DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS-R6-ES-2010-0017]

[MO 92210-0-0008]

Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List a Distinct Population Segment of the Fisher in Its United States Northern Rocky Mountain Range as Endangered or Threatened with Critical Habitat

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of 12-month petition finding.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce a 12-month finding on a petition to list a distinct population segment (DPS) of the fisher (*Martes pennanti*) in its U.S. Northern Rocky Mountain range, including portions of Montana, Idaho, and Wyoming, as endangered or threatened and designate critical habitat under the Endangered Species Act of 1973, as amended (Act). After review of all available

scientific and commercial information, we find that listing the fisher in the U.S. Northern Rocky Mountains as threatened or endangered is not warranted at this time.

DATES: The finding announced in this document was made on [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: This finding is available on the Internet at *http://www.regulations.gov* at Docket Number FWS-R6-ES-2010-0017. Supporting documentation we used in preparing this finding is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Montana Field Office, 585 Shepard Way, Helena, MT 59601; telephone (406) 449-5225. We ask the public to submit any new information that becomes available concerning the status of, or threats to, the fisher, in addition to new information, materials, comments, or questions concerning this finding, to the above address. No information will be accepted by facsimile. The petition finding, related **Federal Register** notices, and other pertinent information, may be obtained online at *http://www.fws.gov/mountain-prairie/species/mammals/fisher/*.

FOR FURTHER INFORMATION CONTACT: Mark Wilson, Field Supervisor, Montana Ecological Services Field Office (see **ADDRESSES**); or by telephone at (406) 449-5225. If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at (800) 877-8339.

SUPPLEMENTARY INFORMATION:

Background

Section 4(b)(3)(B) of the Act (16 U.S.C. 1531 *et seq.*) requires that, for any petition to revise the Federal Lists of Endangered and Threatened Wildlife and Plants that contains substantial scientific and commercial information that listing may be warranted, we make a finding within 12 months of the date of our receipt of the petition. In this finding, we will determine that the petitioned action is: (a) Not warranted, (b) warranted, or (c) warranted, but the immediate proposal of a regulation implementing the petitioned action is precluded by other pending proposals to determine whether species are threatened or endangered, and expeditious progress is being made to add or remove qualified species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Section 4(b)(3)(C) of the Act requires that we treat a petition for which the requested action is found to be warranted but precluded as though resubmitted on the date of such finding, requiring a subsequent finding be made within 12 months. We must publish these 12-month findings in the **Federal Register**.

Previous Federal Actions

U.S. Northern Rocky Mountains

On March 6, 2009, we received a petition dated February 24, 2009, from the

Defenders of Wildlife, Center for Biological Diversity, Friends of the Bitterroot, and Friends of the Clearwater (petitioners) requesting that the fisher in the Northern Rocky Mountains of the United States (USNRMs) be considered a DPS and listed as endangered or threatened, and critical habitat be designated under the Act (Defenders of Wildlife *et al.* 2009, entire). In an April 9, 2009, letter to the petitioners, we responded that we had reviewed the information presented in the petition and determined that issuing an emergency regulation temporarily listing the species under section 4(b)(7) of the Act was not warranted (Guertin 2009, entire). We informed the petitioners that due to staffing and funding constraints in Fiscal Year 2009, we would not be able to further address the petition at that time, but would complete the action when resources allowed. We published a 90-day finding on April 16, 2010, stating that the petition presented substantial information that listing a DPS of fisher in the USNRMs may be warranted, and initiated a status review of the species (75 FR 19925). The notice of a 90-day finding and commencement of a 12-month status review for the USNRMs DPS was published in the annual Candidate Notice of Review on November 10, 2010 (75 FR 69222).

Fishers in the USNRMs were previously petitioned for listing with a U.S. Pacific States' population in 1994 (see below).

U.S. Pacific States

On June 5, 1990, we received a petition dated May 29, 1990, from Mr. Eric Beckwitt, Forest Issues Task Force, Sierra Biodiversity Project, and others requesting that the Pacific fisher (*Martes pennanti pacifica*) be listed as an endangered species in California, Oregon, and Washington under the Act. On January 11, 1991, we published a 90-day finding (56 FR 1159) indicating that the fisher in the Pacific States is a distinct population that is geographically isolated from populations in the Rocky Mountains and British Columbia and represents a listable entity under the Act. The finding also indicated that the petition had not presented substantial information indicating that a listing may be warranted because of a lack of information on fisher habitat needs, population size and trends, and demographic parameters (56 FR 1159).

On December 29, 1994, we received a petition dated December 22, 1994, from the Biodiversity Legal Foundation requesting that two fisher populations in the western United States, including the States of Washington, Oregon, California, Idaho, Montana, and Wyoming, be listed as threatened under the Act. Based on our review, we found that the petition did not present substantial information indicating that listing the two western United States fisher populations as a DPS was warranted (61 FR 8016, March 1, 1996). The best available scientific evidence at that time indicated that the range of the fisher was contiguous across Canada with some areas having abundant populations, and through southward peninsular extensions, was contiguous with the U.S. Rocky Mountain and Pacific populations (61 FR 8016). No evidence was presented in the petition to support physical, physiological, ecological, or behavioral separations (61 FR 8016).

On December 5, 2000, we received a petition dated November 28, 2000, from 12 organizations, with the lead organizations identified as the Center for Biological

Diversity and the Sierra Nevada Forest Protection Campaign, requesting that the West Coast DPS of the fisher, including portions of California, Oregon, and Washington, be listed as endangered and critical habitat be designated under the Act. A court order was issued on April 4, 2003, by the U.S. District Court, Northern District of California, that required the Service to submit for publication in the **Federal Register** a 90-day finding on the 2000 petition (*Center for Biological Diversity, et al.* v. *Norton et al., No. C 01—2950 SC*). On July 10, 2003, we published a 90-day petition finding that the petition provided substantial information that listing may be warranted and initiated a 12-month status review (68 FR 41169).

On April 8, 2004, we published a warranted 12-month finding for listing of the fisher's West Coast DPS (69 FR 18770). A listing action was precluded by higher priorities and the West Coast DPS was added to our candidate species list. On April 8, 2010, the Center for Biological Diversity, Sierra Forest Legacy, Environmental Protection Information Center, and Klamath-Siskiyou Wildlands Center filed a complaint in the United States District Court for the Northern District of California seeking an order for the Service to withdraw the 2004 warranted-but-precluded finding and proceed with a proposed rule to list the species under the Act (*Center for Biological Diversity, et al.* v. *Salazar, et al., No. CV 10—1501*). A resolution of the complaint is pending.

The West Coast fisher was included in the Service's candidate notices of review in 2005, 2006, 2007, 2008, 2009, and 2010 (70 FR 24870, May 11, 2005; 71 FR 53756, September 12, 2006; 72 FR 69034, December 6, 2007; 73 FR 75176, December 10, 2008; 74 FR 57804, November 9, 2009; 75 FR 69222, November 10, 2010).

Species Information

This "Species Information" section concentrates on general biology and fisher studies conducted in the USNRMs area. Additional information regarding fisher biology in the western portion of its range can be found in the Service's 12-month finding on a petition to list the West Coast DPS of the fisher (69 FR 18770).

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 USNRMs (Sauder 2010 unpublished data; Schwartz 2010 unpublished data); 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 of Pennant," or *Mustela pennantii*, was formally described by Erxleben in 1777, based on accounts of the same specimen from either the eastern United States or eastern Canada by Buffon in 1765 and the naturalist Thomas Pennant in 1771 (Rhoads 1898 as cited in Goldman 1935, p. 177; Powell 1981, p. 1). Taxonomic stability was not attained until 80 years after Buffon's original description, when taxonomists transferred the fisher to the genus *Marte*s and changed the spelling of the species to *pennanti* (Hagmeier 1959, p. 185; Powell 1981, p. 1; Powell 1993, pp. 11–12).

The fisher is classified in the order Carnivora, family Mustelidae, a family that also includes weasels, mink, martens, and otters (Anderson 1994, p. 14). It is the largest member of the genus *Martes*, classified as subgenus *Pekania*, and occurs only in North America (Anderson 1994, pp. 22–23). Its geographic range overlaps extensively with that of the American marten (*Martes americana* - subgenus *Martes*), the only other *Martes* species in North America (Gibilisco 1994, p. 59). Characteristic of the subgenus *Pekania* is large body size compared with other *Martes* and the presence of an external median rootlet on the upper carnassial (fourth) premolar (Anderson 1994, p. 21).

Goldman (1935, p. 177) recognized three subspecies of fisher based on differences in skull dimensions, although he stated they were difficult to distinguish: (1) *Martes pennanti pennanti* in the east and central regions; (2) *M. p. columbiana* in the central and northwestern regions that include the USNRMs; and (3) *M. p. pacifica* in the western coast States of the United States. A subsequent analysis questioned whether there is a sufficient basis to support recognition of different subspecies based on numerous factors, including the small number of samples available for examination (Hagmeier 1959, p. 193). Regional variation in characteristics used by Goldman to discriminate subspecies appears to be clinal (varying along a geographic gradient), and the use of clinal variations is "exceedingly difficult to categorize subspecies" (Hagmeier 1959, pp. 192–193). Although subspecies taxonomy as described by Goldman (1935, p. 177) is often used in literature to describe or reference fisher populations in different regions of its range, and recent consideration of genetic variation indicates patterns of population subdivision similar to the earlier described subspecies (Kyle *et al.* 2001, p. 2345; Drew *et al.* 2003, p. 59), it is not clear whether Goldman's designations of subspecies are taxonomically valid. Therefore, for the purposes of this finding, we are evaluating the fisher in the USNRMs as a DPS of a full species (i.e., *M. pennanti*).

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 (*Odocoileus* spp.) carrion (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 10 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 2 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 10 months after copulation; active gestation is estimated to be between 30 and 60 days; and birth occurs nearly 1 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). Newborn kits are entirely dependent and may nurse for 10 weeks or more after birth (Powell 1993, p. 67). Kits develop their own home ranges by 1 year of age (Powell *et al.* 2003, p. 640). Populations of fisher fluctuate in size, and reproductive rates may vary widely from year to year in response to the availability of prey (Powell and Zielinski 1994, p. 43).

An animal's home range is the area traversed by the individual in its normal activities of food gathering, mating, and caring for young (Burt 1943, p. 351). Only general comparisons of fishers' home range sizes can be made, because studies across the range have been conducted by different methods. Generally, fishers have large home ranges, male home ranges are larger than females, and 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). 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). 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 maintained their home ranges during the breeding season were more likely to successfully mate than were nonresident males encroaching on an established range (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 range (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 suboptimal 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, which improves the chance of successful recruitment (Aubry *et al.* 2004, p. 215).

Habitat

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 (reviewed by 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); an abundance of coarse woody debris, boulders, shrub cover, or subterranean lava tubes 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).

Forest succession is a dynamic continuum that begins with an event such as wildfire, windthrow (areas of downed trees due to high winds) or timber harvest that removes or alters major components of an environment. Over time the affected environment experiences a series of changes or seral stages in vegetation species and structure. In the absence of disturbance and over many decades to hundreds of years depending on the forest type, mature or late-seral structure and species composition may result. Late-seral forests (also known as old-growth) are generally characterized by more diversity of structure and function than younger developmental stages. Specific characteristics of late-seral forests vary by region, forest type, and local conditions. 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). Other forest successional stages may suffice if adequate cover and structure is provided. For example, extensive, mid-mature, second growth forests are used by fishers in the Northeast and Midwest United States (Coulter 1966, pp. 59–60; Arthur *et al.* 1989b, pp. 680–683; Powell 1993, p. 92).

To what extent late successional forests are required to support fisher may be dependent on scale (Powell *et al.* 2003, p. 641). 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). Within areas of low and mid-elevation forests, the most consistent predictor of fisher occurrence at larger spatial scales is moderate to high levels of contiguous canopy cover rather than any particular forest plant community (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). In north-central Idaho, mature to old-growth mesic forests of grand and subalpine fir in close proximity to riparian areas are used extensively (Jones 1991, pp. 90, 113; Jones and Garton 1994, p. 381); fishers in this study avoided forests with less than 40 percent crown cover and drier upland sites composed of *Abies grandis* (grand fir), *Abies lasiocarpa* (subalpine fir), *Pseudotsuga menziesii* (Douglas fir), and *Pinus ponderosa* (ponderosa pine) (Jones 1991, p. 90). A preliminary analysis of habitat associations in the USNRMs indicates that in summer, fishers select areas with larger diameter trees and landscapes with a higher proportion of large trees, and avoid dry areas typically populated by ponderosa pine (Schwartz 2010, unpublished data). Winter detections of fisher are more likely in drainages with a high amount of canopy cover, and winter avoidance of dry areas is similar to summer (Schwartz 2010, unpublished data). Fishers in Idaho include forested environments of differing configurations in their home range including roadless areas, industrial forest, and national forests managed for multiple uses (Albrecht and Heusser 2009, p. 19; IOSC 2010, p. 4).

The physical structure of the forest and prey associated with forest structures are thought to be critical features that explain fisher habitat use, rather than specific forest types (Buskirk and Powell 1994, p. 286), and the composition of individual fisher home ranges is usually a mosaic of different forested environments and successional stages (reviewed by Lofroth *et al.* 2010, p. 94). Further, fishers are opportunistic predators with a relatively general diet, and the vulnerability of prey may be more important to the use of an area for foraging than the abundance of a particular prey species (Powell and Zielinski 1994, p. 54). In north-central Idaho, 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).

Fishers are more selective of habitat for resting than they are about foraging or traveling habitat (Arthur *et al.* 1989b, p. 686; Powell and Zielinski 1994, p. 54; Powell 1994, p. 353). 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). Rest sites may be selected for their insulating or thermoregulatory qualities and their effectiveness at providing protection from predators (Weir *et al.* 2004, pp. 193–194). 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). Because of this selectivity for mature forest type or structure, resting and denning sites may be more limiting to fisher distribution than foraging habitats, and should receive particular consideration in managing habitat for fishers (Powell and Zielinski 1994, pp.

56–57).

Cavities and branches in trees, snags, stumps, rock piles, and downed timber are used as resting sites, and cavities in large-diameter live or dead trees are selected more often for natal and maternal dens (Powell and Zielinski 1994, pp. 47, 56). Fishers do not appear to excavate their own natal or maternal dens; therefore, other factors (i.e., heartwood decay of trees, excavation by woodpeckers, broken branches, frost or fire scars) are important in creating cavities and narrow entrance holes (Lofroth *et al.* 2010, p. 112). The tree species may vary from region to region based on local influences. In regions where both hardwood and conifers occur, hardwoods are selected more often, although they may be a minor component of the area (Lofroth *et al.* 2010, p. 115). Den trees tend to be older and larger in diameter than other available trees in the vicinity (reviewed by Lofroth *et al.* 2010, pp. 115, 117). Little is known of natal or maternal den use or selection in the USNRMs. A habitat study conducted in north-central Idaho found no kits or evidence of denning (Jones 1991, p. 83). A female introduced into Montana's Cabinet Mountains used a downed hollow log for a natal den only months after release, and it is likely that this suboptimal site was selected only because of the female's unfamiliarity with the area (Roy 1991, p. 56).

Snow conditions and ambient temperatures may affect fisher activity and habitat use. Fishers in eastern parts of the taxon's range may be less active during winter and avoid areas where deep, soft snow inhibits movement (Leonard 1980, pp. 108–109; Raine 1981, p. 74). Historical and current fisher distributions in California and Washington are consistent with forested areas that receive low or lower relative snowfall (Krohn *et al.* 1997, p. 226; Aubry and Houston 1992, p. 75). Fishers in Ontario, Canada, moved from low-snow areas to high-snow areas during population increases, indicating a possible density-dependent migration to less suitable habitats factored by snow conditions (Carr *et al.* 2007, p. 633). These distribution and activity patterns suggest that the presence of fisher and their populations may be limited by deep snowfall. However, the reaction to snow conditions appears to be variable across the range, with fishers in some locations not affected by snow conditions or increasing their activity with fresh snowfall (Jones 1991, p. 94; Roy 1991, p. 53; Weir and Corbould 2007, p. 1512). Thus, fishers' reaction to snow may be dependent on a myriad of factors, including, but not limited to, local freeze-thaw cycles, the rapidity of crust formation, snow interception by the forest canopy, and prey availability (Krohn *et al.* 1997, p. 226; Mote *et al.* 2005, p. 44; Weir and Corbould 2007, p. 1512).

