

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018-AF03

Endangered and Threatened Wildlife and Plants; Proposal To List the Contiguous United States Distinct Population Segment of the Canada Lynx as a Threatened Species; and the Captive Population of Canada Lynx Within the Coterminous United States (lower 48 States) as Threatened Due to Similarity of Appearance, With a Special Rule

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) proposes to list the contiguous United States population segment of the Canada lynx (*Lynx canadensis*) as threatened, pursuant to the Endangered Species Act of 1973, as amended (Act). This population segment includes the States of Washington, Oregon, Idaho, Montana, Utah, Wyoming, Colorado, Minnesota, Wisconsin, Michigan, Maine, New Hampshire, Vermont, New York, Pennsylvania, and Massachusetts. The contiguous United States population segment of the Canada lynx is threatened by human alteration of forests, low numbers as a result of past overexploitation, expansion of the range of competitors (bobcats (*Felis rufus*) and coyotes (*Canis latrans*)), and elevated levels of human access into lynx habitat. This rule also lists the captive population of Canada lynx within the coterminous United States (lower 48 States) as threatened due to similarity of appearance with a special rule.

DATES: Comments from all interested parties must be received by September 30, 1998. Public hearing locations and dates are set forth in **SUPPLEMENTARY INFORMATION** section.

ADDRESSES: Comments and materials concerning this proposal should be sent to the Field Supervisor U.S. Fish and Wildlife Service, Montana Field Office, 100 N. Park Ave., Suite 320, Helena, Montana 59601. Comments and materials received will be available for public inspection, by appointment, during normal business hours at the above address.

FOR FURTHER INFORMATION CONTACT: Kemper McMaster, Field Supervisor, Montana Field Office (see **ADDRESSES** section) (telephone 406/449-5225; facsimile 406/449-5339).

SUPPLEMENTARY INFORMATION: Public hearings on this proposal will be held in the following locations:

Western States*Colorado*

Wednesday, July 22, 1998 from 7 p.m. until 9 p.m. at the Ramada Inn, 124 W. 6th St., Glenwood Springs, Colorado. This public hearing will be preceded by an informational open house from 6 p.m. to 7 p.m.

Tuesday, July 28, 1998, from 7 p.m. until 9 p.m. at the Sheraton Denver West, 360 Union Boulevard, Lakewood, Colorado. This public hearing will be preceded by an informational open house from 6 p.m. to 7 p.m.

Idaho

Thursday, September 10, 1998, from 2 p.m. until 4 p.m. and from 6 p.m. until 8 p.m. at the Coeur d'Alene Inn and Conference Center, 414 West Appleway Avenue, Coeur d'Alene, Idaho.

Montana

Tuesday, July 21, 1998, from 2 p.m. until 4 p.m. and from 6 p.m. until 8 p.m. at the Colonial Inn Best Western, 2301 Colonial Drive, Helena, Montana.

Wednesday, July 22, 1998, from 2 p.m. until 4 p.m. and from 6 p.m. until 8 p.m. at Cavanaugh's at Kalispell Center, 20 N. Main, Kalispell, Montana.

Oregon

Tuesday September 15, 1998, from 2 p.m. until 4 p.m. and from 6 p.m. until 8 p.m. at Eastern Oregon University, Hoke University Center, 1410 L Avenue, Rooms 201-203, LaGrande Oregon.

Washington

Tuesday, September 8, 1998, from 2 p.m. until 4 p.m. and from 6 p.m. until 8 p.m. at the Cedars Inn, 1 Appleway, Okanogan, Washington.

Wyoming

Wednesday, August 12, 1998, from 2 p.m. until 4 p.m. and from 6 p.m. until 8 p.m. at the Cody Auditorium, Cody Club Room, 1234 Beck Avenue, Cody, Wyoming.

Eastern States*Maine*

Tuesday, September 15, 1998 from 7 p.m. until 9 p.m. at the Old Town High School, 240 Stillwater Ave, Old Town, Maine.

Great Lakes States*Wisconsin*

Tuesday, September 15, 1998 from 7 p.m. to 9 p.m. at the Northern Great Lakes Center on County Road G near

Hwy 2, west of Ashland, Wisconsin. This public hearing will be preceded by an informational open house from 6 p.m. to 7 p.m.

Background

The Canada lynx is a medium-sized cat with long legs, large, well-furred paws, long tufts on the ears, and a short, black-tipped tail (McCord and Cardoza 1982). Adult males average 10 kilograms (kg) (22 pounds (lb)) in weight and 85 centimeters (cm) (33.5 inches (in)) in length (head to tail), and females average 8.5 kg (19 lb) and 82 cm (32 in) (Quinn and Parker 1987). The lynx's long legs and large feet make it highly adapted to hunting in deep snow.

The bobcat (*F. rufus*) is a North American relative of the Canada lynx. Compared to the lynx, the bobcat has smaller paws, shorter ear tufts, a more spotted pelage, and only the top of the tip of the tail is black. The paws of the lynx have twice the surface area of those of the bobcat (Quinn and Parker 1987). The lynx also differs in its body proportions in comparison to the bobcat. Lynx have longer legs, with hind legs that are longer than the front legs, giving the lynx a "stooped" appearance (Quinn and Parker 1987). Bobcats are largely restricted to habitats where deep snows do not accumulate (Koehler and Hornocker 1991). Hybridization between lynx and bobcat is unknown (Quinn and Parker 1987).

Classification of the Canada lynx (also called the North American lynx) has been subject to revision. The Service, in accordance with Wilson and Reeder (1993), recognizes the Canada lynx as *L. canadensis*. The Service previously used the name *L. lynx canadensis* for the Canada lynx (Jones *et al.* 1992; S. Williams, Texas Tech University, pers. comm. 1994). Other scientific names still in use include *Felis lynx* or *F. lynx canadensis* (Jones *et al.* 1986; Tumlison 1987).

The historical and present North American range of the Canada lynx north of the contiguous United States includes Alaska and that part of Canada that extends from the Yukon and Northwest Territories south to the United States border, and east to New Brunswick and Nova Scotia. In the contiguous United States, the lynx historically occurred in the Cascade Range of Washington and Oregon; the Rocky Mountains from Montana, Idaho, and Oregon south to Utah and Colorado; the western Great Lakes region; and the northeastern United States region from Maine, south to New York and Pennsylvania, and east to Massachusetts (McCord and Cardoza 1982; Quinn and Parker 1987).

In the contiguous United States, Canada lynx inhabit a mosaic between boreal forests and subalpine coniferous forest or northern hardwoods, whereas Canada lynx habitat in Canada and Alaska is the boreal forest ecosystem (Barbour *et al.* 1980; McCord and Cardoza 1982; Koehler and Aubry 1994; M. Hunter, University of Maine, pers. comm. 1994, Colorado Division of Wildlife 1997).

Canada lynx are specialized predators that are highly dependent on the snowshoe hare (*Lepus americanus*) for food. Snowshoe hare prefer diverse, early successional forests with stands of conifers and shrubby understories that provide for feeding and cover to escape from predators and protection during extreme weather (Wolfe *et al.* 1982, Monthey 1986, Koehler and Aubry 1994). Lynx usually concentrate their foraging activities in areas where hare activity is high (Koehler *et al.* 1979; Parker 1981; Ward and Krebs 1985; Hash 1990; Weaver 1993; Koehler and Aubry 1994; D. Winger, U.S. Forest Service, pers. comm. 1994).

Canada lynx utilize late successional forests with large woody debris, such as downed logs and windfalls, to provide denning sites with security and thermal cover for kittens (McCord and Cardoza 1982, Koehler 1990, Koehler and Brittell 1990). In Washington, lynx used lodgepole pine (*Pinus contorta*), spruce (*Picea* spp.), and subalpine fir (*Abies lasiocarpa*) forests older than 200 years for denning (Koehler and Brittell 1990). Based on information from the western United States, Koehler and Brittell (1990) concluded sites selected for denning also must provide for minimal disturbance by humans and proximity to foraging habitat (early successional forests), with denning stands at least 1 hectare (ha) (2.471 acres (ac)) in size.

Lynx require adequate travel cover (frequently intermediate successional forest stages) to provide connectivity within a forest landscape for security, movement within home ranges, and access between den sites and foraging areas (Brittell *et al.* 1989, Koehler and Aubry 1994). Such areas also may provide foraging opportunities.

The size and shape of Canada lynx home ranges appear related to the availability of prey and the density of lynx (Koehler and Aubry 1994). Documented home ranges vary from 12 to 243 square kilometers (sq km) (5–94 square miles (sq mi)) and larger (Saunders 1963; Brand *et al.* 1976; Mech 1980; Parker *et al.* 1983; Koehler and Aubry 1994).

The association between lynx and snowshoe hare is considered a classic predator-prey relationship (Saunders

1963; van Zyll de Jong 1966; Quinn and Parker 1987). In much of its North American range, Canada lynx populations fluctuate with the approximate 10-year hare cycle of abundance (Elton and Nicholson 1942); as hare populations increase, lynx populations increase. Generally, it is believed that when hare populations are at their cyclic high, they deplete their food resources and hare populations decline. This causes lynx populations to decline as a result of reduced reproductive success caused by an inadequate alternate food source (Nellis *et al.* 1972; Brand *et al.* 1976).

Snowshoe hare provide the prey quality necessary to support high density lynx populations (Brand and Keith 1979). Lynx also prey opportunistically on other small mammals and birds, particularly when hare populations decline (Nellis *et al.* 1972; Brand *et al.* 1976; McCord and Cardoza 1982). Apparently, a shift to alternate food sources may not compensate for the decrease in hares consumed (Koehler and Aubry 1994). The lower quality diet causes sudden decreases in the productivity of adult females, and decreased survival of young, which causes recruitment to the breeding population to essentially cease (Nellis *et al.* 1972; Brand and Keith 1979).

Based primarily on studies in the western mountains of the contiguous United States, it appears lynx and snowshoe hare in more southern latitudes may not exhibit strong population cycles (Dolbeer and Clark 1975; Wolff 1980; Buehler and Keith 1982; Brittell *et al.* 1989; Koehler 1990; Koehler and Aubry 1994). Wolff (1982 in Koehler and Aubry 1994) hypothesized that the presence of additional predators and competitors of hares at lower latitudes accounts for this pattern. The relative stability of hare populations in southern latitudes also may be a result of patchy, suboptimal habitat (Buehler and Keith 1982, Koehler 1990, Koehler and Aubry 1994).

Periodic increases in lynx numbers in the contiguous United States may be accentuated by dispersal of transient animals from Canadian populations. Canada lynx are capable of dispersing extremely long distances (Mech 1977; Brainerd 1985; Washington Department of Wildlife 1993); for example, a male was documented traveling 616 km (370 mi) (Brainerd 1985). Canada lynx may disperse long distances from their normal range to search for food when snowshoe hare populations decline (Ward and Krebs 1985; C. Pils, *in litt.* 1994; Koehler and Aubry 1994). Canada lynx also may disperse when local lynx

densities are high (U.S. Fish and Wildlife Service 1977; Thiel 1987; J. Conley, Idaho Department of Fish and Game, *in litt.* 1994).

Because lynx occurrence throughout much of the contiguous United States is on the southern periphery of the species' range, there is speculation that presence of lynx in the contiguous United States is solely a consequence of dispersal from Canada. This has led to speculation that most of the United States may never have supported self-sustaining, resident¹ populations over time (T. Bremicker, Minnesota Department of Natural Resources, *in litt.* 1994; S. Fritts, U.S. Fish and Wildlife Service, *in litt.* 1994).

Based on the majority view of the respondents and the best scientific and commercial data available, the Service has determined that, historically, the Canada lynx was a resident species in 16 States in the contiguous United States, occurring in dispersed populations at relatively low densities (Rust 1946; Harger 1965; Nellis 1971; Henderson 1978; Brocke 1982; Mccord and Cardoza 1982; Brainerd 1985; Washington Department of Wildlife 1993; Koehler and Aubry 1994; Kurta 1995; T. Bailey, U.S. Fish and Wildlife Service, *in litt.* 1994; E. Bangs, U.S. Fish and Wildlife Service, pers. comm. 1994; P. Beir, Northern Arizona University, *in litt.* 1994; B. Berg, Minnesota Department of Natural Resources, pers. comm. 1994; P. Brussard, University of Nevada, *in litt.* 1994; G. Koehler, Independent Researcher, *in litt.* 1994; W. Krohn, University of Maine, *in litt.* 1994; J. Weaver, Independent Researcher, *in litt.* 1994). Furthermore, the historic and current presence of snowshoe hare populations, the lynx's primary food, within the same ecosystems in the contiguous United States (Adams 1959; Keener 1971; Dolbeer and Clark 1975; Buehler and Keith 1982; Fuller and Heisey 1986; Monthey 1986; Koehler 1991) supports the Service's conclusion.

The Service considers Canada lynx to have been historically resident within Maine, New Hampshire, Vermont, New York, Pennsylvania, Massachusetts, Michigan, Wisconsin, Minnesota,

¹ **Note:** With respect to the lynx and the analysis presented in this document, the terms "resident" and "resident population" mean a group or subgroup of lynx in an area (e.g., Minnesota) or portion of a larger area (e.g., Great Lakes States) that is capable of long-term persistence, based on self-sustaining reproduction of young and successful recruitment of young into the breeding age cohort, without immigration of lynx from Canada. It is acknowledged that movements of lynx across the United States and Canada border did occur and that this migration was beneficial to the lynx in the contiguous United States.

Montana, Wyoming, Washington, Oregon, Idaho, Utah, and Colorado.

While evidence suggests historical lynx numbers in the contiguous United States increased because of dispersal from lynx populations in northern latitudes during the cyclic peaks (Henderson 1978, Mech 1980), the Service does not conclude that dispersal from Canada was required to maintain the contiguous United States lynx population as viable. However, dispersal of Canada lynx into the contiguous United States may now be necessary to replenish lynx numbers because of the current status of lynx in the contiguous United States. In addition, the Service concludes that suitable Canada lynx habitat currently exists (and existed to a greater extent historically) in the contiguous United States (Rust 1946; Harger 1965; Nellis 1971; Washington Department of Wildlife 1993; Henderson 1978; B. Giddings, Montana Department of Fish, Wildlife, and Parks, *in litt.* 1994; S. Parren, Vermont Department of Fish and Wildlife, pers. comm. 1994; F. Hurley, *in litt.* 1994; and K. Staley, White Mountain National Forest, pers. comm. 1994).

