Management Plan for the **Conservation of Fisher, Wolverine, and Canada Lynx in Idaho**

2023–2028

Prepared by IDAHO DEPARTMENT OF FISH AND GAME

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INTRODUCTION

This plan addresses three species of medium-sized carnivores – fisher (*Pekania pennanti*), wolverine (*Gulo gulo*), and Canada lynx (*Lynx canadensis*). These species have historically been valued as fur resources, and as charismatic animals whose sightings in the wild are cherished.

The Idaho Department of Fish and Game's (IDFG) mission with respect to species conservation is to preserve, protect, perpetuate, and manage Idaho wildlife. Fisher, wolverine, and lynx have limited or low-density distribution in Idaho and occur at the southern extent or periphery of their current ranges in the Rocky Mountains.

Fisher and wolverine have rebounded considerably in suitable habitat since near extirpation in Idaho in the 1950s and represent successful conservation efforts. Idaho's potential role in lynx conservation is more narrow, given the limited availability of suitable habitat in our state.

Science based, state management of these species continues to be important to Idaho, both from the perspective of individual species conservation and as a matter of state sovereignty over our wildlife.

For decades, these three species have been the subject of multiple petitions and lawsuits under the federal Endangered Species Act (ESA), often seeking to force federal restrictions on activities such as forest management, winter recreation, and trapping. Based on best available science, the status of these species in the United States and Canada, and existing regulatory and conservation measures, the State of Idaho maintains that ESA protections are not warranted for populations occurring in Idaho.

It is important for Idaho to continue contributing to the best available science and promote effective, collaborative conservation for these species. The Idaho State Wildlife Action Plan (IDFG *2022*) includes these species as Species of Greatest Conservation Need (SGCN). Because of their low density or limited distribution in Idaho, our management and conservation efforts for these species differ from those addressed in IDFG's furbearer management plan, which identifies harvest management strategies for furbearers that are more abundant and widely distributed in Idaho.

This plan provides updated information on the ecology, status, conservation challenges and opportunities for these three species and identifies our management priorities.

DEPARTMENT DIRECTION FOR THE MANAGEMENT AND CONSERVATION OF FISHER, WOLVERINE, AND CANADA LYNX

- Manage fisher, wolverine and Canada lynx for conservation purposes, retaining/returning state management of these species.
- Continue to provide technical assistance for land management planning activities, including forest management, recreation, and other multiple use to support habitat suitability – most suitable habitat for these species in Idaho is on National Forest lands managed by the U.S. Forest Service (USFS).
- Support best available science through continued collaborative, interagency efforts to monitor occupancy and distribution and to assess climate factors.
- Develop and implement strategies to promote genetic health and connectivity for these species, recognizing their inherent low density or limited distribution in Idaho.
- Support public information and education regarding these species.

FISHER

Fisher-specific priorities are:

- Continue to support fisher habitat in higher occupancy habitat in the Bitterroot/Clearwater and Cabinet Mountains of Idaho (with adjacent habitat in Montana).
- Continue to collaborate with the Montana Department of Fish, Wildlife, and Parks (FWP) to monitor occupancy and track status of fisher distribution.
- Analyze the large genetic data set collected on fisher by IDFG, the USFS, FWP, and the Coeur d'Alene Tribe.
- Develop and implement strategies to promote fisher genetic health and connectivity in Idaho and adjacent Montana.
- Identify factors that may affect fisher connectivity among higher-occupancy habitat in the Bitterroot/Clearwater and Cabinet Mountains.
- Continue to provide technical assistance for forest management planning activities in relation to fisher habitat needs (suitable fisher habitat primarily occurs in portions of the Panhandle and Nez Perce-Clearwater National Forest lands in Idaho).

WOLVERINE

Wolverine-specific priorities are:

- Continue to monitor the status and distribution of wolverine through collaboration with the Western Association of Fisheries and Wildlife Agencies (WAFWA) forest carnivore working group.

- Continue to contribute to the investigation of wolverine landscape and population genetics in the western US and adjacent Canada, through the Trans-Boundary Wolverine Genetic Project.

- Identify and incorporate connectivity considerations for wolverine (*e.g.,* Carroll et al. 2018) in wildlife connectivity planning efforts and associated technical assistance for land managers (suitable wolverine habitat primarily occurs on National Forest lands in Idaho).

- If feasible from available data, improve the ability to characterize/predict wolverine natal denning habitat to inform USFS land management and planning efforts.

- Provide technical assistance for land managers and recreation planners related to intensity and distribution of winter recreation, and considerations for wolverine habitat or connectivity.

CANADA LYNX

Canada lynx-specific priorities are:

- Continue to collaborate with agencies in other states to develop and implement a scientifically robust monitoring approach to inform lynx status, and to support post-delisting monitoring.

- Review habitat suitability and potential critical habitat designations while lynx in remain under ESA protection in the lower-48 states.

- Continue to provide technical assistance for forest management planning activities in relation to lynx occurrence in Idaho (limited designated critical habitat for Canada lynx in Idaho comprises the Purcell Mountains in the Panhandle National Forest).

INFORMATION & EDUCATION

Information and education priorities for these three species are:

- Continue to minimize human caused mortality such as non-target captures during IDFG-regulated trapping activities by educating trappers through outreach, including the biennial Idaho upland game, turkey, and furbearer seasons and rules proclamation booklet, and through in-person outreach at various trapping organization events.

- Generate support and partnerships for conservation of these species by promoting education, awareness, and stewardship of their habitat.

FISHER

Ecology and Status

General Physical Description

The fisher is a member of the weasel family that is infrequently encountered in the forests of Idaho. At a distance, a fisher's coat may appear black though it is dark brown, commonly with frosted white tips on the hairs across the shoulder and white markings on the chest and groin. Females average 4.5 pounds, and males 10 pounds, although 15 -pound individuals have been reported in Idaho.

Distribution/Population Status

Fishers in Idaho have been documented from the Sawtooth Mountains to the Selkirk Mountains near the Idaho-Canada border (Figure 1). However, most of the population occurs in the Bitterroot/Clearwater and Cabinet Mountains, extending into limited portions of western Montana. These fishers are geographically separated from fisher occurring in in the forest belt that runs across Canada, extending north to Southeast Alaska and southward into the United States (northeastern and upper midwestern states). They are also separate from fisher found in the Cascade Mountains of Washington, Oregon, and the Sierra Nevada Mountains of California.

In 2016, the U.S. Fish and Wildlife Service determined that fishers in Idaho and Montana would qualify as a distinct population segment (Northern Rocky Mountains) but concluded that this DPS did not meet criteria for ESA listing.[1]

In Idaho, the historical distribution of fishers is not well documented. Until the early 1800s, fisher distribution likely coincided with mid- to low-elevation late seral mesic forests (see habitat associations below). From the mid-1800s into the early 1900s, fisher distribution was likely reduced by nonselective predator control, overharvest, and habitat destruction (including extensive wildfires in northern Idaho between 1910 and 1934). The fisher was considered extirpated from Idaho by the 1950s.

In the 1960s, fishers from British Columbia were released in north-central Idaho to restore the population to provide additional trapping opportunity (Williams 1962, 1963). Subsequent releases of fishers occurred at various locations in Montana, including the Cabinet Mountains, a range that extends from northwest Montana into the Idaho panhandle.

In 2018, IDFG partnered with FWP to estimate fisher occupancy in the two states. That study (Krohner et al. 2020) made three important conclusions relevant to fisher distribution and population status in Idaho. First, most of the area likely occupied by fishers in the northern Rocky Mountains of the U.S. occurs within Idaho (Figure 2). Second, fishers currently occur in two primary core areas, principally the Cabinet Mountains of the Idaho Panhandle National Forest, and in the Bitterroot/Clearwater Mountains of the Nez Perce-Clearwater National Forest. Third, occupancy is higher in the Bitterroot and Clearwater Mountains (Nez Perce-Clearwater National Forest), while other adjacent areas of predicted suitable habitat are at lower occupancy or unoccupied (Figure 2).

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[1] In 2020, the U.S. Fish and Wildlife Service listed fisher in the Southern Sierra Nevada (California) as a Distinct Population Segment qualifying as an endangered species, because of threats including wildfire, climate change, tree mortality, predation, toxicants, collisions with vehicles and potential effects associated with small population size.

Abundance/Space Use

Fisher occupy large landscapes and naturally occur at low densities. In Idaho, adult male fisher maintain home ranges averaging 38 mi^2 (range 23-69 mi^2) and females maintain home ranges averaging 17 mi^2 (range 9-36 mi^2, Sauder and Rachlow 2014). These home ranges are generally intrasexually specific; however, some sub-adult individuals may be tolerated within a territorial adult's home range (likely because they may be offspring). No population estimates have been conducted of fisher in Idaho.

Habitat Use

The distribution of fisher is broadly limited by three factors: abundance and structure of snow, availability of suitable forest structure (including resting and denning sites), and abundant prey (see Diet below). Unlike lynx and wolverine, fisher are not well adapted to deep, unconsolidated snow. For their size and weight, fishers have small feet, making them prone to sinking into snow rather than walking on top of it. This makes it energetically expensive for fishers to move and survive in areas characterized by deep, unconsolidated snowpack. Elsewhere in the range of fishers, snow depths are predictive in describing the range of fishers (Krohn et al. 2005). In Idaho and Montana, fishers are broadly associated with low to mid-elevation mixed-mesic forest types where snows consolidate, making their travel easier. In north-central Idaho, regular occurrences of fishers taper off at >5,000ft of elevation, though some have been documented at much higher elevations.

