

**DEPARTMENT OF THE INTERIOR****Fish and Wildlife Service****50 CFR Part 17****RIN 1018-AF03****Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Contiguous U.S. Distinct Population Segment of the Canada Lynx and Related Rule****AGENCY:** Fish and Wildlife Service, Interior.**ACTION:** Final rule.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service), determine threatened status for the contiguous U.S. Distinct Population Segment of the Canada lynx (*Lynx canadensis*), with a special rule, pursuant to the Endangered Species Act of 1973, as amended. This population segment occurs in forested portions of the States of Colorado, Idaho, Maine, Michigan, Minnesota, Montana, New Hampshire, New York, Oregon, Utah, Vermont, Washington, and Wisconsin. The contiguous U.S. Distinct Population Segment of the lynx is threatened by the inadequacy of existing regulatory mechanisms. Current U.S. Forest Service Land and Resource Management Plans include programs, practices, and activities within the authority and jurisdiction of Federal land management agencies that may threaten lynx or lynx habitat. The lack of protection for lynx in these Plans render them inadequate to protect the species.

**EFFECTIVE DATE:** April 24, 2000.

**ADDRESSES:** The complete file for this rule is available for inspection, by appointment, during normal business hours at the Montana Field Office, U.S. Fish and Wildlife Service, 100 N. Park Avenue, Suite 320, Helena, Montana 59601.

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

**Background**

The Canada lynx, hereafter referred to as 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 (22 pounds) in weight and 85 centimeters (33.5 inches) in length (head to tail), and females average 8.5 kilograms (19 pounds) and 82 centimeters (32 inches) (Quinn and Parker 1987). The lynx's

long legs and large feet make it highly adapted for hunting in deep snow.

The bobcat (*Lynx rufus*) is a North American relative of the lynx. Compared to the lynx, the bobcat has smaller paws, shorter ear tufts, and a more spotted pelage (coat), and only the top of the tip of the tail is black. The paws of the lynx have twice the surface area as 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 (breeding) between lynx and bobcat is not known (Quinn and Parker 1987).

Classification of the Canada lynx (also called the North American lynx) has been subject to revision. In accordance with Wilson and Reeder (1993), we currently recognize the lynx in North America as *Lynx canadensis*. We previously used the latin name *L. lynx canadensis* for the 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 range of the lynx north of the contiguous United States includes Alaska and that part of Canada that extends from the Yukon and Northwest Territories south across the United States border and east to New Brunswick and Nova Scotia. In the contiguous United States, lynx historically occurred in the Cascades Range of Washington and Oregon; the Rocky Mountain Range in Montana, Wyoming, Idaho, eastern Washington, eastern Oregon, northern Utah, and Colorado; the western Great Lakes Region; and the northeastern United States region from Maine southwest to New York (McCord and Cardoza 1982; Quinn and Parker 1987) (see "Distribution and Status" section).

In the contiguous United States, the distribution of the lynx is associated with the southern boreal forest, comprising of subalpine coniferous forest in the West and primarily mixed coniferous/deciduous forest in the East (Aubry *et al.* 1999) (see "Distribution and Status" section); whereas in Canada and Alaska, lynx inhabit the classic boreal forest ecosystem known as the taiga (McCord and Cardoza 1982; Quinn and Parker 1987; Agee 1999; McKelvey *et al.* 1999b). Within these general forest types, lynx are most likely to persist in areas that receive deep snow, for which

the lynx is highly adapted (Ruggiero *et al.* 1999b).

We consider lynx in the contiguous United States to be part of a larger metapopulation whose core is located in the northern boreal forest of central Canada; lynx populations emanate from this area (Buskirk *et al.* 1999b; McKelvey *et al.* 1999a, 1999b). The boreal forest extends south into the contiguous United States along the Cascade and Rocky Mountain Ranges in the West, the western Great Lakes Region, and along the Appalachian Mountain Range of the northeastern United States. At its southern margins, the boreal forest becomes naturally fragmented into patches of varying size as it transitions into other vegetation types. These southern boreal forest habitat patches are small relative to the extensive northern boreal forest of Canada and Alaska, which constitutes the majority of the lynx range.

Many of these southern boreal forest habitat patches within the contiguous United States are able to support resident populations of lynx and their primary prey species. It is likely that some of the habitat patches act as sources of lynx (recruitment is greater than mortality) that are able to disperse and potentially colonize other patches (McKelvey *et al.* 1999a). Other habitat patches act as "sinks" where lynx mortality is greater than recruitment and lynx are lost from the overall population. The ability of naturally dynamic habitat to support lynx populations may change as the habitat undergoes natural succession following natural or manmade disturbances (*i.e.*, fire, clearcutting). In addition, fluctuations in the prey populations may cause some habitat patches to change from being sinks to sources and vice versa. Throughout this document, we use the term "resident population" to refer to a group of lynx that has exhibited long-term persistence in an area based on a variety of factors, such as evidence of reproduction, successful recruitment into the breeding cohort, and maintenance of home ranges. We use the word "transient" to refer to a lynx moving from one place to another within suitable habitat. Another word we use throughout the document is "dispersing," which refers to lynx that have left suitable habitat for various reasons, such as competition or lack of food. When dispersing lynx leave suitable habitat and enter habitats that are unlikely to sustain lynx, these individuals are considered lost from the metapopulations unless they return to boreal forest.

Lynx use 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; Squires and Laurion 1999; J. Organ, U.S. Fish and Wildlife Service, *in litt.* 1999). For lynx den sites, the age of the forest stand does not seem as important as the amount of downed, woody debris available (Mowat *et al.* 1999). In Washington, lynx used *Pinus contorta* (lodgepole pine), *Picea* spp. (spruce), and *Abies lasiocarpa* (subalpine fir) forests older than 200 years with an abundance of downed woody debris for denning (Koehler 1990). A den site in Wyoming was located in a mature subalpine fir/lodgepole pine forest with abundant downed logs and a high amount of horizontal cover (Squires and Laurion 1999). A lynx den site found in Maine in 1999 was located in a forest stand in *Picea rubra* (red spruce) cover type that was logged in 1930 and again in the 1980s (J. Organ, *in litt.* 1999). The site is regenerating into hardwoods and has a dense understory (J. Organ, *in litt.* 1999). The dominant feature of the Maine site was the abundance of dead and downed wood (J. Organ, *in litt.* 1999).

The size of lynx home ranges varies by the animal's gender, abundance of prey, season, and the density of lynx populations (Hatler 1988; Koehler 1990; Poole 1994; Slough and Mowat 1996; Aubry *et al.* 1999; Mowat *et al.* 1999). Documented home ranges vary from 8 to 800 square kilometers (3 to 300 square miles) (Saunders 1963; Brand *et al.* 1976; Mech 1980; Parker *et al.* 1983; Koehler and Aubry 1994; Apps 1999; Mowat *et al.* 1999; Squires and Laurion 1999). Preliminary research supports the hypothesis that lynx home ranges at the southern extent of the species' range are generally large compared to those in the northern portion of the range in Canada (Koehler and Aubry 1994; Apps 1999; Squires and Laurion 1999).

Lynx are highly specialized predators whose primary prey is the snowshoe hare (*Lepus americanus*), which has evolved to survive in areas that receive deep snow (Bittner and Rongstad 1982). Snowshoe hares use forests with dense understories that provide forage, cover to escape from predators, and protection during extreme weather (Wolfe *et al.* 1982; Monthey 1986; Hodges 1999a, 1999b). Generally, earlier successional forest stages have greater understory structure than do mature forests and therefore support higher hare densities (Hodges 1999a, 1999b). However, mature forests can also provide snowshoe hare habitat as openings develop in the canopy of mature forests when trees succumb to

disease, fire, wind, ice, or insects, and the understory grows (Buskirk *et al.* 1999b). Lynx concentrate their hunting activities in areas where hare activity is relatively high (Koehler *et al.* 1979; Parker 1981; Ward and Krebs 1985; Major 1989; Murray *et al.* 1994; O'Donoghue *et al.* 1997, 1998a).

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 northern Canada and Alaska, lynx populations fluctuate on approximately 10-year cycles that follow the cycles of hare populations (Elton and Nicholson 1942; Hodges 1999a, 1999b; McKelvey *et al.* 1999b). Generally, researchers believe that when hare populations are at their cyclic high, depletion of food resources exacerbated by predation cause hare populations to decline drastically (Buehler and Keith 1982; Krebs *et al.* 1995; O'Donoghue *et al.* 1997). Snowshoe hare provide the quality prey 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; O'Donoghue 1997, 1998a). Red squirrels (*Tamiasciurus hudsonicus*) are an important alternate prey (O'Donoghue 1997; 1998a; Apps 1999; Aubry *et al.* 1999). In the Yukon, lynx shifted to red squirrels when hare numbers began to decline (O'Donoghue 1998a, 1998b). However, a shift to alternate food sources may not compensate for the decrease in hares consumed (Koehler and Aubry 1994). In northern regions, when hare densities decline, the lower quality diet causes sudden decreases in the productivity of adult female lynx and decreased survival of kittens, which causes the numbers of breeding lynx to level off or decrease (Nellis *et al.* 1972; Brand *et al.* 1976; Brand and Keith 1979; Poole 1994; Slough and Mowat 1996; O'Donoghue *et al.* 1997).

Relative densities of snowshoe hares at southern latitudes are generally lower than those in the north, which has led to differing interpretations of the population dynamics of snowshoe hare populations. At southern latitudes hare populations may be—(1) noncyclic, (2) cyclic like northern populations, (3) cyclic with the high and low population numbers closer to the average population numbers, or (4) cyclic with a fluctuating periodicity (length of time between peaks and lows) (Dolbeer and Clark 1975; Wolff 1980; Buehler and Keith 1982; Brittell *et al.* 1989; Koehler 1990; Koehler and Aubry 1994; Hodges

1999b). Hodges (1999b) proposes that northern and southern hare populations have similar cyclic dynamics but that in southern areas both peak and low densities are lower than in the north. Snowshoe hares are generally associated with conifer forest cover types (Hodges 1999b). Relatively low snowshoe hare densities at southern latitudes are likely a result of the naturally patchy, transitional boreal habitat at southern latitudes that prevents hare populations from achieving densities similar to those of the expansive northern boreal forest (Wolff 1980; Buehler and Keith 1982; Koehler 1990; Koehler and Aubry 1994). Additionally, the presence of more predators and competitors of hares at southern latitudes may inhibit the potential for high-density hare populations with extreme cyclic fluctuations (Wolff 1980). If snowshoe hare populations in southern boreal forests do fluctuate (Hodges 1999b), then southern lynx populations also may be expected to fluctuate.