Distribution and Status

Within the contiguous United States, the lynx population is divided regionally by ecological barriers consisting of unsuitable lynx habitat. These regions are the Northeast, the Great Lakes, and the Rocky Mountains/Cascades. To enhance the organization and clarity of this proposal, the regions are discussed separately below.

Northeast Region—Historically, lynx habitat in the Northeast United States existed in a mostly contiguous block of forest in the ecotone between boreal and deciduous forest. This forest has been described as sub-boreal forest (M. Hunter, University of Maine, pers. comm. 1994). Principal tree species include red spruce (*Picea rubens*) and balsam fir (*Abies balsamea*), interspersed with northern hardwoods such as sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), and American beech (*Fagus grandifolia*). Lynx once occurred from northern Maine, across northern New Hampshire and Vermont, to the Adirondacks in New York (McCord and Cardoza 1982) and probably occurred southward along the higher elevations of the mountain ranges in the region (Brocke 1982; K. Gustafson, New Hampshire Department of Fish and Game, pers. comm. 1994). Unfortunately, in records compiled prior to the 1970's, lynx were often not distinguished from bobcats (J. Cardoza,

Massachusetts Division of Fisheries and Wildlife, pers. comm. 1994).

Snowshoe hare habitat in the region is characterized by spruce/fir softwood forests typical of boreal forests; a mixture of mature and successional softwood growth provides cover and browse for hares (Monthey 1986). Forested habitat in the region has increased because of land-use changes during the past century (Irland 1982, Litvaitis 1993). In some areas, there may be a gradual upward trend in the coniferous component as spruce and fir regenerate beneath the hardwood species that had established after large-scale logging and burning at the turn of the century (D. Degraff, U.S. Forest Service, pers. comm. 1994; F. Hurley, Maine Department of Inland Fisheries and Wildlife, *in litt.* 1994; J. Lanier, New Hampshire Fish and Game, pers. comm. 1994). Although localized habitat conditions have improved, reoccupation of these areas may be impeded by barriers to lynx immigration, such as paved roads with high-volume traffic, nonforested agricultural habitats, or other intervening areas of unsuitable habitat.

Although Maine, New Hampshire, Vermont, and New York report areas of suitable lynx habitat and/or prey base, low numbers of lynx are present only in Maine and lynx may be extirpated throughout the remainder of the Northeast Region (see discussion below). Much of the potential lynx habitat in this region is held in private ownership (Harper *et al.* 1990).

Maine—In Maine, historical accounts indicate that, although lynx probably were never abundant, they were resident in the State and that numbers of lynx fluctuated over the past 150 years (Maine Department of Inland Fisheries and Wildlife, *in litt.* 1997). Information on population size, trends, distribution, and factors influencing these variables are sparse and mostly anecdotal (F. Hurley, *in litt.* 1994). Lynx were bountied in Maine prior to the closure of hunting and trapping seasons in 1967.

Suitable habitat and prey to support lynx are abundant in northwestern Maine (F. Hurley, *in litt.* 1994). The Maine Department of Inland Fisheries and Wildlife classifies the lynx as a species of special concern (Matula 1997). The lynx is currently protected from hunting and trapping.

Although no reliable population estimates exist, in 1994 it was suggested that only 200 animals or less occur statewide (Maine Department of Inland Fisheries and Wildlife 1994). A statewide track survey, initiated during the 1994/1995 winter was conducted for

3 successive years. A total of 4,118, 1-km (0.62-mi) transects were surveyed. Lynx were encountered on 54 of the transects in nine townships, all during the first year of the survey (Maine Department of Inland Fisheries and Wildlife, *in litt.* 1997). However, biologists have encountered lynx tracks in northwestern Maine during the past three winters while conducting unrelated fieldwork (Maine Department of Inland Fisheries and Wildlife, *in litt.*, 1998). The Service concludes a resident lynx population exists in Maine.

New Hampshire—Lynx were intermittently bountied in New Hampshire until 1965. In response to the apparent declines in lynx abundance reflected in bounty numbers, the bounty was repealed and thereafter the lynx was provided full protection from legal harvest (Siegler 1971; Silver 1974; Litvaitis *et al.* 1991). Despite legal protection, the lynx population did not increase. Since 1980, the lynx has been listed as an endangered species by the New Hampshire Fish and Game Department. Two years of winter track surveys did not detect Canada lynx (Litvaitis *et al.* 1991). The Service concludes the Canada lynx is very rare and likely extirpated from New Hampshire.

Vermont—In Vermont, historically, lynx likely occurred at low densities in the northern part of the State. Quantitative data on the current abundance or distribution of lynx are unavailable. By the mid-1900's, Vermont had not had a documented breeding population of lynx for several decades (Osgood 1938 *in* Vermont Department of Fish and Wildlife 1987). Since 1972 the lynx has been listed by the State as endangered. One of the last verified occurrences of lynx in the State occurred in 1968, with periodic reports since then. Suitable habitat exists in the northeastern section and along mountain ridges in the State, and snowshoe hares are present in high numbers (S. Parren, Vermont Department of Fish and Wildlife, pers. comm. 1994; C. Groves, Green Mountain National Forest, pers. comm. 1994). Canada lynx is currently considered to be extirpated in Vermont (S. Parren, pers. comm. 1998). The Service concludes the Canada lynx is very rare and likely extirpated from Vermont.

New York State—Historically, lynx occurred in most northern regions of New York, the Adirondack Mountains, and the Catskill Mountains (K. Gustafson, pers. comm. 1994), but they are now considered extirpated (G. Parsons, New York State Department of Environmental Conservation, *in litt.* 1994). By the 1880's, the population was

apparently approaching extirpation (Miller 1899 in Brocke 1982). Trapping and sighting records from the early 1900's to the present indicate that lynx occurred only infrequently. The most recent verified sighting was in 1980 (G. Parsons, *in litt.* 1994). An abundant prey base exists (Brocke 1982), but the habitat has been highly fragmented. Extensive road infrastructure and a lack of early successional coniferous forest in much of the potential habitat likely precludes natural lynx reestablishment in New York (G. Batchellor, New York State Department of Environmental Conservation, pers. comm. 1994; G. Parsons, *in litt.* 1994).

An effort to reintroduce Canada lynx into the Adirondack Mountains occurred from 1988 to 1990 (Brocke *et al.* 1990, D. Major, U.S. Fish and Wildlife Service, pers. comm. 1998), but success of the reintroduction remains doubtful. As of 1993, some Canada lynx were believed still present, but no reproduction had been documented (K. Gustafson, pers. comm. 1994). A collared lynx from the reintroduction effort was recently found near Ottawa, Ontario, Canada (M. Amaral, U.S. Fish and Wildlife Service, pers. comm. 1997). No verified occurrences in New York have been reported recently; however, both the State University of New York at Syracuse and the New York Department of Environmental Conservation maintain records of reported sightings. No further monitoring is planned. In New York, lynx are legally classified as a small game species with a closed season. The Service concludes the Canada lynx is very rare and probably extirpated from New York.

Pennsylvania/Massachusetts—In Pennsylvania and Massachusetts, located at the southernmost reaches of the historical range of the species in the Northeast United States (Hall and Kelson 1959), resident animals may have existed in the coniferous forests of higher elevations of mountain ranges, but accurate historical information is unavailable. Based on the lack of lynx habitat in these States, historically the animal was probably uncommon (J. Belfonti, *in litt.* 1994). Many individuals in these States may have dispersed from more northern regions during cyclic irruptions of the lynx populations in Canada (J. Belfonti, The Nature Conservancy, *in litt.* 1994). The last known record of a naturally occurring Canada lynx in Pennsylvania was in 1923 (J. Belfonti, *in litt.* 1994), and a possible record from 1930 exists for Massachusetts (J. Cardoza, *in litt.* 1994). The Service concludes lynx are

extirpated from Pennsylvania and Massachusetts.

Great Lakes Region—Historically the lynx was found in the western Great Lakes States of Michigan, Wisconsin, and Minnesota. The habitat occupied by lynx in this region consists primarily of an ecotone between boreal and mixed deciduous forest and is a mosaic of balsam fir, eastern hemlock (*Tsuga canadensis*), eastern white pine (*Pinus strobus*), jack pine (*P. banksiana*), quaking aspen (*Populus tremuloides*), birch (*Betula spp.*), and maple (*Acer spp.*) (Barbour *et al.* 1980). Much of the lynx habitat in this region is in public ownership, primarily county, State, or national forests.

The lynx population in this region was regularly supplemented by dispersing lynx from Canada (Harger 1965; M. DonCarlos, *in litt.* 1994; C. Pils, *in litt.* 1994). Historically, Ontario and Manitoba had very strong, cyclic lynx populations from which individuals dispersed to search for food during periods when the hare populations crashed or during cyclic highs of lynx populations. However, trapping harvests during the period of extremely high pelt prices in the 1970's and 1980's substantially impacted Canadian lynx populations. As a result, harvest was closed temporarily and since has been closely regulated (I. McKay, Manitoba Natural Resources, *in litt.* 1994; M. Novak, Ontario Ministry of Natural Resources, pers. comm. 1994). Because of low numbers of lynx, Manitoba closed its season on lynx harvest from 1995 to 1997 (I. McKay, pers. comm. 1997). Although current habitat conditions along the Canada/United States border for lynx are mostly intact and suitable, dispersal into the Great Lakes States has been severely limited because of the reduced lynx population in Canada (D. Mech, pers. comm. 1994; M. Novak, pers. comm. 1994).

Minnesota—In the past, Minnesota lynx populations fluctuated markedly during 10-year cycles and were influenced by influxes from Canada (Henderson 1978; Mech 1980; M. DonCarlos, Minnesota Department of Natural Resources, *in litt.* 1994). The resident lynx population was restricted to the northeastern area of the State; however, transients have been found throughout Minnesota (Gunderson 1978; Mech 1980).

Until 1965, lynx were bountied in Minnesota. In 1976, the lynx was classified as a game species and harvest seasons were established (M. DonCarlos, *in litt.* 1994). Harvest and bounty records for the State are available since 1930. Based on these records, highs in the lynx cycle were approximated to

have occurred in 1940, 1952, 1962, and 1973 (Henderson 1978). Henderson (1978) estimated that during a 47-year period (1930–1976), the Minnesota lynx harvest was substantial, ranging from at least 50 to more than 200 per year during 29 seasons.

From the mid-1970's to the late 1980's, pelt prices were extremely high in Canada and the United States. Also, from 1979 to 1980, hare numbers were at their cyclic peak (M. DonCarlos, *in litt.* 1994). Despite these two factors, lynx harvest remained very low and the expected lynx peak for the early 1980's did not occur (B. Berg, pers. comm. 1994; M. DonCarlos, *in litt.* 1994). As a result, the harvest season was closed and remains closed today. Although lynx are currently considered rare (D. Mech, pers. comm. 1994), available habitat in northern Minnesota is capable of maintaining resident lynx populations (M. DonCarlos, *in litt.* 1994). Based on recent anecdotal information, the Service concludes that a resident population possibly exists in Minnesota (P. Burke, U.S. Fish and Wildlife Service, pers. comm. 1998).

Wisconsin—A resident lynx population likely has not existed in Wisconsin since 1900 (Thiel 1987). The presence of lynx in Wisconsin has been associated with the cyclic lynx population fluctuations in Canada (Thiel 1987). A bounty on lynx existed until 1957. Between 1948 and 1956, 19 lynx were harvested in the State; annual harvest ranged from zero (1954) to four (1952) (Wisconsin Department of Natural Resources 1993). Lynx were placed on the protected species list in 1957 and were classified as State endangered in 1972 (C. Pils, *in litt.* 1994). Between 1976 and 1984, 63 lynx observations were reported, with most reports from the northwestern area adjacent to Minnesota; seven lynx were reported from 1991–1993, two of which were mortalities (Wydeven 1992; Wydeven 1993; Wydeven *in prep.*; C. Pils, *in litt.* 1994). There were no sightings of lynx in 1994 or 1995 and one possible set of tracks was sighted in 1996 (U.S. Fish and Wildlife Service, *in litt.* 1997). Snowshoe hares occur across northern Wisconsin (Buehler and Keith 1982). Potential lynx habitat in northern Wisconsin has remained in an early- to mid-successional mixed coniferous forest condition since the early 1900's, with some limited older growth present but primarily confined to forested wetlands (D. Zastrow, Wisconsin Department of Natural Resources, pers. comm. 1998). The lynx has been reclassified as a State protected species with a closed season (A. Wydeven, Wisconsin Department of Natural

Resources, pers. comm. 1998). Despite extensive review of historic and current information regarding the lynx in Wisconsin, neither Jackson (1961) nor Thiel (1987) were able to cite any evidence of breeding subsequent to the decline of the species in the 1800's. There has been a continued decline in confirmed sightings in recent years and the Service concludes that, based on available information, a resident population of lynx no longer exists in Wisconsin, although individual animals likely are present.

Michigan—In Michigan, historical reports indicate that the Canada lynx was resident and widespread throughout the upper and lower peninsula in the 19th century (Harger 1965). Lynx moved into the upper peninsula from Wisconsin or crossed the St. Mary's River from Ontario (Baker 1983). The limited ability for lynx dispersal from the upper to the lower peninsula, in addition to positive records of lynx in 23 lower peninsula counties, indicated that in the lower peninsula, Canada lynx were self-sustaining in the past (Harger 1965; Baker 1983). Canada lynx were believed extirpated from Michigan's lower peninsula in 1928, and by 1938 they were considered rare or extinct throughout the State (Harger 1965). The lynx persisted on Isle Royale in Lake Superior into the late 1970's (Peterson 1977 in Baker 1983). Based on the numbers and distribution of lynx reported from 1940 to 1965, particularly during 1962, Harger (1965) believed that lynx were repopulating Michigan as a result of improved habitat conditions in the upper peninsula.

The lynx was first listed as State endangered in 1974, but was not included on the list during revisions in 1976 and 1980. It was returned to the list as threatened in 1983 and its status upgraded to endangered in 1987, where it remains. As such, it is protected from harvest but conservation actions are limited because little is known about the species requirements (T. Weise, *in litt.* 1994).