Within the mid-elevation mixed-mesic forest types of north-central Idaho, fishers establish home ranges in landscapes with larger, more connected and contiguous patches of mature forest, with reduced amount of open areas (Sauder and Rachlow 2014). Within established home ranges, fisher core use areas have moderate amounts of high canopy cover forest and moderate amounts of forest edge (Sauder and Rachlow 2015). Heterogeneous forest patterns likely put preferred habitats for both hunting and resting in close proximity. Between foraging bouts, fishers regularly use resting sites in cavities of trees, platforms formed by witches' brooms, broken top trees, or tree forks. Specific data on resting site selection by fishers in Idaho are scarce, but consistent themes have been identified across other populations (Aubry et al. 2013). Resting sites typically have dense overhead cover, steeper slopes, cooler microclimate, and a greater prevalence of large trees and snags than are generally available in the surrounding landscape. Zelinsnki et al. (2004) found that fisher resting sites were often in larger-than-average tree within stands of trees larger than the landscape average. In that study, resting sites were found principally in cavities in live conifer trees and snags averaging ~46 inches in diameter. Jones (1991) reported that the average diameter of resting site trees used by fishers in Idaho was ~22 inches (range 11 to 59 inches) and that 68% were on platforms composed of witches' broom.

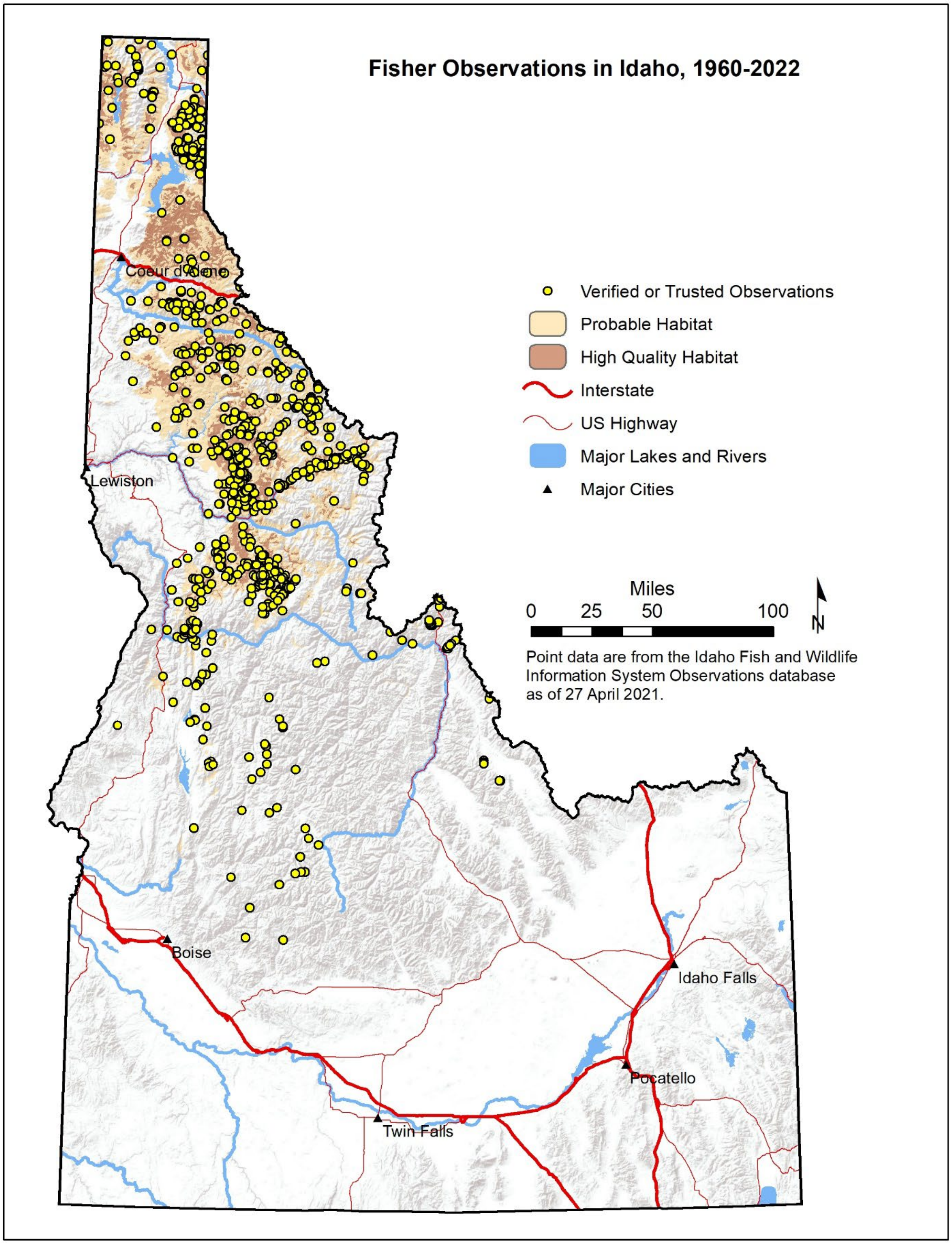

Figure 1. Predicted fisher habitat categorized as probable and high quality (Sauder 2014) and verified fisher observations since 1960.

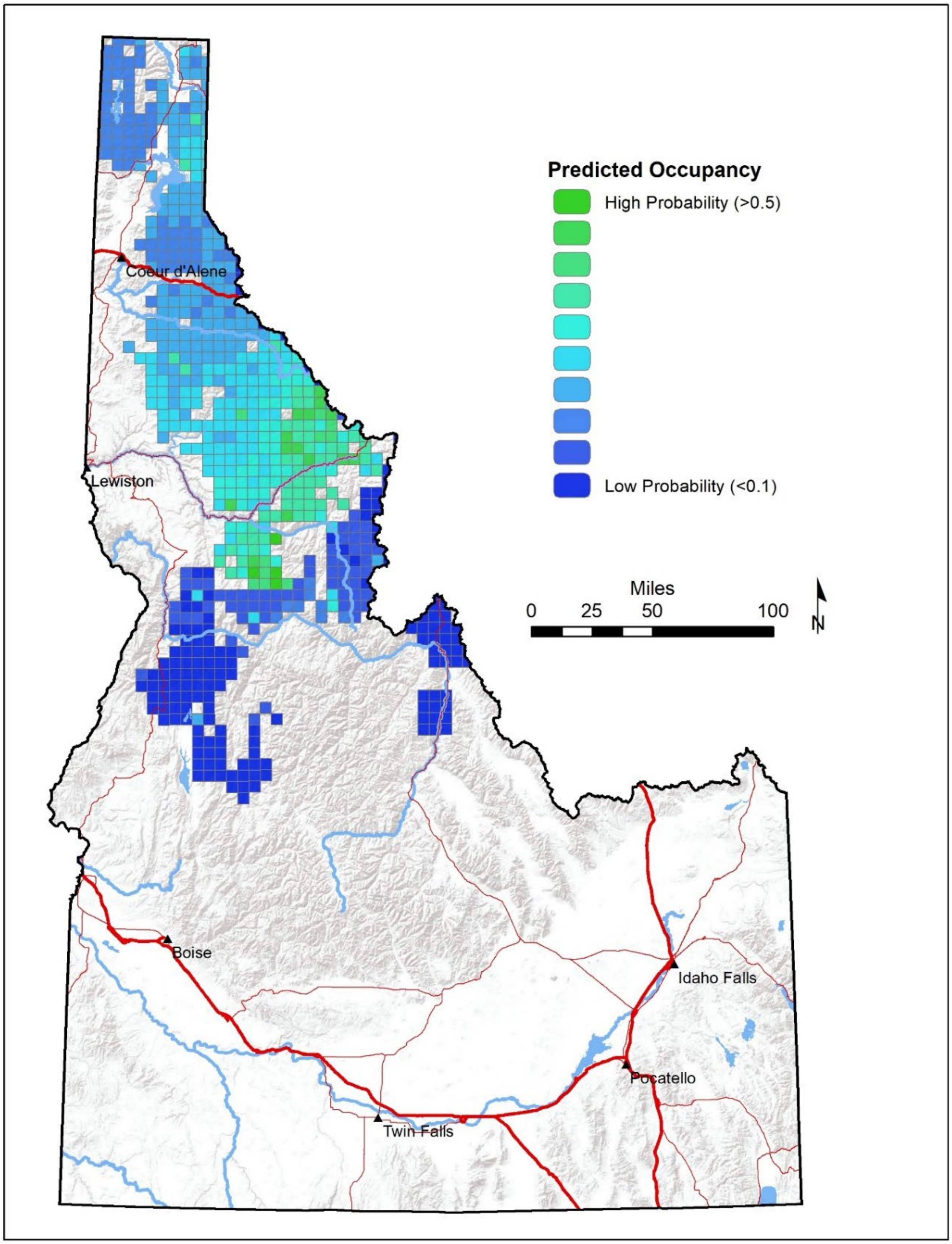

Figure 2. Results from a spatial fisher occupancy model in Montana and Idaho, winter of 2018-2019 (Krohner et al. 2022). Green colors indicate higher predicted occupancy, while dark blue colors indicate lower predicted occupancy.

Reproduction
Females give birth in March or early April and almost immediately breed again. Because the fertilized eggs do not implant for almost 10 months, female fisher are technically pregnant 11 months of the year. This characteristic, called delayed implantation, results in females not giving birth to their first litter until >2 years of age. Females usually give birth to 2-3 kits, with a range of 1-4. No denning studies have been conducted on fishers occurring in Idaho, but studies conducted outside the state indicated natal dens were almost always in large trees with cavities. Females regularly choose cavities with the smallest opening they can fit through. It is believed this is to protect the kits from predators, including male fisher, which are significantly larger than females and will kill kits. Soon after birth, female fisher will often move their kits to a sequence of maternal dens, which are also primarily in cavities of large trees. This behavior enhances the reliance of fisher on the presence of abundant large trees that are prone to forming cavities. In Idaho, it is hypothesized that large western red cedars (*Thuja plicata*) are an important source of natal and maternal den cavities (Sauder, personal communication).