Therefore, lynx densities at the southern part of the range never achieve the high densities that occur in the northern boreal forest (Aubry *et al.* 1999). Comparisons between Canadian and contiguous U.S. lynx harvest returns and snowshoe hare densities over time suggest lynx numbers and snowshoe hare densities for the contiguous United States are substantially lower than those for Canadian provinces (Hodges 1999a, 1999b; McKelvey *et al.* 1999b). We conclude that historic and current lynx densities in the contiguous United States also are naturally low relative to lynx densities in the northern boreal forest.

Researchers believe cyclic increases in historic lynx harvest numbers in the contiguous United States were augmented by dispersal of transient animals from Canadian populations (Gunderson 1978; Henderson 1978; Mech 1980; McKelvey *et al.* 1999b). The opinion of some individuals and agencies is that presence of lynx in some regions of the contiguous United States, particularly the Great Lakes, is solely a consequence of dispersal from Canada (G. Meyer, Wisconsin Department of Natural Resources, *in litt.* 1998; R. Sando, Minnesota Department of Natural Resources, *in litt.* 1998). 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 kilometers (370 miles) (Brainerd 1985). Lynx disperse primarily when snowshoe hare populations decline (Ward and Krebs 1985; Koehler and Aubry 1994;

O'Donoghue *et al.* 1997; Poole 1997). Subadult lynx disperse even when prey is abundant (Poole 1997), presumably as an innate response to establish home ranges. An extreme example of the apparent emigration of lynx from Canada to the contiguous United States is the numerous occurrences of lynx that were frequently documented in atypical habitat, such as in North Dakota, during the early 1960s and 1970s. In these years harvest returns indicated unprecedented cyclic lynx highs for the 20th century in Canada (Adams 1963; Harger 1965; Mech 1973; Gunderson 1978; Thiel 1987; McKelvey *et al.* 1999b). We believe that many of these animals were dispersing and were either lost from the population because they were in areas that are unable to support lynx or they were able to return to suitable habitat.

### Distribution and Status

The complexities of lynx life-history and population dynamics, combined with a general lack of reliable historic or current lynx data for the contiguous United States, make it difficult for us to ascertain the past or present population status of lynx in the contiguous United States. Lynx population dynamics in the contiguous United States may not be the same as in the northern boreal forests of Canada and Alaska. Regarding lynx in the northern boreal forests of Canada and Alaska, we know the following—northern lynx populations undergo extreme fluctuations in response to snowshoe hare population cycles; lynx disperse when hare populations decline; lynx are capable of dispersing long distances; recruitment of young into the population seems to cease during cyclic lows of snowshoe hare populations; and lynx maintain home ranges (Mowat *et al.* 1999). We do not know the extent to which the northern lynx populations influence lynx occurrence in the contiguous United States. Because of the naturally fragmented habitat and lower density hare populations in the contiguous United States, we expect lynx in the contiguous United States to occur at naturally lower densities than in the north.

Historic lynx data in the contiguous United States are scarce and exist primarily in the form of trapping records. Many States did not differentiate between bobcats and lynx in trapping records, referring to both as "lynxcats." Therefore, long-term lynx trapping data is not available for most States. Surveys designed specifically for lynx were rarely conducted, and many reports (e.g., visual observations, snow tracks) of lynx were collected incidental to other activities. The reliability of

many of these records is unknown; trapping records may have errors, track identification is extremely difficult, and observations may be wrong. Long-term trapping data have been used to understand population trends for various species; however, because trapper effort can change, trapping returns may not accurately reflect population trends. Data showing few lynx trapped could be a result of decreased trapper effort, not necessarily a decreased population. These factors hamper our understanding of lynx population dynamics and status in the contiguous United States and preclude us from drawing definitive conclusions about lynx population trends. Data are too incomplete to infer much beyond simple occurrence (McKelvey *et al.* 1999b) and distribution of lynx in the contiguous United States. However, despite these difficulties, trapping data is the best information available on lynx presence throughout much of its range in the contiguous United States and therefore was relied upon in our analysis.

Data that would help us determine whether resident populations of lynx existed historically or exist currently in many States are generally unavailable. Given the available data and the propensity of lynx to disperse, at this time it is impossible to determine with certainty whether reports of lynx in many States were—(1) merely dispersing animals from northern populations that were effectively lost from the metapopulation because they did not join or establish resident populations, (2) animals that were a part of a resident population that persisted for many generations, or (3) a mixture of both members of resident populations and dispersing animals.

There are several plausible explanations for a lack of lynx records, such as (1) the true absence of lynx, (2) lynx populations are at a cyclic low, (3) lack of adequate surveys, or (4) decreased trapper effort. We suspect that some areas in the contiguous United States naturally act as "sinks" for lynx where mortality is higher than recruitment and lynx are lost from the overall population (McKelvey *et al.* 1999a). Sink habitats are most likely those places on the periphery of the southern boreal forest in the contiguous United States where habitat becomes more fragmented and more distant from larger lynx populations.

In the following discussions, we describe available lynx data, habitat, and other elements that frame our understanding of lynx in the various regions and States where lynx have been

reported within the contiguous United States.

Within the contiguous United States, the lynx range extends into different regions that are separated from each other by ecological barriers consisting of unsuitable lynx habitat. These regions are the Northeast, the Great Lakes, the Northern Rocky Mountains/Cascades, and the Southern Rocky Mountains. In general, lynx in each of these regions are associated with habitats that are southern extensions of the boreal forest (Aubry *et al.* 1999). Differences in local climate, primarily precipitation, and effects of elevation have resulted in climax forest types that differ in the eastern regions compared to the West (Buskirk *et al.* 1999b). The climax forest in the East is primarily deciduous or mixed deciduous/coniferous whereas in the West the climax forest is coniferous (Buskirk *et al.* 1999b). While the four regions of lynx range in the contiguous United States are ecologically unique and discreet, in each of these regions the lynx is associated with the southern boreal forest and, with the exception of the Southern Rockies, they are each geographically connected to the much larger population of lynx in Canada. For a more detailed description of the significance of each region within the overall U.S. population, see the "Distinct Population Segment" section.

**Northeast Region**—Based on an analysis of cover types and elevation zones containing most of the lynx occurrences, McKelvey *et al.* (1999b) determined that, at the broad scale, most lynx occurrence records in the Northeast were found within the "Mixed Forest-Coniferous Forest-Tundra" cover type at elevations ranging from 250 to 750 meters (820 to 2,460 feet). This habitat type in the northeast U.S. occurs along the northern Appalachian Mountain range from southeastern Quebec, western New Brunswick, and western Maine, south through northern New Hampshire. This habitat type becomes naturally more fragmented and begins to diminish to the south and west, with a disjunct segment running north-south through Vermont, an extensive patch of habitat in the Adirondacks of northern New York, and with a few more distant and isolated patches in Pennsylvania (see Figure 8.23 in McKelvey *et al.* 1999b). Within this habitat type, the highest frequency of lynx occurrences were in the *Picea rubens* (red spruce), *Abies balsamea* (balsam fir), *Acer saccharum* (sugar maple), *Betula* spp. (birch), *Fagus grandifolia* (beech) forest (McKelvey *et al.* 1999b).

The entire region south of the St. Lawrence River must be considered in

an assessment of lynx in the northeastern United States. Movement of lynx across the St. Lawrence River is believed to occur infrequently (R. Lafond, Quebec Ministry of the Environment, pers. comm. 1999); therefore, emigration from lynx populations of northern Quebec to the region south of the St. Lawrence River is limited. However, northeastern U.S. lynx and snowshoe hare habitat and populations are contiguous with those south of the St. Lawrence River in southeastern Quebec and western New Brunswick and, presumably, together constitute a metapopulation. Lynx should encounter little difficulty moving between southeastern Quebec and Maine and New Hampshire, because habitat is continuous and without barriers. In this region, we conclude the core of lynx habitat historically was found in western Maine, northern New Hampshire, southeastern Quebec, and western New Brunswick.

Harvest records from southeastern Quebec provide evidence that lynx persist in this region. Quebec instituted a lynx management plan requiring that trapping seasons for lynx be closed for 3 years during the lows in the cycles; most recently these seasons were closed during 1995, 1996, and 1997 (Environment et faune Quebec 1995). Outside of these closed seasons, harvest returns in the 1990s ranged from 100 (in 1990 and 1993) to nearly 275 (in 1998) (R. Lafond, *in litt.* 1999). In New Brunswick, the lynx has been listed as endangered since 1982; during 1996 revisions, it was categorized as a "regionally endangered species" (Cumberland *et al.* 1998). Although the lynx harvest season in New Brunswick has been closed, lynx were incidentally caught throughout the 1990s, evidence of the continued occurrence of lynx in New Brunswick (Cumberland *et al.* 1998).

**Maine**—In Maine, lynx accounts are irregular and anecdotal (McKelvey *et al.* 1999b; Maine Department of Inland Fisheries and Wildlife, *in litt.* 1997; R. Joseph, U.S. Fish and Wildlife Service, *in litt.* 1999). Twenty-eight verified records exist for Maine since 1862 (McKelvey *et al.* 1999b). Anecdotal information plus historical and recent records provide evidence of presence, reproduction, and persistence of lynx in several northern and western townships (R. Joseph, *in litt.* 1999), indicating the historical residency of lynx. Lynx had a bounty placed on them in Maine from 1832 to the closure of hunting and trapping seasons in 1967. Maine classifies lynx as a species of special concern (Matula 1997), and currently

hunting or trapping seasons for lynx are closed.

Although no reliable population estimates exist, in 1994 it was suggested that 200 animals or fewer occur Statewide (Maine Department of Inland Fisheries and Wildlife 1994). Lynx tracks were detected during track surveys in the 1990s (Maine Department of Inland Fisheries and Wildlife, *in litt.* 1997, 1998). In 1999, Maine and Service biologists radio-collared six lynx, three adult males and three adult females, and recorded two sub-adults and two kittens associated with radio-collared adults. This finding established with certainty current reproduction in Maine (J. Organ, *in litt.* 1999) and indicates the existence of a resident population. However, available data are not adequate for determining either population trend (increasing or decreasing) or size.

**New Hampshire**—New Hampshire is the only northeastern State that maintained a record of historic lynx harvest (Orff 1985 *in* McKelvey *et al.* 1999b; see Figure 8.1 *in* McKelvey *et al.* 1999b). Lynx were intermittently bountied in New Hampshire until 1965. Most of the lynx harvest occurred in the 1930s, ranging from 1 to 20 per year. Between 1940 and 1964, lynx harvests were lower, ranging from 0 to 3 lynx being caught per year. For 11 years, the harvest was zero (McKelvey *et al.* 1999b). The trapping season was closed in 1964 in response to apparent declines in lynx abundance reflected in harvest returns (Siegler 1971; Silver 1974; Litvaitis *et al.* 1991). Since 1980, the lynx has been listed as an endangered species by the New Hampshire Department of Fish and Game. Winter track surveys in 1986 in portions of the White Mountain National Forest did not detect lynx (Litvaitis *et al.* 1991). Litvaitis *et al.* (1991) hypothesized that lynx were extirpated from New Hampshire as increasing agriculture and timber harvesting in the 1970s precluded them from dispersing into the State from southeastern Quebec. Only two reports of lynx in New Hampshire exist for the 1990s (M. Amaral, U.S. Fish and Wildlife Service, *in litt.* 1999). Although lynx reports are scarce, to our knowledge, no lynx surveys have been completed in New Hampshire in recent years. Therefore, we suspect that lynx are present in New Hampshire because habitat remains contiguous with Maine.