Throughout the 1980's and 1990's, reports of lynx in the upper peninsula of Michigan have been rare; no lynx have been reported in the lower peninsula during this time period (T. Weise, Michigan Department of Natural Resources, *in litt.* 1994). The lynx's current distribution in Michigan is unknown but is likely limited to the upper peninsula. No surveys have been conducted to determine lynx numbers or range (T. Weise, *in litt.* 1994). The last breeding record was in 1976 (T. Weise, *in litt.* 1994). Suitable lynx habitat is currently available in

Michigan's upper peninsula (T. Weise, *in litt.* 1994). Since the mid-1960's the trend of lynx numbers has been unknown. However, the Service concludes that low numbers of lynx may still occur in Michigan's upper peninsula with no increasing trend apparent.

Rocky Mountain/Cascades Region—Lynx currently are thought to be present in the western mountains of the contiguous United States in the Cascades Range of Washington, the Thompson-Okanogan Highlands of northern Washington, the Blue Mountains of Oregon, and the Rocky Mountains in Idaho, Montana, Wyoming, Utah, and Colorado.

Lynx habitat in Montana occurs primarily in the high elevation mountains. Principal tree species include lodgepole pine (*Pinus contorta*), Douglas fir (*Pseudotsuga menziesii*), and subalpine fir (*Abies lasiocarpa*) (Koehler *et al.* 1979, Hash 1990). In Washington, lynx live in boreal-type forests that occur in north central Washington along the east slope of the Cascade Mountain range and the Thompson-Okanogan Highlands. In Oregon, lynx habitat exists in the Blue Mountains in northeastern Oregon and the Cascades. Preferred lynx habitat in Idaho consists of dense coniferous, high elevation forest broken by small shrubby openings and coniferous swamps (Leptich 1990). Unsuitable habitat in Wyoming's Red Desert isolates the lynx population in Colorado and extreme southeastern Wyoming from that of the Rocky Mountains to the northwest (Thompson and Halfpenny 1989; Koehler and Aubry 1994). Colorado's montane and subalpine forest ecosystems are naturally highly fragmented (Findley and Anderson 1956 in Koehler and Aubry 1994, Thompson 1994). Utah is considered the southern margin of the Canada lynx range.

Washington—In Washington, resident Canada lynx were historically found in highest concentrations in the northeast and north central regions, along the east slope of the Cascade Mountains (Washington Department of Wildlife 1993). Nellis (1971) regarded lynx occurrence in Washington as rare to common. Records of lynx exist from the Mount Rainier National Park area in the central Cascades, south in the Cascades nearly to the Oregon border on Mount Adams, and in the Blue Mountains in the southeastern part of the State (Taylor and Shaw 1927 in Koehler and Aubry 1994, Dalquest 1948, Washington Department of Natural Resources 1996a). Washington has designated six "Lynx Management Zones" across north central Washington (Washington

Department of Natural Resources 1996a). Currently, lynx occupy five of these zones: Okanogan, Kettle Range, the Wedge, Little Pend Oreille, and Salmo Priest. Additionally, lynx occupy the northern and southern Cascades of Washington (Washington Department of Natural Resources 1996a; C. Lee, U.S. Fish and Wildlife Service, pers. comm. 1998). Much of these areas are in Federal, Tribal, and State ownership.

A total harvest of 215 lynx was reported for the hunting and trapping seasons from 1960–61 to 1990–91, with peak harvests in 1969–70 (31 lynx) and 1976–77 (39 lynx) (Washington Department of Wildlife 1993). Following the 1976–77 season, lynx harvests decreased markedly, resulting in increasingly restrictive harvest regulations. Based on trapper interviews and track sighting, lynx densities in northeastern Washington appear to have been depressed during at least the past 20 years (Washington Department of Wildlife 1993). In response to markedly decreased harvests, regulations were tightened in 1977–78; lynx hunting and trapping seasons were closed in 1991 (Washington Department of Wildlife 1993).

The current lynx population in the State of Washington has been estimated at 96 to 191 individuals (Washington Department of Wildlife 1993). Brittell *et al.* (1989) estimated 225 lynx in Washington State. However, population estimates may be high because it was assumed that habitat suitability and lynx densities were similar across the range, which is not the case (Washington Department of Wildlife 1993). Since 1993, the lynx has been listed as a State threatened species (Washington Department of Wildlife 1993). The Service concludes that a resident lynx population exists in the State of Washington.

Oregon—Resident Canada lynx populations were historically low in Oregon (Koehler and Aubry 1994). Historic records exist from nine counties in Oregon (Bailey 1936, Nellis 1971). Recent observations of lynx have been reported from the Cascades and the Blue Mountains in northeastern Oregon (Csuti *et al.* 1997; E. Gaines, Oregon Natural Heritage Program, *in litt.* 1994; R. Anderson, Wallowa-Whitman National Forest, *in litt.* 1998). The Canada lynx is currently classified as a furbearer with a closed trapping and hunting season (E. Gaines, Oregon Natural Heritage Program, pers. comm. 1997). The Service concludes that a self-sustaining resident population does not exist in Oregon, but individual animals are present.

Idaho—According to Rust (1946), lynx were distributed throughout northern Idaho in the early 1940's, occurring in 8 of the 10 northern and north-central counties. In 1990, Hash reported stable or declining small lynx populations in Idaho. Harvest records were unreliable prior to the late 1980's because no distinction was made between lynx and large bobcats. In 1982, Idaho Department of Fish and Game initiated a mandatory pelt tagging program and the number of reported lynx harvests dropped to zero. Twelve lynx were reported harvested between 1978 and 1991 (M. Tera-Berns, Idaho Department of Fish and Game, pers. comm. 1997). No current population estimates are available (P. Harrington, U.S. Forest Service, pers. comm. 1994; J. Hayden, Idaho Department of Fish and Game, pers. comm. 1994). Recent confirmed lynx reports are scarce (J. Conley, Idaho Department of Fish and Game, *in litt.* 1994).

Prior to 1977, the species was considered a predator, subject to unrestricted harvest with no closed season and no bag limit. In 1990, in response to concern over the status of lynx in Idaho, the Idaho Department of Fish and Game instituted a statewide harvest quota of three lynx per year. Idaho closed the Canada lynx trapping/hunting season in the 1997/1998 season because the quota had not been filled in several years, although lynx remain classified as a furbearer. In 1995, a multiple agency Conservation Strategy was initiated to assess the conservation of the lynx and other forest carnivores (Idaho Department of Fish and Game *et al.* 1995; Roloff 1995). The Service concludes that a self-sustaining resident population does not exist in Idaho, but individual animals are present.

Montana—In Montana, Canada lynx were reported to be common (Nellis 1971) and were found throughout the western part of the State (B. Giddings, Montana Department of Fish, Wildlife, and Parks, *in litt.* 1994). After 1985, lynx populations in Montana were believed to be at or near their lowest levels in the past several decades (Hash 1990). Brainerd (1985) documented evidence of Canada lynx reproduction; however, more recent evidence of recruitment into the population has not been documented.

Until 1977, lynx in Montana were classified as nongame and were provided no regulatory protection (D. Childress, Montana Department of Fish, Wildlife, and Parks, *in litt.* 1990). Assessment of historic population levels or trends is difficult because lynx often were not distinguished from bobcats in harvest records prior to 1977. Between

1959 and 1967, estimates of statewide harvest ranged from a low of 36 in the 1961–62 season to a high of 376 during the 1963–64 season (Hoffman *et al.* 1969). However, these figures likely overestimate lynx abundance because they probably include bobcats. Since 1985, harvest records exist from 24 counties in the northwest, southwest, and west-central part of the State (B. Giddings, *in litt.* 1994). Hoffman *et al.* (1969) cited numerous records of lynx harvested in eastern Montana's Great Plains region between 1959 and 1967, but these records are suspect because of possible misidentification with bobcat.

Beginning in 1977, lynx were classified as a furbearer. A season length and licensing regulations were set, but no quota was imposed. Harvest records can reflect the status of lynx populations; however, the lynx harvest and, consequently, the lynx population likely were significantly influenced by extremely high pelt prices during the mid-1970's to late 1980's.

Since 1977, Montana's highest lynx harvest occurred in both 1979 and 1984 when 62 lynx were taken in each season (B. Giddings, *in litt.* 1994). Although quotas dropped incrementally from 135 to 40 over an 8-year period (1982–1989), lynx harvest never approached the quota levels, ranging from 62 to 15 animals taken per season (B. Giddings, *in litt.* 1994). After 1985, lynx harvests declined to record lows and lynx populations in Montana were believed to be at or near their lowest levels in the past several decades (Hash 1990). In response, a district of the Montana Trappers Association requested that lynx harvest be closed for one season (S. Conn, Montana Trappers Association, *in litt.* 1990). The State responded by decreasing the quota from 40 to 5 in 1990 (B. Giddings, *in litt.* 1994). During this period, the lowest annual harvest occurred in 1990, with two lynx taken while the quota was five (B. Giddings, *in litt.* 1994). From 1991 to the present, the quota has been two, which was filled annually or exceeded by one (1991) or two (1993) (B. Giddings, *in litt.* 1994).

The Montana Department of Fish, Wildlife, and Parks estimated the lynx population as 1,750 to 2,400 in 1977, 700 to 950 in 1982, and 1,040 lynx in 1994 (B. Giddings, *in litt.* 1994). These estimates were determined using a habitat area/density index. Habitat area estimates did not account for habitat areas that would be unsuitable for lynx.

Harvest records, winter track surveys conducted since 1990–91, and trapper logbooks, have led Montana Department of Fish, Wildlife, and Parks to conclude that the State's lynx population has

recovered and is distributed across its historic range (B. Giddings, *in litt.* 1994). However, others familiar with lynx in the Rocky Mountain region suggest that these estimates are optimistic, and express serious concerns about the status of lynx in Montana (E. Bangs, pers. comm. 1994; M. Hornocker, Hornocker Wildlife Research Institute, Inc., *in litt.* 1994; G. Koehler, *in litt.* 1994; L. Nordstrom, U.S. Fish and Wildlife Service, *in litt.* 1994; M. Roy and S. Torbit, National Wildlife Federation, *in litt.* 1994). The Service concludes a resident population of lynx is present in Montana.

Wyoming—In Wyoming, Canada lynx are generally believed to have been uncommon in the State because of the limited availability of large areas of suitable habitat (Reeve *et al.* 1986; Clark and Stromberg 1987; Wyoming Game and Fish Department 1992). Until 1957, lynx were bountied in the State. Since 1973, the lynx has been listed as a protected nongame species. Nearly all historical and recent records of lynx in Wyoming are from the western mountain ranges, primarily within the Greater Yellowstone Ecosystem (Reeve *et al.* 1986). However, documented reports of lynx in Yellowstone National Park are rare (S. Consolo-Murphy, Yellowstone National Park, pers. comm. 1994). Elsewhere in Wyoming, lynx have been reported from the Uinta Mountains in the extreme southwest and the Big Horn Mountains in the north-central part of the State, although these are unconfirmed by field investigations (Reeve *et al.* 1986).

Only 12 records of lynx exist for Wyoming from 1981 to 1994 (C. Gillin, Wyoming Game and Fish Department, *in litt.* 1994). In late 1996 the Wyoming Game and Fish Department began a study to attempt to document the current range of the lynx. Two lynx have been trapped and collared in the Wyoming Range and continue to be tracked (B. Oakleaf, Wyoming Game and Fish Department, pers. comm. 1998). In addition, one lynx was confirmed in the Wind River Range in 1997 (B. Luce, Wyoming Game and Fish, pers. comm. 1997).

If lynx exist in southeastern Wyoming, they are isolated from the rest of the State by the Red Desert but are contiguous with Colorado lynx populations (J. Fitzgerald, University of Northern Colorado, pers. comm. 1994; J. Halfpenny, Independent Researcher, pers. comm. 1994; J. Weaver, pers. comm. 1994). None of the reports of lynx in the Medicine Bow and Laramie ranges in southeastern Wyoming have been confirmed to date (Reeve *et al.* 1986). The Service concludes that,

although individual lynx are present, a resident population likely no longer exists in Wyoming.

Utah—In Utah, Canada lynx are thought to be nearly extirpated, although it is possible a few may exist in the high, inaccessible areas of the Uinta Mountains (B. Blackwell, Utah Department of Natural Resources, pers. comm. 1994). Sightings have been reported from most of the mountain ranges in Utah. However, because of misidentification with the bobcat, some of these records may not be valid (McKay 1991). Nearly all the reliable lynx reports are from the Uinta Mountain Range along the Wyoming border (McKay 1991). The lynx is listed as a State sensitive species. The Service concludes that a self-sustaining resident population does not exist in Utah, but individual animals may be present.

Colorado—Colorado represents the extreme southern edge of the range of the Canada lynx. Wyoming's Red Desert likely acts as a barrier that reduces or precludes opportunities for immigration and emigration, effectively isolating lynx in the southern Rocky Mountains in Colorado and Wyoming (Halfpenny *et al.* 1982; Koehler and Aubry 1994; G. Koehler, *in litt.* 1994; J. Weaver, *in litt.* 1994). It is likely Canada lynx never have been abundant in Colorado (Colorado Division of Wildlife *et al.* 1997), partially because its montane and subalpine forest ecosystems are naturally highly fragmented (Thompson 1994).

The lynx has been listed as a State endangered species since 1976 (Colorado Division of Wildlife *et al.* 1997). From the late 1800's to 1993, only 65 reliable lynx records exist; the last verified lynx specimens were taken in the early 1970's (J. Sheppard, Colorado Division of Wildlife, *in litt.* 1994). Since the late 1970's, intensive surveying efforts have revealed only minimal evidence of lynx presence (Halfpenny and Miller 1981; Thompson and Halfpenny 1989; Anderson 1990; Thompson and Halfpenny 1991; Andrews 1992; Carney 1993; Fitzgerald 1994; J. Sheppard, *in litt.* 1994; J. Halfpenny, pers. comm. 1994; Colorado Division of Wildlife *et al.* 1997). Lynx in Colorado are believed to be extremely rare and the long-term viability of the lynx in Colorado is questionable (Colorado Division of Wildlife *et al.* 1997). The Service concludes that a self-sustaining resident population does not exist in Colorado, but individual animals may be present.