Food Habits
Fishers are generalist carnivores. Snowshoe hares (*Lepus americanus*), voles (*Microtus spp*.), and squirrels (*Sciuridae*) likely compose the bulk of fisher's diet in Idaho; birds, reptiles, and vegetative matter (e.g., berries) are also likely supplementary, opportunistic food sources. Fishers are natural predators of porcupines (*Erethizon dorsatum*), with an innate knowledge of how to kill and eat them while (mostly) avoiding the quills. While fisher have been known to eat porcupines in Idaho, porcupines are not thought to be a principal food source for fishers in this state due to their low densities and patchy distribution.

Mortality
Sources of mortality include starvation, particularly of juveniles, predation by other carnivores, disease, infanticide, and non-target harvest. Predation of fisher has not been studied in Idaho, but mountain lions (*Puma concolor*), bobcats (*Lynx rufus*), coyotes (*Canis latrans*), Canada lynx, and wolverines have been documented to occasionally prey on fishers in other parts of their range. It is generally believed that the arboreal capabilities of fisher make populations generally resistant to pressures from predators. Fishers in Idaho are closed to harvest; non-target trapping is generally infrequent.

Genetics
Although fisher were presumed extirpated from Idaho by the 1950s, recent analyses have demonstrated otherwise. Using a museum fisher specimen collected in northcentral Idaho in 1896, a native genetic signature (i.e., genetic haplotype) was discovered in the Northern Rockies that is not found elsewhere in the fisher range (Schwartz 2007). When comparing DNA samples from Idaho fisher collected in the early 2000s this unique haplotype was observed in a portion of those samples (Schwartz 2007). The existence of this unique haplotype indicates that some fishers persisted in Idaho/Montana despite the population pressures of the early 1900s and were never extirpated. The existence of the unique haplotype also indicates long-term, limited or absent gene flow between fishers in Idaho and Montana and fisher in adjacent areas, including the Cascades and southern Canada.

Considering these findings, past fisher reintroduction efforts (one in Idaho and multiple in Montana) are more appropriately viewed as population augmentations. The result of these efforts is that fishers in Idaho have a blend of native and non-native haplotypes (*i.e.,* British Columbia and Midwest) (USFWS 2017a). From near extirpation in the 1950s to the current known distribution (Figure 1), fisher populations have expanded significantly. However, the native haplotype has not been observed in the fisher in the West Cabinet Mountains, indicating low/absent gene flow with fisher in the Bitterroot/Clearwater Mountains since the imported fisher releases in the 1960s (Lucid et al. 2019).

Legal & Conservation Status

In Idaho, the fisher is classified as a furbearer with no open season or allowed take since 1940. The Idaho SWAP (IDFG 2022) considers the fisher a SGCN. Multiple national forests in Idaho list fisher on their various sensitive or at-risk species lists. In the two areas of high fisher occupancy in Idaho, the Nez Perce-Clearwater National Forest lists fisher as a Species of Conservation Concern, and the Idaho Panhandle National Forest lists fisher as a Sensitive Species.

In the past 25 years, there have been three petitions for ESA listing of fisher in the Northern Rocky Mountains of the U.S. (1994, 2009, 2013). Petitions have argued for listing based on population size, isolation, habitat loss, and incidental (non-target) trapping. The USFWS' most recent determination in 2017 concluded that fisher in the Northern Rocky Mountains were a distinct population segment (DPS) under the ESA, but the DPS's status and threats did not warrant listing (USFWS 2017b).

Conservation Challenges and Opportunities

The primary drivers for fisher population management, with fisher seasons closed to harvest, are actions that affect habitat suitability, genetic health, and population connectivity.

Population Monitoring

Given the fisher's naturally low densities, association with late-seral forests, and unique genetic characteristics, implementing a monitoring strategy to inform management actions is key to conserving fisher. The 2018-2019 partnership between IDFG and FWP to assess fisher occupancy in Idaho and Montana established a sampling framework and monitoring methods to track fisher populations over time (Krohner et al 2021).

Objective: Monitoring	
Strategies	**Actions**
Regularly evaluate trend and pattern of fisher occupancy in suitable fisher habitat in Idaho and Montana.	In coordination with FWP, implement the fisher occupancy sampling framework developed by Krohner et al. (2021) at ~5-year intervals.

Forest Management and Habitat Modification

Fisher use such large landscapes (~38 mi^2 for males, ~17 mi^2 for females, Sauder and Rachlow 2014) that any one patch of forest or single forest management project is unlikely to help or hurt fishers at a population level. However, forest management over time and on a larger geographic scale may have positive or negative population-level effects. Although fishers are not old-growth forest obligates, across western North America they are consistently associated with complex vertical and horizontal structure characteristics of late seral forests (*e.g.,* large trees, snags, dense canopy cover; Raley et al. 2012). In Idaho, fishers disproportionally use stands characterized by larger diameter trees (>15in diameter at breast height, DBH) and avoid areas with ponderosa pine (*Pinus ponderosa*) and lodgepole pine (*Pinus contorta*; Schwartz et al. 2013). The median fisher home range in Idaho is composed of 56% mature forest and 5% open area (Sauder and Rachlow 2014).

Forest lands managed for multiple uses, such as national forest lands north of the Salmon River, provide most suitable habitat for fisher in Idaho. These lands average 5.7% open area (Sauder and Rachlow 2014). Management yielding suitable habitat for fisher could be a competing priority with management efforts yielding less suitable fisher habitat (*e.g.,* early seral forest habitat favorable for elk, stand management for timber merchantability).

Sauder and Rachlow (2014) reported that industrial forest landscapes, which averaged 17% open area, were 72% less likely to be occupied by fisher when compared to multiple-use forests. Trends in management of private lands for timber merchantability, based on computerized timber processing, are unlikely to meet the habitat preferences of fisher; these managed forests do not reach the size class or provide the structural complexity suitable for fisher foraging, denning, and nesting sites. Commercial forests trend to favor simplified vertical and horizontal forest structure, with shorter harvest rotations, even-aged and single-species stand management, and harvest of smaller-diameter trees (*e.g.,* Simmons et al 2014).

Objective: Support fisher habitat suitability at the landscape level.	
Strategies	**Actions**
Incorporate fisher habitat suitability in forest management planning considerations.	Provide technical assistance to USFS, Idaho Department of Lands, and private timber companies on incorporating fisher habitat suitability into project design and forest management planning prioritizing effort in documented/predicted higher-occupancy habitat.
	Identify factors (*e.g.*, forest structure or prey densities) that may affect fisher occupancy in areas among higher-occupancy habitat. (*e.g.,* habitat evaluation in the Coeur d'Alene, St. Joe, Cabinet Mountains).

Genetics & Connectivity

While translocation efforts of fisher into Idaho and Montana were successful in increasing the fisher population, the genetic health and associated long-term viability remains unclear. The 2018-2019 Idaho-Montana fisher survey estimated substantially higher occupancy rates in the Cabinet Mountains (Idaho Panhandle) and Clearwater/Bitterroot Mountains (north-central Idaho; Figure 2). Limited available genetic information indicates that gene flow between fisher in the Cabinets and Bitterroot/Clearwater is limited or absent. Fisher in the Cabinet Mountains appear to have genetics only from previous fisher translocations (from Canada and the Midwest), while fisher in the Clearwater/Bitterroot include native genetics in addition to genes of translocated animals.

There has been limited work to identify fisher population genetics in Idaho and Montana, where previous translocations augmented a small number of native fishers (which were separated from other populations) before genetic implications were better recognized. There has also been limited work to identify what management actions, if any, are needed to promote genetic health and connectivity in a small population to guard against inbreeding and deleterious genetic characteristics.

Objective: Promote genetic health and connectivity among higher occupancy areas.	
Strategies	**Actions**
Improve understanding of fisher genetic health in Idaho and Montana.	Partner with FWP and the USFS to conduct a genetic analysis of fishers in Idaho and Montana.
Promote connectivity among higher occupancy habitat.	Identify factors (e.g., forest structure or prey densities) that may affect fisher occupancy among or adjacent to higher-occupancy habitat. (e.g., habitat evaluation in the Coeur d'Alene and St. Joe Forests).
	Identify opportunities for connectivity among higher occupancy areas. These may include habitat improvement efforts, voluntary conservation easements, and inclusion of fisher in wildlife connectivity considerations in transportation planning.
Promote genetic health with management action if appropriate.	If applicable, investigate the feasibility of increasing distribution and/or genetic diversity of fisher within suitable habitat.

Human-Caused Mortality

Rodenticides—Exposure to anticoagulant rodenticide (ACR) and related poisoning has been identified as a threat to fishers in the Sierra Nevada and Coast Range Mountains of California and Oregon, where ACR use has been associated with illegal marijuana grow operations. (Gabriel et al. 2012, 2105). In the Gabriel study, 85% of fishers tested for ACR exposure came back positive and 9% of known fate mortalities of fishers were attributed to ACRs (Gabriel et al. 2015). Illegal rodenticide use was identified as a threat to fishers in the USFS determination to list the South Sierran Nevada DPS as threatened in 2020.