**Vermont**—In Vermont, only four verified records of historic lynx occurrence exist (McKelvey *et al.* 1999b). In the mid-1900s, it was reported that Vermont had not had a documented breeding population of lynx for several decades (Osgood 1938 *in* Vermont Department of Fish and

Wildlife 1987). In fact, we have no evidence of a breeding population ever occurring in Vermont. Since 1972, the lynx has been listed by the State as endangered. The last verified occurrence was from 1968, with periodic reports since then. Vermont naturally supports less lynx habitat than we previously presumed, based on analyses by McKelvey *et al.* (1999b). Furthermore, lynx habitat in Vermont is somewhat isolated from that in New Hampshire. The State of Vermont currently considers lynx to be extirpated (A. Elser, Vermont Department of Fish and Wildlife, *in litt.* 1998). Therefore, we conclude that lynx occurrence in Vermont is poorly documented, and, based upon the limited extent and dispersed nature of suitable habitat, lynx were probably never abundant or persistent over time. Currently, lynx are not thought to occur in Vermont.

**New York**—Historically, lynx reportedly occurred in most northern regions of New York, particularly in the Adirondack Mountains and the Catskill Mountains (McKelvey *et al.* 1999b; K. Gustafson, pers. comm. 1994). Miller (1899 *in* Brocke 1982) believed that, by the 1880s, the population was approaching extirpation. McKelvey *et al.* (1999b) found 23 verified lynx occurrences since 1900, primarily from the Adirondack Mountains. The most recent verified record was from 1973 (McKelvey *et al.* 1999b). Historically, the Adirondacks apparently supported lynx habitat, although it was isolated from habitats and lynx populations to the north.

An effort to reintroduce lynx into the Adirondack Mountains occurred during 1988–1990 (Brocke *et al.* 1990; D. Major, U.S. Fish and Wildlife Service, pers. comm. 1998), but the reintroduction is believed to have failed. A collared lynx from the reintroduction effort was found near Ottawa, Ontario, Canada (M. Amaral, U.S. Fish and Wildlife Service, pers. comm. 1997) and another as far away as northern New Jersey (K. Gustafson, New Hampshire Fish and Game Department, pers. comm. 2000). No verified occurrences in New York have been reported recently. In New York, lynx are legally classified as a small game species with a closed season. We conclude the lynx is extirpated from New York.

**Pennsylvania/Massachusetts**—In the proposed rule, Pennsylvania and Massachusetts were considered to be a part of the historic range of lynx. However, the inherent isolation and small sizes of habitat patches both currently and historically, combined with the few accounts of lynx occurrence in these States, led us to

conclude that lynx were merely dispersing animals in these States (J. Belfonti, The Nature Conservancy, *in litt.* 1994). Without the habitat and prey to support lynx, we concluded that these animals were lost from the gene pool and that Pennsylvania and Massachusetts were not within the historic range of lynx.

In summary, we have firm documentation that lynx occur in Maine and that they are reproducing. We conclude that a resident lynx population historically occurred and currently occurs in Maine. Lynx historically occurred in New Hampshire, but recent records of lynx occurrence in New Hampshire are rare. Suitable habitat exists contiguous to Maine. Historically, Vermont and New York have had relatively few records of lynx and none exist from the 1990s, with the exception of animals introduced into New York. It is possible that lynx have been extirpated from New Hampshire, Vermont, and New York. We no longer include Pennsylvania and Massachusetts within the historic range of lynx because these States are isolated from resident populations and lack suitable habitat. Therefore, we concluded that the low number of lynx occurrence records represented dispersing animals that were likely lost from the population.

We conclude, based on documentation of lynx reproduction and individual animals in Maine, the substantive lynx harvest in southeastern Quebec, and the connectivity of boreal forest south of the St. Lawrence River in Quebec, New Brunswick, Maine, and New Hampshire, that in the Northeast a population of lynx continues to exist in the core of the region in the north; however, the range appears to have retracted northward. Connectivity with lynx populations north of the St. Lawrence River in Canada has been reduced from historic levels because of development along the St. Lawrence River and ice breaking to allow year-round shipping.

**Great Lakes Region**—The majority of lynx occurrence records in the Great Lakes Region are associated with the "mixed deciduous-coniferous forest" type (McKelvey *et al.* 1999b). Within this general forest type, the highest frequency of lynx occurrences were in the *Acer saccharum* (sugar maple), *Tilia* spp. (basswood), *Pinus banksiana* (jack pine), *P. strobus* (white pine), and *P. resinosa* (red pine) forest types (McKelvey *et al.* 1999b). These types are found primarily in northeastern Minnesota, northern Wisconsin, and the western portion of Michigan's upper peninsula.

Although the mixed deciduous-coniferous forest covers an extensive area in this region, we consider much of this area to be marginal habitat for lynx because it is a transitional forest type at the edge of the snowshoe hare range. Habitat at the edge of hare range supports lower hare densities (Buehler and Keith 1982) that may not be sufficient to support lynx reproduction. Furthermore, snow depths within appropriate habitat that allow lynx a competitive advantage over other carnivores (*i.e.*, coyotes (*Canis latrans*)) occur only in limited areas in northeastern Minnesota, extreme northern Wisconsin, and Michigan's upper peninsula.

The historic and current status of lynx in the Great Lakes Region is uncertain. Minnesota has a substantial number of lynx reports, primarily trapping records (McKelvey *et al.* 1999b), as expected because of the connectivity of the boreal forest with that of Ontario, Canada, where lynx occur. Wisconsin and Michigan have substantially fewer records of lynx (McKelvey *et al.* 1999b). Researchers have debated whether lynx in this region are simply dispersing lynx emigrating from Canada, are members of a resident population, or are a combination of a resident population and dispersing individuals (McKelvey *et al.* 1999b; R. Sando, Minnesota Department of Natural Resources, *in litt.* 1998). In recent decades, lynx dynamics in the Great Lakes appear to have been driven by immigration because lynx occurrence records did not show a response to local cycles of hare abundance (McKelvey *et al.* 1999b), as would have been expected of a resident lynx population. Available information, does not indicate that resident populations exist, but it does indicate that recent cyclic highs in the Great Lakes lynx data are at least partially Canadian in origin (McKelvey *et al.* 1999b).

**Minnesota**—The majority of lynx occurrence records are from the northeastern portion of the State; however, dispersing lynx have been found throughout Minnesota outside of typical lynx habitat (Gunderson 1978; Mech 1980; McKelvey *et al.* 1999b). Until 1965, lynx had a bounty placed on them in Minnesota. In 1976, the lynx was classified as a game species, and harvest seasons were established (M. DonCarlos, Minnesota Department of Natural Resources, *in litt.* 1994). Harvest and bounty records for Minnesota are available since 1930. Approximate 10-year cycles are apparent in the data, with highs in the lynx cycle in 1940, 1952, 1962, and 1973 (Henderson 1978; McKelvey *et al.* 1999b). During a 47-

year period (1930–1976), the Minnesota lynx harvest was substantial, ranging from 0 to 400 per year (Henderson 1978). These harvest returns for Minnesota are believed to be influenced by influxes from Canada, particularly in recent decades (Henderson 1978; Mech 1980; McKelvey *et al.* 1999b; M. DonCarlos, *in litt.* 1994). When an anticipated lynx cyclic high for the early 1980s did not occur, the harvest season was closed in 1984 (M. DonCarlos, *in litt.* 1994) and remains closed today. Outside of harvest data, 76 verified lynx records exist for Minnesota (McKelvey *et al.* 1999b).

With available data, we cannot verify whether a resident population existed historically in Minnesota. Reproduction and maintenance of home ranges by lynx was documented in the early 1970s (Mech 1973, 1980), which may be evidence of the existence of a resident population. The early 1970s also were a period when the second highest lynx harvest returns in the 20th century occurred throughout Canada. High numbers of lynx trapped in Minnesota during this period were likely due in part to immigrants from Canada (McKelvey *et al.* 1999b). Lynx were consistently trapped over 40 years during cyclic lows, which may indicate that a small resident population occurred historically.

Current information is insufficient to determine whether a resident population of lynx exists in Minnesota and, if so, whether there has been a decline in numbers. In northeastern Minnesota, where deep snow accumulates, suitable lynx and snowshoe hare habitat is likely present. Much of this area is protected as designated wilderness, including the Boundary Waters Canoe Area. Furthermore, these habitats are contiguous with boreal forest in southern Ontario. Trapping records for Ontario districts adjacent to the Minnesota border demonstrate consistent occurrence of lynx in the area over the past 10 years (N. Dawson, Ontario Ministry of Natural Resources, *in litt.* 1999). The only recent verified records of lynx in Minnesota were two lynx in 1992 and one in 1993 (M. DonCarlos, *in litt.* 1994). However, no lynx surveys or research have been conducted in Minnesota to document presence, absence, or population trend. A lynx survey was initiated this year as a joint effort by the Service, the Forest Service and the University of Minnesota. Although habitat and prey conditions appear suitable in the northeastern portion of the State, we have received no information that

substantiates presence of a resident lynx population currently in Minnesota.

**Wisconsin**—Thiel (1987) concluded that, historically, Wisconsin did not support a permanent, self-sustaining lynx population; rather, lynx presence was associated with cyclic lynx population fluctuations in Canada resulting in increased dispersal. Verified reports of lynx in Wisconsin are few (29 records from 1870 to 1992) (McKelvey *et al.* 1999b); over half of these reports are associated with unprecedented cyclic highs that occurred throughout Canada in the early 1960s and 1970s. Between 1948 and 1956, 19 lynx were harvested in the State; annual harvests were low, ranging from 0 (in 1954) to 4 (in 1952) (Wisconsin Department of Natural Resources 1993). In 1992, two lynx mortalities were reported in Wisconsin (Wydeven 1993; C. Pils, *in litt.* 1994). Lynx tracks have been detected during wolf surveys in the 1990s (Wydeven 1998).

A bounty on lynx existed until 1957. Lynx were placed on the protected species list in 1957 and were classified as State endangered in 1972 (C. Pils, *in litt.* 1994). Because of the lack of breeding records, Wisconsin reclassified the lynx as a “protected” species with a closed season (G. Meyer, *in litt.* 1998).

