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Idaho
Furbearer Management Plan
2022–2027

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EXECUTIVE SUMMARY

Few species have played a greater role in shaping the American West than the animals harvested for their fur. The wild fur trade pushed the westward exploration of North America and established some of the first European outposts across the west. This history and heritage of furbearers and their place in shaping their physical and social environment remains present today in Idaho.

Idaho is home to 19 species of mammal representing seven taxonomic families that are or were harvested for their fur. The importance of these species is well documented and diverse. Many of these species are abundant in Idaho and valued as a furbearing resource by hunters and trappers. Their harvest provides a varied and unique suite of outdoor opportunities. North American beavers (*Castor canadensis*) and common muskrats (*Ondatra zibethicus*) shape aquatic and riparian ecosystems through their landscape manipulation and herbivory. Red fox (*Vulpes vulpes*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), American badger (*Taxidea taxus*), and other mesocarnivores prey on small mammals, helping keep these populations in balance. North American river otters (*Lontra canadensis*) serve as apex carnivores in aquatic systems. Many of the furbearing species are considered charismatic by the public and observations of them in the wild by Idahoans are cherished.

The Idaho Department of Fish and Game's (henceforth "Department") mission is to preserve, protect, perpetuate, and manage all Idaho's wildlife and provide for continued supplies of wildlife for hunting, fishing, and trapping. Species management plans, like this Furbearer Management Plan (henceforth "Plan"), help the Department identify and set priorities for fulfilling its mission related to these species. With over 30 years since the last plan, much has changed in regards to furbearer management, making this an opportune time to re-establish priorities for the furbearer program.

Through the development of this Plan, management needs were identified for individual species and the furbearer program as a whole. From this expansive list, a subset of management actions were selected as top priorities for the Plan period. These top priorities were then grouped into 4 categories: Harvest Management and Population Monitoring, Habitat Management, Data Management, and Outreach and Communication.

Harvest Management and Population Monitoring focus on maintaining furbearer populations across the state, providing hunting and trapping opportunity, and creating flexibility to address wildlife-human conflict. Species-specific priorities include developing tools to better guide harvest of bobcat and river otter. Further priorities include addressing information needs on the status and distribution of species with little data such as American ermine (*Mustela erminea*), long-tailed weasel (*Mustela frenata*), and western spotted skunk (*Spilogale gracilis*). To address these management actions the following strategies have been identified.

- Continue to monitor populations of furbearers and predatory wildlife through catch per unit effort data to inform harvest management and population status.

- Maintain the current season structure for the furbearers and predatory wildlife in this plan.
- Use existing bobcat harvest data to develop a Statistical Population Reconstruction (SPR) model to more accurately inform how potential changes in harvest affect bobcat populations.
- Upon development of the initial SPR model, identify what (if any) additional data or research components are needed to develop an approach to better manage bobcat harvest and begin addressing those data needs.
- Using the information gained from the SPR modeling and other efforts, work with stakeholders to explore what options exist for providing bobcat harvest opportunity.
- Update the original calculations of available habitat and potential density estimates of river otters, and identify what (if any) additional data or research components are needed in updating these estimates.
- Develop a monitoring framework to track broad changes in river otter population status at the regional scale.
- Work with stakeholders to explore what options exist for providing river otter harvest opportunity.
- Develop supplemental tools in the furtaker report form allowing trappers who harvest weasels to differentiate between the two species and provide harvest location data.
- Identify collaborative opportunities to collect information to inform the Department on the current distribution of American ermine, long-tailed weasel, and western spotted skunk.
- Explore the value of American ermine and long-tailed weasel occurrences from data collected in other forest carnivore sampling efforts to inform status and distribution.

Habitat Management priorities are species specific and rely on partnerships and data to drive successful outcomes. Opportunity exists to incorporate muskrat habitat needs into relevant Wildlife Management Area (WMA) planning activities with the potential to create more trapping opportunity and improve wetland habitat for waterfowl. Working with land management agencies to incorporate marten (*Martes americana; Martes caurina*) habitat needs are also prioritized as this species rely on connectivity of mature, mixed conifer forest. Lastly, translocating North American beaver as a habitat restoration tool has been growing in application across the West and has opportunity for practical application with the Department, various land management agencies, and private landowners. To address these management actions the following strategies have been identified.

- Develop a muskrat habitat needs document, particularly in relations to water level manipulation, to incorporate into relevant WMA planning and activities and when working with private landowners, where applicable.
- Work with land management agencies to incorporate marten habitat needs in their land management plans.
- Communicate the habitat needs of marten to promote connectivity of suitable habitat in relation to forest management activities and planning efforts.

- Identify what strategies maximize survival and success of translocated beaver.
- Explore tools and techniques to address beaver flooding through non-lethal mea

Data management priorities ensure the security and accessibility of the data used in the furbearer program is efficient and effective. While the current data storage approaches with furbearer harvest data have served the Department to this point, opportunity exists to improve and modernize this component of the furbearer program. Development of an online platform for trapping license holders to submit their mandatory furtaker report form will streamline this process and provide a user-friendly platform for trapping license holders. Transitioning data storage from a Microsoft Access database to a modern platform will make long-term storage more secure and allow for streamlined data analysis. When accessible, the online platform could directly incorporate the data entered by trappers into the data storage platform, significantly reducing valuable Department time and resources spent in manual entry and analysis. To address these management actions the following strategies have been identified.

- Develop an online platform for license holders to enter furtaker harvest data. This will provide better service to trapping license holders, speed up data processing, and provide more timely access to harvest data.
- Develop a new data management system for furbearer harvest data that addresses storage concerns, allows for the transfer of existing data to this system, and provides a streamlined way to incorporate data provided to the Department using the electronic furtaker harvest report form.

Finally, Outreach and Communication development exists as a crucial component of the furbearer program priorities by ensuring support and understanding for trapping as a constitutionally protected activity in Idaho. Though trapping provides a valued outdoor opportunity and serves many important purposes in wildlife management, it has poor public support amongst non-trappers. Research demonstrates that trapping stigma is primarily rooted in misinformation and providing the most basic facts on the role of trapping in modern day furbearer management can improve support. With changing demographics and a growing population in Idaho, addressing this communication need is of utmost importance to maintain support for trapping. To address these management actions the following strategies have been identified.

- Host AFWA's Trapping Matters Workshops in multiple locations across the state to allow for regional Department and sister agencies' employee participation.
- Promote the inclusion of trapping and wolf trapping education into new employee work plans, including front desk and administrative staff.
- Develop and implement a trapping related class for the Department's upcoming In Service Training School.
- Develop consistent talking points for Department staff to address commonly asked questions from the public to ensure consistent messaging and effective communication.

- Create and distribute seasonally appropriate social media and press releases. Address topics including: awareness of trapping seasons and regulations, benefits of trapping, reintroduction efforts that utilized trapping, and how to release your pet from a trap training.
- Include language related to roles of the public when encountering a trap or trapped animal on the landscape and the positive roles of trapping in all hunting regulation booklets.
- Provide hands on demonstrations for how to release your pet from a trap at rattlesnake avoidance dog trainings and other appropriate hunting and outdoor dog training events across the state.
- Attend trapping conventions to discuss key messages developed by AFWA and trapping Best Management Practices (BMP).
- Present to directors and member of various trappers associations the importance and implementation of key messaging and promoting of trapping BMP.
- Incorporate key messages communication and trapping BMP information into the Department's trapper education curriculum.

INTRODUCTION

Furbearers represent a diverse group of wildlife. Comprising seven different taxonomic families, these species are found in every ecotype of the state providing outdoor opportunity through hunting, trapping, and wildlife viewing while performing a variety of ecosystem services along the way. Across history, a uniting theme of this suite of species is pursuit for their fur in a wide array of garments for both fashion and function, hence the name "furbearers". The fur harvested from furbearers in Idaho may be utilized around the world through fur trade distribution; whether it is a hat in Texas, trim on a parka in the Canadian Arctic, or a garment of high fashion in Hong Kong.

Idaho is home to 19 species of mammal that are or have been harvested for their fur. The Idaho Department of Fish and Game (henceforth "Department") manages this group, in part, by their classification in Idaho Code. Idaho Code further specifies these species as furbearers, predatory wildlife, big game, or protected nongame.

Species classified as Furbearing Animals with an established harvest season include:

- American badger (*Taxidea taxus,* henceforth "badger")
- North American beaver (*Castor Canadensis,* henceforth "beaver")
- Bobcat (*Lynx rufus*)
- American marten (*Martes Americana,* henceforth "marten")
- Pacific marten (*Martes caurina,* henceforth "marten")
- American mink (*Neogale vison*; henceforth "mink")
- Common muskrat (*Ondatra zibethicus*, henceforth "muskrat")
- North American river otter (*Lontra Canadensis,* henceforth "river otter"), and
- Red fox (*Vulpes vulpes*)

Species classified as Furbearing Animals with a closed season include:

- Canada lynx (*Lynx canadensis*; also listed as threatened under the Endangered Species Act of 1973, as amended [ESA]; 16 U.S.C.1531 et seq.), and
- Fisher (*Pekania pennanti*; a Species of Greatest Conservation Need (SGCN) in the Idaho State Wildlife Action Plan (Idaho Department of Fish and Game 2017))

Several animals harvested for their fur are classified as predatory wildlife:

- Coyote (*Canis latrans*)
- American Ermine (*Mustela ermine*; henceforth "ermine")
- Long-tailed weasel (*Mustela frenata*)
- Northern raccoon (*Procyon lotor*)
- Striped skunk (*Mephitis mephitis*), and
- Western spotted skunk (*Spilogale gracilis*)

The last two species are the gray wolf (*Canis lupus*), classified as big game, and the wolverine (*Gulo gulo*), classified as Protected Nongame.

This furbearer management plan (henceforth "Plan") focuses on the fifteen species classified as furbearers with an established harvest season and predatory wildlife[1].

There are a variety of recreational opportunities provided by this list of furbearers and predatory wildlife. Trapping is a popular method of take for all species discussed and the only legal method of take for beaver, marten, mink, muskrat, and river otter. Hound hunting is a popular method of take for bobcats where reliable snow cover exists and to a lesser degree other furbearers and predatory wildlife. Predator calling is conducted for a variety of furbearers and predatory wildlife that can be hunted, and is especially popular with coyotes and red fox. Hikers and other outdoor enthusiasts appreciate viewing many of these species in the wild, often as an unexpected highlight while enjoying other outside activities.

Management of these species are primarily conducted through trapping and hunting. Their harvest serves a multitude of purposes. It provides a valued opportunity to pursue these species, enabling people to interact with a suite of wildlife that are often not encountered in other ways. Many of these species are relatively abundant and contribute to livestock depredation, damage to transportation and irrigation infrastructure, and can serve as sources of zoonotic diseases. Their harvest can aid in mitigating these negative interactions.

From a biological perspective, the data collected from the harvest of these species through trapping enables the Department to track the status of these species' populations. Anyone who purchases a trapping license in the state is required to submit a furtaker harvest report before they are allowed to purchase a trapping license for the next year. From this harvest report data, the Department is able to estimate total harvest, location of harvest, and track trends in populations through catch per unit effort data (CPUE). For the majority of these species, this serves as the primary data source to determine their status and trend.

The public who pursues these species, be it trapping or hunting, tend to be small in number but dedicated to these activities. A survey of trappers in the western U.S. identified that trappers spent an average of 45 days/season trapping (AFWA 2015), notably more days than people who hunted or fished. Interest in trapping has increased in Idaho. License sales have gone from approximately 1,000 licenses sold in the early 2000s to over 2,000 licenses in 2021 (Appendix A, Table 1). Non-resident participation with trapping is low, averaging approximately 1 to 2% of total license sales (Appendix A, Table 1). The increase in trapping license sales does not correlate with increased fur prices and is more likely attributable to a resurgence in interest in the outdoors coupled with an interest in trapping as a method of predator management.

Trapping tends to have the lowest public support when compared with other outdoor activities (Duda et al. 1998). This is generally rooted in the perception that trapping is cruel, inhumane, and results in high numbers of nontarget captures (B. White, personal communication, December 20, 2021). Across the country these perceptions are used to promote antitrapping

[1] *Management of Canada lynx, fisher, gray wolf, and wolverine are addressed in separate plans.*

legislation through ballot initiatives and bill submissions. Successful efforts to remove trapping as a management tool also served to undermine the legitimacy of state management agencies and have been used as a stepping-stone to attack other methods of take and wildlife management. As demographics change across the country and in Idaho, addressing these false perceptions will be a critical component of maintaining trapping as a management tool.

1990 FURBEARER MANAGEMENT PLAN GOALS AND ACCOMPLISHMENTS

The most recent furbearer plan developed by the Department was in 1990 (Will 1990). This plan identified 19 priorities for furbearer management, many of which are still relevant today. These 19 priorities can be grouped into five broad categories: Education and Outreach, Harvest Management and Population Monitoring, Habitat Management, Restoring Species Historic Range, and Regulatory Conflicts. Since development of the 1990 plan, the Department has made much progress towards addressing these issues. Below are the priorities of each category along with the Department's progress towards each goal.

Education and Outreach
Priorities: Develop a trapper education program and make this a mandatory education requirement to trap; promote the value and opportunities provided by furbearers and the role of trapping to the public; and address the negative perception of trapping by some members of the public.

- The Department developed and offers trapper education classes statewide. In 2018, this trapper education class became mandatory for anyone who purchased their first trapping license after July 1, 2011. This educational opportunity promotes an understanding of the regulations and ethics associated with trapping.
- Promoting the value of furbearers and addressing negative perceptions associated with trapping is an ongoing issue. The Department has addressed outreach as specific needs arose and has identified Outreach and Communication as a continued priority in this Plan.

Harvest Management and Population Monitoring
Priorities: Develop reliable and cost-effective management criteria for guiding harvest of furbearers; improve and streamline the mandatory furtaker harvest report; and dedicate funding to implement a statewide furbearer management program.

- In 2001, the Department modified furtaker report forms to collect species-specific CPUE data. Since this change, the data collected from this effort serves as the primary data source used to track trends in furbearer populations.
- In 2018, the Department created and filled a Furbearer Staff Biologist position with an associated budget to develop furbearer management in the state.

Habitat Management
Priorities: Analyze furbearer impact and use as a management tool when habitat alterations are considered, land management plans are reviewed, and loss of wildlife habitat is assessed.

- Furbearers, particularly those identified as Species of Greatest Conservation Need (SGCN) status, are incorporated in all relevant habitat planning and review.
- The use of beaver as a habitat management tool is growing in the Department with five regions currently using this approach.

Restoring Species Historic Range

Priorities: Ensure occupation of suitable habitat for fisher, beaver, and river otter through translocation and further build partnerships with other state agencies by providing live fisher, marten, and river otter surplus for species restoration efforts.

- River otter are considered well distributed across the state in available habitat.
- River otter have been provided to other states to aid in restoration efforts.
- Marten were re-established to the Bear River Mountains of southeastern Idaho.
- Beaver have been translocated across the state to address habitat goals.

Regulatory Conflicts

Priorities: Clarify for the trapping community and expand regulatory oversight of bait use, modify trap-labeling requirements, and change how the Department addresses capture of non-target species.

- Regulations associated with bait have been expanded to provide clarification and opportunities for bait use.
- Trap labels have been updated in regulation to accept a unique trapper ID number in lieu of a personal name and address.

TRAPPER OPINION SURVEY

A fundamental component of wildlife management is to understand the needs and preferences of relevant constituents. Development of the Plan gave the Department an opportunity to survey Idaho trapping license holders on their views of management and trapping opportunity. The use of standard survey research methodology gather opinions from trappers allowed the Department to collect data from a representative sample of its constituency that is otherwise not possible via a season setting process. In September 2021, the Department mailed all trapping license holders from the past five years (n = 4,305 aper questionnaire booklet and received 1,600 returns (37% response rate). The overall margin of sampling error for the trapper opinion survey was ±2.5% (at a 99% confidence level).

Results indicate Idaho trappers are predominantly white males of an average age of 51 years old (Table 1a). Length of residency varied, but most respondents indicated they have been a resident of Idaho for more than 20 years (Table 1b). The northern and western portions of Idaho were reported as the state's most active trapping areas, primarily in the Southwest (24.5%) and Panhandle Regions (23.2%), with participation in other regions between 7 to 15% based on respondent self-reporting (Table 2).

Table 1a. Trapper Ages.

Age	Respondents	%
18-24 yr	55	4.6
25-34 yr	144	12.0
35-44 yr	232	19.3
45-54 yr	215	17.8
55-64 yr	279	23.2
65-74 yr	212	17.6
75+ yr	68	5.6

Table 1b. Trapper Residency

Residency	Respondents	%
1-5 yr	173	15.1
6-10 yr	74	6.5
11-20 yr	86	7.5
21-30 yr	160	14.0
31-40 yr	181	15.8
41-50 yr	192	16.8
50+ yr	278	24.3

Table 2. Self-reported primary trapping region in Idaho, USA among respondents

Region	Respondents	%
Panhandle	279	23.2%
Clearwater	183	15.2%
Southwest	295	24.5%
Magic Valley	159	13.2%
Southeast	159	13.2%
Upper Snake	173	14.4%
Salmon	90	7.5%

Terms of how long respondents have trapped furbearers in Idaho, 48.4% reported trapping for the past 1 to 5 years and 36.6% reported trapping for more than 10 years. The bimodal distribution suggests trapping license holders consist of both participants who are relatively new to the activity and those who are long-term dedicated participants. These data are indicative of an attrition or "churn" rate that is common among hunting, trapping, and fishing participants.

The primary goal of the trapper opinion survey in relation to the Plan was to identify species that are commonly targeted, trappers "top-three" species of importance, and the motivations for pursuing those species. Of the 15 furbearer species eligible for trapping in Idaho, the survey identified coyote, bobcat, and beaver as both the most targeted and most important species to Idaho trappers (Table 3). Respondents reported the recreation/pleasure and challenge of trapping as their primary motivations followed by motivations related to their desire to help manage wildlife and control predators (Table 4).

After ranking their top-three species, respondents were asked how satisfied they have been with their trapping experience, their perception of a target species population status, and the season length they prefer for that species. Here, the top-three species—coyote, bobcat, and beaver—are reported.

For respondents who ranked coyote in their top-three, satisfaction averaged 2.9 on a 4-point rating scale, indicating general satisfaction with their trapping experience. Population status averaged 3.0 on a 5-point rating scale, indicating no perceived change to coyote populations. Approximately 93% of respondents indicated the current coyote season length (i.e., year-round) is "just right."

For respondents who ranked bobcat in their top-three, satisfaction averaged 2.6 on a 4-point rating scale, indicating general satisfaction with their trapping experience. Population status averaged 3.0 on a 5-point rating scale, indicating a perception between less game and no perceived change to bobcat populations. Approximately 65% of respondents indicated the current bobcat season length is "just right", however, approximately one third of respondents wished for a longer season with an earlier start.

For respondents who ranked beaver in their top-three, satisfaction averaged 3.0 on a 4-point rating scale, indicating general satisfaction with their trapping experience. Population status averaged 3.0 on a 5-point rating scale, indicating no perceived change to the beaver populations. Approximately 85% of respondents indicated the current beaver season length is "just right".

Table 3. Most important furbearer species to license holders from the 2021 Department Trapper Opinion Survey.

Species	n	%
Coyote	758	23.6
Bobcat	585	18.2
Beaver	443	13.8
Gray wolf	324	10.1
Muskrat	255	7.9
Red fox	237	7.4
Marten	172	5.3
Raccoon	164	5.1
Mink	89	2.8
River otter	70	2.2
Badger	54	1.7
Striped skunk	45	1.4
Long-tailed weasel	9	0.3
Short-tailed weasel	8	0.2

Table 4. Motivations for trapping in Idaho, USA

	Mean	SD	Frequency (%)				
			Not At All	Slightly	Somewhat	Largely	Very Much
For recreation/pleasure	4.1	1.0	3.5	3.8	15.0	34.7	43.0
For the challenge	3.9	1.1	6.3	4.4	21.9	32.2	35.2
To control predators	3.8	1.3	9.5	6.5	18.2	23.4	42.4
To help manage wildlife	3.7	1.1	4.9	8.0	25.8	30.3	31.0
It is part of my lifestyle	3.7	1.2	7.4	8.5	22.9	27.9	33.2
To control nuisance wildlife	3.6	1.3	9.2	12.7	22.0	20.6	35.5
To protect property	3.0	1.4	20.0	14.6	25.9	20.3	19.1
For disease control	2.4	1.3	36.6	19.2	23.4	10.6	10.2
To make clothing/fur	2.1	1.2	43.1	22.1	21.2	9.3	4.4
To make income	2.0	1.1	42.6	26.1	20.9	7.2	3.2
To take a trophy	2.0	1.3	53.3	15.1	16.6	8.0	7.0
To provide food	1.4	0.8	76.7	13.3	6.9	2.4	0.7

Response scale: not at all (1), slightly (2), somewhat (3), largely (4), very much (5)

For Idaho trappers, access to public lands and all three of the commonly used trap types (footholds, bodygrip traps, and snares) are important in providing opportunity. For the top-three species, most respondents indicated they primarily use public land to trap (coyote = 70%; bobcat = 81%; beaver = 73%) but private land was used at a high rate, too (coyote = 56%; bobcat = 50%; beaver = 60%). Footholds and to lesser extent snares were used for coyote and bobcat, while bodygrip traps were primarily reported for beaver.

To understand trapper support for two commonly used management tools (translocation and temporary closures) respondents were asked to indicate their support for both under certain scenarios. Between 61-69% of respondents were supportive or very supportive of translocation to restore a species to its original range, provide additional harvest opportunity, or prevent a species from disappearing in Idaho. Similar support was demonstrated for closing areas to harvest when the goals were to increase a species population or introduce it to its former range.

Lastly, participants were asked about their knowledge and support of Trapping Best Management Practices (BMPs). In the early 1990's the European Union proposed to ban the import of any wild fur from a country that allowed the use of "conventional leg hold traps". If passed, this would have had strong negative consequences on fur harvest in the U.S. Subsequently, the U.S. agreed to identify traps that met agreed humane standards and improve compliance with trap use. The Association of Wildlife and Fisheries Agencies (AFWA), the U. S. Department of Agriculture Animal and Plant Health Inspection Service-Wildlife Services (Wildlife Services), the National Trappers Association, the Furtakers of America, and various state agencies led this effort. After 20 years of research, current trapping BMPs are available for 22 species of furbearer in North America.

When asked about their knowledge of trapping BMPs and use of BMP traps, 83% of respondent stated they were familiar with trapping BMPs and 92% said most of their traps met BMP guidelines. Of respondents not familiar with BMPs, 49% indicated that access to BMP information would aid their use of BMP traps on their trapline.

DEPARTMENT DIRECTION FOR FURBEARER MANAGEMENT 2022-2027

This plan investigates the management and conservation needs of 15 species that differ vastly in their ecology and management status. To effectively utilize the limited resources of the Department, the various needs identified for each of these species and the furbearer program as a whole must be prioritized. Through this plan development period, its contributors, along with input from various user groups, sister agencies, and the public, have developed a prioritized list of needs. Some priorities are species-specific, whereas others address the furbearer program as a whole. These priorities are grouped into four broad categories: Harvest Management and Population Monitoring, Habitat Management, Data Management, and Outreach and Communication. The following sections provide the background and specific priorities identified within each category.

Harvest Management and Population Monitoring

A guiding charge for the Department is to preserve, protect, perpetuate, and manage all Idaho's wildlife and provide for continued supplies of hunting, fishing, and trapping. When it comes to meeting this charge for furbearers and predatory wildlife, the level of active management needed by the Department for each species varies. Several species in this Plan are habitat generalists and exhibit high fecundity rates. These factors, combined with a low statewide harvest suggests that additional Department effort in population monitoring is not needed to inform harvest management.

To monitor the status of furbearers and predatory wildlife, the Department relies heavily on the CPUE data derived from furtaker harvest report forms. At the end of each season, all licensed trappers are required to fill out and submit the furtaker harvest report form provided by the Department in the form of a mailed notecard. By submitting the form, trapper's document the species pursued via trapping and hunting, the number harvested, number of traps used, and days they pursued which species in which counties. The notecard also asks trappers to identify "nontarget species" captured, which refers to animals captured when the trapping season for the species is closed. From this information, the Department can calculate the number of trap nights required to capture a single animal of a given species. With the assumption that more trap nights are required to capture a single animal of a given species when populations are low and less trap nights when populations are high, this metric can be tracked over time to monitor trends in population.

This type of effort-based data is used throughout wildlife management (Allen et al. 2020). However, there are limitations in this approach. For CPUE to perform at its full potential, the factors that go into trapping the animal must remain constant. Factors that could influence trapping effort not tied to changes in animal populations may include weather, regulation changes, fuel prices, and fur prices. Efforts have been made to control for these variables using a statistical approach with limited success. While CPUE remains a useful tool for many species, several species have been identified through this planning process that require additional

information. These species are bobcat, river otter, ermine and long-tailed weasel, and the western spotted skunk.

Bobcats are a popular furbearer pursued by trappers and hunters and the most valuable furbearer on a per pelt basis in the state. While they are found throughout much of Idaho, bobcats tend to exist in lower densities than other similar sized carnivores. Within the bobcat hunting and trapping community, a strong interest exists to provide additional harvest opportunity and structure bobcat seasons to provide more overlap with other furbearers. However, the current monitoring program limits our ability to make informed decisions on these proposed changes.

