BEFORE THE SECRETARY OF THE INTERIOR

PETITION TO LIST THE NORTHERN ROCKIES DISTINCT POPULATION SEGMENT OF FISHER (*PEKANIA PENNANTI*) AS THREATENED OR ENDANGEREED UNDER THE ENDANGERED SPECIES ACT

Notice of Petition

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PETITIONERS

The Center for Biological Diversity ("Center") is a non-profit, public interest environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center is supported by more than 625,000 members and activists throughout the United States. The Center and its members are concerned with the conservation of endangered species, including Northern Rockies Fisher, and the effective implementation of the ESA. The Center's members and staff include area residents with biological, health, educational, scientific research, moral, spiritual and aesthetic interests in the fisher and its habitat in the Northern Rockies.

Defenders of Wildlife is a non-profit conservation organization that advocates for wildlife and its habitat. Defenders uses education, litigation, and research to protect wild animals and plants in their natural communities. Known for its effective leadership on endangered species issues, Defenders also advocates new approaches to wildlife conservation that protect species before they become endangered. Its programs reflect the conviction that saving the diversity of our planet's life requires protecting entire ecosystems and ensuring interconnected habitats. Founded in 1947, Defenders of Wildlife is a 501(c)(3) membership organization with more than 1,000,000 members and supporters nationwide.

Friends of the Bitterroot is a 501(c)(3) grassroots conservation organization with about seven hundred members dedicated to conserving wild land and wildlife, protecting forests and watersheds, and working toward a sustainable relationship with the environment. Friends of the Bitterroot works to protect habitat and gain science-based management decisions through public education, informed involvement in public processes, and contributions to scientific data. Its conservation work is local and regional, primarily involving the mountainous headlands of the Bitterroot, Selway, Salmon, and Big Hole Rivers as well as the Rock Creek tributary of the Clark Fork, east of the Bitterroot. Much of this area is occupied or recently occupied fisher habitat. Over the years, Friends of the Bitterroot has demonstrated a sustained commitment to the well being of wildlife, especially wildland dependent, far-ranging species like grizzly bears, wolverines and fisher. Many members live and/or recreate in and adjacent to fisher habitat, and several have happily reported seeing tracks or the animal itself while out skiing or hunting.

Friends of the Clearwater is a 501(c)(3) grassroots conservation organization dedicated to preserving the wild lands and ecological integrity of the Clearwater River Basin in Idaho. Friends of the Clearwater is based in Moscow, Idaho and has been active in public processes where decisions are made that affect fisher habitat. It participates in public involvement processes through comments, public meetings, and open houses and also sponsors free public events, field trips to fisher habitat and seminars. Friends of the Clearwater's members, which number over 600 households, and supporters are also active in a variety of public processes that affect fishers and their habitat.

Western Watersheds Project is a non-profit conservation group founded in 1993 with 1,400 members. The group has field offices in Idaho and Montana and is concerned about the long-term survival and recovery of the Northern Rockies fisher. The group works to influence and improve public lands management throughout the West. The mission of Western Watersheds Project is to protect and restore western watersheds and wildlife through education, public policy initiatives and litigation.

Friends of the Wild Swan is a Montana non-profit organization with its principal place of business in Swan Lake, Lake County, Montana. Friends of the Wild Swan is dedicated to the conservation of natural resources and preserving the biological integrity of the Crown of the Continent ecosystem in northwest Montana which includes ensuring the long-term survival of fisher.

Submitted this 23rd day of September, 2013

Pursuant to Section 4(b) of the Endangered Species Act ("ESA"), 16 U.S.C. § 1533(b); Section 553(e) of the Administrative Procedure Act, 5 U.S.C. § 553(e); and 50 C.F.R. § 424.14(a), the Center for Biological Diversity, Defenders of Wildlife, Friends of the Bitterroot, Friends of the Clearwater, Friends of the Wild Swan, and Western Watersheds Project hereby petition the Secretary of the Interior, through the United States Fish and Wildlife Service ("FWS," "Service"), to list the Northern Rockies Distinct Population Segment of Fisher (*Pekania pennanti;* formerly *Martes pennanti* [see Sato et al. 2012]) as a threatened or endangered species and to designate critical habitat to ensure its recovery.

FWS has jurisdiction over this petition. This petition sets in motion a specific process, placing definite response requirements on the Service. Specifically, the Service must issue an initial finding as to whether the petition "presents substantial scientific or commercial information indicating that the petitioned action may be warranted." 16 U.S.C. § 1533(b)(3)(A). FWS must make this initial finding "[t]o the maximum extent practicable, within 90 days after receiving the petition." *Id*. Petitioners need not demonstrate that listing of the Northern Rockies Distinct Population Segment of Fisher is warranted, rather, petitioners must only present information demonstrating that such listing may be warranted. While petitioners believe that the best available science demonstrates that listing of the Northern Rockies Fisher is in fact warranted, there can be no reasonable dispute that the available information indicates that listing the species may be warranted. As such, FWS must promptly make a positive initial finding on the petition and commence and complete a status review as required by 16 U.S.C. § 1533(b)(3)(B). Petitioners also request that critical habitat be designated for the Northern Rockies Fisher Distinct Population Segment concurrently with the species being listed as endangered or threatened, pursuant to 16 U.S.C. § 1533(a)(3)(A) and 50 C.F.R. § 424.12.

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EXECUTIVE SUMMARY

The Northern Rockies fisher (*Pekania pennanti*; formerly *Martes pennanti* [see Sato et al. 2012]) is a medium-sized, forest-dwelling carnivore that is cat-like and has a long, slender brown body with short legs and a long bushy tail. The Northern Rockies fisher once ranged from eastern British Columbia and southwestern Alberta through northeastern Washington, Idaho, Montana, northwest Wyoming, and north-central Utah. Due to trapping and habitat loss, today it survives only in small, low-density populations along the border of Montana and northern Idaho. The Northern Rockies fisher was recently recognized as a Distinct Population Segment by the U.S. Fish and Wildlife Service (2011) due primarily to genetic characteristics that differentiate fishers in the Northern Rockies from all other fishers. The Endangered Species Act states that a species shall be determined to be endangered or threatened based on any one of five factors (16 U.S.C. § 1533 (a)(1)). The Northern Rockies fisher is threatened by all five of these factors and thus warrants protection as a threatened or endangered species:

Modification or Curtailment of Habitat or Range

Fishers select forested habitats with the largest, oldest trees available and with high levels of forest canopy to offer protection from predation, vertical escape from predators, and microhabitats suitable for thermoregulation (Naney et al. 2012, Raley et al. 2012, Aubry et al. 2013, Schwartz et al. 2013). Fishers require structural characteristics of late-successional forests to provide sites for resting and denning. Small habitat patches, such as riparian buffers, do not provide adequate habitat to ensure fisher persistence (Schwartz et al. 2013). Logging, fire, fire-control activities, forest diseases, development, and other factors which reduce forest canopy threaten the habitat and survival of fishers. In a prior negative 12-month finding for Northern Rockies fisher (FWS 2011), the Service concluded that logging was not a threat to fishers because at the time, habitat ecology and habitat requirements of fishers in the USNRMs were not well known (p. 38520). Since the time of that finding, however, several new studies have been published on fisher habitat ecology (Naney et al. 2012, Raley et al. 2012, Aubry et al. 2013, Schwartz et al. 2013). These publications reveal that fisher habitat needs are similar throughout the western region, and that Northern Rockies fishers select habitats based on characteristics consistent with fishers in other more intensively studied regions where logging and other habitat-degrading activities are known to threaten their survival.

Overutilization

It is well established in the scientific literature that fisher populations are vulnerable to over-trapping. Levels of incidental trapping of fishers in the Northern Rockies have increased alarmingly in recent years and have risen to the level of a threat that qualifies the DPS for protection under the Endangered Species Act. In Idaho, reported non-target catch of fishers by individual fur-takers was 46 fishers in the 2010-2011 trapping season, four of which were dead, and 30 fishers in the 2011-2012 trapping season, 18 of which were dead (IDFG 2013). These numbers represent a startling increase in the number of trapped fishers when compared to the numbers caught over the past decade. The number of fishers which have been incidentally trapped since 2008 (n=132), is more than twice as many fishers as were captured from 2002-2007 (n=61). The startlingly high recent capture rates are not even representative of the total trapping threat to the DPS because Montana permits legal fisher trapping and does not monitor incidental capture of animals trapped and released alive on a statewide level. Further, these numbers only include take by licensed furbearers and do not include trapping conducted by state and federal agencies. There is no evidence that the drastically increased number of captures in recent years is due to population growth, rather, the data which are available indicate that the number of captures has increased due to an increase in the number of trapping licenses issued. Comprehensive population estimates are not available for the Northern Rockies fisher DPS, so agencies cannot ensure that fisher trapping levels are sustainable, and few to no measures are officially taken to reduce incidental capture of fishers, which are curious and easily trapped. The data which are available indicate that the population is small. Also since the time of the negative petition finding in 2011, new matrix demographic modeling has revealed the importance of adult survival on fisher life history, magnifying the threat posed to fishers by trapping when adults are removed from the population (Buskirk et al. 2012, p. 77).

Disease and Predation

It has recently come to light that fishers are vulnerable to several diseases including toxoplasmosis, canine distemper, and parasites (Larkin et al. 2011, Gabriel et al. 2012a). The insular nature of the Northern Rockies population makes disease a major concern for its long-term survival. Co-occurring stressors such as habitat fragmentation can magnify the impacts of disease on fisher fitness (Gabriel et al. 2012a, p. 139). Predation also threatens fishers in the Northern Rockies. Recent studies have demonstrated that predation on fishers in western North America is more common than was previously known (Raley et al. 2012, p. 246).

Inadequacy of Existing Regulatory Mechanisms

There are no existing regulatory mechanisms at the federal, state, or local level to adequately protect fishers in the Northern Rockies from the threats they face from habitat loss, overutilization, disease and predation, and other factors.

Other Factors

Other factors that threaten fishers include poisoning, vehicle collisions, and accidental trapping in manmade structures such as water tanks (Zielinski et al. 1995, Folliard 1997, Truex et al. 1998, Gabriel et al. 2012, EPA 2013). Fishers are highly prone to localized extirpation, their colonizing ability is somewhat limited, and their populations are slow to recover from deleterious impacts (FWS 2012).

Previously the Service issued a negative 12-month finding on a petition to protect fishers in the Northern Rockies (FWS 2011), but since that time much significant new information has come to light that better indicates that fishers in Idaho and Montana are threatened by habitat loss and degradation, trapping, disease, predation, and other factors, and that the DPS now warrants federal protection. In addition, the recent placement of the fisher into its own genus—*Pekania* (Koepli et al. 2008, Sato et al. 2012), magnifies the need for federal protection to ensure its survival and recovery.

INTRODUCTION

The Northern Rockies fisher is a cat-like, brown carnivore with a long body and a long bushy tail that lives in deep forest habitats along the border of Montana and northern Idaho (Figure 1). The fisher has undergone steep decline in both population and range. This petition summarizes the natural history of fishers and then provides evidence that, in the context of the ESA's five statutory listing factors, the Northern Rockies fisher warrants listing as endangered or threatened under the Act due to loss or curtailment of habitat or range, overutilization from trapping, disease and predation, the inadequacy of existing regulatory mechanisms to safeguard the species, and other factors. Lastly, this petition requests that critical habitat be designated for fishers in the Northern Rockies.

NATURAL HISTORY

Description

The fisher is a forest-dwelling, medium-sized mammal, light brown to dark blackish-brown in color, with the face, neck, and shoulders sometimes being slightly gray (Powell 1981, p. 1). The chest and underside often have irregular white patches. The fisher has a long body with short legs and a long bushy tail. Males range in length from 90 to 120 centimeters (cm) (35 to 47 inches (in.)), and females range from 75 to 95 cm (29 to 37 in.) in length. At 3.5 to 5.5 kilograms (kg) (7.7 to 12.1 pounds (lbs)), male fishers weigh about twice as much as females (2.0 to 2.5 kg (4.4 to 5.5 lbs)) (Powell et al. 2003, p. 638). Heavier males have been reported across the range, including individuals within the Northern Rockies; an exceptional specimen from Maine weighed 9 kg (20.1 lbs) (Blanchard 1964, pp. 487–488). Fishers may show variation in typical body weight regionally, corresponding with latitudinal gradients. For example, fishers in the more southern latitudes of the U.S. Pacific States may weigh less than fishers in the eastern United States and Canada (Seglund 1995, p. 21; Dark 1997, p. 61; Aubry and Lewis 2003, p. 87; Lofroth *et al.* 2010, p. 10).

Taxonomy

The fisher is found only in North America and is classified in the order Carnivora, family Mustelidae, a family that also includes weasels, mink, martens, wolverines, and otters (Anderson 1994, p. 14). Until recently, the fisher was included in the genus Martes along with martens. Recent genetic research, however, determined that the genus Martes is paraphyletic (containing some but not all descendants from a common ancestor) (Koepfli et al. 2008, p. 5; Sato et al. 2012). To resolve this new information, Sato et al. (2012) elevated the subgenus Pekania to the level of genus, changing the fisher's classification from *Martes pennanti* to *Pekania pennanti* (p. 755). The classification of fishers into genus Pekania confines the genus Martes to a monophyletic group including only the remaining extant martens (in North America, *Martes americana and M. caurina*). The placement of the fisher into its own genus elevates the conservation priority of the species.

As previously determined by the Service (FWS 2011, p. 38518), the Northern Rockies population of fisher qualifies as a Distinct Vertebrate Population Segment (DPS) under the Service's DPS policy (61 FR 4722, February 7, 1996), and is thus a listable entity under the Act.

Three elements are considered in the decision concerning the establishment and classification of a DPS: (1) The discreteness of a population in relation to the remainder of the species to which it belongs; (2) The significance of the population segment to the species to which it belongs; and (3) The population segment's conservation status in relation to the Act's standards for listing.

Under the DPS policy, a population segment of a vertebrate taxon may be considered discrete if it satisfies either one of the following conditions: (1) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors; quantitative measures of genetic or morphological discontinuity may provide evidence of this separation. (2) It is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act.

As already determined by the Service, fishers in the U.S. Northern Rocky Mountains (USNRMs) are markedly separated from other populations of the taxon as a result of physical factors, and thus meet the definition of a discrete population (FWS 2011, p. 38516). Fishers in the USNRMs are geographically separate from other fisher populations. The range of the fisher in the Northern Rockies is separated from the fisher in its West Coast Range of Washington, Oregon, and California by distance, natural physical barriers, and inhospitable habitat. The fisher distribution in the U.S. Northern Rockies is the southern extent of the taxon's known range in the Rocky Mountains. The northern geographic extent of fisher distribution roughly coincides with the border of the United States and Canada at 49 degrees north latitude. The Northern Rockies Fisher DPS is bounded by the southern Bitterroot Range north of Lemhi Pass in Montana, east and then north along the Continental Divide including forested areas east of the Divide to the Rocky Mountain Front, north along the eastern boundary of Glacier National Park, west along the Boundary Mountains and northern Whitefish Range in northern Montana, west to the southern Selkirk and southern Purcell Mountains to the Idaho boundary with Washington, south along the forested areas of northern Idaho bounded on the west by the Palouse and Camas Prairie regions, south along the Western Mountains and North Payette River to the Boise Mountains, and northeast along the Salmon River to the southern Bitterroot Range north of Lemhi Pass in Idaho (See FWS 2011, Figure 2). There is no evidence to indicate that fisher in the USNRMs were recently, or historically, connected to other fisher population centers in the United States (Gibilisco 1994, p. 64; Proulx et al. 2004, p. 57).