Historical Distribution Across the Range of the Species

Fishers occur only in North America, appearing in the fossil record approximately 30,000 years ago in the eastern United States throughout the Appalachian Mountains, south to Georgia, Alabama, and Arkansas, and west to Ohio and Missouri (Anderson 1994, p. 18). No fossil evidence of a fisher range expansion to the north or west exists until the middle Holocene (4,000 to 8,000 years ago) in southern Wisconsin, and only within the past 4,000 years is there evidence that fishers inhabited northwestern North America (Graham and Graham 1994, pp. 46, 58). Although there is limited fossil evidence available from central Canada, fishers' expansion westward and northward likely coincided with glacier retreat and the subsequent development of the boreal spruce forests (Graham and Graham 1994, p. 58). Fossil remains of early fisher in the northwest have been found in British Columbia, Washington, and Oregon, and no fossil remains have been discovered in the USNRMs region (Graham and Graham 1994, pp. 50–55).

Our present understanding of the historical (before European settlement) distribution of fishers is based on the accounts of natural historians of the early 20th century and general assumptions of what constitutes fisher habitat. The presumed fisher range prior to European settlement of North America (c. 1600) 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 (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).

The distribution of fishers has been described by numerous authors, and the distribution boundaries vary depending on the evidence used for occurrences. The presumed presence of fishers has been drawn along the lines of forest distribution, and the species has been consistently described as an associate of boreal forest in Canada, mixed deciduous-evergreen forests in eastern North America, and coniferous forest ecosystems in the west (Lofroth *et al.* 2010, p. 39). Subsequently, range maps of historical distribution typically portray large areas of continuous occurrence, although it is likely that the suitability of habitat to support fishers within the portrayed range varied over time and spatial scales, subject to climatic variation, large-scale disturbances, and other ecological factors (Giblisco 1994, p. 70; Graham and Graham 1994, pp. 57–58). Fishers do not occur in all forested habitats today, and evidence would indicate they did not occupy all forest types in the past (Graham and Graham 1994, p. 58). Based on the contemporaneous assemblages of fossilized remains, it is likely that habitat selection by fishers has historically been influenced by the availability of specific types of prey (Graham and Graham 1994, p. 58).

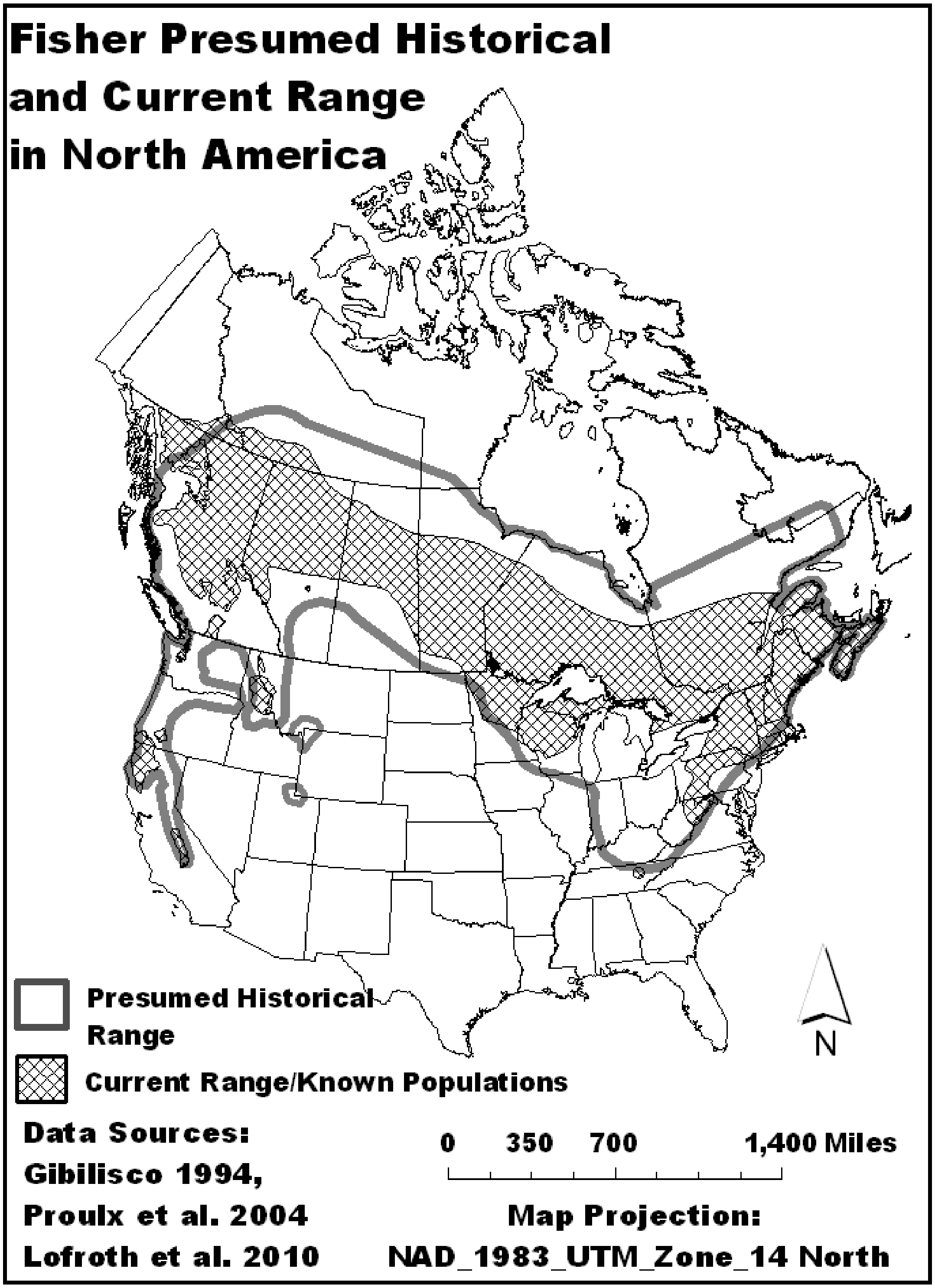

Figure 1. Presumed Historical Distribution (circa 1600) and Current Distribution and Known Populations of the Fisher (*Martes pennanti*) (data compiled from Gibilisco 1994; Proulx *et al.* 2004; and Lofroth *et al.* 2010).

Post-European Settlement Distribution Across the Range of the Species

In the late 1800s and early 1900s, fishers experienced reductions in range, decreases in population numbers, and local extirpations attributed to overtrapping, predator control, or habitat destruction in the United States, including the USNRMs, and to a lesser extent in Canada (Weckwerth and Wright 1968, p. 977; Brander and Books 1973, p. 53; Douglas and Strickland 1987, p. 512; Powell and Zielinski 1994, p. 39). Since the 1950s, fishers have recovered in some of the central (Minnesota, Wisconsin, Michigan) and eastern (Northeastern States and West Virginia) portions of their historical range in the United States as a result of trapping closures and regulations, habitat regrowth, and reintroductions (Brander and Books 1973, pp. 53–54; Powell 1993, p. 80; Gibilisco 1994, p. 61; Lewis and Stinson 1998, p. 3; Proulx *et al.* 2004, pp. 55–57; Kontos and Bologna 2008, entire). Fishers have not returned to the areas south of the Great Lakes to the southern Appalachian States (Proulx *et al*. 2004, p. 57). The historical, early European settlement, and contemporary distribution of fishers in the USNRMs is discussed in detail in the following sections.

Current Distribution Outside of the U.S. Northern Rocky Mountains

Presently, fishers are found in all Canadian provinces and territories except Newfoundland and Prince Edward Island (Proulx *et al.* 2004, p. 55) (Figure 1). The fisher range in Quebec, Ontario, and eastern Manitoba is contiguous with currently occupied areas in New England, northern Atlantic States, Minnesota, Wisconsin, and the

Upper Peninsula of Michigan in the United States (Proulx *et al*. 2004, pp. 55–57). In Saskatchewan and Alberta, fishers are found primarily north of 52 degrees and 54 degrees north latitude, respectively, and form no known breeding population with the United States (Proulx *et al.* 2004, p. 58). In Alberta, trapping data indicate that a rare fisher may occur to the south of high-density population areas to approximately 32 km (20 mi) north of the United States border along the Continental Divide near Waterton Lakes National Park, (Corrigan 2010, pers. comm.; Hale 2010, pers. comm.) – an area contiguous with the USNRMs. However, there is no indication that there is a population of fisher in southern Alberta or whether the source of the occasional rare fisher detected there is the distant fisher population of central Alberta, central British Columbia, or the USNRMs. Fishers occupy low-to mid-elevation forested areas throughout British Columbia, but are rare or absent from the coast and from the southern region for at least 200 km (125 mi) to the border with the United States (Weir *et al.* 2003, p. 25; Weir and Lara Almuedo 2010, p. 36).

After reviewing known distribution records for fishers in 1956, Hagmeier (p. 156) noted that there were no known records from southeastern British Columbia, which includes the Rocky Mountains in the eastern Kootenay Region contiguous with northern Idaho and northwest Montana. A reintroduction of fishers to the Kootenay Region of southeast British Columbia, an area just north of the USNRMs, was attempted in the 1990s (Fontana *et al.* 1999, entire), but “the observed survival rate of translocated adults and the few cases of confirmed reproduction in the area were not likely sufficient for the population to expand and become self-sustaining” (Weir *et al.* 2003, p. 25). The South

Thompson Similkameen area of south-central British Columbia, bordering north-central Washington, produced 88 legally harvested fishers between 1928 and 2007, and 13 since 1985 (Lofroth *et al*. 2010, p. 48). Because the northern boundary of the South Thompson Similkameen is considered the southern extent of the fisher population distribution in the province (Weir and Lara Almuedo 2010, p. 36), the significance of the trapping data to fisher distribution is not clear without more specific location information. Harvest data could indicate that individuals were captured at the periphery of larger, established populations, that there is a low-density population in south-central British Columbia, or that individuals represent transient or extralimital (outside an established population area) records.

In the western United States outside of the USNRMs, fishers occur in a few disjunct and relatively small areas of their former range in the Cascade Mountains of southwest Oregon, the Klamath and Coastal Ranges of southwest Oregon and northwest California, and the Southern Sierra Nevada Mountains in east-central California (Proulx *et al*. 2004; Lofroth *et al.* 2010, pp. 47–49). A reintroduction program is underway on the Olympic Peninsula of Washington State, and the program's objective of establishing a self-sustainable population of fisher has yet to be achieved (Lewis *et al.* 2009, p. 3).

Historical Distribution and Early European Settlement Distribution in the U.S. Northern Rocky Mountains

Presumed historical distribution of fishers in the USNRMs is 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) (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). The representation of historical fisher distribution in the USNRMs by the sources above should be viewed cautiously, because it is based on limited information and records collected in the late 1800s to mid-1900s (Hagmeier 1956, pp. 154, 156, 161, 163; Hall 1981, p. 985) after European settlement had influence in the area. In addition, as stated previously, fishers have been consistently described as associates of coniferous forest ecosystems in the west, and the presumed historical presence of fishers was drawn along the lines of forest distribution, with little physical evidence of whether fishers occupied those habitats.

Montana

No reliable records are available for Montana, and historical and early settlement distribution in the western forested areas of the State was assumed based on the reports of the presence of fishers in northwest Wyoming and central Idaho (Hagmeier 1956, p. 156).

Vinkey (2003, pp. 44–69) investigated fisher records in the Rocky Mountains, concentrating on Montana, to determine the fisher distribution post-settlement and prior to their apparent disappearance in the 1920s (Newby and McDougal 1964, p. 487; Weckworth and Wright 1968, p. 977). The first reference to fisher in Montana was a shipping record of pelts from Fort Benton in 1875 (Vinkey 2003, p. 49). Although shipping records are not definitive of the product origin, it is likely some of the fisher pelts were of Montana origin because of Montana's prominence in the fur trade and Fort Benton's location at the upper reaches of the Missouri River (Vinkey 2003, p. 49).

Reports of fishers in Montana's Glacier National Park in the early 1900s were dismissed as "unreliable" and "unauthentic" by Newby (cited in Hagmeier 1956, p. 156); nevertheless, these records have been cited by other authors, in addition to reports from early trappers, to support a distribution of fishers in Montana as far south as Wyoming (Hoffman *et al.* 1969, p. 596; Vinkey 2003, p. 50). Hoffman *et al.* (1969, p. 596) interpreted the lack of reliable records as an indication of the fisher's extirpation in Montana and adjacent areas before any specimens could be preserved. Thus, in Montana, the presumed occurrence of fishers before translocations occurred in 1959 is based on trapper accounts alone (Weckworth and Wright 1968, p. 977; Hoffman *et al.* 1969, p. 596).

Idaho

The historical presence of fisher in Idaho was 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). Only two fisher specimens document the presence of fishers in the USNRMs prior to their presumed extirpation in the 1920s (Williams 1963, p. 9). Both specimens originated in Idaho. The above-mentioned 1890 specimen from Alturas Lake, Blaine County, in central Idaho is housed in the collection of the National Museum of Natural History in Washington, D.C., and this specimen has been pivotal for supporting historical distribution and post-settlement representation, and for suggesting that an indigenous population has survived since the 1920s in the USNRMs (Hagmeier 1956, p. 154; Hall 1981, p. 985; Drew *et al.* 2003, pp. 59, 62; Vinkey *et al.* 2006, p. 269). An 1896 Harvard Museum specimen collected in Idaho County in north-central Idaho west of the Bitterroot Divide, which separates Idaho and Montana, further supports the extent of fisher distribution in the late 1800s, and supports a close ecological connection between north-central Idaho and west-central Montana (Vinkey *et al.* 2006, p. 269; Schwartz 2007, pp. 923–924).

Wyoming and Utah

The first reported fisher capture in Wyoming 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). The pelt of a poached fisher was confiscated in Yellowstone National Park in the 1890s, but it is not clear where the animal was captured originally (Skinner 1927, p. 194; Buskirk 1999, p. 169). 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). As early as the 1920s the fisher was considered rare or absent from Yellowstone National Park (Skinner 1927, p. 180). The inclusion of Utah in the historical range of the fisher was based solely on photographs of tracks taken in 1938 (Hagmeier 1956, p. 161).

Location of Restocking Efforts in the U.S. Northern Rocky Mountains

By 1930, fishers were thought to be extirpated from the USNRMs in Montana and Idaho as they were in other parts of the United States (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).

Contemporary Distribution in the U.S. Northern Rocky Mountains

The use of unreliable records to support distribution and population extent has led to overestimation of other species' ranges (Aubry and Lewis 2003, p. 86; McKelvey *et al.* 2008, p. 550). Mindful of that, we have used the most reliable and verified data in this analysis of the fisher in the USNRMs. We base the contemporary (1960 to present) record of fisher distribution in the USNRMs on verifiable or documented records of physical evidence such as legal harvest or incidentally captured specimens, animals captured for scientific study, genetic analysis of biological samples, and photographs identified by a knowledgeable expert. Eyewitness accounts of a fisher itself, or its sign, by the general public or untrained observer also may be found in agency databases (IOSC 2010, p. 5–6); however, a correct identification of fisher or its sign can be difficult by an untrained observer and these unverified records or anecdotal reports should be viewed cautiously (Aubry and Lewis 2003, p. 81; Vinkey 2003, p. 59; McKelvey *et al.* 2008, p. 551). Other animals that are similar in appearance and share similar habitats, such as the American marten, mink (*Mustela vison*), or domestic cat (*Felis catus*), may be mistaken for fishers (Aubry and Lewis 2003, p. 82; Lofroth *et al.* 2010, p.11; Kays 2011, p. 1). Animal signs, such as tracks, can be significantly altered by environmental conditions, and fisher tracks can be confused with those of the more common American marten (Vinkey 2003, p. 59; Giddings 2010, pers. comm.).

Montana and Idaho

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 2010, 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). Fisher detections (species identification) and genetic analyses to identify individual fishers have been provided to us as they become available (Albrecht 2010, unpublished data); the results of some targeted fisher surveys are pending (IOSC 2010, p. 10). Harvest specimens and targeted studies provide confident identification of fishers, but may not represent the full extent of fisher distribution due to biases of trapper effort, site accessibility, nonrandom site selection to increase the efficacy of detection, or a lack of either survey or trapping exposure (Vinkey 2003, p. 59; Schwartz *et al.* 2007, p. 6; Albrecht and Heusser 2009, p. 19).