River otters are currently managed under a framework that involves both personal and regional quotas, the only furbearer species with this level of harvest management. The original season framework was created by estimating potential river otter populations in the state through modeling available habitat and using density estimates derived from work in the 1980s to extrapolate potential population size. From this potential population size, a conservative allowable harvest estimate was determined. While this effort provided a solid foundation to guide initial river otter harvest, advances have been made in our understanding of the species and its habitat since its initial season 20 years ago. Interest exists from the trapping community to provide additional opportunity to harvest otters, but due to the small overall statewide harvest (approximately 160 animals annually) CPUE has limited value in tracking population trends of river otter to inform harvest seasons.

An additional consideration for increasing our level of monitoring efforts for both bobcat and river otter is the federal nexus regulating the trade of their pelts. Both species fall under the Convention on International Trade of Endangered Species (CITES) Appendix II. River otter and bobcat are similar in appearance to other imperiled species of felid and otter in other parts of the world. To ensure that these imperiled species are not laundered into the legal bobcat and river otter trade on the international market, the US Fish and Wildlife Service, (henceforth, “the Service”) regulates the exportation of bobcat and river otter through a CITES tagging export program. Implementation of this CITES program is managed on the ground by state wildlife agencies. This CITES export program has been challenged multiple times by anti-trapping and other litigation groups in an effort to end the export of these species pelts. Losing this export status would largely eliminate the trade in both species. Improving the monitoring and harvest management of both species, especially in light of any changes to harvest, would strengthen the furbearer management program against attacks on this sustainable use of wildlife.

For ermine, long-tailed weasel, and the western spotted skunk, harvest and interest from the trapping community is low. These species are usually harvested as secondary targets while pursuing other furbearers. Recent range wide studies have suggested that the population of both weasel species have exhibited recent declines, particularly the long-tailed weasel (Jachowski et al. 2021). Across its range in the United States, the long-tailed weasel is listed as vulnerable or greater in 13 states (Nature Serve 2021). The western spotted skunk has been identified as a species of greatest conservation need in multiple states and and in 2012, the US

Fish and Wildlife Service found a petition to list its eastern counterpart, the plains spotted skunk (*Spilogale putorius interrupta*), as endangered or threatened under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) may be warranted (Endangered and threatened wildlife . . . 2012). Across the conservation community, there has been increasing attention to the status of these small carnivores. In Idaho, little information exists on the status and distribution of these three species. Improving our understanding of their status and distribution in Idaho will be valuable when informing growing concerns associated with their status.

Harvest Management and Population Monitoring Direction

Management Direction – The Department will continue to provide a diverse suite of harvest opportunities and provide ample flexibility to address wildlife-human conflict with these species.

Strategy: Continue to monitor populations of furbearers and predatory wildlife through CPUE data to inform harvest management and population status.

Strategy: Maintain the current season structure for the furbearers and predatory wildlife in this plan.

Management Direction – The Department will develop tools to better guide bobcat harvest management to allow for ample harvest opportunity and increased season flexibility while ensuring harvest levels are sustainable.

Strategy: Use existing bobcat harvest data to develop a Statistical Population Reconstruction (SPR) model to more accurately inform how potential changes in harvest affect bobcat populations.

Strategy: Upon development of the initial SPR model, identify what (if any) additional data or research components are needed to develop an approach to better manage bobcat harvest and begin addressing those data needs.

Strategy: Using the information gained from the above two strategies, work with stakeholders to explore what options exist for providing bobcat harvest opportunity.

Management Direction – The Department will develop tools to strengthen the harvest management of river otters.

Strategy: Update the original calculations of available habitat and potential density estimates of river otters using the best available data.

Strategy: Develop a monitoring framework to track broad changes in river otter population status at the regional scale.

Strategy: Using the information gained from the above two strategies, work with stakeholders to explore what options exist for providing river otter harvest opportunity.

Management Direction – The Department will gather information to inform the status and distribution of ermine, long-tailed weasel, and western spotted skunk.

Strategy: Develop supplemental tools in the furtaker report form allowing trappers who harvest weasels to differentiate between the two species and provide harvest location data.

Strategy: Identify collaborative opportunities to collect information to inform the Department on the current distribution of ermine, long-tailed weasel, and western spotted skunk.
Strategy: Explore the value of ermine and long-tailed weasel occurrences from data collected in other forest carnivore sampling efforts to inform status and distribution.

Habitat Management
The Department directly manages habitat on its Wildlife Management Areas (WMAs) as well as provides technical and financial assistance to land management agencies and private landowners to incorporate wildlife needs into their management activities. It additionally provides important review through the technical assistance program regarding how activities on the landscape may impact wildlife resources. While many species of furbearers are considered habitat generalists, some have narrower habitat requirements and/or are more directly impacted by land management actions than other species.

Muskrats are the third popular furbearer in the state in terms of trapper participation (Appendix A, Table A-3). Muskrats additionally have the ability to shape wetland ecosystems by their herbivory, and maintaining muskrat populations in wetlands have been demonstrated to be beneficial to waterfowl and waterbirds (Bishop et al. 1979, de Szalay and Cassidy 2001). With their popularity amongst trappers and landscape-level effects on wetlands, promoting muskrats has the ability to provide multiple benefits.

Both marten species in Idaho are associated with mature conifer forest, with canopy cover exceeding 50%, and complex horizontal forest structure to provide habitat for prey (Andruskiw et al. 2008). Because of this habitat requirement, marten are susceptible to habitat loss and fragmentation at the landscape-scale (Soutiere 1979, Thompson 1994, USFWS 2015). Maintaining forest connectivity in relation to habitat loss due to factors such as timber harvest and wildfires is important to ensure marten populations remain well represented across the state.

The ability of beaver to manipulate their habitat is impressive. Their manipulation of water in riparian systems can increase instream and riparian habitat quality, increase forage for a variety of wildlife species, and make stream flow more resilient to annual changes in precipitation (Bouwes et al. 2015). Within the Department, beaver mediated habitat restoration has been identified as a key strategy in the State Wildlife Action Plan, is a programmatic priority in the Diversity Program, and is an important tool in the Habitat Program. However, several needs exists to improve the Department's use of beaver as a habitat improvement tool. Science guiding how to improve the likelihood of the survival and success of translocated beavers is lacking. Also, the use of non-lethal tools to address beaver damage and manage their presence on the landscape, can be useful when using beaver as a restoration tool, but knowledge and experience implementing these practices is lacking in the Department.

Habitat Management Direction

Management Direction – The Department will promote the incorporation of habitat management practices to promote muskrat populations.

> **Strategy:** Develop a muskrat habitat needs document, particularly in relations to water level manipulation, to incorporate into relevant WMA planning and activities and when working with private landowners, where applicable.

Management Direction – The Department will work with land management agencies to incorporate marten habitat needs in their land management plans.

> **Strategy:** Communicate the habitat needs of marten to promote connectivity of suitable habitat in relation to forest management activities and planning efforts.

Management Direction – The Department will address information needs and serve as a potential funding source related to beaver mediated habitat restoration.

> **Strategy:** Identify what strategies maximize survival and success of translocated beaver.
> **Strategy:** Explore tools and techniques to address beaver flooding through non-lethal means.

Data Management

A cornerstone of furbearer management in Idaho is data collected from the mandatory furtaker harvest report form. Currently, this form is mailed to trapping license holders to be returned to the Department and manually entered. Historically, license holders could enter their trapping harvest information online, however this option was suspended. The data is currently stored in a Microsoft Access database, but should be transferred to and managed from a more secure platform.

Data Management Direction

Management Direction – The Department will update, streamline, and strengthen its collection and storage of furbearer harvest data.

> **Strategy:** Develop an online platform for license holders to enter furtaker harvest data. This will provide better service to trapping license holders, speed up data processing, and provide more timely access to harvest data.
> **Strategy:** Develop a new data management system for furbearer harvest data that addresses storage concerns, allows for the transfer of existing data to this system, and provides a streamlined way to incorporate data provided to the Department using the electronic furtaker harvest report form.

Outreach and Communication

Trapping serves many important roles in wildlife management. It is a regulated method of take that has a dedicated user group, and provides a unique outdoor opportunity. For several species of wildlife, this is the only allowable method of take. The skill sets developed by trappers are utilized to capture wildlife for research and translocations. The data collected from trappers is used by the Department to track trends in populations, and serves as the only data

source available for multiple species. Trappers also often address wildlife nuisance problems in their community. In a 2015 nationwide survey of trappers, 54% of Idaho trappers reported having been contacted to remove nuisance wildlife (AFWA 2015). In some instances, often in rural communities, trapping continues to provide an important form of seasonal income.

Despite the many important roles trapping plays in modern life, it is poorly understood by the public and tends to have the lowest public support when compared to other outdoor activities (Duda et al. 1998). Nationwide, this negative perception has led to citizen-based initiatives targeting trapping. Currently, ten states (five of them western) have passed legislation severely restricting trapping or making the activity illegal. Additionally, multiple other states have recently faced petitions and ballot initiatives to severely restrict trapping including Montana, Oregon, Arizona, and Colorado. Consensus among wildlife professionals is this push to eliminate trapping on the landscape will continue (AFWA FCTWG 2021).

Negative connotations with trapping are often associated with limited understanding of the role trapping plays in modern day wildlife management and the sustainable use of wildlife (AFWA 2001). In a large, nationwide effort to survey perceptions of trapping, AFWA found 59% of respondents disapproved of the activity when no context was provided. However, approval rose to 67% amongst the same respondents when trapping was conducted for reasons such as population management, addressing wildlife conflict, or for biological study (AFWA 2001). A single piece of information providing context for the role of trapping had a strong impact on survey participants, suggesting these negative perceptions were not strongly held.

This perception is not unique to the public, but also found among conservation professionals. A survey of 1,000 members each of the Wildlife Society, American Fisheries Society, North American Wildlife Enforcement Officers' Association, and the Society for Conservation Biologist was conducted addressing a variety of conservation related issues, including whether or not to outlaw foothold traps. Forty-six percent (46%) of respondents favored their discontinuation (Muth et al. 2006). Reasons listed for outlawing foothold traps included trapping causing unnecessary pain or stress, is a danger to nontargets, and is without use as a management tool (Muth et al. 2006). These views, and their strength, are likely rooted in the same limited understanding found in the general public. While this survey does not specifically reflect the Department, the overall trend suggests that even wildlife professionals are unfamiliar with the tools used in trapping and the role of trapping in wildlife management.

In Idaho, trapping, along with hunting and fishing, is protected in the state constitution, demonstrating Idahoans' value for these outdoor activities. However, this does not eliminate the need to promote a better understanding of trapping and the important role it plays in wildlife management within the Department, our constituents, and the larger public. To address this common need amongst state agencies, AFWA's US Furbearer Conservation Technical Working Group has collaborated with social scientists and communication specialists in developing a Communication Strategy for Trapping and Furbearer Management Document (AFWA 2019). Using this document as a guide, we have identified several areas to promote an

awareness of trapping and improve our messaging and communication regarding this topic over this Plan's timeframe.

Outreach and Communication Direction

Management Direction – The Department will strengthen its internal awareness of: 1) the mechanics of trapping, 2) its role in wildlife management, and 3) communication strategies to improve public understanding of trapping and trapping-related issues.

Strategy - Host AFWA's Trapping Matters Workshops in multiple locations across the state to allow for regional Department and sister agencies' employee participation.

Strategy - Promote the inclusion of trapping and wolf trapping education into new employee work plans, including front desk and administrative staff.

Strategy – Develop and implement a trapping related class for the Department's upcoming In Service Training School.

Strategy – Develop consistent talking points for Department staff to address commonly asked questions from the public to ensure consistent messaging and effective communication.

Management Direction – To increase awareness and reduce user conflict, the Department will develop and provide outreach on trapping and the role of trapping in wildlife management to hunters, anglers, and other outdoor recreation groups.

Strategy – Create and distribute seasonally appropriate social media and press releases. Address topics including: awareness of trapping seasons and regulations, benefits of trapping, reintroduction efforts that utilized trapping, and how to release your pet from a trap training.

Strategy – Include language related to roles of the public when encountering a trap or trapped animal on the landscape and the positive roles of trapping in all hunting regulation booklets.

Strategy - Provide hands on demonstrations for how to release your pet from a trap at rattlesnake avoidance dog trainings and other appropriate hunting and outdoor dog training events across the state.

Management Direction – Work with state trapping associations to improve communication on the role and value of trapping with other user groups. As a primary user group of furbearers, trappers are important ambassadors of this activity and are strong stakeholders in furbearer management. Opportunity exists to improve upon how trapping organizations communicate with larger audiences.

Strategy - Attend trapping conventions to discuss key messages developed by AFWA and trapping Best Management Practices (BMP).

Strategy - Present to directors and member of various trappers associations the importance and implementation of key messaging and promoting of trapping BMP.

Strategy - Incorporate key messages communication and trapping BMP information into the Department's trapper education curriculum.

SPECIES ACCOUNTS

American Badger

The badger is a semi-fossorial mustelid that can live from below sea level to elevations of 3,600 m. Badgers prefer open grasslands, prairies, cropland, parklands, and mountain meadows associated with soils conducive to digging burrows. While badgers occur throughout Idaho, they are more common in the southern portions of the state and are relatively rare in the north (Figure 1).

Home range size can vary widely based on differing habitat types and prey abundance. In British Columbia, Hoodicoff (2009) found badgers had a mean home range size of 78.6 km^2. In southwestern Idaho, Messick and Hornocker (1981) found badgers had home range sizes of 0.9 to 34.3km^2. Idaho specific density information is lacking, however studies of badgers in other parts of the western US estimate densities at 6 individuals/km^2 and male home ranges tend to overlap multiple female home ranges during the breeding season (Goodrich and Buskirk 1998, Messick and Hornocker 1981).

Badgers are opportunistic carnivores that prefer small mammals, such as mice, ground squirrels, and voles. Nevertheless, multiple food habit studies have documented a wide array of food items including small birds, waterfowl, eggs, upland birds, arthropods, and animals as large as marmots. Badgers are also known to scavenge on carrion from larger ungulates.

Breeding season for badgers is late June through August. Males do not reach sexual maturity until their second year, whereas females can breed their first year. Badgers have delayed implantation which occurs December to early February, with an average of 1.7 kits born in late March to early May (Messick and Hornocker 1981). Average lifespan is 8 to 10 years with individuals documented to 14 years of age (Messick and Hornocker 1981). Young generally disperse at 4 to 5 months of age.

Mortality and Harvest

Human activities (e.g. vehicle collision, trapping, and shooting) are a leading cause of mortality with badgers. Adult badgers have very few natural predators. In a mark-recapture study in southwest Idaho, cause of mortality was determined for 51 badgers; two were killed by eagles, one by a canine predator, and two starved. The remaining badger mortalities were human caused (Messick and Hornocker 1981). In a summary of disease in badgers, Quinn et al. (2016) identified a number of internal parasites that badgers can be afflicted with including roundworms, tapeworms, and flukes. Still, parasite loads are not often associated with mortality.

In Idaho, badgers are classified as a furbearer and can be hunted and trapped year-round with no personal quotas. CPUE ranges from 5.5 to 17.2 per 100 trap nights (Figure 2). Annually, the average number of trappers pursuing badgers is 63, with a high of 81 in 2014 (Appendix A, Table A-2). Badgers are typically harvested as a secondary target while pursuing other species

such as coyote and bobcat. Overall, reported harvest of this species is low, with an average reported harvest of 250 badgers annually (Appendix A, Table A-1).

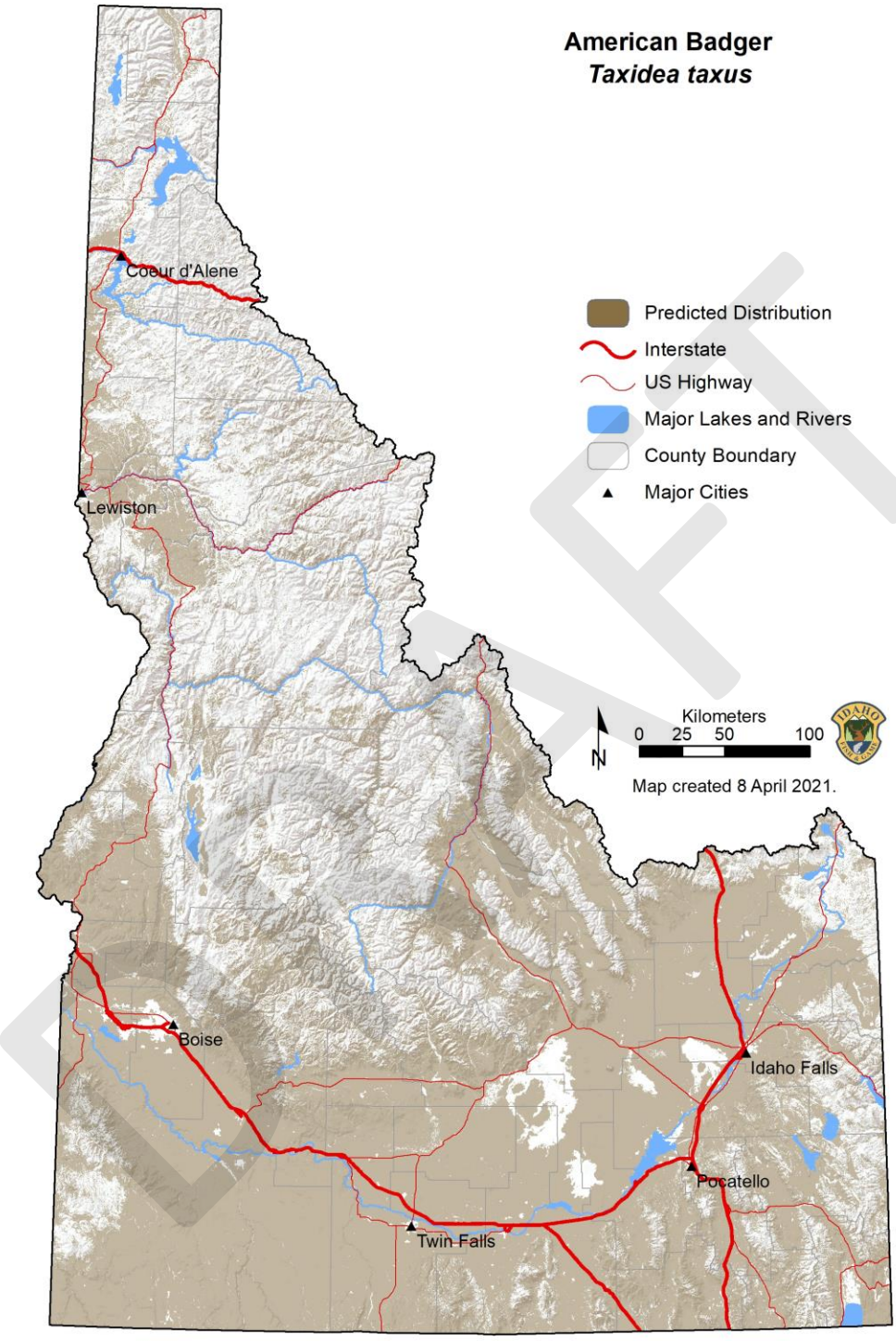

Figure 1. The predicted distribution of American badgers in Idaho, USA.

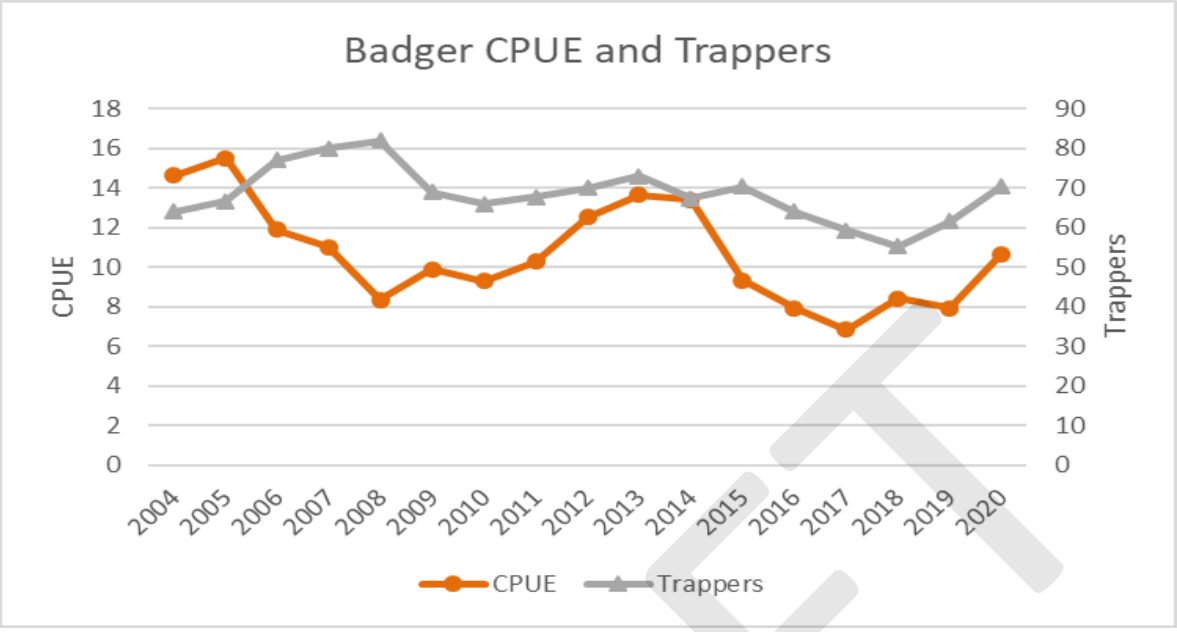

Figure 2. The three-year rolling average of annual badger catch per unit effort estimate, and the number of badger trappers in Idaho, USA.

Wildlife-Human Conflict

The primary human conflict with badgers is their tendency to burrow on the edges of crop fields and meadows where burrows may damage farm equipment and create potential hazard for livestock. Additionally, badgers carry a number of zoonotic disease that can affect humans, notably rabies, leptospirosis, and roundworms.

Management Goals and Direction

While badger specific CPUE appears to be in a decreasing trend (Figure 2), this is likely tied to the pronounced increase in coyote trapping effort and harvest since 2013. Statewide harvest for badger is low, notably in comparison to abundant suitable habitat. Moreover, badger rank 11th of the 15 species/species groups tracked through the Department's furtaker harvest report forms (Appendix A, Table A-2), suggesting trapper participation for this species is small. Based off low harvest and abundant suitable habitat, the badger population is regarded as stable under the current management strategy.

Management Actions

- No badger specific proposed management actions

North American Beaver

Few species influence their environment more than beaver. In small creeks and streams, beavers must build a complex of dams to create the deep-water habitat required to avoid predators, expand safe foraging opportunities, and control water levels (Pollock et al. 2017). The ponds resulting from dams can be immensely beneficial for wildlife communities that rely on healthy riparian systems. In lakes, ponds and large rivers, beavers will build lodges and bank burrows for shelter. Beavers exist statewide in Idaho, however their occurrence (as evident from dam building) in small streams is patchy (Figure 4).

Beavers live in colonies consisting of multiple generations of the same family. These colonies ~~usually~~ consist of two adults, two kits, and two yearlings, however colonies can range from 1 to 10 beavers depending on habitat quality and survival (Novak 1987). Young tend to disperse from the natal colony at 2 years of age (Novak 1987). Habitat quality is a strong driver in determining the size of a particular colony's home range. In the eastern deciduous forest, the average home range on streams ranges from 0.4 miles to 0.6 miles (Novak 1987). Little is known regarding beaver home range size and habitat use in the arid west.

Beavers are herbivores and consume a wide array of herbaceous plants as well as the inner bark of woody species such as willow, aspen, alder, and cottonwood (Jenkins and Busher 1979). Herbaceous plants make up the majority of their diet during the spring and summer. In the fall and winter, their diet shifts to woody species as herbaceous species begin to desiccate and go dormant (Chabreck 1958, Jenkins 1975). In systems that freeze over, beavers will cache limbs and branches underwater near their lodges to eat throughout the winter.

Beavers reach sexual maturity between 1.5 to 3 years of age (Baker and Hill 2003). Breeding adults form monogamous pair bonds and produce one litter annually. Breeding occurs in the fall or early winter, with the birth of kits occurring sometime between May and July. Litter size is typically 2 to 4 kits, however can be up to 9 (Wigley et al. 1983). Beaver are relatively long lived with a lifespan up to 10 to 12 years.

Through their dam building activities, beaver have an impressive ability to shape their ecosystem. Their ability to slow the movement of water in riparian systems increases and diversifies instream and riparian habitat. Their presence can make streams resilient to annual changes in precipitation. These outcomes have far-reaching benefits for a variety of wildlife, and in the right situations have important benefits for livestock producers and other water users. As such, beaver mediated habitat restoration is identified as a key strategy in Idaho's State Wildlife Action Plan (Idaho Department of Fish and Game 2017), is a programmatic priority for the Department's Diversity Program, and is an important tool utilized by the Department's Habitat Program in addressing a variety of game and non-game related habitat goals. Interest in the strategic use of this species to improve habitat is growing, and multiple Department regions currently have beaver oriented working groups consisting of State, Federal, non-profit and private representation.