In terms of significance, the DPS policy describes four possible classes of information that provide evidence of a population segment's biological and ecological importance to the taxon to which it belongs. As specified in the DPS policy (61 FR 4722), this consideration of the population segment's significance may include, but is not limited to, the following: (1) Persistence of the discrete population segment in an ecological setting unusual or unique to the taxon; (2) Evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon; (3) Evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historical range; or (4) Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics. A population segment needs to satisfy only one of these conditions to be considered significant.

In terms of ecological setting, the fisher is a forest-dependent species, and marked separation from fishers in other geographic locations may be indicated by variations in forest types or ecological conditions influencing forest characteristics. Fishers in Idaho have some of the largest home ranges recorded for the species (reviewed by Powell and Zielinski 1994, p. 58; IOSC 2010, p. 4; reviewed by Lofroth et al. 2010, p. 68), possibly indicating suboptimal forest resources often found in peripheral populations (Wolf et al. 1996, p. 1147). The limited availability of hardwood tree types used for denning in other areas of the range also may indicate a local adaptation to different den structures in the USNRMs and the selection of less optimal structures based on necessity. Fishers in the Northern Rockies are subject to suboptimal habitats and pressures typically seen in important peripheral populations. Strong selective pressures in peripheral populations may induce adaptations that may be important to the taxon in the future.

The retention of a fisher population in the USNRMs is significant to the taxon because of its situation at the periphery of the range. Populations at geographic margins may be of high conservation significance and important to long-term survival and evolution of species (Lesica and Allendorf 1995, p. 756; Fraser 2000, p. 49). Peripheral populations are likely to be in suboptimal habitats and subject to severe pressures that result in genetic divergence, as seen in USNRMs fisher populations, either from genetic drift or adaptation to local environments (Fraser 2000, p. 50). Because of their exposure to strong selective pressures, peripheral populations may contain adaptations that may be important to the taxon in the future. Lomolino and Channell (1998, p. 482) hypothesize that because peripheral populations should be adapted to a greater variety of environmental conditions, then they may be better suited to deal with anthropogenic disturbances than populations in the central part of a species' range.

The loss of the fisher in the USNRMs would result in a significant gap in the range of the taxon (FWS 2011, p. 38517). Loss of Northern Rockies fisher would further contribute to the extensive range retraction and fragmentation that has occurred since European settlement of North America (Gibilisico 1994, p. 60). The USNRMs represent one of only three historical peninsular reaches of the range in the United States connecting with Canada and the southernmost extension of the taxon's distribution in the Rocky Mountains (Gibilisco 1994, p. 60; Proulx et al. 2004, p. 57). Fisher populations in the western United States are isolated from each other and the closest Eastern population in the Great Lakes area, and have lost a connection or have a severely diminished capacity to connect with larger population areas in Canada (Gibilisco 1994, p. 64; Zielinski et al. 1995, p. 107; Aubry and Lewis 2003, pp. 86, 88; Weir 2003, pp. 19, 24, 25; Weir and Lara Almuedo 2010, p. 36). Extirpation of the USNRMs population would significantly impact representation of the species by shifting the southern boundary of the western range of the taxon over 965 km (600 mi) to the north. Only three individually isolated fisher populations in Oregon and California, two being native populations (Aubry and Lewis 2003, p. 88; Lofroth et al. 2010, p. 47), would be left in the entire southwest range of the taxon at a distance of over 800 km (500 mi) from populations in Canada (Weir and Almuedo 2010, p. 36).

The USNRMs fisher differs markedly from other members of the taxon in genetic characteristics, and this difference is significant to the conservation of the species (FWS 2011, p. 38518). Fishers in the USNRMs represent a native lineage that escaped extirpation early in the 20th century (Weckwerth and Wright 1968, p. 977; Schwartz 2007, p. 924). Close to half of the USNRMs fishers sampled have a unique mitochondrial haplotype [a group of alleles (DNA sequences) of different genes on a single chromosome that are closely enough linked to be inherited usually as a unit]—Haplotype 12—found nowhere else in the range of the taxon (Drew et al. 2003, p. 57; Vinkey 2003, p. 82; Vinkey et al. 2006, p. 269).

Individuals with Haplotype 12 are significantly divergent from all other haplotypes in having an additional variation (Haplotype B) within a genetic structure associated with the mitochondria called Cytochrome b, while all of the other 11 mitochondrial haplotypes have the Haplotype A of the Cytochrome b region (Vinkey 2003, p. 79; Vinkey et al. 2006, p. 268; Schwartz 2007, p. 923). Unique genetic haplotypes common to the native lineage are expected, considering the peripheral location of the population and a history of severe population reduction and isolation, factors which contribute to genetic uniqueness (Lesica and Allendorf 1995, p. 754, Vinkey 2003, p. 82). Locally adapted populations evolve traits that provide an advantage and higher level of fitness under the local environmental conditions or habitat than genotypes evolved elsewhere (Kawecki and Ebert, 2004, p. 1225), and the unique genetic characteristics may have factored into sustaining a rare population in the USNRMs. The forces that shape adaptation are often strongest in the periphery of the range, and populations situated here may be better suited to deal and adapt to changes in their environments (Lomolino and Channell 1998, p. 482). The loss of the native fisher lineage in the USNRMs would result in the loss of a unique and irreplaceable genetic identity and the local adaptation and evolutionary potential that goes with it (FWS 2011, p. 38518).

New research published by Knaus et al. (2011) further confirms that the Northern Rockies Fisher is genetically distinct:

> "Our results confirm previous work that identifies some haplotypes from the Bitterroot Mountains of western Montana and central Idaho (e.g., MP 41-42; MP14-16) as unique relative to other known haplotypes in the U.S. Northern Rockies, British Columbia, and eastern North America. These unique mitogenomes are unlikely to represent outside reintroductions from other locations in North America, and may instead represent native haplotypes from populations that avoided early 20th century extinction by persisting in Bitterroot Mountain refugia . . . As such, these populations may warrant protection as a "distinct population segment" under the Endangered Species Act" (Knaus et al. 2011, p. 10).

In sum, the fisher in the USNRMs is both discrete and significant to the taxon to which it belongs. Fishers in the USNRMs are markedly separated from other populations of the same taxon as a result of physical factors, further supported by quantitative differences in genetic identity (FWS 2011). The loss of the fisher in the USNRMs would result in a significant gap in the range of the taxon and the loss of markedly different genetic characteristics relative to the rest of the taxon. Because the fisher in the USNRMs is both discrete and significant, it qualifies as a DPS under the Act (FWS 2011, p. 38518). Due to threats to its survival, the Northern Rockies fisher warrants protection as a threatened or endangered species in relation to the Act's standards for listing, as detailed in the Threats section, below.

RANGE

Based on accounts from natural historians of the early 20th century, and on general assumptions of what constitutes fisher habitat, the presumed fisher range prior to European settlement of North America was throughout the boreal forests across North America in Canada from approximately 60° north latitude, extending south into the United States in the Great Lakes area and along the Appalachian, Rocky, and Pacific Coast mountains (see FWS 2011, Figure 1) (Hagmeier 1956, entire; Hall 1981, pp. 985–987; Powell 1981, pp. 1–2; Douglas and Strickland 1987, p. 513; Gibilisco 1994, p. 60). In the late 1800s and early 1900s, fishers experienced reductions in range, decreases in population numbers, and local extirpations attributed to trapping, predator control, and habitat destruction (Weckwerth and Wright 1968, p. 977; Brander and Books 1973, p. 53; Douglas and Strickland 1987, p. 512; Powell and Zielinski 1994, p. 39).

Presumed historical distribution of fishers in the USNRMs (Figure 1) is generally depicted as continuous with eastern British Columbia and southwestern Alberta in Canada, bounded on the east by the forested areas of the front range of the Rocky Mountains at approximately 113 degrees west longitude in Montana, the south at approximately 44 degrees north latitude, and the west in Idaho at approximately 116.5 degrees west longitude, extending to the northwest, north of the Palouse Prairie in Idaho to include the forested Pend Oreille River area of northeastern Washington (Hagmeier 1956, entire; Hall 1981, pp. 985–987; Gibilisco 1994, p. 64) (see FWS 2011, Figure 1). The described historical distribution also includes individually isolated areas in the present-day Greater Yellowstone Ecosystem (northwest Wyoming, southern Montana and east-central Idaho), and north-central Utah (Gibilisco 1994, p. 64).

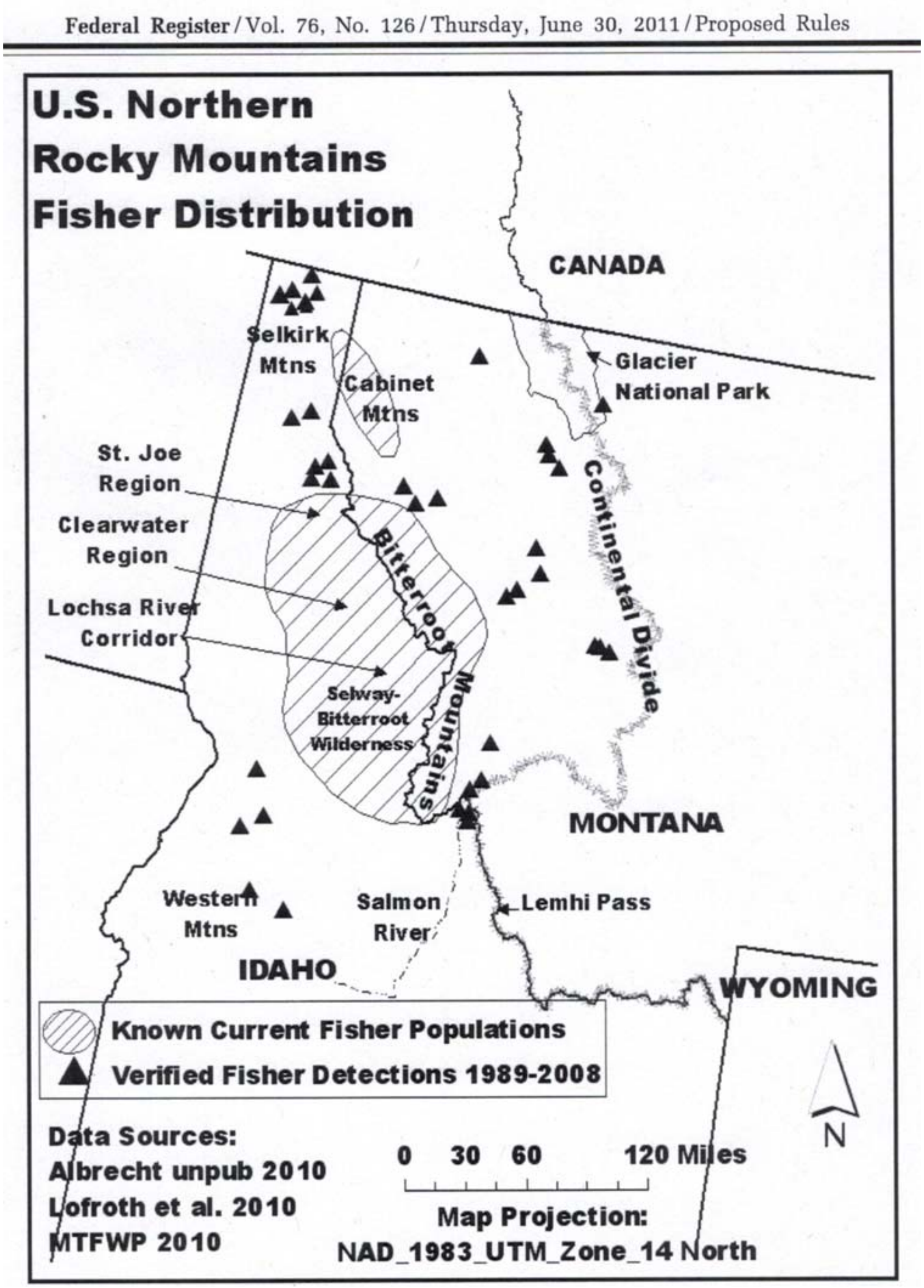

Figure 1. Current Distribution and Known Populations of Northern Rockies Fisher, from FWS 2011, (Fig. 2), data from Albrecht 2010, Lofroth et al. 2010, MTFWP 2010.

Historical and early settlement distribution in the western forested areas of Montana is assumed based on reports of the presence of fishers in northwest Wyoming and central

Idaho, and on shipping records of pelts from Fort Benton (Hagmeier 1956, p. 156, Hoffman et al. 1969, p. 596, Vinkey 2003, p. 49). An 1896 Harvard Museum specimen collected in Idaho County in north-central Idaho west of the Bitterroot Divide, which separates Idaho and Montana, provides evidence of a close ecological connection between north-central Idaho and west-central Montana (Vinkey et al. 2006, p. 269; Schwartz 2007, pp. 923–924). The historical presence of fisher in Idaho is based on an 1890 specimen from Alturas Lake (originally Sawtooth Lake) in the Sawtooth Mountains of Blaine County in central Idaho (Goldman 1935, p. 177; Hagmeier 1956, p. 154; Drew et al. 2003, p. 62; Schwartz 2007, p. 922), and other 20th century reports of fishers in the ‘‘mountainous parts of the state,’’ including the Selkirk (north), Bitterroot (northeast), and Salmon River (central) ranges (Hagmeier 1956, p. 154). These two historical specimens provide evidence that an indigenous population has survived in the USNRMs since the 1920s (Hagmeier 1956, p. 154; Hall 1981, p. 985; Drew et al. 2003, pp. 59, 62; Vinkey et al. 2006, p. 269).

In Wyoming, the first reported fisher capture is often cited as occurring in the 1920s from the Beartooth Plateau east of Yellowstone National Park near the Montana State line (Thomas 1954, p. 28; Hagmeier 1956, p. 163). Fishers have been seldom described in Wyoming (Buskirk 1999, p. 169), and by the 1950s fishers were considered ‘‘extinct or nearly so’’ in the Yellowstone area (Thomas 1954, p. 3; Hagmeier 1956, p. 163). The inclusion of Utah in the historical range of the fisher is based solely on photographs of tracks taken in 1938 (Hagmeier 1956, p. 161).

By 1930, fishers were thought to be extirpated from the USNRMs in Montana and Idaho (Williams 1963, p. 9; Newby and McDougal 1964, p. 487; Weckworth and Wright 1968, p. 977). Montana Department of Fish and Game (now Montana Fish, Wildlife and Parks (MTFWP)) initiated a restocking program for fisher in 1959 with 36 individuals from central British Columbia transplanted to the Purcell, Swan, and Pintler Ranges in northwestern and west-central Montana (Weckworth and Wright 1968, p. 979). Idaho Fish and Game (IDFG) followed with a reintroduction program for fishers in 1962. Forty-two fishers from central British Columbia were transplanted to areas considered to have been formerly occupied before presumed extirpation in north-central Idaho, including the Bitterroot divide area (Williams 1963, p. 9; reviewed by Vinkey 2003, p. 55). Minnesota and Wisconsin were the sources for 110 fishers transplanted to the Cabinet Mountains of northwest Montana between 1989 and 1991 (Roy 1991, p.18; Heinemeyer 1993, p. ii). After an absence of authenticated records for over 20 years in the USNRMs, areas near release sites yielded fisher captures in Montana in the years following the first reintroduction efforts in 1959 (Newby and McDougal 1964, p. 487; Weckworth and Wright 1968, p. 979). No post-release studies were conducted in Idaho until the mid-1980s, but marten trappers in the State reported inadvertent captures of fishers by the late 1970s (Jones 1991, p. 1).