In 2017, IDFG submitted liver samples from 29 incidentally harvested fishers to test for ACR exposure. Results revealed that 9 of these individuals (31%) had been exposed to ACRs. Of these 9 individuals, 4 (14%) contained trace amounts, and 5 (17%) had levels sufficient to quantify (31 to 610 parts per billion). Uncertainty exists as to at what concentration of ACRs result in clinical manifestations (M. Garbriel, personal communication), but the upper end of this range (i.e., ~600) is consistent with levels that resulted in lethal toxicosis by ACR exposure to fishers in California (Gabriel et al. 2012).

Although some illegal marijuana cultivation may occur in occupied fisher habitat in Idaho, infrequent grows of tens of plants are the norm (per communication with Idaho law enforcement). Although ACR use at small grows is possible, it is likely to occur at the scale comparable to that in California or Oregon where grows have involved hundreds of plants.

The source of some fisher exposure to ACRs is difficult to isolate. Agencies like the USFS, Idaho Department of Lands, and private timber corporations use ACRs in Idaho to abate pocket gopher damage to tree seedlings, but they are not likely the source ACRs in Idaho fisher. Open field applications of ACRs to control pocket gophers are limited to first generation ACR compounds, and by law they must be placed directly into the tunnels of pocket gophers, not spread on the surface. Only 1 of 9 Idaho fishers tested positive for this class of ACR; 8 of the 9 positive samples were for second generation ACRs (Sauder, personal communication). Second generation ACRs (*e.g.,* D-con) are federally regulated to be used within 50ft of human dwellings and are not authorized for open field applications.

Trapping Activities—Trapping is an important opportunity in Idaho. Data collected from trappers are used to track trends in species populations, and the harvest of certain species can alleviate multiple forms of wildlife-human conflict on the local scale. The fisher is classified as a furbearer with a closed season. A primary goal of the translocation efforts that occurred in Idaho in the early 1960s was to re-establish fisher harvest opportunity, but this has not come to fruition.

The creation of a fisher harvest season would create additional opportunity for trappers and fulfill a management goal of the prior translocations. However, developing a sustainable and acceptable harvest framework (e.g., geographic and numeric limits) is challenging, with competing biological, social, and political considerations.

Although harvest of fisher is closed, they are sometimes captured by trappers pursuing other furbearers, particularly bobcat and marten. Since IDFG began collecting non-target trapping data in 2000, anywhere from 4 to 58 fisher captures have been reported by trappers per year, with an average of 5 fisher mortalities annually (Figure 3)[2]. Through this period, available information does not indicate influence of non-target mortalities to any trend or pattern in fisher occupancy; fishers have at least maintained their general distribution or continued to expand since their population low in the 1950s.

Some techniques are available to reduce non-target captures. When using footholds for bobcat and similar sized or larger species, a pan tension of ≥4 lb can reduce the likelihood of fisher being captured in the trap. Instruction about pan tension is included in IDFG's mandatory trapper education programs, and is an approach commonly used by trappers. Placing body-gripping traps into enclosures with openings of 2.5 inches has been shown to allow entry by marten (where it is the target species) while preventing the entry of fisher because of size difference between the two species. This technique involves additional gear, and the trapper usage of this technique and perceptions of its effectiveness on marten capture are unknown.

Illegal Take—Illegal take of fisher in Idaho is rare. In the past 5 years, IDFG conservation officers have documented one event when a person attempted to keep a fisher that was incidentally caught in a marten set.

Vehicle Collision/Roadkill—Vehicle collisions have been identified as a source of mortality for fisher in Yosemite National Park and surrounding Sierra National Forest (Rodriguez et al. 2012). In Idaho, no vehicle collisions have been documented from radio tagged animals (Sauder, personal communication), or though IDFG's roadkill observation database.

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[2]Idaho law requires release of non-target animals captured alive and requires that non-targets that are killed be turned into the Department.

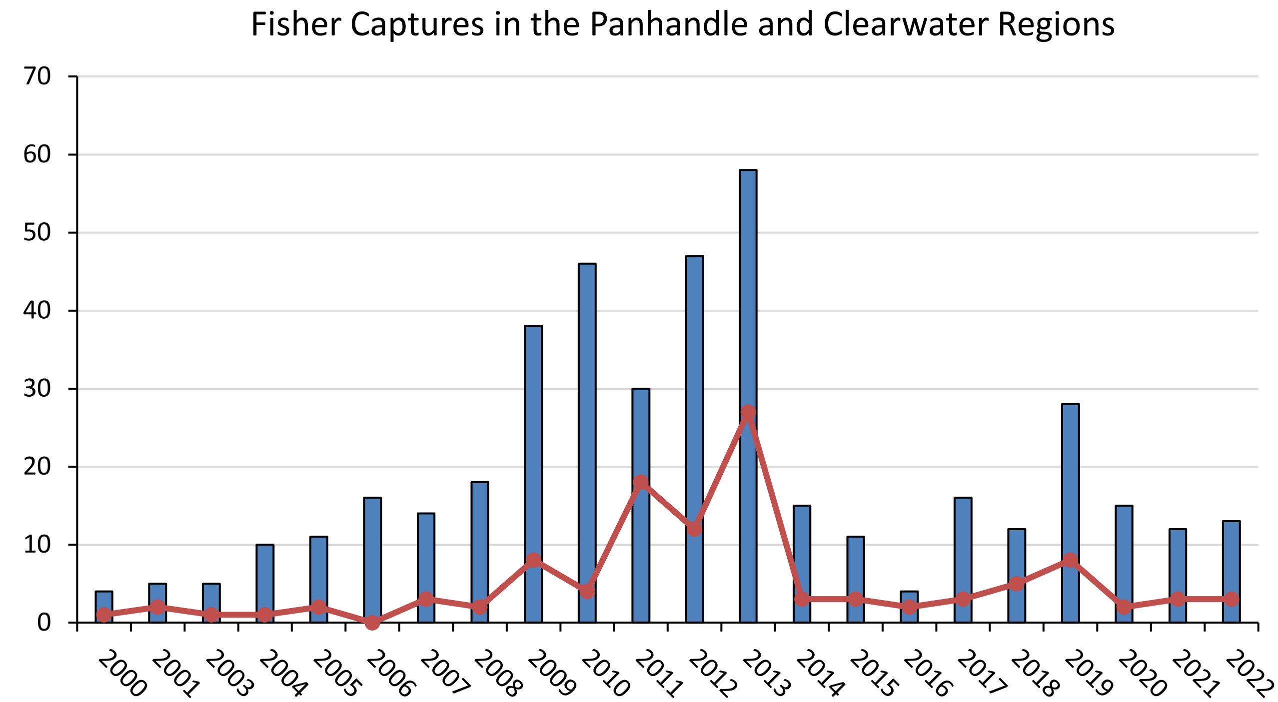

Figure 3. Total reported non-target fisher captures (Blue Columns), and mortalities (Orange Line) in the Panhandle and Clearwater Regions per license year.

Objective: Reduce incidental (lawful) and illegal human-caused mortality.	
Strategies	**Actions**
Ensure education about ACRs in fisher occupied areas.	Coordinate with federal and state partners to provide training and information regarding ACR application to reduce potential impacts to fisher.
Monitor ACR prevalence in Idaho fisher populations.	Collect and submit liver samples opportunistically from non-target capture mortalities or other mortalities for testing and analysis.
Minimize non-target captures of fishers during bobcat and marten trapping seasons.	Include techniques for selectivity (minimizing non-target capture) in trapper education programs. Coordinate with Idaho trapper groups to promote techniques to capture target while minimizing non-target captures.
	In coordination with trappers, investigate if marten boxes with openings sized to exclude fisher impact marten harvest.

WOLVERINE

Ecology and Status

General Physical Description
The wolverine is the largest terrestrial member of the mustelid family. Wolverines have large feet with claws and powerful musculature that allow efficient travel on snow and access to carrion. Males and females are similar in appearance. Adult males are larger (~ 30 lbs than adult females ~18 lbs).

Distribution/Population Status
Historical distribution in North America included most of Canada, Alaska, and the northern tier of the U.S., including the Rocky Mountains and as far south as northern New Mexico (Banci 1994). By the mid-1920s, wolverines were extirpated from much of the continental US, in part from broad-scale predator trapping and poisoning programs (Krebs et al. 2004, Aubry et al. 2007). Wolverine in Idaho might have been extirpated by 1939 or restricted in low numbers to the more inaccessible mountainous portions of the state (Davis 1939).

Since the mid-1900s, wolverines have expanded into some of their former range in the continental U.S. (Aubry et al. 2007). Currently, the southernmost extent of the known reproducing population includes northern and central Idaho, western Montana, western Wyoming, and central Washington (Figure 4). Verified records from the Wallowa Mountains in northeastern Oregon (A. Magoun, personal communication), the Sierra Nevada in California (Moriarty et al. 2009), in and near the Uinta Mountains in Utah (Utah Division of Wildlife unpublished data), and Rocky Mountain National Park in Colorado (Packila et al. 2017) appear to represent solitary individuals from dispersal events.

The Western States Wolverine Conservation Project camera survey in 2015 and 2016 provided the first broad-scale evaluation of wolverine distribution in Idaho, Montana, Washington, and Wyoming since near extirpation. This project confirmed that recolonization has progressed substantially since historical lows. However, the probability of occupancy varies throughout the 4-state region, possibly linked to differences in habitat quality, differences in wolverine survival, or the time required to recover from historical absence (Figure 5; Lukacs et al. 2020).