Other Reports or Sightings—Lynx observations in Nevada, North Dakota, South Dakota, Iowa, Nebraska, Indiana, Ohio, and Virginia appear to be a result

of transients dispersing during periods of high lynx density elsewhere (Hall and Kelson 1959; Burt 1954 *in* Brocke 1982; S. Johnson, Indiana Department of Natural Resources, *in litt.* 1994; P. Jones, Ohio Department of Natural Resources, *in litt.* 1994; W. Jobman, U.S. Fish and Wildlife Service, *in litt.* 1997; Smithsonian Institute, *in litt.* 1998). During the early 1960's, lynx moved into the Great Plains and the Midwest region of the United States during an apparent cyclic high in surrounding lynx populations (Gunderson 1978; Mech 1980; DeStefano 1987; South Dakota Natural Heritage Program, *in litt.* 1994). Based on the lynx's ecological requirements, such records likely represent dispersing, transient individuals, not resident populations.

Summary of Status—Based on information available to the Service at this time, the Service concludes that lynx were resident in 16 States in the contiguous United States. Currently, resident populations of lynx likely exist in Maine, Montana, Washington, and possibly Minnesota. States with recent records of individual lynx sightings, but possibly no longer sustaining self-supporting populations, include Wisconsin, Michigan, Oregon, Idaho, Wyoming, Utah, and Colorado. Lynx may be extirpated from New Hampshire, Vermont, New York, Pennsylvania, and Massachusetts.

Previous Federal Action

The Canada lynx was added to Appendix II of the Convention on International Trade in Endangered Species of Wild Flora and Fauna in 1977. The Service classified the Canada lynx as a category 2 candidate species in the December 30, 1982, Vertebrate Notice of Review (47 FR 58454). Category 2 species were those species for which information in the Service's possession indicated that listing was possibly appropriate, but for which substantive data on biological vulnerability and threats were not available to support a proposed rule. Candidate species are currently defined as those species for which the Service has sufficient information on file detailing biological vulnerability and threats to support issuance of a proposed rule, but issuance of the proposed rule is precluded by other listing actions. On October 6, 1992, the Service published a notice of a 90-day petition finding indicating that the August 22, 1991 petition did not present substantial information to indicate that listing the North Cascades population of the Canada lynx as endangered was warranted (57 FR 46007). A lawsuit was filed challenging the October 6, 1992,

petition finding. On July 9, 1993, the Service published a notice indicating that it had revisited the North Cascades 90-day petition after receiving new information and again found that there was not substantial information to indicate that listing the population may be warranted (58 FR 36924). The Service announced in the finding that a status review would be conducted. In a settlement agreement dated November 30, 1993, the Service agreed to conduct a status review throughout the lower 48 States to determine if the species was threatened or endangered, and to complete the review and publish the finding by November 15, 1994. On February 2, 1994, the Service published a notice (59 FR 4887) announcing continuation of the status review that was initiated in 1982.

On April 27, 1994, the Service received a petition to list the coterminous United States population of "North American" lynx as threatened or endangered. Additionally, the petitioners requested that the southern Rocky Mountain population of the "North American" lynx in Wyoming and Colorado be emergency listed. A notice was published on August 26, 1994 (59 FR 44123), indicating that the petition presented substantial information that listing may be warranted, but that there was not substantial information to indicate that emergency listing may be warranted for the Southern Rocky Mountain population.

On December 27, 1994, the Service published a notice (59 FR 66507) of its 12-month finding as to the status of the Canada lynx in the 48 contiguous States, as directed by the settlement agreement and the petition, that listing was not warranted because of the lack of residency of lynx populations in the lower 48 States and the Service's inability to substantiate that threats such as "trapping, hunting, poaching, and present habitat destruction" actually "threaten the continued existence of the lynx in the wild." On January 30, 1996, the Defenders of Wildlife and 14 other plaintiffs challenged the Service's finding by filing a lawsuit.

On March 27, 1997, the U.S. District Court (District of Columbia) issued an order setting aside the not warranted finding and remanded it to the Service for further consideration. The Service was ordered to publish a 12-month finding on the status of the lynx within 60 days. On May 27, 1997, the Service published a 12-month petition finding (62 FR 28653) that the Canada lynx population in the contiguous United States was warranted for listing under

the Act but precluded by higher priority listing actions. This warranted but precluded finding automatically elevated the Canada lynx to candidate species status. Candidate species are defined as those species for which the Service has sufficient information on file detailing biological vulnerability and threats to support issuance of a proposed rule, but issuance of the proposed rule is precluded by other listing actions.

On September 15, 1997, Defenders of Wildlife, *et al.* filed suit against the Service in the U.S. District Court, District of Columbia, arguing that the Service violated the Act in finding that listing the Canada lynx population in the contiguous United States was warranted but precluded. On December 22, 1997, the court denied the plaintiffs' motion to enforce judgement against the Service's May 1997 warranted but precluded finding for the Canada lynx population in the contiguous United States. At the same time, the court set an expedited schedule and hearing date (March 18, 1998) for the lawsuit filed in September 1997.

On February 12, 1998, the U.S. District Court approved a settlement agreement between the Service and the Plaintiffs that called for the Service to publish a proposed rule to list the Canada lynx in the contiguous United States by June 30, 1998. This proposed rule for the contiguous United States population of the Canada lynx fulfills the requirement of the settlement agreement and serves as the final 12-month warranted finding on the petitions to list the lynx.

Processing of this proposed rule conforms with the Service's Listing Priority Guidance for Fiscal Years 1998 and 1999, published on May 8, 1998 (63 FR 25502). The guidance clarifies the order in which the Service will process rulemakings giving highest priority (Tier 1) to processing emergency rules to add species to the Lists of Endangered and Threatened Wildlife and Plants (Lists); second priority (Tier 2) to processing final determinations on proposals to add species to the Lists, processing new proposals to add species to the Lists, processing administrative findings on petitions (to add species to the Lists, delist species, or reclassify listed species), and processing a limited number of proposed or final rules to delist or reclassify species; and third priority (Tier 3) to processing proposed or final rules designating critical habitat. Processing of this proposed rule is a Tier 2 action. At this time, this region has no pending Tier 1 actions and is progressing with work on Tier 2 actions. This proposed rule also conforms to

earlier Service guidance on assignment of priorities to species under consideration for listing as endangered or threatened published in the **Federal Register** on September 21, 1983 (48 FR 43098). This guidance sets up a priority system from 1–12 based on immediacy and magnitude of threat and on species' taxonomy. In the Service's May 1997 finding the lynx was elevated to candidate status and given a listing priority of 3.

In accordance with the policy promulgated July 1, 1994 (59 FR 34270), the Service will solicit the opinions of independent Canada lynx experts and/or conservation biologists regarding the proposed rule. The purpose of such review is to ensure listing decisions are based on scientifically sound data, assumptions, and analyses, including input of appropriate experts and specialists. Peer reviewers will be identified through requests to research institutions, universities, and museums for individuals with recognized expertise with the subject matter. The reviewers will be asked to comment during the public comment period upon the specific assumptions and conclusions regarding the proposed listing and special rule. These comments will be considered in the preparation of the final rule as appropriate. In a status review of the lynx in 1994, prior to the publication of the Service's formal peer review policy, the Service solicited the comments of 31 independent experts and/or conservation biologists regarding the effects of cyclic Canada lynx movements from Canada to the contiguous United States. Of the 16 responses received, 9 respondents believed Canada lynx should be considered resident in portions of the contiguous United States, 1 did not (regarding the Great Lakes region only), and 6 did not specifically respond to the questions.

Summary of Factors Affecting the Species

Section 4 of the Act and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act set forth the procedures for adding species to the Federal lists. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to the Canada lynx (*Lynx canadensis*) are discussed below.

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

Since the mid-to-late 1800's, several habitat-related factors influenced, and

continue to contribute to, declines in local or regional Canada lynx populations. The most influential factor affecting lynx habitat is human alteration of the distribution and abundance, species composition, successional stages, and connectivity of forests, and the resulting changes in the forests' capacity to sustain lynx populations. Additionally, forest fragmentation isolates habitat into relatively small patches, thereby reducing the viability of wildlife that are dependent on larger areas of forest habitat (Litvaitis and Harrison 1989).

In all regions of the lynx range in the contiguous United States, timber harvest and its related activities are a predominant land use affecting lynx habitat. Forestry practices can be beneficial or detrimental for lynx depending on the method and timing by which they are conducted. Timber harvest can be used to achieve the early successional stages of forest preferred by snowshoe hares, although it takes time (15 years or more depending on the type of forest) for harvested areas to reach this stage (Monthey 1986, Quinn and Parker 1987, Koehler 1990, Koehler and Brittell 1990, Washington Department of Wildlife 1993). For example, in the West, thinning (either single tree or group selection), if implemented in a well-planned harvest prescription, can hasten the development of late-successional forests containing structures such as downed woody debris for thermal and security cover and for denning; early thinning to maximize tree-growth potential can be compatible with snowshoe hare and lynx habitat needs provided that stands are thinned before snowshoe hares recolonize the area (Koehler and Aubry 1994).

Intensive tree harvesting (e.g., large-scale clearcutting) can eliminate the mosaic of habitats necessary for Canada lynx survival, including late successional denning and early successional prey habitat. Specifically, these activities can result in reduced cover, unusable forest openings, and monotypic stands with a sparse understory that are unfavorable for Canada lynx and/or their prey (Brittell *et al.* 1989; de Vos and Matel 1952; Harger 1965; Hatler 1988; Koehler 1990; K. Gustafson, pers. comm. 1994; J. Lanier, pers. comm. 1994). Canada lynx avoid openings such as clearcuts, unforested areas, and grasslands (Koehler *et al.* 1979; Koehler and Brittell 1990, Murray *et al.* 1994) and snowshoe hares are also unlikely to use such areas because of the lack of cover (Koehler *et al.* 1979; H. Golden, Alaska Department

of Fish and Game, pers. comm. 1994; Koehler and Aubry 1994).

Great Lakes and Northeast Region

Softwoods that provided Canada lynx habitat were logged extensively during the late 1800's and early 1900's (Jackson 1961; Barbour *et al.* 1980; Belcher 1980; Irland 1982). Over a relatively short period, timber extraction during this era resulted in the replacement of late-successional conifer forest with extensive tracts of very early successional habitat and eliminated cover for lynx and hare (Jackson 1961, Keener 1971). Coniferous forests also were cleared for agriculture during this period. In the Northeast Region, slash, accumulated during logging operations, fueled wildfires that burned vast acreages of softwood forest (Belcher 1980; J. Lanier, pers. comm. 1994). This sudden alteration of habitat likely resulted in sharp declines in snowshoe hare numbers over large areas, subsequently reducing Canada lynx numbers (Jackson 1961; Keener 1971; K. Gustafson, pers. comm. 1994; J. Lanier, pers. comm. 1994).

During these early periods of timber extraction in the Northeast and Great Lakes Regions, probable declines in Canada lynx numbers were concurrent with substantial increases in human populations and unregulated trapping in or near lynx habitat (K. Gustafson, pers. comm. 1994; J. Lanier, pers. comm. 1994). By the turn of the century in the Northeast Region, historical records indicate that lynx populations were declining or were nearly extirpated (Silver 1974; Vermont Department of Fish and Game 1987; K. Gustafson, *in litt.* 1994; G. Parsons, *in litt.* 1994).

The impacts of the logging conducted in the Northeast Region during the late 1800's continue to affect Canada lynx habitat. In Maine, softwood cover and dense sapling growth provided improved snowshoe hare habitat after timber harvest and fires in late successional forests (Monthey 1986). However, in the western sections of the Northeast Region, extensive tracts of predominantly softwood forests that were harvested and burned-over during the late 1800's and early 1900's were subsequently replaced with regenerating hardwoods (D. Degraff, pers. comm. 1994; J. Lanier, pers. comm. 1994). For a period of time, this extensive area would have been in the early successional habitat used by snowshoe hare. However, such extensive tracts did not provide the mosaic of forest habitats required by lynx and, as succession progressed, these tracts became unsuitable for both lynx and hare. Hardwood forests do not typically

supply adequate cover for snowshoe hares (Monthey 1986). Additional declines in hare populations may have occurred during the 1940's and 1950's as a result of large-scale forest maturation (Litvaitis *et al.* 1991).

In Maine, large tracts of forest (some as large as 36-square mile townships) were harvested in the 1960's to reduce the incidence of spruce budworm. Harvesting of these large tracts create a simplified, monotypic forest over large areas, not a mosaic of forest stands. Passage of the State Forestry Practices Act has required clearcut size to be substantially reduced.

At higher elevations and northern latitudes in the Northeast, red spruce and balsam fir are important components of snowshoe hare habitat. Declines in red spruce forests have been documented, and drought, acid deposition, and other human-generated pollutants have been suggested as principal causes (Scott *et al.* 1984).

Lynx populations have not increased in the Northeast Region despite some apparent improvements in habitat. Forested habitat in the Northeast has increased because of land-use changes during the past century (Irland 1982; Litvaitis 1993). In some areas there may be a gradual upward trend in the coniferous component as spruce and fir regenerate beneath hardwood species (D. Degraff, pers. comm. 1994). Several of the Northeast States support adequate, if not abundant, snowshoe hare populations (C. Grove, Green Mountain National Forest, pers. comm. 1994; F. Hurley, *in litt.* 1994; J. Lanier, pers. comm. 1994).

Isolation of suitable habitat and lack of immigration apparently remain important factors in the continued absence of lynx populations in the Northeast Region (Litvaitis *et al.* 1991; W. Krohn, University of Maine, *in litt.* 1994; R. Lafond, Quebec Department of Recreation, Fish, and Game, pers. comm. 1994). Historically, resident Canada lynx populations in the Northeast were periodically supplemented with transient or dispersing individuals from the north (Litvaitis *et al.* 1991; J. Lanier, pers. comm. 1994). However, over the past several decades, Canada lynx numbers also declined in the southern portions of its range in Canada in response to overexploitation and clearing of forested habitat for agriculture, timber, and human settlement (Mills 1990; McAlpine and Heward 1993; Quebec Department of Recreation, Fish, and Game, *in litt.* 1993). The fragmented landscape across southern Quebec probably presents a substantial barrier to lynx attempting to disperse

southward across the St. Lawrence River (W. Krohn, *in litt.* 1994; R. Lafond, pers. comm. 1994; J. Lanier, pers. comm. 1994; J. Litvaitis, University of New Hampshire, pers. comm. 1994). However, lynx from a resident population in a Quebec reserve south of the St. Lawrence should encounter little difficulty crossing into Maine (C. McLaughlin, Maine Department of Inland Fisheries and Wildlife, *in litt.* 1998). Similarly, movement of lynx into Maine from occupied habitat in New Brunswick should be possible.