A legal trapping season for fisher was reopened in Montana in 1983 after a series of fisher transplantations and evidence that fishers were reproducing in the State (Weckwerth and Wright 1968, entire; MTFWP 2010, p. 3). The majority of verified fisher records in the State through 2009 result from the harvest program (Vinkey 2003, p.

51; MTFWP 2010, p. 2, Attachment 3). In addition, Montana agency files include 48 incidental harvest records between 1968 and 1979 (Vinkey 2003, p. 51). Prior to 2002, Idaho records included verified fisher presence by targeted live-trapped and incidental captures, or otherwise-obtained physical specimens, photographs, and individuals observed directly by qualified experts (IOSC 2010, p. 7). From 2004 to the present, multiple State and Federal agencies in Montana and Idaho have partnered to collect biological data and samples by live-trapping and hair-snares for genetic testing (Albrecht and Heusser 2009, p. 23; Albrecht 2010, unpublished data; IOSC 2010, pp. 4–6; MTFWP 2010, p. 2); many surveys are conducted using a standardized protocol specific to fisher (Schwartz et al. 2007, entire).

In western Montana from 1968 to the late 1980s, fishers were known to occur in the Bitterroot Mountains bordering north-central Idaho, and west of the Continental Divide in the Whitefish Range, Flathead, and Swan Mountain Ranges (Vinkey 2003, p. 53). Trapping or targeted sampling has not been robust in these areas west of the Continental Divide since the early 1990s, but there are verified fisher detections over the past two decades (Vinkey 2003, p. 53; MTFWP 2010, Attachment 2; see FWS 2011, Figure 2). Fisher presence has been consistent in the Bitterroot Mountains to the present, and in the Cabinet Mountains in northwest Montana since the late 1980s introduction (Vinkey 2003, p. 53; MTFWP 2010, Attachment 2). Fishers in Idaho are found in the Selkirk Mountains in the north, the Clearwater and Salmon River Mountains in central Idaho, and the Bitterroot Range, including the Selway-Bitterroot Wilderness, in the north-central portion of the State.

In Wyoming, the contemporary distribution of fisher is unknown. Rare reports of fisher tracks and harvested specimens are available up until the 1950s (Thomas 1954, p. 31; Hagemeier 1956, p. 163; Buskirk 1999, p. 169). The Wyoming Fish and Game Department (2010, p. IV–2–26) and Gibilisco (1994, pp. 63–64) report only two verified records, both prior to 1970, in or near Yellowstone National Park. The Service has stated that it does not accept reported fisher tracks in snow (Gehman and Robinson 2000, p. 7) in the Gallatin and Madison Ranges of southern Montana detected during carnivore detection surveys conducted in the Greater Yellowstone Ecosystem from 1997-2000 as valid verification of fisher presence (FWS 2011, p. 38514). Proulx et al. (2004, p. 59) could not confirm the presence of fisher in Wyoming in their status review of *Martes* distribution. Schwartz et al. (2007, p. 1) acknowledge that Wyoming may contain fisher, but there is no evidence to confirm that presence. The fisher is considered extirpated in Utah (Biotics Database 2005, pp. 1–2).

Recent genetic analyses revealed the presence of a remnant native population of fishers in the USNRMs that escaped the extirpation presumed to have occurred early in the 20th century (Vinkey et al. 2006 p. 269; Schwartz 2007, p. 924). Fishers in the USNRMs today reflect a genetic legacy of this remnant native population, with unique genetic identity found nowhere else in the range of the fisher and genetic contributions from fishers introduced from British Columbia and the Midwest United States. Individuals with native genes are concentrated in the Bitterroot Mountains of west-central Montana and north-central Idaho, the St. Joe and Clearwater Regions, and the Lochsa River corridor in Idaho (Vinkey 2003, p. 76; Vinkey et al. 2006, p. 267; Albrecht 2010, unpublished data cited in FWS 2011). Individuals in these areas appear to form one population based on the frequency of gene types (Schwartz 2007, p. 924). The unique genetic type also has been identified in the only two existing USNRMs fisher specimens from the 1890s (Schwartz 2007, p. 922). The presence of this unique variation would indicate that fishers in the USNRM were isolated from populations outside the region by distance, small population number, or both, for some time before the influences that led to the presumed extirpation in the early 20th century (Vinkey 2003, p. 82). Today, a genetic identity more commonly found in British Columbia populations also is present in the Bitterroot Divide area, and fishers in this region are likely a mix of native and individuals translocated from British Columbia (Vinkey 2003, p. 76; Vinkey et al. 2006, p. 268; Schwartz 2007, p. 924). Fishers in northwestern Montana and extreme northern Idaho represent the geographically distant source populations from Minnesota and Wisconsin that were introduced into the Cabinet Mountains of Montana in the late 1980s (Drew et al. 2003, p. 59; Vinkey et al. 2006, pp. 268–269; Albrecht 2010, unpublished data cited in FWS 2011). British Columbia types also are found in this region, reflecting offspring of a 1959 introduction from Canada, a remnant native population, or possibly natural immigration from Canada (Vinkey et al. 2006, p. 270; Schwartz 2007, p. 924).

Biology

Fishers are opportunistic predators, primarily of snowshoe hares (*Lepus americanus*), squirrels (*Tamiasciurus, Sciurus, Glaucomys,* and *Tamias* spp.), mice (*Microtus, Clethrionomys,* and *Peromyscus* spp.), and birds (numerous spp.) (reviewed in Powell 1993, pp. 18, 102). Carrion and plant material (*e.g.*, berries) also are consumed (Powell 1993, p. 18). The fisher is one of the few predators that successfully kills porcupines (*Erethizon dorsatum*), and porcupine remains have been found more often in the gastrointestinal tract and scat of fisher than in any other predator (Powell 1993, p. 135). There is only one study reporting the food habits of an established fisher population in the USNRMs, and that study confirms that snowshoe hares, voles (*Microtus* and *Clethrionomys* spp.), and red squirrels (*Tamiasciurus hudsonicus*) are similarly important prey in north-central Idaho as they are in other parts of the range (Jones 1991, p. 87). Fishers from Minnesota relocated to the Cabinet Mountains of Montana subsisted primarily on snowshoe hare and deer carrion (*Odocoileus* spp.) (Roy 1991, p. 29). As dietary generalists, fishers across their range tend to forage in areas where prey is both abundant and vulnerable to capture (Powell 1993, p. 100). Fishers in north-central Idaho exhibit seasonal shifts in habitat use to forests with younger successional structure plausibly linked to a concurrent seasonal shift in habitat use by their prey species (Jones and Garton 1994, p. 383).

Fishers are estimated to live up to ten years (Arthur et al. 1992, p. 404; Powell et al. 2003, p. 644). Both sexes reach maturity their first year but may not be effective breeders until reaching two years of age (Powell et al. 2003, p. 638). Fishers are solitary except during the breeding season, which is generally from late February to the middle of May (Wright and Coulter 1967, p. 77; Frost et al. 1997, p. 607). The breeding period in north-western Montana and north-central Idaho is approximately late February through April based on observations of significant changes of fisher movement patterns and examination of the reproductive tracts of harvested specimens (Weckwerth and Wright 1968, p. 980; Jones 1991, pp. 78– 79; Roy 1991, pp. 38–39). Uterine implantation of embryos occurs ten months after copulation; active gestation is estimated to be between 30 and 60 days; and birth occurs nearly one year after copulation (Wright and Coulter 1967, pp. 74, 76; Frost et al. 1997, p. 609; Powell *et al.* 2003, p. 639).

Litter sizes for fishers range from one to six, with a mean of two to three kits (Powell *et al.* 2003, pp. 639–640). Potential litter sizes in the USNRMs are between two to three per female, based on the frequency of embryos recovered from harvested females (Weckwerth and Wright 1968, p. 980; Jones 1991, p. 84). Reproductive rates may vary widely from year to year in response to the availability of prey (Powell and Zielinski 1994, p. 43). Newborn kits are entirely dependent and may nurse for ten weeks or more after birth (Powell 1993, p. 67). Kits develop their own home ranges by one year of age (Powell *et al.* 2003, p. 640). Adult survival and fecundity of older females are important variables in fisher life history (Buskirk et al. 2012, p. 88).

Fishers generally have large home ranges, with males having larger home ranges than females. Fisher home ranges vary in size across North America and range from 16 to 122 square kilometers (km^2) (4.7 to 36 square miles (mi^2)) for males, and from 4 to 53 km^2 (1.2 to 15.5 mi^2) for females (reviewed by Powell and Zielinski 1994, p. 58; Lewis and Stinson 1998, pp. 7–8; Zielinski et al. 2004, p. 652). Fisher home ranges in British Columbia and the USNRMs are larger than those in other areas in the range of the taxon (reviewed in Powell and Zielinski 1994, p. 58; reviewed in Lofroth et al. 2010, pp. 67–70). In north central Idaho, the movements of a small number of radio-collared fishers indicated that males range from approximately 30 to 120 km^2 (8.7 to 35 mi^2) year round, and females range from 6 to 75 km^2 (1.7 to 22 mi^2), with a slight reduction in summer (Jones 1991, pp. 82–83). Fishers in Idaho have home ranges larger than any other home ranges reported within the range of the taxon (Idaho Office of Species Conservation (IOSC) 2010, p. 4). The abundance or availability of vulnerable prey may play a role in home range selection (Powell 1993, p. 173; Powell and Zielinski 1994, p. 57).

Fishers exhibit territoriality, with little overlap between members of the same sex; in contrast, overlap between opposite sexes is extensive, and size and overlap are possibly related to the density of prey (Powell and Zielinski 1994, p. 59). Male fishers may extend or temporarily abandon their territories to take long excursions during the breeding season from the end of February to April presumably to increase their opportunities to mate (Arthur 1989a, p. 677; Jones 1991, pp. 77–78). However, males who maintain their home ranges during the breeding season may be more likely to successfully mate than non-resident males that encroach on established ranges (Aubry et al. 2004, p. 215).
It is not known how fishers maintain territories; it is possible that scent marking plays an important role (Leonard 1986, p. 36; Powell 1993, p. 170). Direct aggression between individuals in the wild has not been observed, although signs of fishers fighting and the capture of male fishers with scarred pelts have been reported (Douglas and Strickland 1987, p. 516). Combative behavior has been observed between older littermates and between adult females in captivity (Powell and Zielinski 1994, p. 59).

There is little information available regarding the long-distance movements of fishers, although long-distance movements have been documented for dispersing juveniles and recently relocated individuals before they establish a home range. Fishers relocated to novel areas in Montana's Cabinet Mountains and British Columbia moved up to 163 km (100 mi) from release sites, crossing large rivers and making 700-m (2,296-ft) elevation changes (Roy 1991, p. 42; Weir and Harestad 1997, pp. 257, 259). Juveniles dispersing from natal areas are capable of moving long distances and navigating various landscape features such as highways, rivers, and rural communities to establish their own home ranges (York 1996, p. 47; Weir and Corbould 2008, p. 44). In Maine and British Columbia, juveniles dispersed from 0.7 km (0.4 mi) to 107 km (66.4 mi) from natal areas (York 1996, p. 55; Weir and Corbould 2008, p. 44). Dispersal characteristics may be influenced by factors such as sex, availability of unoccupied areas, turnover rates of adults, and habitat suitability (Arthur et al. 1993, p. 872; York 1996, pp. 48–49; Aubry et al. 2004, pp. 205–207; Weir and Corbould 2008, pp. 47–48).

Long distance dispersal by vulnerable, less experienced individuals is made at a high cost and is not always successful. Fifty-five percent of transient fishers in a British Columbia study died before establishing home ranges, and only one in six juveniles successfully established a home range (Weir and Corbould 2008, p. 44). One dispersing juvenile female traveled an unusually long distance of 135 km (84 mi) over rivers and through sub-optimal habitats before succumbing to starvation (Weir and Corbould 2008, p. 44). Individuals traveling longer distances are subject to greater mortality risk (Weir and Corbould 2008, p. 44), and very few establish the stability of a home range. Failure to establish a home range has negative effects on reproductive successful (Aubry et al. 2004, p. 215).

Habitat

Fishers are forest carnivores that are closely associated with late successional habitats. In western North America, the fisher is a structure-dependent species-- across the west, fishers are associated with complex vertical (e.g., large trees and snags) and horizontal (e.g., large logs and dense canopy) structure characteristic of late-seral forests (Raley et al. 2012). Fishers are associated with low and closed canopies, large tree size class, complex physical structure for resting and denning, vegetative and structural aspects that lead to abundant prey, and high levels of cover to reduce vulnerability to and provide escape from predation (Powell 1993, Buskirk and Powell 1994, Carroll et al. 1999, Schwartz et al. 2013). The occurrence of fishers at regional scales is consistently associated with low- to mid-elevation environments of mesic (moderately moist), coniferous and mixed conifer and hardwood forests with abundant physical structure near the ground (Hagmeier 1956, entire; Arthur et al. 1989a, pp. 683–684; Banci 1989, p. v; Aubry and Houston 1992 p. 75; Jones and Garton 1994, pp. 377–378; Powell 1994, p. 354; Powell et al. 2003, p. 641; Weir and Harestad 2003, p. 74).

Fishers avoid areas with little or no cover (Powell and Zielinski 1994, p. 39; Buskirk and Powell 1994, p. 286; Weir and Corbould 2010; Schwartz et al. 2013, p. 109). Weir and

Corbould (2010) found that fishers avoid open areas, non-forested ecosystems, and areas with recent logging. An abundance of coarse woody debris, boulders, shrub cover, or subterranean lava tubes can sometimes provide suitable overhead cover in non-forested or otherwise open areas (Buskirk and Powell, 1994, p. 293; Powell et al. 2003, p. 641). In the understory, the physical complexity of coarse woody debris such as downed trees and branches provides a diversity of foraging and resting locations (Buskirk and Powell 1994, p. 295).

Fishers are associated more commonly with mature forest cover and late-seral forests with greater physical complexity than other habitats (reviewed by Powell and Zielinski 1994, p. 52; Raley et al. 2012, Schwartz et al. 2013, p. 109). Home ranges may be established based on attributes at a landscape scale, foraging at a site scale, and resting and denning use based on the element or structural scale (Powell 1993, p. 89; Buskirk and Powell 1994, p. 284; Weir and Corbould 2008, p. 103).

At all spatial scales, new research shows that across the west, moderate to dense forest canopy is one of the strongest and most consistent predictors of fisher distribution and habitat selection. Raley et al. (2012) conclude that moderate-to-dense canopy cover is a critical component of fisher habitat throughout western North America, and that canopy is linked to multiple aspects of the fisher's life needs (p. 245). At regional and landscape scales, an increasing amount of forest canopy is the most consistent predictor of fisher occurrence in California (Carroll et al. 1999; Carroll 2005a; Davis et al. 2007; Zielinski et al. 2010). Similarly, fisher occurrence in the Northern Rockies is positively correlated with canopy cover up to an apparent threshold of 60 percent (Carroll et al. 2001, Raley et al. 2012, p. 245). A moderate to high level of contiguous canopy cover is also the most consistent predictor of fisher occurrence at larger spatial scales within areas of low and mid-elevation forests (Buck 1982, p. 30; Arthur et al. 1989b, pp. 681–682; Powell 1993, p. 88; Jones and Garton 1994, p. 41; Weir and Corbould 2010, p. 408).