Recolonization in Idaho occurred through natural expansion from Canadian populations (Newby and Wright 1955, Newby and McDougal 1964, McKelvey et al. 2014, Aubry et al. 2007). Distribution records (Figure 6) and occupancy estimates (Figure 5) suggest wolverines presently occur in most of what is presumed to be historically occupied habitat in Idaho; however, we lack information to compare productivity or population stability.

Figure 4. Modeled wolverine habitat in the western U.S. derived from a composite of habitat models presented in Copeland et al. (2010) and Inman et al. (2013), and occupancy status of said habitat.

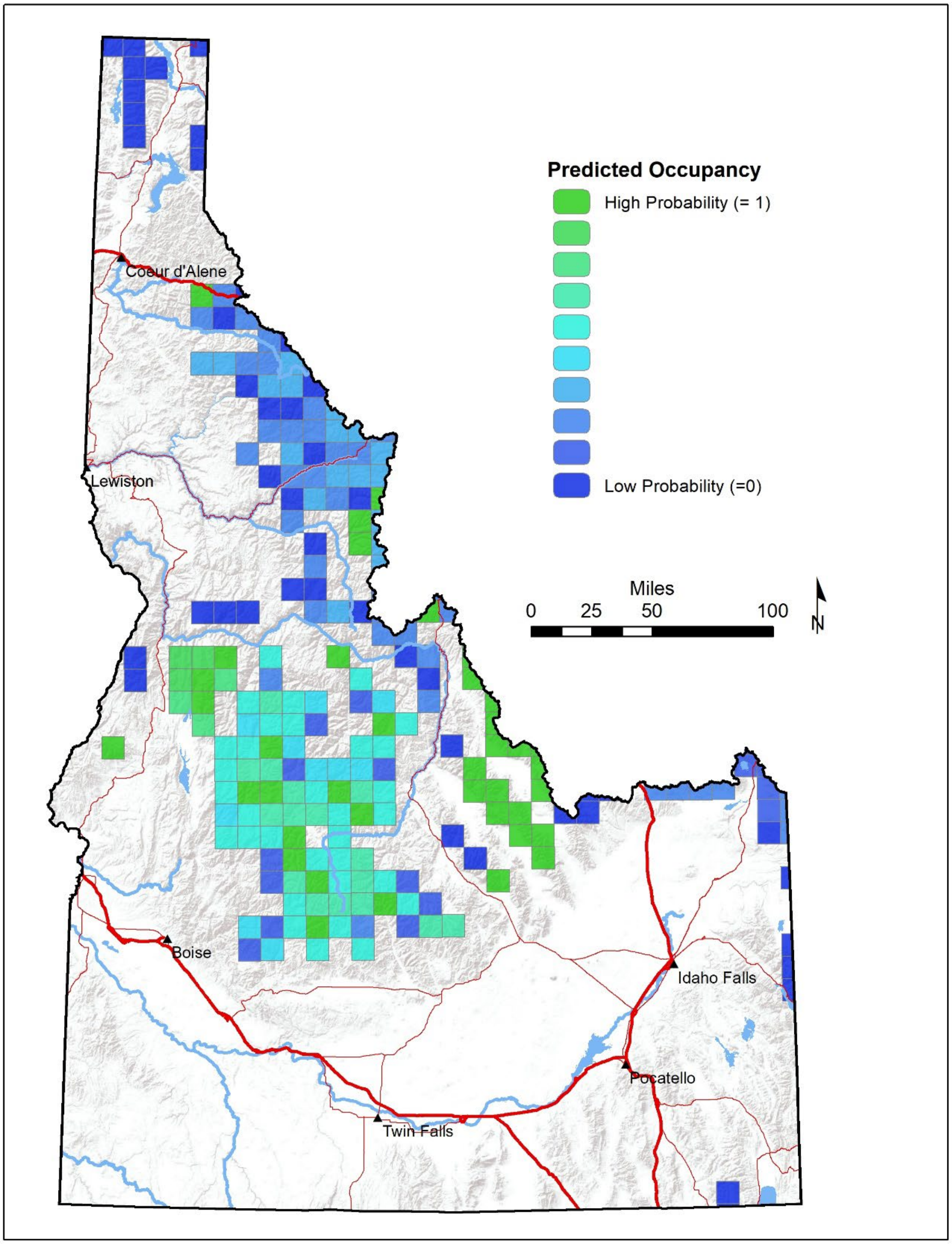

Figure 5. Estimated occupancy probability for wolverines in Idaho, Montana, Washington, and Wyoming in 2016 (Lukacs et al. 2020). Bright Green colors indicate areas of high predicted occupancy, while dark blue colors indicate lower predicted occupancy.

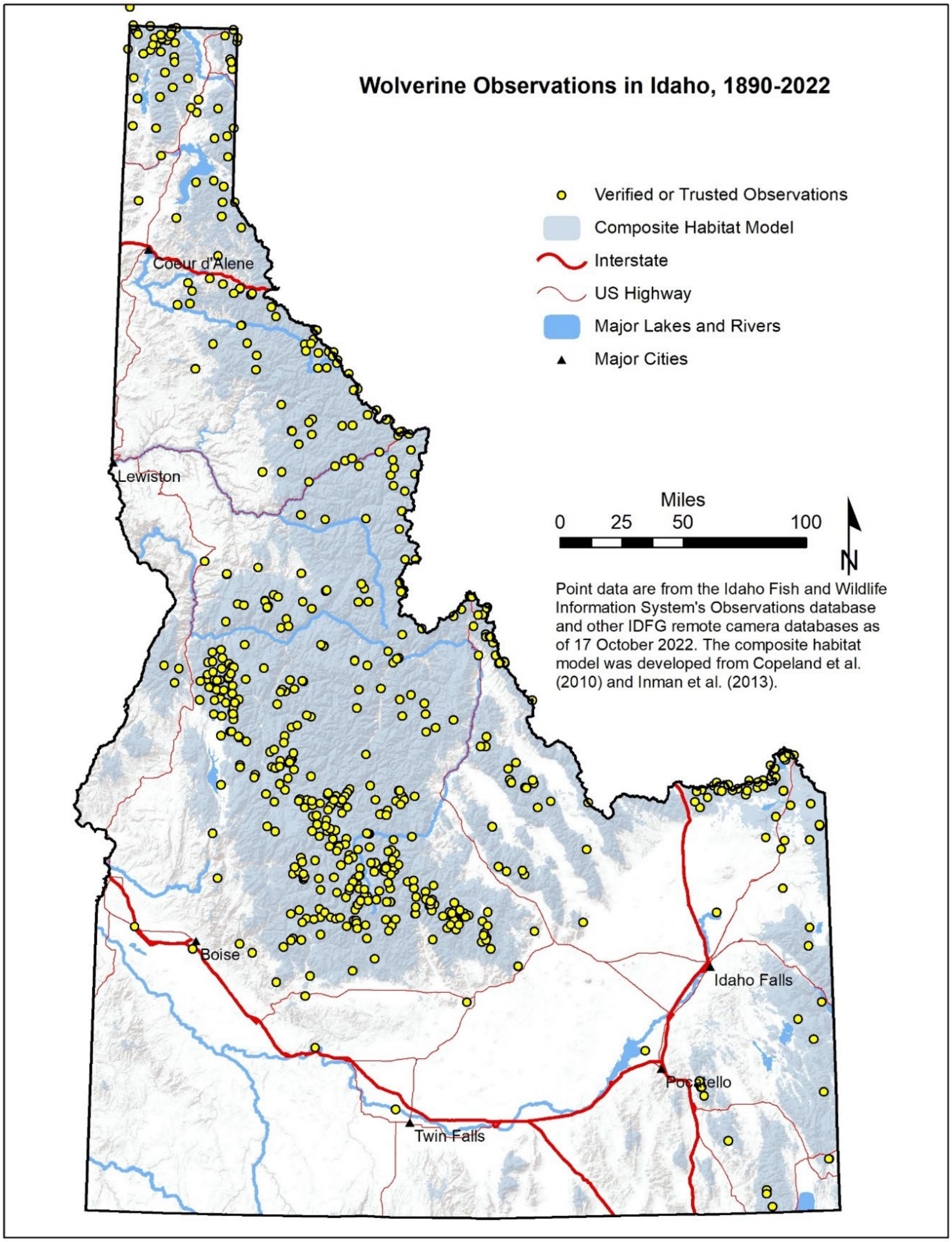

Figure 6. Predicted wolverine habitat from composite of two wolverine habitat models (Copeland et al. 2010, Inman et al. 2013) and verified wolverine observations since 1890.

Abundance /Space Use

Inman et al. (2013) estimated ~300 individual wolverines in the U.S. Rocky Mountains (Idaho, Montana, Wyoming, and Washington), based on projection of habitat use, home range size, and density of wolverine in the Greater Yellowstone area.

The spatial distribution of wolverines on the landscape is determined by territorial behavior, large home range size, habitat, and food availability. Males and females in Idaho had the largest home ranges reported for the species, averaging >492 mi^2 for males and >112 mi^2 for females (Copeland 1996, Heinemeyer et al. 2017). These home ranges are generally intrasexually specific.

Wolverines disperse at 10–15 months, although some individuals remain closely associated with their natal home range for up to 2 years (Copeland 1996, Vangen et al. 2001). Dispersal distance for both sexes can exceed 93 mi (Copeland 1996, Inman et al. 2011). Natural topographical features do not seem to block movements of wolverines, nor is there strong evidence that human development is currently impeding dispersal movements (Hornocker and Hash 1981, Packila et al. 2007, Schwartz et al. 2009).

Habitat Use

Wolverines are generally associated with high-elevation alpine habitat and montane coniferous forests, inhabiting an elevational band above and below tree line. Most of the modeled wolverine habitat in Idaho (Figure 6) occurs on USFS land, which is managed for multiple use, including outdoor recreation, range, timber, minerals, energy, watersheds, and fish and wildlife values.