Mortality and Harvest

Beaver, like many other game species, are a wildlife management success story. Historically abundant throughout most of North America, beaver were extirpated across much of the continent due to unregulated trapping in the 19th and early 20th centuries. The formation of state wildlife agencies and the subsequent harvest management and conservation efforts of beavers resulted in a strong population resurgence. Today beaver occupy all of their historic range, albeit at lower densities.

Human activities such as trapping and control of nuisance animals can be an important source of mortality. Natural causes of beaver mortality include severe winter weather and extreme fluctuations in water levels due to flooding or drought. Beavers have many natural predators in Idaho including mountain lions (*Puma concolor*), wolves, bobcats, lynx, bears (*Ursus americanus; Ursus arctos*), coyotes, river otters, fox, fisher, wolverines and even raptors. In high population densities and/or other population level stress inducing conditions, tularemia has been documented causing widespread die-offs (Lawrence et al. 1956, Stenlund 1953).

While beavers have a relatively high reproductive rate, this species is considered easy to trap and can be overharvested, especially at the local level. When assessing sustainable harvest levels, much of the work has been conducted in areas ecologically different from Idaho, however studies identify sustainable annual harvest rates from 15% in areas of low habitat productivity to 30% in higher quality habitat (Novak 1987). When working with trappers in the eastern part of the continent, management agencies have translated this to an estimate of number of beaver harvested per live lodge, ranging from 1 to 2.5. It is unknown how applicable these numbers are for Idaho.

Since 1995, annual beaver harvest in Idaho through trapping (not including removal of nuisance beavers) has ranged from 1,583 to 4,041 animals (Appendix A, Table A-1). Beaver were identified as the third most important furbearer by Idaho's trappers (Table 3), and is the second most trapped species in terms of number of participants (Appendix A, Table A-2). Over the past 19 years, 300 to 350 trappers have pursued beaver statewide, with the exception of a short increase in participation during the 2013-2015 seasons (Figure 3).

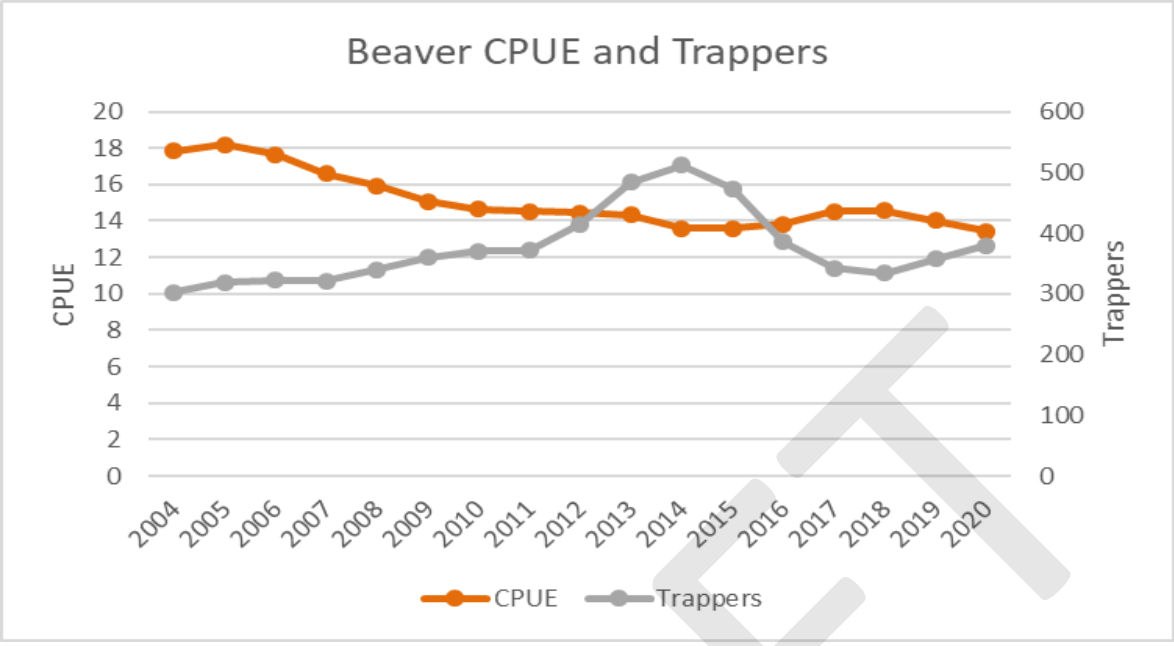

Figure 3. The three-year rolling average of annual beaver catch per unit effort estimate, and the number of beaver trappers in Idaho, USA.

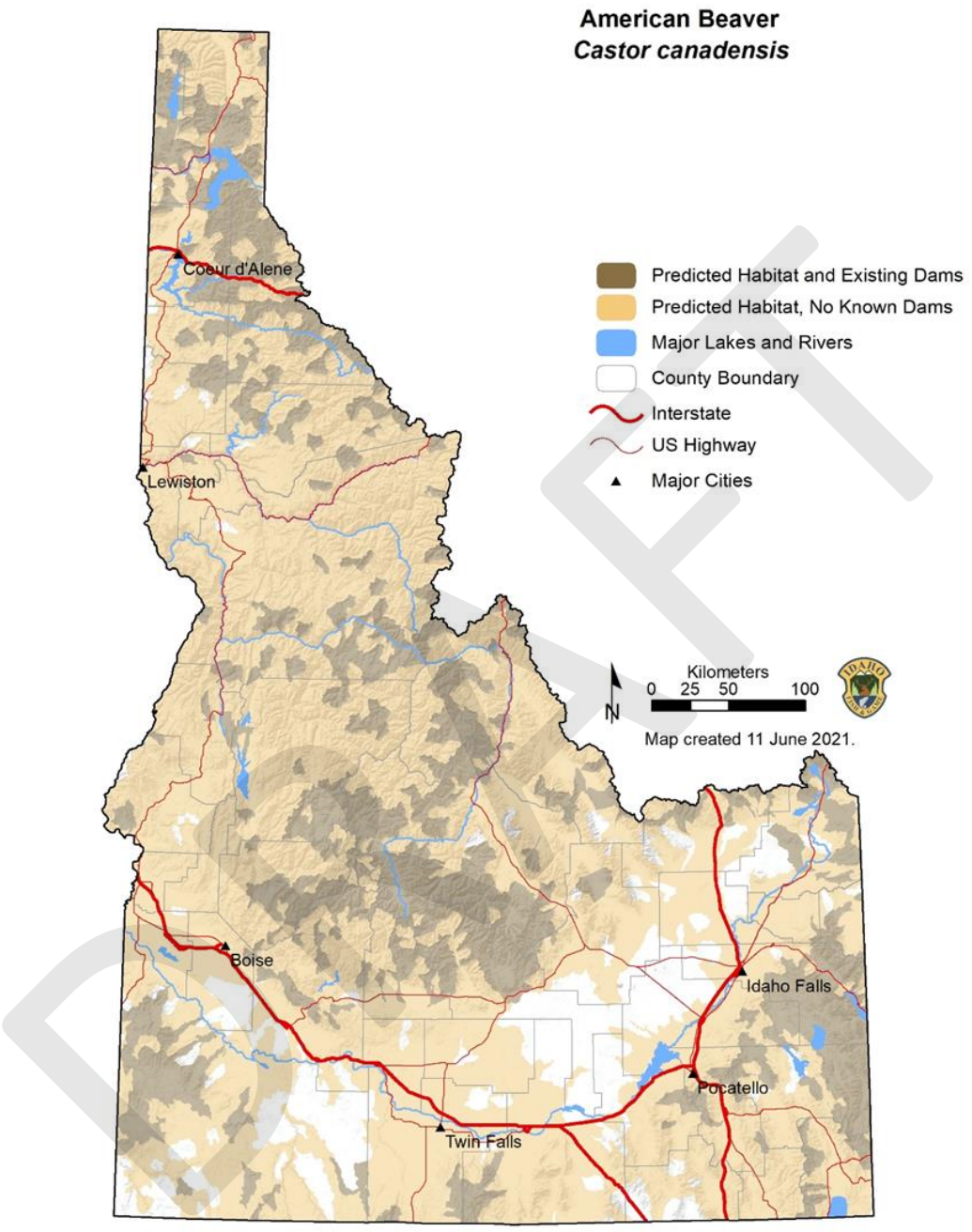

Figure 4. Predicted beaver habitat and areas with known beaver dam building in Idaho, USA.

Wildlife-Human Conflict

In the wrong places or without mitigation efforts, beaver have the ability to cause extensive damage. Their dam building and foraging activities can flood roads, clog irrigation infrastructure, plug culverts, remove desirable trees, flood agricultural crops, and submerge established stream crossings. To balance the value and challenges of beaver on the landscape, the Department utilizes a variety of approaches. Outside of the harvest season, the Department

issues kill permits to address specific damage complaints. This allows the permittee to remove beaver themselves or by contracting with a trapper. In the appropriate settings, the Department also live traps and relocates nuisance beavers.

During the harvest season, the Department encourages the removal of these animals by a licensed trapper, allowing the animal to be utilized areas where the landowner or management agency are interested in keeping beaver on the landscape, the Department will work with them on a case-by-case basis to provide guidance on, or assistance with installing beaver deceivers, pond levelers, tree wrapping, and other beaver damage mitigation techniques.

Management Goals and Direction

The only allowable method of take for beavers is trapping e Department provides long (5-6 month) seasons with no personal quotas, thus providing abundant opportunity for the state's third most popular furbearer (Table 2). Moreover, this long season provides extended opportunity for the trapping community to address nuisance animals. The stable JE (Figure 3) and low statewide harvest suggest beaver populations are stable at the statewide scale. Beavers are found in all major river systems in the state. However, habitat modeling efforts suggest there is ample habitat available in smaller streams across that state that do not have beaver present in appreciable numbers (Figure 4). While this modeling effort is coarse, it does suggest that opportunity exists to expand beaver distribution in strategic areas to meet a variety of habitat and harvest opportunity goals.

The growing interest in beaver as a restoration tool has raised concerns related to beaver management. Enthusiastic, but potentially poorly informed efforts in other states have pushed for translocations of beaver into areas that may not be suitable from a biological and/or social perspective. Other states in the west have seen citizen-based efforts to remove trapping as a management tool over poorly informed concerns that regulated trapping may be the cause of absent beaver populations. To inform this conversation, a better understanding of the habitat use, demographics, and distribution in the state is needed.

Management Actions

- Improve our understanding of beaver habitat use and sources of mortality in ecotypes where beaver mediated habitat restoration is being promoted as a tool.
- Explore options to address beaver damage in non-lethal ways through construction of pond leveling devices and beaver deceivers where the opportunity and willing participants exist.
- Work with regional staff and stakeholders identify priority areas to restore beaver populations to address wildlife habitat goals and landowner or land manager needs.
- Develop a guidance document lining protocols on beaver translocations to increase beaver survival, dam building success, minimizing human conflict, and minimizing disease transmission concerns.

Bobcat

The bobcat is the most widely distributed wild felid in North America. The species' distribution ranges from central Mexico to southern Canada and throughout most of the contiguous United States (Newberry and Hodges 2018). Bobcats are considered common across much of Idaho and are absent only in the high elevation forests where lack of primary prey species and snowfall inhibits effective hunting and areas of extensive row-crop agriculture (Figure 5).

Habitat preferences are strongly driven by prey densities (Koehler and Hornocker 1989, Litvaitis et aI. 1986). Male and female bobcats may prefer different habitats seasonally with males preferring larger areas overlapping multiple female home ranges, and females selecting smaller areas with the highest prey densities (Chamberlain et al. 2003). During summer, bobcats prefer higher elevations and are not as selective in their use of habitats (Koehler and Hornocker 1989). In winter, habitat selection is greatly influenced by snow conditions, and bobcats prefer lower elevations, south-southwest facing slopes, rocky terrain, and open areas (Koehler and Hornocker 1989, McCord 1974).

Male home range size across the species range varies from 40 to 100 km^2 (Bailey 1974, Chamberlain et al. 2003, Broman et al. 2014). Males typically have ≥1.65 times the home range size as females (Ferguson et al. 2009). In two Idaho studies, male home ranges averaged 53.0 km^2 (Bailey 1974) and 28.5 km^2 (Knick 1990). Idaho specific density estimates in suitable habitat range from 1 bobcat per 11.1 km^2 (Knick 1990) to 1 bobcat per 23.3 km^2 (Koehler and Hornocker 1989).

Bobcats are strictly predatory. Rabbits (*Sylvilagus* spp.), and hares (*Lepus* spp.) are the most important prey items throughout most of their range, sometimes exceeding 90% of their diet (Bailey 1979, Knick 1990). Secondary prey species can range widely from big game to rodents. Tree and ground dwelling squirrels and Cricetid rodents likely played an important seasonal role in winter diet of bobcats in Montana and in Idaho (~83% and ~90%, respectively) likely due to similarities in regional topography, vegetation, climate, and prey types (Koehler and Hornocker 1989, Newberry and Hodges 2018).

The breeding season of bobcat varies across its range. Breeding is possible throughout the year, although most breeding activities occur from December to June (Crowe 1975). Female bobcats typically are not reproductively successful until their second year. Bobcats give birth between April-July (Bailey 1974) and litter sizes range from 1 to 6 kittens with an average of 2.7 in Idaho. Bobcat young can disperse from their mother at approximately nine months of age, but often stay close as long as the following fall.

Mortality and Harvest

Human activities (e.g., hunting, trapping, vehicle collisions, and depredations) are the leading cause of bobcat mortality. In an unexploited population in Idaho, adult survival was 78%; hypothesized to be near the maximum survival rate for bobcats (Knick 1990). Excluding heavily

exploited populations or during periods of dramatic prey declines, adult bobcat survival rates range from 56 to 67**%** (Knick 1990).

As with many furbearers, mortality rates are not constant over all age cohorts and male mortality is generally higher (Allen et al. 2018). Kitten survival rates are strongly influenced by prey abundance and juvenile rates are influenced by hunting efficiency and established home ranges. Bobcats are able to sustain population levels under moderate harvest from hunters and trappers although temporary and/or localized population declines can occur when adult female harvest exceeds certain thresholds (Knick 1990). From modeling efforts, Knick (1990) determined a bobcat population in central Idaho could not sustain itself when adult female survival was ≤ 52%.

Today, bobcats are a highly sought-after furbearer and the coloration of cats found in the American West consistently rank as the most valuable furbearer (on a per pelt basis) in North America. Originally considered a predator/varmint with little economic value, after the passing of the Endangered Species Act (1973) and CITES (1975) interest in bobcats surged. These two legal documents prohibit trade in most species of spotted cats across the world due to population status concerns. With the demand for this style of pelt still strong, fashion companies looked for a substitute, and found the spotted pelt of the bobcat.

In Idaho, trapping, hunting, and hunting with hounds from December 14 to February 16 are approved methods of take for bobcats. By Commission rule, trappers and hunters are required to get bobcats tagged with CITES export tags by the Department within 10 days after the close of the trapping/hunting season. Mandatory reporting has been in effect since the 1981–1982 season.

As demonstrated in Figure 6, CPUE has consistently stayed between 1.5 and 2 animals per 100 trap nights. Annual trapping participation has fluctuated between 250 to 300 bobcat trappers over the past 19 years with the exception of the 2012–2015 seasons which correspond with a pronounced increase in fur value and trapping participation (Figure 6). Statewide, harvest fluctuates with an 18 year annual harvest average of 1,282 bobcats (791 to 2,404; Table A-1). The Panhandle, Clearwater, and Southwest regions consistently rank as the top regions of harvest.

While several species of furbearers can be hunted in addition to trapped, bobcats are the only furbearer in Idaho where hunting is an important contributor to overall harvest. Statewide, hunting (i.e., predator calling, hounds, and incidental) accounts for approximately 34% of the total bobcat harvest. Hound hunting accounts for the majority of hunting take. In regions where persistent snow cover in bobcat habitat provides good hound hunting opportunity such as the Panhandle and Clearwater Regions, hound hunting can account for up to 50% of the overall bobcat harvest.

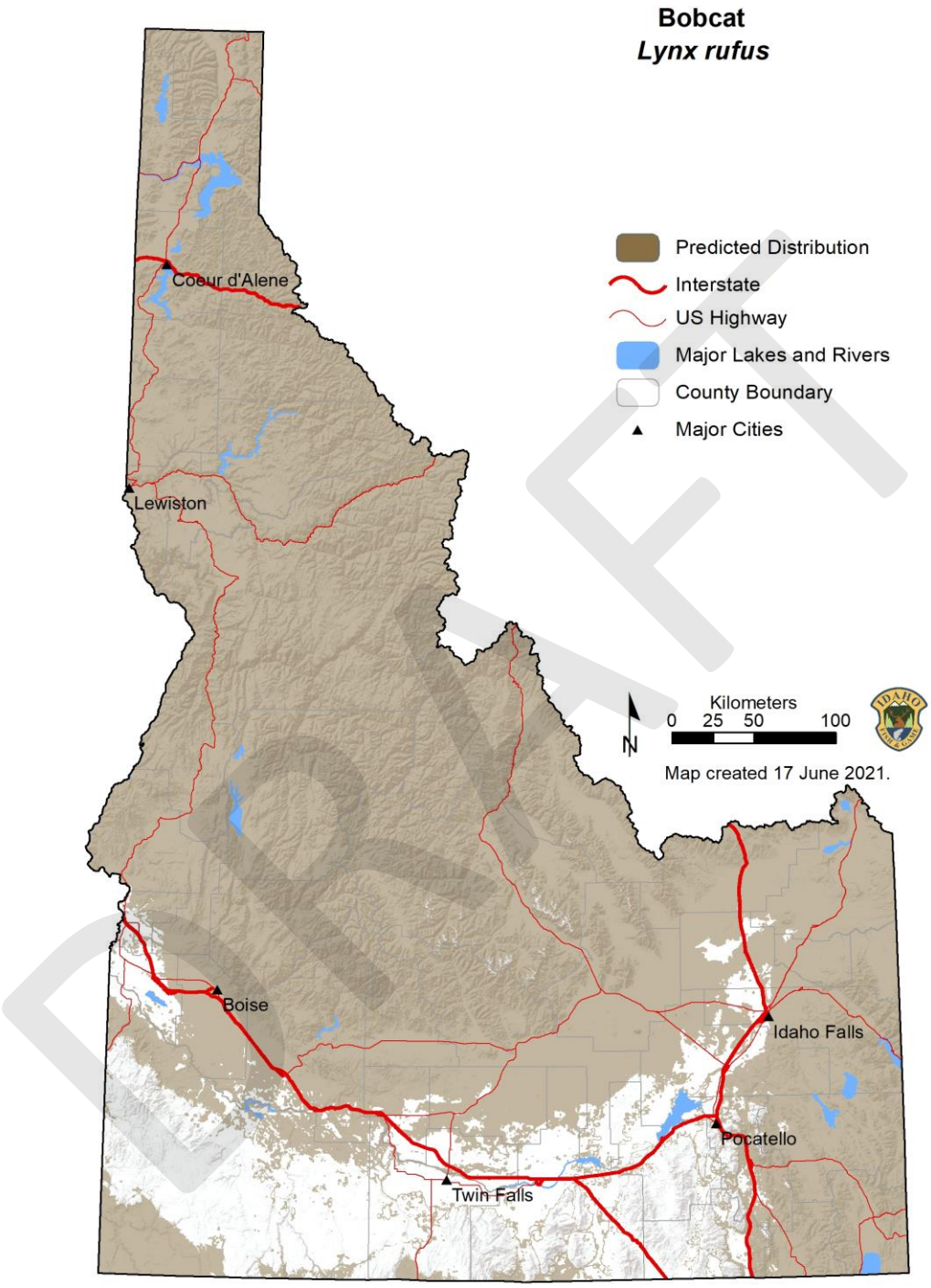

Figure 5. The predicted distribution of bobcats in Idaho, USA.

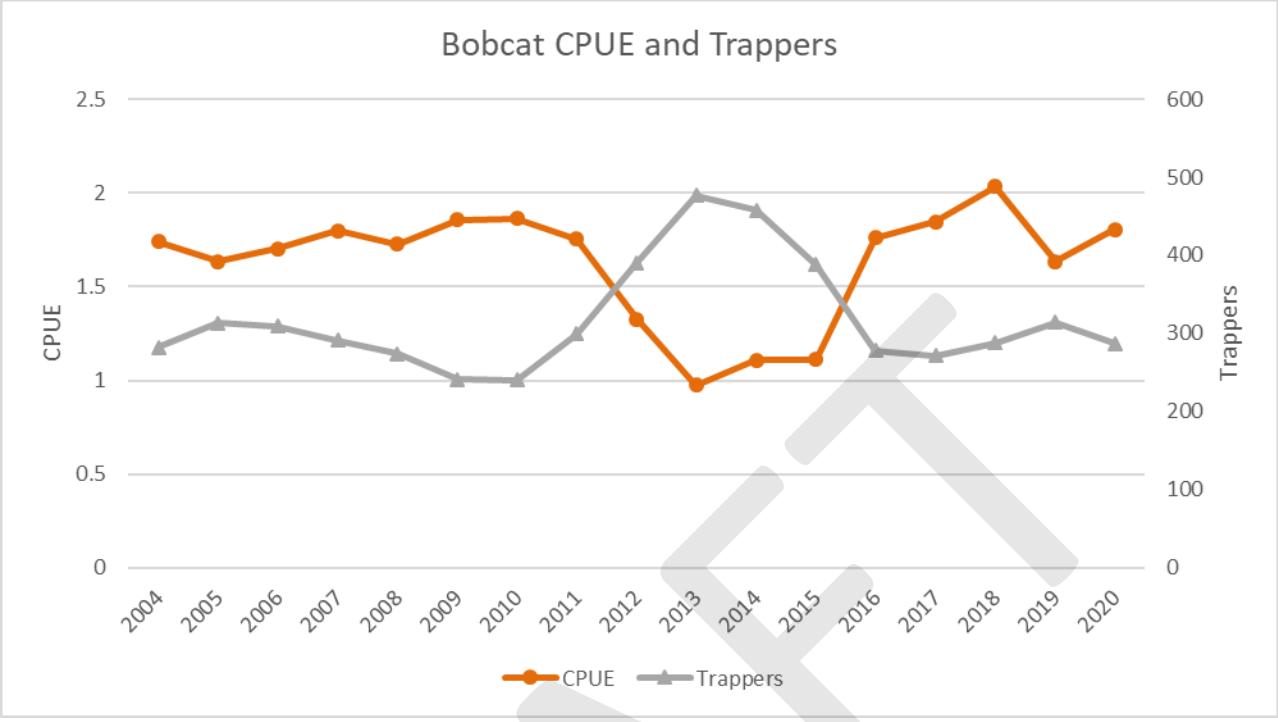

Figure 6. The three-year rolling average of annual bobcat catch per unit effort estimate, and the number of bobcat trappers in Idaho, USA.

Wildlife-Human Conflict

Occasionally, bobcats will prey on domestic animals (APHIS Database 1996-2018). To address these occasional wildlife-human conflicts, the Department issues kill permits to individuals on a case-by-case basis when depredations occur out of season and encourage conflicts to be addressed through hunting and trapping when the bobcat season is open.

Management Goals and Direction

Opportunities for bobcat harvest are currently provided through a 60-day season where both hunting and trapping are permitted with no personal quotas. Season timing is structured to provide harvest opportunity when pelts are prime and avoids peak breeding season when the species is most susceptible to harvest. With the exception of the surge in bobcat and other fur prices during the 2011– 2015 trapping seasons, CPUE estimates have fluctuated between 1.5 to 2 and trapping participation averages between 250 to 300 trappers annually statewide (Figure 6). This, combined with ample suitable habitat across the state, suggests bobcat populations are likely stable at a statewide scale.

While CPUE is used to inform the Department of bobcat population status, a need exists to strengthen our understanding of bobcat harvest management. Their densities tend to be much lower in comparison to similar sized carnivores and they possess a relatively low reproductive potential. Moreover, bobcat populations are less able to compensate for higher rates of adult mortality in arid environments and areas with harsh winter weather (Rolley et al. 1987) which

characterizes most of Idaho. They are consistently the most valuable furbearer in the state on a per pelt basis and are the second most important species to trappers (Table 2). Interest from the trapping and hound hunting community to expand trapping opportunity, and/or adjust the season structure has been voiced, however our current monitoring strategy has limited ability to track how any changes may affect bobcat populations. Development of tools to more accurately track changes in bobcat population status would enable more flexibility in harvest management and in times of stable or growing populations, more opportunity for hunters and trappers.

Attempts to eliminate the use of trapping as a wildlife harvest and management tool is increasing across the country. Because bobcats are commercially valuable, charismatic, and have a federal nexus due to the CITES export program, they are an ideal target for anti-trapping efforts. Anti-trapping groups call into question the quality of data used to manage bobcats at both the state and federal level. In the past 5 years, bobcats have been the focal species for anti-trapping efforts in multiple western states. Strengthening our understanding of bobcat population status in relationship to harvest would make Idaho more resilient to these efforts.

Management Actions

- Collaborate with bordering states to better understand genetics, disease, and population fluctuations.
- Conduct research to identify how the ecology of bobcats differs in the various ecotypes of Idaho.
- Explore how monitoring efforts for other species (i.e., camera based surveys for big game) may inform our understanding of bobcats in the state.

Coyote

The coyote is a habitat generalist residing in every major habitat type in North America and occupying every state, province, territory and district north of Panama. The coyote's adaptable nature, both in where it lives and what it eats, has no doubt contributed to its success even within America's megacities. Idaho is no exception and the species inhabits all habitat types within the state (Figure 8).