Today, diminished numbers of Canada lynx in southern Canada and the paucity of functional dispersal routes from Canadian lynx populations have substantially restricted the opportunity for Canada lynx to recolonize suitable habitat in New York, Vermont, and New Hampshire (Litvaitis *et al.* 1991; W. Krohn, *in litt.* 1994; R. La Fond, pers. comm. 1994; J. Lanier, pers. comm. 1994).

In 1990, the U.S. Forest Service published a report that examined the northern forest lands in New York, Vermont, New Hampshire, and Maine (Harper *et al.* 1990). The 26-million acre study area encompassed most of the historic range of lynx in the region. Eighty-four percent of northern forest lands in the region are currently privately owned and 16 percent are in public ownership, of which only 300,000 acres are federally owned. Commercial forestry continues to be the dominant land use on 60 percent of the private lands in the northern forests. The rapid pace of subdivision for recreation home sites has been identified as a serious concern to maintaining the integrity of Northeast forests (Harper *et al.* 1990).

Habitat fragmentation from forestry management programs, agricultural conversions, and roadway construction may be limiting lynx in the Great Lakes States. However, insufficient information currently exists to assess the impact of these threats to lynx. Lynx habitat quality appeared to be increasing in Michigan's upper peninsula as of 1965 (Harger 1965); however, as of 1998, lynx numbers have not increased in response to predicted improved habitat (Kurta 1995).

Rocky Mountain/Cascades Region

The majority of Canada lynx habitat in the West occurs on public lands. Research linking forest management on Federal lands in the West to Canada lynx habitat requirements is minimal.

In the interior Columbia River basin of eastern Washington and Oregon, Idaho, and western Montana, timber harvest patterns, along with the

exclusion of fire have converted much of the late successional stage forest to younger, mid-successional stage forests (U.S. Forest Service and Bureau of Land Management 1996). There has been an increase in fragmentation of forest lands and loss of connectivity within and between blocks of habitat, which has isolated some wildlife habitats and reduced the ability of some wildlife populations to move across the landscape (U.S. Forest Service and Bureau of Land Management 1997).

In the Seeley-Swan Valley in northwestern Montana, the forest landscape has become increasingly fragmented since 1930, consisting of smaller, more numerous patches with more edge and less interior habitat (Hart 1994). Fragmentation was caused by an extensive network of highway and forest roads, timber harvest, and residential construction. Timber harvest replaced fire as the dominant disturbance process (Hart 1994). Mature/overmature forests have declined in total area, while seedling and sapling seral stages have become more extensive (Hart 1994). The amount of predicted lynx habitat in the Seeley-Swan Valley has declined 36 percent since 1930 and became more fragmented over time (Hart 1994).

Recolonization of suitable lynx habitat within the State of Washington eventually may be precluded by the fragmentation of habitat and potential isolation from the lynx population in Canada (Washington Department of Wildlife 1993).

Fire has played an important role in forest ecology in western mountain ranges of the United States. Forest fires naturally maintained mosaics of early successional forest stands, unburnt bogs and swamps, and late-successional conifer forest forming ideal snowshoe hare and Canada lynx habitat (Todd 1985; Fischer and Bradley 1987; Quinn and Parker 1987). During the early twentieth century, Federal and State agencies in the contiguous United States enacted a policy of suppressing forest fires. The lack of adequate hare habitat in southern latitudes may be partially a result of fire suppression during the past 50 years (Koehler 1990). Suppression of forest fires in the West has allowed forests to mature, thereby reducing habitat suitability for snowshoe hares and Canada lynx (Brittall *et al.* 1989; Fox 1978; Koehler 1990; Washington Department of Wildlife 1993; T. Bailey, U.S. Fish and Wildlife Service, *in litt.* 1994; H. Golden, pers. comm. 1994). Fire suppression is most likely affecting lynx habitat in areas where historical frequency of fires is shorter than the length of time fires have been

suppressed in the Region (P. Stickney, U.S. Forest Service, pers. comm. 1994).

In all regions of the contiguous United States lynx range, clearing of forests for urbanization, recreational developments such as ski areas, and agriculture has fragmented, degraded, or reduced the available suitable lynx habitat, reduced the prey base, and increased human disturbance and the likelihood of accidental trapping, shooting, or highway mortality (de Vos and Matel 1952; Harger 1965; Belcher 1980; Thiel 1987; Todd 1985; Thompson 1987; Harper *et al.* 1990; Brocke *et al.* 1991; Thompson and Halfpenny 1991; Colorado Division of Wildlife *et al.* 1997) (see factor E).

B. Overutilization for Commercial, Recreational, Scientific, or Education Purposes

The Service believes that the effects of an overharvest of Canada lynx during the 1970's and 1980's persist today and continue to reduce the potential for recovery of lynx populations in the contiguous United States by precluding repopulation of areas of suitable habitat. Where exploitation is intense and recruitment is low, trapping can significantly depress lynx populations (Koehler and Aubry 1994). Fewer Canada lynx of breeding age reduce the ability and degree to which lynx populations recover after population lows (de Vos and Matel 1952; Brand and Keith 1979; Todd 1985; Ward and Krebs 1985; Bailey *et al.* 1986; Hatler 1988; Brittall *et al.* 1989). Elton and Nicholson (1942) recognized that overharvest had the potential to diminish lynx populations to levels where the natural cycles of lynx populations could not occur.

Lynx behavior makes them susceptible to trapping. Canada lynx are easy to catch in traps (Bailey *et al.* 1986; Hatler 1988; Mills 1990). The potential number of traps a lynx encounters is increased when it moves long distances to search for prey. Canada lynx are more vulnerable to concentrated trapping efforts because lynx focus their hunting in areas where snowshoe hare densities are high (Ward and Krebs 1985). On the Kenai Peninsula, Alaska, juvenile lynx were five times more vulnerable to trapping than adults; several juvenile siblings can easily be trapped from a small area (Bailey *et al.* 1986). Trapping females that are accompanied by kittens often results in the death of those kittens because they are unable to feed and protect themselves (Bailey *et al.* 1986; Carbyn and Patriquin 1983; Parker *et al.* 1983). It is possible for a trapper to remove a large proportion of a local lynx population by trapping where lynx

are concentrated (Carbyn and Patriquin 1983; Ward and Krebs 1985; Bailey *et al.* 1986; J. Weaver, pers. comm. 1994).

Human-induced mortality is the most important mortality factor for Canada lynx populations (Ward and Krebs 1985). Trapping mortality has been shown to be entirely additive (i.e., in addition to natural mortality) rather than compensatory (taking the place of natural mortality) (Brand and Keith 1979). In Minnesota, trapping was estimated to account for 81 percent of known lynx mortality during cyclic lows and 58 percent of mortality during cyclic highs (Henderson 1978). In numerous studies, trapping or shooting was documented as the cause of a substantial majority of Canada lynx mortalities (Mech 1980; Carbyn and Patriquin 1983; Ward and Krebs 1985; Bailey *et al.* 1986).

Unregulated trapping and hunting of Canada lynx continued for decades in the contiguous United States. Lynx were bountied in several States until relatively recently. Canada lynx were likely overexploited during periods of unregulated harvest in the Northeast and Great Lakes regions (K. Gustafson, pers. comm. 1994; J. Lanier, pers. comm. 1994). In the Rocky Mountains/Cascades Region, lynx population declines prior to 1940 were attributed to high trapping pressure (Nellis 1971).

Historically, lynx trapping provided a significant economic return in the fur trading industry. During periods of high pelt prices, the potential for obtaining even a single lynx pelt made trapping efforts worthwhile (Quinn and Parker 1987, Hatler 1988). This economic incentive increases the threat of over exploitation of Canada lynx populations.

The present low numbers of lynx in the contiguous United States and southern Canada are the residual effects of substantial overtrapping that occurred in the 1970's and 1980's, in response to unprecedented high pelt prices (Bailey *et al.* 1986; B. Berg, pers. comm. 1994; D. Mech, pers. comm. 1994; M. Novak, Ontario Ministry Natural Resources, pers. comm. 1994; A. Todd, Alberta Department of Forestry, Lands, and Wildlife, pers. comm. 1994). As a result of fur demands by the fashion industry, pelt prices began increasing around 1975 (Hatler 1988, Hash 1990). In Montana, the 1974 average pelt price was \$63, but by 1978 the average price increased over 500 percent to \$348 (B. Giddings, *in litt.* 1994). Lynx pelt prices peaked in the mid-1980's at nearly \$500 and remained above \$200 per pelt for 12 years until 1989. Pelt prices were comparable throughout the United States and

Canada (Todd 1985; Hatler 1988; I. McKay, Manitoba Natural Resources, *in litt.* 1994; Quebec Department of Recreation, Fish, and Game, *in litt.* 1994).

The number of Montana bobcat and lynx trapping licenses is an example of a general index of trapper effort and also of the amount of trapping pressure on lynx populations. Records indicate that the price of pelts influenced the trapping effort. The average number of licensed lynx and bobcat trappers from 1972–73 through 1974–75 was 1,600 (B. Giddings, *in litt.* 1994). After the record high pelt prices in 1978–79, a total of nearly 5,000 trappers were licensed for the next season. Although information on licenses was not available after 1982, trapper effort likely remained high as long as pelt prices were high and lynx were being trapped. Records for other regions during this period demonstrate the same trend (Brand and Keith 1979; Todd 1985; Bailey *et al.* 1986; Hatler 1988; Washington Department of Wildlife 1993; M. DonCarlos, *in litt.* 1994; I. McKay, *in litt.* 1994; Quebec Department of Recreation, Fish, and Game, *in litt.* 1994).

This period of intense trapping pressure also occurred during a period of naturally declining Canada lynx numbers in Canada. Periods of population decline are critical times when trapping has a greater additive impact on a population's ability to recover from periodic lows (Brand and Keith 1979; Bailey *et al.* 1986). Alberta's lynx fur harvest during the 1975–76 cyclic low was still nearly 2 to 3 times higher than that during the preceding two cyclic lows (Todd 1985). In Quebec from 1976 to 1979, lynx harvest reached record highs for a period during a cyclic low in hare and lynx populations (Quebec Department of Recreation, Fish, and Game, *in litt.* 1993). These harvest levels are linked to the highest pelt prices ever recorded there and to a continuous and sustained increase in the number of trappers during the preceding decade.

The additive trapping mortality of Canada lynx during the 1970's and 1980's depleted the breeding stock of lynx populations in the United States and southern Canada, which limited the ability for lynx populations to subsequently recover and repopulate areas of suitable habitat. Lynx populations may have become so severely depleted that they cannot reach their former densities during the periods of abundant prey and maximum reproductive success (Quinn and Parker 1987; Hatler 1988). The lynx population of the 1980's and 1990's has reflected the over exploitation of the previous

decade in the lack of cyclic lynx highs in parts of the contiguous United States and the lack of typical cyclic influxes of lynx from Canada, although data have indicated normal hare populations (M. DonCarlos, *in litt.* 1994; M. DonCarlos, pers. comm. 1994).

In response to substantially declining harvests during the 1970's and 1980's (indicating that lynx populations were being over exploited), Washington, Montana, Minnesota, Alberta, British Columbia, Manitoba, Ontario, Quebec, and Alaska severely restricted or closed their lynx harvest seasons (Bailey *et al.* 1986; Hatler 1988; Hash 1990; Washington Department of Wildlife 1993; S. Conn, *in litt.* 1990; M. DonCarlos, *in litt.* 1994; B. Giddings, *in litt.* 1994; R. McFetridge, Alberta Environmental Protection, *in litt.* 1994; I. McKay, *in litt.* 1994; M. Novak, pers. comm. 1994). Because of continued concern for lynx populations, none of the States have relaxed their restrictions, and many Canadian provinces still maintain careful control of lynx harvest (Alberta Environmental Protection 1993; Washington Department of Wildlife 1993; M. DonCarlos, *in litt.* 1994; B. Giddings, *in litt.* 1994; R. McFetridge, *in litt.* 1994; I. McKay pers. comm. 1997).

As of 1993, the lynx population in portions of Quebec apparently has not yet fully recovered despite adequate, increasing hare populations (Quebec Department of Recreation, Fish, and Game, *in litt.* 1993). Because of concern over a potentially declining lynx population, the British Columbia government closed the season on Canada lynx for a 3-year period in the mid-1990's (A. Fontana, British Columbia Department of Wildlife, pers. comm. 1994). Manitoba closed its lynx season Province-wide from 1995–1997 because of low lynx numbers (I. McKay, pers. comm. 1997).

States where lynx currently or historically occur declare harvest of lynx illegal, with the exception of Montana, where legal harvest is set by a limited statewide quota of two. In all States where the lynx was considered to be a resident species, lynx are included on the State's lists of endangered, threatened, protected, or regulated game species.

C. Disease or Predation

Disease and predation are not known to be factors threatening Canada lynx. However, in areas with human population centers, or high human densities in more rural areas, diseases of domestic animals may pose potential threats to lynx (R. Brocke, State

University of New York, pers. comm. 1994).

D. Inadequacy of Existing Regulatory Mechanisms

There are no regulatory mechanisms that address the management or conservation of functional Canada lynx habitat, although most states provide the Canada lynx with protection from hunting and trapping.

Lynx are classified as endangered by 4 of the 16 States in the contiguous United States where the Canada lynx was considered to be a resident species, Vermont (1972), New Hampshire (1980), Michigan (1987), and Colorado (1976). Lynx are classified as threatened by Washington (1993). Utah has classified the lynx as a sensitive species. The lynx is classified as a species of special concern in Maine (1997) and in Wisconsin it is protected (1997). Two States officially classify them as extirpated: Pennsylvania (J. Belfonti, *in litt.* 1994) and Massachusetts (J. Cardoza, *in litt.* 1994). Five States classify lynx as small game or furbearers with closed seasons: Idaho (1997), New York (1967), Minnesota (1984), Wyoming (1973), and Oregon (1997).