Two studies in central Idaho indicate that wolverine habitat selection varies seasonally, likely reflecting seasonal food supply. Wolverines are opportunistic omnivores in summer and primarily scavengers in winter. Accordingly, higher-elevation rock and talus were used more in summer, perhaps reflecting hunting opportunities for marmots and ground squirrels. Northerly aspects were frequented year-round (Copeland 1996). Males and females use the landscape differently, at least in winter. While both males and females select valleys, drainage bottoms, and forest edges, females select talus, more fragmented forest patches, and snowier, colder habitats compared with males. Males demonstrate a stronger selection of fir-dominated conifer forest and proximity to secondary roads (Heinemeyer et al. 2019).

Reproduction

Adult females appear to mate every year; however, the proportion that successfully rear young is low and average kits/female/year is <0.90 (Magoun 1985, Inman et al. 2012, Heinemeyer et al. 2017). In Idaho, females enter dens and give birth in mid-February to mid-March and average 1–3 kits per litter (Magoun and Copeland 1998, Inman et al. 2012, Heinemeyer et al. 2017). Natal dens were in high-elevation, snow-covered alpine and subalpine habitats associated with large wood or rock structures, such as large boulder talus or large-diameter downed logs that provided subnivean spaces (Figure 7). Persistent snow may aid in kit survival by providing reduced predation risk, thermal benefits, or proximity to quality rearing habitat (Magoun and Copeland 1998, Heinemeyer et al. 2019). While this persistent stable snow cover appears to be an important feature of denning habitat in multiple areas, Webb et al. (2016) did not identify any relationship between spring snow cover and evidence of reproduction in the boreal forests of northern Alberta.

Figure 7. Natal den sites in Beaverhead Mountains (left; Wildlife Conservation Society photo) and the Salmon River Mountains north of McCall (right; IDFG photo).

Food Habits
Wolverine populations are presumed to be food-limited in the cold, low-productivity environments they occupy (Persson 2005). Starvation is likely an important mortality factor for young and very old wolverines (Banci 1994, Krebs et al. 2004). Large mammal carrion is particularly important, including that associated with hunter camps, wounding mortality, and avalanche mortality (Hornocker and Hash 1981, Banci 1994, Copeland 1996). Investigations at winter foraging sites of GPS-collared wolverines in central Idaho suggest that mountain goat (*Oreamnos americana*) carcasses may be a locally important food source where goats overlap with wolverines (K. Heinemeyer, personal communication). Food caching is a common behavior of wolverines in all seasons.

Mortality
Sources of mortality include starvation (particularly with dispersal-age individuals), attacks by other predators, and human-caused mortality. Predators include gray wolves (*Canus lupus*), mountain lions, American black bears (*Ursus americanus*), and golden eagles *(Aquila chrysaetos*; Boles 1977, Banci 1994, Inman et al. 2008, J. Copeland, personal communication).

Legal and Conservation Status
The North American wolverine is recognized as a subspecies (*Gulo gulo luscus*). The wolverine is classified by the State of Idaho as a Protected Nongame Species, and it is a SGCN in the SWAP (IDFG 2022). Wolverine are found in all national forests in Idaho and are classified by the USFS as Species of Conservation Concern or Sensitive Species, depending on the forest.

Wolverine in the contiguous U.S. have been petitioned for listing under the ESA 2 times over the past 25 years (1994, 2000), and the subject of a series of lawsuits. In October 2020, after completion of a Species Status Assessment (USFWS 2018), the USFWS withdrew an earlier proposal to list the wolverine in the contiguous United States as a threatened distinct population segment. The USFWS' analysis of connectivity, genetic diversity and climate considerations were the subject of scientific and legal debate.

In response to litigation regarding the withdrawal of the proposed listing and an appellate court decision regarding a different ESA listing decision, the USFWS voluntarily agreed in 2022 to reinstate the proposed listing rule for additional analysis. While this review is being conducted, wolverine in the contiguous U.S. is again a candidate (proposed) for ESA listing as a threatened distinct population segment.

Conservation Challenges and Opportunities

In the absence of hunting and trapping seasons, the primary drivers for wolverine population management in Idaho are actions that affect habitat suitability, connectivity, breeding success, and mortality.

Connectivity

Spatial Connectivity—Wolverines in Idaho are part of a larger population that requires regular movement of individuals between habitat patches for long-term persistence (Aubry et al. 2007, Inman et al. 2013). Connectivity depends on conditions at multiple scales, ranging from those supporting local dispersal and successful reproduction at a local population level to landscape permeability allowing for gene flow and occasional but critical long-distance dispersal events.

Central Idaho's wilderness and surrounding remote mountainous areas contain large, well-connected blocks of habitat. This area supports consistent resident, breeding local populations of wolverines. Wolverines appear to move across this landscape readily, as demonstrated by 2 radio collared animals that dispersed from the Sawtooth and White Cloud Mountains to the Salmon River Mountains north of McCall (Copeland 1996, Heinemeyer and Squires 2014), and by parent-offspring relationships derived from genetics (Pilgrim and Schwartz 2018).

Some areas of the state provide habitat that is more fragmented, peninsular, or less suitable (e.g., Idaho Panhandle, Lemhi and Lost River Mountains). While these areas have supported resident animals (Lucid et al. 2016, Evans Mack 2019), the occupancy of resident animals over time or existence and status of local populations is unclear. In addition, climatic projections for increasing temperatures and reduced snowpack could further amplify habitat fragmentation or further lessen habitat suitability over time. For example, Carroll et al. (2020) found that dispersing wolverines do not move indiscriminately across the landscape, they move readily through low-quality habitat, traveling along lower-resistance pathways to reach high-quality habitat. Although wolverines dispersed through lower-quality habitat compared with habitat that resident animals occupied, a lower habitat quality threshold exists for habitat traversed during dispersal events.

In general, occupied wolverine habitat is spatially separated from human habitation, including roads and infrastructure. This relationship likely reflects wolverines' preference for alpine and subalpine habitats, which are typically incompatible with infrastructure development, rather than avoidance of human activity (Copeland et al. 2007). Wolverines are more likely to encounter infrastructure as they cross lower-elevation habitat (i.e., valley bottoms) when moving between habitat areas or when dispersing. Although wolverines respond to road corridors at a fine scale by adjusting behaviorally, such as repeated approaches and retreats, altering course to avoid infrastructure, or choosing not to cross, crossing U.S. and state highways has been documented (Packila et al. 2007). A wolverine that dispersed from Wyoming to Colorado successfully crossed Interstate 80, 3 U.S. highways, and 5 state highways (Inman et al. 2008). , Overall, wolverines seem to demonstrate impressive dispersal ability , but infrastructure and roads in valleys between wolverine habitat could affect wolverine movement or increase mortality of dispersing individuals

Genetics—The current population in Idaho and adjacent states is a result of reestablishment primarily by immigrants from southwestern Canada (McKelvey et al. 2014). Schwartz et al. (2007) found that only 3 of 9 haplotypes known from wolverines in Canada occurred in the northern Rockies, and most samples from western U.S. populations had only one haplotype. Wolverines in Idaho had the lowest genetic diversity levels among 8 populations evaluated across the Rocky Mountains (Cegelski et al. 2006). That study suggested Idaho populations were genetically isolated, even from populations in Montana. It should be noted that the sample size for Idaho in these genetic analyses was relatively small and did not include 24 animals from the wolverine–winter recreation study (Heinemeyer et al. 2019), or 39 new individuals from the western states camera survey in Idaho, Montana, Washington, and Wyoming (Pilgrim et al. 2018).If movement between subpopulations is limited, the risk of inbreeding increases over the long-term (Kyle and Strobeck 2001, Cegelski et al. 2006, Schwartz et al. 2009). However, these efforts were limited in scope and inferences about genetic isolation could be different with a broader sampling effort. Considering the large ranging nature of wolverines, additional monitoring is needed to determine if management actions are needed.

Variables that most influence wolverine gene flow have differed when comparing movements within breeding ranges to long-distance dispersal events. Schwartz et al. (2009) found that snow depth was the most important predictor for wolverine gene flow across all scales, especially up to distances of ~143 mi; whereas terrain ruggedness and housing density most influenced genetic connectivity at a broad scale (e.g., large distances representing occasional long-distance dispersal events; Balkenhol et al. 2020).

Schwartz et al. (2009) and Trail et al. (2010) identified the Bitterroot Mountains between Montana and Idaho as a critical artery of gene flow. This area genetically links wolverines of central Idaho to those in the Bob Marshall Wilderness and Glacier National Park in Montana, and through them on to Canada. The Centennial Mountains in Idaho also link wolverines in the Sawtooth Mountains to those in the Greater Yellowstone Ecosystem (GYE; Schwartz et al. 2009)

Objective: Maintain population connectivity	
Strategies	**Actions**
Continue to characterize genetic connectivity with more robust sample sizes representative of the contiguous U.S. as well as adjacent Canadian territories.	Contribute to and continue to support the ongoing transboundary landscape genetics evaluation to examine gene flow and population structure
Characterize wolverine movements and dispersal. Develop analytical products to support resource development and management decisions.	Develop analytical products that support project planning and review, including consideration for climate change.
	Develop voluntary partnerships to facilitate protection of areas important for wolverine movements and dispersal.
Collaborate with natural-resource-based industries, resource managers, landowners, and other stakeholders to plan and implement approaches to maintain genetic connectivity.	Provide technical assistance to licensing and permitting regulatory authorities, industry, and other stakeholders about opportunities to maintain wolverine movements and dispersal.
	Conserve wolverine populations and habitat with cooperative agreements (e.g., land exchanges, conservation easements, and Forest Legacy Program).