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) (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.

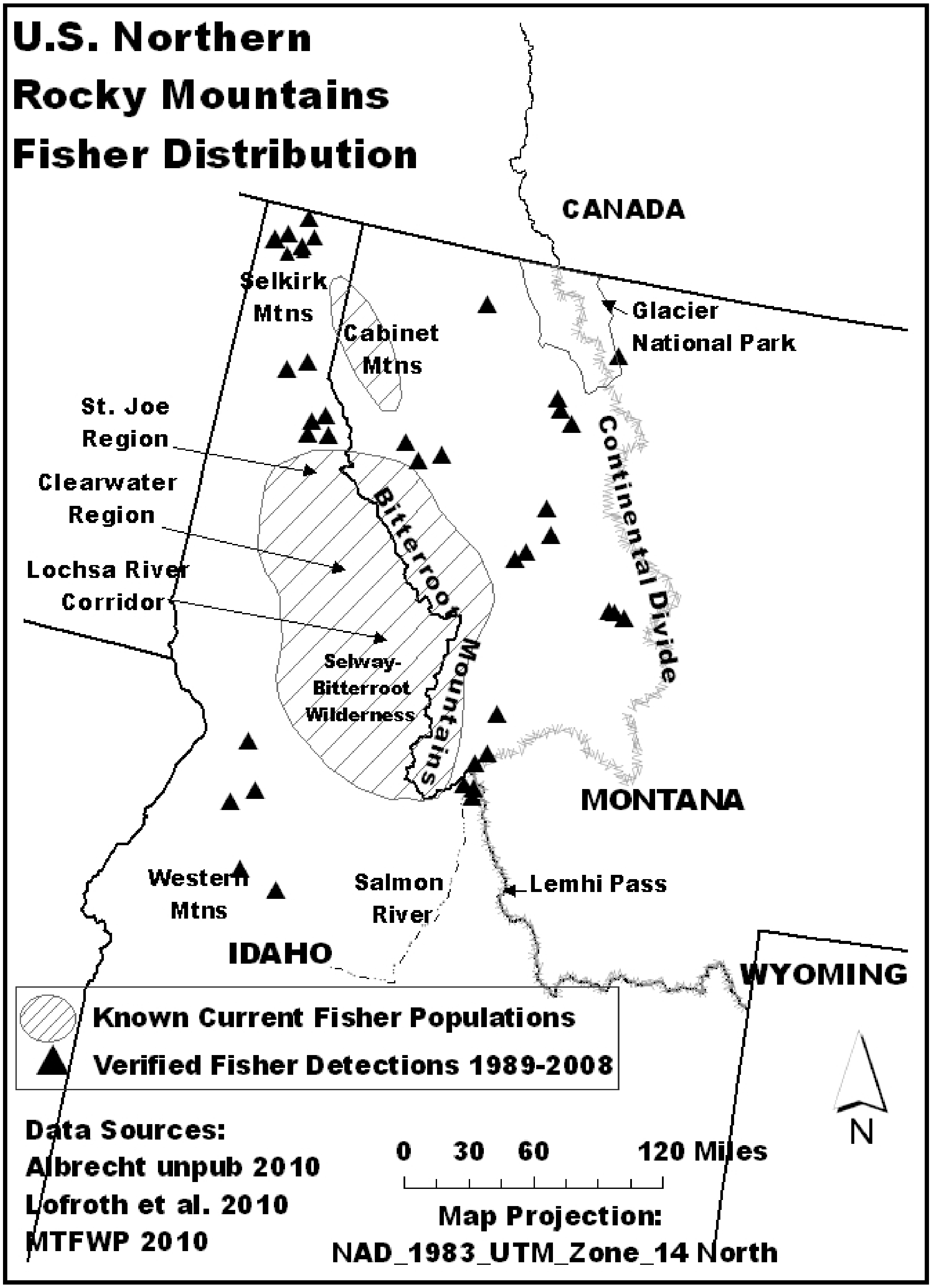

Figure 2. Current Distribution and Known Populations of the Fisher (*Martes pennanti*) (data compiled from Albrecht 2010, unpublished data; Lofroth *et al.* 2010; MTFWP 2010).

Wyoming and Utah

The contemporary distribution of fisher in Wyoming 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). A photograph of an animal near Yellowstone National Park described as a fisher was featured in a popular publication in 1995 (Gehman, p. 2), but to date there has been no professional or expert verification that the photographed animal is indeed a fisher. Carnivore detection surveys were conducted in the Gallatin National Forest in the northern Greater Yellowstone Ecosystem between 1997 and 2000, using camera stations, hair-snares, and snow track transects; the surveyors reported fisher tracks in snow in the Gallatin and Madison Ranges of southern Montana (Gehman and Robinson 2000, p. 7). These records are considered unverified, because the use of sighting and track measurements alone are dependent on the observer's level of skill, snow and weather conditions, and "notoriously unreliable" (Vinkey 2003, p. 59).

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. One specimen was described from Ucross, Wyoming, in 1965 (Hall 1981, p. 985) over 217 km (135 mi) east of the Beartooth Plateau and Yellowstone National Park, but most of that distance is open grassland or sagebrush, which is unsuitable for fisher. 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. Recently, fishers are described as “accidental” or “rare” in Wyoming with assumed breeding or records of breeding in the northwest part of the State (Orabona *et al.* 2009, p. 152; Wyoming Fish and Game Department 2010, p. IV-2-26). However, the statement of fisher breeding in Wyoming is unsubstantiated and apparently made in error, (Oakleaf 2010, pers. comm.). The fisher is considered extirpated in Utah (Biotics Database 2005, pp. 1–2).

Summary of Contemporary Distribution of Fisher in the U.S. Northern Rocky Mountains

Based on the available verified specimen data, contemporary fisher distribution in western Montana and Idaho (Figure 2) covers an area similar to that depicted in the historical distribution synthesized by Gibilisco in 1994 (p. 64) (Figure 1). The contemporary distribution of fishers includes forested areas of western Montana and north-central to northern Idaho, and the boundary is further described in the “Distinct Vertebrate Population Segment” section of the finding. Based on a lack of verified records or documentation, we cannot conclude that the fisher is present, or if a breeding population was ever present, in Wyoming, including the Greater Yellowstone Ecosystem, which includes parts of south-central Montana, northwest Wyoming, and south-east Idaho.

Distribution Based on Genetic Characteristics

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. We discuss the genetic differences due to this the native legacy and its significance to the fisher taxon in the "Significance" section of the DPS analysis later in this document.

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). 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 USNRMs 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). 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).

An assessment of the degree of hybridization between native and introduced individuals is difficult based on the assessment techniques. Analysis of genetic identity is conducted on mitochondrial DNA, which only reflects the genetic contribution of the mother (Forbes and Alledorf 1991, p. 1346; Vinkey 2003, p. 82). Males could make a greater contribution to distant populations based on their larger home range sizes and expanded wanderings during the breeding period (Arthur 1989a, p. 677; Jones 1991, pp. 7–78), but based on mitochondrial DNA analysis alone, this contribution would not be detected.

Population Status

Estimates of fisher abundance and vital rates are difficult to obtain and often based on harvest records, trapper questionnaires, and tracking information (Douglas and

Strickland 1987, p. 522), and recent information is limited. Habitat modeling and behavioral or other natural history characteristics (e.g., home range sizes) also are used to estimate population sizes over a geographic area (Lofroth 2004, pp. 19–20; Lofroth *et al.* 2010, p. 50). Fisher densities over areas of suitable habitat have been reported, but there are no total or comprehensive population sizes for the fisher in the eastern United States or Canada. In the western range, fisher populations have been estimated using habitat models and home range sizes. Late winter populations in British Columbia range from 1,403 to 3,715 individuals (Lofroth 2004, p. 20). In the Southern Sierra Nevada Mountains, the fisher population is estimated between 160 to 598 individuals depending on the methods used, and an estimated 4,616 fishers inhabit the Southwest Oregon/Northern California area (reviewed by Lofroth *et al.* 2010, p. 50).

As previously noted, fishers in the USNRMs have increased in number and distribution since their perceived extirpation in the 1920s. However, little is known of the population numbers, trends, or vital rates of fishers in the USNRMs today. Preliminary work 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 (Schwartz *et al.* 2007, pp. 1–2). An evaluation of the translocation effort in the Cabinet Mountains of northwest Montana between 2001 and 2003 yielded only 4 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) (Figure 2). Based on genetic similarities, fishers in the Selkirk Mountains of northern Idaho, just south of the Canadian border, 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 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). 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). 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). 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) (Figure 2). We have no additional information on the Lochsa River or Clearwater surveys to determine if these reports are indicative of comprehensive population numbers. No habitat suitability or capacity model is available for Idaho.

Evaluation of Listable Entities

Under section 3(16) of the Act, we may consider for listing any species, including subspecies, of fish, wildlife, or plants, or any DPS of vertebrate fish or wildlife that interbreeds when mature (16 U.S.C. 1532(16)). Such entities are considered eligible for listing under the Act (and, therefore, are referred to as listable entities), should we determine that they meet the definition of an endangered or threatened species. In this case, the petitioners have requested that the fisher in the USNRMs be considered as a DPS of a full species for listing as endangered or threatened under the Act. We concluded in our 90-day finding on the petition that there is support for a DPS of fisher in the USNRMs (75 FR 19925), and we analyze this possibility further in the following section after reviewing the best available information.

Distinct Vertebrate Population Segment

Under the Service’s DPS policy (61 FR 4722, February 7, 1996), three elements are considered in the decision concerning the establishment and classification of a possible DPS. These are applied similarly for additions to, or removal from, the Federal List of Endangered and Threatened Wildlife. These elements include:

(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, delisting, or reclassification (i.e., is the population segment endangered or threatened).

In evaluating the distribution of fisher and the geographic extent of a possible DPS in the USNRMs, we examined information cited in the petition (Defenders *et al.* 2009, pp. 11–24), published range maps, published works that included historical occurrences, unpublished studies related to fisher distribution, and other data submitted to us subsequent to the request for information published in the 90-day finding for fisher (75 FR 19925). Fisher distribution in the USNRMs and extended area was discussed in detail in the preceding "Distribution" section.

Discreteness

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.

Western Montana and north-central to northern Idaho broadly encompass the area under consideration for a fisher DPS in the USNRMs. The population area includes the contemporary (1960s reintroductions to present) distribution of fisher in the USNRMs and is best circumscribed by geological features and the distribution of habitat known to support fisher. The distribution of fishers in the USNRMs 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, northeast along the Salmon River to the southern Bitterroot Range north of Lemhi Pass in Idaho (Figure 2). The northern geographic extent of the fisher distribution roughly coincides with the border of the United States and Canada at 49 degrees north latitude. The fisher distribution in the USNRMs is the southern extent of the taxon's known range in the Rocky Mountains.

Fishers in the USNRMs are physically or geographically separate from other fisher populations. The range of the fisher in the West Coast Range of Washington, Oregon, and California is separated from the USNRMs by distance, natural physical barriers, including the nonforested high desert areas of the Great Basin in Nevada and eastern Oregon and the Okanogan Valley in eastern Washington, major highways, urban and rural open-canopied areas, and agricultural development (69 FR 18770; Lofroth *et al.* 2010, p. 47). Occupied areas in the USNRMs are 150 to 200 km (93 to 124 mi) from the closest edge of the West Coast fisher DPS abutting the unoccupied Okanogan Valley of Washington (69 FR 18770, Lofroth *et al.* 2010, p. 33). Occupied areas in the USNRMs are approximately 418 km (300 mi) from the closest occupied area of the West Coast DPS in the southern Cascade Mountains of southwest Oregon or the Olympic Peninsula in Washington (National Park Service (NPS) 2009, entire; Lofroth *et al.* 2010, p. 47). 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). Maps of historical and recent fisher distributions show no connection in the contiguous United States between occurrences in the USNRMs and the fisher populations in the Midwest and Great Lakes area, which occur approximately 1,126 km (700 mi) away, across mostly nonforested areas of unsuitable habitat (Hagmeier 1956, p. 151; Douglas and Strickland 1987, p. 313; Gibilisco 1994, p. 64; Proulx *et al.* 2004, p. 57).

There is no indication that a population of fisher exists in a large geographic area of southern Alberta or southern British Columbia in Canada to the north of the USNRMs (see “Distribution” section). Individual fishers have been identified near the international boundary and observed using areas in both Canada and the USNRMs (Fontana *et al.* 1999, p. 19; Albrecht 2010, unpublished data; Giddings, 2010 pers. comm.). We believe that the detections in extreme southern Canada represent wandering individuals, or individuals in the USNRMs whose home ranges include suitable habitat patches coincidental to the border, because the closest concentration of fishers in Canada is over 200 km (125 mi) north of the USNRMs through patchy habitat of low suitability (Weir 2003, p. 14; Weir and Lara Almuedo 2010, p. 36). The lack of suitable habitat in southeastern British Columbia likely contributed to the failure to reestablish a fisher population there in the early 1990s (Fontana *et al.* 1999, p. 1; Weir *et al.* 2003, pp. 24–25).

We have no direct confirmation that fishers are moving between the USNRMs and larger population centers in Canada; however, it is likely there is some interaction between transient individuals from the larger population areas. Reports of transient or juvenile fishers moving linear distances up to 135 km (84 mi) are known from other parts of the fisher's range (Weir and Corbould 2008, p. 48), although shorter distances of up to 107 km (66 mi) are more common (York 1996, p. 55). It is unlikely that transient individuals provide a functional connection between Canada population centers and the USNRMs. Individuals traveling longer distances are subject to a greater risk of mortality, and very few establish the stability of a home range (Weir and Corbould 2008, p. 44) required for successful long-term recruitment. Because the intervening areas appear unable to support resident fishers, and we believe that the only fishers using these areas are transient individuals attempting to move between population centers, we have concluded that the USNRMs fisher population is markedly separate from those to the north.

Summary for Discreteness

We conclude that the fisher in the USNRMs is markedly separated from other populations of the same taxon as a result of physical factors, and thus meets the definition of a discrete population according to the Service's DPS policy. Because the entity meets the first criterion for discreteness (marked physical separation), an evaluation with respect to the second criterion (international boundaries) is not needed.

Significance

If a population segment is considered discrete under one or more of the conditions described in the Service's DPS policy, its biological and ecological significance will be considered in light of Congressional guidance that the authority to list DPSs be used "sparingly" (see Senate Report 151, 96th Congress, 1st Session) while encouraging the conservation of genetic diversity. In making this determination, we consider available scientific evidence of the discrete population segment's importance to the taxon to which it belongs. Since precise circumstances are likely to vary considerably from case to case, the DPS policy does not describe all the classes of information that might be used in determining the biological and ecological importance of a discrete population. However, 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. Furthermore, other information may be used as appropriate to provide evidence for significance. Below we address conditions 1, 2, and 4. Condition 3 does not apply to fishers in the USNRMs because North American fishers are distributed widely within their historical range in Canada and the eastern United States.

Unusual or Unique 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 the western portion of the range (West Coast, western Canada, and the USNRMs) generally inhabit landscapes dominated by conifer forests, whereas fishers live in more dense, lowland forests with higher proportions of deciduous trees in the Northeast and upper Midwest United States and Canada (Allen 1983, pp. 2–3; Arthur *et al.* 1989b, p. 687; Powell 1993, p. 89; Buskirk and Powell 1994, p. 285; Jones and Garton 1994 p. 377; Ricketts *et al*. 1999, pp. 156, 160, 170). Fishers of the West Coast population (Washington, Oregon, and California) inhabit forest environments unusual in comparison to the rest of the taxon, and are unique from other parts of the range based on the unusual forest environment (69 FR 18777). Not only are the forests of the West Coast fishers lacking the broadleaf forest component common in the eastern range, but the coastal climate of wet winters and cool, dry summers produces distinctive forests of sclerophyllic (leathery-leafed) evergreen trees and shrubs found nowhere else in the range (Smith *et al*. 2001 pp. 17–18; 69 FR 18777).