Home range size varies based on sex, reproductive status, group size, season, habitat type, and prey densities. Limited research has been done in Idaho on home range size, however it is likely that productive rangelands and agricultural areas have higher densities of coyotes relative to more mountainous or heavily timbered habitats. Coyote populations are dependent on a variety of factors, making it inaccurate to generalize results across study areas. While efforts have been made to estimate coyote numbers across targeted geographic locations, techniques such as track counts, scat counts, aerial surveys, CPUE, and howling surveys have not been validated (Knowlton 1972) and the Department has not attempted to estimate the statewide coyote population.

Coyotes are opportunistic omnivores that will take advantage of natural and human-provided food sources. In Idaho, small mammals, particularly lagomorphs and rodents, provide the mainstay in coyote diets (MacCracken and Hansen 1987). Most studies conducted on coyote prey selection found that seasonality and alternative prey availability influenced selection, suggesting that while coyotes will occasionally target neonate ungulates, their selection of this prey item is driven by a lack of smaller quarry. However, there is evidence that coyote predation can measurably influence population productivity of pronghorn (Brown and Conover 2011) and white-tailed deer in the southeastern United States (Gulsby et al. 2015).

Coyotes are flexible in their social structure and can be found singly, in pairs, or in packs of several animals. Adults weigh between 20 and 40 pounds. Mated pairs are monogamous and pair bonds can last for several years. Litters averaging 3 to 7 pups are typically born between March-May after a gestation of 60 to 63 days (Voight and Berg 1987). Both parents participate in pup rearing. The reproductive output of female coyotes may be density dependent (Sterling et al. 1983) with fewer pups born when the local population is high and large litters produced when it is low. This characteristic, combined with a relatively early sexual maturity of just one year, allows coyotes to rebound quickly following high mortality events.

Mortality and Harvest

Human activities (e.g., hunting, trapping, depredation, vehicle collisions) are a leading cause of mortality for coyotes. Coyote populations can also be regulated by disease and parasites, including but not limited to, distemper and canine hepatitis, sarcoptic mange, parvo, plague, rabies, hydatid, tularemia, Lyme's, and leptospirosis. As a predator, the coyote has few non-human predators, however mountain lions and gray wolves will occasionally kill coyotes. Golden eagles (*Aquila chrysaetos*) have also been documented attacking young pups.

Scientific evidence has shown that removal of coyotes at a local scale has little to no effect on overall population numbers. Regardless of exploitation, coyote numbers will likely remain static with any fluctuations in population most likely attributable to weather and rodent populations. A study by (Connelly and Longhurst 1975) found that removal rates exceeding 75% of a local coyote population are needed to have measurable population-level effects. While human's ability to reduce coyote populations are not likely to succeed at the landscape scale, success can be demonstrated in targeted removal of coyotes to address specific depredations and chronic depredation areas.

In Idaho, coyotes are classified as predatory wildlife and can be taken year-round by individuals with a hunting or trapping license. From a harvest perspective, coyotes have been the most popular species to trap for the past decade (Appendix A, Table A-2). As seen in Figure 7, coyote CPUE appears to be stable to declining. The observed decline corresponds with an increase in coyote trapping participation, measured by the number of coyote trappers per year. Therefore, this declining trend may be due to changes in trapper participation and not overall coyote population status.

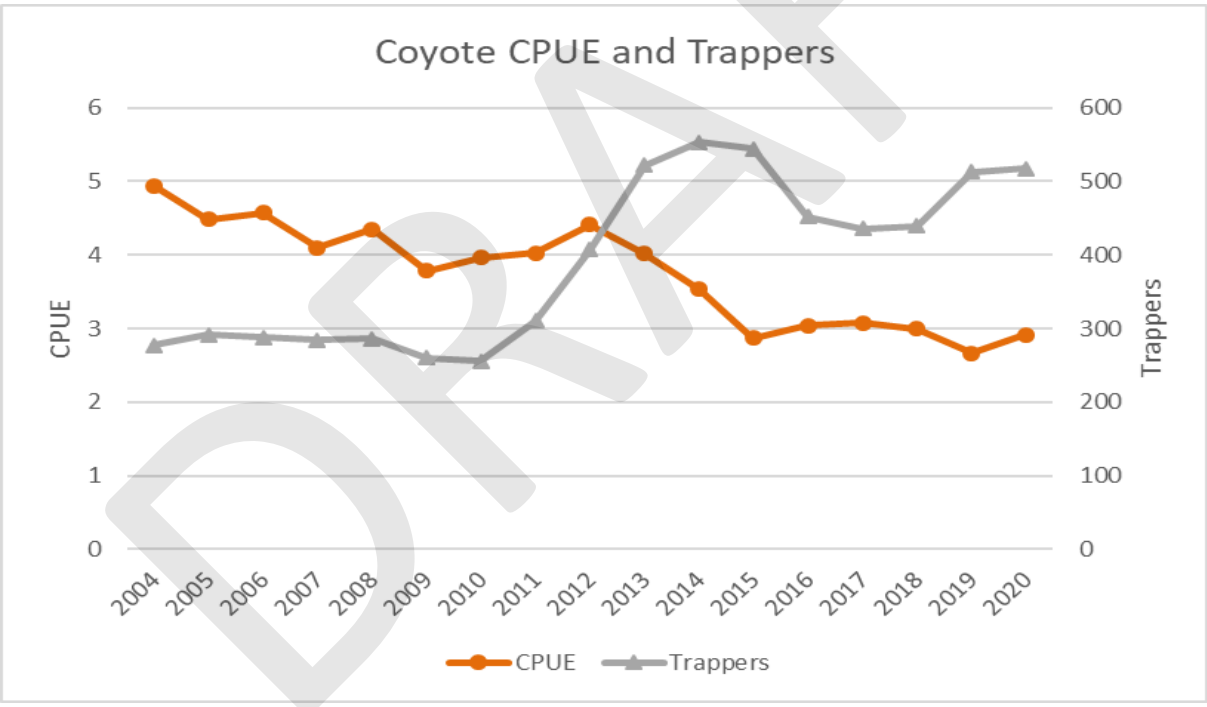

Figure 7. The three-year rolling average of annual coyote catch per unit effort estimate and the number of coyote trappers in Idaho, USA.

Wildlife-Human Conflict

Coyote depredation occurs on a wide array of poultry and livestock and coyotes are the primary culprit of domestic sheep depredations in the West. Wildlife Services handles most coyote depredations across the United States, including Idaho, with an approach that targets areas experiencing chronic coyote depredations. The success of reducing depredations through coyote removal has been debated. Connelly and Longhurst (1975) found that ranches where

coyotes were removed harbored higher densities of coyotes due to enhanced reproductive output and increased immigration into vacated territories. Where there was no removal of coyotes, densities were lower because coyotes defended territories and had smaller litters. Whether higher densities always equate to increased depredations likely depends on alternative prey sources, coyote social structure, seasonal environmental conditions, and livestock husbandry practices.

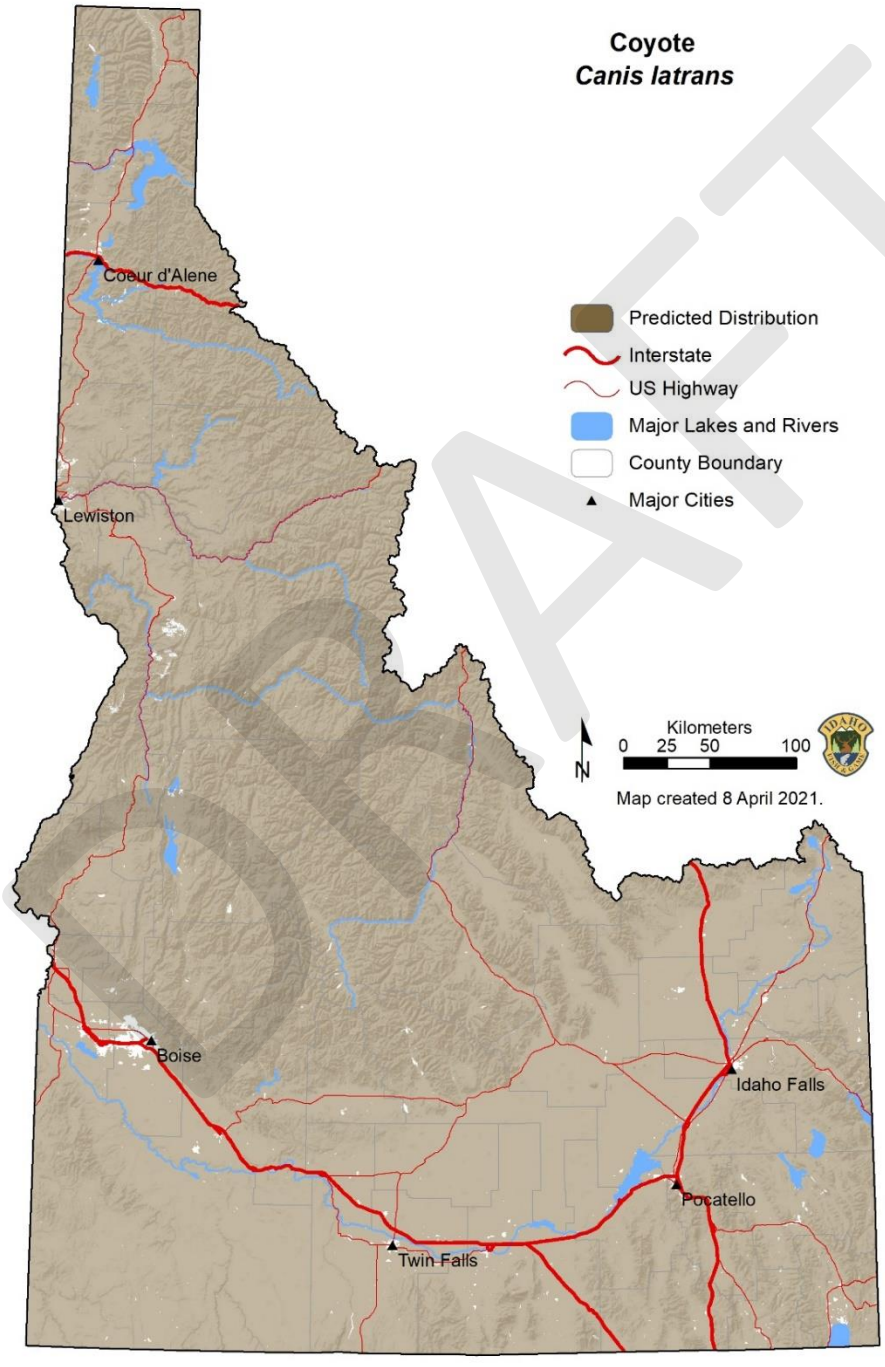

Figure 8. The predicted distribution of coyotes in Idaho, USA.

Management Goals and Direction

Coyotes are an ecologically and economically important species in Idaho. Classified as a predator, the Department has limited ability to implement any management strategies for coyotes. A decline in CPUE has been observed since 2012. This corresponds with a pronounced increase in coyote trapping participation, and an increase in coyote pelt prices. Thus, the CPUE decline may be more closely tied to increased participation by new trappers and/or experienced trappers increasing their trapping effort rather than an actual decline in coyote populations. The coyote's ability to withstand high annual mortality rates combined with its adaptive reproductive capability, varied diet, and ability to inhabit all habitat types in the state suggests the coyote populations are stable at a statewide scale.

Management Actions

- No coyotes specific proposed management actions

Marten (American and Pacific)

Idaho is home to two species of marten; the American marten and the Pacific marten. Originally, both species were classified as American marten, but were split into different species in 2012 due to genetic and morphological differences (Dawson and Cook 2012). In Idaho, both species are found in high elevation mixed conifer forests, and the geographic distribution of the two species is relatively well defined, with the split occurring at the Clark Fork Valley in northern Idaho (Figure 9, Lucid et al. 2020). American marten occur north of the Clark Fork Valley and Pacific marten occur to the south. Based on genetic work in the Idaho Panhandle, there appears to be little mixing between the two species (Lucid et al. 2020). Due to their ecological similarities, both species are manages as a single entity and are referred to collectively as "marten" in this species account.

Marten prefer forested and semi-forested areas, especially those with complex vertical and horizontal structure, including dense trees and a wide variety of dead or fallen wood (Andruskiw et al. 2008). In Idaho, marten can be found in the forested regions of the state, preferring higher elevations and abundant tree cover. Historically, they have been associated with mature and old growth forests, rather than regenerating stands, however habitat use varies across the United States (Thompson et al. 2012).

Marten home ranges are extensive and can be three to four-times larger than similar-sized carnivores (Buskirk and McDonald, 2012). Generally, individuals in higher quality habitat have smaller home ranges than those in areas of poor habitat; the largest documented home ranges (>10 km^2) have been located in heavily logged landscapes (Bull and Heater 2001b, Self and Kerns 2001). Several studies indicate that winter home ranges average between 3 to 4 km^2 (Wright 1999, Dumyahn and Zollner 2007).

Marten have a generalist diet consisting primarily of small mammals including voles and mice, as well as birds, insects and various berries (Martin 1994). Marten also rely on larger prey; one study attributed up to 95% of their caloric intake to species such as the snowshoe hare, ruffed grouse, and red squirrel (Cumberland et al. 2001).

Marten exhibit a polygamous breeding system (Woodford et al. 2013) and breed from mid-June through August (Markley and Basset 1942). Implantation of fertilized eggs does not occur until 7 to 8 months post breeding, and young are born in March and April the following year, meaning females give birth to their first litter at two years old. Females produce one litter, with 2 to 3 kits on average (range 1 to 5 kits) and are the sole providers (Strickland et al. 1982, Mead 1994, Woodford et al. 2013). Kits stay with their mother around 1.5 to 2 months before becoming independent.

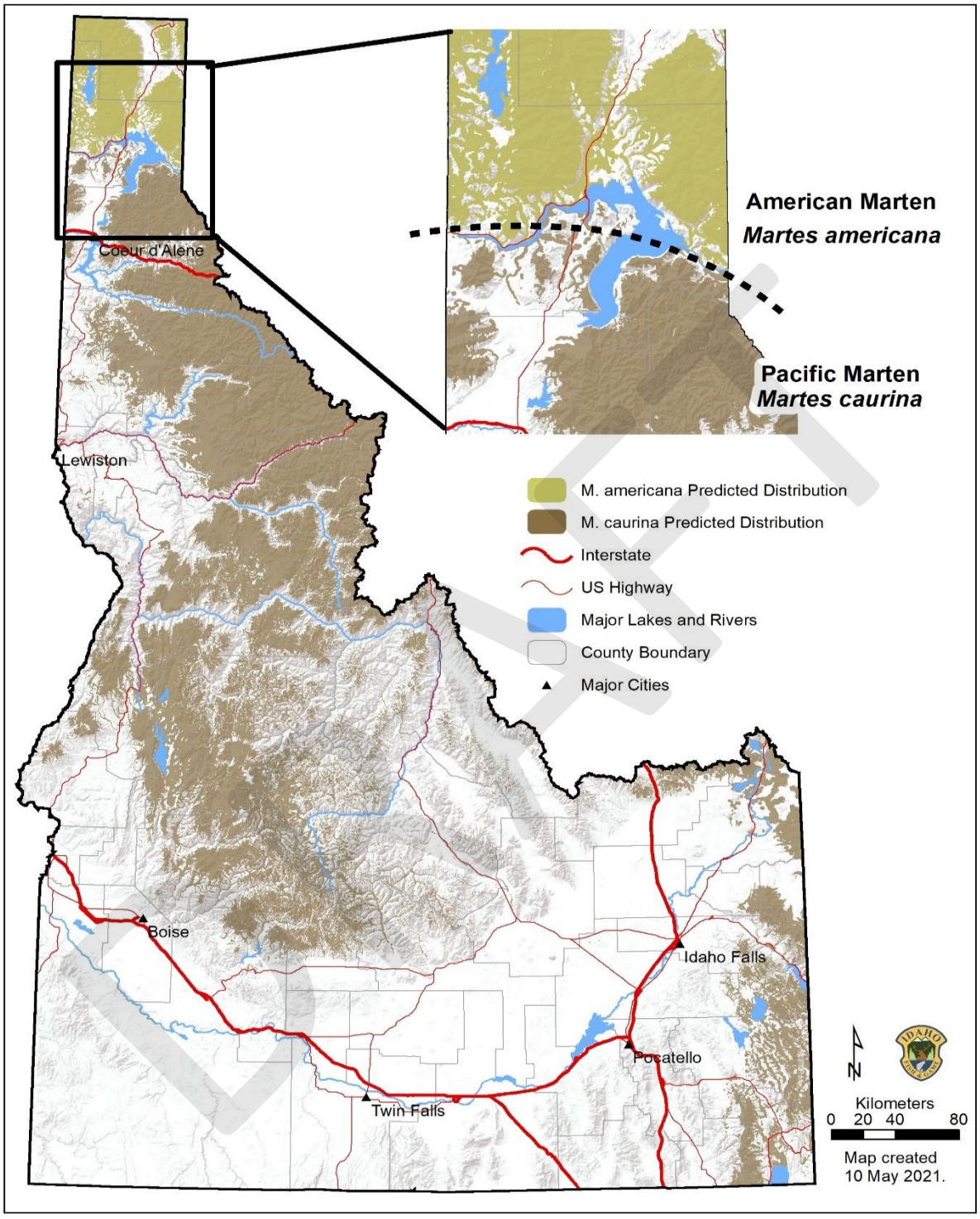

Figure 9. The predicted distribution of American Marten and Pacific Marten in Idaho, USA.

Mortality and Harvest

Marten rarely live beyond 5 to 7 years with predation as their main source of mortality. Predators include bobcats, coyotes, and raptors, especially great horned owls (*Bubo virginianus*) (Lindstrom et al. 1995, Bull and Heater 2001a, Erb et al. 2015). Trapping, starvation,

exposure, and disease are also common mortality causes (Fredrickson 1990, Bull and Heater 2001a).

In areas where they are pursued as furbearers, trapping can be an important source of mortality. Trapping mortality demographics are consistently male-biased (Strickland and Douglas 1987, Thompson and Colgan 1987, Hodgman et al. 1994, Erb et al. 2015) due to higher energy requirements and larger home ranges of males, which increase exposure to trapping (Buskirk and Lindstedt 1989). Studies suggest that natural-mortality is more female-biased (Strickland et al. 1982, Strickland and Douglas 1987, Hodgman et al. 1997, Erb et al. 2015) and generally, younger marten are more susceptible to trapping than older individuals (Strickland and Douglas 1987).

Marten are sensitive to habitat loss and fragmentation at a landscape scale. Both have been linked to population decline driven by increased predation and reduced survival rates (Soutiere 1979, Thompson 1994, USFWS 2015). Key drivers of habitat loss and fragmentation include logging, climate-change, and increased frequency, intensity, and size of wildfires (USFWS 2015). Landscapes with highly fragmented and/or open areas are unable to support high marten densities because fewer home ranges can be supported and reduced connectivity impedes dispersal (Thompson 1994, Johnson et al. 2009, USFWS 2015). Together these exert negative pressures on maintenance and expansion of the species distribution at a population or meta-population level (Thompson 1994, Johnson et al. 2009, USFWS 2015).

Marten populations are inherently unstable and exhibit large fluctuations in age structure and vital rates (Powell 1994). However, various modeling efforts suggest that variation in adult and juvenile survival influences population growth more than variation in fecundity (Buskirk et al. 2012, Slauson et al. 2019). This is important for conservation and management considerations because stable habitat conditions over longer temporal periods are more likely to result in population growth and/or recovery through increased adult and juvenile survival rather than rapid population growth due to increased fecundity in temporarily favorable conditions (Buskirk et al. 2012).

In Idaho, both marten species are classified as furbearers and are managed as a single entity. Trapping is the only legal method of take for marten. Harvest is managed through season length and there are no personal quotas. The total number of marten harvested varies by year with an average of 982 marten taken per year over the last 24 years (range 515 to 2680; Table A-1). A sharp peak in marten harvest occurred between 2010 and 2014, which coincided with an increase in fur prices and concomitant trapper participation (Figure 10). Since 2001, marten CPUE declined from nine per 100 trap nights (TN) in 2004 to just under five in 2010. Since then, CPUE has remained stable between 4 and 5 marten/100 TN (Figure 10).

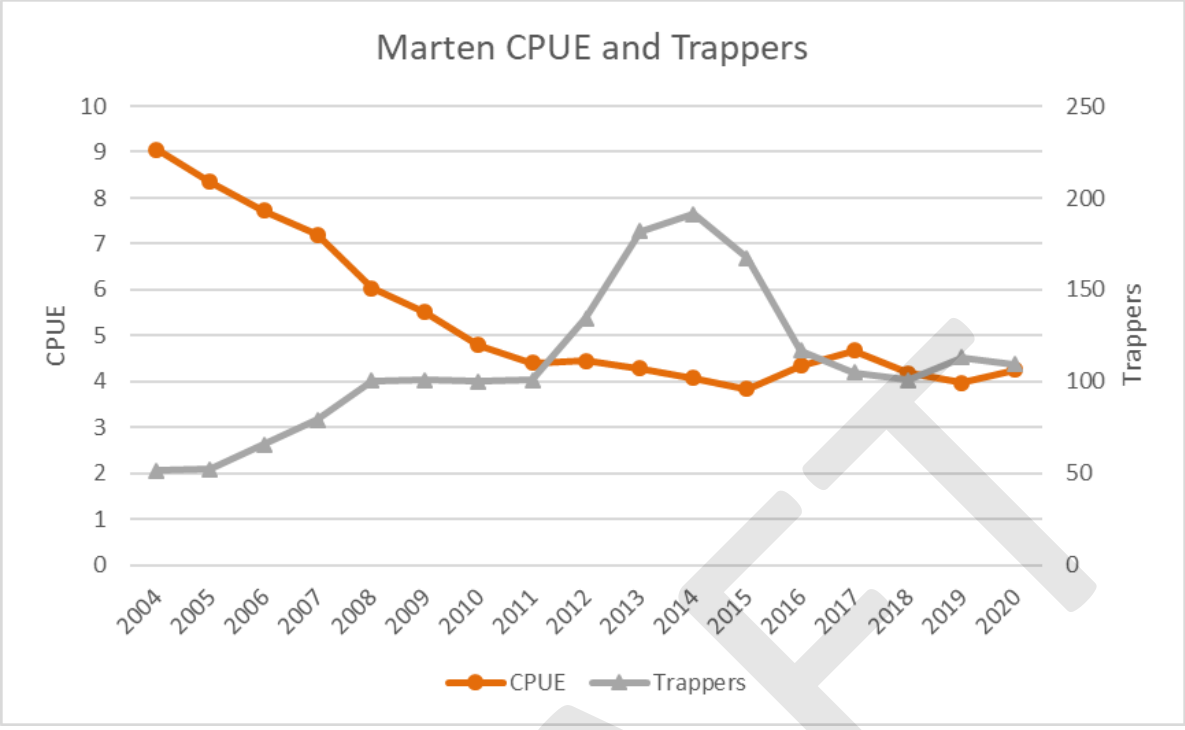

Figure 10. The three-year rolling average of annual marten (both American and Pacific) catch per unit effort estimate and the number of marten trappers in Idaho, USA.

Management Goals and Direction

Marten are a less popular species to trap than many of the state's furbearers, with an average of 100 trappers pursuing marten in any given year. After the initial decline of CPUE from 2004 to 2010, statewide CPUE has remained stable for the past 10 years (Figure 9). While the Department does not have a detailed understanding of marten densities, large expanses of habitat exist throughout the state (Figure 9) and much of it is inaccessible to trappers due to difficult and remote access. This, combined with home range sizes of 3 to 4 km^2 and a comparatively small harvest of just under 2,000 animals a year, suggests harvest pressure on marten at a statewide scale is sustainable.

Marten have more specific habitat requirements than other furbearers (Strickland 1994, Skalski et al. 2011). Additionally, gene flow through dispersal is an important population maintenance strategy, and habitat fragmentation is a key threat to successful dispersal and survival (Soutiere 1979, Thompson 1994, Johnson 2008, Johnson et al. 2009, USFWS 2015). Lucid et al. (2020) identified that conserving marten travel corridors, especially at elevations of 1,500 m or higher, might be especially crucial for maintaining robust marten populations in northern Idaho.

The Department monitors marten populations through statewide estimates of CPUE. While this approach allows tracking of population status on a broad spatial scale, this tool is less useful at identifying population trends on a more local scale. With the considerations listed above regarding marten conservation and management, a monitoring approach independent of harvest data that provides a more detailed tracking of populations would be valuable. While a

marten specific monitoring approach is not considered a cost effective option for the Department, this species is commonly observed through other efforts targeting other species (e.g., fisher, wolverine, wolves) and the utility of these observation in monitoring marten should be explored.

Management Actions

- Use existing detection data on marten from all survey efforts to develop a marten habitat model.
- Using CPUE data, harvest demographics, camera monitoring data and any other relevant data sources, conduct a statistical population reconstruction (using methods described in Skalski et al. 2011) to increase our knowledge of marten abundance, natural survival, harvest mortality, and recruitment.
- Develop our understanding of marten population connectivity and health utilizing marten genetic samples taken from other forest carnivore monitoring efforts.
- Target monitoring efforts at Idaho's American marten population specifically to understand population dynamics and complete range extent in Idaho.
- Partner with universities to encourage, facilitate, and advise more research on both Pacific and American marten in Idaho.