Newly published information highlights the importance of mature forests with high levels of canopy cover for fisher in the Northern Rockies. Schwartz et al. (2013) studied fishers in the Clearwater sub-basin and eastern slope of the Bitterroot-Selway ecosystem in Idaho and Montana from 2002-2006 using radio-collared fishers to document habitat use. They found that at both stand and landscape scales, fishers disproportionately use sites characterized by large diameter trees, and that fishers select for sites with large logs and tree cavities (p. 103, 108). They found that fishers avoid areas dominated by ponderosa and lodgepole pine, avoid areas of uniform early seral forests, and avoid open areas, such as clearcuts and landscapes with a high proportion of grass (p. 110).

On the importance of landscape-level habitat factors for fisher, the authors state:

> "Perhaps the most compelling result from this study was the consistent selection by female fishers for large trees at both stand and landscape scales. Our best multivariable model contained both maximum DBH at the stand level and a proportion of large tress within 1 km circular landscapes. Large trees occur in many settings throughout the study area, including remnant stands surrounded by

> forests that are highly altered by recent and historical logging, landscapes with large trees only in riparian areas, and patches of large trees embedded in wilderness and other highly inaccessible lands. However, it appears in our study area that the most preferred stands with large DBH trees (average maximum DBH in used habitats = 107.77 cm versus 64.224 cm in unused habitats) also occur in landscapes with large trees (used landscapes were composed of 47% large tree stands versus 29% in available landscapes). Thus, we recommend that silvicultural treatments of stands consider not only the retention of large trees, but consider the larger landscape when managing for fishers" (Schwartz et al. 2013, p. 109).

Their results highlight the importance of late-successional forests to fishers in the Northern Rockies at both the stand- and landscape-level (p. 103).

Other studies have found that in north-central Idaho, fishers use mature to old-growth mesic forests of grand fir (*Abies grandis)* and subalpine fir (*Abies lasiocarpa)* in close proximity to riparian areas (Jones 1991, pp. 90, 113; Jones and Garton 1994, p. 381). Fishers in this region avoid forests with less than 40 percent crown cover (Jones 1991, p. 90). Fishers expand their use of young forest stages in winter, likely in response to a seasonal shift in habitat use by their prey or an increase in prey vulnerability in these areas (Jones and Garton 1994, p. 383). Individuals translocated to the Cabinet Mountains of Montana from Minnesota and Wisconsin exhibit winter habitat use similar to that reported for fishers in north-central Idaho (Roy 1991, p. 60). Fishers in north-central Idaho and Montana also select forest riparian areas and draws or valley bottoms that have a strong association with spruce, which tend to have dense cover, high densities of snowshoe hare, and a diversity of other prey types (Powell 1994, p. 354; Jones 1991, pp. 90–93; Heinemeyer 1993, p. 90).

Female fishers are obligate cavity users for reproduction. Fishers use cavities in large-diameter live trees and snags exclusively for birthing and rearing kits until weaning. Tree cavities provide secure environments for kits by regulating temperature extremes and limiting access by predators (Raley et al. 2012). In most known cases, the cavities that reproductive female fishers use for natal and pre-weaning dens are created by heartwood decay through the action of heart-rot fungi (e.g., Aubry and Raley 2006; Reno et al. 2008; Weir and Corbould 2008). Most post-weaning dens are also in tree cavities, although females with older kits occasionally use other types of structures, including hollow logs (Aubry and Raley 2006). Reproductive den trees are always among the largest trees available, being two to three times larger in diameter on average than other trees in the vicinity of the den (e.g., Reno et al. 2008; Weir and Corbould 2008; Davis 2009). Trees used for denning are also old; the average estimated age of reproductive den trees in British Columbia is 372 years for Douglas fir, 177 years for lodgepole pine, and 96 years for trembling aspen (Raley et al. 2012, p. 238). Available evidence indicates that the incidence of heartwood decay and cavity development is more important to fishers for denning than is the tree species (Raley et al. 2012, p. 239).

Like denning habitat, fisher resting habitat is also strongly tied to forest structure. Appropriate rest sites provide fishers with multiple advantages that improve individual fitness such as security, thermal regulatory cover, and proximity to prey (Raley et al. 2012, p. 241). Fishers typically rest in large deformed or deteriorating live trees, snags, and logs. Forest conditions around the rest structures frequently include structural elements characteristic of late-seral forests. Raley et al. (2012) compiled data from more than 2,260 rest structures from 12 different geographic areas and determined that the characteristics of structures used by fishers for resting are overwhelmingly consistent throughout western North America (p. 240). Throughout the West, fishers consistently select sites for resting that have larger diameter conifer and hardwood trees, larger diameter snags, more abundant large trees and snags, and more abundant logs than random sites (Raley et al. 2012). Many of the structures fishers need are created through the actions of particular organisms such as rust fungi and heart-rot fungi or by ecological conditions that take many decades to develop. Because fishers frequently rest and den in cavities in large trees or snags, a suitable microstructure may require more than 100 years to develop. Live trees, snags, and logs used for resting are on average, 1.4 to 3.4 times larger in diameter than available structures (e.g., Weir and Harestad 2003; Zielinski et al. 2004b; Purcell et al. 2009). The large size of these structures is likely related to tree age and the long time periods required for appropriate microstructures to develop (Raley et al. 2012, p. 240).

Fishers are more selective of habitat for resting than they are for foraging or traveling habitat, making rest and den site availability a more limiting factor in distribution than foraging habitat (Arthur et al. 1989b, p. 686; Powell and Zielinski 1994, p. 54-57; Powell 1994, p. 353; Lofroth et al. 2010, p. 115). Across the range, fishers select resting sites with characteristics of late successional forests—higher canopy closure, large diameter trees, coarse downed wood, and singular features of large snags, tree cavities, or deformed trees (Powell and Zielinski 1994, p. 54; Lofroth et al. 2010, pp. 101–103). Compared with availability, fishers consistently select large live trees, snags, and logs for resting that result from long-term forest growth and decay processes. Resting locations for fishers in north-central Idaho are predominately in mature forest types (Jones and Garton 1994, p. 383). When fishers use younger forest types, they will select large-diameter trees or snags, if present, that are remnants of a previously existing older forest stage (Jones 1991, p. 92).

Aubry et al. (2013) conducted a meta-analysis of habitat selection by fishers at resting sites in the Pacific Coast region, and found that throughout their coastal range, fishers exhibit “clear and remarkably consistent selection” for resting sites with steeper slopes, cooler microclimates, denser overhead cover, greater volume of logs, greater basal area of conifers, hardwoods, and snags, and larger diameter conifers and hardwoods than are generally available (p. 969). The authors conclude that in areas where fishers have not been studied and data on selection of resting sites are lacking, that their findings provide empirical support for management and conservation actions that promote the retention and development of the environmental attributes that provide fisher resting habitat (p. 965).

Thermoregulation is more important to fishers than has been previously recognized, and appears to influence selection of rest structures and sites (Raley et al. 2012, p. 231). In regions with cold winters, fishers use hollow portions of logs or subnivean spaces beneath logs more frequently than in areas with milder winters. This suggests that fishers use structures associated with subnivean spaces to minimize heat loss during cold weather (Weir et al. 2004; Weir and Corbould 2008; Raley et al. 2012, p. 240). Rest site selection may also provide thermal relief during hot weather (Raley et al. 2012, p. 244).

Because of their association with mature forest habitat and closed canopy conditions, and their need for complex structures for resting and denning, fishers are particularly vulnerable to habitat loss and degradation from logging, fire, forest disease, and other factors which reduce forest complexity. Though fishers are sometimes detected in other areas, such as riparian buffers that bisect open landscapes, this habitat is likely not sufficient for fisher persistence (Schwartz et al. 2013, p. 110).

STATUS

Little is known about population numbers, trends, or vital rates of Northern Rockies fishers. After being nearly extirpated in the 1920s, fishers in the USNRMs have increased in number and distribution. Research is ongoing to determine the geographic range of the species, identify populations with native and introduced genes, and determine the abundance of individuals in populations using DNA analyses (eg. Schwartz et al. 2007, pp. 1–2, Lucid et al. 2013). The data which are available indicate that fisher populations in the Northern Rockies are small and that population density is low.

An evaluation of the translocation effort in the Cabinet Mountains of northwest Montana between 2001 and 2003 yielded only four live-trapped individuals and 28 track detections over 25 survey weeks, indicating that the population there is likely small and limited in distribution (Vinkey 2003, p. 33). Lucid et al. (2013) report that the Multispecies Baseline Initiative, a collaborative project to inventory for fishers and other species across the Idaho Panhandle and adjacent mountain ranges, established 112 bait stations from 2010-2012 in the West Cabinet Mountains, Selkirk Mountains, and Purcell Mountains and detected 29 total individual fishers in the three mountain ranges. They detected 28 individual fishers in the West Cabinet Mountains using molecular analysis of hair from bait stations. In the Selkirk Mountains, they detected one individual fisher, and no fishers were detected in the Purcells (Lucid et al. 2013). Based on genetic similarities, fishers in the Selkirk Mountains of northern Idaho are likely associated with the fishers from Minnesota and Wisconsin introduced to Montana's Cabinet Mountains to the east (Cushman et al. 2008, p. 180). Efforts to detect fisher in the Selkirk Mountains between 2003 and 2005 using hair-snares for genetic analysis produced only 26 samples identified as fisher, although the number of unique individuals is likely much smaller than the number of samples (Cushman *et al.* 2008, p. 180).

A review of historical records and carnivore research in Montana indicates that the fisher is one of the lowest density carnivores in the state (Vinkey 2003, p. 61). What is known of fisher populations today in Montana is primarily derived from harvest data and winter furbearer track surveys (MTFWP 2010, p. 2, Attachment 8, pp. 2–3), neither of which is ideal for estimating population trend. A Montana habitat model based on 30 years of fisher presence data (the majority being harvest data) conservatively estimates that there is high habitat suitability capable of supporting 216 individuals concentrated in the Bitterroot Mountains along the Idaho border, the Swan and Flathead River drainages, and the Whitefish and Cabinet Mountains just south of the Canada border (MTFWP 2010, Attachment 8, pp. 2–3; Montana Natural Heritage Program (MTNHP) 2010a, entire; 2010b, entire).

Most of the recent USNRMs fisher survey effort has targeted the Coeur d'Alene, St. Joe, Clearwater, and Lochsa areas of northern and north-central Idaho. In 2006 and 2007, 10 individual fishers were identified in an area of approximately 8,951 km^2 (3,456 mi^2) of potentially suitable habitat in the St. Joe and Coeur d'Alene areas, north and south of Interstate 90 in northern Idaho (Albrecht and Heusser 2009, pp. 6, 8, 15). The St. Joe and Coeur d'Alene projects were not intended to elucidate fisher presence in the entire area of potentially suitable habitat, but simply to detect the presence of fisher; therefore, traps were placed in areas highly likely to support fisher (Albrecht and Heusser 2009, p. 19). Thirty-four fisher were identified in a 1,295-km^2 (500-mi^2) (one fisher per 38 km^2 (14.7 mi^2)) area of the Lochsa River corridor of north-central Idaho during a targeted live-trap study between 2002 and 2004 (Schwartz 2010, unpublished data cited in FWS 2011). Thirty individual fishers were captured in the Clearwater area north of the Lochsa River in north-central Idaho between 2007 and 2010 (Sauder 2010, unpublished data cited in FWS 2011). Based on genetic data, it appears that individuals in these areas of north-central Idaho and fishers in west-central Montana represent a single population (Schwartz 2007, p. 924).

Fishers in the USNRMs have some of the largest home ranges recorded for the species (reviewed by Powell and Zielinski 1994, p. 58; IOSC 2010, p. 4; reviewed by Lofroth et al. 2010, p. 68), likely indicating a fragmented, suboptimal landscape typical of peripheral, and consequently small, populations. In four years of targeted research in the Northern Rockies, Schwartz et al. (2013) were only able to capture 11 female fishers. Their study area likely has one of the densest populations of fisher in the Northern Rockies, but even in the highest density area, fishers occur at very low density (p. 110).

Existing as a small, low-density population magnifies threats posed to the fisher by trapping, disease, habitat loss, and other factors.

THE NORTHERN ROCKIES FISHER WARRANTS PROTECTION UNDER THE ESA

The Endangered Species Act states that species may warrant federal listing based on any one of five factors. The survival of the Northern Rockies Fisher DPS is threatened by all five of these factors as detailed below, indicating that the fisher now warrants federal protection.

THREATS

PRESENT OR THREATENED DESTRUCTION, MODIFICATION OR CURTAILMENT OF HABITAT OR RANGE

The fisher is threatened by habitat destruction and modification from several factors including timber harvest, development and roads, climate change, fire, fire-control activities, forest diseases, and livestock grazing.

Timber Harvest and Forest Management

Because of the specialized habitat requirements of fishers, timber harvest and management threaten their survival. Timber harvest and management over the last century has resulted in the widespread loss of old forest and large- and medium-diameter trees that historically were broadly distributed (Hessburg and Agee 2003, p. 45). From around 1940 to the present, low-elevation forests in the Northern Rockies have been depleted of large, older trees, and mid-elevation habitats retain only small amounts (DellaSala et al. 1996, p. 213; Lesica 1996, p. 37).

Across the U.S. Northern Rocky Mountains, fisher habitat has been modified, curtailed, and fragmented (eg. Hessburg et al. 2000, p. 78; Wisdom et al. 2001, p. 184). Intensive logging and clearcutting practices in Idaho and Montana have been occurring since the 1950s, converting large areas of natural forest to tree plantations with an emphasis on even-aged forest management that eliminates habitat for fishers (Hessburg and Agee 2003, p. 41). With plantation or rotational forestry, large tree components and coarse woody debris are suppressed or not allowed to accumulate to the point that they provide structure needed by fishers for resting and denning (Weir 2003, p. 16). Timber harvest, together with fire exclusion, has produced young, homogenously structured forest patches that do not provide for the life history needs of fishers.

Trees managed for timber production are generally harvested before they can reach older age-classes preferred by fishers. They are also harvested before they are old enough to become more susceptible to infection by heart-rot fungi which creates the structures needed by fishers. Parasites, such as dwarf mistletoes (*Arceuthobium* spp.) and rust fungi (*Chrysomyxa* spp. or *Melampsorella* spp.), promote brooming and platforms in live trees and the development of branch platforms in older trees. The parasites can have a negative impact on timber production, and infected trees are generally removed to eradicate these pathogens. Forest-management practices thus interrupt the ecological processes that create the microstructures needed to provide resting habitat for fishers (Raley et al. 2012, p. 243).

Pre-thinning, timber harvest, road construction and maintenance, and other forestry activities threaten fisher habitat. Northern Rockies fishers are threatened by timber harvest on federal lands because of the multiple-use mandate to maintain in perpetuity a high level of output of renewable resources including timber (PL 104-333). Mandates for forest health and fuels reduction projects further threaten fisher habitat on federal lands (*e.g.*, Healthy Forests Restoration Act (Pub. L. 108–148)).

Extensive logging occurs on the seven National Forests in the Northern Rockies which contain fisher habitat. More than 626 million boardfeet of timber were removed from these forests from 2009-2012 (Table 1).