In addition to differences of forest type between the USNRMs and eastern North America and the U.S. West Coast, fishers in the USNRMs occupy forest areas that differ due to influences of climate and precipitation patterns from fisher population areas in western Canada. Forested areas of western Montana and central-to-northern Idaho are temperate, coniferous forests influenced by dramatic elevation gradients that produce several types of vegetation zones (Ricketts *et al.* 1999, pp. 213–214, 250–251; Bailey 2009, p. 89, plate 1). Topographic relief produces localized climate effects which add to the vegetation variability within this region (Ricketts *et al.* 1999, pp. 213–214). Locally variable in predominant tree species or assemblages of species, this temperate zone encompasses the USNRMs extending north along the Continental Divide into southwestern Alberta and southeast British Columbia (Ricketts *et al.* 1999, pp. 213–214).

The northern areas of the USNRMs are heavily influenced by maritime moisture patterns, and in addition to the predominating *Pseudotsuga monziesii*, Pacific tree species such as *Thuja plicata* (western red cedar), *Tsuga heterophylla* (western hemlock) and *Abies grandis* are present (McGrath *et al.* 2002, entire; U.S. Forest Service (USFS) 2009, p. 1). Severe winters with heavy snowfall are usual and summers are usually dry; precipitation is highly variable within the zone averaging between 510 to 1,020 mm (20 to 40 in.) per year primarily falling as snow in fall, winter, and spring (USFS 2009, p. 1). In the southern part of the USNRMs, maritime conditions decrease along latitudinal and altitudinal clines in the mountains of central Idaho and the Bitterroot Range in west-central and southwest Montana (McGrath *et al.* 2002, entire). *A. grandis, P. monziesii,* and western spruce/fir forests, *Larix* spp. (larch), *Pinus ponderosa* and *Pinus contorta* (lodgepole pine) characterize the mountain forests of the Idaho Batholith (Ricketts *et al.* 1999, p. 250; McGrath *et al.* 2002, entire). Hardwood trees, selected for fisher denning in other parts of the range, are not significant parts of the landscape in the USNRMs (reviewed by Powell 1993, pp. 55–56; Heinemeyer and Jones 1994, p. iii; reviewed by Lofroth *et al.* 2010, pp. 101, 108–109). The absence of hardwoods may be a limiting factor to fishers in the region (Heinemeyer and Jones 1994, p. iii), or an indication of successful adaptation to resources not used elsewhere. Both of these points are speculative as there is little information available describing natal den selection or successful reproduction in the USNRMs.

Fishers in British Columbia and Alberta are associated most commonly with the Sub-boreal Spruce and Boreal White and Black Spruce Biogeoclimatic Zones in the central to northern areas of the provinces (Weir and Lara Almuedo 2010, p. 36; Meidinger *et al.* 1991, p. 211; Delong *et al.* 1991, p. 239). The Sub-boreal Spruce Zone is a heavily forested montane region with uplands dominated by *Picea engelmannii x glauca* (hybrid white spruce) and *Abies lasiocarpa*; *Pinus contorta* is common on drier sites (Meidinger *et al.* 1991, p. 210). The climate of the Sub-boreal Spruce Zone is continental and characterized by severe, snowy winters and relatively warm, moist, and short summers (Meidinger *et al.* 1991, p. 210). Mean annual precipitation ranges from 415 to 1,650 mm (16 to 65 in.) with less than half of that falling as snow in winter (Meidinger *et al.* 1991, p. 210). The Boreal White (*Picea glauca*) and Black (*Picea mariana*) Spruce Zone is a relatively dry zone with very long, very cold winters with short summer growing seasons, and annual precipitation averages between 330 and 570 mm (13 and 22 in.), with 35 to 55 percent falling as snow (DeLong *et al.* 1991, p. 238). *P. glauca*, *P. mariana*, *P. contorta*, and *A. lasiocarpa* are major tree species in these zones (DeLong *et al.* 1991, p. 238). Both the Sub-boreal Spruce and Boreal White and Black Spruce Zones have a representative deciduous tree component of *Populus tremuloides* (trembling aspen), *Betula papyrifera* (paper birch), and *Populus balsamifera* spp. *Trichocarpa* (black cottonwood) (DeLong *et al.* 1991, p. 238; Meidinger *et al.* 1991, p. 212; Weir and Corbould 2008, p. 5), all of which are tree hardwood types selected by fisher for reproductive dens (Weir and Lara Almuedo 2010, p. 37).

Topographic relief in the USNRMs produces localized variations in vegetation and seasonal snowfall not widely seen in the western Canada population. It is hypothesized that fisher distribution on the landscape is limited by deep snow (Krohn *et al.* 1995, p. 103; Krohn *et al*. 1997, p. 226). If this is correct, then the precipitation in the USNRMs, the majority of which falls as snow and is heavily influenced by topography, could lead to geographic partitioning and an overall less optimal habitat within the region. There are observations of fishers using areas with deep, fluffy snow in the USNRMs, which also could indicate an adaptation to local conditions, but the relationship between using or avoiding certain snow conditions has not been evaluated statistically. 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.

More information is needed to elucidate important ecological relationships for fishers in the USNRMs. Therefore, we do not conclude that the fisher in the USNRMs is significant to the taxon as a whole based on ecological differences alone, but the observed differences indicate that fishers in the region 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.

Significant Gap in the Range of the Taxon

The loss of the fisher in the USNRMs would result in a significant gap in the range of the taxon and 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). Range retraction in the eastern United States south of the Great Lakes has isolated populations in New England and northern Atlantic States from Minnesota and Wisconsin, although the eastern United States populations retain connectivity to Canada (Gibilisico

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 recent fisher introduction to Washington's Olympic peninsula is not considered here because its establishment as a self-sustaining entity has not been demonstrated.

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, defined as peripheral populations, 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). Populations at the periphery tend not to be given conservation priority because of their existence in lower quality habitats, and these populations are presumed to be least likely to survive a reduction in range (Wolf *et al.* 1996, p. 1147).

This presumption is based on an existing theory that the cause of a species' range contraction is erosion that commences at the periphery where population numbers are low and progresses to the center where optimal habitats support higher population numbers (Lomolino and Channell 1995, pp. 336, 338). Upon closer examination, population persistence is not biased toward larger, less isolated or more central regions of a species historical range. Of 245 vertebrate species experiencing geographic range contraction, 98 percent retained some species presence in peripheral populations, 68 percent retained greater periphery than core, and 37 percent of species retained no core but remained in peripheral populations (Channell and Lomolino 2000, p. 85). 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 (human-caused) disturbances than populations in the central part of a species' range.

We conclude that the loss of the USNRMs fisher population would result in a significant gap in the range of the taxon by shifting the southern boundary of the western range over 965 km (600 mi) to the north, leaving only three individually isolated populations in the entire southwestern range of the taxon. Thus, the USNRMs population meets the definition of significant in our DPS policy.

Marked Genetic Differences

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). Mitochondrial DNA is associated with the energy-producing structures within cells called mitochondria, and is inherited through the maternal line. 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 (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). It is the intent of the DPS policy and the Act to preserve important elements of biological and genetic diversity. 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. Thus, we conclude that 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.

Summary for Significance

We conclude that the fisher population in the USNRMs is significant because its loss would result in a significant gap in the range of the taxon, and its genetic characteristics differ markedly from those of other fisher populations.

Determination of Distinct Population Segment

Based on the best scientific and commercial information available, we find that 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. 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.

Distinct Population Segment Five-Factor Analysis

Since the fisher in the USNRMs qualifies as a DPS, we will now evaluate its status with regard to its potential for listing as endangered or threatened under the five factors enumerated in section 4(a) of the Act.

Section 4 of the Act (16 U.S.C. 1533) and implementing regulations (50 CFR part 424) set forth procedures for adding species to, removing species from, or reclassifying species on the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a)(1) of the Act, a species may be determined to be endangered or threatened based on any of the following five factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

In making this finding, information pertaining to the USNRMs fisher DPS in relation to the five factors provided in section 4(a)(1) of the Act is discussed below. In making our 12-month finding on the petition we considered and evaluated the best available scientific and commercial information**.**

In considering what factors might constitute threats to a species, we must look beyond the exposure of the species to a particular factor to evaluate whether the species may respond to that factor in a way that causes actual impacts the species. If there is exposure to a factor and the species responds negatively, the factor may be a threat and, during the status review, we attempt to determine how significant a threat it is. The threat is significant if it drives, or contributes to, the risk of extinction of the species such that the species warrants listing as endangered or threatened as those terms are defined in the Act. However, the identification of the factors that could impact a species negatively may not be sufficient to compel a finding that the species warrants listing. The information must include evidence sufficient to suggest that these factors are operative threats that act on the species to the point that the species may meet the definition of endangered or threatened under the Act.

We are required by the Act to assess threats information that may occur within the foreseeable future. We define foreseeable future as a timeframe in which impacts can be reasonably expected to occur. Where future projections are not available, it is assumed that current trends will continue unless information exists to the contrary. Our evaluation of the fisher in the USNRMs follows.

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of Its

Habitat or Range

Under Factor A, we will discuss a variety of impacts to fisher habitat including: (1) Timber Harvest and Forest Management, (2) Development and Roads, (3) Climate Change, and (4) Fire and Disease. Climate change is discussed under Factor A, because the primary impact of climate change on fishers is expected to be through changes to the availability and distribution of fisher habitat. Many of these impact categories overlap or act together to affect fisher habitat.

Timber Harvest and Forest Management

Industrial timber harvest in the inland Northwest United States (Interior Columbia River Basin), including Idaho and western Montana, did not occur until the early 20th century (Hessburg and Agee 2003, pp. 40–41). Prior to 1900, logging in Idaho and Montana supplied timbers only to local concerns such as mining and railroad development, and did not become important to national markets until after other forested areas (e.g., Great Lakes region) had been depleted (Hessburg and Agee 2003, p. 40). Early industrial logging used selective practices, taking only large, high-grade or salvage logs (Hessburg and Agee 2003, pp. 41–42). By 1940, many inland northwest areas containing dry forest types, typically of ponderosa pine, were intensively logged by this method; moist or mesic forest types favored by fishers in the Flathead Valley and Whitefish Mountains in Montana and the Coeur d'Alene area of northern Idaho were also affected (Lesica 1996, p. 34; Hessburg and Agee 2003, pp. 41–42). The balance of forested areas in Idaho and Montana showed little or no logging activity up to 1940 (Hessburg and Agee 2003, p. 42).

Historical fisher population numbers are not known, but reports of their presence declined in the 1920s to a point that the fisher was presumed extirpated in the USNRMs (Williams 1963, p. 8; Weckwerth and Wright 1968, p. 977; Brander and Books 1973, p. 52). Fishers in the USNRMs avoid dry forest types (Schwartz 2010, unpublished data), and because local subsistence logging and early industrial logging were of limited geographic scale and selected for dry forest types, it is unlikely that this contributed directly to the fishers' apparent demise across the USNRMs area. Other factors or combination of factors, discussed in subsequent sections, may have had more influence on past fisher population reductions.

From the 1930s, timber harvest continued (Hessburg and Agee 2003, p. 41) while native fishers maintained an undetected refugium likely, in the Selway-Bitterroot Mountains straddling the border of Montana and Idaho (Vinkey *et al.* 2006, p. 269). Timber harvest was increasing in the USNRMs as fisher reintroductions (later realized to be population augmentations) were occurring in the late 1950s and early 1960s. Clearcutting practices, which removed all overhead cover in the harvest area, increased on private and public lands, and large areas of private timberland were converted to plantation forestry which emphasized clearcutting and even-aged forest regeneration management practices (Hessburg and Agee 2003, p. 41). With plantation or rotational forestry, the large tree components and coarse woody debris are suppressed or not allowed to accumulate to the point that they supply denning or cold weather resting sites (Weir 2003, p. 16). From 1938 to present day, low-elevation timberlands have been depleted of large, older trees considered late-seral or old-growth type, and the mid-elevation habitats retain only small amounts (DellaSala *et al.* 1996, p. 213; Lesica 1996, p. 37). The majority of presettlement upland old-growth forest was in the drier forest types of ponderosa pine/Douglas fir/western larch, which are subject to frequent low-intensity underburns that reduce ladder fuels (forest fire fuels that provide fire connectivity from understory to midlevel or canopy fuels) and more shade-tolerant vegetation in the understory (Green *et al.* 1992, p. 2). However, fishers are known to avoid these forest types and they represent only minor components of areas used by fishers (Jones and Garton 1994, pp. 377–378; Schwartz 2010, unpublished data).

In general, timber harvest and management over the last century has resulted in the loss of old forest and large- and medium-diameter trees that historically were widely distributed in forest structures other than old growth forest (Hessburg and Agee 2003, p. 45); still, the amount of land covered by forest in the USNRMs is similar to historical times (Hessburg *et al.* 2000, p. 60). Timber harvest, together with fire exclusion, has produced younger, homogenously structured forest patches, especially in dry forest types, with more canopy layers and more understory vegetation than historically due to fire suppression (Hessburg and Agee 2003, pp. 45–46). Fragmentation of managed landscapes has increased due to more numerous and smaller patches of various forest types, while roadless and wilderness areas have retained a simpler less fragmented structure (Hessburg *et al.* 2000, p. 78). From a landscape perspective, the departure from historical old-growth structure is most pronounced in the northern areas of the USNRMs, with a concurrent shift to increasing old-forest multistory stages in the southern areas (Wisdom *et al.* 2001, p. 184).

As a result of timber harvest and management practices, forest structures and quantities of large trees across the USNRMs have been affected. It is unclear how this has impacted fisher populations. There is no information regarding fisher population numbers within the region before European settlement, and no region-wide population numbers or trends are available today to allow a comparison of the impacts of changes to the landscape over time on fisher populations. Fishers were so rare as to be considered extirpated before large-scale harvesting occurred. Fifty years after the introduction of 78 animals to 9 areas in Idaho and Montana between 1959 and 1962 (reviewed by Vinkey 2003, p. 55), concurrent with decades of post-introduction timber harvest, fishers, half of which are of native lineage, persist on the landscape in a wider distribution than they did before augmentations (Vinkey 2003, p. 82; IOSC 2010, pp. 7, 10; MTFWP 2010, Attachment 4). Although there is little information elucidating the density of fisher populations in the USNRMs, the contemporary distribution of fishers appears to be similar to the historically depicted distribution in Idaho and Montana (Gibilisco 1994, p. 64) (Figure 1).

We are not concluding that a cause and effect relationship exists between increased timber harvest or treatment and increasing fisher distribution. The existing state of the USNRMs landscape is conducive to supporting fisher, but it is unknown if the system has the capacity to support, in the long term, a self-sustaining population or subpopulations in a metapopulation dynamic. 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), either naturally occurring or human-produced. Timber harvest and management have significant potential to alter the suitability of a landscape for fishers; conversely, management of forests using mechanical means or fire can assist in creating conditions that foster larger trees, create snags, increase woody debris, or open densely stocked areas to provide habitat for fisher prey species. Fishers in the USNRMs evolved in forest types where fire frequency and intensity was mixed, and windthrow was common, resulting in a complex and intricate landscape mosaic of young, mixed-age, and late-seral components (Jones 1991, p. 111; Arno *et al*. 2000, pp. 225–227). Thus, the result of silviculture treatments or harvest may resemble the natural disturbances and the succession that follows (Powell and Zielinski 1994, p. 64).

Current and Future Timber Harvest and Management

Commercial timber harvest, management for timber production, and the use of forestry techniques to protect, restore, and enhance forest ecosystems are ongoing activities in the USNRMs and are expected to continue. Fourteen national forests comprise approximately 65 percent of the land area and 72 percent of the forest types known to be used by fishers in the USNRMs (U.S. Department of Agriculture (USDA)

2009, entire). Timber harvest or manipulation for either timber production or other resource objectives is stated in each forest's Land and Resource Management Plan, which provide direction for a 10- to 15-year period. National forests are subject to a multi-use mandate and maintenance "in perpetuity of a high level of annual or regular periodic output of the various renewable resources," including timber (PL 104-333), and other legislative mandates for forest health or fuels reduction (e.g., Healthy Forests Restoration Act (PL 108-148)), which may require manipulation of forested areas. Planning directives specify lands for timber production for long-term sustained yields; however, silviculture (forest removed or treated) acres on all forests in the USNRMs has generally declined over the past 15 years, including a significant reduction in clearcutting (USDA 2010a, entire; USDA 2010b, entire). The USFS actions are regulated and relevant authorities are discussed in the "Factor D" section below.