American Mink

Mink are a semiaquatic weasel that lives in close association with riparian habitats. Mink occur throughout Idaho and inhabit streams, rivers, ponds, and terrestrial environments associated with ephemeral ponds (Figure 11). Mink also inhabit arid or semi-desert habitats if there is water close by.

Home range size for mink can range from 23 to 164 ha with little difference between male and females (Halbrook and Petach 2018). However, a female with kits will have a much smaller home range size (2.12 ha) influenced by inability to move longer distances with kits. Daily movements for mink vary drastically but on average mink can travel up to 659 meters in search of food and resources (Haan 2011). Density of mink in an area can fluctuate depending on prey density, cover, denning sites, and environmental contaminants but has been shown to be around 1.37 mink/km^2 (Fuller et al. 2016).

Mink are strictly carnivores and an important predator in riparian systems. They serve as a generalist predator and can feed on a wide diversity of prey species including fish, frogs, crustaceans, mollusks, and mussels. Mink are also a primary predator of muskrat (Holmengen et al. 2009). Abundance and increased prey diversity have a close association to increased colonization and occupancy of mink in riparian-stream systems (Wolff et al. 2015, Holland et al. 2018).

Breeding typically occurs in March for mink in Idaho. Gestation period ranges from 40 to 75 days. A typical litter of 3 to 4 kits is produced and born inside of dens in April or May. By the end of September males and females reach their adult size of about 3.1 kg and 1.6 kg respectively depending on the availability of food resources (Do and Miar 2020). The following spring kits will be of breeding age. Average life span for mink are 1 to 3 years in the wild, and up to 8 years in captivity (Basu et al. 2007).

Mortality and Harvest

Several causes of mortality exist in the mink, including predation, trapping harvest, and contamination. Mink are considered a sentinel species and serve as an indicator for water quality and environmental contaminants. Because mink are a top carnivore in their riparian system, bioaccumulation of contaminants such as Mercury (Hg) and polychlorinated biphenyls (PCBs) can occur (Basu et al. 2007). Health concerns from PCB accumulation in minks consist of decreased reproductive success, reduced growth, and increased kidney and liver weights (Aulerich and Ringer 1977).

In Idaho, mink are a furbearer species that have a designated trapping season. Trapping is the only allowable method of take. Overall harvest of mink is low, averaging 714 a year from 1995–2019 (Appendix A, Table A-1), with a relatively small number of trappers pursuing mink in any given year (134 to 260; Figure 12). CPUE for mink varies from 4.5 to 15.7 animals per 100 trap nights (Figure 12), and has exhibited a steady decline since 2010.

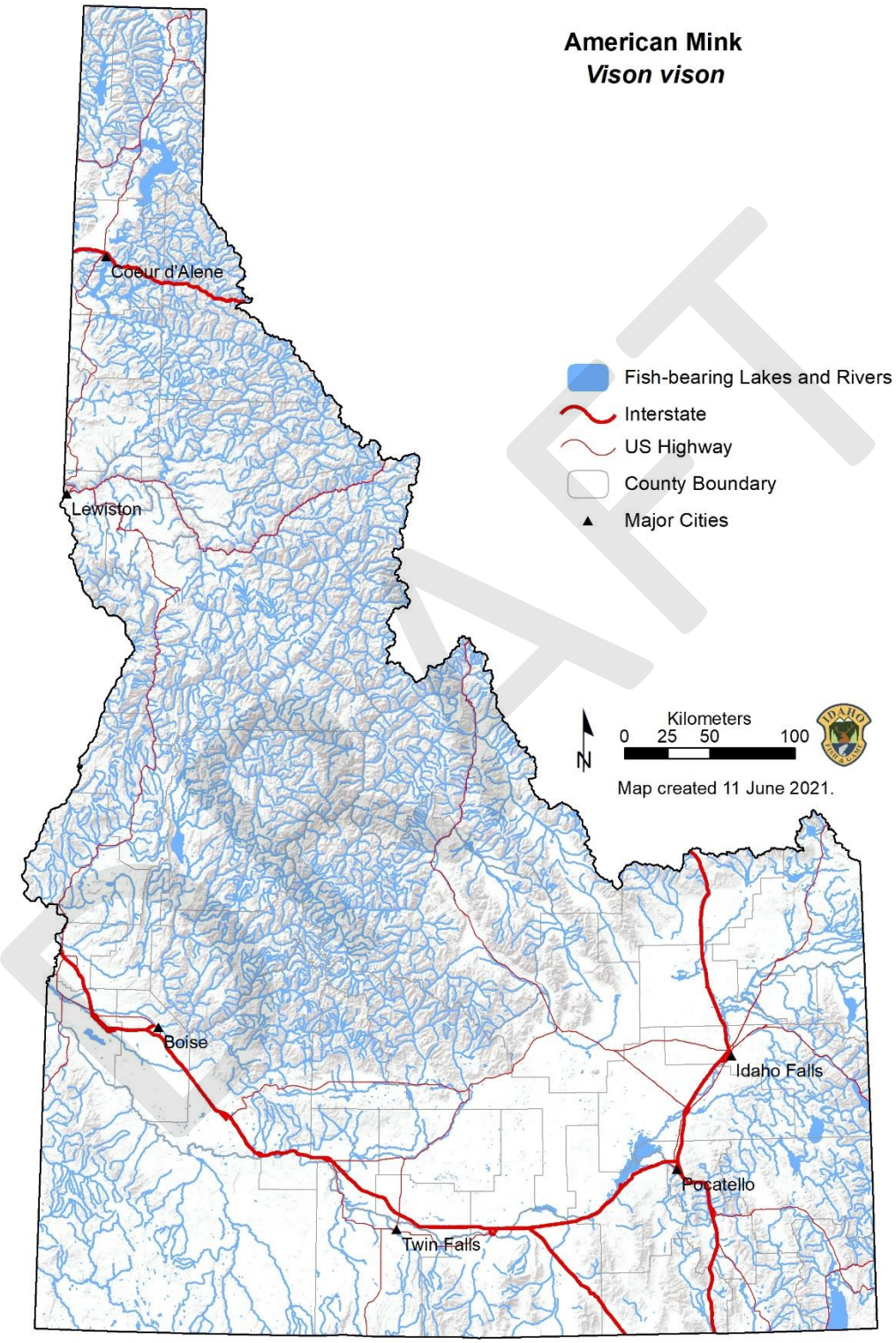

Figure 11. The predicted distribution of mink in Idaho, USA.

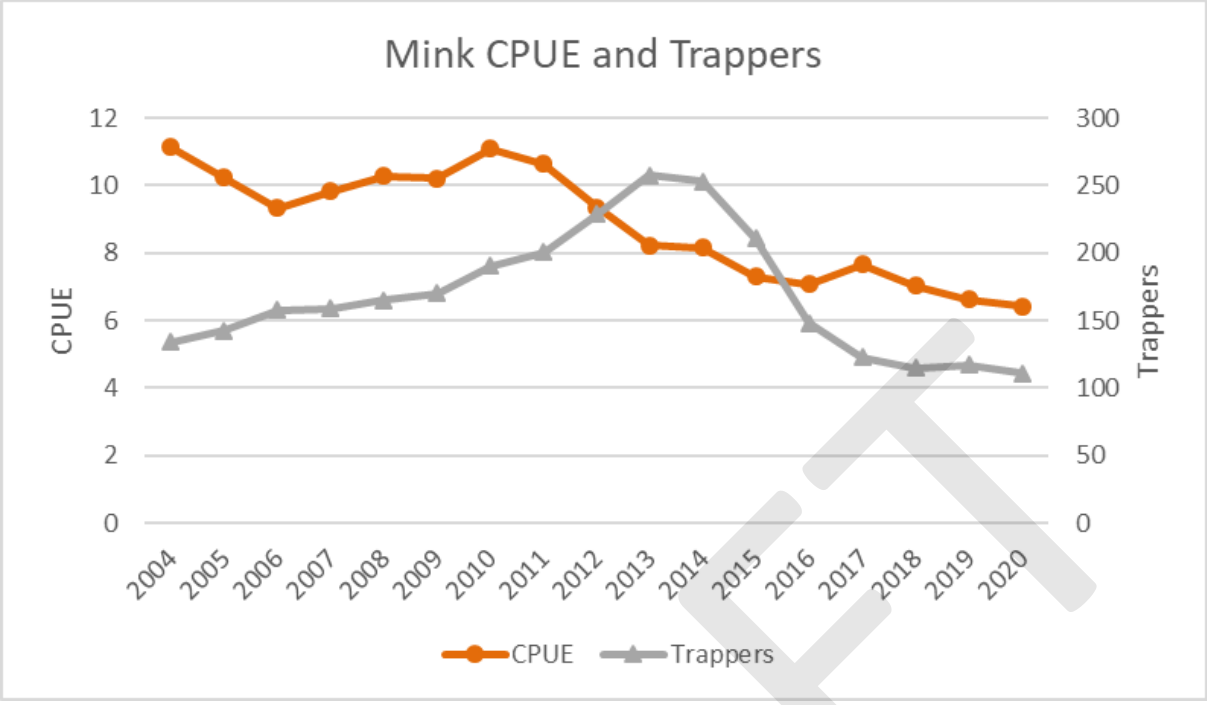

Figure 12. The three-year rolling average of annual mink catch per unit effort estimate and the number of mink trappers.

Management Goals and Direction

As indicated above, overall harvest is low, but a declining trend has been observed for the past decade (Figure 12). Compared to some species, CPUE may be less effective for mink, as they are often caught as a secondary target while pursuing other aquatic furbearers, particularly muskrat and raccoon. Abundant habitat and low harvest pressure, suggests the current harvest strategy is not negatively affecting mink populations.

As a high trophic level species, mink can bio-accumulate toxic levels of heavy metals, and this has been known to have negative effects on reproductive fitness and survival. While there are no emerging concerns related to heavy metal bioaccumulation in mink in Idaho, this should be considered when assessing new or existing projects that have the potential to create heavy metal run off in mink habitat. Since this is a concern associated with a wide array of species, this need likely aligns with preexisting comments provided by the Department.

In December 2020, the first known case of COVID-19 in free ranging wildlife was documented adjacent to a mink farm in Utah. This disease has been documented having detrimental effects to captive mink farming facilities across the globe, but how this disease may impact wild mink populations is unknown. The likelihood of the human population that interacts with wild mink, such as trappers and wildlife rehabbers, contracting the disease from infected mink is also unknown.

Management Actions

- Incorporate mink's susceptibility to heavy metal contamination in Department commentary on projects through technical assistance where and when applicable.
- Consider opportunities to collaborate in COVID-19 disease research involving wild mink.

Common Muskrat

Muskrats are one of the most abundant and widespread semi-aquatic furbearer in the United States and Canada (McDonald 2010) and are the most trapped furbearer in North America. In Idaho, they are the third most popular furbearer in terms of trapper participation (Appendix A, Table A-2) and ranked the fifth most important species to trappers (Table 2). In Idaho, muskrats occur in every county and are associated with wetlands, ponds, and slow moving streams (Figure 14). Considered ecosystem engineers, muskrats shape wetlands by the structuring of marshland vegetation through their house construction and herbivory, providing emergent structures and open water that benefit aquatic invertebrates and waterfowl (Bishop et al. 1979, de Szalay and Cassidy 2001). Muskrats are sensitive to various toxins and chemicals and are therefore considered indicators of ecosystem health (Everett and Anthony 1976, Erickson and Lindsey 1983).

Muskrats have small home ranges that are centered on their den burrows and/or houses. In lentic habitats (e.g. marshes, ponds), muskrat home ranges can range from 0.05 to 0.5 ha depending on habitat and demographics (Proulx and Gilbert 1983, Keyser 1989). In linear lotic habitats (e.g., creeks, irrigation ditches), muskrat home ranges may range from 400-900 m of the waterway (Ahlers et al. 2010). Drought conditions and seasonal water fluctuations can cause muskrats to move outside their home ranges to find suitable habitat.

Muskrats are largely herbivorous, consuming a wide variety of plants, but will also consume animal proteins such as freshwater mussels and clams (Neves and Odom 1989). As a dietary generalist, muskrats appear to adapt to non-native food items and persist even in wetlands colonized by invasive plants such as reed canary grass (*Phalaris arundinacea*) and cattails (*Typhus spp.*). In certain conditions, muskrats are known to increase beyond the carrying capacity of the current habitat conditions and an “eat out” will occur in which most of the aquatic plants have been consumed (Pelikan et al. 1970, Danell 1978, Willner et al. 1980).

Muskrats usually begin reproducing in the spring following their birth, but earlier breeding has been documented (Willner et al. 1980). Litter sizes range from three to 12, with 1 to 3 litters a year being produced (Willner et al. 1980, Boutin et al. 1988). Dependent upon environmental conditions, reproduction rates vary widely with peaks associated with water levels that provide an abundance of suitable habitat for emergent vegetation.

Mortality and Harvest

Muskrats rarely live beyond two years and predation is the main source of mortality. Predators include mink, bald eagles (*Haliaeetus leucocephalus*), and great-horned owls (Errington 1967, Dunstan and Harper 1975). Raccoons can be a predator of muskrat kits and in some circumstances will prey on adults (Harris 1951).

Muskrats are known to be hosts and reservoirs for a wide range of pathogens, parasites, and contaminants throughout their range. However, what effects these have on the health and vitality of the individual and at a population level can vary (Ganoe 2019). Muskrats are susceptible to a variety of diseases which can cause localized mortality events. Cysticercosis,

tularemia, Tyzzer's disease, and biotoxin poisoning from cyanobacteria are the leading diseases that can cause die-offs (Ganoe et al. 2020).

Muskrats can withstand high mortality rates. Several studies have estimated that harvest rates of 60-74% by trappers are sustainable under constant environmental conditions (Smith et al. 1981, Clark 1987). Since water levels is the predominant factor driving muskrat populations (Errington et al. 1963, Virgil and Messier 1996, McDonald 2010), flooding and drought can have large effects on localized populations. However, when conditions are suitable, muskrat populations can respond quickly. Muskrat populations generally follow 5 to 10 year population cycles that are related to the carrying capacity of their habitat (Willner et al. 1980).

Trappers and wildlife managers have perceived declines in muskrat populations across North America. Ahler et al. (2017) used 42 years of muskrat harvest data compiled across 37 states to examine trends in muskrat populations across the United States. Controlling for annual pelt prices, Ahler et al. (2017) found strong evidence that muskrat populations have declined across the 37 states. The cause of these declines are not certain, but habitat loss, changes in hydrology, predation, and environmental contamination have all been suggested (Ahler et al. 2017, Ganoe et al. 2020). In Idaho, this work identified a 60 to 69% decline in predicted muskrat harvest since 1970. Over the past 20 years, the Department's monitoring efforts have identified a 31% decline in statewide CPUE (Figure 13).

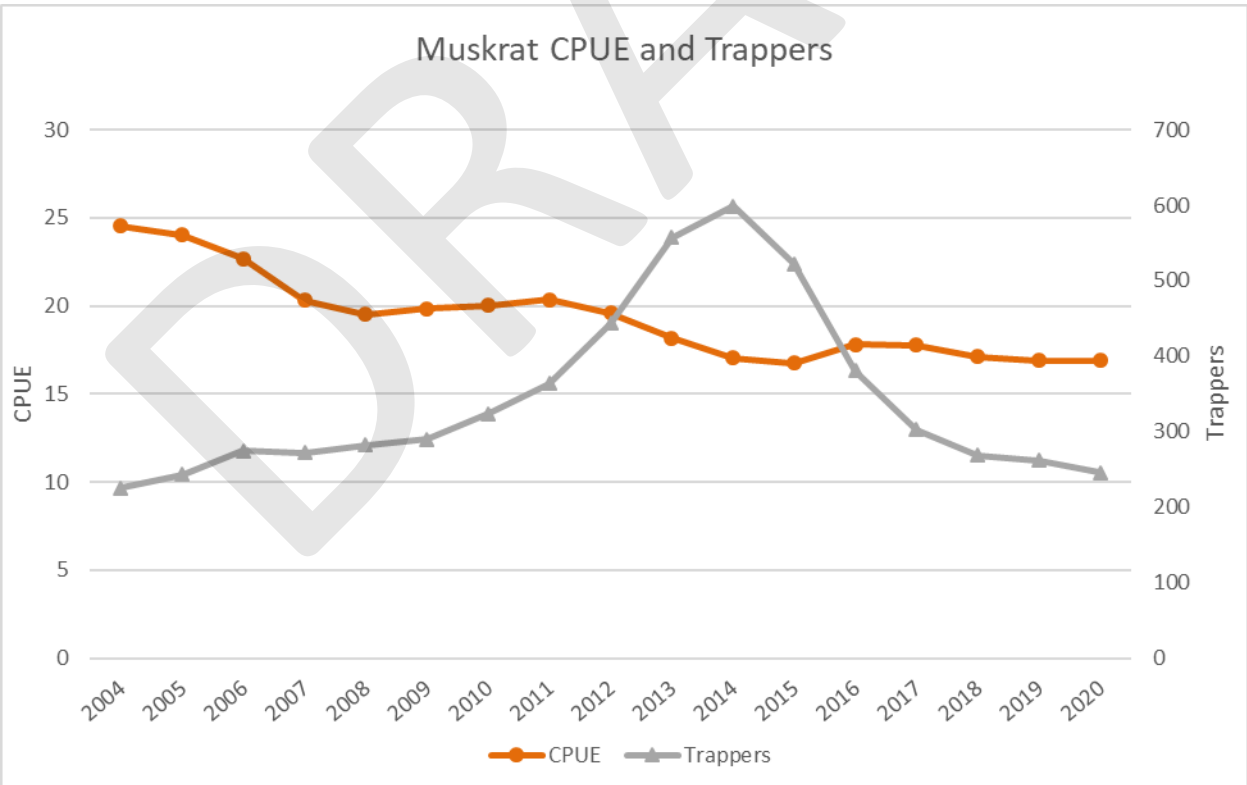

Figure 13. The three-year rolling average of annual muskrat catch per unit effort estimate and the number of muskrat trappers in Idaho, USA.

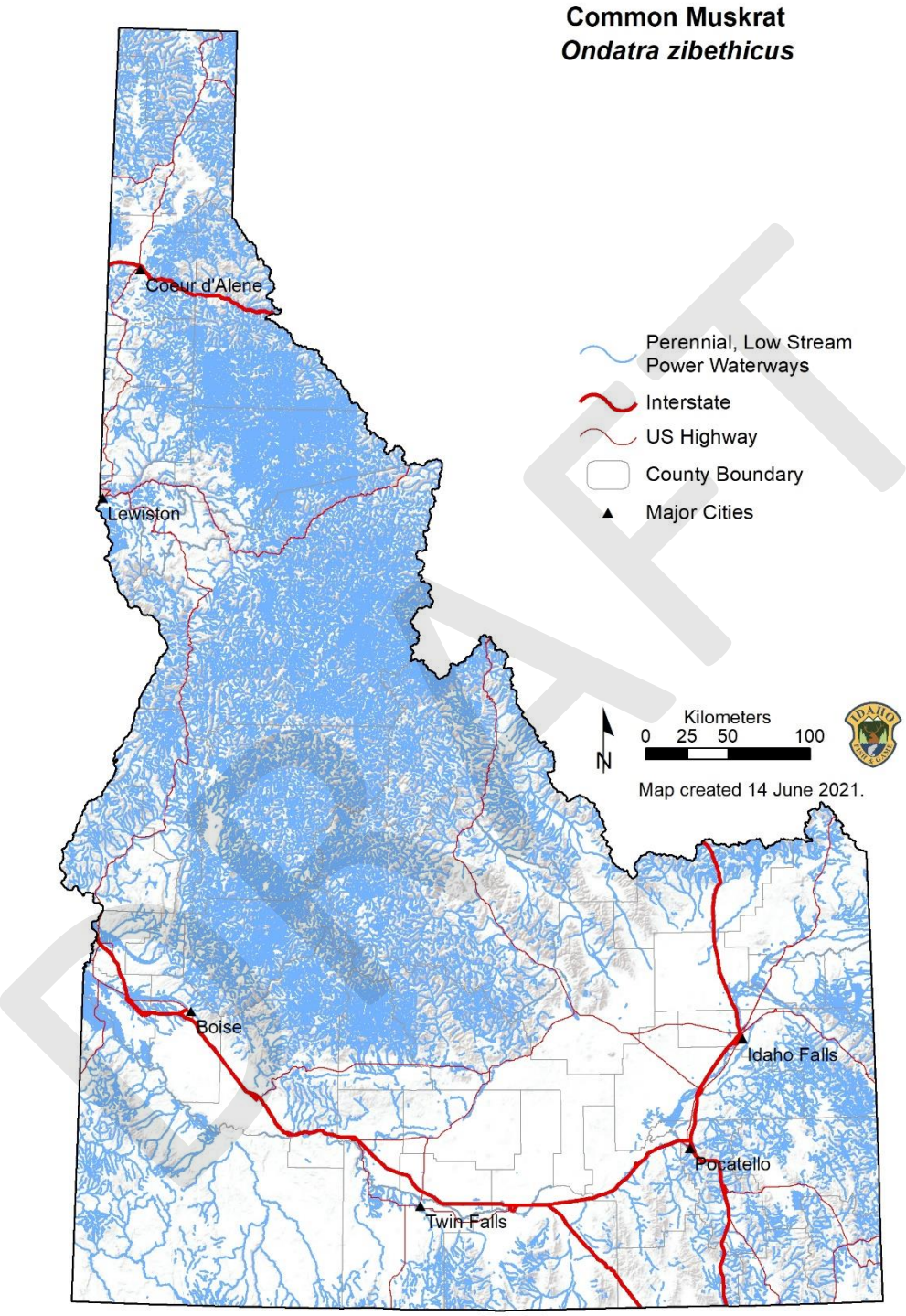

Figure 14. The predicted distribution of muskrats in Idaho, USA.

Wildlife-Human Conflict

Muskrats can cause damage by their burrowing activities and depredation on certain agricultural crops. Economic losses can be as much as $1 million per year in rice producing states (i.e., Arkansas, California, Louisiana and Mississippi; Miller 2018). In Idaho, most muskrat conflicts result from their burrowing into dams, levees, ponds, and irrigation ditches. To address this, existing laws (Idaho Code, Section 36-1107 (c)) allow muskrats to be taken at any time in or along the banks of irrigation ditches, canals, reservoirs or dams, by the owners, their employees, or those in charge of said irrigation ditches or canals.

Management Goals and Direction

Muskrats are an important furbearer in Idaho. They are the most harvested species in the state in terms of total annual harvest (Appendix A, Table A-1) and rank in the top three of trapper participation (Appendix A, Table A-2). While current populations are seemingly meeting trapper demand, concerns exist with the observed long-term declines in muskrat CPUE. Despite these observed declines, overall harvest is low compared to available habitat, reproductive rates of the species are high, and muskrats remain widely distributed across the state. The Department will continue to track trends in the population from CPUE to monitor muskrat to see if this declining trend persists.

Muskrats have small home ranges and large populations can exist on relatively small wetlands. With multiple Department WMAs focusing on wetland habitat, the Department is well suited to promote muskrat populations and trapping opportunity. Muskrats are susceptible to abrupt changes in water levels and winter water depth can be a predictor of the distribution of muskrat houses (Toner et al. 2010). Stable water levels, especially during winter months, are important for muskrat survival and productivity. However, muskrat populations do benefit from periodic drawdowns and flooding of wetland habitats (Allen and Hoffman 1984, Toner et al. 2010). These changes in water levels can result in flushes of emergent vegetation that provide habitat and forage for muskrats as well as many other species of wildlife. As ecosystem engineers, promoting muskrat populations in the right situations could be beneficial to other species of wildlife, especially waterfowl.

Management Actions

- Consider opportunities to participate in regional efforts to determine muskrat population status and perceived declining trends.

Northern Raccoon

A habitat generalist, raccoons are able to exploit a wide array of habitat types across North America. In Idaho, raccoons are found across much of the state, absent only in higher elevation forests and desert areas far from water sources (Figure 15). The highest densities are associated with permanent water sources in conjunction with row crop agriculture and some forested cover.

In a summary of raccoon home range sizes, Kaufmann (1982) identified areas as small as 5.1 ha in a suburban environment in Ohio to over 2,560 ha in the prairies of North Dakota. Adult males maintain exclusive home ranges, but significant overlap exists between females and their young. Due to this overlap between females and young, raccoon densities can become quite high. Documented densities have varied from 12.8 to 31 raccoons/km^2 in various studies across the US (Slate 1980; Yeager 1937). Based on habitat needs, densities in Idaho are likely at the lower end of reported estimates.

Raccoons are omnivorous and able to utilize a wide array of food sources. Studies of food habits identify raccoons utilizing a wide array of wild and domestic fruits, nuts and berries, as well as crayfish, mussels, carrion, small mammals, and amphibians. Where available, raccoons will utilize human associated food sources such as garbage, a wide variety of row crops, as well as prepared food for human and/or animal consumption.

Raccoons are capable of breeding during their first year and produce one litter annually. Litters are born in the spring with size ranges from 2 to 5 young and an average of 2.6. The young can begin to disperse from the mother approximately 9 months after birth, but often stay in the natal group up to 18 months. In the wild, a raccoon's lifespan is heavily influenced by harvest intensity with lifespans averaging <5 years, although animals as old as 16 years have been documented (Johnson 1970).