Table 1. Millions of boardfeet cut from National Forests in the range of Northern Rockies Fisher 2009-2012. Data from: http://www.fs.fed.us/forestmanagement/products/sold-harvest/cut-sold.shtml

National Forest	**2009**	**2010**	**2011**	**2012**	**TOTALS**
Bitterroot	7,479	8,478	10,587	13,805	40,349
Clearwater	19,099	14,960	26,777	27,263	88,099
Flathead	43,298	44,255	28,289	28,125	143,967
Idaho Panhandle	17,661	19,954	26,294	28,116	92,025
Kootenai	25,595	28,558	24,191	36,677	115,021
Lolo	24,915	23,555	16,522	14,831	79,823
Nez Perce	16,859	8,189	14,774	27,213	67,035
TOTAL	154,906	147,949	147,434	176,030	**626,319**

Fishers are threatened by timber harvest on state lands in Idaho and Montana because the states are required to maximize long-term financial returns to public schools and other trust beneficiaries (Idaho Board of Land Commissioners 2007, p. 3; Montana Code Annotated 2009a, entire). Fishers are also threatened by logging on private lands which are managed to maximize wood production.

In a prior negative 12-month finding for Northern Rockies fisher (FWS 2011), the Service concluded that logging was not a threat to fishers because at the time, habitat ecology and habitat requirements in the USNRMs were not well known (p. 38520). Since the time of that finding, however, several new studies have been published on fisher habitat ecology. These publications reveal that fisher habitat needs are similar throughout the western region, and that Northern Rockies fishers select habitats consistent with fishers in other more intensively studied regions where logging is a demonstrated threat.

Across western North America, at all spatial scales, moderate to dense forest canopy is one of the strongest and most consistent predictors of fisher distribution and habitat use, signifying that activities that decrease canopy cover threaten fisher habitat. Raley et al. (2012) conclude:

> The association of fishers with high amounts of canopy cover is further demonstrated by their avoidance of open environments. Early studies in the West indicated that canopy cover was important to fishers, but avoidance of areas with no tree or shrub cover was a more consistent pattern (Buskirk and Powell 1994; Powell and Zielinski 1994). Nevertheless, specific information on these

> associations at different spatial scales was lacking, and the biological significance of canopy cover to fishers was unclear. Based on the wealth of information now available, we conclude that moderate-to-dense canopy cover is a critical component of fisher habitat throughout western North America that is linked to multiple aspects of the fisher's life needs (p. 245).

Fishers need dense canopies to provide vertical escape cover from terrestrial predators and to provide favorable microclimatic conditions during cold and hot weather (Weir and Corbould 2010, Raley et al. 2012, p. 246).

In the Northern Rockies specifically, newly published information highlights the importance of mature forests with high levels of canopy cover to meet fisher life history needs. Schwartz et al. (2013) studied fishers in the Northern Rockies using radio-collared fishers to document habitat use. They found that at both stand and landscape scales, fishers disproportionately use sites characterized by large diameter trees, and that fishers select for sites with large logs and tree cavities (p. 103, 108). They found that fishers avoid areas of uniform early seral forests, and avoid open areas, such as clearcuts and landscapes with a high proportion of grass (p. 109-110).

New information on the specific negative effects of logging on fishers and fisher habitat has also recently been published:

> "Reduction in abundance and distribution of structural elements may negatively affect the energy budgets of fishers by increasing travel distances required to locate suitable dens or rest sites, thermal refugia, and safe places to consume prey (Green et al. 2008; Volume I, Chapter 7). Structural elements may be lost as a result of vegetation management practices (e.g., timber harvest, fuels and silvicultural treatments) or stand-replacing wildfire (Hann et al. 1997, Franklin et al. 2002*a*, Green et al. 2008, Wisdom and Bate 2008). Typically, decades are required to develop these various structural elements, and it may take more than a century to develop large, hollow trees that are suitable for reproductive dens (Volume I, Chapter 8)" (Naney et al. 2012, p. 7).

It is also now known that fisher survival estimates vary depending on several factors including whether or not timber harvest has taken place (Buskirk et al. 2012, p. 85).

In the previous negative finding, the Service also stated that fishers have been observed to use different habitat types including forests managed primarily for timber production, but that the relative importance of each of the habitat types for supporting fisher populations is unclear (FWS 2011, p. 38521). Schwartz et al. (2013) directly address the relative importance of different habitat types to fisher in the Northern Rockies, stating:

> "In this study, we found that females are indeed selecting habitat at two scales: a stand scale as indicated by stands that have large mean and maximum DBH trees (as well as a large variation in tree size) and a landscape scale as indicated by the preference for landscapes with a high proportion of large trees. Thus, it appears

> that while fishers can be detected in riparian stringers that bisect open landscapes, this habitat may not be sufficient for persistence" (p. 110).

The newly published information makes clear that at both the stand and landscape scale, fishers select for areas with large trees, large logs and tree cavities, and high levels of canopy cover (Naney et al. 2012, Raley et al. 2012, Aubry et al. 2013, Schwartz et al. 2013). Fishers are more selective of habitat for resting than they are for foraging or traveling habitat, making rest and den site availability a more limiting factor in distribution than foraging habitat (Arthur et al. 1989b, p. 686; Powell and Zielinski 1994, p. 54-57; Powell 1994, p. 353; Lofroth et al. 2010, p. 115). Older, closed-canopy forests with an abundance of large trees and structural elements obviously have more importance for fisher persistence than logged environments.

Habitat conditions in the Northern Rockies may already be sub-optimal for fisher, and ongoing timber harvest activities threaten the fisher's remaining habitat. Fisher home ranges in Idaho and Montana are larger than most other areas in the taxon's range (reviewed by Powell and Zielinski 1994, p. 58; reviewed by Lofroth et al. 2010, p. 68; IOSC 2010, p. 4), and this large size could be the result of fragmentation or low-quality habitat (Powell and Zielinski 1994, p. 60). The Service has already acknowledged that it is unknown if current habitat conditions in the Northern Rockies can support, in the long term, a self-sustaining population or subpopulations in a metapopulation dynamic (FWS 2011, p. 38524). Any further degradation of fisher habitat in the region thus threatens the survival and recovery of the fisher. The best available scientific information on the habitat needs of fishers clearly demonstrates that forest management activities that decrease canopy cover and remove old and large trees directly threaten fisher survival. Based on the information now available, it would be arbitrary to dismiss forest fragmentation and timber harvest as a threat to Northern Rockies fishers.

Development and Roads

Development and roads pose an increasing threat to the Northern Rockies fisher. The low to mid-elevation mesic forests, valley bottoms, and riparian corridors that are preferred by fishers coincide with areas that are under more pressure for resource extraction, development, and recreation by humans (Carroll et al. 2001, p. 962). Since the 1990s, rapid housing growth has occurred in the Rocky Mountain region, especially in close proximity to public lands (Alig et al. 2010, p. 9). Additional residential development adjacent to public lands is expected to increase by 10 to 42 percent in some areas of the USNRMs by 2030 (Stein et al. 2007, p. 8). Density of existing development in the Northern Rockies is also expected to increase (FWS 2011, p. 38521).

Development and roads destroy and degrade fisher habitat by removing canopy cover and structural elements needed by fishers for resting and denning. Development and roads also increase fisher susceptibility to mortality from vehicle strikes, and increase the risk of exposure to diseases from domestic animals and anthropogenic wild animals such as skunks and raccoons (Ruediger 1994, p. 3; Carroll et al. 2001, p. 969; Brown et al. 2008, p. 23). Paved and forest roads also increase the susceptibility of fishers to trapping

(Weaver 1993; Hodgman et al. 1994, p. 598; Switalski and Jones 2012, p. 17). Development and road construction also lead to increased recreational pressure on fisher habitat (Naney et al. 2012).

When evaluating the threat posed to fishers by development, it is important to consider that the effective loss of habitat from development is greater than the footprint of individual projects (Naney et al. 2012, p. 36). Small-scale developments such as housing subdivisions may reduce fisher habitat in a given area by a certain number of acres, but other activities associated with development magnify threats to fishers including more roads, increased risk of vehicle strikes and trapping mortality, increased risk of predation and disease transmission from pets and anthropogenic wild animals, increased risk of human-caused wildfires, additional loss of habitat due to fuel-reduction projects to protect human structures, etc. The cumulative effects of increasing development and resultant activities can be substantially greater than the effects caused by any single activity (Naney et al. 2012, p. 36).

Climate Change

Global climate change is potentially a major threat to Northern Rockies fisher and its habitat. Fishers are dependent on specific forested environments for survival, and predicted climate changes could impact the habitat elements upon which fishers depend. The Intergovernmental Panel on Climate Change (IPCC) concluded that climate warming is unequivocal, as is evident from observed increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level (IPCC 2007a, pp. 30–31). Continued greenhouse gas emissions at or above current rates are expected to cause further warming (IPCC 2007a, p. 30). Regional increases in the frequency of hot extremes, heat waves, and heavy precipitation are expected, as well as greater warming in high northern latitudes (IPCC 2007a, p. 46).

Specific regional projections for the Northern Rockies include warmer temperatures, with more precipitation falling as rain than snow, diminished snowpack and altered stream flow timing, increase in peak flow of rivers, and increasing water temperatures through the 21st century (to 2099) (Hansen et al. 2001, p. 769; ISAB 2007, pp. iii, 15–16). Changes in temperature and rainfall patterns are expected to shift the distribution of ecosystems northward (IPCC 2007b, p. 230) and up mountain slopes (McDonald and Brown 1992, pp. 411–412; IPCC 2007b, p. 232). Predicted climate shifts over the next century could result in the loss of alpine and subalpine spruce-fir forests, for example, forcing competition for prey between fishers and predators that are now occupying higher elevation niches (*e.g.*, lynx) (Koehler 1990, p. 848; Ruediger et al. 2000, p. 3). Increasing temperatures without additional moisture could stress vegetation, alter riparian systems, increase fire risk, and increase the susceptibility of forest vegetation to disease (Westerling et al. 2006, p. 943; ISAB 2007, pp. 19, 25).

Because fishers are entirely dependent on forested habitats for survival, factors such as climate change that threaten their habitat directly threaten their survival. Riparian areas are used extensively by fishers in the USNRMs (Jones 1991, pp. 90–93). Changing water regimes or decreased flow could decrease the productivity of riparian species and affect vegetation structure necessary for prey and security cover. The potential effects of climate change on the health of riparian systems could be exacerbated by the demands from increasing human population, development, and land use (Hansen et al. 2002, p. 159).

Lawler et al. (2012) developed bioclimatic models to investigate how expected changes in climate are likely to affect fishers. They used the median of projected climates from 16 different general circulation models and found that fisher habitat in the Northern Rockies region is likely to experience an increase of at least 4 degrees Celsius by 2099 (p. 375). Their results suggest that fishers will be highly sensitive to climate change. They project that fishers will lose most of their climatically suitable range in the contiguous United States by the end of this century (p. 379). In their models, multiple climate-change scenarios consistently project northward range shifts for fishers (p. 393). They conclude that climate change is likely to result in a number of complex effects on fishers due to interactions between rising temperatures and drought, water stress, insect and disease occurrence, and fire (p. 396). These factors are already affecting western forests and are all likely to impact fisher habitat (Dale et al. 2001, Breshears et al. 2005, Lawler et al. 2012, p. 396).

Other studies have come to similar conclusions about the expected effects of climate change on the distribution and habitat of fishers (Burns et al. 2003, Krohn 2012, Naney et al. 2012). Burns et al. (2003a) used regression models of vegetation associations of animal species and climate-change effects on vegetation in a subset of U.S. national parks to predict mammalian species turnover by the end of the 21st century, and found that fishers are one of the most climate-sensitive carnivores.

The low dispersal rate of fishers and the patchiness of their habitat in the Northern Rockies magnify the negative impacts that shifting habitats from climate change will have on the DPS (Olson and Schwartz 2013).

The effects of climate change on fishers are likely to be greatest at the margins of their range and in areas on the margins of habitat suitability (Naney et al. 2012, p. 34), magnifying the threat posed to the Northern Rockies fisher by climate change because habitat in the Northern Rockies is likely sub-optimal based on large home-range size and low population density (Lofroth et al. 2010, Schwartz et al. 2013). Though much information is lacking, the best information available indicates that climate change is a threat to the habitat of fishers in the Northern Rockies.

Fire and Disease

The Northern Rockies fisher is threatened by fire, fire-control activities, and forest diseases. Because fishers require abundant large trees, high levels of canopy cover, and other specific habitat elements, fire and disease threaten their habitat and thus their survival. The Northern Rocky Mountain region has a history of local and periodic regional fire and tree-disease events. Large regional fire events in 1910 and 1934 likely contributed to regional fisher population decline (Jones 1991, p. 1).

Forests in the USNRMs are vulnerable to an increasing frequency of large fires, which could lead to changes in forest composition and structure, cause direct fisher mortality, diminish the capacity of the landscape to support fisher, and isolate small populations in a matrix of unsuitable habitat. Stand-replacing wildfire can remove habitat elements that are essential for fishers (Hann et al. 1997, Franklin et al. 2002*a*, Green et al. 2008, Wisdom and Bate 2008).

Since the 1980s the fire regime in the Northern Rockies has shifted toward more frequent longer burning fires in association with warmer springs and longer dryer summer seasons (Westerling et al. 2006, p. 942). Climate model projections for decreased snowpack, earlier snowmelt, and increasing temperatures contributing to longer fire seasons indicate that the threat posed to fishers by fire will continue to increase (Westerling et al. 2006, p. 943, Lawler et al. 2012, Naney et al. 2012).

Both fire and fire-control activities can degrade fisher habitat. Fuels-reduction projects and prescribed burning are ongoing activities in the Northern Rockies and have the potential to harm fisher habitat.

Tree diseases that affect forest structure and composition could impact fisher habitats by reducing cover or altering prey availability. Recent drought and increased winter temperatures have contributed to unprecedented rates of bark beetle infestations in the western United States (Brunelle et al. 2008, pp. 836–837). Beetle-killed trees can exacerbate fire hazard (Bentz et al. 2010, p. 611). Climate change could lead to increased incidence of forest disease outbreak and heightened risk to fisher habitat (Lawler et al. 2012).

Livestock Grazing

To the extent that there is habitat overlap, grazing could potentially threaten the development of habitat conditions needed to support fisher. Livestock grazing could threaten fisher habitat in several ways. In areas where it occurs, livestock grazing could reduce fisher prey populations, degrade fisher riparian habitat, impact the structural diversity of vegetation important to fishers, and increase the spread of non-native fire-prone plants. Grazing operations and anti-predator response activities by agencies to protect livestock also increase the risk of fishers being caught in traps.

The U.S. Forest Service authorizes livestock grazing within Northern Rockies fisher habitat, including the Nez Perce, Clearwater, Kootenai, Lolo, Idaho Panhandle, Flathead, and Bitterroot National Forests. Livestock grazing is also authorized in Northern Rockies fisher habitat by the Bureau of Land Management.

Historic and current livestock grazing could contribute to the degradation of fisher habitat in a number of ways. Riparian ecosystems are a key part of fisher dispersal habitat.

Grazing and trampling of vegetation has numerous detrimental impacts on riparian areas including reducing cover and structural diversity, impeding regeneration, and reducing habitat needed to support prey populations. Grazing can impact habitat by inhibiting regeneration of cover including aspen and willow (Kay and Bartos 2000, Powell et al. 2003, p. 642). Grazing can also inhibit the growth of herbaceous and shrub vegetation that is needed to support an adequate prey base. Abundance of important fisher prey species such as snowshoe hare, mice, and voles tends to be lower in grazed areas (Weatherill and Keith 1969). Livestock and livestock grazing activities attract and subsidize species such as ravens and coyotes that may impact small birds and other fisher prey.

