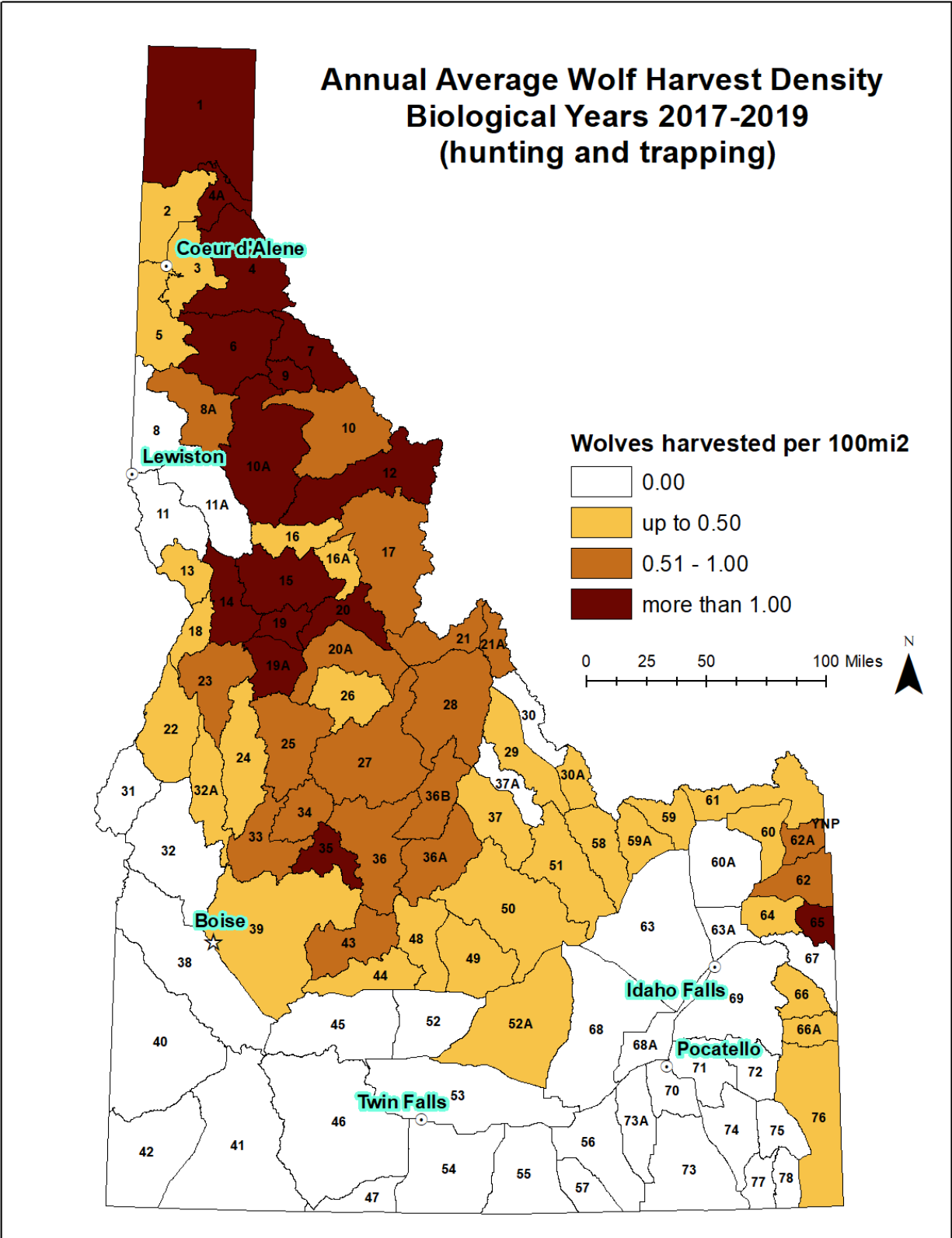


Figure 6. Distribution of documented wolf harvest density (hunting and trapping) by the total of wolves harvested per 100 mi² (by Game Management Unit) BY2017 – 2019 average.