Mortality and Harvest

Human activities (e.g. hunting and trapping, vehicle collisions) are the leading cause of mortality with raccoons. In a study of a relatively unhunted population, starvation and extreme parasitism were the leading causes of death of juvenile animals, however adult mortality was extremely low (Mech et al. 1968). The only diseases reported to have localized impacts on populations are distemper (Johnson 1970).

Raccoons are able to sustain population levels under high harvest. This is due to their flexibility in diet and habitat requirements, the ability to exist at high population densities, low non-human-caused mortality, and relatively high reproductive rates. Investigation of harvestable rates of raccoons in Illinois under three fecundity rates (low, medium, and high) suggested a sustainable harvest rate of 49 to 59% of the population (Sanderson et al. 1984).

Figure 16 illustrates a relatively stable CPUE over the last 18 years, fluctuating between 10 to 12 animals per 100 trap nights with participation averaging around 230 people pursuing raccoons

each season (Figure 16). While information on specific densities in Idaho is lacking, overall harvest is low, with a 24 year reported harvest average of 1,140 animals annually (Appendix A, Table A-2).

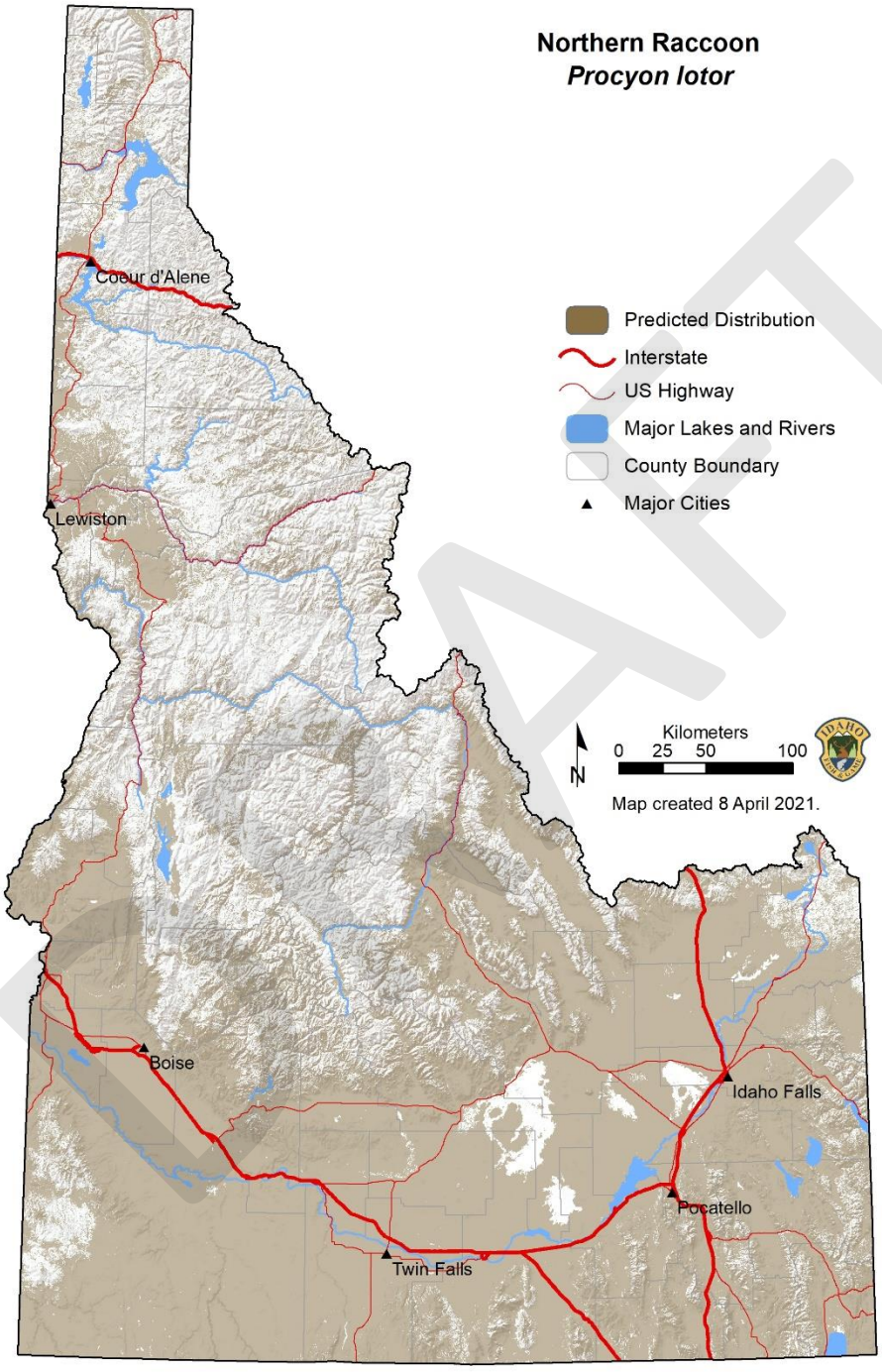

Figure 15. The predicted distribution of Northern Raccoon in Idaho, USA.

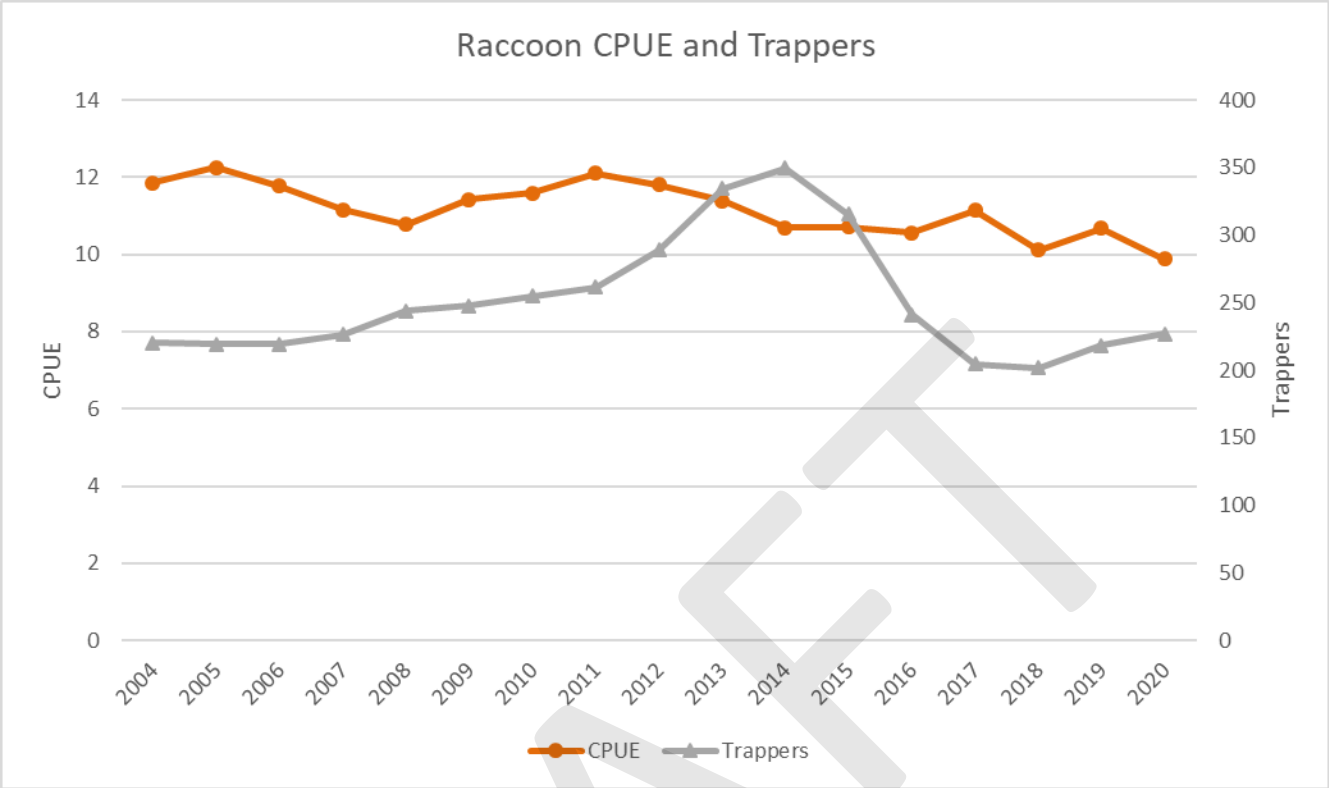

Figure 16. The three-year rolling average of annual raccoon catch per unit effort estimate and the number of raccoon trappers in Idaho, USA.

Wildlife-Human Conflict

Raccoons are known to cause damage by depredating poultry farms, fish ponds and hatcheries, raiding gardens and food stores for livestock, as well as having localized impacts on large scale agriculture, particularly corn. In specific situations, they are known to depredate on wild bird populations that nest in high densities, including waterfowl and colonial nesting waterbirds. Additionally, raccoons carry several zoonotic diseases that can negatively affect humans, including raccoon roundworm, leptospirosis, and rabies.

Management Goals and Direction

Raccoons are a popular species to trap and rank in the top five most pursued species from furtaker harvest report data over the past 25 years (Appendix A, Table A-4). Because raccoons are classified as predators, the Department has limited ability to implement specific management strategies. Their stable CPUE and ability to withstand high harvest rates suggests the raccoon population is stable in Idaho.

Management Actions

- No raccoon specific proposed management actions.

Red Fox

The red fox is a small member of the canid family and the most widely distributed carnivore on the planet (Voigt 1987). Red foxes occupy habitats ranging from tundra to desert, though they are most abundant in agricultural areas across North America (Samuel and Nelson 1982, Voigt 1987, Larivière and Pasitschniak-Arts 1996). In Idaho, red foxes may be found in all habitat types except those found at the highest elevations, however they are not evenly distributed across all habitat types (Figure 17).

Red fox family groups are territorial, with distinct, non-overlapping home ranges. In eastern North America, home ranges were 500 to 2,000 ha in good-quality habitat (Voigt 1987). While there are no home range sizes or population density estimates available for Idaho, densities of 1 to 3 foxes/km^2 have been documented in good habitats in eastern North America (Voigt 1987). In lower quality boreal forest and tundra habitats, densities as low as 0.1 foxes/km^2 have been reported (Voigt 1987). Local population densities are likely related to small mammal abundance, the presence of alternative food sources, and competition with other predators.

Red foxes have a varied diet (Samuel and Nelson 1982) dominated by small and medium-sized mammals (Green and Flinders 1981). They are omnivorous and will readily consume berries and other vegetation at certain times of the year. Ground-nesting birds, bird eggs, and fledgling birds are also susceptible to fox predation, particularly during the nesting season. Invertebrates and herpetofauna can provide food sources in some environments and carrion can be an important food source, particularly in late winter.

Although red foxes are generally considered to be seasonally monogamous, there is evidence to suggest that some level of polygamy occurs. Most breeding takes place during January-March, and gestation lasts for 52 days. Females <1 year old may breed in low-density populations. Litter sizes of 3 to 6 pups are typical, however litters of $\geq$14 pups have been documented (Voigt 1987). Fecundity in foxes appears closely tied to mortality rates—higher mortality results in higher fecundity (Voigt 1987, Larivière and Pasitschniak-Arts 1996).

Mortality and Harvest

Red foxes are susceptible to a variety of mortality factors. Hunting, trapping, and other human-caused mortality (e.g., roadkill, poultry protection) can be locally significant. In some states and provinces, human-caused mortality can be as much as 85% of the juvenile population (Voigt 1987). Population size and current fur prices can significantly affect harvest levels (Voigt 1987). Foxes are often trapped as a secondary target species in coyote and bobcat sets.

Diseases and parasites can locally impact both adult and juvenile foxes (Samuel and Nelson 1982). In Idaho, sarcoptic mange may be an important non-human cause of mortality. Although mange itself is not lethal, it can cause indirect mortality due to starvation, hypothermia, and infection. To date, rabies has not been detected in Idaho fox populations, however it can be a significant cause of fox mortality where it occurs. Other diseases, such as parvovirus and

distemper, and various internal parasites can kill foxes (Voigt 1987), but none are likely to pose a serious threat to red fox populations in Idaho.

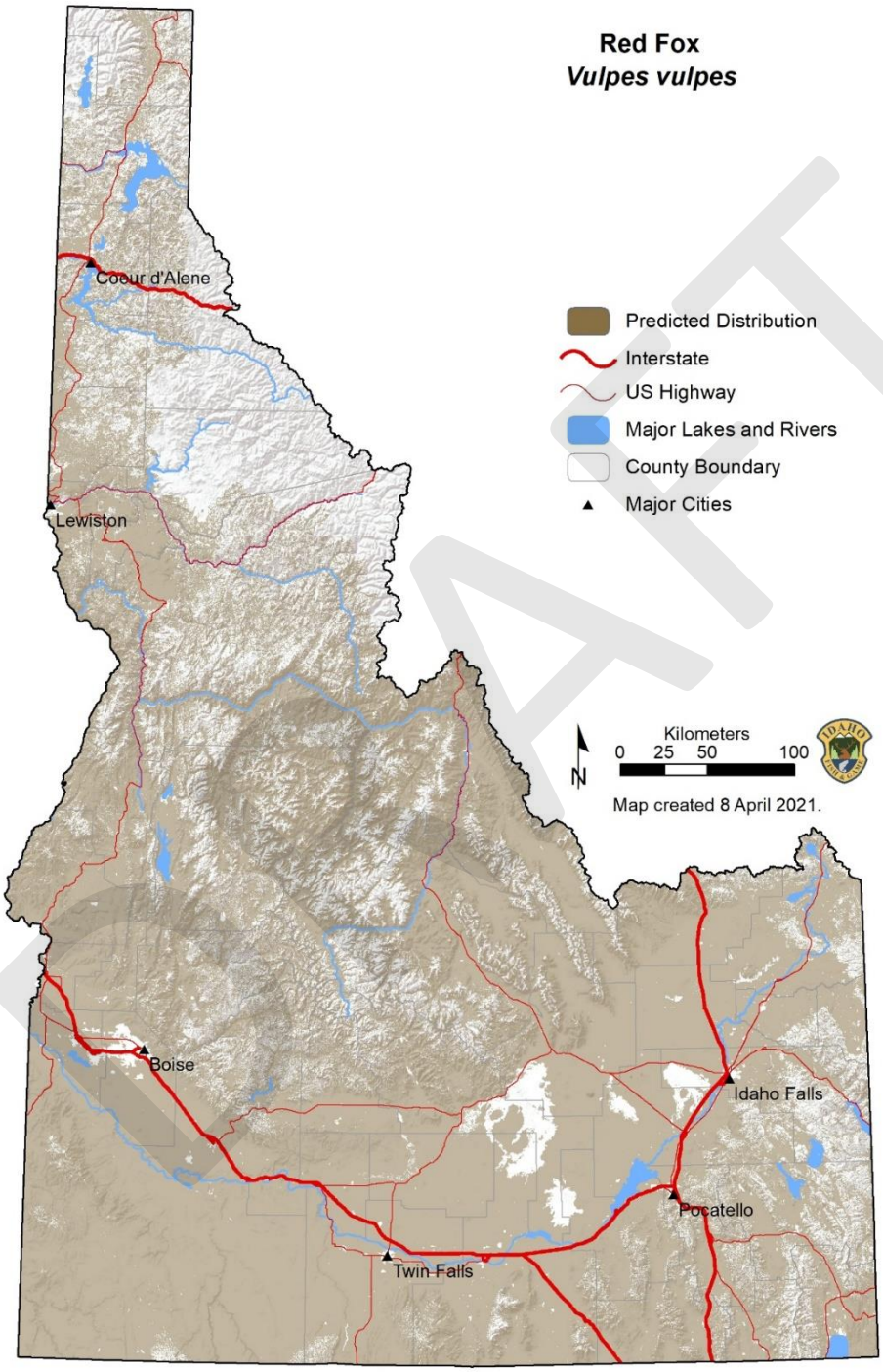

Figure 17. The predicted distribution of red fox in Idaho, USA.

There is evidence to suggest that red fox populations are held in check by coyotes due to interspecific competition (Voigt and Earle 1983, Harrison et al. 1989, Sargeant and Allen 1989, Mueller et al. 2018). Consequently, foxes may flourish in areas with low coyote densities. If coyote populations are similarly limited by the presence of grey wolves (Dekker 1989), red fox abundance may be higher in areas with wolves present.

Red fox CPUE in Idaho has varied between four and seven since 2002 with a steady decline observed since 2011 (Figure 18). Red foxes are often caught as a secondary target while pursuing coyotes, and therefore it is difficult to uncouple CPUE trends between the two species. Causes of the observed decline in CPUE and absence of red fox in the northern parts of the state are unknown. In eastern parts of the country, red foxes are associated closely with agriculture and changes in agriculture practices have been hypothesized to negatively affect red fox populations in these areas. Historical distribution of red foxes in Idaho is also unknown and their populations in the Panhandle and Clearwater regions could have consistently been limited.

Wildlife-Human Conflict

Red foxes are rarely in conflict with humans except in isolated instances. Foxes will readily occupy home ranges that include both agricultural and suburban landscapes which can result in the loss of poultry (and eggs) and other conflicts. In Idaho, USDA Wildlife Services removed <10 nuisance red foxes annually from 2014–2018 (USDA WS 2020).

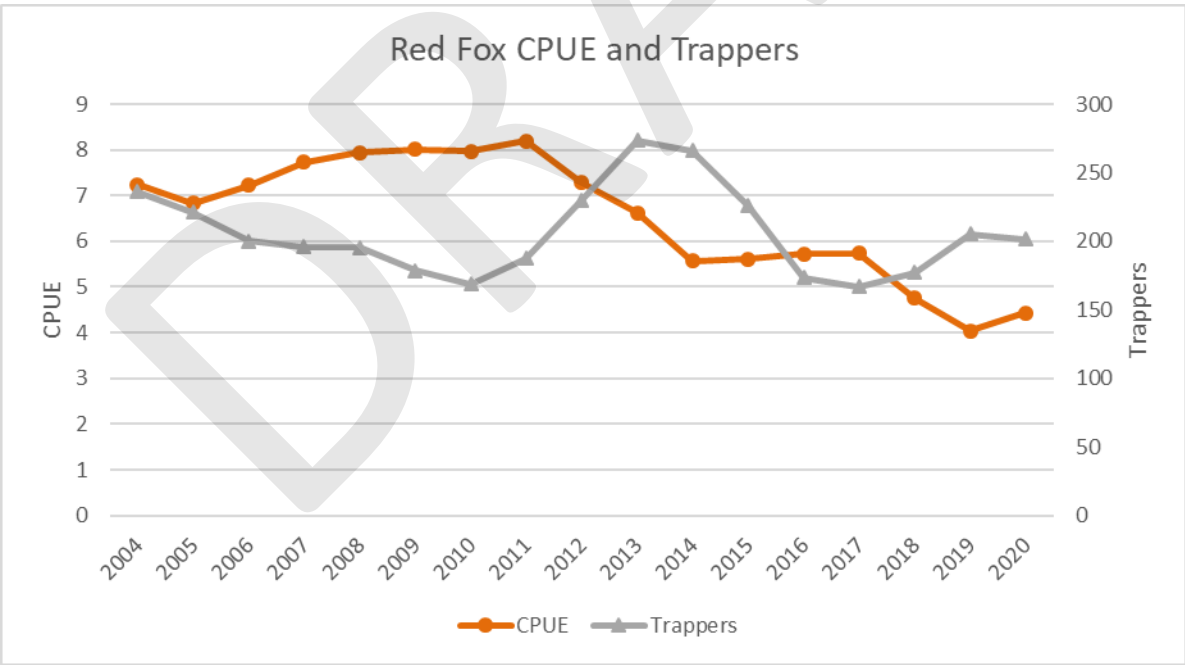

Figure 18. The three-year rolling average of annual red fox catch per unit effort estimate and the number of red fox trappers in Idaho, USA.

Management Goals and Direction

It is unknown if the observed declining red fox CPUE is associated with a population decline or due to the increase in coyote trapping popularity since they are often caught as a secondary target while pursing coyotes. While the Department does not have a detailed understanding of red fox densities, large expanses of habitat exist which is inaccessible to trappers due to steep terrain and low road densities. The abundance of available habitat, combined with small home range of red fox and a comparatively small harvest suggests harvest pressure on red fox at a statewide scale is sustainable.

Across the western US, genetic work has started to identify multiple subspecies of red fox. To date, much of this work has been focused on fox populations in the west coast states, but there is increased interest to explore genetic variation and potential existence of new subspecies across the United States. This effort has resulted in identifying populations that have been listed or petitioned for listing under the ESA. No comprehensive work has been conducted in the intermountain states yet to explore the potential for genetic subspecies.

Management Actions

- Explore the utility of red fox data collected through other sampling efforts (i.e. camera and genetic based surveys) in monitoring status and distribution.

- Consider participating in collaborative state agency work exploring the genetic structure of red fox populations.

North American River Otter

The river otter is a modern day conservation success story. Their native range covers most of North America with the exception of the extreme arctic and portions of the arid Southwest and central Plains. However, by the early 1900s river otters were extirpated or nearly extirpated from 20 of the lower 48 states. Subsequently, focused conservation efforts by state wildlife agencies have made great progress in restoring the species. Today, river otters occupy all 48 states and have likely reached their maximum geographic distribution in the United States (Roberts et al. 2020).

River otters are able to inhabit a wide array of natural and manmade aquatic habitat types. In Idaho, river otters inhabit perennial water bodies across the state and are absent only in sparsely vegetated desert waterways (Figure 19). The primary driver of river otter occupancy in any given waterway is likely prey availability.

In Idaho, seasonal home range was determined by Melquist and Hornocker (1983) as minimum linear distance traveled and found to range from 8 km for a juvenile female in the fall to 78 km for a yearling male in the summer. Additional research in the Clearwater region estimated home range lengths to vary from 15.5 20 148.3 km (Mack et al. 1994). Home ranges among individuals do overlap, and multiple individuals have been documented using the same foraging areas (Melquist and Hornocker 1983). Population densities are also variable, and Melquist and Hornocker (1983) found that densities ranged from 1 river otter/2.7 to 5.8 km of waterway in the different regions of central Idaho during a 1970s study.

River otters are opportunistic feeders and are able to utilize a wide array of aquatic and terrestrial food sources. Although most studies have found that fish are the most important component of their diet, river otters will also consume invertebrates, birds, amphibians, and small mammals (Anderson and Woolf 1987, Mack et al. 1994, Day et al. 2015). In particular, crustaceans (primarily crayfish) can make up a significant portion of the non-fish diet, and have been shown to be an important prey species in Idaho (Mack et al. 1994). River otters in Idaho are likely to specialize in warm water fish and crayfish species in lakes, ponds and larger river systems, but may also target salmonids when they are the most readily available prey in cold water systems.

Female river otters breed for the first time at 2 years old, and will then produce up to one litter annually. In Idaho, river otters breed in late April or May and give birth in March or early April the following spring. Similar to other mustelids, river otters exhibit delayed implantation, which results in a fertilized egg lying dormant for approximately 8 to 9 months after successful breeding. In addition, river otters exhibit induced ovulation. Males become sexually mature at 2 years of age, but may not become successful breeders until ages 3 to 5 when the bacculum has fully developed (Hamilton and Eadie, 1964, Stenson 1985, Diggs 2013). In central Idaho, litter size averaged 2.4 pups per breeding female. The pups are weaned at 5 months and disperse from parents within the first year, staying with the mother until early March at the latest. In the wild, river otter lifespan is generally 10 years or less.