Livestock grazing is also linked to the spread of undesirable non-native plants into public lands ecosystems and may result in increased fire risks to fisher habitat (Belsky and Gelbard 2000, Reisner et al. 2013).

Public-land range conditions have generally worsened in recent decades. Impacts from climate change, in conjunction with already reduced productivity caused by past grazing, magnifies the degradation threat posed to fisher habitats by grazing (Beschta et al. 2012).

Commercial livestock grazing may also result in anti-predator responses activities by agencies such as the USDA APHIS Wildlife Services and the Idaho Department of Fish and Game, with concomitant risks of fishers being caught in traps. Reductions in predators such as wolves and coyotes may reduce deer carcass abundance and deprive fisher of this important resource.

OVERUTILIZATION FOR COMMERCIAL, RECREATIONAL, SCIENTIFIC, OR EDUCATIONAL PURPOSES

The Northern Rockies Fisher Distinct Population Segment warrants Endangered Species Act protection due to overutilization from trapping. Trapping is known to be one of the most important factors influencing fisher populations (Powell and Zielinski 1994, p. 45, 64; Aubry and Lewis 2003, p. 81, 89; FWS 2011, p. 38526). Trapping is often the main mortality factor for fishers (Krohn et al. 1994, pp. 139–140). Unregulated overharvesting contributed to the fishers' severe population decline in the early 20th century (Douglas and Strickland 1987, p. 512; Powell 1993, p. 77). Even low levels of harvest-related mortality, added to natural mortality, can negatively impact small populations like Northern Rockies fisher (Powell and Zielinski 1994, pp. 45, 64; FWS 2011, p. 38526).

Because fishers are easily trapped, trapping can be a significant cause of severe fisher population decline (Douglas and Strickland 1987, p. 523). Fisher populations are particularly sensitive to the effects of trapping because of their life-history traits, including slow reproductive rate and the sensitivity of population numbers to prey fluctuations (Powell and Zielinski 1994, p. 45).

A recently published study of population biology and matrix demographic modeling of fishers (Buskirk et al. 2012) sheds new light on the magnitude of threat that trapping mortality poses to fisher populations. Buskirk et al. (2012) used longitudinal studies of vital rates and population processes at landscape scales to construct matrix demographic models and found that fisher life history is most strongly influenced by adult survival. In the models, fisher survival estimates varied depending on several factors including whether the populations were subjected to trapping. Estimated fisher survivorship (annualized) ranged from a low of 0.33 to a high of 0.90 depending on whether the population was trapped and on the age of study animals (Buskirk et al. 2012, p. 85). Varying fisher fecundity (either through litter size or pregnancy rate) and holding survival rates constant had very little effect on population growth rate (lambda), demonstrating the importance of adult survival to fisher life history (Buskirk et al. 2012, p. 88).

Knowing that fisher life history is strongly influenced by adult survival has important implications. Rather than expecting that populations will be able to grow quickly in temporarily favorable environments, managers can expect that stable conditions and long time periods will be required for population growth or recovery (Buskirk et al. 2012, p. 91). Removal of adults from populations by trapping thus has an important effect on population growth rate. This new finding is particularly important for fisher in the Northern Rockies because as a small, low density population, this DPS is sensitive to even light trapping pressure. For small populations, even light levels of trapping can cause local extinction (Powell 1979, 1982). It has been thought for many years that incidental trapping mortality is a limiting factor for fisher recovery in Idaho (Jones 1991, Heinemeyer 1993, IDFG 1995).

Fishers are classified as furbearers under State codes in both Idaho and Montana (IDFG 2010, p. 35; MTFWP 2010, Attachment 10, p. 2). Targeted legal harvest occurs in Montana, and accidental capture and mortality occur in both Montana and Idaho. Both states have a mandatory reporting requirement for incidental mortality; only Idaho requires reporting of animals trapped and released. There are no measures required to avoid or prevent accidental capture of fishers in either Montana or Idaho.

The number of fishers incidentally trapped in Idaho has been increasing dramatically since 2006 and has recently reached alarming levels. The number of furbearer trapping licenses sold doubled between 2001 and 2008 (IDFG 2008, p. 8), indicating additional trapping pressure and an increased risk of unintended captures.

Fur-taker report cards required to be submitted by licensed trappers at the end of the trapping season show that in the 2011-2012 trapping season, non-target catch of fishers by all individual fur-takers in Idaho was 46 fishers in the 2010-2011 trapping season, four of which were dead, and 30 fishers in the 2011-2012 trapping season, 18 of which were dead (Table 2 and Figure 2).

Table 2. Number of reported fishers trapped (dead or released) in Idaho from 2002-2012

Year	Fishers incidentally trapped (dead)	Fishers incidentally trapped (released or unknown)	Total fishers incidentally trapped
2002-2003	2	3	5
2003-2004	0	5	5
2004-2005	1	9	10
2005-2006	2	9	11
2006-2007	0	16	16
2007-2008	3	11	14
2008-2009	2	16	18
2009-2010	8	30	38
2010-2011	4	42	46
2011-2012	18	12	30

Data from IDFG 2011, IDFG 2013b.

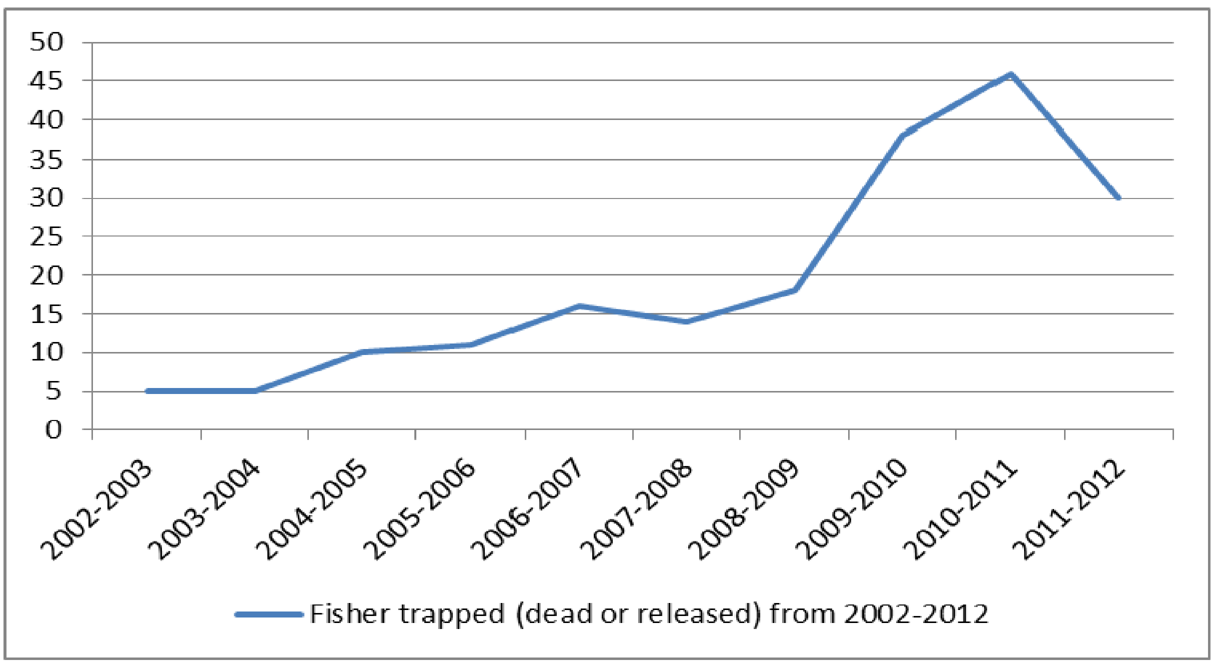

Figure 2. Number of reported fishers trapped (dead or released) in Idaho from 2002-2012. Data from IDFG 2011, IDFG 2013b.

The recent level of incidental captures is the highest level of any time during the 40-year reporting period. Seventy-six fishers were incidentally trapped in Idaho in the 2010-2011 and 2011-2012 trapping seasons (IDFG 2013a, 2013b). The vastly increased number of incidental captures poses a threat to the survival of the DPS. There are no data which indicate that the increased number of captures can be explained by population expansion. The data which are available indicate that density is low and the population is small. The increase in the number of furbearer trapping licenses sold for other species indicates that trapping pressure has increased for fishers. The Service has previously stated that incremental increases in incidental capture could be a concern in Idaho (FWS 2011, p. 38526). This factor has now risen to the level of a threat that qualifies the DPS for federal protection.

In addition to incidental trapping, legal harvest of fishers poses a threat to the DPS in Montana. Because overall population size is not known, it is not possible to guarantee that fisher quotas are sustainable. In Montana from 1968-2010, there were 305 reported fisher specimens taken from legal harvest or from mortality incidental to legal harvest for other species (Vinkey 2003, p. 51; MTFWP 2010, p. 2). From 2002 forward, trapping in Montana has occurred almost exclusively in the Bitterroot Divide area, Trapping District 2 (MTFWP 2010, Attachment 3, entire). Trapping in District 2 poses a magnified threat to Northern Rockies DPS fisher survival because it is a stronghold for fishers of native (not introduced) lineage (Schwartz 2007, p. 924; Knaus et al. 2011, p. 10). District 2 trapping has a five fisher quota, which is filled in most years (MTFWP 2010, Attachment 8, pp. 1, 4). Legal harvest also threatens fishers in Trapping District 1, including the Cabinet Mountains, in the northwest corner of the state. The trapping quota was reduced from ten to two between 1993 and 1996, and harvest is low and variable (MTFWP 2010, Attachment 8, p. 1). Six of the eight individuals captured between 2003 and 2008 were adults (MTFWP 2010, Attachment 3, entire), which suggests low recruitment.

These high numbers from furbearer license reports are themselves concerning but they do not even represent comprehensive take of fishers in Idaho and Montana because in addition to trapping by individual permit holders, fisher are also incidentally caught in traps set by USDA APHIS Wildlife Services, the Idaho Department of Fish and Game and Montana Fish, Wildlife, and Parks, and tribes.

It is likely that the total mortality from trapping is higher than the reported number of fisher found dead in traps. It can not be assumed that fishers that are trapped and released survive because the fate of released animals is uncertain. Lewis and Zielinski (1996, p. 295 and references therein) report that live fishers are difficult to remove from traps, and suffer broken bones, hemorrhage, self-mutilation, and predation as consequences of capture; estimated survivability after release for incidentally captured fishers is as low as 50 percent in some studies. Additional mortality from the trauma of capture and release and unreported captures is likely.

It cannot be assumed that remoteness protects fishers from trapping risk. Off-road vehicle access to remote areas increases the threat of trapping to fishers (Weaver 1993, Switalski and Jones 2012, p. 17).

Fisher populations can be seriously affected by overtrapping (Powell and Zielinski 1994, p. 45). Increased levels of incidental capture are now endangering Northern Rockies fisher. The recently elevated level of incidental capture has risen to the level of a population threat and the fisher should thus be protected under the Endangered Species Act.

DISEASE AND PREDATION

New information on the threat of disease to fishers continues to emerge, with significant findings having developed since 2009. Because fisher populations in the Northern Rockies are small and isolated, the threat of disease poses a major concern for their long-term stability. Even small increases in adult mortality can negatively influence small populations of low-density carnivores like Northern Rockies fisher (Ruediger et al. 1999, p. 2; Buskirk et al. 2012). Four pathogens that are of particular concern for fishers are canine distemper virus, toxoplasmosis, parvoviruses, and rabies (Gabriel et al. 2012, p. 138). Each of these pathogens can lead to the decline or extirpation of carnivore populations, and these pathogens are carried by host species that are sympatric with Northern Rockies fishers (Gabriel et al. 2012, p. 140). The threat posed to Northern Rockies fisher by disease is heightened by synergies with other threats.

Canine distemper virus (CDV) is a highly labile RNA virus that infects and causes significant disease in carnivores worldwide, including mustelids such as fisher (Gabriel et al. 2012, p. 141). Canine distemper affects multiple sites in the central nervous system. Distemper has strong immunosuppressive effects that act synergistically with other subclinical or latent infections to enhance the severity of disease and increase the probability of death. Distemper has been associated with *Hepatozoans* and toxoplasmosis. Reservoir hosts for canine distemper include domestic and wild dogs, raccoons (*Procyon lotor*), and black bears (*Ursus americanus*) (Keller et al. 2012, p. 1040), all of which occur in the range of Northern Rockies fisher.

In 2009 an epizootic of canine distemper virus caused four mortalities within a short time period in an insular population of fishers in the southern Sierra Nevada Mountains in California (Gabriel 2012). This was the first report of CDV in fishers and underscores the significance of CDV as a pathogen of management concern. On the threat posed to fishers and martens by distemper, Gabriel et al. (2012) state:

> Given the devastating effects of CDV outbreaks on captive and wild populations of carnivores, the conservation implications of infections with CDV could be significant. Likewise, CDV-related mortalities in small or insular *Martes* populations could have a significant effect on their persistence and viability (p. 142).

Canine distemper cannot be dismissed as a threat to Northern Rockies fishers, as numerous species that can carry the disease occur in the region. Distemper has resulted in the decline or near-extirpation of small, isolated populations of several species (Woodroffe 1999). An epidemic of canine distemper virus in black-footed ferrets in 1985 led to the extirpation of the species from the wild (Thorne and Williams 1988, pp. 67, 72).

It has recently come to light that a parasite, *Toxoplasma gondii,* can be lethal for fishers (Gabriel et al. 2012). Toxoplasmosis leads to morbidity or mortality when individuals are concurrently infected by another immunosuppressive agent such as canine distemper virus (Larkin et al. 2011, p. 428). *Toxoplasma gondii* is an obligate intracellular protozoan parasite with a complex life cycle. Clinical signs of toxoplasmosis in mustelids include head tremors and ataxia, circling, limb lameness, lethargy, blindness, loss of appetite, anorexia, difficulty chewing and swallowing, and abortion. This parasite occurs worldwide and probably has the potential to infect all avian and mammalian species (Tenter et al. 2000, Gabriel et al. 2012, p. 145).

The subclinical effects of *T. gondii* infection can also be significant (McAllister 2005). Subclinical infection with toxoplasmosis could have deleterious effects on fisher behavior and could cause increased susceptibility to predation (Kreuder et al. 2003, Webster 2007). It is possible that a heightened susceptibility to predation from toxoplasmosis could be related to the high predation rates currently experienced by fisher populations in California (Gabriel et al. 2012). Toxoplasmosis infection, or infection with other parasites such as *Sarcocystis* spp., could also increase susceptibility to vehicular strikes (Larkin et al. 2011, p. 428). Behavioral changes induced by *T. gondii* or *Sarcocystis* spp. could influence fisher feeding ecology, movement, reproductive success and, ultimately, survival (Larkin et al. 2011, p. 428).

Outbreaks of toxoplasmosis can cause significant levels of mortality. Toxoplasmosis has resulted in significant mortality in free-ranging southern sea otters, and in black-footed ferrets and American minks in captive-breeding programs. Gabriel et al. (2012) report that a fisher in California recently died from inflammation of the brain and meninges caused by *T. gondii* infection. The rare but significant effects of toxoplasmosis epizootics in other mustelids demonstrate the potential importance of this parasite for *Martes* populations worldwide (Dubey et al. 2001). Gabriel et al. (2012) conclude that *T. gondii* is a threat to fishers that warrants consideration in conservation efforts (p. 146).