State-owned forestry lands comprise approximately 6 percent of the forest types preferred by fishers in the USNRMs area. Timber harvest is an activity expected to continue on State trust or endowment lands in both States of Idaho and Montana, because of the responsibility 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). Forest resources are evaluated for management of a sustainable harvest on 5- to 10-year review schedules (Idaho Board of Land Commissioners 2007, p. 18; Montana Department of Natural Resources and Conservation (MTDNRC) 2010, p. 3). Private lands, including commercial timber operations with the primary objective of maximizing fiber production, comprise approximately 22 percent of the fisher forest types. The extent of timber harvest operations are driven by market forces and difficult to predict (Morgan *et al.* 2005, p. 2), but it is reasonable to conclude that management to maximize wood production (e.g., pre-thinning of stands), harvest, road construction and maintenance, and other activities will continue into the future.

We expect the current timber management and silviculture activity to continue on national forest lands guided by management plans. The effects of present and future forest management and timber harvest on the capacity of the USNRMs to support fishers may be influenced by many factors, including the location, scale, and juxtaposition of treatments to previous disturbances; the suitability of an area to provide fisher habitat under natural conditions; and the habitat needs of fishers. The habitat ecology of fishers in the USNRMs is not well understood. Forest patches with high densities of large trees, canopy covers exceeding 40 percent, and riparian areas appear to be important; however, information is lacking regarding fishers' requirements for patch size and connectivity (Jones and Garton 1994, pp. 380, 385–386). Although some information is available from other regions, habitat requirements for successful denning and rearing of young in the USNRMs are not known. Fishers have been described as using "old-growth" forest types disproportionally to their occurrence (Thomas *et al.* 1988, p. 255); however, there also has been a lack of clarity in the use of the term "old-growth" in forest ecology literature, and description of forest characteristics at any particular successional stage vary by geographic region, forest type, and local conditions (Green *et. al.* 1992 errata 2008, p. 2). Therefore, without specific parameters, basing a loss of fisher habitat on trends of "old-growth" or even "larger trees" may be misleading.

Late seral or mature forest elements such as snags and overhead cover are important habitat features for fishers throughout their range. These mature forest conditions may take many decades to hundreds of years to develop, and national forest management direction is revised over short time periods relative to forest succession. National forest lands that support fishers today reflect natural processes and silviculture actions spanning numerous planning periods as well as actions taken before comprehensive national forest management was mandated in 1976 (16 U.S.C 1601-1614). Given the history of forest management and planning, we do not expect significant changes in the availability of mature forest habitats through future forest planning cycles.

The species continues to occupy its presumed historical range despite habitat alterations that have occurred within that range, although fisher densities may be different. Fishers in the USNRMs have been observed to use roadless areas of forests, national forest lands managed for multiple purposes, and State forests and industrial forests managed primarily for commercial timber production (J. Sauder, IDFG, unpublished data cited in IOSC 2010, p. 4), although it is unclear how fishers are using these environments, or the relative importance of each to supporting individuals or fisher populations. We expect that fishers' use of lands managed for timber production or multiple uses will occur in the future under conditions fostered by the continuance of current management. Therefore, we conclude that the best available scientific and commercial information does not indicate that current or future forest management practices and timber harvest threaten the fisher now, or in the foreseeable future.

Development and Roads

The USNRMs region encompasses large tracts of public lands with little or no development, wilderness areas, and numerous municipalities of varying size, low-density rural development, rail lines, road networks and other human developments. Most of the development and infrastructure, including national forest roads, have been on the landscape for decades (Baker *et al.* 1993, p. 2; Havlick 2002, p. 11). Higher density development and road networks are situated in broad, open, lower-elevation intermountain valleys or lower montane areas, and most human activity and dwellings adjacent to public lands occur in dry woodlands or dry forest (Hessburg and Agee 2003, p. 47). Development in most cases is not far from public lands – primarily national forest. Mesic forest types and riparian corridors preferred by fishers are generally found at low to mid-elevations, and these highly productive habitats often coincide with areas that receive above average levels of human use (Carroll *et al.* 2001, p. 962). Where development and roads coexist with these areas, habitat could be lost directly by replacement with infrastructure or removal of cover, and fishers could be impacted by increased susceptibility to direct mortality from vehicle collisions, and increased exposure to disease from pets and animals such as raccoons associated with human development (Ruediger 1994, p. 3; Carroll *et al.* 2001, p. 969; Brown *et al.* 2008, p. 23). We have no information that disease is a problem for fishers in the USNRMs, and reports of fisher mortality due to vehicle collision are few (Vinkey 2003, p. 32; Giddings 2010, pers. comm.) (see Factor C discussion below).

The secondary effects of human activity and infrastructure, and roads or road use, in causing fisher avoidance or inhibiting movement on the landscape are unclear. It is reported that fishers in California more often used areas with a greater than average density of low-use roads (Dark 1997, p. 50), and, in Maine, fishers seldom traveled in the vicinity of roads or powerline corridors (Coulter 1966, p. 61). Conversely, Arthur *et al.* (1989b, p. 687) found that fishers in Maine were fairly tolerant of human activity, including low-density housing, farms, roads, and gravel pits, if forest canopy cover was maintained in the vicinity. Roads in forested areas of the USNRMs are often constructed along riparian corridors or forested valley bottoms, which are habitats fishers prefer. Targeted surveys for fishers are often conducted near roads because of the ease of access and likelihood of detecting fisher in a preferred habitat. Fishers do not avoid areas adjacent to a minor State highway that traverses National Forest land in Idaho (Schwartz *et al*. 2007, p. 6), and other targeted survey efforts for fishers in northern Idaho have successfully detected fishers in the vicinity of roads (Schwartz *et al.* 2007, p. 6; Albrecht and Heusser 2009, p. 8). This would imply that fishers are not displaced from suitable habitat by the presence of roads or road use. Roads and landscape features such as rivers have been implicated in increasing mortality risk to dispersing fishers, but fishers have dispersed across, and did not appear to be affected by roads, lakes or rivers in other parts of the range (York 1996, p. 46; Fontana *et al.* 1999, pp. 17; Weir and Corbould 2008, p. 44).

Roads constructed on public lands to provide access for resource use and extraction have been implicated in increasing access for trappers that target fishers or that may accidentally trap them (Hodgman *et al*. 1994, p. 598). The closure of roads to provide grizzly bear (*Ursus arctos*) habitat security is a possible reason for the reduction in fishers harvested in Montana's Flathead and Swan Valley (Giddings 2010, pers. comm.). Recent changes in the USFS' travel management direction (70 FR 68264, November 9, 2005), require that national forest roads are managed in a manner compatible with wildlife resources. Accordingly, implementation of seasonal or permanent road closures to benefit the threatened grizzly bear has likely provided benefits to fishers in many parts of the USNRMs.

Rapid housing growth has occurred in close proximity to public lands in the Rocky Mountain region since the 1990s, with much of it situated in areas already considered wildland-urban interface and impacted by development (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). The sale of private nonindustrial lands (i.e., family-owned forests) currently managed for timber is a likely source for additional residential development (Alig *et al.* 2010, pp. 6–7), although it is uncertain if a significant quantity of these lands is mesic forest or dry forest type less suitable for fishers.

There is a trend of large, industrially managed or corporate forest properties being divested for real estate development across the United States that is expected to continue into the future. Although large areas of industrial forest are predicted to be lost nationwide through 2050, most of this loss is due to urbanization in the southern United States (Alig *et al.* 2010, pp. 14–15). We know that fishers utilize industrial forests in the USNRMs (IOSC 2010, p. 4). The availability of industrial forest lands for other uses will likely improve conditions for fishers in Montana, where over 1,253 km^2 (484 mi^2) of low-elevation commercial forest, originally intended to be sold for development purposes was instead purchased for conservation and sustainable forestry by State, Federal, and conservation organizations (MTFWP 2010, Appendix 13, entire; The Nature Conservancy 2010, entire).

Dwellings, roads, and other infrastructure have been on the landscape for decades, and areas currently developed will see an increase in the density of development over the next 20 years. It is unknown if fisher habitats that are currently or potentially suitable will be affected directly by future development. The proximity and availability of public lands may moderate a loss of habitat if it occurs, but the impact to fishers is uncertain because of a lack of understanding of how fishers use the lands at the interface of public and private ownerships. Increased road traffic and human presence and recreational demands on public lands may increase the risk to fisher of vehicle collisions and displacement from suitable habitats near areas of high human use. Reports of fishers' responses to human activity and the presence of roads are mixed and, therefore, difficult to conclude with certainty. Habitat loss and increased direct mortality resulting from increasing human development are a concern but, based on the available information, do not rise to a level of threat to the USNRMs fisher now, or in the foreseeable future.

Climate Change

We know of no element of the fisher's ecology or physiology that would be directly affected by changes in climate. Predicted climate changes could impact forested environments upon which fishers depend; therefore, we address climate change under Factor A.

Climate is influenced primarily by long-term patterns in air temperature and precipitation. The Intergovernmental Panel on Climate Change (IPCC) concluded that climate warming is unequivocal, and 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). Eleven of the 12 years from 1995 through 2006 rank among the 12 warmest years in the instrumental record of global average near-surface temperature since 1850 (Independent Scientific Advisory Board (ISAB) 2007, p. 7; IPCC 2007a, p. 30). During the last century, mean annual air temperature increased by approximately 0.6°C (1.1°F) (IPCC 2007a, p. 30). Warming appears to be accelerating in recent decades, as the linear warming trend over the 50 years from 1956 to 2005 (average 0.13°C or 0.24°F per decade) is nearly twice that for the 100 years from 1906 to 2005 (IPCC 2007a, p. 30). Climate change scenarios estimate that the mean air temperature could increase by over 3°C (5.4°F) by 2100 (IPCC

2007a, pp. 45–46). The IPCC also projects that there will likely be regional increases in the frequency of hot extremes, heat waves, and heavy precipitation, as well as greater warming in high northern latitudes (IPCC 2007a, p. 46). We recognize that there are scientific differences of opinion on many aspects of climate change, including the role of natural variability in climate. In our analysis, we rely primarily on synthesis documents that present the consensus of a large number of experts on climate change from around the world, as well as the scientific papers used in those reports, to represent the best available scientific information. Where possible, we used empirical data or projections specific to the western United States, which includes the Northern Rocky Mountain region, and have focused on observations or expected effects on forested ecosystems.

Specific regional projections for the Interior Columbia Basin and the USNRMs are 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). The consequences of these projections are unclear and could result in positive, negative, or neutral impacts to fisher habitat and populations. Fisher habitat could expand due to warming temperatures extending the growing season and increased atmospheric carbon dioxide escalating vegetation growth and extending forest area (Millar *et al.* 2006, pp. 48–49). It is hypothesized that climate change will produce greater tree species richness over much of the coterminous United States because of the current relatively greater species richness in warmer climates (Hansen *et al.* 2001, p. 774). The potential habitats of dominant rainforest conifers (e.g., western hemlock and red cedar that fishers use in the USNRMs) are expected to decrease west of the Cascades but expand into mountain ranges of the interior West (ISAB 2007, p. 26). If the hypothesis that fishers are limited by deep winter snow is correct (Raine 1981, p. 74; Krohn *et al.* 1997, p. 226), decreased winter snowfall could increase the habitat available to fishers.

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), or novel predator-prey interactions could evolve (ISAB 2007, pp. 26, 28). 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). 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).

Projected changes of climate could result in a wide range of potential outcomes for fishers and their habitat. The effects to fishers in either the short or long term in a focused geographic area cannot be reasonably discerned without a specific aspect of the species' ecology or physiology linked to a confidently projected climate change variable (e.g., water temperature tolerance of fish, or early snowmelt reducing wolverine denning). Increasing temperatures and drought could affect fire frequency and intensity and the susceptibility of forest vegetation to disease, but climate change itself does not represent a threat to fishers now or in the foreseeable future.

Fire and Disease

Fire disturbance was an integral force in shaping the Northern Rocky Mountains forest ecosystem well before European settlement of the region (Lesica 1996, p. 33). Lower, drier elevations were prone to frequent, low-intensity burns, while cool high-elevation forests were subject to intense stand-replacing events at intervals up to 300 years (reviewed by Hessburg and Agee 2003, p. 27). The grand fir/hemlock/cedar forests known to support fisher today in Idaho have a history of highly variable mixed-intensity fire regimes. Fire severity and return intervals varied widely ranging from low-intensity fires with 16-year return intervals, to high-severity fires with 500-year return intervals (reviewed by Hessburg and Agee 2003, p. 27). Pre-European settlement forests would likely have been in a shifting mosaic of different successional stages, with 4 to 46 percent of the landscape of trees older than 200 years old (reviewed by Lesica 1996, p. 37). A fire history from 1650 to 1900 reveals that local fires or no fires occurred in most years.

Occurring less often were extensive regional fire events in warm, dry summers that were preceded by warm springs: Eleven of these events occurred in the 20th century (Morgan *et al.* 2008, p. 723). One of the largest regional fires of the 20th century occurred in 1910, consuming over 11,675 km^2 (4507 mi^2) in northern Idaho and scattered locations in northwest Montana (Morgan *et al.* 2008, p. 721). Regional fires in the early 1900s consumed more mesic forest than regional fires in later years (Morgan *et al.* 2008, p. 725). It has been suggested that the 1910 and 1934 fire events, in combination with overharvest by the fur industry, contributed to the fisher population decline (Jones 1991, p. 1).

Active fire suppression by humans in the mid-20th century has been implicated in the accumulation of forest vegetation believed to contribute to more fire-prone conditions today (Hessburg and Agee 2003, pp. 44, 46). However, a remarkable period between 1935 and 1987 was the longest period of low fire activity of the previous 250 years, and the lack of large fire activity was more a factor of cooler, wet climate conditions than fire suppression action (Morgan *et al.* 2008, p. 726). An abrupt change occurred in the 1980s from a fire regime of infrequent large fires of short duration, to more frequent longer burning fires (Westerling *et al.* 2006, p. 942). The shift was associated with unusually warm springs, longer summer dry seasons associated with reduced winter precipitation, and early spring snowmelt (Westerling *et al.* 2006, p. 943), a climate pattern seen with historical regional fire regimes.

Since the 1980s, the Northern Rocky Mountains have seen the largest absolute increase in large wildfire activity in the forest types least affected by previous fire exclusion: mesic mid-elevation and high-elevation forest types (Westerling *et al.* 2006, p. 943). Climate model projections indicate decreased snowpack, earlier snowmelt, and increasing temperatures contributing to longer fire seasons (Westerling *et al.* 2006, p. 943). Moisture patterns are more difficult to predict than temperature (Global Climate Change Impacts 2009, p. 135; Dai 2011, p. 16). Because many climate models predict higher precipitation levels associated with climate warming, the interaction between precipitation and temperature increase can be quite complex. If temperatures increase without compensating moisture patterns or amounts, the predicted warmer springs and summers could produce conditions favorable to the occurrence of large fires in the future, regardless of past trends (Westerling *et al.* 2006, p. 943). If this occurs, increased fire frequency and intensity in forests could increase the likelihood of direct fisher mortality, diminish the capacity of the landscape to support fisher, and increase isolation of small fisher populations on the landscape.

Diseases that affect forest structure and composition could impact fisher habitats by reducing cover or altering prey availability. Bark beetle (*Dendroctonus* spp.) eruptions have been affecting forest structure for millennia, but recent drought and increased winter temperatures have contributed to unprecedented rates of beetle infestations in lodgepole and ponderosa pine in the western United States (Brunelle *et al.* 2008, pp. 836–837). Lodgepole forests in British Columbia are a significant habitat type for fishers in British Columbia, and these forests have experienced widespread mortality from beetle infestation (Weir and Corbould 2010, p. 409). Infestations are widespread in forested areas of Idaho and western Montana (MTDNRC 2009, entire; Idaho Department of Lands 2010, entire), but the affected forest types are a small component of fisher habitat in the USNRMs (Jones and Garton 1994, pp. 377–378). Mortality of the overstory occurs in affected stands, but fisher use may not be affected if sufficient secondary structure remains (Weir and Corbould 2010, p. 409). Over time, affected trees or stands could provide standing (vertical) rest and den sites as well as contributing to downed woody debris in the understory (Simard *et al.* in press, p. 2). Standing beetle-killed trees have been considered a significant fire hazard which could fuel larger, landscape fires (Bentz *et al.* 2010, p. 611). Recent studies indicate that this concern could be overstated as neither torching nor crowning would be expected to increase with dead standing trees with retained needles, and the likelihood of sustaining an active crown fire in dead stands significantly decreases with tree collapse (Simard *et al.* in press, pp. 2, 28).