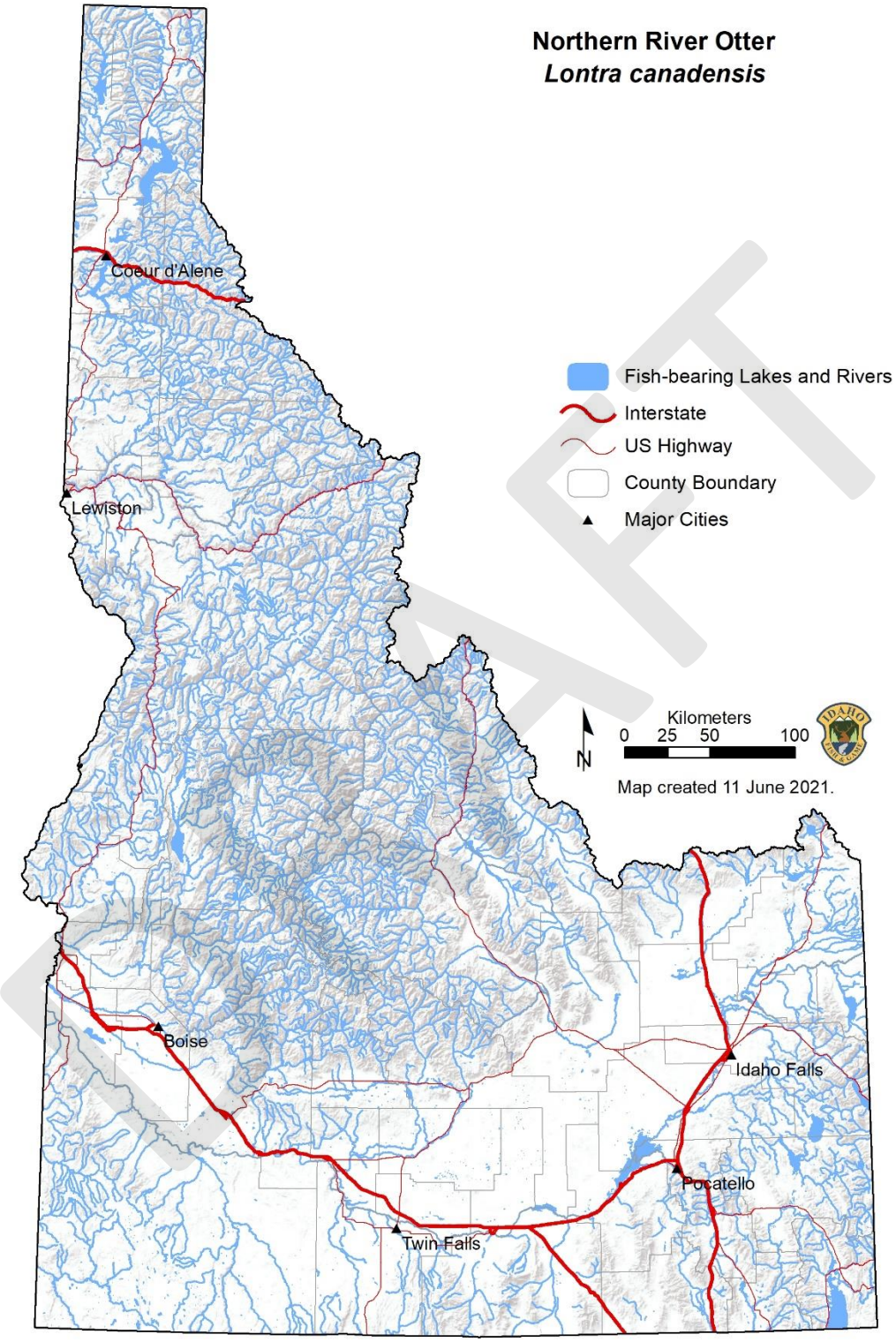

Figure 19. The predicted distribution of river otter in Idaho, USA.

Mortality and Harvest

River otters have very few natural predators and are especially safe from predation when in the water. When travelling on land, they are vulnerable to predation from domestic dogs and coyotes, and potentially other large carnivores (Hornocker and Melquist 1983). The leading causes of mortality in wild river otter populations are human driven and often associated with trapping and vehicle collisions (Hornocker and Melquist 1983, Rutter 2018). Death due to parasite and disease is difficult to assess (Kimber and Kollias 2000), and has not been documented in Idaho-specific studies (Hornocker and Melquist 1983, Mack et al. 1994).

Overharvest and aquatic habitat alterations and contamination in the early 1900s are thought to have been the primary factors in reducing the river otter range across much of the contiguous United States (Roberts et al. 2020). They are particularly susceptible to water pollution as many pollutants directly affect their prey, as well as individual river otters themselves (Kimber and Kollias 2000). In the 1970s many states and provinces, including Idaho, began implementing management actions to directly address river otter conservation (Melquist and Hornocker 1979, Raesly 2001).

After a 29-year closure on legal trapping in Idaho, a river otter trapping season was reopened in 2000. The Department set initial trapping regulations utilizing both regional and personal quotas, a conservative framework that involved modeling available habitat across the state, estimating river otter densities from published research, and extrapolating to determine a potential population size. Along with an estimate of habitat availability and estimated population size within each administrative region, a 5% estimated harvest rate was used to develop regional harvest quotas. Since the initial quota structure was set, regional quota limits have been slowly increasing throughout the state. Continued non-target otter captures, along with stable CPUE rates (Fig. 20), suggests a stable population. As of 2020, Idaho had a total allowable harvest of 160 animals across the seven regions.

Figure 20 shows that CPUE for river otters has fluctuated between approximately 9 and 12 animals captured per 100 trap nights. Additionally, the number of trappers pursuing river otters over that same period averaged 71.9 annually, with notable spikes during 2014 and 2015 following a pronounced rise in fur prices. From 2000 to 2019, total statewide river otter annual harvest ranged from 82 to 196 animals, with an average of 126 animals (Table A-1).

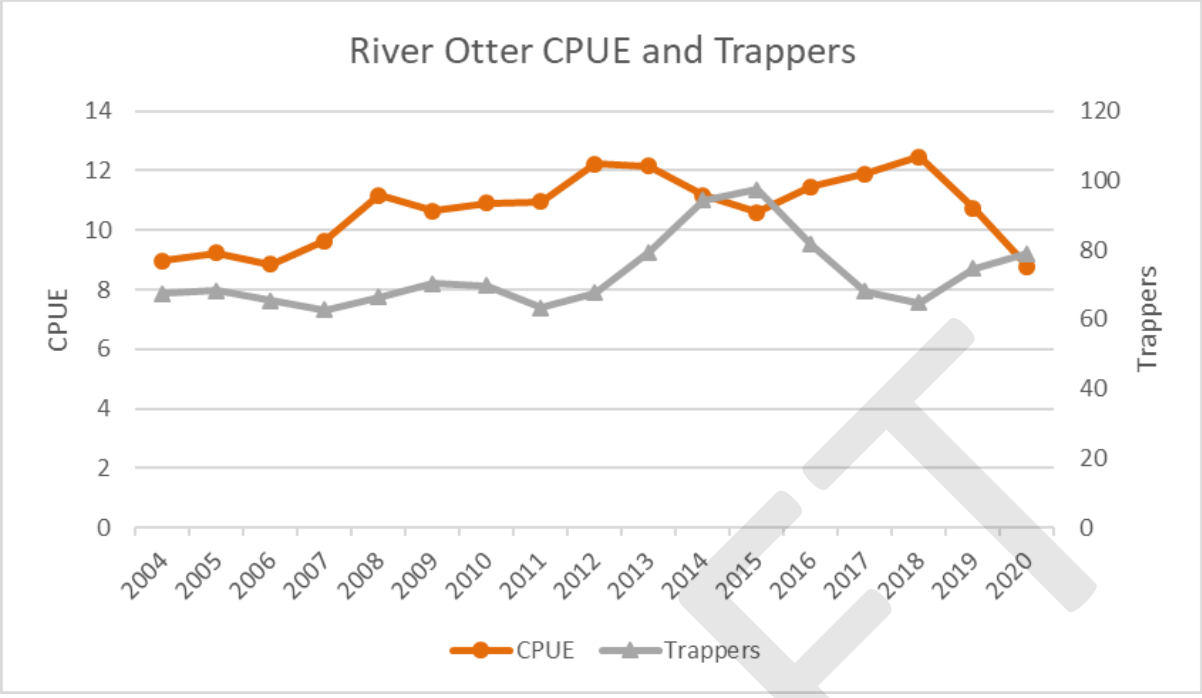

Figure 20. The three-year rolling average of annual river otter catch per unit effort estimate and number of river otter trappers in Idaho, USA.

Wildlife-Human Conflict

In some settings, river otters can be a nuisance by depredating fishponds, hatcheries, and popular recreation waterways. Additionally, their scat and latrines can be unsightly and destructive on docks and marinas. River otters can host a variety of endoparasites (e.g., nematodes and trematodes), including some species that may be passed to pets through feces, though these transmissions rarely lead to clinical symptoms (Kimber and Kollias 2000).

Management Goals and Direction

Since reopening the state for river otter trapping during the 2000 trapping season, the Department has made multiple adjustments to harvest management including increasing/decreasing regional quotas, increasing personal quotas, and opening/closing waterways to harvest. Statewide, the stable river otter CPUE and abundant available habitat suggests a stable population. Furthermore, the conservative harvest management through regional and personal quotas provides security from overharvest.

While the current management strategy has built-in safeguards to ensure a sustainable level of harvest, the Department lacks the tools to accurately assess how increasing harvest opportunity, and therefore harvest, may affect river otter populations. Unlike most furbearers, and even some big game species, river otters have a low reproductive rate, occur on the landscape at low densities, and are unable to recovery quickly from overharvest. The CPUE data has limited applicability in monitoring Idaho's river otter population. CPUE works best under consistent harvest pressure and large harvests of a target species. Low overall harvest of the species, especially at a regional scale, combined with river otters often being harvested as a

secondary target while targeting beaver, makes CPUE data less reliable, particularly at a regional scale.

For the Department to assess the impacts of increased harvest opportunity, additional monitoring data is needed. Outside of using harvest data, river otter monitoring can be a labor and time intensive endeavor. Population estimates using mark-recapture techniques are expensive and only feasible at small scales. Therefore, most agencies that conduct monitoring beyond harvest data utilize some form of sign-based surveys, using density of sign and/or sign under an occupancy framework as proxies for population levels. Due to Idaho's large size and ecological diversity, proposed monitoring efforts would need to consider the costs, personnel time, and access needed to improve population estimates and monitoring methods for management purposes. Also, due to logistical constraints, monitoring efforts may only include a subset of available habitat, therefore the variation in population densities among habitat types would need to be considered.

Management Actions

- See the "Harvest Management and Population Monitoring" section of this plan

Western Spotted Skunk

The Western Spotted Skunk is the smallest North American skunk (Rosatte and Larivière 2003). The species is currently distributed from central Mexico north to British Columbia, with an east–west distribution reaching from the California Coast to the central Great Plains (Verts et al. 2001). In Idaho, the species is presumed to be distributed across much of the state.

Spotted skunks are omnivores and occupy a variety of habitats including wooded areas, tallgrass prairies, and rocky canyons, but seldom occur in low-lying deserts (Rosatte and Larivière 2003). Availability of burrows, food, and thick vegetative cover likely is essential for the maintenance of *Spilogale spp*. populations (Rosatte and Larivière 2003). In western Washington and Oregon, the western spotted skunk was found widely distributed throughout upland coniferous forest, contrary to habitat associations previously reported (e.g., Brown 1985, Carey and Kershner 1996).

Populations of spotted skunks are disjunct and often localized (Rosatte and Larivière 2003). Reported density estimates for Eastern Spotted Skunk (*S. putorius*) range from 5.0/km^2 in an agricultural area (woodland pasture and flat intensively cultivated agricultural land) of Iowa (Crabb 1948) to 40/km^2 on a Florida barrier island (Kinlaw et al. 1995).

Western Spotted Skunks breed in September, undergo delayed implantation, and give birth in April and May (Mead 1968). Gestation lasts 210 to 230 days with a mean litter size of 3.8 (range 2 to 5; Mead 1968). Western Spotted Skunk is considered reproductively isolated from Eastern Spotted Skunk (Rosatte and Larivière 2003).

Mortality and Harvest

Spotted skunks are preyed upon by a variety of predators including bobcat, great horned owl, (Howard and Marsh 1982), and domestic dogs and cats. One study speculated that most deaths are caused by human activities such as automobile collisions, shooting, and trapping of skunks as pests (Howard and Marsh 1982, Rosatte 1987). Although rabies has been documented in spotted skunks elsewhere within their range, it has not been documented in Idaho's population. The incidences of rabies in spotted skunks varies temporally and geographically, and the impact of infectious diseases such as rabies on the regulation of populations is unknown (Rosatte and Larivière 2003). In captivity, spotted skunks may live almost 10 years (Egoscue et al. 1970). In the wild, they probably experience shorter life spans, most likely <5 years (Van Gelder 1959).

Rangewide, spotted skunks are not a popular species to pursue and are likely caught as secondary targets while pursuing other species of furbearers. In Idaho, both reported captures and participation is low. Statewide harvest has been reported in 33 of 44 counties, (Figure 21) and averages around 36 animals annually (Appendix A, Table A-1). Since harvest is low and spotted skunks are often captured as a secondary target, it is not possible to calculate CPUE trends.

Human–Wildlife Conflict

Skunks become a nuisance when their burrowing and feeding habits conflict with humans. Skunks sometimes damage apiaries by eating bees, and will occasionally dig in golf courses, yards, and gardens for grubs and insects (Rosatte 1987, Knight 1994). However, these complaints must be weighed against the skunk's beneficial destruction of insects, especially in agricultural areas (Rue 1981). Skunks may also burrow under porches or buildings by entering foundation openings, sometimes creating a nuisance with their odor (Crabb 1948, Knight 1994). Occasionally, skunks feed on corn, kill poultry, and eat eggs (Crabb 1948).

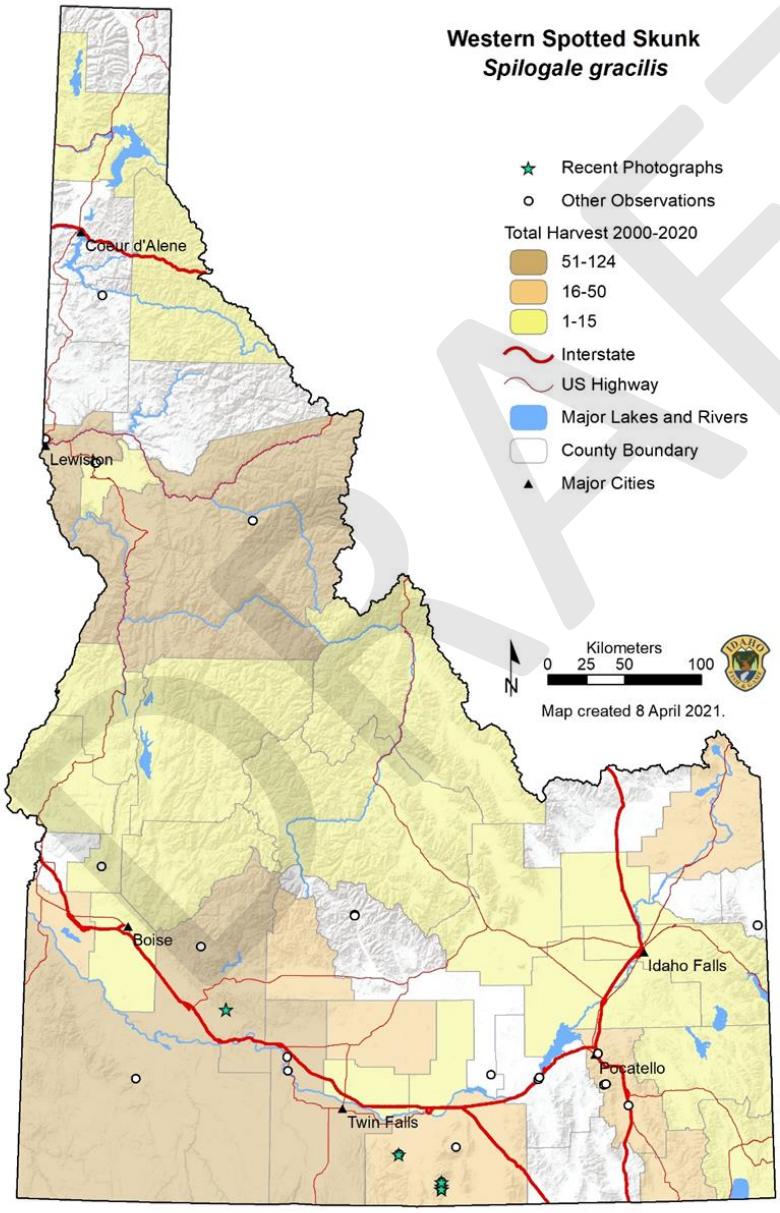

Figure 21. Western Spotted Skunk trapper harvest by county and incidental observations, 2000 to 2020, Idaho.

Management Goals and Direction

The status and distribution of spotted skunks are unclear in several states (Rosatte and Larivière 2003). Whereas the status of Western Spotted Skunk is virtually unknown, long-term trends for the congeneric Eastern Spotted Skunk suggest this species has experienced a significant range-wide decline and the species is currently listed by various state agencies as endangered, threatened, or "of concern" across much of its range (Gompper and Hackett 2005). In 2012, the US Fish and Wildlife Service found a petition to list the Plains Spotted Skunk (*S*. *p*. *interrupta*) as endangered or threatened under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) may be warranted (Endangered and threatened wildlife…2012). The International Union for Conservation of Nature (IUCN) categorizes the Western Spotted Skunk as "Least Concern" with a decreasing population trend but considers the decline not to be at a rate fast enough to be categorized as "Near Threatened" (Cuarón et al. 2016).

In Idaho, the spotted skunk is currently classified as predatory wildlife, yet the species has been elevated to a species of greatest conservation need in several western states (Washington, Arizona, Texas, California, and Wyoming) due to a lack of information on its current status. Accordingly, the fundamental objective for spotted skunk management in Idaho is to maximize the persistence of this species' populations. Increasing our understanding of the status of spotted skunk in Idaho is essential to future conservation and management efforts as well as to inform potential future listing petitions.

Management Actions

- See the "Harvest Management and Population Monitoring" section of this plan

Striped Skunk

Striped skunks are small (4 to 10 pound) nocturnal omnivores who live in a wide variety of habitats within the lower 48 states, Canada, and northern Mexico. In Idaho, they are found throughout the state, but are most common at elevations below 6,000 ft (Figure 23). Although strong diggers, they often take advantage of human structures (basements, porches, outbuildings, and culverts) for use as den sites, or co-opt the abandoned dens of other species. At northern latitudes during winter, they may spend as many as 100 days per year in torpor inside their dens. Normally solitary, skunks will den communally during winter to conserve heat and energy.

Skunks breed once per year in spring, and females give birth to 5 to 8 kits in early summer (Hamilton 1963). Kits stay with the female until late summer to early fall when dispersal occurs. Densities are dependent on habitat quality, ranging from 0.5 to 14.3 skunks/km^2 (Verts 1967, Bjorge 1977). Densities tend to be highest in areas of mixed agriculture.

Skunks are primarily nocturnal, foraging along habitual routes for terrestrial and aquatic insects, small reptiles, mice, snails, worms, and the eggs of ground-nesting birds. True omnivores, they also eat fruit, berries, row crops, compost, and carrion.

Mortality and Harvest

Skunks serve as prey for a variety of animals including badgers, great horned owls, coyotes, and golden eagles. Human-caused mortality in the form of trapping, hunting, roadkill, and farm machinery are also common. Skunks are parasitized by a wide array of endo and ecto-parasites, which can reduce fitness.

Since 2004, statewide harvest of striped skunk and the number of skunk trappers have increased, and CPUE has fluctuated between 12 and 16 (Figure 24). However, since 2015, a declining pattern has begun to emerge. Striped skunk CPUE as a metric for population status is likely less reliable than for some other species since they are often caught as a secondary target while trappers are pursuing bobcat, coyote, and fox. With a strong market for coyote pelts, the Department has observed a pronounced increase in coyote harvest, and this is likely contributing to the increased harvest and trapper participation seen with striped skunks.

Wildlife-Human Conflict

Striped skunks are common in rural areas and often use human structures for denning areas. As a result of their willingness to live in close vicinity to humans, conflicts can arise from striped skunks raiding poultry coops for eggs, digging in yards and/or gardens and flower beds for grubs, or spraying homeowners' dogs during altercations. In other parts of the country, skunks can be a primary carrier of rabies, and the skunk rabies variant can be found in the Midwest, Southwest, and California, but has not been detected in Idaho. As nest predators, skunks can also be considered problematic for upland game and waterfowl production (Vickery et al. 1992, Pasitschniak–Arts and Messier 1995).

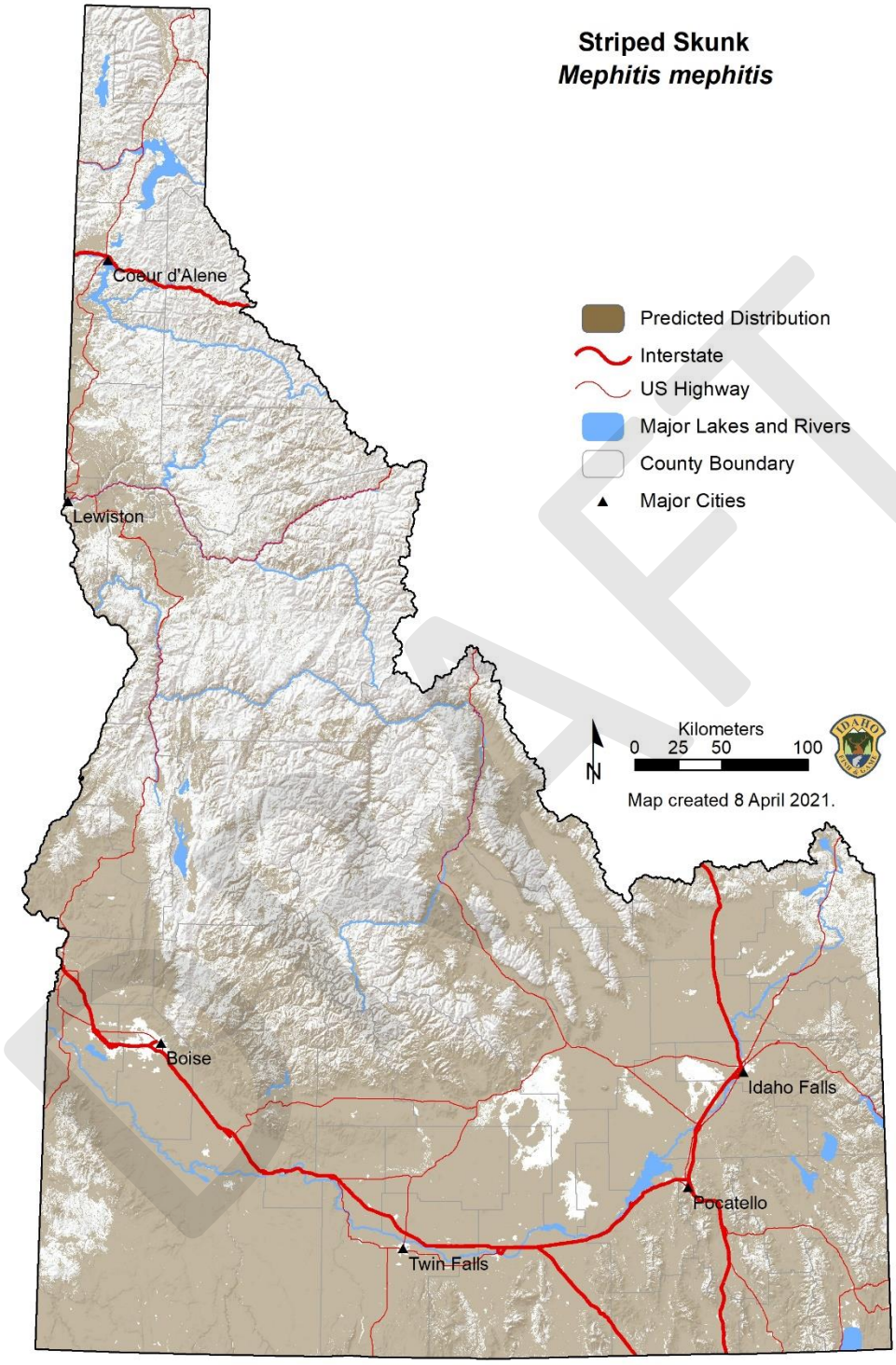

Figure 23. The predicted distribution of striped skunk in Idaho, USA.

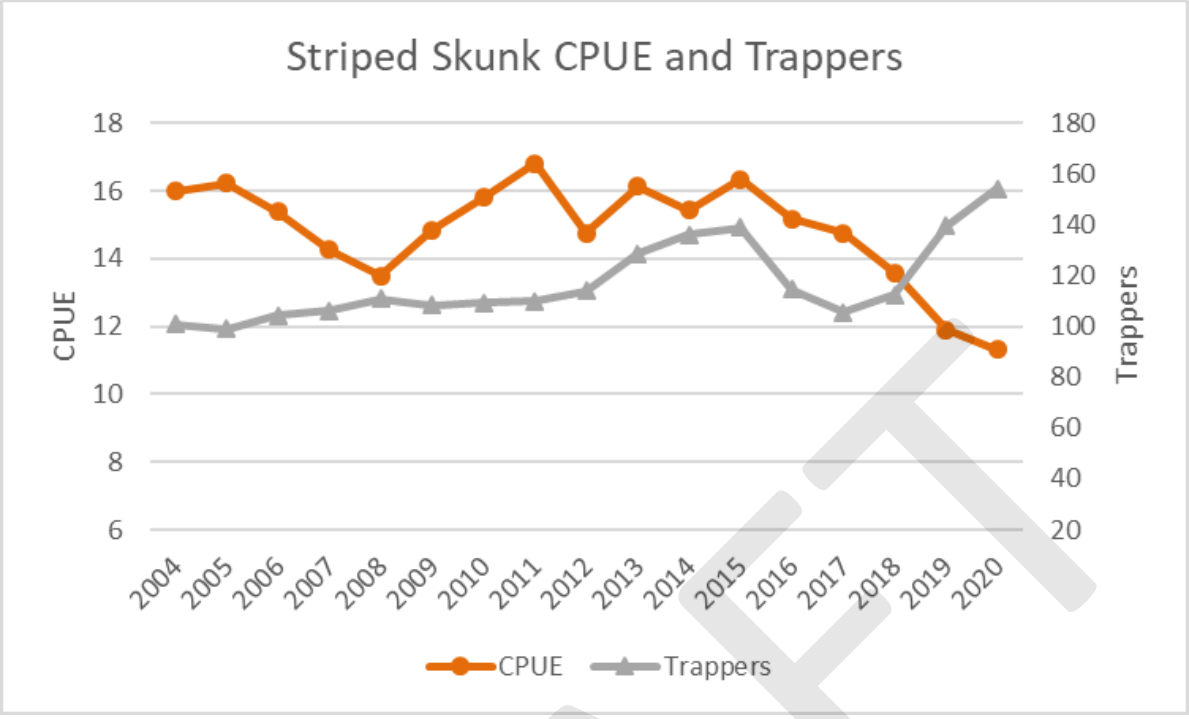

Figure 24. The three-year rolling average of annual striped skunk catch per unit effort estimate and the number of striped skunk trappers in Idaho, USA.