Parvoviruses affect a wide variety of carnivores throughout the world, and have the potential to infect all *Martes* species (Gabriel et al. 2012, p. 144). Parvoviral infections are of particular concern for small and vulnerable populations like Northern Rockies fisher (Gabriel et al. 2012, p. 145). Parvoviruses show strong environmental resistance, and spillover from nearby infected individuals or inanimate objects is a concern. Parvoviruses are highly resistant to environmental degradation and, can persist in the environment for months and possibly years under suitable conditions (Gabriel et al. 2012, p 144). Transmission is generally through the fecal-oral route, rather than by direct transmission, and feces deposits are potential sources of exposure for *Martes* species (Barker and Parrish 2001, McCaw and Hoskins 2006). Numerous other carnivores and domestic dogs could expose the Northern Rockies fisher population to parvoviruses.

Rabies is a serious concern for many carnivore communities. Domestic dogs can exacerbate the risk of rabies outbreak to wild carnivore populations (Gabriel et al. 2012, p. 141). There is likely a correlation between the prevalence of disease in wild populations and contact with domestic animals at the urban-wildland interface (Riley et al. 2004, p. 18).

Fishers are vulnerable to infection by a variety of additional parasites including intestinal invertebrates (*e.g.*, nematodes, trematodes) and other bacterial, protozoan, and arthropod disease agents (Brown et al. 2008, p. 21). Parasites have the potential to cause severe diseases and may limit population numbers. Individuals weakened by parasitism or other infectious disease processes are more vulnerable to other sources of mortality such as predation and vehicular strikes. The opportunistic feeding habits of fishers could increase their probability of exposure to parasites and pathogens and to infected sympatric species (Larkin et al. 2011, p. 425).

Disease can act synergistically with other population limiting factors such as habitat loss and degradation, predation, competition, and nutritional stress (Gabriel et al. 2012, p. 139). Even diseases that do not cause major mortality events can significantly impact a population's fitness due to co-occurring stressors such as logging, habitat fragmentation, encroachment of human development, and other disturbances (Larkin et al. 2011, p. 425). Disease could also limit the ability of fishers to re-colonize unoccupied suitable habitats.

Mortality from predation could be a significant threat to fishers. Recent studies have demonstrated that predation on fishers in western North America is more common than was previously thought (Sweitzer et al. 2011; Raley et al. 2012, p. 246). Fisher predators include bear, bobcat, cougar, Canada lynx, coyote, fox, mountain lion, wolverine, and raptors (FWS 2011, Raley et al. 2012). Powell and Zielinski (1994, pp. 7, 62), Truex et al. (1998, p. 3), and Higley and Matthews (2009, p. 22) report that predation can be a significant source of fisher mortality. Two ongoing studies in the southern Sierra Nevada population have reported that predation is the most common source of mortality of radio-collared fishers (Sweitzer et al. 2011). Fisher predation in the Northern Rockies likely occurs at similar rates as in the other regions where it is reported to be a significant source of mortality, because common fisher predators are present throughout the range of fishers in the Northern Rockies.

The risk of predation is magnified by other factors such as habitat loss and degradation. Forest fragmentation that forces fishers to travel long distances without suitable hiding cover may increase their vulnerability to predation by other carnivores (Heinemeyer 1993, p. 26; Powell and Zielinski 1994, p. 62). Disease and infection with parasites can also increase vulnerability to predation (Gabriel et al. 2012).

Small populations of low-density carnivores, like fishers, are more susceptible to small increases in mortality factors due to their relatively low fecundity, and low natural population densities (Ruediger et al. 1999, pp. 1–2). Because of these factors, and because of new information on the importance of adult survival to fisher population growth (Buskirk et al. 2012), both disease and predation threaten the survival and recovery of Northern Rockies Fisher.

INADEQUACY OF EXISTING REGULATORY MECHANISMS

There are no existing regulatory mechanisms at the federal, state, or local level which adequately safeguard the fisher from the threats which make it in danger of becoming extinct in the foreseeable future.

Seventy-two percent of the land area with forests typical of fisher habitat types in the Northern Rockies is managed by federal entities, including parts of fourteen national forests. Federal activities on national forest lands are subject to the National Forest Management Act of 1976 (NFMA) (16 U.S.C 1601–1614) which requires the development and implementation of resource management plans for each unit of the National Forest System. The fisher is considered a sensitive species in Forest Service Region 1 (western Montana and northern Idaho) and Region 4 (central to southern Idaho) (USFS 2005, p. 4; USFS 2008, p. 6). A sensitive species is a species identified by a regional forester for which viability is a concern (USFS Manual (2670.5). The USFS' Sensitive Species Policy (USFS Manual (2670.32)) calls upon national forests to assist and coordinate with states and other federal agencies in conserving species with viability concerns. The Forest Service is directed to develop and implement management practices to ensure these species do not become endangered or threatened.

The sensitive species program cannot be considered an adequate regulatory mechanism to protect fisher because sensitive species are not afforded any regulatory habitat protection; rather the agency is only required to analyze the impacts of its actions on the fisher under the National Environmental Policy Act (NEPA). This requirement in no way mandates the agency to select an environmentally benign alternative or to try to mitigate the adverse impacts of projects. Moreover, any protections afforded the fisher under the sensitive species program are discretionary. Discretionary mechanisms are not adequate to protect the fisher on National Forest lands because National Forests are managed to meet multiple objects including providing access to recreation opportunities for the public and serving as an economic development resource for the regions where they occur.

Furthermore, it is unlikely that fisher will continue to receive recognition as a Forest Service regional sensitive species throughout its range on National Forest System lands due to changes in the Forest Service's at-risk species policy. The 2012 Forest Service Planning Rule (36 CFR 219) requires identification and conservation of "species of conservation concern" at the forest, rather than the regional, level. Under the new planning regulations, individual forests within the range of the fisher, upon revising their forest plan, may remove fishers from the procedural requirements provided under the regional sensitive species program. For example, the Nez Perce-Clearwater forest plan revision has not identified fisher as a potential species of conservation concern in their preliminary planning process, thus potentially removing even the modest conservation considerations offered under the sensitive species program.

Prior Forest Service planning regulations, which governed the formulation of the relevant forest plans, required that forest plans identify certain species as Management Indicator

Species in order to estimate effects of management alternatives on wildlife populations (36 CFR 219.20). The fisher has been considered a Management Indicator Species by several National Forests to guide vegetation management of old-growth forest (USFS 1999, p. 11; USFS 2006, p. 14), but this designation cannot provide regulatory protection for fisher habitat.

The National Environmental Policy Act (NEPA) requires federal agencies to consider the environmental impacts of their proposed actions and reasonable alternatives to those actions. To meet this requirement, federal agencies conduct environmental reviews, including Environmental Impact Statements and Environmental Assessments. NEPA cannot regulate activities that might affect fishers, it only requires evaluation and disclosure of information regarding the effects of contemplated federal actions on sensitive species and their habitats. NEPA requires analysis of the cumulative effects of projects—a Cumulative Effects Analysis (CEA). There are numerous inadequacies in the ability of CEAs to offer meaningful protection to the Northern Rockies fisher, as examined in detail by Schultz (2010) in a review of the challenges in connecting Cumulative Effects Analysis to effective wildlife conservation planning:

> "Fisher, for example, do not benefit from a management strategy or cumulative impact thresholds. Interviewees and IPNF (Idaho Panhandle National Forest) documents suggest that there are viability concerns for fisher on the IPNF (USFS 2006a) . . . Effects to fisher populations, like those to lynx, are analyzed in terms of acres of suitable habitat in the project area, determined using timber stand data. According to the IPNF, fisher habitat is difficult to model because of a lack of information on habitat requirements and limitations in accounting for various habitat characteristics using timber stand data (USFS 2006a). The IPNF's approach is to maintain the quality of sub-drainages based on the percentages of mature or old-growth timber, and to limit effects through other management guidelines focused on the preservation of mature or old-growth stands, riparian areas, and coarse woody debris (USFS 2006a, 2007b). Presumably, as long as no project degrades the quality of any sub-drainage, projects are not creating any additional threats to viability, aside from those that may already exist. However, without more knowledge about population status and wildlife-habitat relationships, it is difficult to be confident that these guidelines for maintaining fisher habitat are effective" (p. 547).

Schultz's analysis provides a detailed example from an Environmental Impact Statement for a logging project (Mission Brush EIS, USFS 2006) of why Cumulative Effects Analysis under NEPA is inadequate to protect fisher habitat in the Northern Rockies:

> "Similar issues arise in the fisher CEAs. The Mission Brush EIS (USFS 2006a) explains that past harvest had the potential to eliminate some fisher habitat, although it includes no estimates of how the availability of fisher habitat has changed over time on the forest, on a population scale, or in the project area. The CEA for past activities concludes: "In combination with past natural and human-caused events, the proposed action would reduce the quantity of suitable fisher

denning habitat. However, given the low density of fisher populations, it is unlikely that they are limited by denning habitat. Previous activities would not have cumulatively significant impacts when added to the proposed action, since the effects are already incorporated into the environmental baseline" (USFS 2006a, p. 4-79). An implicit assumption in this analysis is that the species is so rare that some additional habitat loss is insignificant. However, species-habitat relationships, by the USFS's own admission, are poorly understood for this species, making it difficult for the IPNF to know what the effects of further habitat loss and fragmentation might be, or whether this area might be supporting some critical portion of the small population that remains. It is also impossible to know what types of effects would lead the IPNF to conclude that there would be significant effects to fisher populations. The concluding assertion that there are no significant impacts rings hollow without an attendant explanation. Imagine instead that the analysis stated: "Past effects are incorporated into the environmental baseline and proposed actions would not have a cumulatively significant impact because we are still not reaching threshold x." In this case, the red flag is clear in terms of significant cumulative effects. However, the lack of management thresholds allows small portions of habitat to be eliminated incrementally without any signal when the loss of habitat might constitute a significant cumulative impact. Minimum thresholds for viability are undoubtedly difficult to establish (Tear et al. 2005). However, some kind of threshold or trigger point, which could be expressed as a range of conditions to incorporate uncertainty and reflect a distribution of ecological conditions, is needed to provide a basis for conclusions regarding the significance of impacts and to provide some context for project-level impacts. As was the case with lynx, there is also no clear accounting of what has been lost in terms of fisher habitat or populations in the area, and whether the fisher population has already sustained significant cumulative impacts. Current conditions for this and other species are not compared with any point in the past, making it impossible to understand cumulative impacts. Historical information is central to a CEA, which is about whether thresholds are being crossed and also how current conditions compare with past conditions (McCold and Saulsbury 1996, MacDonald 2000, Eccleston 2006). If population data were unavailable, the USFS could provide information on habitat loss for individual species, which might give some indication of possible cumulative impacts. Without thresholds or perspective on past actions, there is little information to provide context for projects that eliminate small portions of habitat and no real assessment of cumulative effects, either generally or as a result of management actions, on fisher populations over time. As a result, this approach to CEA has limited power to affect decision making. Additionally, because there are no population estimates and no forest-wide analyses of the status of the species, it is impossible to know if the forest is supporting what might be considered a viable population" (p. 547-548).

There are no provisions of NEPA that guarantee protection for fisher habitat. Thus, though the Forest Service is directed under the Sensitive Species Policy to develop and implement management practices to ensure the fisher does not become endangered or threatened, there are no regulations that ensure that the fisher's habitat is being protected.

NEPA also fails to protect fisher habitat from the negative impacts of livestock grazing. When the Forest Service and other agencies conduct NEPA analyses for grazing permit renewals, the biological evaluations typically conclude that the proposed action, "may affect individuals, but not likely lead to a trend towards Federal listing," or similar language. The agencies simply fail to consider the cumulative effects of the livestock grazing they are authorizing across the range of the DPS. Further, legislation has been proposed in Congress to reduce or eliminate the environmental reviews and analyses related to public lands allotment grazing permit renewals. The land management agencies are also being impacted by the seven percent budget cuts under "sequestration." For all these reasons, fisher habitat is not adequately protected on federal lands.

Twenty-two percent of fisher forest types in the Northern Rockies are privately owned including commercial timber lands. There are no existing regulatory mechanisms to prevent loss and degradation of fisher habitat on private lands.

Six percent of fisher habitat types in the Northern Rockies are owned by states or local governments (FWS 2011). Montana state forests with fisher habitat types are situated in the northwest and north-central part of the state, often sharing boundaries or interspersed with national forest lands in lower elevations of intermountain valleys. Timber harvest for revenue generation is conducted on an annual basis and includes forest types preferred by fishers. Fishers are managed as a sensitive species. Though forests are managed to promote a diversity of habitat conditions beneficial to wildlife (MTDNRC 2010, p. 1), these provisions do not provide regulatory protection for fisher habitat. There is no specific direction to retain mature or larger trees for fisher independent of emphasis on snag retention.

In Idaho, the fisher is identified as a species of greatest conservation need in the Idaho Comprehensive Wildlife Conservation Strategy (IDFG 2005, p. 365, Appendix B, p. 8). Species of greatest conservation need are those considered at high risk due to low number, declining numbers, or other factors that make them vulnerable to extirpation (IDFG 2005, Appendix B, pp. 1, 8). Identification as a species of greatest conservation need provides no regulatory protection. There are no identified regulatory mechanisms that apply to habitat management for fisher in Idaho. Management goals for riparian buffers during timber harvest under the Idaho Forest Practices Act (Idaho Administrative Code 2000, 20.02.01) could theoretically provide some habitat connectivity for fishers, but do not provide enough habitat protection to sustain fisher populations (Schwartz et al. 2013, p. 110).

As discussed above in the Modification or Curtailment of Habitat or Range section, habitat conditions in the Northern Rockies may already be sub-optimal for fisher. Newly published scientific information details the importance of large, connected areas of old, closed-canopy forests with abundant structural elements for the persistence of fishers in the Northern Rockies (Naney et al. 2012, Raley et al. 2012, Schwartz et al. 2013).

Logging obviously degrades fisher habitat, and any further loss of habitat rises to the level of threat under the criteria of the Endangered Species Act

There are no existing regulatory mechanisms that adequately protect fisher from intentional or incidental trapping. The fisher is classified as a regulated furbearer in Montana (MTFWP 2010). Montana is the only State in the western United States where fisher trapping is legal. The trapping season is open December 1 to February 15, or within 48 hours of a quota being reached (MTFWP 2010). Two districts are open for trapping— District 1 in the northwest has a quota of two, including the Cabinet Mountains, and District 2 in west-central Montana, including the Bitterroot Mountains, has a quota of five; there is a statewide sub-quota of two females. Only one fisher may be taken per person per season, and take must be reported within 24 hours to the MTFWP. Reporting and surrender of an accidental mortality (unintended capture or outside legal season) must be done within 24 hours of capture, and only uninjured animals can be released from traps. The requirement that traps must be checked every 48 hours is not adequately protective. There are no penalties for surrendering an accidentally killed fisher, but there are penalties and fines for being in possession of an incidentally taken fisher.

Harvest quotas and seasons are evaluated and set by the MTFWP Commission every year, with the general regulations established for 2-year periods (Montana Code Annotated 2009b; MTFWP 2010, Attachment 10, p. 2). Quotas have been adjusted downward several times since the establishment of the regulated trapping program in1983 in response to harvest success, demographics of harvested animals, and track survey data. There are no established objectives or direction that indicates action thresholds for adjusting quotas or practices. There is no regulatory mechanism or requirement in place to minimize incidental take of fisher.

In Montana, furbearer trappers are not required to report incidental captures of non-target species when they can be released uninjured. Situations regarding incidental captures are taken care of at the regional level by region personnel on a circumstance by circumstance basis, and have not been recorded in the past. Trappers meet reporting requirements by contacting regional staff at the local level (MTWFP 2013).