We have no evidence to determine whether a lynx population resided in Wisconsin historically or resides currently; however, Wisconsin Department of Natural Resources suggested that a breeding population may have existed in the State prior to the 1900s (G. Meyer, *in litt.* 1998). Most of northern Wisconsin forests are mixed deciduous-coniferous forest (McKelvey 1999b). We believe this transitional forest type at the edge of the snowshoe hare range may be unable to support hare densities sufficient to sustain a resident lynx population. An exception may be in extreme northern portions of Wisconsin, where more suitable habitat exists and deep snows accumulate.

**Michigan**—In Michigan, historical reports suggest that the Canada lynx was resident and widespread throughout the upper and lower peninsula in the 19th century (Harger 1965). However, records verifying these accounts are scarce; 44 verified records exist from the mid 1800s until 1983 (McKelvey *et al.* 1999b). 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). Lynx persisted on Isle Royale in Lake Superior into the late 1970s (Peterson 1977 *in* Baker 1983; M. Romanski, Isle Royale National Park, *in litt.* 1998). Sixteen of 44 verified lynx records for Michigan are associated with

an extreme cyclic high in Canada in the early 1960s (Harger 1965; McKelvey *et al.* 1999b). Only two verified records of lynx exist for Michigan (from the upper peninsula) since the 1960s (McKelvey *et al.* 1999b; G. Burgoyne, Jr., Michigan Department of Natural Resources, *in litt.* 1998). Michigan listed the lynx as “rare” in 1974; in 1983 it was listed as threatened and in 1987, its status was upgraded to endangered (G. Burgoyne, Jr., *in litt.* 1998). Although suitable habitat and snow depths likely exist in Michigan's upper peninsula, too few records exist to substantiate either the historic or current presence of a resident lynx population in Michigan.

In summary, using the best available information we cannot determine whether resident lynx populations occur currently or historically in the Great Lakes Region. Within this region, we consider northeastern Minnesota to be most likely to support a resident lynx population based on the presence of boreal forest that is contiguous with that of Ontario, where lynx are known to exist, and the number of lynx records from this area. We suspect that there may have been a small resident population historically in northeastern Minnesota; however, we recognize the lack of evidence to clearly support either the past or current existence of a resident population in Minnesota. Because of the paucity of records from Wisconsin and Michigan and the presence of habitat that we think is marginal for lynx, we suspect records of lynx in Wisconsin and Michigan most likely are transient animals that are dispersing, rather than individuals from resident populations. Accurate mapping of lynx habitat in the Great Lakes Region would enable us to define where to expect resident lynx to occur in this region.

**Northern Rocky Mountain/Cascades Region**—In this region, the majority of lynx occurrences are associated at a broad scale with the “Rocky Mountain Conifer Forest”; within this type, most of the occurrences are in moist *Pseudotsuga menziesii* (Douglas fir) and western spruce/fir forests (McKelvey *et al.* 1999b). Most of the lynx occurrences are in the 1,500–2,000 meters (4,920–6,560 feet) elevation class (McKelvey *et al.* 1999b). These habitats are found in the Rocky Mountains of Montana, Idaho, eastern Washington, and Utah and the Cascade Mountains in Washington and Oregon. The majority of verified lynx occurrences in the U.S. and the confirmed presence of resident populations are from this region. The boreal forest of Washington, Montana, and Idaho is contiguous with that in

adjacent British Columbia and Alberta, Canada.

**Washington**—In Washington, resident lynx populations were historically found in the northeast and north-central regions and along the east slope of the Cascade Mountains (Washington Department of Wildlife 1993). 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 southeastern Washington (Taylor and Shaw 1927 *in* Koehler and Aubry 1994; Dalquest 1948; Washington Department of Natural Resources 1996a). Washington has a long record of verified lynx occurrences over the past century (McKelvey *et al.* 1999b).

Trapping data kept since 1961 reflect cyclic patterns (McKelvey *et al.* 1999b). The largest harvests were taken in 1969–1970 (31 lynx) and 1976–1977 (39 lynx) (Washington Department of Wildlife 1993). Trapping restrictions were implemented in 1977–1978, and lynx hunting and trapping seasons were closed in 1991 (Washington Department of Wildlife 1993). In the years 1987–1989, immediately prior to the season being closed, harvest increased substantially despite restrictive quotas and shortened seasons (see Figure 8.7 *in* McKelvey *et al.* 1999b). We suspect that this increase in trapped animals may have represented a cyclic increase, as was evident in harvest data from British Columbia during this time frame (see Figure 8.6 *in* McKelvey *et al.* 1999b; M. Badry, British Columbia Ministry of Environment, *in litt.* 1999). Lynx harvest data from British Columbia demonstrate cyclic fluctuations for the past 13 seasons, as well as the continued presence of lynx, in regions contiguous with Washington (M. Badry, *in litt.* 1999).

Established snow track survey routes are conducted to detect the presence of lynx within the six designated “Lynx Management Zones” across the north-central part of Washington (Richardson 1999; Washington Department of Natural Resources 1996a). Results of these surveys show that currently, lynx occupy four of these zones—Okanogan, Kettle Range, Little Pend Oreille, and Salmo Priest—but have not documented lynx presence in the Wedge or Vulcan Mountain, the two smallest zones delineated in Washington (Richardson 1999). Recent preliminary DNA survey results indicate the presence of lynx in the southern and central Cascades in Washington (Weaver and Amato 1999), and recent records of lynx reproduction also exist for Washington in the northern Cascades (Koehler 1990;

Friends of the Loomis Forest, *in litt.* 1999).

Although Washington has the best lynx data in the contiguous U.S., we cannot identify population changes or trend from this data. It is clear that resident lynx populations exist in Washington. The lynx population in Washington has been roughly estimated at 96–191 (Washington Department of Wildlife 1993) and 225 individuals (Brittall *et al.* 1989). However, these population estimates may be high because of assumed similar habitat suitability and lynx densities 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). Richardson (1999) recommended retaining the lynx as a threatened species in the State because the status of the lynx had not changed appreciably in Washington.

**Oregon**—Historic lynx records exist from nine counties in Oregon (Bailey 1936; Nellis 1971). McKelvey (1999b) documented 12 verified lynx records for Oregon in the past century. Based on the time frames when collected and locations in atypical habitat, some of these records likely were dispersing transient individuals. Recent observations of lynx have been reported from the Cascades and the Blue Mountains in northeastern Oregon (Csuti *et al.* 1997; R. Anderson, Wallowa-Whitman National Forest, *in litt.* 1998), and preliminary DNA survey results also suggest the presence of lynx in the Cascade Range in Oregon (Weaver and Amato 1999). Lynx have rarely been reported harvested in Oregon, although the season for lynx is essentially open because the State does not regulate lynx harvest, however we do not believe any lynx have been harvested because there are no records of lynx trapping or pelts collected in Oregon (C. Carson, pers. comm., USFWS, Office of Management Authority (OMA), 2000). Based on the limited available information, we cannot substantiate the historic or current presence of a resident lynx population in Oregon.

**Idaho**—According to Rust (1946), lynx were not abundant but were distributed throughout northern Idaho in the early 1940s, occurring in 8 of the 10 northern and north-central counties. McKelvey *et al.* (1999b) located a number of lynx specimen records from Idaho collected during the early 1900s. Harvest records for Idaho are unreliable because no distinction was made between lynx and bobcats until 1982 when Idaho Department of Fish and Game initiated a mandatory pelt tagging

program. Anecdotal reports compiled by Lewis and Wenger (1998) indicated the occurrence of lynx in atypical habitats. Based on the time frames when collected, these records likely were dispersing transient individuals. Between 1960 and 1991, 35 verified records exist for Idaho, with 13 of these from 1982 to 1991 (McKelvey *et al.* 1999b). From 1991 until recently, there had been no verified records of lynx from Idaho (McKelvey *et al.* 1999b); however, until the past year, no lynx surveys were conducted in Idaho. Preliminary results from recent DNA surveys suggest the presence of lynx in northern and north-central Idaho (J. Weaver, Wildlife Conservation Society, *in litt.* 1999).

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. In 1997/1998, Idaho closed the lynx trapping/hunting season because no lynx had been captured in several years.

Although records of lynx in Idaho are relatively common and boreal forest habitat is contiguous with adjacent States and Canada where lynx populations are known to exist, we cannot clearly substantiate either the historic or current presence of resident lynx populations in Idaho, nor can we identify population changes or trend with the available information.

**Montana**—In Montana, numerous historic and current lynx records exist throughout the Rocky Mountain Conifer Forest in the western part of the State (McKelvey *et al.* 1999b; P. Graham, Montana Department of Fish, Wildlife, and Parks, *in litt.* 1998). Reproduction has been documented (Brainerd 1985). Many records exist of lynx harvested in eastern Montana's Great Plains Region in the 1960s (Hoffman *et al.* 1969); however, we suspect these were dispersing transient animals associated with cyclic highs in northern lynx populations during the early 1960s.

Since 1950, Montana lynx harvest records exhibit cycles (McKelvey *et al.* 1999b), although accurate harvest records were not kept until 1977 when lynx were classified as a furbearer. The harvest data reflect the extreme highs of the early 1960s and 1970s that were documented throughout Canada. Since 1977, Montana's largest lynx harvest occurred in both 1979 and 1984 when 62 lynx were taken in each season (McKelvey *et al.* 1999b; B. Giddings, Montana Department of Fish, Wildlife, and Parks, *in litt.* 1994). These harvest

returns were substantially lower than those recorded in the early 1960s and 1970s, leading to concern that lynx populations in Montana were at or near their lowest levels in the past several decades (Hash 1990; S. Conn, Montana Trappers Association, *in litt.* 1990). The State established quotas that were incrementally decreased from 135 in 1982 down to a Statewide quota of 2 beginning in 1991 (B. Giddings, *in litt.* 1994). In 1999, Montana's lynx harvest season was closed.

Harvest records, winter track surveys conducted since 1990/1991, and trapper logbooks, led Montana Department of Fish, Wildlife, and Parks to conclude that the State's lynx population has recovered and is distributed throughout what it determined to be "predicted lynx habitat" (P. Graham, *in litt.* 1998). Montana Department of Fish, Wildlife, and Parks estimated the lynx population as 1,040 lynx in 1994 (B. Giddings, *in litt.* 1994). This estimate was determined using a habitat area/density index, which is likely inaccurate, given broad assumptions regarding habitat suitability and lynx distribution.