Climate

Wolverine may occupy a snowy bioclimatic niche because their physiology requires colder temperatures or because they face less competition with other large mammals that are not present in winter (Copeland 2010).

Snow cover is a commonly used metric to project change in wolverine habitat resulting of a warming climate. Projections of increasing temperatures and a trend for more precipitation to fall as rain rather than snow represent a potential stress on wolverine based on elevation and latitude. However, the magnitude of projected change varies widely in time and space, and natural climate variability can reduce or amplify projected effects (*e.g.*, Abatzoglou et al. 2014). Local climate conditions may continue to offer climate refugia (*e.g.*, Moritz and Agudo 2013), and the complexity of terrain in Idaho represents a challenge for many climate models. All these factors lead to uncertainty about how climate change could influence wolverine persistence in Idaho over the next 50 years.

Most projections for the Pacific Northwest predict progressively warmer and wetter conditions during the 21st century. Temperatures are predicted to increase in all seasons, with the largest increases in summer. Precipitation is predicted to increase during fall and winter, with little change or additional drying during summer. Much of the western U.S. is expected to transition from a snow-dominated system to one more rain-dominated; spring snowpack is expected to decline, especially at warmer low to mid-elevations; and existing snow is expected to continue melting earlier (Pierce and Cayan 2013). These changes are expected to become most pronounced beyond 2035 (Kunkel et al. 2013).

Climate models provide credible estimates at global and continental scales under a given set of assumptions (IPCC 2007). Downscaling to more local geography, such as wolverine habitat in Idaho, presents challenges due to topographical complexity or lack of resolution of the data and introduces more assumptions and analyses that can lead to over- and underestimations of local climatic changes (e.g., Salathé et al. 2010). For example, elevations can range >7,000 ft within a single sampling unit within central Idaho's rugged terrain. Similarly, the spatial scale of some remotely sensed data (e.g., MODIS) used to estimate snow cover, can result in unreliable estimates, particularly in fragmented landscapes.

Thus, while McKelvey et al. (2011) and Peacock (2011) predicted large declines in spring snow cover and depth by the end of the century, both studies recognized a large range of variation and uncertainty due to spatial scale of the data, particularly in topographically complex areas. A high-resolution projection of snowpack found that snowpack loss was strongly dependent on topographical aspect, with northerly slopes retaining more snow longer, and that snow was likely to persist into the mid-21st century within the upper half of an elevational band defining wolverine denning (Barsulgli et al., 2020). Likewise, Carroll et al. (2018) concluded that wolverine habitat is not expected to shift drastically between 2010 and 2050, although connective pathways shift spatially and become smaller into the future.

Perhaps the largest unknowns are the wolverine's sensitivity to climate, the degree to which its association with snow is obligatory, and the animal's adaptive capacity. While snow cover is projected to decline, this will vary by elevation, topography, and geographic region. In addition, the inter-annual variability likely will be substantial, and other factors (e.g., road density, human population density) may interact with climate changes to redefine suitable habitat. Thus, the ability of wolverines to adapt behaviorally and physiologically will be relative to the magnitude of change experienced and therefore variable through space and time.

Objective: Collect local scale climate data, particularly data associated with snowpack	
Strategies	**Actions**
Model localized climate-driven changes to wolverine habitat	Support efforts to establish long-term climate monitoring stations (e.g., remote cameras, light sensors, temperature sensors) at locations representative of Idaho's complex topography

Human-Caused Mortality

Incidental Trapping—Wolverines are classified as protected non-game animals and are closed to harvest. However, wolverines have been incidentally captured in traps legally set for other species. IDFG has documented 27 incidents since 1965 (the year wolverines were designated as state-protected).

Of incidental trapping incidents, 11 animals were direct mortalities, and 16 animals were released alive, some with documented injuries. Prior to 2004, non-target trap records were sporadic. Beginning in 2004, at least one incident has occurred almost every year, and some years have had 2 or 3 incidents.

Illegal Take—No illegal take of wolverines has been documented in the last 5 years by IDFG.

Vehicle Collisions/Roadkill—Vehicle collisions with wolverine are rare. IDFG has documented one confirmed mortality and two unconfirmed mortalities of wolverine in the roadkill database.

Objective: Reduce incidental and illegal human-caused mortality.	
Strategies	**Actions**
Minimize non-target capture of wolverine in trap sets	Continue to provide guidance on reducing non-target take and minimizing injury to wolverine in biannual upland game bird, turkey, and furbearer proclamation booklet.
	Continue to teach wolverine avoidance techniques in mandatory Trapper and Wolf-Specific Trapper Education Classes

Knowledge Gaps

Wolverine Abundance—A population estimate is fundamental to assessing conservation status, extirpation risk, population changes over time, and effects of resource management actions. However, the ability to obtain a reliable abundance metric on a low-density, far-ranging animal such as wolverine is difficult. Due to sample size and difficulty of tracking change over time, genetics-based methods have limitations. The Western States Wolverine Conservation Project opted for an occupancy metric because an estimate of abundance required an intensity of sampling that was logistically beyond reach. For example, Ellis et al. (2013) estimated that 100–150 camera stations, 1 per 39 mi^2 cell, would be needed to reach an 80% probability of detecting a 50% decline in the current U.S. Rocky Mountain wolverine population. As an alternative to estimating abundance, the WSWSP established a robust method for quantifying wolverine distribution and probability of occupancy at the metapopulation scale and tracking changes in these metrics over time (Lukacs et al. 2020).

Wolverine Denning Habitat and Association with Snow Cover—The relationship between wolverine dens and snow cover has become less clear in recent years. Copeland et al. (2010) found a very high spatial correlation between the locations of dens known globally at the time and a model of persistent spring snow. More recently, wolverine dens have been documented in areas with minimal or no persistent spring snow **(**Makkonen 2015, Webb et al. 2016, Aronsson & Persson 2017, Jokinen et al. 2019). In the context of a warming climate, understanding the nature of the den site–snow relationship and its effect on reproductive success is critical to projecting the persistence of Idaho's wolverine subpopulations. Magoun et al. (2017) suggested that if persistent spring snow is important at the den-site level, remote sensing techniques are not precise enough to capture it at all locations, and different scales and resolutions are needed to examine this relationship.

Objective: Increase base knowledge of wolverine to inform conservation efforts	
Strategies	**Actions**
Investigate the relationship between wolverine natal denning habitat and snow cover	Identify denning sites through radio collared female wolverines and aerial surveys.
	If feasible, develop a model to characterize and predict maternal denning areas to inform land management planning efforts

CANADA LYNX

Ecology and Status

General Physical Description

The Canada lynx is a medium-sized member of the felid family. It is similar in size to the bobcat (*Lynx rufus*), but is differentiated by its light-colored coat, prominent ear-tufts, long legs, and large feet. Large feet are a prominent characteristic of the lynx and allow the species to efficiently travel over deep, unconsolidated snow. Males and females are similar in appearance. Adult males are larger (26 lb average) than adult females (22 lb average).

Distribution/Population Status

Lynx are closely tied to boreal forests and their historical distribution in North America largely reflects the historical distribution of boreal forest. Reports of lynx outside of this habitat type exist, with observations extending to places such as Nevada, Iowa, and New York (McKelvey et al. 2000). However, these reports may paint an inaccurate depiction of what constitutes historical and present-day lynx range, as many of these were likely from transient/dispersing lynx and not resident animals. In a review by the USFWS, inclusion of areas that do not include lynx habitat foster a misperception of the historic range of the species in the contiguous U.S. (68 FR 40080). Review of this subject identified only a few areas in the contiguous U.S. with sufficient quality habitat to maintain resident lynx populations (e.g., northern Maine, northeastern Minnesota, western Montana, and northcentral and northeastern Washington; 68 FR 40077, 40099).

Though lynx sightings have occurred throughout much of Idaho (Figure 8), this should not be interpreted as lynx distribution or reflective of habitat suitability. IDFG has only documented 81 verifiable lynx detections, with most of these sightings occurring outside of high-quality habitat (Figure 8). These sightings are best described as transient or dispersing individuals. In Idaho, high quality lynx habitat is limited, with most existing in small isolated and fragmented parcels (Figure 8) that can only support a small number of individuals even if fully occupied.

Space Use/Abundance

Given the limited suitable habitat and limited observations in Idaho, no abundance estimates or studies of home ranges have been developed in Idaho. The number of lynx in Idaho is likely very small, and should only be considered in a population context relative to its connection to larger contiguous occupied habitat outside of state boundaries.

Densities of lynx can fluctuate greatly across their range, depending on primary prey (*i.e.,* snowshoe hare) densities. In northwest Montana the median female home range was 8.8 mi^2 (range = 7-25 mi^2; Holbrook et al. 2019). Male home ranges in northwest Montana were not reported, but home range analysis in other areas demonstrate male home ranges to be 1.5 to 3x larger than females (Quinn and Parker 1984). In areas with greater lynx occupancy, home ranges overlap, particularly among different ages and sexes (Nellis et al. 1972, Brand et al. 1976).