The fisher is legally classified as a furbearer in Idaho, but no legal season has been open for more than 60 years (Idaho Administrative Code 2010, 13.01.16; IOSC 2010, p. 11). Trapping associations, however, have recently requested the Idaho Fish and Game Commission to reopen a trapping season, and it is potentially under consideration. Capture of fishers currently occurs, primarily incidentally to trapping of martens and bobcats. There are no legislated regulatory mechanisms in place to minimize incidental take of fisher. The required trap check time of 72 hours is inadequately protective.

Marten and other furbearer trapping is conducted under statewide licensure but management occurs at regional levels. There is no limit to the number of statewide licenses sold, and no seasonal quotas for marten or bobcat are in place that could theoretically benefit fisher, such as closure in the event of excessive fisher capture. The

IDFG Commission has the authority to set bag or possession limits and seasons (Idaho Administrative Code 2010, 13.01.16). A mandatory fur-taker harvest report is required to be submitted to the IDFG by July 31 to assist with setting season limits (IDFG 2010, p. 38). An incidental capture of a fisher that results in mortality requires reporting and surrender of the carcass to IDFG within 72 hours; live animals require immediate release if they appear unharmed or, if animals appear injured, the IDFG is contacted for assistance (IDFG 2010, p. 36). Trappers are reimbursed $10 for the surrendered carcass and are required to report the capture, dead or released alive, on the harvest report. There is no mechanism in place to adjust a trapping season while it's in session, such as closing a unit or area early, to accommodate an incidental take of a fisher.

Bobcat trapping is likely one source of incidental trapping of fishers, and it is likely that the price of bobcat pelts will remain quite high (IDFG 2011). It can be assumed that bobcat trapping could increase or at least maintain current high levels with high pelt prices, and therefore fisher incidental trapping is also likely to continue to increase (Table 3 and Figure 3).

Table 3. Comparison of numbers of reported fishers incidentally trapped, trapped bobcats in the same counties as incidentally trapped fishers, and the price for bobcat pelts.

Year	Fishers incidentally trapped (dead or released)[1]	Total # of trapped bobcats in same counties where fishers have been incidentally trapped[2]	Price for bobcat pelts in dollars[2]
2002-2003	5	202	$ 214.68
2003-2004	5	380	$ 213.15
2004-2005	10	364	$ 198.64
2005-2006	11	225	$ 283.61
2006-2007	16	315	$ 202.97
2007-2008	14	362	$ 299
2008-2009	18	199	$ 208.16
2009-2010	38	221	$ 245.07
2010-2011	46	242	$ 319.58

[1] Source: IDFG 2011
[2] Source: IDFG Pittman Robertson furbearer reports, available at: https://collaboration.idfg.idaho.gov/WildlifeTechnicalReports/Forms/AllItems.aspx

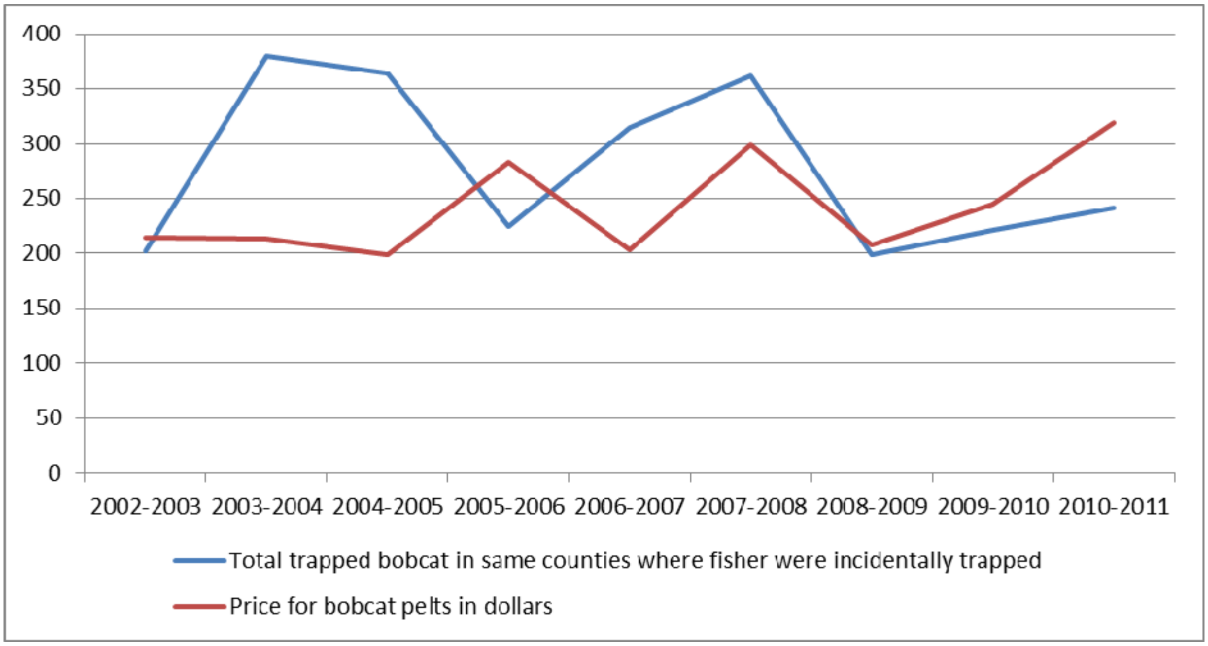

Figure 3. Comparison of numbers of trapped bobcats in the same counties as incidentally trapped fishers, and the price for bobcat pelts. Data from IDFG 2011.

In a previous negative finding for Northern Rockies fisher, the Service determined that there is a concern regarding the inadequate control of mortality due to capture incidental to the trapping of other furbearing animals in Idaho and Montana. The finding states, “The authority exists under States’ laws to manage trapping programs, specifically for fisher, as well as other species. However, we are unaware of any policy or management direction that would invoke that authority and apply adaptive management or minimization measures to reduce additional mortality from unintended harvest” (FWS 2011, p. 38530). At the time of the finding, the Service did not consider the amount of incidental fisher mortality to have risen to the level of a threat. Since that time, however, incidental trapping of fishers has increased dramatically, and trapping has now risen to such a high level that it poses a significant threat to the species’ survival, as detailed above in the Overutilization section.

Due to new information on the threats posed to fisher in the Northern Rockies by trapping, disease, and habitat loss, and the inadequacy of existing regulatory mechanisms to abate these threats, the fisher warrants protection under the Endangered Species Act.

OTHER NATURAL OR HUMAN-MADE FACTORS AFFECTING ITS CONTINUED EXISTENCE

Other factors that threaten Northern Rockies fisher include small population size and population isolation, non-target poisoning, collision with vehicles, and accidental trapping in manmade structures (Folliard 1997, p. 7; Truex et al. 1998, p. 34, Gabriel et al. 2012). It is likely that where fisher distribution overlaps with current and future human developments, anthropogenic causes of mortality will continue to occur and will increase with expected increases in rural development (Naney et al. 2012, pp. 21–23, 25–26).

Small Population Size, Population Isolation, and Restricted Range

Small, isolated populations are subject to increased extinction risk from stochastic environmental, genetic, or demographic events (Shaffer 1981, p. 131; Brewer 1994, p. 616). Loss of genetic diversity can lead to inbreeding depression and an increased risk of extinction due to loss of genetic viability and reduced population growth rate (Allendorf and Luikart 2007, pp. 338–343). Environmental events such as drought, fire, or storms can have severe consequences for small populations. Combinations of factors can interact to increase the risk of extinction.

Fishers are vulnerable to the effects of small population size and isolation based on characteristics of their life history. Fishers are solitary and territorial. Where landscapes are less than optimal, they require large home ranges (Weir and Corbould 2010, p. 405). This results in low population densities, as the population requires a large amount of quality habitat for survival and proliferation. Fishers also are long-lived, have low reproductive rates, and, generally have small dispersal distances because they are reluctant to move through areas with no cover (Buskirk and Powell 1994, p. 286). Where habitat is fragmented, it is more difficult to locate and occupy distant yet suitable habitat, and fishers may be aggregated into smaller interrelated groups on the landscape (Carroll et al. 2001, p. 974).

Restricted geographic range, small population size, territoriality, habitat specificity, habitat fragmentation, occurrence at the range periphery, and low population density all contribute to increased vulnerability to extinction of Northern Rockies fisher (Purvis et al. 2000, p. 1947; Kyle et al. 2001, p. 2345; Kyle and Strobeck 2001, p. 343; Wisely et al. 2004, pp. 644, 646).

Because the Northern Rockies fisher population is small and isolated, the impacts of other threats are greater (Naney et al. 2012, p. 36). Trapping, disease, predation, and rodenticide poisoning each threaten Northern Rockies fisher on their own, and the impacts of each are magnified due to the characteristics of the populations in the region. Fisher home ranges in the Northern Rockies are large, indicating that resource availability is already limiting population size and recovery. When combined with the new high-level threat fishers face from incidental capture in wolf traps, and new information on the importance of adult survival to fisher recovery, small population size and isolation rises to the level of threat for Northern Rockies fisher.

Non-target Poisoning

It has recently come to light that wildlife, including fishers, are threatened by poisoning from anticoagulant rodenticides and other toxic agents used to suppress mammal populations in agricultural and peri-urban settings and on public lands (Gabriel et al. 2012, EPA 2013). In 2013 the U.S. Environmental Protection Agency released a nationwide compilation of reported wildlife mortality incidents from vertebrate poisoning agents. The records reveal widespread non-target poisoning of wildlife from states across the country. The records are obviously not representative of all wildlife poisoning incidents because, as the Service has acknowledged (FWS 1993, p. I-4), many if not most poisoning incidents are undetected and further, the vast majority of states do not have programs in place to track poisoning incidents. Based on the limited data available, the EPA reported known poisonings from 12 states including Washington, California, Colorado, and nine Eastern and Midwestern states. Animals detected that have died from non-target poisoning include fisher prey species and carrion, other carnivores, and numerous other species including squirrels, voles, rabbits, chipmunks, deer, skunks, raccoons, opossums, quail, weasels, bobcats, foxes, coyotes, badgers, and mountain lions (EPA 2013, entire).

Anticoagulant rodenticides in particular have come to light as a significant threat for wildlife. Direct and indirect exposures and illicit use of rodenticides on public and community forest lands have recently raised concern for fishers in Pacific states. Gabriel et al. (2012) tested 58 fisher carcasses for rodenticide exposure and found that 79 percent (46 of 58) had been exposed to rodenticides. The authors determined that rodenticide contamination is widespread within the fisher's range in California, encompassing mostly public forest and park lands. Because the fisher is a forest-dependent carnivore, the authors hypothesized that exposure to anticoagulant rodenticides would be rare, but carcass test results revealed widespread exposure.

Toxicants were not previously thought to be a threat to fisher because of the animal's occurrence in and dependence on mid- to late-seral stage forest habitats. Exposure to anti-coagulant rodenticides is a previously unknown but real threat to fisher in California, and could also potentially threaten fishers in the Northern Rockies. The Service has previously identified non-target poisoning as a threat to grizzly bears and grey wolves (FWS 1993) from poisons used to control coyotes and other mammals. The Service determined that these poisons threaten grizzlies through risk of eating contaminated prey as well as through reduced prey availability (FWS 1993, p. III-20).

In California, spatial analyses did not reveal any point sources of rodenticide exposure, suggesting that exposure is widespread across the landscape (Gabriel et al. 2012, p. 11). Data from the study refuted the hypothesis that exposure would be clustered near areas of human activity and instead found that exposure was common outside these areas, indicating that widespread, non-regulated use of anticoagulant rodenticides is occurring on public lands (p. 12). Illegal marijuana operations are one likely source of exposure. Toxic agents used to control coyote and other populations are likely another exposure source. Fishers in the Washington fisher re-introduction area have also shown high exposure rates to anticoagulant rodenticides (Gabriel et al. 2012, p. 160). Exposure to these toxicants is likely from secondary poisoning from consumption of prey or carrion that have been exposed to rodenticides rather than by direct consumption (Gabriel 2012).

The likelihood of discovering individual wildlife deaths attributable to rodenticides is very small (FWS 1993, p. I-4). The secretive nature of fishers makes it even more unlikely that poisoning incidents would be detected (FWS 1993, p. I-4). In a 1993 Biological Opinion on the effects of vertebrate control agents on endangered species, the Service determined that since it is so unlikely that take resulting from rodenticide use would ever be discovered, that if even one specimen were to be discovered, then consultation must be reinitiated (FWS 1993, p. I-4). This very low threshold for reinitiation, requiring only a single confirmed specimen, highlights the improbability of recovering the carcasses of wildlife that have been poisoned, even more so for animals as secretive as the fisher.

Although no fishers in the Northern Rockies are known to have been poisoned from non-target pesticides, poisoning should not be dismissed as a potential threat to fishers in the region for numerous reasons. The likelihood of detecting poisoned fishers is very small. Toxic agents are widely used to control coyote and other mammal populations, and the Service has acknowledged these agents as a threat to grizzly bears and grey wolves. The newly released EPA data show that across the country other carnivores and numerous fisher prey and carrion species have succumbed to non-target poisoning.

Additional Causes of Mortality

Fisher are also vulnerable to mortality from vehicle collisions and accidental trapping in manmade structures such as water tanks (Zielinski et al. 1995, Folliard 1997, Truex et al. 1998). Even modest increases in mortality rates from the additive effects of multiple causes may interfere with population growth and recovery (Spencer et al. 2011, p. 796). Fishers are highly prone to localized extirpation, their colonizing ability is somewhat limited, and their populations are slow to recover from deleterious impacts (FWS 2012, p. 31).

CONCLUSION

The Endangered Species Act requires that the Service promptly issue an initial finding as to whether this petition "presents substantial scientific or commercial information indicating that the petitioned action may be warranted." 16 U.S.C. § 1533(b)(3)(A). There is no question that under the five listing factors of the Act, protecting the Northern Rockies Fisher DPS may be warranted. The fisher is threatened by loss or curtailment of habitat or range, disease and predation, overutilization via incidental trapping, and various other factors including small population size and population isolation, poisoning, road-kill mortality, and trapping in manmade structures. There are no existing regulatory mechanisms which are adequate to protect the fisher. For the Northern Rockies fisher to have the best chance at recovery, it should be promptly protected under the Act with designated critical habitat.

REQUEST FOR CRITICAL HABITAT DESIGNATION

Petitioners urge the Service to designate critical habitat for the Northern Rockies Fisher DPS concurrently with its listing. Critical habitat as defined by Section 3 of the ESA as:

(i) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the provisions of section 1533 of this title, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) the specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 1533 of this title, upon a determination by the Secretary that such areas are essential for the conservation of the species. 16 U.S.C. § 1532(5).

Congress recognized that the protection of habitat is essential to the recovery of listed species, stating that: classifying a species as endangered or threatened is only the first step in insuring its survival. Of equal or more importance is the determination of the habitat necessary for that species' continued existence… If the protection of endangered and threatened species depends in large measure on the preservation of the species' habitat, then the ultimate effectiveness of the Endangered Species Act will depend on the designation of critical habitat. H. Rep. No. 94-887 at 3 (1976).

Critical habitat is an effective and important component of the ESA, without which the fisher's chance for recovery diminishes. Species with critical habitat are twice more likely to recover than species that lack designated critical habitat (Taylor et al. 2005). Petitioners thus request that the Service designate critical habitat for fishers in the Northern Rockies.

On behalf of all parties,

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