Disease processes are natural forces in shaping forest environments and may be important in providing denning or resting structures for fishers. We have no information that the current bark beetle epidemic is negatively impacting fisher habitat or fishers in the USNRMs. An increase in incidence of forest diseases or novel diseases also could accompany a changing climate, but as with fire, the threat to fisher habitats is difficult to predict. Based on the available information, climate driven events such as regional fires or disease and insect infestations do not rise to the level of threat to the fisher now or in the foreseeable future.

Summary of Factor A

The fisher is a forest-dependent species that evolved in the USNRMs in a complex landscape mosaic shaped by fire, tree disease, and windthrow. In the USNRMs, younger forests provide foraging habitat, but abundant mature and old trees that provide extensive canopy cover for resting and possibly denning are also considered important elements to support fishers on the landscape. Fisher populations were greatly reduced to the point they were believed extirpated in the USNRMs in the early 20th century. Human occupation and commercial timber harvest occurred at low levels early in the century, and anthropogenic alteration of fisher habitat is an unlikely cause of the species' population collapse in this region. Over decades, fisher populations resurged, with the help of augmentations, concurrently with natural climate events such as drought and fire, and also the permanent or long-lasting effects of development and timber harvest that potentially alter the important mature forest structure.

Fourteen national forests comprise approximately 72 percent of the forest types known to be used by fishers in the USNRMs, State forestry lands 6 percent, and private lands including industrial timber lands comprise approximately 22 percent (USDA 2009, entire). Commercial timber harvest, management for timber production or fuels reduction (such as pre-commercial thinning), prescribed burning, recreation and road maintenance and use are ongoing in the region and we expect these activities to continue. Fishers have been observed to use roadless areas of forests, national forest lands managed for multiple purposes, and State forests and industrial forests managed primarily for commercial timber production. It is unclear how fishers are using these environments, or their relative importance to supporting individuals or fisher populations. However, habitats supporting fishers today reflect past and current forest management, silviculture, and natural processes, and we do not expect future changes in the management of forest conditions to significantly vary from current direction.

Based on the limited available survey information, the contemporary distribution of fishers is similar to the historically depicted distribution in Idaho and Montana, despite alterations that have occurred within its range. Current fisher population numbers or trends are unknown. The existing state of the USNRMs landscape is conducive to supporting fisher, but it is not clear what the capacity of the system is to support, in the long-term, a self-sustaining population or a metapopulation dynamic of subpopulations. Interpreting the impact of past and present forest management, resource extraction, or development is complicated by an incomplete picture of how the animals are using an altered landscape. Given the available information, it does not appear that forest management and timber harvest are threats to the species currently or in the foreseeable future.

Dwellings, roads, and other infrastructure have been on the landscape for decades, and currently developed areas likely will see an increase in the density of development over the next 20 years. It is unknown if fisher habitats that are currently or potentially suitable will be affected directly by future development. The proximity and availability of public lands may moderate a loss of habitat, if it occurs, but more needs to be understood regarding how fishers are using the lands at the interface of public and private ownership. An increase in traffic on roads, and increased human presence and demands for recreation on public lands also, may increase the risk of vehicle collision and displacement from suitable habitats in proximity to areas receiving high levels of human use. Reports of fishers' responses to human activity and the presence of roads are mixed and, therefore, difficult to conclude with certainty. Habitat loss and increased direct mortality resulting from increasing human development are a concern, but, based on the available information, do not rise to a level of threat to the population.

The Northern Rocky Mountain region has a history of local and periodic regional fire and tree disease events. Fire and disease will continue to shape the forest landscape. While most climate predictions through the 21st century include increased temperature and earlier spring snowmelt conducive to longer fire seasons, the uncertainty of moisture patterns makes regional fire patterns difficult to predict. 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. Although the potential for changing fire frequency and intensity exists, these events cannot be predicted with confidence. The current incidence of bark beetle infestation does not appear to represent a significant threat to fishers in the USNRMs. An increase in incidence of forest diseases or novel diseases also could accompany a changing climate, but as with fire, the threat to fisher habitats is difficult to predict.

Based on the available information, climate-driven events such as regional fires that may result from projected increases in temperature, earlier spring snowmelt and drought, or the increased susceptibility of trees to disease or insects due to drought, do not rise to the level of a threat to the fisher in the foreseeable future.

We conclude that the best scientific and commercial information available indicates that the fisher in the USNRMs is not now, or in the foreseeable future, threatened by the present or threatened destruction, modification, or curtailment of its habitat or range to the extent that listing under the Act as an endangered or threatened species is warranted at this time.

Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Unregulated overharvest, and the use of strychnine as a trapping and general predator control agent, in addition to habitat loss, eliminated or greatly reduced fisher numbers across the range by the mid-1900s (Douglas and Strickland 1987, p. 512; Powell 1993, p. 77). The closure of trapping seasons in the 1920s and 1930s, reintroductions and augmentations, and land-use changes helped restore the fisher's presence in many parts of its range (Douglas and Strickland 1987, p. 512; Powell 1993, p. 80; Drew *et al.* 2003, 59; Vinkey 2003, p. 61). The role of land use changes with respect to the increase in fisher presence in the USNRMs is less clear (see Factor A section), but the regulation of trapping and end to indiscriminate predator control has likely had a positive influence.

Trapping seasons were reopened in many northeastern and Midwestern States, including Montana, between 1949 and 1985, with accompanying regulations intended to prevent overtrapping and population decline (Powell 1993, p. 80).

Unregulated trapping was a significant cause of severe population declines, because fishers are easily trapped (Douglas and Strickland 1987, p. 523), and where trapping occurs, there is a potential for populations to be negatively affected (Powell and Zielinski 1994, p. 64). Fisher populations can also be sensitive to the effects of trapping because of a slow reproductive rate and the sensitivity of population numbers to prey fluctuations (Powell and Zielinski 1994, p. 45). The presence of fishers is closely associated with the availability of their prey. In general, fisher populations tend to be distributed in small or isolated populations where their habitat or prey distribution is fragmented naturally or by human actions. 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), possibly indicating a fragmented, suboptimal landscape typical of peripheral populations, and consequently small populations. Small or isolated populations may be more intensely affected by the additional mortality from furbearer harvest than are more robust and widespread populations if harvest is not adequately regulated (Powell and Zielinski 1994, pp. 45, 66). There is also the potential for fisher populations to be seriously affected by unintended trapping or incidental trapping for other species, including other furbearers (Powell and Zielinski 1994, p. 45).

Fishers are classified as furbearers under State codes in both Idaho and Montana (IDFG 2010, p. 35; MTFWP 2010, Attachment 10, p. 2). The fisher also is considered a species of greatest conservation need in Idaho. Other furbearer species are legally trapped in the State, but trapping seasons for fishers have been closed for over 60 years in Idaho (IOSC 2010, p. 12). Fishers are legally trapped in Montana. The authority to regulate trapping procedures resides with the States' respective fish and wildlife or game commissions (Idaho Administrative Code 13.01.16; Montana Code Annotated 2009b), which review and revise furbearer trapping regulations every 2 years–most recently for the 2010 to 2012 seasons in Idaho (IDFG 2010, entire) and the 2010 and 2011 seasons in Montana (MTFWP 2010, Attachment 10, p. 2). The 2-year rules review period has been in effect since at least 1986 in Idaho and since 2006 in Montana (MTFWP 2007, p. 2; White 2011c, pers. comm.). Within this 2-year period, game commissions and State wildlife agencies have authority to close seasons, change season lengths, adjust or implement quotas, and apply other means to reduce impacts to intentionally or incidentally trapped populations, if it is considered necessary (White 2011b, pers. comm.; Idaho Administrative Code 2010, 13.01.16; MTFWP 2010, Attachment 10, p. 7). Based on the current trapping regulations, fisher will not be targeted, but legal trapping will occur for other species during the 2-year period in Idaho, and legal trapping for fishers will be subject to the established regulations and authority in Montana (see Factor D section below).

Most of the population distribution information for Montana is based on specimens from the regulated furbearer trapping program started in 1979 (MTFWP 2010,

p. 2, Attachment 4, entire; MTNHP 2010b, entire). There are 305 specimens, from legal harvest or mortality incidental to legal harvest for other species, recorded in MTFWP files since 1968 (Vinkey 2003, p. 51; MTFWP 2010, p. 2). Harvest over the past 27 years has been most productive in Trapping District 2, which includes the 200-km (125–mi) long Bitterroot Divide with Idaho (MTNHP 2010b, entire), and trapping in Montana over the past 8 years has been conducted in this area almost exclusively (MTFWP 2010, Attachment 3, entire). The Bitterroot Divide area in west-central Montana is a strong-hold for fishers of native lineage that form a population with fishers in Idaho (Schwartz 2007, p. 924). Trapping District 2 has a five fisher quota, which is filled most years (MTFWP 2010, Attachment 8, pp. 1, 4). Harvest or other factors may be impacting the fishers in Trapping District 1, including the Cabinet Mountains, in the northwest corner of the State. The trapping quota has been reduced from 10 to 2 between 1993 and 1996, and harvest is low and variable (MTFWP 2010, Attachment 8, p. 1). A low harvest level could reflect low trapper effort, difficult access, variability in prey availability, or a small or difficult to detect population. Six of the eight individuals captured between 2003 and 2008 were adult (MTFWP 2010, Attachment 3, entire), which suggests, but does not conclude, low recruitment. These low harvest numbers are consistent with the scarcity of fisher detections described in the evaluation of the Cabinet Mountain reintroduction effort (Vinkey 2003, p. 33), and possibly indicative of a population that is small or difficult to access.

There is disagreement among researchers as to whether trap mortality is additive (operates in addition to) or compensatory (compensates for) to natural mortality.

Trapping is often the main mortality factor for fisher (Krohn *et al*. 1994, pp. 139–140). Harvest directed mainly at juveniles is most likely to be compensatory, as juveniles have higher natural mortality than adults (Krohn *et al.* 1994, p. 144). Numerous models are applied to managing harvest quotas to sustain populations based on demographic rates, estimated fecundity, population density, and spacing patterns (reviewed by Strickland 1994, pp. 153–158; Koen *et al.* 2006, p. 1489). For example, low ratios of juveniles to adult females in a harvest could be indicative of declining populations (Strickland and Douglas 1981 in Koen *et al.* 2006, p. 1484), which could be compensated for by altering harvest quotas in succeeding years. In a single season, harvests take several hundred to over a thousand individuals from many trapped populations across the North American range of the species (Association of Wildlife Agencies 2010, entire), and statistical models can be applied to determine population trends or changes in demographics. The small harvest in Montana (from two to five individuals, depending on the trapping unit) defies statistical analysis (Giddings 2010, pers. comm.), and the evaluation of trapping effects is based strongly on demographics. Juveniles are represented in the harvest over the past 10 years, and the predominant portion of the harvest consisting of younger-aged males is interpreted as an indication of light trapping pressure (MTFWP 2010, Attachment 8, p. 4), which is likely compensatory to natural mortality.

Fishers have been caught incidentally to trapping for other furbearers in Montana and Idaho. Montana records indicate 11 incidental mortalities between 1983 and 2009, in addition to legally harvested animals (MTFWP 2010, p. 4). Since 1970 in Idaho, 242 fishers were trapped incidentally, 37 of those were reported as dead in the trap, 107 were released alive, and there were 98 trapper reports of fishers captured but no indication of their condition (IOSC 2010, p. 12; White 2011b, pers. comm.). Incidental capture of fishers has progressively increased between 2006 and 2010 in Idaho due to unknown reasons, resulting in 22 of the 37 mortalities known to have occurred in the past 40 years (White 2011b, pers. comm.). In addition, in the past 5 years, 42 live releases from traps and 37 captures of unknown status also were reported (White 2011b, pers. comm.). The IDFG considers the "unknown" fishers to be live releases because it does not make sense to report a capture and not a mortality due to the following regulations: there is a legal requirement to report all fisher captures, there is no penalty for incidental capture, it is illegal to possess a killed fisher, and there is a small financial incentive to surrender mortalities (White 2011c, pers. comm.). A change in the number of "unknowns" reported between 2006 and 2008 to a similar number of live releases in 2009 and 2010 corresponds with the start of a highly publicized fisher habitat ecology project, and is indicative of fur trappers' interest in contributing information for the study (White 2011b, 2011c, pers. comm.).

Possible explanations of this recent rise in fisher captures include, but are not limited to, population expansion or better reporting and awareness, as stated above (IOSC 2010, pp. 12–13; White 2011b, pers. comm.). Over the past 40 years, Idaho incidental captures exhibit a cyclic pattern of distinct highs and lows every 4 to 5 years, which persist for 4 to 5 years. This pattern may reflect similar cyclic changes in fisher population numbers that are unrelated to trapping effects (White 2011b, pers. comm.). The level of incidental captures demonstrated between 2006 and 2010 is the highest during the 40-year reporting period. Combined with the increase in anecdotal sightings, the recent high number of captures may be indicative of an increasing and expanding population (White 2011b, 2011c, pers. comm.).

The number of trapping licenses sold doubled between 2001 and 2008 in Idaho (IDFG 2008, p. 8), which could mean additional trapping pressure and an increased risk of unintended captures. Fishers are most often caught incidentally to trapping for American marten (White 2011b, pers. comm.). Although hundreds of martens are harvested most seasons, the number of trappers targeting marten is comparatively low compared to those targeting other species (IDFG 2007, p. 11; IDFG 2008, pp. 9–11). Marten trapping efforts have remained steady in years with both low and high incidental fisher capture (IDFG 2008, p. 10); therefore, the total number of trapping licenses sold may not be a good indicator of increased trapping pressure on fishers.

Both Montana and Idaho have a mandatory reporting requirement for incidental mortality. Only Idaho requires reporting of animals trapped and released. 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. There are no measures required to avoid or prevent accidental capture of fishers in either Montana or Idaho. Hence, additional mortality from incidental capture and release may not be fully considered in management evaluations.

The known incidental capture mortality is less than one fisher per year over the period of 1970 to 2005 in Idaho, and 1983 to 2009 in Montana (MTFWP 2010, p. 4; White 2011b, pers. comm.). Additional mortality from the trauma of capture and release and unreported captures is likely, but quantification would be speculative. The harvested population in west-central Montana is considered stable, with the existing trapping pressure, including the reported incidental mortality, based on consistent yearly harvest over time and the continual presence of a high proportion of juveniles in the harvest (MTFWP 2010, Appendix 8, p. 5). Relying on harvest statistics to assess the status of the fisher population in the Cabinet Mountain region of northwest Montana is not possible based on the lack of recent incidental mortalities and limited harvest in the area (MTFWP 2010, Appendix 8, p. 4; Appendix 11).

The impact of the reported level of unintentional mortality or capture in Idaho is difficult to conclude based on the available information. As stated above, the increase in captures in Idaho could reflect an increase of trapper effort for other furbearers. Alternatively, increasing captures may result from expanding or increasing fisher populations and density-dependent displacement of juveniles to less suitable habitats that increase their vulnerability to capture. In addition, the number of reported live-released captures could be misleading. Released fishers are not tagged or identified in any way. Because fishers are easily trapped, it is possible that the live-released data represent fewer individuals who are repetitively captured. Individuals previously released could be represented in the mortality data as well – a consequence of a later capture.

The recent increased mortality in Idaho may be compensatory to natural forces, and thus not affecting population persistence. However, without a history of demographic information (sex/age) of the affected individuals, it is difficult to assess additive or compensatory effects. Because demographic patterns are not available, we look to other areas of the range where fisher populations are persisting with sustainable, regulated harvest. Although factors affecting population dynamics differ between the eastern and western U.S. populations, fishers in peripheral populations and small geographic areas in the east persist with regulated harvest far exceeding the targeted and incidental harvest that occurs in both Montana and Idaho. For example: during the 2001-2008 period, 30 to 108 fishers were harvested annually in West Virginia, and the annual harvest in Rhode Island was as high as 97 individuals (Association of Fish and Wildlife Agencies 2010, entire). Fishers have been legally harvested in Montana since 1983, with the current Statewide quota in place since 1996, and are considered stable at levels above the past 5-year mortality occurrence in Idaho (MTFWP 2010, Attachment 8, p. 3). Mortality in Montana and Idaho may be cumulative in areas of shared population, such as the Bitterroot Mountains, but that impact cannot be concluded based on the available information.