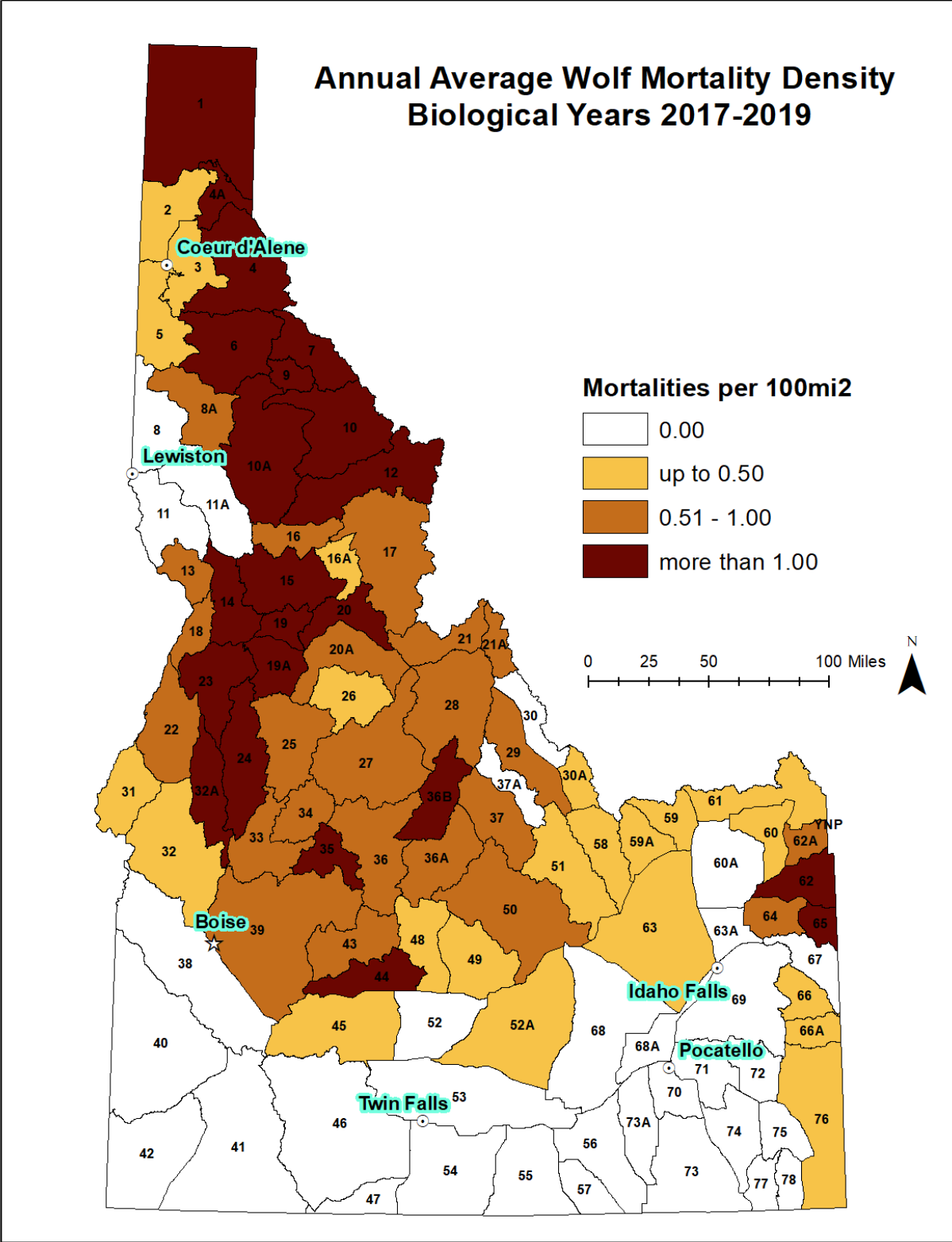


Figure 7. Average annual documented wolf mortality density (i.e., control action, harvest, roadkill), by the total per 100 mi² through BY2017 – 2019, by Game Management Unit.