We conclude that a resident population of lynx is distributed throughout its historic range in Montana. However, available data are not sufficient to determine either population trend (increasing or decreasing) or estimates of population size. Furthermore, we now question the interpretations we made in the proposed rule as well as those made by the other sources that harvest returns in the 1980s and 1990s reflected substantially reduced populations (see "Factor B" in the "Summary of Factors" section). We now know that harvest returns in the early 1960s and 1970s represented unprecedented cyclic highs for the 20th century (McKelvey *et al.* 1999b). Therefore, it is possible that lower lynx harvest returns in the 1980s were not unusual compared to harvest returns prior to 1960. Lynx harvest returns for British Columbia and Alberta since 1919 demonstrate the variability of cyclic amplitudes throughout the past century (McKelvey *et al.* 1999b) and lead us to suspect that cycles in Montana were similar.

**Wyoming**—Most historical and recent records of lynx in Wyoming are from the northwestern mountain ranges (Reeve *et al.* 1986; McKelvey *et al.* 1999b). McKelvey *et al.* (1999b) found only 30 verified records Statewide since 1856. Documented reports of lynx in Yellowstone National Park are rare (S. Consolo-Murphy, Yellowstone National Park, pers. comm. 1994); no recent verified records exist from the Greater Yellowstone Ecosystem (McKelvey *et al.*



1999b). However, no lynx surveys have been conducted in this area. Elsewhere, lynx have been reported from the Big Horn Mountains in north-central Wyoming (Reeve *et al.* 1986; McKelvey *et al.* 1999b). Until 1957, lynx had bounties place on them in the State. Since 1973, the lynx has been listed as a protected non-game species and harvest was closed. Because of connectivity with lynx populations and habitat in Montana, we suspect that lynx were historically resident in northwestern Wyoming.

In 1996 the Wyoming Game and Fish Department began a lynx study in west-central Wyoming. Production of kittens was documented in 1998 (Squires and Laurion 1999). This may indicate the presence of a resident population in this local area (Ruggiero *et al.* 1999b). However, using available information we are unable to determine status or trend of lynx throughout Wyoming.

**Utah**—There are few historic reports of lynx in Utah (McKay 1991; McKelvey *et al.* 1999b). Nearly all the reliable lynx reports are from the Uinta Mountain Range along the Wyoming border (McKay 1991). McKelvey *et al.* (1999b) found only 10 verified records of lynx in Utah since 1916; no verified records exist since 1991. However, recent unverified reports of lynx in the Uintas persist (Bates, Utah Department of Wildlife, pers. comm. 1999). The lynx is listed as a State sensitive species with closed harvest seasons. Based on the limited available information we cannot substantiate either the historic or current presence of a resident lynx population in Utah.

In summary, we believe the Northern Rockies/Cascades Region supports the most viable resident lynx populations in the contiguous U.S., while recognizing that, at best, lynx in the contiguous U.S. are naturally rare. Strong evidence exists to support the presence of resident lynx populations distributed throughout much of the forest types considered lynx habitat in Montana and Washington. We expect that resident lynx populations exist in contiguous habitats in Idaho and northwestern Wyoming. We believe that lynx have always occurred intermittently in Oregon and Utah, although we cannot determine the historic or current presence of resident populations in either of these States. Recently initiated DNA surveys in all the States within this region should further refine our understanding of the status of lynx in this region.

#### **Southern Rockies**

Colorado represents the extreme southern edge of the range of the lynx.

The southern boreal forest of Colorado and southeastern Wyoming is isolated from boreal forest in Utah and northwestern Wyoming by the Green River Valley and the Wyoming basin (Findley and Anderson 1956 in McKelvey *et al.* 1999b). These habitats likely act as a barrier that reduces or precludes opportunities for immigration and emigration from the Northern Rocky Mountains/Cascades Region and Canada, effectively isolating lynx in the southern Rocky Mountains in Colorado and southeastern Wyoming (Halfpenny *et al.* 1982; Koehler and Aubry 1994). A majority of the lynx occurrence records in Colorado and southeastern Wyoming, are associated with the "Rocky Mountain Conifer Forest" type. The occurrences in the Southern Rockies were generally at higher elevations (1,250 to over 3,750 meters (4,100–12,300 feet)) than were all other occurrences in the West (McKelvey *et al.* 1999b).

**Colorado**—The montane and subalpine forest ecosystems in Colorado are naturally highly fragmented (Thompson 1994), which we believe limits the size of lynx populations. A total of 78 lynx reports rated as positive (22) or probable (56) exist in State records since the late 1800s (J. Mumma, Colorado Division of Wildlife, *in litt.* 1998); although McKelvey *et al.* (1999b) considered only 17 of these records "verified." The last verified lynx specimens were taken in 1974 (Halfpenny *et al.* 1982). No verified records of lynx exist since 1974; however, extensive survey efforts have resulted in reports of lynx tracks (Halfpenny and Miller 1981; Thompson and Halfpenny 1989; Anderson 1990; Thompson and Halfpenny 1991; Andrews 1992; Carney 1993; Fitzgerald 1994; Colorado Division of Wildlife *et al.* 1997). The lynx has been listed as a State endangered species since 1976 (Colorado Division of Wildlife *et al.* 1997) and harvest of the species is currently closed.

Few, if any, native lynx continue to exist in Colorado (J. Mumma, *in litt.* 1998). As a result, in 1997, the Colorado Division of Wildlife, in cooperation with numerous government and private entities, began a program to introduce lynx from Canada and Alaska into Colorado in an attempt to reestablish a viable lynx population. Forty-one lynx were released into the wild beginning in early spring 1999. It is too early to predict the success of this effort.

**Wyoming**—"Rocky Mountain Conifer Forest" in southeastern Wyoming is contiguous with that of Colorado. None of the reports of lynx in the Medicine Bow and Laramie Ranges in

southeastern Wyoming have been confirmed (Reeve *et al.* 1986). However, McKelvey *et al.* (1999b) found two specimens collected prior to 1900 in southeastern Wyoming. There is a general lack of information in Wyoming, particularly southeastern Wyoming, that limits our ability to assess historical and current status of the lynx.

In summary, we believe that a resident lynx population historically occurred in the Southern Rockies Region in both Colorado and southeastern Wyoming, based on the records of lynx in Colorado and the persistence of contiguous habitat in southeastern Wyoming with the Colorado habitat. This resident population may now be extirpated.

**Other Reports or Sightings**—Lynx observations in Nevada, North Dakota, South Dakota, Iowa, Nebraska, Indiana, Ohio, and Virginia are considered individuals dispersing subsequent to periods of cyclic high lynx numbers in Canada (Hall and Kelson 1959; Burt 1954 in Brocke 1982; McKelvey *et al.* 1999b; 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 1960s, lynx moved into the Great Plains and the Midwest Region of the U.S. associated with an unprecedented cyclic high in Canada (Gunderson 1978; Mech 1980; DeStefano 1987; South Dakota Natural Heritage Program, *in litt.* 1994). These records are outside of the southern boreal forests where most lynx occurrences are found (McKelvey *et al.* 1999b). We conclude that these unsuitable habitats are unable to sustain lynx and that these records represent dispersing individuals that are lost from the metapopulation unless they return to boreal forest. We do not consider these States to be within the contiguous U.S. range of lynx.

#### **Distinct Population Segment**

For a species to be listable under the Endangered Species Act (Act), it must be a "species" as defined in the Act. The Act defines "species" as a species, subspecies, or Distinct Population Segment (DPS) of a vertebrate species. On February 7, 1996, the Service and the National Marine Fisheries Service published final policy guidance concerning recognition of Distinct Vertebrate Population Segments for consideration under the Act (61 FR 4722). We follow the Vertebrate Population Policy when considering listing a vertebrate species as endangered or threatened in only a



portion of its range. In developing the proposed rule and final rule for the lynx, we used the Vertebrate Population Policy to evaluate whether the lynx population in the contiguous United States constitutes a DPS under the Act.

Under the Vertebrate Population Policy, two elements, discreteness and significance, must be considered to determine whether a species' population meets the definition of a DPS. 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.

According to the Vertebrate Population Policy, a species' population 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.”

We have determined that resident populations of lynx existed historically and currently exist within the contiguous United States (see “Status” section). In Canada, management of forest lands and conservation of wildlife habitat varies depending on Provincial regulations. Canada has no overarching forest practices legislation, 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, such as length of season and quotas, vary, being regulated by individual Provinces or, in some cases, individual trapping districts. Therefore, we conclude that the contiguous United States population of the lynx is discrete based on the international boundary between Canada and the contiguous United States due to differences in management of lynx and lynx habitat.

According to the Vertebrate Population Policy, a population segment can be considered significant based on considerations that include, but are not limited to, 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.”

Lynx in the contiguous United States may be considered biologically and ecologically significant simply because of the climatic, vegetational, and ecological differences between lynx habitat in the contiguous United States and that in northern latitudes in Canada and Alaska (Buskirk *et al.* 1999b). In the contiguous United States, the distribution of lynx is associated with the mosaic of southern boreal forest and subalpine coniferous forest in the West and southern boreal forest/hardwoods in the East; whereas in Canada and Alaska lynx inhabit the classic boreal forest ecosystem known as the taiga (McCord and Cardoza 1982; Quinn and Parker 1987; Agee 1999; McKelvey *et al.* 1999b) (see “Background” and “Distribution and Status” sections).

Lynx and snowshoe hare population dynamics in portions of the contiguous United States are different from those in northern Canada. We conclude that historic and current lynx and snowshoe hare densities in the contiguous United States are naturally low relative to lynx and hare densities in the northern boreal forest (see “Background” and “Distribution and Status” sections). Because the southern boreal forest in the contiguous United States is naturally highly fragmented and contains more hare predators, it is unable to support the extremely high peak densities of snowshoe hares as in the northern boreal forest of Canada and Alaska (Wolff 1980; Buehler and Keith 1982; Hodges 1999a, 1999b; McKelvey 1999a). Therefore, lynx densities at the southern part of the range never achieve the high densities of the northern boreal forest (Aubry 1999).

After review and consideration of lynx status and management in the contiguous United States and Canada, and lynx and snowshoe hare life-history, habitat, and population dynamics, we have determined that the lynx population in the contiguous United States is discrete and significant and, therefore, qualifies as a DPS to be considered for listing under the Act.

Within the contiguous United States population segment, the range of the lynx is divided regionally by ecological barriers of unsuitable lynx habitat. These regions are— (1) the Northeastern Region, including Maine, New Hampshire, Vermont, and New York; (2) the Great Lakes Region, including Michigan, Wisconsin, and Minnesota;

(3) the Northern Rocky Mountain/Cascades Region, including Washington, Oregon, Idaho, Montana, northwestern Wyoming, and Utah; and (4) the Southern Rocky Mountains Region, including Colorado and southeastern Wyoming.