A Canada lynx trapping season still occurs in Montana, but the legal, State wide quota is restricted to two animals. In response to declining harvests, Montana has substantially reduced the lynx quota since 1977 (when the lynx was added to the Convention on International Trade in Endangered Species (CITES) and Montana classified the species as a furbearer). Since 1991, the quota has been two for the entire State, which has been met or slightly exceeded annually (B. Giddings, pers. comm. 1998).

Estimates of illegal harvest of Canada lynx are unavailable for most areas. Illegal harvest has been a serious concern in localized areas in the past (Washington Department of Wildlife 1993).

On February 4, 1977, the Canada lynx was included in Appendix II of CITES. The CITES is an international treaty established to prevent international trade that may be detrimental to the survival of plants and animals. A CITES export permit must be issued by the exporting country before an Appendix II species may be shipped. The CITES permits may not be issued if the export will be detrimental to the survival of the species or if the specimens were not legally acquired. However, CITES does not itself regulate take or domestic trade.

Regulatory mechanisms to protect Canada lynx habitat are limited. Although the U.S. Forest Service

classifies lynx as a sensitive species within the contiguous United States, few national forests have developed population viability objectives or management guidelines required by the National Forest Management Act for Canada lynx because of limited information about the species' requirements. All national forests are obligated to protect biological diversity on Federal lands.

In the northeast region, the Green Mountain National Forest Plan states that the national forest will develop management plans if and when an established Canada lynx population is detected (U.S. Forest Service 1986a). There are no specific regulations or guidelines pertaining to lynx habitat. The White Mountain National Forest Plan includes Canada lynx as an indicator species and limits recreational trail density in Canada lynx habitat. The forest plan calls for consideration of the needs of the species in planning alternatives, the monitoring of lynx populations, and for initiating or coordinating studies and/or recovery efforts (U.S. Forest Service 1986b).

In the Great Lakes region, some national forests apply standards for gray wolf (*Canis lupus*) to guide Canada lynx habitat management (M. Shedd, Superior National Forest, pers. comm. 1994). It is unknown whether wolf standards are appropriate for lynx.

Washington Department of Wildlife (1993) determined that habitat needs of Canada lynx had not been considered adequately while planning for timber harvest on national forest and State lands in some areas of the State.

Several lynx conservation plans exist or are under development. Such plans include the lynx habitat management guidelines for Washington (Washington Department of Fish and Wildlife 1993; R. Naney, Okanogan National Forest, *in litt.* 1994), the Idaho State conservation effort (Roloff 1995), Washington Department of Natural Resources conservation strategy (Washington Department of Natural Resources 1996a), Boise-Cascade Timber Corporation lynx habitat management plan in Washington (Whitwill and Roloff 1996), Kootenai National Forest in Montana (Kootenai National Forest 1997), and the Southern Rocky Mountains, Draft strategy for the conservation and reestablishment of lynx and wolverine in the southern Rocky Mountains (Colorado Division of Wildlife *et al.* 1997). At this time, there has been no comprehensive review of these plans to determine whether the guidelines in these plans have the ability to maintain or increase lynx populations. The degree to which these

plans are or will be implemented and monitored varies.

Land use on private lands can have a great impact on Canada lynx habitat. The majority of Canada lynx habitat in the Northeast region occurs on private land, ranging from small residential lots to large industrial ownerships (Harper *et al.* 1990). All States in the region have various laws and regulations regarding environmental issues (Harper *et al.* 1990). Indirectly these regulations may promote the conservation of habitat; however, none are directed specifically to Canada lynx habitat conservation. In the Northeast region, the Northern Forest Lands Council has a charter to maintain traditional patterns of landownership and use; part of this effort includes a forest inventory (Northern Forest Lands Council, *in litt.* 1994). How this effort may affect the conservation of Canada lynx habitat is unknown.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Loss of suitable habitat for Canada lynx reduces the potential for population growth or recolonization of the lynx and further confines lynx to smaller, more isolated habitat units (Weaver 1993). Isolation increases the susceptibility of the lynx to human-caused threats, natural stochastic events, and effects of genetic bottlenecks (Andrews 1992; Weaver 1993). In the Rocky Mountain/Cascades Region much of lynx habitat is naturally disjunct and habitat connectivity is required across large geographic areas to facilitate dispersal and genetic exchange (Roloff 1995). The increased fragmentation of forest lands and loss of connectivity within and among blocks of habitat in the interior Columbia River basin of Washington, Oregon, Idaho, and Montana has reduced the ability of some wildlife populations to move across the landscape, resulting in long-term loss of genetic interchange (U.S. Forest Service and Bureau of Land Management 1997).

Elevated levels of human access into forests are a significant threat to Canada lynx because they increase the likelihood of lynx encountering people, which may result in displacement of lynx from their habitats and/or possible injuries or deaths by intentional or unintentional shooting, trapping, and vehicle accidents (Hatler 1988; Thiel 1987; Brittell *et al.* 1989; Koehler and Brittell 1990; Brocke *et al.* 1991; Andrew 1992; Washington Department of Wildlife 1993; Brocke *et al.* 1993; M. Hunter, University of Maine, pers. comm. 1994). Human access into Canada lynx habitat in many areas has increased over the last several decades

because of increasing human populations and increased construction of roads and trails and the growing popularity of snowmobiles and offroad vehicles. In the interior Columbia River basin of Washington, Oregon, Idaho, and Montana, increased human access has decreased the availability of areas with low human activities, which are important to large forest carnivores, including lynx (U.S. Forest Service and Bureau of Land Management 1997).

Lynx will use some types of roads for hunting and travel (Koehler and Aubry 1994). Koehler and Aubry (1994) concluded road construction and maintenance are important components of lynx habitat management because they both destroy and create prey habitat, but also make lynx more vulnerable to human-caused mortalities. In the interior Columbia River basin of Washington, Oregon, Idaho, and Montana, high road densities were found primarily in intensively managed forest lands of both public and private ownership (U.S. Forest Service and Bureau of Land Management 1997).

Wide-ranging species are impacted by the increased road densities that often accompany human-caused forest fragmentation (Litvaitis 1993). The Loomis State Forest in Washington plans to construct a total of 615 mi of roads from 1996 to 2005 (Washington Department of Natural Resources 1996b). According to the plan, the density of roads in primary lynx habitat will be 1.91 to 3.04 road mi per square mile (sq mi) (Washington Department of Natural Resources 1996b). Even roads that are considered "closed" will continue to be accessible to snowmobiles, thereby allowing access to higher elevation lynx habitat by humans and lynx competitors.

In the Pioneer Mountains of Montana, a currently narrow, unpaved road is being paved and widened to further encourage already high recreational use of the forest (Harding Lawson Associates Infrastructure, Inc. 1996). The project area is occupied, high-quality lynx habitat, although lynx use of the area is currently restricted because of intense recreational use of the area (Harding Lawson Associates Infrastructure, Inc. 1996). Completion of this road project will impact lynx by causing further deterioration of lynx habitat, because increased human activity will sever lynx travel corridors and mortalities from vehicle collisions will increase (Harding Lawson Associates Infrastructure, Inc. 1996).

Blocks of suitable habitat, both public and private, are often dissected by extensive networks of paved roads. Traffic on highways has been shown to

pose a considerable mortality risk to Canada lynx (Brocke *et al.* 1991; B. Ruediger, U.S. Forest Service, pers. comm. 1997). Highway densities are a contributing factor in the decline of carnivores, including the lynx, in the contiguous United States (Ruediger 1996). Dispersing or transient lynx are more vulnerable to traffic deaths than resident lynx because their movements over large areas increase their exposure to roads. In the Great Lakes States, recent records of lynx are from mortalities due to vehicle collisions, which could limit the potential for reestablishment of populations in Wisconsin or Michigan.

Increasing human access into Canada lynx habitat has increased the vulnerability of Canada lynx to both legal and illegal harvest in areas that, historically, were relatively isolated from humans (Todd 1985; McKay 1991; Washington Department of Wildlife 1993; M. Hunter, pers. comm. 1994). In the Uinta Mountains of Utah, most of the documented Canada lynx specimens were shot during deer hunting season in an area easily accessed by hunters (McKay 1991). In Washington, there is concern that human access may reduce the number of Canada lynx emigrating from British Columbia, further increasing the vulnerability of the remaining small population (Washington Department of Wildlife 1993). The high degree of access into Alberta's forests created by petroleum development and logging was suggested as an explanation for why Alberta produced a large proportion of the total Canadian lynx harvest in the 1970's and 1980's (Todd 1985).

Human access is a particularly important factor during periods when Canada lynx populations are low and concentrated in localized refugia. Brand and Keith (1979) indicated that refugia may have supported only adult lynx during population lows. Refugia were therefore critical for repopulating available range elsewhere when the population increased (Todd 1985). If such refugia were accessible to humans, local lynx populations could be easily extirpated by trapping, particularly if there are incentives such as high pelt prices (Carbyn and Patriquin 1983; Ward and Krebs 1985; Bailey *et al.* 1986; J. Weaver, pers. comm. 1994; Koehler and Aubry 1994).

The Canada lynx may be displaced or eliminated when competitors (e.g., bobcat, coyote) expand into its range (de Vos and Matel 1952; Parker *et al.* 1983; Quinn and Parker 1987; M. DonCarlos, pers. comm. 1994; D. Major, U.S. Fish and Wildlife Service, pers. comm. 1994; J. Weaver, pers. comm. 1994). The

Canada lynx is at a competitive disadvantage against these other species because it is a specialized predator, whereas bobcat and coyotes are generalists that are able to feed on a wide variety of prey. Historically, bobcat and coyotes have not been able to compete with lynx in areas that receive deep snow cover, where lynx are much more highly adapted. Where Canada lynx and bobcat or coyote ranges overlapped, their niches were segregated by winter range conditions (McCord and Cardoza 1982; Parker *et al.* 1983; Quinn and Parker 1987). In Yukon, Canada, coyotes selected snow that was shallower and harder than that used by lynx (Murray *et al.* 1994).

Some biologists believe competition has played a significant role in the decline of Canada lynx (Brocke 1982; Parker *et al.* 1983; E. Bangs, U.S. Fish and Wildlife Service, pers. comm. 1994). Murray *et al.* (1994) speculate that, in Yukon, use of open spruce forests by lynx may have been to avoid areas where coyotes were present. In Utah, where more habitat is suitable for bobcat, it has been suggested that bobcat competition with Canada lynx resulted in the possible extirpation of Canada lynx from Utah (B. Blackwell, pers. comm. 1994). Research has detected direct competition in certain areas, as on Cape Breton Island where, without changes in forest habitat, bobcats displaced Canada lynx from all areas except high elevations, where snow accumulation limited the bobcat's range (Parker *et al.* 1983).

Competition between Canada lynx and other species may be facilitated through alteration of forests by timber harvest or other human activities. Modified habitat may be more suitable to Canada lynx competitors or may facilitate the establishment of a competitor after local extirpation of the lynx (McCord and Cardoza 1982; Quinn and Parker 1987). In the Northeast United States, extensive clearing of forests for timber and agriculture improved conditions for white-tailed deer (*Odocoileus virginianus*) populations, which subsequently may have influenced a northward expansion of bobcats into the region (K. Gustafson, pers. comm. 1994). Additionally, mild weather in some regions for the past decade has improved conditions and habitat for bobcat and coyotes, particularly by minimizing snow depth (Quinn and Parker 1987; J. Weaver, pers. comm. 1994). Coyotes have been colonizing Maine and New Hampshire since the 1970's (Litvaitis and Harrison 1989).

Competition during late winter, a time when lynx are already nutritionally

stressed, may be especially detrimental to lynx (Koehler and Aubry 1994). Snowmobile trails and roads that are maintained for winter recreation and forest management activities enable coyotes and bobcats to access lynx winter habitat (Koehler and Aubry 1994).

Snowmobile use in the Great Lakes and Rocky Mountain/Cascades regions has resulted in an increase in both human presence and the prevalence of packed snow corridors in lynx habitat. The increased snowmobile use and the increased area in which snowmobiles are used likely diminishes habitat quality for lynx, and also decreases the lynx's competitive advantage in deep snow. This results in an increased threat posed by competitors, as a result of the increase in hard-packed snow trails.

Legal trapping activities for bobcat, coyotes, and other furbearers create a potential for incidental capture of lynx. The threat to resident lynx from legal trapping for other species may be limited because most bobcat or coyote trapping occurs in areas unlikely to support lynx (M. DonCarlos, pers. comm. 1994; K. Elowe, Maine Department of Inland Fisheries and Wildlife, pers. comm. 1994; J. Lanier, pers. comm. 1994; D. Mech, pers. comm. 1994; Maine Department of Inland Fisheries and Wildlife, *in litt.* 1997).

Where Canada lynx populations have been substantially reduced or extirpated in the contiguous United States, natural recolonization of suitable habitat likely will require lynx migration from other areas in the contiguous United States or Canada. However, because of the unsuitable habitat isolating Colorado and southeastern Wyoming from the remainder of the Rocky Mountains/Cascades, recolonization through immigration is extremely unlikely.

Winter navigation and associated ice breaking on the St. Mary's River between Ontario and Upper Michigan could be a potential threat to reestablishment or maintenance of a lynx population in that area. Presently, the St. Mary's River shipping channel is not kept open between January 15 and March 25. Ice breaking before or after that period could reduce the amount of time available for lynx to immigrate across the St. Mary's shipping channel from Ontario to Michigan (Robinson and Fuller 1980).

Distinct Population Segment

For a species to be listable under the Act, it must meet the definition of a "species" as provided in the Act. The Act defines "species" as a species, subspecies, or distinct population segment of a vertebrate species. On

February 7, 1996 (61 FR 4722), the Service and National Marine Fisheries Service published final policy guidance concerning recognition of Distinct Vertebrate Population Segments for consideration under the Act. It is necessary for the Service to use this Vertebrate Population Policy when it is considering listing a vertebrate species or species as endangered or threatened in only a portion of its range. In developing this proposed rule the Service evaluated whether Canada lynx in the contiguous United States constitutes a distinct population segment under the population policy.