Management Goals and Direction

Striped skunks are currently classified as "predatory" in Idaho, and thus the Department has limited ability to direct management. Multiple years of data collected from trappers show that skunk harvest numbers are relatively low across the state and CPUE is stable over the long term (Figure 24). This combined with ample suitable habitat, suggests that striped skunk populations are stable in Idaho.

Management Actions

- No striped skunk specific proposed management actions.

American Ermine and Long-Tailed Weasels

Idaho is home to two weasel species: the ermine (also referred to as the "short-tailed weasel") and the long-tailed weasel. Both species are brown along their dorsal area and white along their belly. In the winter, both species turn white, except for the tip of their tail, which remains black. The long-tailed weasel is about 1/3 larger than the ermine. Individuals of both species are typically solitary except during the mating season and are known to be territorial.

Both species are found across a wide swath of North America, and overlap over large portions of their range, including Idaho (Figures 25 and 26). Where both species occur, long-tailed weasels tend to be much less common, with reported ratios of ermine to long-tailed weasels in the harvest ranging from 1:1.5 (Gamble 1980) to 1:119 (Hall 1981). It is unknown if a similar relationship exists in Idaho.

Like other mustelids, weasels exhibit sexual dimorphism with males being larger than females. Ermine females have an average home range size of 8.6 ha compared to males that have a home range of 51.3 ha (Linnell et al. 2017a). Long-tailed weasels tend to have larger home range sizes. A female's average home range size can be as high as 51.8 ha with male's ranging up to 180.3 ha (Gehring and Swihart 2004). The home range sizes of both weasel species depends on habitat type, fragmentation, and food resources that exists in their respective habitats.

Weasels are strictly carnivores and will prey on an array of species. They mostly consume small mammals such as voles and mice but will frequently prey on snakes, rabbits, and birds. They are a generalist predator, which may contribute to their ability to live in many habitat types. Females tend to be more sensitive to prey abundance during the breeding season and select areas such as early seral forests that produce more small-mammal prey (Linnell 2014).
Both species breed during April-June and give birth to young the following April or May (King and Powell 2007). Litter size is typically 4 to 9 kits, which begin consuming meat within a few weeks. Female ermine kits will often breed during their first few months of life, giving birth the following spring. Female long-tailed weasels often do not breed until after their first year. The young of both species become independent quickly, with short-tailed weasels dispersing within 16 weeks and long-tailed weasels dispersing around 10 to 12 weeks.

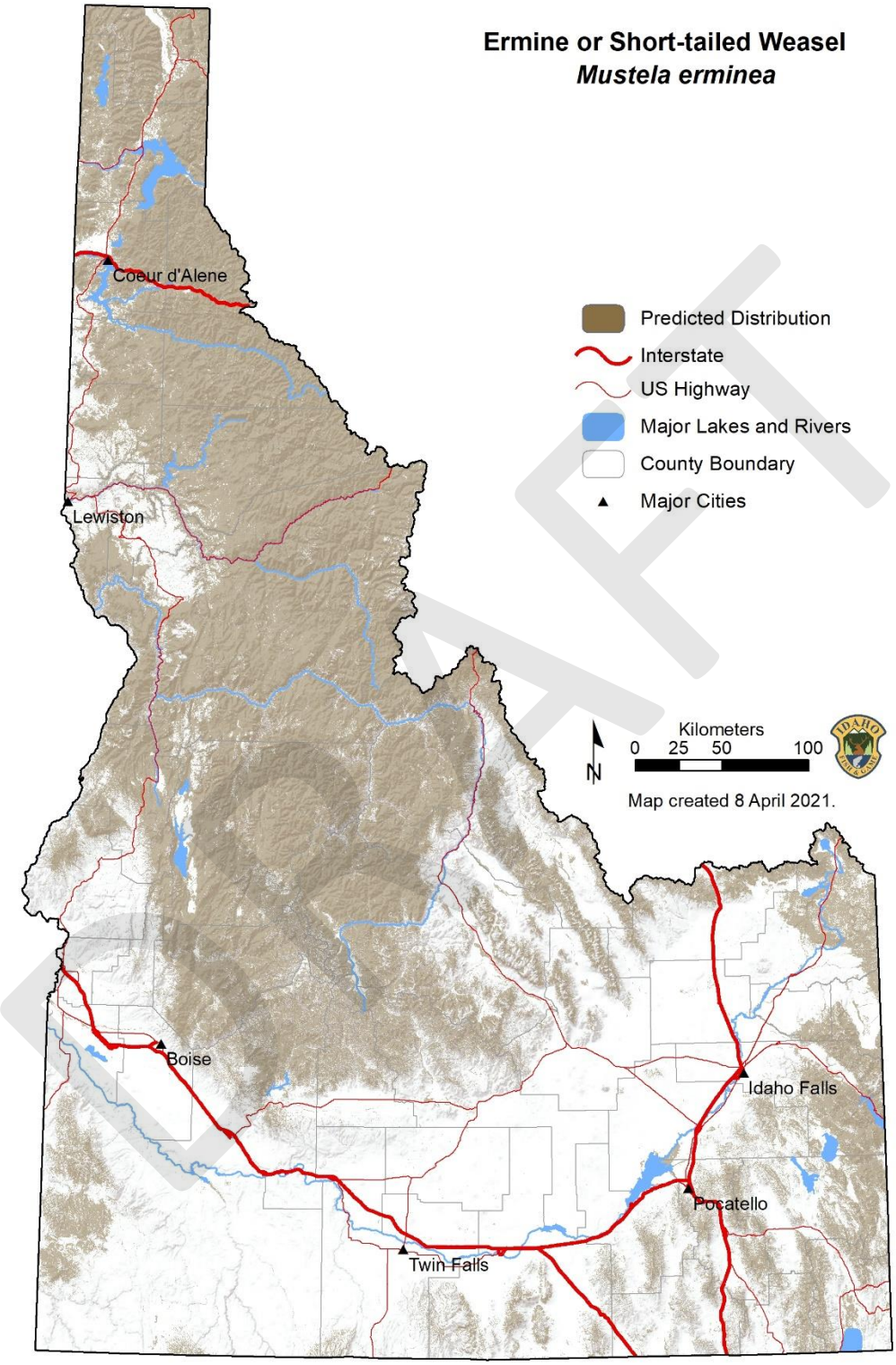

Figure 25. Predicted Distribution of the ermine (short-tailed weasel) in Idaho, USA.

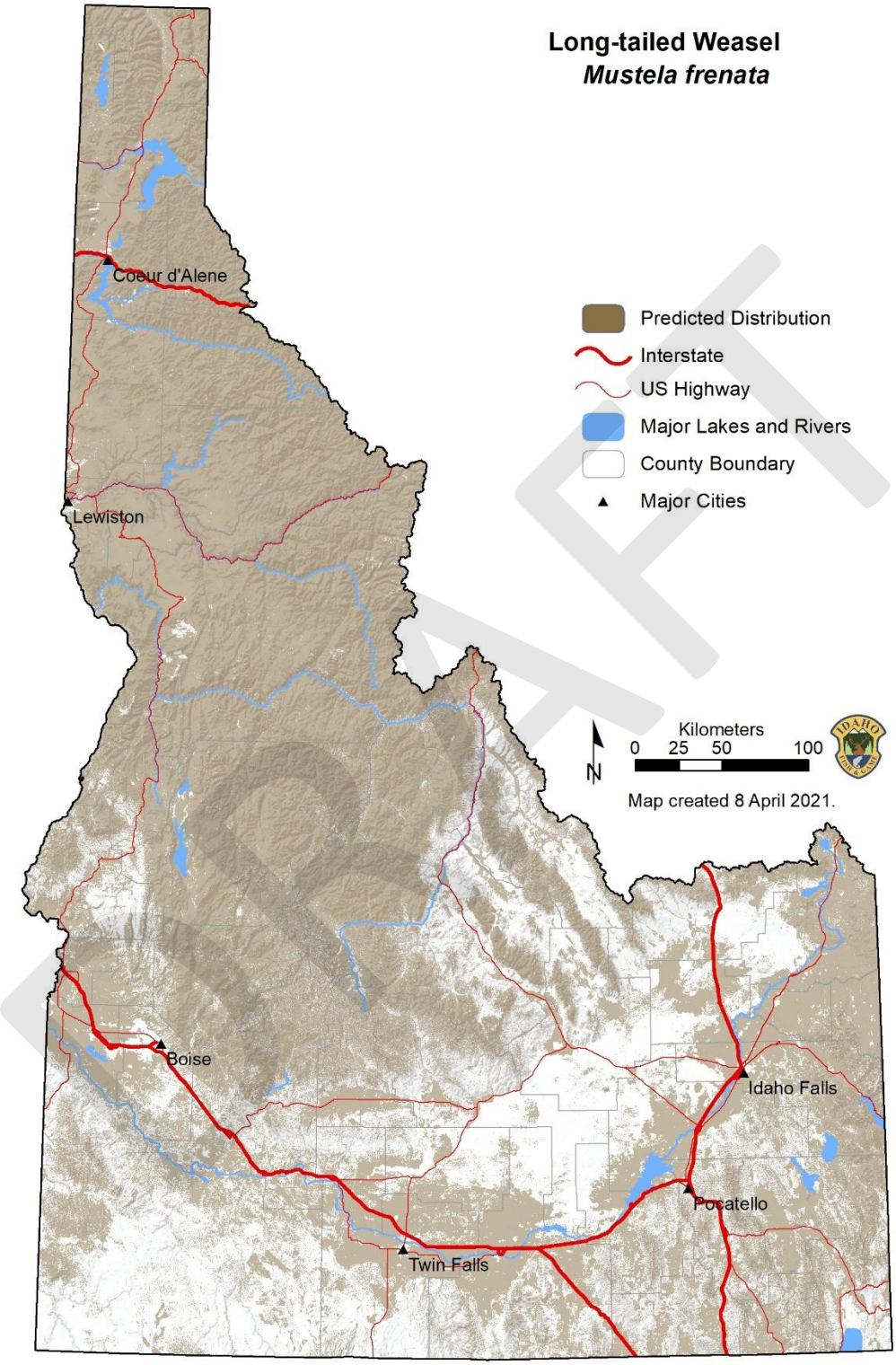

Figure 26. The Predicted Distribution of the long-tailed weasel in Idaho, USA.

Mortality and Harvest

Predation from avian species such as owls and hawks occur infrequently most of the year, but increases in the winter (Linnell et al. 2017b). In addition, foxes and coyotes will prey on weasels opportunistically.

Both species have a high reproductive rate, breed at a young age, and exhibit high annual rates of mortality, up to 50% (Sandell 1984). Ermine populations are known to fluctuate widely, and this likely corresponds to prey populations and weather events that can affect kit survival. While no focused work has been conducted on harvest management of either species, it is generally accepted that ermine are resilient to harvest, and harvest rates tend to correspond with population fluctuations. However, long-tailed weasels are considered the rarer of the two species, have a lower reproductive rate, and exhibit high rates of natural mortality.

Both species are recorded as a single group, "weasels", in the Department's Furtaker Harvest Report Form. Weasel harvest and participation in Idaho is low. Statewide harvest is small, averaging 138 individuals annually (Appendix A, Table A-1). The number of trappers each year that target weasels is small, averaging 44, and has ranged from 23-77 individuals (Figure 27). Currently, there is little commercial value for either species and, they are likely harvested as a secondary target while pursuing other species, such as marten.

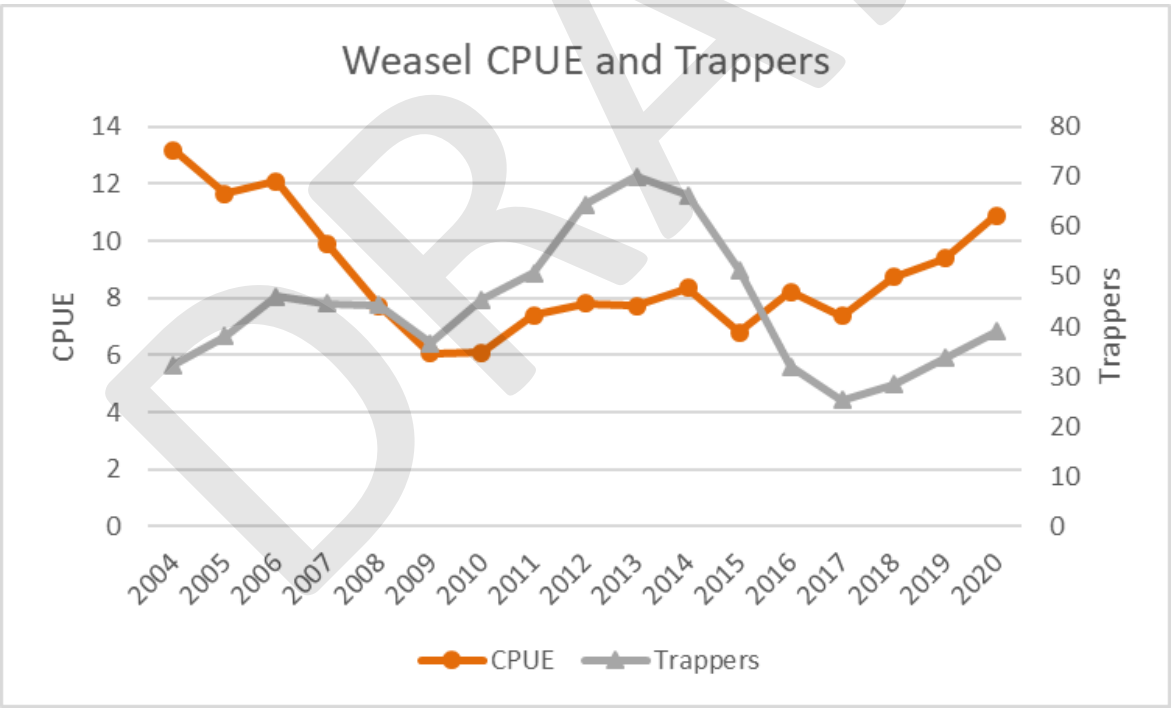

Figure 27. The three-year rolling average of annual weasel (both short-tailed and long-tailed) catch per unit effort estimate, and the number of weasel trappers, Idaho USA.

Management Goals and Direction

Both ermine and long-tailed weasel are classified as a predator, and the Department has limited ability to implement any management strategies. Considering the amount of suitable habitat for both species and the low overall harvest, neither species is likely impacted from harvest.

While both species have been relatively understudied compared to other mammalian carnivores, some conservation and information themes have evolved that are noteworthy. Across the range of the long-tailed weasel, there are concerns that this species may be in decline. Harvest records have indicated that the population has been in decline since the 1930s in Canada, and it has been identified as a species of special concern in several US states. Research institutions in the eastern US have begun to investigate long-tailed weasel status across its range. For the ermine, recent genetic work identified three species from what was historically considered a single species (Colella et al. 2021). With the growth of genetics as a tool in wildlife conservation and management, new discoveries of this sort are likely to continue.

While Department biologists do not suspect that the current management strategy has a negative impact on either weasel species, concerns in other states suggest that the Department would benefit from gaining additional information on the status and distribution of both species.

Management Actions

- See the “Harvest Management and Population Monitoring” section of this Plan.

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Appendix A: Annual Trapping License Sales, Total Reported Harvest of Furbearers and Predatory Wildlife, and Trapping Participation by Species

The Department tracks harvest of most furbearers and predatory wildlife through the Furtaker Harvest Report form. For anyone who purchases a trapping license, completion of this form is mandatory to purchase a trapping license for the following year. This form tracks the harvest of each species by county, and after 2001, it also tracks effort associated with trapping each species. This process only collects data from trapping license holders, so for species that can be hunted (other than bobcat) the presented harvest numbers should be considered a minimum estimate. This system also allows us to determine how trapping participation for different species varies over time. Using the data collected through this form, the Department can track the total harvest, spatial distribution of said harvest, Catch Per Unit Effort for each species, trapper participation by species, and non-target captures.

Table A-1. Trapping License Sales from the 1994 to the 2020 Seasons.

Season	Licenses Sold					% Non-Resident
	Adult Resident	Junior Resident	Total Resident	Non-Resident	Total Sales	
1994-1995	na	na	748	10	758	1%
1995-1996	na	na	638	7	645	1%
1996-1997	na	na	779	7	786	1%
1997-1998	740	130	752	12	764	2%
1998-1999	612	110	626	14	640	2%
1999-2000	451	98	558	9	567	2%
2000-2001	504	97	607	6	613	1%
2001-2002	546	91	647	10	657	2%
2002-2003	690	126	824	8	832	1%
2003-2004	835	130	824	8	835	1%
2004-2006	871	137	975	10	871	1%
2005-2006	858	131	989	12	1,001	1%
2006-2007	1,042	132	1174	26	1,200	2%
2007-2008	1,015	112	1127	23	1,150	2%
2008-2009	1,091	112	1203	15	1,218	1%
2009-2010	992	111	1103	11	1,114	1%
2010-2011	1,082	131	1213	9	1,222	1%
2011-2012	1,568	171	1739	28	1,767	2%
2012-2013	1,799	232	2031	26	2,057	1%
2013-2014	2,117	253	2370	24	2,394	1%
2014-2015	1,999	309	2308	31	2,339	1%
2015-2016	1,771	248	2019	28	2,047	1%
2016-2017	1,583	155	1738	21	1,759	1%
2017-2018	1,627	169	1796	34	1,830	2%
2018-2019	1,635	130	1765	28	1,793	2%
2019-2020	1,861	155	2016	37	2,083	2%
2020-2021	2034	174	2208	38	2,083	2%

Table A-2. The annual reported harvest for badger, beaver, bobcat, coyote, marten (both American and Pacific), mink, muskrat, raccoon, red fox, river otter, western spotted skunk, striped skunk, and weasels (both ermine and long-tailed) from the 1994 to 2020 seasons in Idaho, USA.

SEASON[a]	BADGER[b]	BEAVER	BOBCAT[b]	COYOTE[b]	MARTEN	MINK
1994-1995	150	2462	na	1603	515	350
1995-1996	280	3675	407	2304	452	749
1996-1997	145	4041	na	1915	537	758
1997-1998	169	3529	925	1166	316	513
1998-1999	187	2164	711	1529	150	540
1999-2000	229	2290	879	1349	370	603
2000-2001	190	2829	1022	1674	289	582
2001-2002	285	2657	947	2638	775	763
2003-2004	297	2637	1976	4874	688	613
2004-2005	213	3399	1878	3728	1100	735
2005-2006	199	2950	1721	3061	813	971
2006-2007	487	2744	2402	4061	1437	1105
2007-2008	335	2965	1450	3588	1243	586
2008-2009	253	3066	1012	2544	1264	772
2009-2010	189	3069	962	2313	967	964
2010-2011	501	2728	1429	3097	1231	1078
2011-2012	290	2480	1669	4152	1751	925
2012-2013	245	3550	1564	4069	2234	1028
2013-2014	275	3545	1412	4755	2680	1101
2014-2015	160	2653	861	4080	1488	794
2015-2016	247	2172	908	4749	897	484
2016-2017	313	1583	897	3972	697	380
2017-2018	237	1878	1351	5167	974	599
2018-2019	232	1971	1247	5705	780	441
2019-2020	248	2153	974	5752	918	416
2020-2021	227	1977	822	4348	528	326

[a] Data for the 2002-2003 season is not available

[b] Species that can be both hunted and trapped

Table A-2 (continued). The annual reported harvest for badger, beaver, bobcat, coyote, marten (both American and Pacific), mink, muskrat, raccoon, red fox, river otter, western spotted skunk, striped skunk, and weasels (both ermine and long-tailed) from the 1994 to 2020 seasons in Idaho, USA.

SEASON[a]	MUSKRAT	RACCOON[b]	RED FOX[b]	RIVER OTTER	STRIPED SKUNK[b]	SPOTTED SKUNK[b]	WEASEL[b]
1994-1995	12498	614	2734	na	447	1	50
1995-1996	23954	968	2716	na	682	30	67
1996-1997	21055	849	2856	na	455	11	78
1997-1998	13903	656	1740	na	511	7	51
1998-1999	13741	540	1822	na	545	0	78
1999-2000	8841	709	1943	na	508	31	98
2000-2001	11190	931	1787	99	689	30	89
2001-2002	15522	1270	2785	82	999	26	93
2003-2004	8312	1347	2980	114	1096	36	140
2004-2005	11849	1287	2141	122	1173	39	178
2005-2006	14563	1158	1243	124	856	43	181
2006-2007	15973	1397	1469	119	760	75	201
2007-2008	9564	1326	1216	110	573	0	113
2008-2009	13819	1415	994	123	790	28	111
2009-2010	19026	1335	758	121	660	44	114
2010-2011	20876	1519	1043	120	809	22	267
2011-2012	21767	1432	1227	122	847	59	208
2012-2013	30821	1457	1292	161	742	78	293
2013-2014	34792	2054	1429	196	845	37	362
2014-2015	30397	1643	954	157	869	53	99
2015-2016	12321	889	740	150	795	17	121
2016-2017	9548	815	662	94	563	9	44
2017-2018	10085	882	914	126	1022	74	99
2018-2019	7705	879	909	134	1007	67	158
2019-2020	7722	1136	1236	119	988	71	148
2020-2021	6263	875	697	145	935	32	106

[a] Data for the 2002-2003 season is not available

[b] Species that can be both hunted and trapped

Table A-3. Trapper participation by species from 1994 to the 2020 seasons for badger, beaver, bobcat, coyote, marten (both American and Pacific), mink, muskrat, raccoon, red fox, river otter, striped skunk, western spotted skunk, and weasel (both ermine and long-tailed) in Idaho, USA.

SEASON[a]	BADGER[b]	BEAVER	BOBCAT[b]	COYOTE[b]	MARTEN	MINK
1994-1995	39	169	68	156	38	82
1995-1996	48	261	99	196	35	133
1996-1997	46	293	120	210	34	144
1997-1998	36	247	101	151	28	112
1998-1999	44	211	107	149	15	92
1999-2000	51	195	111	153	37	95
2000-2001	52	213	109	154	33	111
2001-2002	57	282	201	252	52	147
2003-2004	61	307	346	387	52	137
2004-2005	74	282	298	275	55	140
2005-2006	65	284	253	238	49	144
2006-2007	92	276	282	283	83	158
2007-2008	83	283	263	267	94	134
2008-2009	71	330	217	241	108	163
2009-2010	53	328	198	216	86	170
2010-2011	74	316	254	256	89	196
2011-2012	76	333	362	387	105	189
2012-2013	60	446	446	482	177	244
2013-2014	83	508	499	571	220	279
2014-2015	59	426	331	469	137	187
2015-2016	69	351	254	448	116	131
2016-2017	64	275	196	325	82	103
2017-2018	45	298	297	410	102	110
2018-2019	57	321	296	452	101	110
2019-2020	83	357	272	542	120	114
2020-2021	69	334	235	464	84	102
26-yr average	62	305	239	313	82	143

[a] Data for the 2002-2003 season is not available

[b] Species that can be both hunted and trapped

Table A-3 (continued). Trapper participation by species from 1994 to the 2020 seasons for badger, beaver, bobcat, coyote, marten (both American and Pacific), mink, muskrat, raccoon, red fox, river otter, striped skunk, western spotted skunk, and weasel (both ermine and long-tailed) in Idaho, USA.

SEASON[a]	MUSKRAT	RACCOON[b]	RED FOX[b]	RIVER OTTER	SPOTTED SKUNK[b]	STRIPED SKUNK[b]	WEASEL[b]
1994-1995	156	123	168	na	1	64	19
1995-1996	277	183	198	na	8	93	30
1996-1997	277	193	228	na	5	76	31
1997-1998	212	143	143	na	4	92	20
1998-1999	180	135	140	na	0	86	26
1999-2000	156	144	141	41	12	73	26
2000-2001	188	168	152	45	11	94	27
2001-2002	210	228	234	74	135	11	24
2003-2004	233	276	289	68	125	13	40
2004-2005	222	209	209	71	10	99	40
2005-2006	222	192	156	64	12	95	39
2006-2007	267	219	197	53	22	97	57
2007-2008	218	217	197	65	0	99	38
2008-2009	254	236	162	75	10	110	38
2009-2010	291	217	146	61	10	90	33
2010-2011	316	246	168	60	8	105	62
2011-2012	362	258	205	58	15	107	50
2012-2013	509	302	270	75	21	106	71
2013-2014	617	375	287	96	14	151	77
2014-2015	471	297	191	103	17	132	42
2015-2016	327	209	156	85	5	107	30
2016-2017	238	168	146	52	6	78	23
2017-2018	260	193	168	61	12	108	23
2018-2019	230	199	181	75	16	127	37
2019-2020	235	220	231	82	15	160	38
2020-2021	207	223	170	78	12	168	36
26-yr average	274	214	190	69	19	98	38

[a] Data for the 2002-2003 season is not available

[b] Species that can be both hunted and trapped