McKelvey *et al.* (1999b) illustrate lynx population dynamics emanating from central Canada to the periphery. The authors use Canadian and United States lynx trapping and occurrence data to display lagged synchronous cycles (cycles with similar peaks and lows in population size) (McKelvey *et al.* 1999b), providing evidence of the interconnectedness of lynx population dynamics in the contiguous United States with lynx population dynamics in the Canadian boreal forest. All of the different regions that support lynx within the contiguous United States are directly contiguous with lynx habitat or lynx populations in Canada, except the Southern Rockies, although the connectivity of the Northeast Region is largely limited to areas south of the St. Lawrence Seaway: southern Quebec and New Brunswick.

Within the contiguous United States, all four regions are isolated from each other by expanses of unsuitable habitats that limit or preclude lynx movement between these regions. Unsuitable habitat along the southeastern Great Lakes isolates the Northeastern and Great Lakes regions; the Great Plains isolates the eastern regions from the West. Although there may be some limited potential for dispersal between the Southern and Northern Rockies, lynx in the Southern Rockies are considered to be isolated from lynx populations in the Northern Rockies/Cascades Region by the Green River basin and the Red Desert. We have no expectation that lynx in these individual regions influence the presence or persistence of lynx within another region of the contiguous United States. Therefore, we believe each of these four regions are discrete.

When considering whether a population meets the significance test, policy requires us to evaluate the population as it relates to the entire range of the taxon. In the case of the lynx, the range of the taxon is extensive and exists mainly in Canada and Alaska. When we evaluated the significance of the small discrete regions in the contiguous United States to the entire range of the taxon in North America, we determined that none of these regions individually constitute significantly unique or unusual ecological settings; therefore, they could not be separated from the contiguous U.S. DPS as a whole. Within all four regions of the

contiguous United States, the distribution of the lynx is associated with the southern boreal forest.

We have concluded that none of the four regions, individually, fulfill both the discreteness and significance criteria as provided under the policy. Therefore, we conclude that the listable entity is the contiguous United States DPS of the lynx, consisting of the Northeast, the Great Lakes, the Northern Rockies/Cascades, and the Southern Rockies regions.

Within the contiguous United States, the relative importance of each region to the persistence of the DPS varies. The Northern Rockies/Cascades Region supports the largest amount of lynx habitat and has the strongest evidence of persistent occurrence of resident lynx populations, both historically and currently. In the Northeast (where resident lynx populations continue to persist) and Southern Rockies regions, the amount of lynx habitat is naturally limited and does not contribute substantially to the persistence of the contiguous United States DPS. Much of the habitat in the Great Lakes Region is naturally marginal and may not support prey densities sufficient to sustain lynx populations. As such, the Great Lakes Region does not currently contribute substantially to the persistence of the contiguous United States DPS. Collectively, the Northeast, Great Lakes, and Southern Rockies do not constitute a significant portion of the range of the DPS. We conclude the Northern Rockies/Cascades Region is the primary region necessary to support the continued long-term existence of the contiguous United States DPS. However, the role that each region plays in the long-term conservation of the species will be explored further in recovery planning for the species.

#### Previous Federal Action

The lynx was added to Appendix II of the Convention on International Trade in Endangered Species (CITES) of Wild Flora and Fauna in 1977. The species was classified as a category 2 candidate species in the December 30, 1982, Vertebrate Notice of Review (47 FR 58454), meaning that more information was necessary to determine whether the species' status was declining. In response to a petition received on August 22, 1991, we published a notice of a 90-day petition finding on October 6, 1992, that we did not have substantial information to indicate that listing the North Cascades population of the lynx as endangered may be warranted (57 FR 46007). A lawsuit was filed challenging the October 6, 1992, finding. On July 9, 1993, we published a notice indicating

that we had reviewed the North Cascades 90-day petition after receiving new information and again found that we did not have substantial information to indicate that listing the population may be warranted (58 FR 36924). In a settlement agreement dated November 30, 1993, we 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, we published a notice announcing continuation of the status review (59 FR 4887).

On April 27, 1994, we received a petition to list the conterminous U.S. 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. We published a notice on August 26, 1994, that the petition presented substantial information that listing may be warranted, but that we determined emergency listing was not warranted for the Southern Rocky Mountain population (59 FR 44123).

On December 27, 1994, we published a notice (59 FR 66507) of our 12-month finding that listing the lynx in the contiguous United States was not warranted because of the lack of residency in lynx populations in the lower 48 States and our 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 filed a lawsuit challenging our finding.

On March 27, 1997, the court issued an opinion and order setting aside the not warranted finding and remanding it back to us for further consideration. We were ordered to publish a 12-month finding on the status of the lynx within 60 days. On May 27, 1997, we published a 12-month finding (62 FR 28653) that the 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 lynx to candidate species status.

On September 15, 1997, Defenders of Wildlife *et al.* filed suit in response to our finding that listing the Canada lynx population in the contiguous United States was warranted but precluded. On February 12, 1998, a settlement agreement was reached that called for us to finalize a proposed rule to list the

Lynx in the contiguous United States by June 30, 1998. The proposed rule to list the contiguous United States DPS of the Canada lynx as threatened was published on July 8, 1998 (63 FR 36994).

On July 8, 1999 (64 FR 36836), we extended the listing deadline by 6 months to receive and evaluate comments on new information contained in a report, "The scientific basis for lynx conservation in the contiguous United States" (Science Report), prepared by a team led by the Forest Service's Rocky Mountain Research Station (Ruggiero *et al.* 1999c). As a result, the new listing deadline became January 8, 2000. The Act permits such an extension for the purpose of soliciting additional data when there is substantial disagreement regarding the sufficiency or accuracy of the available data relative to the determination.

The Act requires listing determinations to be made using the best scientific and commercial data available. However, the 1998 settlement agreement allowed only 4 months within which to prepare the proposed rule to list the lynx, much less time than the 9 months allowed by the Act to conduct a status review to make a listing determination. Consequently, we were not able to gather nor consider the best scientific and commercial data available at the time of publication of the proposed rule; instead we relied primarily on data we had gathered during the lynx status review in 1994. Therefore, this final rule treats information available since 1994 as new information; whereas, typically, new information is that information made available subsequent to the proposed rule.

#### Summary of Comments and Recommendations

In the July 8, 1998, proposed rule and associated notifications (63 FR 58910), all interested parties were requested to submit comments or suggestions on the proposed rule, particularly on the following topics—(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 the species; and (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. In the proposed rule, we announced that 10 public hearings on the proposal would be held in various locations throughout the range of the lynx in the contiguous United States. One additional public hearing was announced on August 26, 1998 (63 FR 45445).

Open houses and public hearings, providing an additional forum for public comment on the proposed rule, were held in Colorado, Idaho, Montana, Oregon, Washington, Wyoming, Maine, and Wisconsin. The 60-day comment period on the proposed rule, originally closing on September 30, 1998, was twice extended by request. The first extension was announced on October 2, 1998, and extended the comment period to October 14, 1998 (63 FR 53010). The second extension was announced on October 19, 1998, and extended the comment period on the proposed rule until November 16, 1998 (63 FR 55839).

On July 8, 1999 (64 FR 36836), we extended the listing deadline by 6 months to receive and evaluate comments on new information contained in a report, "The scientific basis for lynx conservation in the contiguous United States" (Science Report), prepared by a team led by the Forest Service's Rocky Mountain Research Station (Ruggiero *et al.* 1999c). The Act permits such an extension for the purpose of soliciting additional data when there is substantial disagreement regarding the sufficiency or accuracy of the available data relative to the determination. On August 18, 1999, we announced that we had reopened the comment period for an additional 38 days to allow the public to provide additional comment on the proposed rule based on new information contained in the Science Report (64 FR 44883).

Prior to making our final listing determination on the lynx, we held the 11 announced public hearings, and allowed for a total of 140 days of public comment on the proposed rule and Science Report. Appropriate Federal and State agencies, tribal governments, county governments, scientific organizations, and other interested parties were contacted and requested to comment during the initial comment period, notified of the extensions, and were again contacted when the comment period was reopened to allow evaluation of the Science Report. Notices of the proposed rule and public hearings were sent to over 1,200 individuals, and public notices were published in 63 newspapers within the contiguous U.S. range of the lynx, including the Spokesman Review,

Spokane, Washington; Wenatchee World, Wenatchee, Washington; The Oregonian, Portland, Oregon; The La Grande Observer, La Grande, Oregon; The News Review, Roseburg, Oregon; The Daily Courier, Grants Pass, Oregon; The Bend Bulletin, Bend, Oregon; The Idaho Statesman, Boise, Idaho; Great Falls Tribune, Great Falls, Montana; Independent Record, Helena, Montana; The Missoulian, Missoula, Montana; The Billings Gazette, Billings, Montana; Bozeman Daily Chronicle, Bozeman, Montana; The Daily Inter Lake, Kalispell, Montana; The Western News, Libby, Montana; Casper Star-Tribune, Natrona County, Wyoming; Wyoming Tribune Eagle, Laramie County, Wyoming; The Cody Enterprise, Cody, Wyoming; The Dubois Frontier, Fremont County, Wyoming; Jackson Hole News, Jackson, Wyoming; Pinedale Roundup, Sublette County, Wyoming; The Riverton Ranger, Fremont County, Wyoming; Thermopolis Independent Record, Thermopolis, Wyoming; Detroit Free Press, Detroit, Michigan; Lansing State Journal, Lansing, Michigan; Daily Mining Gazette, Michigan; Marquette Mining Journal, Marquette, Michigan; Iron Mountain News, Iron Mountain, Michigan; Escanaba Press, Escanaba, Michigan; The Evening News, Michigan; North Country Sun, Michigan; Ontonagon Herald, Ontonagon, Michigan; L'Anse Sentinel, L'Anse, Michigan; The Munsing News, Munsing, Michigan; Manistique Pioneer Tribune, Manistique, Michigan; The Newberry News, Newberry, Michigan; Iron River Reporter, Iron River, Michigan; The Menominee County Journal, Michigan; Minneapolis Star Tribune, Minneapolis, Minnesota; St. Paul Pioneer Press, St. Paul, Minnesota; Duluth News Tribune, Duluth, Minnesota; Ely Echo, Ely, Minnesota; Grand Forks Herald, Grand Forks, Minnesota; Bemidji Pioneer, Bemidji, Minnesota; International Falls Journal, International Falls, Minnesota; Virginia Mesabi News, Minnesota; Cook County News, Minnesota; Grand Rapids Herald Review, Minnesota; Milwaukee Journal Sentinel, Milwaukee, Wisconsin; Wisconsin State Journal, Madison, Wisconsin; Wausau Herald, Wausau, Wisconsin; Florence Mining News, Florence, Wisconsin; Spooner Advocate, Spooner, Wisconsin; Rhinelander News, Rhinelander, Wisconsin; Vilas County News Review, Wisconsin; Superior Daily Telegram, Superior, Wisconsin; Bangor Daily News, Bangor, Maine; Manchester Union Leader, Manchester, New Hampshire; Burlington Free Press, Burlington, Vermont; Albany Times Union, Albany, New York; Rocky

Mountain News, Denver, Colorado; Boulder Daily Camera, Boulder, Colorado; and The Daily Sentinel, Grand Junction, Colorado.