Recent incremental increases in incidental capture could be a concern in Idaho if the trend continues and there is no evaluation or consideration of the potential impacts to local and regional populations. The available mortality and incidental capture data lack context and could be interpreted in ways that reach a conclusion of benign or detrimental effects. The IDFG is conducting a habitat ecology study to assist in adjusting management to benefit fishers, with results expected over the next 2 years (White 2011b, pers. comm.). By studying fishers' habitat use, geographic or timing restrictions can be crafted to limit their exposure to trapping for other species. We anticipate that the resulting data will also be helpful in elucidating the incidence and trends of fisher mortality in the USNRMs.

The role of overtrapping in reducing fisher populations is well known. Trapping regulation, in addition to habitat regeneration and population augmentations in some cases, have contributed to recovery and persistence of fishers across the species range. Fishers are legally trapped in Montana, but trapping seasons for fishers have been closed for over 60 years in Idaho. The Montana fisher trapping program began in 1983. After a period of adjustment, the current Statewide quotas have been in place since 1996. Combined with a low level of mortality incidental to trapping for other species, the Montana fisher population is considered stable with the existing trapping pressure. There is no trapping for fishers in Idaho, but a small number of fishers have been captured or killed incidentally to the trapping of other species – primarily the American marten – between 1970 and 2005. The reported incidental capture and mortality increased between 2006 and 2010 for unknown reasons; possible explanations include an increasing and expanding fisher population or greater exposure to trapping or both. These recent incidental captures could be a concern if the trend continues and there is no evaluation and consideration of the potential impacts; however, efforts are ongoing to elucidate the fisher's ecology and devise beneficial management strategies. The potential exists for targeted or incidental trapping to negatively impact fisher populations, but based on the available information, this potential does not rise to the level of threat at this time.

Summary of Factor B

Trapping is considered one of the most important factors influencing fisher populations, and unregulated overharvesting contributed to the fishers' severe population decline in the early 20th century. Targeted legal harvest occurs in Montana, and accidental capture and mortality occur in both Montana and Idaho. If not adequately regulated, low levels of harvest-related mortality, added to natural mortality, have the potential to negatively impact small, local populations. The Montana trapping season is monitored and regulated, and there is no information to conclude that the distribution or population numbers of fisher are being negatively impacted directly by the current trapping regimes. Incremental increases in incidental capture could be a concern in Idaho if the trend continues without some evaluation of the local and regional population impacts, and application of remedial actions, if necessary.

We conclude that the best scientific and commercial information available indicates that the fisher in the USNRMs is not now, or in the foreseeable future, threatened by overutilization for commercial, recreational, scientific, or educational purposes to the extent that listing under the Act as an endangered or threatened species is warranted at this time.

Factor C. Disease or Predation

Mustelids are susceptible to viral-borne diseases, including rabies, canine and feline distemper, and plague contracted through contact with domesticated or wild animals (reviewed by Lofroth *et al.* 2010, pp. 65–66). Antibodies to a number of canine viruses have been isolated from fishers in northwest California (Brown *et al*. 2008, p. 2). Parasitism by intestinal invertebrates (e.g., nematodes, trematodes) is common (reviewed by Powell 1993, p. 72), and evidence of other bacterial, protozoan, and arthropod disease agents also have been identified in fishers (Banci 1989, p. v; Brown *et al.* 2008, p. 21). Individuals weakened by parasitism or other infectious disease processes may be more vulnerable to other sources of mortality such as predation. However, little is known about the impacts of disease in fishers, and there is no documentation of disease-causing widespread population decline (Powell 1993, p. 71; Brown *et al.* 2008, p. 5). There is no information on the incidence of disease specific to fishers in the USNRMs.

Fox, bear, mountain lion, great-horned owls, and bobcat prey on fishers, although there is little evidence to indicate that healthy adult fishers have many natural enemies except humans (Douglas and Strickland 1987, p. 516; Powell 1993, pp. 72–73). 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). Predation of fishers newly translocated to Montana was reported (Roy 1991, pp. 29, 35; Heinemeyer 1993, p. 26), but this was attributed to the relocation techniques used and fitness of the individual animals (Powell and Zielinski 1994, p. 62; Vinkey 2003, p. 34). No information is available regarding predation of fisher from established populations in the USNRMs.

Summary of Factor C

There is little known about the impacts of disease in fishers, and there is no information on the incidence of disease specific to fishers in the USNRMs. There is no evidence that healthy adult fishers in suitable habitat are subject to excessive rates of predation or that fisher populations in the USNRMs are impacted by predation. We conclude that the best scientific and commercial information available indicates that the fisher in the USNRMs is not now, or in the foreseeable future, threatened by disease or predation to the extent that listing under the Act as an endangered or threatened species is warranted at this time.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

To the extent that we identify possibly significant threats in the other factors, we consider under this factor whether those threats are adequately addressed by existing regulatory mechanisms. If a threat is minor or the effects uncertain, listing may not be warranted even if existing regulatory mechanisms provide little or no protection to counter the threat. Numerous mechanisms affect land and species management in the USNRMs. These mechanisms could include: (1) Local land use laws, processes, and ordinances; (2) State laws and regulations; and (3) Federal laws and regulations. Regulatory mechanisms, if they exist, may preclude listing if such mechanisms are judged to adequately address the threat to the species such that listing is not warranted.

Seventy-two percent of the land area with forests typical of fisher habitat types (fir, spruce, hemlock, Douglas fir (Jones and Garton 1994, p. 377–378)) in the USNRMs is managed by Federal entities within national forest or park boundaries (USDA 2009, entire). Approximately 15,969 km^2 (6,165 mi^2) of wilderness areas are incorporated within national forest boundaries. Private lands, including tribal and commercial timber lands, comprise approximately 22 percent of fisher forest types, and the remaining 6 percent is State or local government forest (USDA 2009, entire). Fourteen national forests form large areas of contiguous forested land area, often sharing boundaries with State forest lands occupying lower elevations of intermountain valleys or transition areas with woodlands or nonforested areas.

Federal Regulatory Mechanisms

National Forest Management Act

Federal activities on national forest lands are subject to the National Forest Management Act of 1976 (NFMA) (16 U.S.C 1601-1614). The NFMA requires the development and implementation of resource management plans for each unit of the National Forest System. Implementation rules for resource planning have undergone numerous revisions and legal challenges. Planning rules amended in 2008 are being reevaluated, and an amended 2000 planning rule is currently in place (74 FR 67059, December 18, 2009). The 2000 planning rule emphasizes maintaining ecological conditions that provide a high likelihood of supporting the viability of native and desired nonnative species well distributed throughout their ranges within a plan area. Ecological conditions need to be maintained to support the natural distribution and abundance of a species and not contribute to its extirpation.

Individual national forests may identify species of concern that are significant to each forest's biodiversity. The fisher is considered a sensitive species in the USFS 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. Special management emphasis is placed on Sensitive Species to ensure their viability. The USFS is directed to develop and implement management practices to ensure these species do not become endangered or threatened. Management is in place at the individual forest plan level or through regional direction that addresses habitat needs of fishers. The habitat ecology of fishers in the region is not well studied, but current management direction addresses forest characteristics known to be important to fishers such as the protection of riparian areas, retention of elements such as snags and downed woody material, size of forest openings, and the retention of canopy cover (Samson 2006, pp. 15–16; Bush and Lundberg 2008, p. 16).

National Forests have been managing for old-growth forest since the 1990s, guided by regional standardized definitions and descriptors (Green *et al.* 1992 Errata 2008, entire). The USFS planning regulations require that forest plans identify certain species as Management Indicator Species in order to estimate effects of management alternatives on fish and wildlife populations (36 CFR 219.20). In addition to Sensitive Species status, the fisher is considered a Management Indicator Species by the Nez Perce and Flathead National Forests to guide vegetation management of old-growth forest (USFS 1999, p. 11; USFS 2006, p. 14). Vegetation objectives include maintaining or actively restoring landscape composition, structure, and patterns to a condition similar to that expected under natural disturbance and succession regimes, and managing landscapes to develop larger old-growth patch sizes, healthy riparian areas with mosaics of tree age and size classes, and retention of structural elements such as snags and down logs (USFS 1999, Appendix A; USFS 2006, pp. 41–42).

The habitat ecology of fishers in the region is not well studied, but current management direction addresses forest characteristics known to be important to fishers (USFS 1999, p. 24 and Appendix A; USFS 2003a, p. III-7; USFS 2003b, Appendix A; USFS 2006, pp. 41–42; Samson 2006, entire; Bush and Lundberg 2008, entire). Within the NFMA regulatory framework, management direction and requisite monitoring, forest management should be consistent with supporting fisher habitat where natural ecological conditions allow. If each plan area (national forest) supports a natural distribution and abundance, then the large contiguous area of national forest lands comprising the USNRMs would have the potential to support a regional population.

National Environmental Policy Act

As a sensitive species, the USFS is required to consider effects in documentation completed under the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 *et seq.*). The 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. The NEPA does not itself regulate activities that might affect fishers, but it does require full evaluation and disclosure of information regarding the effects of contemplated Federal actions on sensitive species and their habitats.

Healthy Forest Restoration Act

The Healthy Forest Restoration Act of 2003 (Pub. L. 108-148) (HFRA) improves the capacity to conduct hazardous fuels reduction projects on national forest lands to protect communities within or adjacent to USFS boundaries (wildland-urban interface); municipal watersheds at risk from fire; areas where windthrow or the existence or imminent risk of an insect or disease epidemic significantly threatens ecosystem components or resource values; and areas where wildland fire poses a threat to threatened and endangered species or their habitat, or where the natural fire regimes are important for their habitat.

Provisions of the HFRA can be used to expedite vegetation treatment, such as mechanical thinning or prescribed fire, which could be beneficial or detrimental to fishers on national forest lands. The USFS and Department of the Interior revised their internal implementing procedures describing categorical exclusions exempt from NEPA review to expedite hazardous-fuels reduction and vegetation restoration projects meeting certain criteria (68 FR 33813, June 5, 2003; 68 FR 44597, July 29, 2003).

The HFRA requires authorized projects, including categorical exclusions under NEPA, to be planned and conducted consistent with resource management plans and other relevant administrative policies, such as the USFS' Sensitive Species Policy, and prohibits authorized projects in wilderness areas, formal wilderness study areas, and other restricted Federal lands (Section 102(d)). Projects conducted to reduce fuels could provide a benefit to fishers by creating foraging habitat if needed, promoting the growth of larger trees by decreasing competition, and reducing catastrophic fire risk. While the reverse may be true, the application of the Sensitive Species Policy should direct HFRA projects to improve or maintain suitability of habitats for fishers.

The Wilderness Act

The USFS manages lands designated as wilderness areas under the Wilderness

Act of 1964 (16 U.S.C. 1131-1136). Within these areas, the Wilderness Act states the following: (1) New or temporary roads cannot be built; (2) there can be no use of motor vehicles, motorized equipment, or motorboats; (3) there can be no landing of aircraft; (4) there can be no other form of mechanical transport; and (5) no structure or installation may be built. Lower-elevation forest in wilderness areas may be important refuges for fishers because of limited human access and less fragmentation than managed forests (Hessburg *et al.* 2000, p. 78). For example: The Selway-Bitterroot Wilderness in Idaho may have functioned as a refugium for native fishers that enabled their survival through the severe population decline in the past, and the area appears to be a stronghold for native fishers today (Vinkey 2003, pp. 90–91).

National Park Service Organic Act

The National Park Service Organic Act of 1916 (16 U.S.C. 1 *et seq.*), as amended, states that the NPS "shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations to conserve the scenery and the national and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Fishers or sign of fishers have been reported in Glacier National Park in northern Montana, but recent verified information is lacking. The Park's west side is a mix of conifer forests, with maritime-influenced western hemlock and western red cedar existing in "ancient stands in places" (NPS 2010, entire), and likely capable of supporting fishers. The NPS does not manage habitats specifically for fishers, but where fishers occur in Glacier National Park, they and their habitats are protected from large-scale loss or degradation due to the NPS' mandate to "conserve scenery... and wildlife[by leaving] them unimpaired." Due to the limited access to exploitive activities such as timber or furbearer harvest, National Parks, as with wilderness areas, may provide refuges for fisher populations that are a source of individuals dispersing to peripheral areas.

State Management

Montana

Regulatory mechanisms related to fisher conservation in Montana apply to State forest and furbearer harvest management. 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; forests also are managed to promote a diversity of habitat conditions beneficial to wildlife (MTDNRC 2010, p. 1). Fishers are managed as a sensitive species "primarily through managing for the range of historically occurring conditions appropriate to the site" (Administrative Rules of Montana (ARM) 2003, 36.11.436). In 2003, MTDNRC formally codified mitigation measures specific to forest types preferred by fisher for State forest management including: timber and salvage harvest, thinning, prescribed burning, road maintenance, and other activities (ARM 2003, entire). Project-level evaluation emphasizes large snag and coarse woody debris retention and emulation of natural forest patch size and shape to maintain or contribute to connectivity with crown canopy closure of greater than 39 percent and patch greater than 91 m (300 ft) wide (ARM 2003, 36.11.403). Riparian areas, within 100 ft of class-I (fish bearing) streams and 50 ft of class-II (non-fish bearing) streams, maintain or are allowed to progress to at least 40-percent canopy cover (ARM 2003, 36.11.440). There is no specific direction to retain mature or larger trees for fisher independent of snag retention, but it is stated that the importance of late-successional riparian and upland forest shall be considered in meeting the requirements for fishers (ARM 2003, 36.11.440).

The fisher is classified as a regulated furbearer in Montana (MTFWP 2010, Attachment 10, p. 2). Montana is the only State in the western United States where fisher trapping is still legal. Trapping season is open December 1 to February 15, or within 48 hours of a quota being reached (MTFWP 2010, Attachment 10, p. 7). There is authorization to close the season if conditions or circumstances indicate a quota will be reached within 48 hours (MTFWP 2010, Attachment 10, p. 7). 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 (MTFWP 2010, Attachment 10, p. 7). Only one fisher may be taken per person per season, and take must be reported within 24 hours to the MTFWP (MTFWP 2010, Attachment 10, p. 7). 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 (MTFWP 2010, Attachment 10, p. 7). 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 (MTFWP 2010, p. 4). There is no regulatory mechanism or requirement in place to minimize incidental take of 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). Trends in harvest success, demographics (age class/sex), and snow track surveys are used to determine the effectiveness of the quota system and assist in the State's objective of maintaining current fisher population size and distribution (MTFWP 2010, Attachment 8, pp. 1–3). A consistent harvest and the presence of juveniles are considered an indication of a stable population (MTFWP 2010, pp. 1–2). Snow track surveys are conducted along fixed routes in some areas of the State that do not receive targeted fisher harvest (MTFWP 2010, Attachment 8, p. 3); however, track surveys are conducted sporadically and are very dependent on snow conditions for usefulness (Giddings 2010, pers. comm.). 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. Quotas and harvest have been relatively consistent since 1996 (MTFWP 2010, Attachment 8, pp. 1, 3). We are not aware of any established objectives or direction that indicates action thresholds for adjusting quotas or practices.

Idaho

The fisher is identified as a species of greatest conservation need in the Idaho Comprehensive Wildlife Conservation Strategy, which recommends actions to determine fisher population trends, landscape and regional scale response to habitat disturbance, genetic composition of populations, and the relationship between habitat fragmentation and movement patterns (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). There are no identified regulatory mechanisms that apply to habitat management for fisher in the State.

Implementing rules that protect riparian areas from timber harvest actions for the Idaho Forest Practices Act apply to operations on lands under all management types. Management goals for class I streams include the retention of standing conifers, hardwoods and snags within 15 m (50 ft) on each side, leaving 75 percent of existing shade, and within 9 m (30 ft) on each side of class II streams (Idaho Administrative Code 2000, 20.02.01).