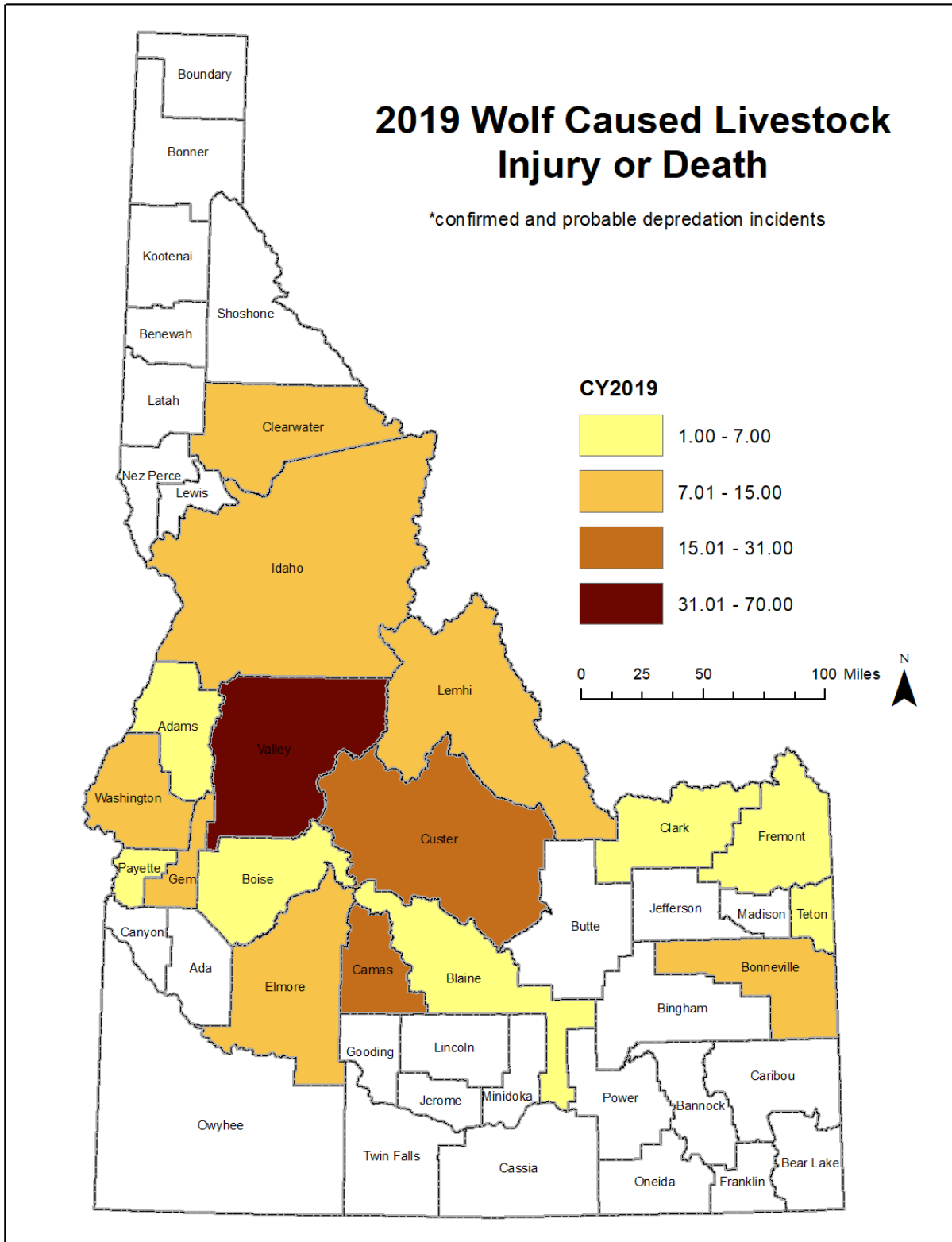


Figure 8. Total Wildlife Services confirmed and probable wolf-cause livestock mortalities by Idaho county for CY2019.