We received a total of 3,548 responses on the proposed rule, 166 oral and 3,382 written comments. Of these comments, 7 were from Federal agencies; 58 were from State, county, city governments or schools; 3,261 were from individuals; 214 were from organizations and industry; 5 were from tribal governments, and 3 were from Canada. Most of these responses were received in the form of a form letter or postcard. Of these commentors, 2,676 supported listing the Canada lynx, 780 opposed listing, and 92 expressed no position.

In response to the reopening of the comment period on August 18, 1999, to receive comment on the Science Report, we received an additional 379 responses. Of these, 239 supported a listing, 115 opposed the listing, and 25 provided comment on the Science Report only. All written and oral statements presented at the public hearings and received during the public comment periods, including comments on the Science Report and peer review comments, are addressed below and within the text of this rule. Comments of a similar nature are grouped into general issues. These issues and our response to each are discussed below.

*Issue 1*—Several commentors believed that there are insufficient and/or inadequate data to support evidence of lynx existence and viable population status within the lower 48 States or at the southern fringes of the range. They believed lynx should be managed in Canada rather than by the Act in the United States. Numerous commentors strongly opposed listing the lynx in Oregon and other individual States, claiming there has never been a self-sustaining breeding population of lynx in a particular State. Several commentors were concerned that much of the information used to develop the range maps for lynx in the United States may represent only dispersing individuals and does not indicate viable populations capable of successful reproduction and recruitment. Similarly, several individuals commented that the distribution maps in the Science Report do not accurately reflect occupied range and that there is no evidence that lynx currently exist in many of the States that the map identifies as occupied.

*Response*—The scientific basis for our findings and conclusions in the proposed rule and those in the Science Report were questioned by many of the affected State wildlife agencies and others that responded during the public

comment period. When making a listing determination, we are required to use the best available scientific and commercial information. To accomplish this, section 4(b)(6)(B) of the Act allows for a 6-month extension of a final determination for the purpose of soliciting additional information if there is substantial disagreement regarding the sufficiency or accuracy of the available data. In the case of the lynx finding, because there was substantial disagreement regarding the sufficiency or accuracy of the available data, we extended for 6 months the deadline for a final listing determination on the proposal to list the contiguous United States DPS (64 FR 36836). The 6-month extension allowed us to receive and evaluate new information contained in the Science Report, a scientific report on lynx prepared by a team of scientist assembled by the Forest Service's Rocky Mountain Research Station in 1998. The Science Report is a comprehensive compilation and assessment of historic and current lynx occurrence records and distribution, scientific literature, lynx and prey ecology, habitat correlations and threats to the continued existence of lynx in the contiguous United States. The Science Report is the only comprehensive assessment of lynx in the contiguous United States and was used, as was the new information obtained during the comment period, in our final listing determination (see "Background," "Distribution and Status," and "Summary of Factors" sections).

Current and best available information, including the Science Report, verified the persistence and presence of lynx in the contiguous United States and recent records of lynx in Oregon (see "Distribution and Status" section). However, with the limited information available on the species, we cannot ascertain whether a resident lynx population exists currently or existed historically in Oregon. We believe that many of the lynx records in the contiguous United States, including Oregon, are of transient animals that dispersed during cyclic population increases (see "Background" and "Distribution and Status" sections). Regardless, the Act, and the Service in administering the Act, do not make a distinction between resident populations, breeding populations, and transient or breeding individuals when considering a species for listing. However animals that are considered "dispersing," and found in unsuitable habitat are considered lost from the metapopulations, because they are unlikely to survive unless they return to

boreal forest. Therefore, dispersing individuals were not considered in this listing. Further, the fact that lynx are managed in Canada does not relieve us from our statutory responsibilities to protect the wildlife of the United States. We have determined that the contiguous United States population of lynx is a DPS under the Act and warrants listing as a threatened species. This determination, therefore, includes all lynx within the contiguous United States, whether they be transient lynx or resident populations.

The lynx distribution maps developed for the Science Report were produced by overlaying lynx occurrence records on maps of primary vegetation types (McKelvey *et al.* 1999b). The authors included all occurrence records made available by State, tribal, and Federal agencies, published and unpublished reports, and museum and harvest records. Furthermore, they considered the reliability of the records. Although there may be errors for some individual data points, these data provide a good basis for us to evaluate lynx occurrence and distribution in the contiguous United States. The maps defined vegetation types for which most lynx occurrences are associated. They are not maps of occupied habitat.

*Issue 2*—Many commentors believed we have insufficient or inadequate data to show that a sufficient prey base historically existed or currently exists in the lower 48 States to support lynx.

*Response*—The Act requires that the Service make listing determinations solely on the basis of the best scientific and commercial data available. Where there is little information available we use our best scientific judgement and that of experts in the field. Available snowshoe hare information as it applies to lynx is summarized by Hodges (1999a, 1999b) in the Science Report. Additionally, we relied on the availability of the primary habitat types used by both snowshoe hares and lynx as an indicator of suitable habitat and likely presence of one or both species (see "Distribution and Status" and "Factor A").

*Issue 3*—Many commentors believed there were insufficient or inadequate data to support a listing and that the decision-making process concerning the proposal to list the lynx was being driven by political pressure and lawsuits. One commentor also believed that the limited quantity of evidence gathered by the Service does not meet the standard of sound science required by the Act and that the proposed rule did not acknowledge the strengths and limitations in the extant body of research related to Canada. For example,

trapper harvest data do not account for trapper effort which may be affected by pelt prices, social change or climatic conditions. Several commentors wanted to know what the effects of trapping on lynx population status and potential recovery were and if the mortality from accidental trapping or animal damage control activities were significant to the overall population. They similarly commented that the Science Report failed to provide quantified data and conclusions justifying additional protection under the Act and believed that additional studies were needed and should be initiated and completed. They suggested that we defer a decision until more information is available.

*Response*—While lawsuits have had an important procedural impact in our listing process, whether the species warrants listing under the Act is a substantive biological determination and has remained our responsibility. We have carefully assessed the best scientific and commercial data available, as required by the Act. We recognize that there are limitations in the extant body of data, including the trapping information, and have taken those limitations into consideration when evaluating the data. As described in "Factor B" in the "Summary of Factors" section, harvest returns are affected by factors that influence trapper effort and success, such as changes in socioeconomic conditions, season length, quotas and trapping restrictions, and ease of access. However, we also recognize the harvest data provided information on the presence and persistence of lynx within the contiguous United States (see "Distribution and Status" section). Furthermore, harvest data for lynx in Canada has similarly provided information about the persistence of lynx in adjacent habitats in Canada and increased our understanding of lynx population dynamics (see "Background," "Distribution and Status," and "Factor B" sections). We have determined that the occurrence of lynx within the contiguous United States is influenced to varying degrees by immigration of lynx from Canada.

We carefully assessed the effects of trapping during our review of the species' status (see "Factor B" and "Factor E" in the "Summary of Factors" section). The effects of trapping on lynx populations are variable depending on factors such as whether lynx taken are a part of a resident population or dispersing individuals that are unlikely to reproduce and contribute to a population, fitness of the lynx population in a given area, connectivity within a larger metapopulation, the

impact of other threats to the population, and the additive nature of these threats. If the population is doing well in an area and there are no threats to its continued existence, trapping mortality would not likely jeopardize the population. However, if other threats to a resident population exist, the additive nature of additional losses to the population may prove to be significant, at least on a local scale. Mortality from accidental trapping or animal damage control activities would be considered incidental and in most cases would not be significant; we have no information to indicate that the loss of such individuals has negatively affected the overall ability of the contiguous United States DPS to persist.

We agree that additional studies of lynx are necessary to better understand the dynamics and requirements of lynx populations in the contiguous United States (see "Distribution and Status" section). However, the Act does not allow us to defer a listing decision based on the need for more research. Most scientists would agree that there is always a need for more research, but listing decisions cannot be postponed based on this premise when known threats to a species are present that may result in a species' trend toward extinction.

*Issue 4*—Several wildlife professionals stated that the effects of overharvesting lynx during the 1970s and 1980s were overstated in our proposed rule and that it does not explain current population levels. If lynx were overharvested in the past, they should have had sufficient time to recover by now. They stated that overutilization is no longer a potential threat nor an additive threat to the continued existence of lynx.

*Response*—We made our determination to propose the species for listing based on the available information at the time. We concluded that low numbers of lynx in the contiguous United States and Canada were the residual effects of substantial overtrapping that occurred in the 1970s and 1980s. We no longer believe that to be true (see "Factor B" in the "Summary of Factors" section). New information explains that the cyclic lynx highs of the early 1960s and 1970s that are reflected in harvest records were unprecedented high levels for the 20th century. Harvest returns that we believed to be abnormally low, were being compared to harvest records during the unprecedented high levels of the 1960s and 1970s rather than to data for cycles over a longer period of time. Comparisons of the recent records to earlier records from the 20th century

indicated comparable harvest records. We conclude that, in the contiguous United States, lynx populations are naturally at low densities; therefore, what seem to be low population levels compared to those of the northern boreal forest in Canada and Alaska likely are normal for lynx at the southern portion of their range where optimal habitat is naturally limited (see "Factor B" of the "Summary of Factors" section).

We recognize the limitations of using harvest data to evaluate the status of a vertebrate population (see "Distribution and Status" section and "Factor B" of the "Summary of Factors" section). There can be numerous reasons for a smaller harvest return one year compared to previous returns, such as trapper effort, weather, or low pelt prices. States in the contiguous United States substantially restricted or closed their lynx harvest seasons by 1990, resulting in less information with which to evaluate the current status of lynx. We now believe that ongoing precautions taken by States and Provinces to restrict lynx trapping since the 1980s possibly prevented the overharvest of resident populations of lynx. We concur with Mowat *et al.* (1999) that it is possible lynx were overharvested in local areas but that in time, particularly with the protection given lynx from trapping closures in the contiguous United States, dispersal by lynx from healthy populations has led and in the absence of significant threats will lead to the repopulation of such areas.

*Issue 5*—Numerous individuals commented that the proposed rule and the Science Report failed to demonstrate that there are significant threats to the survival of the lynx, claiming that there is little evidence in the proposed rule or the Science Report to support claims that current management practices, including timber harvesting and human access, adversely affect lynx; that lynx are old growth obligates; that either bobcat or coyotes are direct competitors for prey with lynx; that lynx habitat throughout the lower 48 States has been fragmented, degraded or reduced by human activity; or that this has resulted in lynx declines. Additionally, these commentators asked how important were localized threats to the overall status of the species and if we knew enough about the threats to assess the cumulative effects to lynx.