The fisher is legally classified as a furbearer in Idaho, but no legal season has been open for over 60 years (Idaho Administrative Code 2010, 13.01.16; IOSC 2010, p. 11). Capture of fishers has occurred, primarily incidentally to legally trapped marten during the open season from November 1 through January 31 (White 2011a, pers. comm.). There are no legislated regulatory mechanisms in place to minimize incidental take of fisher, but voluntary trapper education is provided to help direct trapping towards the intended species (White 2011a, pers. comm.). Marten and other furbearer trapping is conducted under Statewide licensure but management occurs at smaller, regional levels. There is no limit to the number of Statewide licenses sold, and no seasonal quotas for marten are in place (White 2011b, pers. comm.). The IDFG Commission has the authority to set bag or possession limits and seasons (Idaho Administrative Code 2010, 13.01.16). A mandatory furtaker 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. We are not aware of a mechanism in place to adjust a trapping season while in session, such as closing a unit or area early, to accommodate an incidental take of a fisher or fishers. We have no knowledge of how the reports of incidental take of a fisher or fishers are used to adjust subsequent marten seasons or quotas, or those of other target species that fisher could be caught incidentally to, in order to avoid additional mortality.

Management on National Forests and State Forests for Other Species Benefitting Fisher

All national forests in the USNRMs have amended their forest plans with the Northern Rockies Lynx Management Direction to provide protections and conservation for the Canada lynx (USDA 2007, entire). Lynx utilize mesic coniferous forests although their range extends to higher elevation zones than fishers (reviewed by Ruediger *et al*. 2000, p. 1–3). Lynx similarly prefer to move through continuous forest cover, frequently use riparian zones, and target snowshoe hare as a principle prey species (reviewed by Ruediger *et al*. 2000, pp. 1–4, 1–7). Large woody debris within mature or older conifer or mixed-conifer sites are selected by female lynx for denning, and these elements are known to be used by fishers (Jones and Garton 1994, p. 380; reviewed by Ruediger *et al.* 2000, p. 1–4; reviewed by Lofroth *et al*. 2010, p. 106). Direction is in place for national forest lands to provide connectivity for lynx travel throughout the USNRMs (USDA 2007, p. 27). Standards and guidelines for specific habitat protections are applied in the north half of the USNRMs, where habitats are known to be occupied by lynx (USDA 2007, p. 29). Specific measures are applied at the scale of a female lynx's home range, which is similar to home range sizes reported for fisher in the USNRMs and British Columbia (reviewed by Ruediger *et al.* 2000, p. 6–2; reviewed by Lofroth *et al.* 2010, p. 68). These measures include limiting disturbance by timber harvest and other activities, maintaining patches conducive to denning and retention of coarse woody debris, protecting regenerating areas that provide snowshoe hare habitat, and retaining wooded areas (USDA 2007, pp. 8–28).

In 1998, the Service issued a biological opinion on the implementation of USFS Land and Resource Management Plans as amended by the Interim Strategy for Managing Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana, and Portions of Nevada (INFISH) (Service 1998, entire). The guidelines, developed to protect bull trout and other fish habitat, also may provide benefits to fisher by protecting riparian corridors, establishing large woody debris requirements, and delineating Riparian Habitat Conservation Areas which would prohibit timber harvest in most situations. Conservation Areas would be established within 91 m (300 ft) slope distance of either side of class I streams, to 46 m (150 ft) on both sides of perennial class II streams, and within 15 to 30 m (50 to 100 ft) of seasonal or intermittent streams and small wetlands (Service 1998, p. 9).

The USNRMs covers an area that includes all or part of the Northern Continental Divide, Selway-Bitterroot, Selkirks, and Cabinet-Yaak Grizzly Bear Recovery Zones. Fishers may benefit from the reduction of road densities or reduced motorized use of roads on national forest lands or the large areas of core habitat within 3rd and 4th order watersheds with no motorized travel routes or high use trails within the recovery zones (Interagency Grizzly Bear Committee 1998, entire).

Management direction intended to protect other species listed under the Endangered Species Act could provide benefit to fishers on Montana State forests. Montana State forests located in the Cabinet-Yaak and Northern Continental Divide Recovery Zones for the threatened grizzly bear are managed to limit road density and maintain hiding cover near roads and adjacent to riparian areas (ARM 2003, 36.11.432-433). Retention of coarse woody debris, vegetative cover for landscape connectivity, and habitat for a common prey species – snowshoe hare – are intended to contribute to Canada lynx (Lynx Canadensis) habitat requirements (ARM 2003, 36.11.435). The retention of vegetation and minimization of disturbance in riparian areas to protect bull trout habitat also could benefit fisher on State forest land.

Summary of Factor D

In our review of the factors affecting fishers in the USNRMs, we found no single factor or accumulated effects of factors that, when considered within the foreseeable future, rose to a level significant enough to warrant the protections of the Act. There is a concern regarding the adequate control of mortality due to capture incidental to the trapping of other furbearing animals. 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. Since we did not consider that the threat of incidental mortality, based on the limited information available to us, rose to the level of a threat to the species in the foreseeable future, it is not necessary to consider the effectiveness of the relative regulatory mechanism.

We conclude that the best scientific and commercial information available indicates that the fisher in the USNRMs is not now, or in the foreseeable future, threatened by the inadequacy of existing regulatory mechanisms to the extent that listing under the Act as an endangered or threatened species is warranted at this time. It is unclear that regulatory mechanisms in addition to those described are needed for the species based on the current understanding of threats.

Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence

Population Size and Isolation

A principle of conservation biology is that small, isolated populations are subject to an increased risk of extinction from stochastic (random) environmental, genetic, or demographic events (Brewer 1994, p. 616). Environmental changes such as drought, fire or storms have severe consequences if affected populations are small and clumped together (Brewer 1994, p. 616). Loss of genetic diversity can lead to inbreeding depression and an increased risk of extinction (Allendorf and Luikart 2007, pp. 338–343). Demographic changes can reduce the effective population size (number of breeding individuals). Populations with small effective size show reductions in population growth rates, loss of genetic variability, and increases in extinction probabilities (Leberg 1990, p. 194; Jimenez *et al.* 1994, p. 272; Allendorf and Luikart 2007, pp. 338–339).

There is little information to indicate fisher population numbers or population dynamics in the USNRMs. Fishers are vulnerable to the effects of small populations and isolation based on characteristics of their life history. Fishers are known to be solitary and territorial, and require large home ranges where landscapes are less than optimal (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 reproduction rates, and, though capable of long-distance movements, generally have small dispersal distances. Small dispersal distances may be a factor of fishers' reluctance to move through areas with no cover (Buskirk and Powell 1994, p. 286). Thus, 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).

Territoriality and habitat specificity compounded by habitat fragmentation may contribute to the strong genetic structuring over intermediate geographic distances seen in fisher populations in other parts of the species' range (Kyle *et al.* 2001, p. 2345; Wisely *et al.* 2004, pp. 644, 646). Higher levels of genetic structuring describe populations that are more genetically distinct and have less intrapopulation variation, a condition occurring in peripheral or more disturbed habitats of a species' range with low effective population sizes and limited genetic exchange (Kyle and Strobeck 2001, p. 343). Where these conditions exist, species face an increased vulnerability to extinction (Wisely *et al.* 2004, p. 646).

Small, isolated populations can be at risk from stochastic factors. Demographic stochasticity (the chance events associated with annual survival and reproduction) and environmental stochasticity (temporal fluctuations in environment conditions) tend to reduce population persistence (Shaffer 1981, p. 131). Combinations of factors can interact to increase the risk of extinction. Trapping pressure, for example, if additive to natural mortality, could act by itself or in combination with environmental conditions to have significant impact on annual survival. Regional fires that have occurred historically in the USNRMs could reduce the suitability of large forest tracts for decades, reducing habitat and further isolating small populations.

As stated above, we have little information to indicate the number of individuals, population dynamics, or evidence of genetic structuring and inbreeding for fishers in the USNRMs. Although we have no information on fisher abundance, their home range sizes are large – an indication that the availability of resources may be limiting population size. Their restricted geographic range, based on isolation from larger populations in Canada or the United States, frequently correlates with small population size (Purvis *et al.* 2000, p. 1947). Given the restricted distribution, the presumably small population size, and propensity to aggregate on the landscape, fishers in the USNRMs are vulnerable to demographic, environmental, and genetic stochasticity, which could impact long-term persistence. The USNRMs fisher population resurged from near extirpation in the 1920s with possible assistance from augmentations. It is likely that the historical populations were never large. Fishers' response to the impacts of a changing landscape from human development and timber harvest are uncertain. The species appears to have several characteristics related to small population size that increase the species' vulnerability to extinction from stochastic events and other threats on the landscape. Currently, we do not have sufficient information on these environmental or anthropogenic threats to know whether they affect small populations to an extent that threatens the fisher in the USNRMs. We are unable to quantify a foreseeable future for stochastic events that may have disproportionate negative effects on small population sizes. We do not anticipate the effects of these events on small population size to change, but our understanding of these effects may improve over time.

Summary of Factor E

Based on the best available information, we have no indication that other natural or anthropogenic factors are likely to significantly threaten the existence of the fisher in the USNRMs. We recognize the inherent vulnerabilities of small populations and restricted geographic range. The impacts of various potential threats can be more pronounced on small or isolated populations, and we have identified numerous potential threats occurring on the landscape within the range of the fisher in the USNRMs (see Factor A and B section). However, at this time we do not have information to indicate that these activities pose a threat to the fisher. Additionally, we do not consider a small population alone to be a threat to species; rather, it can be a vulnerability that can make it more susceptible to threat factors, if they are present.

We conclude that the best scientific and commercial information available indicates that the fisher in the USNRMs is not now, or in the foreseeable future, threatened by other natural or anthropogenic factors affecting its continued existence, or that these factors act cumulatively with other potential threats, to the extent that listing under the Act as an endangered or threatened species is warranted at this time.

Finding - Determination of Status of Distinct Population Segment

As required by the Act, we considered the five factors in assessing whether the fisher in the USNRMs is endangered or threatened throughout all or a significant portion of its range. We have carefully examined the best scientific and commercial information available regarding the status and the past, present, and future threats faced by the fisher in the USNRMs. We reviewed the petition, information available in our files, and other published and unpublished information submitted to us by the public following our 90-day petition finding. We also consulted with fisher experts and other Federal and State resource agencies. We were able to qualitatively describe a foreseeable future for forest management, development, and climate change and discussed how we anticipate each factor to change over time. We were unable to project specific changes to the species from these foreseeable actions into the future because we do not have sufficient data to know how the analyzed factors will affect the species.

The fisher is a forest-dependent species that evolved in the USNRMs in a complex landscape mosaic shaped by climate driven events such as fire, drought, and forest diseases. Fisher populations were greatly reduced to the point they were believed extirpated in the USNRMs in the early 20th century due to unregulated overharvest and indiscriminate predator control. Although current comprehensive fisher population numbers and trends are not known, fisher populations have resurged from previous lows concurrently with the effects of human development and timber harvest and the regulation of harvest. The USNRMs landscape supports fisher, but it is unknown if the system has the capacity to support a population long term. Interpreting or projecting the impacts of forest management, development, and resource extraction is complicated by a lack of knowledge of fisher habitat ecology in the region, and mixed reports of how fishers respond to human disturbance. Fisher habitats could be vulnerable to the climate change effects of increased temperature and earlier spring snowmelt predicted to produce longer fire seasons. An increase in incidence of forest diseases or novel diseases also could accompany a changing climate. Although the potential for changing fire and disease regimes exists, these events are dependent on complex patterns of moisture availability and cannot be predicted with confidence.

Targeted legal harvest of fishers occurs in Montana and accidental capture and mortality occurs in both Montana and Idaho. Low levels of additional mortality from harvest to natural mortality have the potential to negatively impact small, local populations if not adequately regulated. There is no indication that the distribution or population numbers of fisher are being negatively impacted directly by the current trapping regimes in Montana. Recent increases in incidental capture and associated mortality could be a concern in Idaho if the trend continues without some evaluation of the local and regional population impacts and remedial actions applied, if necessary.

A restricted geographic range like the fisher’s in the USNRMs frequently correlates with small population size, and it is likely that the historical populations were never large. Given the restricted distribution, the presumably small population size, and propensity to aggregate on the landscape, fishers in the USNRMs are vulnerable to extinction from stochastic events and other threats on the landscape which could impact long-term persistence. Fishers' response to the impacts of a changing landscape from human development, timber harvest and climate change are uncertain. As stated above, trapping pressure, if additive to natural mortality, could act by itself or in combination with environmental conditions to have significant impact on annual survival. Currently, we do not have information on these threats to an extent that allows us to know whether small population size allows for other environmental or anthropogenic factors to create a threat to the fisher in the USNRMs.

Our review of the best available scientific and commercial information pertaining to the five factors does not support the assertion that there are threats of sufficient imminence, intensity, or magnitude to indicate that the fisher in the USNRMs is in danger of extinction (endangered) within the foreseeable future (threatened), throughout all or significant portion of its range. Therefore, we find that listing the fisher in USNRMs throughout its range as an endangered or threatened species is not warranted at this time.

In making this finding, we recognize that the fisher in the USNRMs, despite not being warranted for listing as endangered or threatened, may benefit from increased management emphasis due to its need for forest cover and susceptibility to capture and mortality from furbearer harvest. We recommend precautionary measures to protect the species be continued where they are in place and expanded where they are not. We recommend and encourage additional research to improve the understanding of the species, so that our responses to future potential threats can be better understood.

Significant Portion of the Range

Having determined that the fisher in the USNRMs is not in danger of extinction or likely to become so within the foreseeable future throughout all of its range, we must next consider whether there are any significant portions of the range where the fisher in the USNRMs is in danger of extinction or is likely to become endangered in the foreseeable future.

The Act defines an endangered species as one “in danger of extinction throughout all or a significant portion of its range,” and a threatened species as one “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The term “significant portion of its range” is not defined by the statute. For the purposes of this finding, a portion of a species’ range (fisher in the USNRMs) is “significant” if it is part of the current range of the species, and it provides a crucial contribution to the representation, resiliency, or redundancy of the species. For the contribution to be crucial it must be at a level such that, without that portion, the species would be in danger of extinction.

In determining whether a species is threatened or endangered in a significant portion of its range, we first identify any portions of the range of the species that warrant further consideration. The range of a species can theoretically be divided into portions in an infinite number of ways. However, there is no purpose to analyzing portions of the range that are not reasonably likely to be significant and threatened or endangered. To identify only those portions that warrant further consideration, we determine whether there is substantial information indicating that: (1) The portions may be significant, and (2) the species may be in danger of extinction there or likely to become so within the foreseeable future. In practice, a key part of this analysis is whether the threats are geographically concentrated in some way. If the threats to the species are essentially uniform throughout its range, no portion is likely to warrant further consideration. Moreover, if any concentration of threats applies only to portions of the species' range that clearly would not meet the biologically based definition of "significant" (i.e., the loss of that portion clearly would not reasonably be expected to increase the vulnerability to extinction of the entire species to the point that the species would then be in danger of extinction), such portions will not warrant further consideration.

If we identify portions that warrant further consideration, we then determine their status (i.e., whether in fact the species is endangered or threatened in a significant portion of its range). Depending on the biology of the species, its range, and the threats it faces, it might be more efficient for us to address either the "significant" question first, or the status question first. Thus, if we determine that a portion of the range is not "significant," we do not need to determine whether the species is endangered or threatened there; if we determine that the species is not endangered or threatened in a portion of its range, we do not need to determine if that portion is "significant."

Applying the process described above for determining whether a species is threatened in a significant portion of its range, we considered status first to determine if any threats or potential threats acting individually or collectively threaten or endanger the species in a portion of its range. We have analyzed the threats to the degree possible, and determined they are essentially uniform throughout the species' range. The limited information available for the fisher, such as the lack of population numbers and dynamics, and an incomplete knowledge of tolerances to disturbance and habitat needs, does not allow us to determine what portion of the range if any, would be impacted to a significant degree more than any other.

Conclusion of 12-Month Finding

We do not find that the fisher in the USNRMs is in danger of extinction now, nor is it likely to become endangered within the foreseeable future, throughout all or a significant portion of its range. Therefore, listing the species as endangered or threatened under the Act is not warranted at this time.

We request that you submit any new information concerning the status of, or threats to, the fisher in the USNRMs to our Montana Ecological Services Field Office (see **ADDRESSES** section) whenever it becomes available. New information will help us monitor this species and encourage its conservation. If an emergency situation develops for the fisher in the USNRMs or any other species, we will act to provide immediate protection.

References Cited

A complete list of references cited is available on the Internet at *http://www.regulations.gov* and upon request from the Montana Ecological Services Field Office (see **ADDRESSES** section above).

Author

The primary author of this document is staff of the Montana Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT** section above).

Authority

The authority for this action is the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.).

June 14, 2011

/s/ Gabriela Chavarria

Acting Director, U.S. Fish and Wildlife Service

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