While application of the vertebrate population policy may result in the identification of a greater number of potentially listable entities, the policy was developed specifically to allow for more refined application of the Act that better reflects the biological needs of the taxon being considered and avoids the inclusion of entities that may not require the considerable protections of the Act. This approach better serves Congress's intent that listing of distinct population segments be conducted "sparingly."

Under the vertebrate population policy, two elements, discreteness and significance, must be considered to determine whether a species' population meets the definition of a distinct population segment. If a population is discrete and significant, its status is evaluated using the five listing factors described in section 4(a)(1) of the Act to determine if it meets the definition of either threatened or endangered.

A species' population segment can be considered discrete from the remainder of the taxon 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," or (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." Given that the Service has determined that resident, viable numbers of Canada lynx exist in the contiguous United States (see Background section), the Service concludes that the contiguous United States population of the Canada lynx is discrete based on the international boundary between Canada and the contiguous United States because of differences in status and management of Canada lynx between the United States and Canada.

In Canada, management of forest lands and conservation of wildlife habitat varies depending on Provincial regulations. In Alberta, there is no law regulating forest practices and the status of Canada lynx in Alberta is of concern because of habitat-related threats as a result of logging (B. Triechel, Alberta Environmental Protection, pers. comm. 1997). There is no overarching forest practices legislation in Canada, such as the United States' National Forest Management Act, governing management of national lands and/or providing for consideration of wildlife habitat requirements. Additionally, in Canada, lynx harvest regulations vary, being regulated by individual Province or, in some cases, individual trapping district.

According to the Vertebrate Population policy, a population segment can be considered significant based on information such as the following: (1) "Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon"; (2) "Evidence that loss of the discrete population segment would result in a significant gap in the range of the 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 historic range;" and (4) "Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics."

In a general sense, Canada lynx in the contiguous United States might be considered biologically and/or ecologically significant simply because they represent the southern extent of the species' overall range. There are climatic and vegetational differences between Canada lynx habitat in the contiguous United States and that in northern latitudes in Canada and Alaska (Kuchler 1965). In the contiguous United States, Canada lynx inhabit a mosaic between boreal forests and subpine coniferous forests or northern hardwoods, whereas in more northern latitudes, Canada lynx habitat is the boreal forest ecosystem (Barbour *et al.* 1980; McCord and Cardoza 1982; Koehler and Aubry 1994; M. Hunter, University of Maine, pers. comm. 1994; Colorado Division of Wildlife *et al.* 1997) (see Background section).

Canada lynx and snowshoe hare population dynamics in portions of the contiguous United States are different from those in northern Canada. Historically, Canada lynx and snowshoe hare populations in some areas of the contiguous United States have not exhibited the extreme cyclic population

fluctuations of the northern latitudes for which Canada lynx are noted (Dolbeer and Clark 1975; Brittell *et al.* 1989; Wolff 1980; Buehler and Keith 1982; Koehler 1990; Koehler and Aubry 1994) (see Background section). This less cyclic population has been attributed to the lower quality and quantity of snowshoe hare habitat available in southern latitudes and/or the presence of additional snowshoe hare predators (Buehler and Keith 1982, Wolff 1982 *in* Koehler and Aubry 1994, Koehler 1990, Koehler and Aubry 1994).

Extirpation of the contiguous United States population of the Canada lynx would result in a significant gap in the range of the taxon. Canada lynx would not only be lost throughout a broad region of the United States, but a number of ecosystems would lose a top-level carnivore from their representative fauna.

After review and consideration of Canada lynx status and management in the contiguous United States and Canada, contacts with recognized experts, lynx life history, habitat, and population dynamics, the Service has determined that the Canada lynx in the contiguous United States is discrete and significant and, therefore, qualifies as a distinct population segment to be considered for listing under the Act.

Finding

Based on historic observations, trapping records and other evidence available to the Service at this time, the Service finds that, historically, Canada lynx were resident in 16 of the contiguous United States. The overall numbers and range of Canada lynx in the contiguous United States are substantially reduced from historic levels. Currently, resident populations of lynx likely exist in Maine, Montana, Washington, and possibly Minnesota. States with recent records of individual lynx sightings, but possibly no longer sustaining self-supporting populations, include Wisconsin, Michigan, Oregon, Idaho, Wyoming, Utah, and Colorado. Lynx may be extirpated from New Hampshire, Vermont, New York, Pennsylvania, and Massachusetts.

At present, lynx numbers in the contiguous United States have not recovered from the overexploitation by both unregulated and regulated trapping that occurred in the 1970's and 1980's. As a result, the other threats to the lynx described earlier under the "Summary of Factors Affecting the Species" section have a serious effect on the remaining population. Where Canada lynx numbers have been substantially reduced or extirpated, natural recolonization of suitable habitat likely

will require lynx migration from other areas in the contiguous United States or Canada. In Maine, there is evidence that lynx move back and forth across the Canadian border, indicating that Maine lynx habitat is contiguous with occupied habitat in Quebec and possibly, New Brunswick (M. Amaral, *in litt.* 1998).

Forest management practices that result in the loss of diverse age structure, roading, urbanization, agriculture, recreational developments, and unnatural fire frequencies have altered suitable lynx habitat in many areas throughout the contiguous United States. As a result, many states may have insufficient habitat quality and/or quantity to sustain lynx or their prey.

The likelihood of lynx encountering people has dramatically increased over the last few decades as a result of elevated levels of human access into lynx habitat. Roads and trails, snowmobiles, offroad vehicles, and ski area developments enable human access into historically remote forests, thereby increasing the likelihood of lynx being displaced from otherwise suitable habitats and increasing the vulnerability of lynx to human-induced mortality.

Although the legal taking of lynx is highly restricted in the contiguous United States, existing regulatory mechanisms may be inadequate to protect the small, remnant lynx populations or to conserve Canada lynx habitat.

The cumulative effect of these habitat changes has been the creation of habitats and prey bases that are better able to support lynx competitors, such as bobcats and coyotes, rather than lynx. Bobcats are able to outcompete lynx except in habitats with excessive snow depths. Roads and packed snow trails have allowed bobcats and coyotes to access the winter habitats for which lynx are highly specialized.

Recently, some States, Federal agencies, and other entities have initiated survey and research efforts to better evaluate the status of the Canada lynx within the contiguous United States. Additionally, some States such as Washington, Colorado, and Idaho are in the process of developing strategies to conserve and restore lynx in their states.

Resident lynx populations still occur in Montana, Washington, Maine and, possibly, Minnesota. According to Montana Fish, Wildlife and Parks, Montana's lynx numbers are fairly stable. Therefore, the Service concludes that a designation as threatened is appropriate. A threatened species is defined in the Act as a species likely to become an endangered species within

the foreseeable future throughout all or a significant portion of its range.

Based on the preceding discussions and analyses, using the best available scientific and commercial information available, the Service finds that listing of the Canada lynx within the contiguous United States is warranted. The Service proposes to list the contiguous United States Canada lynx population segment (consisting of the States of Maine, New Hampshire, Vermont, New York, Pennsylvania, Massachusetts, Michigan, Wisconsin, Minnesota, Washington, Oregon, Idaho, Montana, Wyoming, Utah, and Colorado) as threatened.

Critical Habitat

Critical habitat is defined in section 3(5)(a) of the Act as— (i) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection and; (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. The term “conservation” as defined in section 3(3) of the Act means “to use and the use of all methods and procedures necessary to bring any endangered or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary,” i.e., the species is recovered and can be removed from the list of endangered and threatened species.

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12) require that, to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time the species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not prudent for the Canada lynx at this time. Service regulations (50 CFR 424.12(a)(1)) state that designation of critical habitat is not prudent when one or both of the following situations exist—(1) the species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species, or (2) such designation of critical habitat would not be beneficial to the species.

In accordance with the definition of critical habitat provided by section 3(5)(A)(I) of the Act, the Service's regulations require the Service to

consider those physical and biological features that are essential to the conservation of the species and that may require special management considerations or protection. Such requirements include, but are not limited to—(1) space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and, generally, (5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

Potential benefits of critical habitat designation derive from section 7(a)(2) of the Act, which requires Federal agencies, in consultation with the Service, to ensure that their actions are not likely to jeopardize the continued existence of listed species or to result in the destruction or adverse modification of critical habitat of such species.

Critical habitat, by definition, applies only to Federal agency actions. The 50 CFR 402.02 defines “jeopardize the continued existence of” as meaning to engage in an action that would reasonably be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.

“Destruction or adverse modification” is defined as a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical. Thus, in the section 7(a)(2) consultation process, the jeopardy analysis focuses on potential effects on the species' populations, whereas the destruction or adverse modification analysis focuses on habitat value.

Common to both a jeopardy and the destruction or adverse modification of critical habitat is the requirement that the Service find an appreciable effect on both the species' survival and recovery. This is in contrast to the public perception that the adverse modification standard sets a lower threshold for violation of section 7 than that for jeopardy. Thus, Federal actions satisfying the standard for adverse modification are nearly always found to also jeopardize the species concerned, and the existence of critical habitat designation does not materially affect

the outcome of consultation. Biological opinions that conclude that a Federal agency action is likely to adversely modify critical habitat but is not likely to jeopardize the species for which it is designated are extremely rare historically; none have been issued in recent years. Thus, the Service believes that, from a section 7 consultation perspective, no additional conservation benefit would be achieved for the contiguous United States Canada lynx population by the designation of critical habitat.

Currently, in the contiguous United States, legal harvest of lynx is not a threat to the population because all States, except Montana, have closed seasons on the harvest of lynx. Montana has an extremely low quota, allowing two lynx to be harvested per season. Additionally, current prices for lynx pelts are relatively low so there is little incentive to trap lynx. However, should pelt prices increase again in the future, there will be strong incentive to trap lynx as evidenced by trapping records from the 1970's and 1980's (see Factor B, above). Designation of critical habitat would increase the vulnerability of lynx to poaching; therefore, the Service concludes it would not be prudent to designate critical habitat.

In the contiguous United States, Canada lynx inhabit a mosaic between boreal forests and subalpine coniferous forests or northern hardwoods, as described earlier in the Background section. Canada lynx are highly dependent on snowshoe hares to supply an adequate food source. Canada lynx concentrate their foraging activities in areas where hare activity is high. Snowshoe hares prefer structurally diverse forests, often early successional stages, with stands of conifers and shrubby understories that provide for feeding, escape from predators, and protection during extreme weather. For denning, it is believed Canada lynx require late successional forests that provide downed logs and windfalls for cover. Additionally, Canada lynx are highly mobile and can move long distances in search of prey (see Background section, above). Home range sizes vary widely (12 to 243 sq km (5–94 sq mi) depending primarily on the density of lynx and availability of prey in an area. For example, the estimated range of one male lynx would encompass all protected lands in the White Mountain National Forest in New Hampshire and Maine (Brocke *et al.* 1993).

The Service concludes it would not be beneficial to designate specific geographic locations as critical habitat because snowshoe hare habitat and lynx

denning habitat will always shift spatially and temporally across the landscape as a result of natural (e.g., fire, forest maturation, seasonal) and human-caused changes (e.g., logging, thinning). Canada lynx would reasonably be expected to relocate in response to the natural dynamics of lynx population levels, prey availability, and habitat conditions, thereby making little use of specific areas designated as critical habitat.

Attempting to encompass lynx movements or the spatial shifts in lynx foraging or denning habitat that will occur over time by designating critical habitat on a large-scale (e.g., an entire national forest or wilderness area) would not be beneficial to the species. Under such a designation, it would be impracticable to assert that a single Federal action would appreciably diminish the value of critical habitat for both the survival and recovery of a listed species or that the entire expansive area requires special management or protection (the purpose of a critical habitat designation) for lynx. Additionally, Forest Plans that dictate how an entire national forest would be managed are already subject to review under section 7.

A large-scale designation would be over inclusive because it would contain many areas that never were or will be lynx habitat and areas that, although they may be used by lynx, would not require special management or protection for lynx. For example, in 1994, nearly 60 percent of the approximately 17 million acres of national forests in Montana were classified as roadless or designated wilderness areas (J. Gatchell, Montana Wilderness Association, pers. comm. 1994). However, a large proportion of these areas are not suitable lynx habitat because they consist of rock- and ice-covered mountaintops.

A substantial amount of Federal land exists in the Western and Great Lakes regions of the contiguous United States lynx population segment in Washington, Oregon, Idaho, Montana, Wyoming, Utah, Colorado, Minnesota, Wisconsin, and Michigan. Actions on these Federal lands are ensured of the benefit of review under section 7 of the Act, regardless of whether or not critical habitat is designated. Potential and occupied Canada lynx habitat exists primarily on Federal lands managed by the U.S. Forest Service. Additional Federal land managers include but are not limited to the National Park Service and Bureau of Land Management. Currently, the U.S. Forest Service, Bureau of Land Management, and the Service are developing a section 7

conferencing and consultation strategy to conserve lynx on the 56 National Forests and numerous Bureau of Land Management districts within its historic range in the contiguous United States (B. Ruediger, *in litt.* 1998).

Designation of critical habitat provides no limitations or constraints on private landowners if there is no Federal involvement and, as such, provides the species no conservation benefit. The amount of Federal land in the northeastern United States range of the lynx is small (primarily the White Mountain and Green Mountain National Forests in parts of Vermont, New Hampshire, and Maine) compared to the amount of non-Federal land. Because few Federal actions occur in the northeastern United States range of the lynx, project review under section 7 of the Act would be rarely required (M. Amaral, pers. comm. 1998).

In the Rocky Mountain/Cascades, Great Lakes, and Northeast regions of the lynx range, there are large parcels of land in corporate ownership. Actions on these lands will either have no Federal nexus or will require review under section 7 of the Act.

Protection of lynx habitat can be addressed in habitat conservation plans voluntarily developed by landowners under the section 10 permitting process. In the State of Washington, Canada lynx are covered under a multispecies Habitat Conservation Plan on forest lands owned by Plum Creek Timber Company in the central Cascades mountain range.