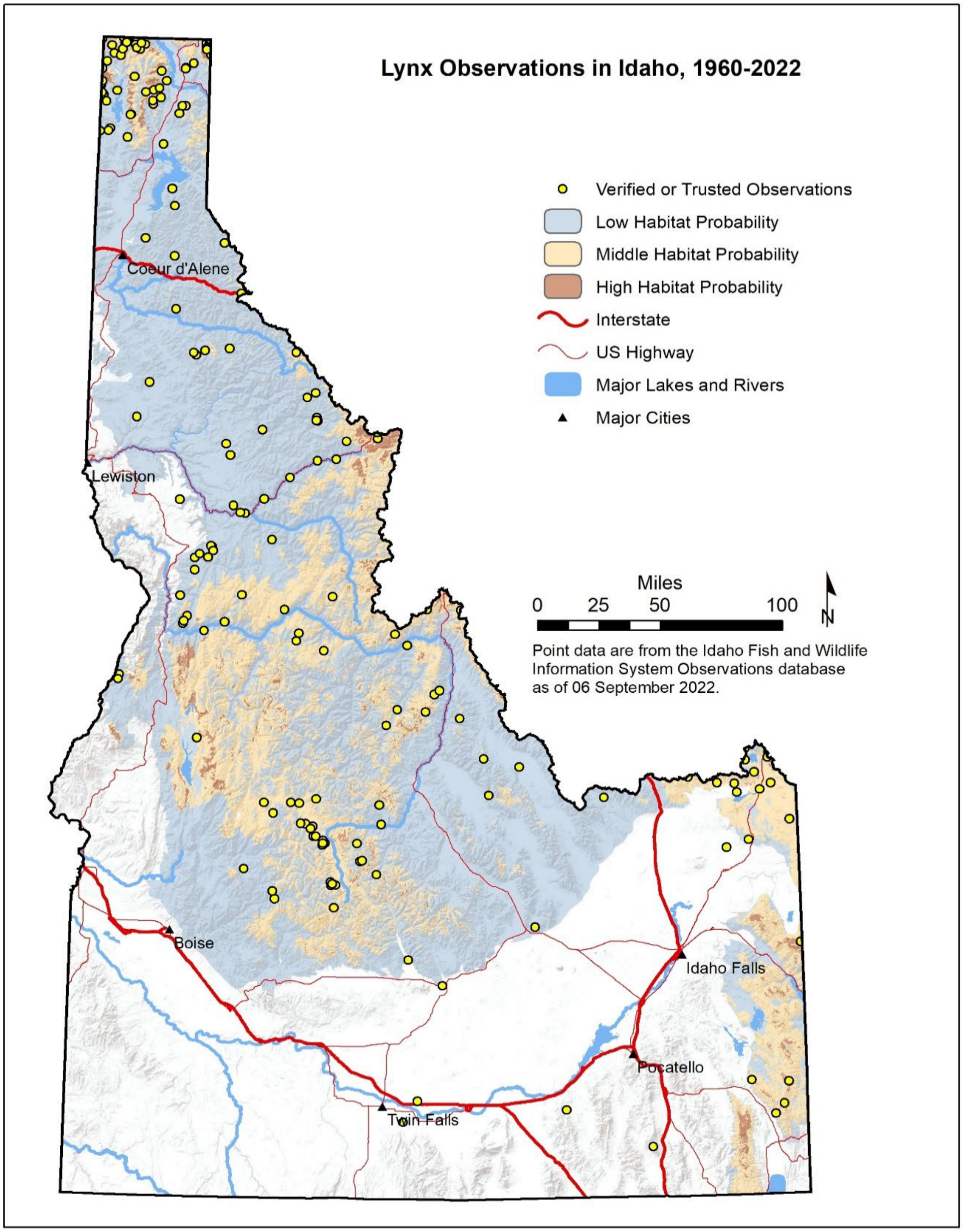

Figure 8. A categorical representation of Canada lynx habitat (Olson et al. 2021). Low habitat probability indicates unlikely use, middle habitat probability indicates some level of use, potentially by single animals or animals more likely to be dispersing or moving between territories, and high habitat probability indicates higher probability of use, particularly by resident individuals. Yellow circles represent verified or trusted lynx observations between 1960 and 2022.

Habitat Use

Suitable lynx habitat is forest structure that supports: (1) snowshoe hare density above 0.2 per acre (Berg et al. 2012), (2) enough horizontal cover to allow for efficient hunting (Vashon et al. 2008; Squires et al. 2010), and (3) winter conditions that promote unconsolidated snowpack to provide Canada lynx an adaptive advantage over other meso-carnivores due to their foot loading.

In the Northern Rockies of the United States, these components tend to be found in mid- to high-elevation forest (*i.e*., 4,900 – 6,500 ft) composed of spruce-fir overstory with a midstory forming complex structure and high horizontal cover (Squires et al. 2010). This tends to be associated with late-seral stage forests. However, this is not the only forest structure needed by lynx. In an investigation of habitat use of 32 female lynx over 94 lynx years, Holbrook et al. (2018) identified that a high-quality mosaic habitat for female lynx contains ≈50-60% mature forest and ≈18-19% advanced regenerating forest.

Reproduction

Reproduction, recruitment, and population densities in lynx have been closely tied to snowshoe hare population cycles across much of their range (Elton and Nicholson 1942). This cyclic recruitment has not been observed throughout the southern periphery of lynx range (*i.e.*, south of Canada), likely due to the absence of strong snowshoe hare population cycles. Observed litter size of 53 litters produced approximately 2.5 kittens/litter in northwestern Montana, without variation by age or year (Kosterman et al. 2018). Age-related variation in litter size has been documented in northern portions of the species range (*i.e.*, Yukon Territories, Canada; Mowat 1996).

Food Habits

Throughout the species' range, snowshoe hare is the primary food item. In northwestern Montana, snowshoe hares account for 96% of winter prey biomass (Squires and Ruggiero 2007). Further south, in an introduced population of lynx in Colorado, Ivan and Shenk (2016) found that while snowshoe hares continued to be an important food source, red squirrels (*Tamis hudsonicus*) were also an important prey item, accounting for more than 20% of diet by biomass in 7 of the 11 years of the study. While secondary prey items (*i.e.*, prey other than snowshoe hare) may vary in rates of occurrence in food habitat studies, snowshoe hares remain the primary food item and suitable snowshoe hare densities are a requirement for lynx persistence.

Mortality

Lynx are subject to a variety of mortality factors. Starvation/malnutrition is a dominant mortality factor (Quinn and Parker 1984). Predation is also a source of mortality with bobcat, gray wolves, mountain lion, and even other lynx as a source of predation. In a study of 85 radio collared lynx in Maine, predation was the leading cause of mortality, with fisher accounting for 14 of the 18 predation events (McLellen et al. 2018). Human-caused mortality is also an important source of mortality in some populations where lynx are open to harvest (which is not the case in Idaho).

Legal and Conservation Status

The lynx is classified as a furbearer in Idaho with a closed season. The SWAP (IDFG 2022) identifies lynx in the Purcell Mountains in the northeast corner of the Panhandle as a SGCN, consistent with federally designated critical habitat under the ESA. Lynx that occur south of the U.S.-Canada border have been identified as a DPS and listed as threatened under the ESA since 2000. In 2017, the USFWS recommended delisting lynx as part of their 5-year status review and started the delisting process. These efforts were ultimately halted by litigation, after the USFWS reached legal settlements that involve developing a recovery plan for lynx in the contiguous United States and reviewing its designation of critical habitat.

Conservation Challenges and Opportunities

Lynx in Idaho pose a unique situation from a conservation perspective. Suitable lynx habitat is extremely limited in the state. Persistence of lynx in these areas is dependent on the status of lynx in neighboring areas (British Columbia and Montana), where enough suitable habitat exists to support reproductively viable populations of lynx. As an example, if we consider the 'high habitat probability' identified in Olson et al. (2021) in western Montana and northern Idaho, Idaho contains roughly 5% of the habitat suitable for resident animals. This limited amount of habitat is insufficient to influence a lynx population.

Population Monitoring

Although IDFG has little ability to impact lynx populations from a biological standpoint, it is important to continue to participate in providing the best available science used to inform determinations under the ESA. IDFG collaborates with neighboring state agencies on development and implementation of lynx population monitoring strategies. With most identified habitat for lynx existing in Montana, continued coordination will be critical for gathering scientifically robust information on the status of lynx in Idaho and adjacent states.

Objective: Maintain Accurate Understanding of Canada Lynx Status and Distribution in Idaho	
Strategies	**Actions**
Monitor population status and distribution	Continue collaboration with FWP and Wyoming Game and Fish Department to refine and implement a robust occupancy monitoring effort that informs state and federal agencies on current lynx status and distribution in Idaho and surrounding states.

Human-Caused Mortality

Non-Target Captures—Since 2000, 7 lynx have been caught in foothold traps set for other species with open trapping seasons, with six of the captures by trappers targeting bobcat. There was one mortality related to these captures, but it was due to illegal shooting the lynx in the trap. The remaining 6 lynx were released presumably unharmed, with one animal radio collared and monitored by IDFG after its release. While these few unintended captures do not impact populations of lynx, it is prudent to minimize non-target capture.

Illegal Take—Illegal take of lynx is rare in Idaho. In the past 5 years, IDFG conservation officers have documented one incident where a person shot and killed a Canada lynx they thought was a bobcat when it attacked their chicken coop.

Vehicle Collisions/Roadkill—No lynx have been documented being hit by vehicles in IDFG's Roadkill Observation Database.

Objective: Minimize incidental or illegal human-caused mortality of Canada lynx.	
Strategies	**Actions**
Educate the trapping community on measures to reduce non-target captures	Continue to provide guidance on reducing non-target take and minimizing injury to Canada lynx in biennial upland game bird, turkey, and furbearer proclamation booklet.
	Continue to discuss non-target take reduction and injury minimization to the trapping community at events, such as fur auctions, conferences and trapper education classes.

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