Therefore, because of the increased vulnerability of the lynx, the spatial and temporal changes in lynx foraging and denning habitats, the high mobility of individual lynx, the inability to control lynx habitat in Canada, and the fact that designation of critical habitat would provide little different or greater benefit than that provided by the jeopardy standard under section 7 regulations, the Service has determined that the designation of critical habitat for the contiguous United States population of the Canada lynx is not prudent.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness and conservation actions by Federal, State, and local agencies, private organizations, and individuals. The Act provides for possible land acquisition and cooperation with the States and requires

that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

The contiguous United States population of the Canada lynx occurs on lands administered by the U.S. Forest Service, National Park Service, Bureau of Land Management; Tribal lands, State lands, and private lands. Examples of Federal agency actions that may require conference and/or consultation as described in the preceding paragraph include timber, silviculture/thinning, road construction, fire, and recreation management activities or plans by the Forest Service, Bureau of Land Management, and National Park Service; Federal highway projects, and U.S. Housing and Urban Development projects.

The Act and implementing regulations set forth a series of general prohibitions and exceptions that apply to all threatened wildlife. The prohibitions, codified at 50 CFR 17.21 and 17.31, in part, make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or attempt any of these), import or export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered or threatened wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.32. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and/or for incidental take in the course of otherwise lawful activities. For threatened species, permits also are available for zoological exhibition, educational purposes, or special purposes consistent with the purposes of the Act. Regulations governing permits for species listed as threatened due to similarity of appearance are codified at 50 CFR 17.52 and regulation implementing CITES are codified at 50 CFR part 23.

It is the policy of the Service (59 FR 34272; July 1, 1994) to identify to the maximum extent practicable at the time a species is listed those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of this listing on proposed and ongoing activities within the species' range.

For the contiguous United States population of the Canada lynx, the Service believes the following actions would not likely result in a violation of section 9:

(1) Actions that may affect Canada lynx in the contiguous United States that are authorized, funded or carried out by a Federal agency when the action is conducted in accordance with an incidental take statement issued by the Service pursuant to section 7 of the Act;

(2) Actions that may result in take of Canada lynx in the contiguous United States when the action is conducted in accordance with a permit under section 10 of the Act; For the contiguous United States population of the Canada lynx, the following actions likely would be considered a violation of section 9:

(1) Actions that take Canada lynx that are not authorized by either a permit under section 10 of the Act, or an incidental take permit under section 7 of the Act; the term "take" includes harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting, or attempting any of these actions;

(2) Possess, sell, deliver, carry, transport, or ship illegally taken Canada lynx;

(3) Interstate and foreign commerce (commerce across State and international boundaries) without the appropriate permits under section 10(a)(1)(a), 50 CFR 17.32 and/or CITES.

(4) Significant lynx habitat modification or degradation, including

but not limited to forest management (e.g., logging, road construction and maintenance, prescribed fire), and recreational, urban, or agricultural development, to the point that it results in death or injury by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Requests for copies of the regulations regarding listed wildlife and inquiries about prohibitions and permits may be addressed to U.S. Fish and Wildlife Service, P.O. Box 25486, Denver Federal Center, Denver, Colorado 80225.

Special Rule

The implementing regulations for threatened wildlife under the Act incorporate the section 9 prohibitions for endangered wildlife (50 CFR 17.31), except when a special rule promulgated pursuant to section 4(d) applies (50 CFR 17.31(c)). Section 4(d) of the Act provides that whenever a species is listed as a threatened species, the Service shall issue regulations deemed necessary and advisable to provide for the conservation of the species. Conservation means the use of all methods and procedures necessary to bring the species to the point at which the protections of the Act are no longer necessary. Section 4(d) also states that the Service may, by regulation, extend to threatened species, prohibitions provided for endangered species under Section 9.

This special rule will provide for the take of captive-bred Canada lynx without permit, allow the continuation of the export of captive-bred Canada lynx under CITES export permits, and provide for the transportation of lynx skins in commerce within the United States. The export of properly tagged (with valid CITES export tag) skins from lynx documented as captive-bred will be permitted in accordance with part 23 of this chapter. Properly tagged skins may be transported in interstate trade without permits otherwise required under part 17.32.

Public Comments Solicited

The Service intends that any final action resulting from this proposal will be as accurate and as effective as possible. Therefore, comments, or suggestions from the public, other concerned governmental agencies, the scientific community, industry, or any other interested party concerning this proposed rule are hereby solicited. Comments particularly are sought concerning:

(1) Biological, commercial trade, or other relevant data concerning any threat (or lack thereof) to this species;

(2) Additional information concerning the range, distribution, and population size of the species;

(3) Current or planned activities in the subject area and their possible impacts on this species;

(4) Additional information pertaining to the promulgation of a special rule to provide States and Tribes the opportunity to maintain the lead role in protection, management, and recovery of the species through the voluntary development and implementation of a conservation plan. Such conservation plans would address activities having the potential to adversely impact lynx or lynx habitat, including activities that may result in the take of lynx incidental to otherwise lawful activities; provisions to avoid and minimize those impacts; and existing or planned conservation measures that will be implemented to result in a net recovery benefit for lynx. Potential activities to be addressed in such a plan may include trapping and hunting programs that target species other than lynx; forest management; road construction, maintenance and use; and recreational development. Approved conservation plans would authorize the non deliberate or non purposeful take of lynx incidental to otherwise lawful State or Tribal activities.

The final decision on this proposal will take into consideration the comments and any additional information received by the Service, and such communications may lead to a final regulation that differs from this proposal.

The Act provides for at least one public hearing on this proposal, if requested. However, given the high likelihood of several requests throughout the species' range, the Service has scheduled hearings in advance of any request. For additional information on public hearings, see the **SUPPLEMENTARY INFORMATION** section.

Similarity of Appearance

Section 4(e) of the Act authorizes the treatment of a species (or subspecies or population segment) as an endangered or threatened species even though it is not otherwise listed as endangered or threatened if: (a) The species so closely resembles in appearance an endangered or threatened species that enforcement personnel would have substantial difficulty in differentiating between listed and unlisted species; (b) the effect of this substantial difficulty is an additional threat to the endangered or threatened species; and (c) that such treatment will substantially facilitate the enforcement and further the policy of the Act.

The Canada lynx is included in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CITES is an international treaty that regulates international trade in certain animal and plant species. Exports of animals and plants listed on CITES Appendix II as a similarity of appearance species may occur only if the Scientific Authority has advised the Management Authority that such exports will not be detrimental to the survival of the look alike species, and if the Management Authority is satisfied that the animals or plants were not obtained in violation of laws for their protection. The Canada lynx was included in CITES Appendix II on February 4, 1977, as a part of the listing of all Felidae that were not already included in the appendices. A CITES export permit pursuant to 50 CFR part 23 must be issued by the exporting country before an Appendix II species may be shipped. All Felidae were included in Appendix II to enable better protection of look alike species that were or could be threatened with extinction without strict regulation of trade. After inclusion of the lynx (as well as the bobcat and river otter) in CITES Appendix II, the Service worked with the States to develop guidelines for State programs that would provide the information needed to satisfy CITES export requirements. Under the State CITES export programs, all skins to be exported are required to be tagged with a permanently attached, serially numbered tag that identified the species, State of origin, and season of taking. The tags are provided to the States by the Service. The States that were approved for export of lynx are Alaska, Idaho, Minnesota, Montana, and Washington. Canada lynx in Alaska are not encompassed by this listing, all existing CITES requirements remaining the same. Of the 48 contiguous States, Montana is the only State that still has a wild lynx harvest with a quota of two.

Currently there are facilities in Idaho, Minnesota, Montana, North Dakota, and Utah that raise captive-bred Canada lynx for commercial purposes. At least some of the farms report that their initial stock was obtained from Canada. From 1992 through 1997, Minnesota and Montana reported that a total of 139 lynx pelts were tagged for export under the CITES program and these primarily originated from farmed animals. The Service currently has an application pending for the export of 254 captive-bred lynx from Utah. These captive-bred specimens have neither a positive or

negative effect on the species in the wild.

Current prices for lynx pelts are relatively low so there is little present incentive to trap lynx. However, should pelt prices increase again in the future, there could be strong incentive to trap wild lynx and export their pelts. Lynx are easy to trap and the illegal take of lynx may present an enforcement and inspection problem for Service personnel. Captive-bred Canada lynx cannot be effectively differentiated from wild Canada lynx by Service law enforcement and inspection personnel without proper tagging. For these reasons, the Service is listing the captive populations of Canada lynx within the United States as threatened due to similarity of appearance. However, under the latitude for threatened species afforded by the Act and 50 CFR 17.31(c) the Service is proposing to issue permits for captive-bred Canada lynx to facilitate the lawful export of Canada lynx. The listing of the captive populations of Canada lynx within the United States as threatened due to similarity of appearance eliminates the ability of persons to misrepresent illegally taken wild Canada lynx as captive-bred Canada lynx for commercial purposes.

This proposed rule would, in addition to the export under 50 CFR part 23 of live captive-bred Canada lynx, allow the export of skins derived from captive-bred populations of Canada lynx if the specimens are tagged with a CITES export tag and accompanied by a valid CITES export permit. The import of lawfully obtained Canada lynx pelts originating in the nation of Canada would continue to require the necessary CITES export permits, but no additional Endangered Species Act import permit would be required. Interstate transport and/or commerce in skins that are properly tagged with valid CITES export tags would be allowed without permits otherwise required under 50 CFR 17.32. The export or interstate transport of skins of Canada lynx taken incidental to otherwise lawful trapping for species other than Canada lynx will not be permitted under the special rule. The import of live specimens would require permits under the Act.

Regulations implementing the Endangered Species Act are set forth at 50 CFR part 17. Any person intending to engage in an activity for which a permit is required such as exporting lawfully obtained Canada lynx must, before commencing such activity, obtain a valid permit authorizing such activity. Permit requirements for threatened species are set forth at 50 CFR 17.31 and 17.32. Permit requirements for species

listed by similarity of appearance are set forth at 50 CFR 17.52, with exceptions to permit requirements provided by special rule as proposed herein. The Service's general permit procedures are set forth at 50 CFR part 13. Uniform rules and procedures for the importation, exportation and transportation of wildlife are set forth at 50 CFR part 14.

In summary, CITES/Endangered Species Act permits will be required for U.S. captive-bred lynx being sold abroad. No U.S. Fish and Wildlife permits will be required for the importation of lynx products into the U.S., and permits will not be required for interstate transport and commerce in skins that are properly tagged with valid CITES export tags.

National Environmental Policy Act

The Fish and Wildlife Service has determined that Environmental Assessments and Environmental Impact Statements, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Act. A notice outlining the Service's reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

Required Determinations

The Service has examined this regulation under the Paperwork Reduction Act of 1995 and found it to contain no information collection

requirements for which Office of Management and Budget (OMB) approval is required. Persons exporting captive-bred Canada lynx may continue to obtain permits which are already authorized under 50 CFR part 23 as approved by OMB and assigned clearance number 1018-0022.

The Service invites comments on the anticipated direct and indirect costs and benefits or cost savings associated with the special rule for the captive Canada lynx population. In particular the Service is interested in obtaining information on any significant economic impacts of the proposed rule on small public and private entities. Once we have reviewed the available information, we will prepare an initial regulatory flexibility analysis for the special rule and make this available for public review. This analysis will be revised as appropriate and incorporated into the record of compliance (ROC) certifying that the special rule complies with the various applicable statutory, Executive Order, and Departmental Manual requirements. Pursuant to the Endangered Species Act, the ROC is not applicable to the listing of the Canada lynx. In accordance with the criteria in Executive Order 12866, neither the listing nor the special rule are significant regulatory actions subject to review by the Office of Management and Budget.

References Cited

A complete list of all references cited herein, as well as others, is available

upon request from the Montana Field Office (see **ADDRESSES** section).

Author

The primary author of this document is Lori H. Nordstrom, Montana Field Office (see **ADDRESSES** section).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, the Service hereby proposes to amend Part 17, Subchapter B of Chapter I, Title 50 of the U.S. Code of Federal Regulations, as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. Amend 17.11(h) by adding the following, in alphabetical order under “MAMMALS,” to the List of Endangered and Threatened Wildlife to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
MAMMALS							
*	*	*	*	*	*		*
Lynx, Canada	<i>Lynx canadensis</i> .	USA (WA, OR, WA, OR, ID, MT, ID, MT, UT, UT, WY, CO, MN, WY, CO, MN, WI, MI, ME, VT, WI, MI, ME, NH, NY, MA, VT, NH, NY, PA, MA, PA, AK), Canada.	(Unless bred in captivity)	T		N/A	N/A
Do	do	do	All captive animals within the coterminous U.S.A. (lower 48 States), activities as prohibited or allowed under 17.31, 17.32, 17.40(k), 17.52, and part 23.	T(S/A)		N/A	17.40(k)
*	*	*	*	*	*		*

3. Amend § 17.40 by adding paragraph (k) to read as follows:

§ 17.40 Special rules—mammals.

* * * * *

(k) Canada lynx (*Lynx canadensis*) population—(1) *Prohibitions*. (i) Except as noted in paragraph (k)(2) of this

section, all prohibitions of 50 CFR 17.31 and exemptions of 50 CFR 17.32 and 17.52 apply to the captive Canada lynx population within the coterminous United States (lower 48 States).

(2) *Exceptions.* (i) The Service may issue incidental take permits or permits authorizing activities that would otherwise be unlawful under paragraph (k)(1) of this section for education purposes, scientific purposes, the enhancement or propagation for survival of Canada lynx, zoological

exhibition, and other conservation purposes consistent with the Act in accordance with 50 CFR 17.52 and pursuant to a section 6 cooperative agreement with a State, if applicable.

(ii) No permit will be required for taking of lawfully obtain captive-bred lynx. The Service may issue CITES export permits for captive-bred Canada lynx and properly tagged captive-bred Canada lynx skins in accordance with 50 CFR part 23. Interstate transport and or commerce in skins that are properly

tagged with a valid CITES export tag would be allowed without a permit. The export or interstate transport of skins of Canada lynx taken incidental to otherwise lawful trapping for species other than Canada lynx will not be permitted.

Dated: June 26, 1998.

Donald Barry,

Acting Assistant Secretary, Fish and Wildlife and Parks.

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