*Response*—In the proposed rule, we identified numerous potential threats to the continued existence of lynx based on information available at the time. Since then we have significant new information regarding the magnitude

and imminence of some of the factors identified as threats in the proposed rule. However, there is still a lack of quantifiability information to determine whether some of the possible threats have or would actually result in lynx declines. Both the "Summary of Factors" and "Background" sections discuss the new information we have obtained and how it has been assessed in our decision, particularly regarding habitat (Factor A) and competition issues (Factor E). Because a substantial amount of lynx habitat in the contiguous United States occurs on federally managed lands, particularly in the West, we conclude that the factor threatening lynx in the contiguous United States is the lack of guidance in existing Federal land management plans for conservation of lynx and lynx habitat. Implementation of lynx conservation through revision of Federal land management plans may sufficiently remove threats to the species such that it no longer warrants listing.

*Issue 6*—Many State agencies believed the proposed rule failed to demonstrate that there has been significant extirpation of lynx within the lower 48 States or that a significant range reduction has occurred. There is disagreement on the status and historic range of lynx within some States. Furthermore, they believe that lynx do not occur throughout predicted habitat. They requested information on the basis of our determination of whether a resident or remnant lynx population existed within a State and if the low numbers were the result of poor monitoring, marginal habitat or poor rates of immigration from source populations. They believed the Science Report likewise failed to assess lynx population size, status, and trends.

*Response*—The Act requires us to make listing determinations on the best available scientific and commercial information. Data are often not available to make statistically rigorous inferences about a species' status (*e.g.*, abundance, population trends, and distribution). The extant body of data concerning lynx population status, trends, and historic range is limited. Current information about lynx in the contiguous United States allows us to understand the distribution of lynx. However, the available data for most States do not allow us to assess whether resident populations were historically or are currently present (see "Distribution and Status" section). The scientific community is just beginning to study issues such as specific habitat and prey requirements necessary to support lynx populations, role of dispersing animals in metapopulation dynamics, and lynx

demographics. However, given these uncertainties, we are still charged with determining whether the species warrants listing under the Act. After reviewing the best available information, obtained through a comprehensive effort involving review of historic and current occurrence records, including harvest records for both Canada and the United States; sightings and track records; personal communications with lynx, hare, and forest ecology experts; and a review of all available literature, we have made several conclusions about the status of lynx in the contiguous United States as described in the "Distribution and Status" and "Finding" sections.

In the proposed rule we attempted to identify whether each of the States historically supported or currently support resident populations of lynx. The Act does not make a distinction between protection of resident and migratory or transient species, or between resident populations and those supported by immigration from Canada. Whether a species resides in whole or in part in the United States, it is eligible for protection under the Act. In many instances we cannot be certain whether the lynx was historically resident in a region or was wholly made up of transient animals from Canada or other parts of its range, or a combination of these (see "Background" and "Distribution and Status" sections). However, given the available information from occurrence records, habitat maps, and comparisons of harvest records from the United States and Canada, we concluded that certain areas, such as the Northern Rockies/Cascades Region, continue to support self-sustaining resident lynx populations, while in other areas or regions we were unable to determine the historic or current presence of a resident lynx population based on available information (see "Distribution and Status" section).

*Issue 7*—Numerous commentors made the following statements: The proposed rule failed to demonstrate that the contiguous United States population represents a DPS and, given the large areas of habitat still directly connected to Canada, evidence of movement across the international border, and the failure to demonstrate that the United States' population is significant, designation of a contiguous United States DPS for lynx is not warranted. The Vertebrate Population Policy does not provide authority for using an international boundary and differences in management programs as a basis for determining discreteness. Likewise, the "significant gap" criterion in the policy

was not intended to be applied to populations on the edge of a species' range. There is no evidence that lynx in the United States are capable of long-term survival if isolated from the larger population in Canada. There is no evidence that lynx populations within the contiguous 48 States were once connected. The idea that semi-isolated subpopulations of lynx separate from each other and from Canada can be supported within the United States is contrary to what is known about lynx ecology. Lynx in the United States are part of a trans-border population and should be managed in cooperation with Canada. Conversely, several commentors believe that lynx in the southern portion of Canada have sharply declined and that we cannot rely on immigration from Canada, nor Canadian management of lynx, to maintain lynx in the United States. Several commentors believe that the lynx deserves protection under the Act based solely on its United States' population.

*Response*—The Service's Vertebrate Population Policy, published in the **Federal Register** on February 7, 1996 (61 FR 4722) specifies that a population segment may be found to be discrete if it satisfies one of two conditions. One of the two conditions states, "It is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist." We have determined that lynx occur in both resident populations and as transients in the contiguous United States and conclude that this population satisfies the above requirement for discreteness based on the international boundary between Canada and the contiguous United States and the differences in management of lynx between Canada and the United States (see "Distinct Population Segment" section). While we recognize that portions of the contiguous United States DPS of lynx are part of a trans-border population, when using the international boundary as a criterion for establishing discreteness, the Vertebrate Population Policy does not make a distinction of whether there is movement between the two populations. While we recognize that this movement occurs, and we believe that immigration from Canada may strongly influence the persistent occurrence of lynx in some portions of the United States' population (see "Distribution and Status" section), this does not negate the international boundary for establishing discreteness

between Canadian' and United States' lynx populations under our policy.

Based on the discreteness of a population, our Vertebrate Population Policy requires that we consider the significance of the population to the taxon to which it belongs. We believe there are climatic and vegetational differences in lynx habitat between Canada and the United States, as well as ecological differences between lynx in the contiguous United States and northern populations in Canada and Alaska (see "Distinct Population Segment" section). Therefore, the contiguous United States' population meets the significance criteria for establishment of a DPS.

Additionally, we believe the criterion relating to a "significant gap" in the species' range applies to any discrete unit that exhibits significance regardless of whether it is on the edge of the species' range. For example, there may be situations where populations at the edge of a species range may have unique genetic characteristics or may have adapted to unique or unusual ecological conditions.

Finally, after we established that the United States' population of lynx is discrete and significant, we then applied the listing criteria to the contiguous United States' population of lynx and determined that it meets the definition of a threatened species under the Act (see Factors A-E in the "Summary of Factors" section).

*Issue 8*—Many commentors believed that lynx in different regions of the United States, isolated in island populations and divided regionally by ecological barriers, even State boundaries, are biologically significant and should be considered for listing separately so that each population can be protected and managed according to its needs. They think that, for a wide-ranging species such as lynx, the status of the lynx population in Montana should have no bearing and should not provide a baseline for populations struggling to survive elsewhere in the lower 48 States. In particular, they stated that the Southern Rockies meets the definition of a DPS and that it should be listed as endangered because it is likely on the verge of extirpation, is genetically isolated, faces continued threats, and meets the definition of an unusual or unique ecological setting. These commentors stated that loss of lynx in the Southern Rockies would result in a significant gap in its range. Furthermore, there is scientific consensus that lynx were once viable in Colorado and southern Wyoming. Conversely, some commentors believe lynx at the southern edge of the range

should be excluded from listing. They stated that existing data suggest that lynx exist in the lower 48 States, especially east of Montana, only as a rare and transitory species at the edge of its range, dependent on continued immigration from Canada.

*Response*—We recognize that, within the contiguous United States, the distribution of the lynx is divided into four geographically isolated regions; the Northern Rockies/Cascades, Southern Rockies, Great Lakes and Northeast (see “Distribution and Status” and “Distinct Population Segment” sections). In evaluating whether these qualified as separate DPSs or should be considered one, we analyzed whether lynx in these individual regions qualified as both discrete and significant according to our DPS policy. We concluded that within the United States they were geographically isolated and, therefore, qualified as discrete. When considering whether a population meets the significance test, policy requires that our evaluation take into account the population as it relates to the entire range of the taxon. In the case of the lynx, the range of the taxon is extensive and exists mainly in Canada and Alaska. Only a small portion of the range extends into the United States. The Southern Rockies and Northeast regions account for an extremely small fraction of the entire range of the taxon. We determined that none of the regions individually constitute significantly unique or unusual ecological settings. Within all four regions of the contiguous United States the distribution of lynx is associated with the southern boreal forest. The important element for lynx is forest structure that provides food and cover for snowshoe hares and cover for lynx dens, not the specific vegetation found within the boreal forest. Therefore, the individual regions could not be considered individually significant under our Vertebrate Population Policy and could not be separated from the contiguous United States DPS as a whole. We determined that, individually, none of the four regions fulfill both the discreteness and significance criteria as required under the Vertebrate Population Policy (see “Distinct Population Segment” section). Therefore, we conclude that the listable entity is the contiguous United States DPS of the lynx, consisting of the Northeast, the Great Lakes, the Northern Rockies/Cascades, and the Southern Rockies regions.

Within the contiguous United States, the relative importance of each region to the persistence of the DPS varies. The Northern Rockies/Cascades Region supports the largest amount of lynx

habitat and has the strongest evidence of persistent occurrence of resident lynx populations, both historically and currently. In the Northeast, Great Lakes, and Southern Rockies regions, the amount of lynx habitat is relatively limited and does not contribute substantially to the persistence of the contiguous United States DPS. We conclude the Northern Rockies/Cascades Region is the primary region necessary to support the continued long-term existence of the contiguous United States DPS.

*Issue 9*—Several individuals believed that we failed to take into account the increased abundance of mountain lions as a threat to lynx and that the rule should acknowledge this concern and discuss this factor as potentially affecting Canada lynx.

*Response*—At the time we wrote the proposed rule to list the lynx as a threatened species, we did not address mountain lion competition with lynx because we had no information that it was a potential threat. Subsequently, the Science Report has identified the potential threat of mountain lion competition (Aubry et al. 1999; Buskirk et al. 1999a). Definitive data on the potential threat of mountain lions on lynx are lacking. However, because known incidents of mountain lions killing lynx are rare, we presume they occupy different ecological niches (particularly in winter), and because they depend on different prey, we conclude that the population-level effect of mountain lions on lynx is minimal (see “Factor E” of the “Summary of Factors” section).

*Issue 10*—Some commentors believed we did not provide for adequate public participation in commenting on the Science Report or in response to the listing proposal.

*Response*—Prior to making our final listing determination on the lynx, we held 11 public hearings and allowed for a total of 140 days of public comment on the proposed rule and Science Report. Our proposed rule to list the lynx as threatened, published in the **Federal Register** on July 8, 1998, opened a 60-day comment period during which we requested comments and materials concerning the proposed rule. At the same time we announced that 10 public hearings on the proposal would be held in various locations throughout the range of the lynx in the contiguous United States. One additional public hearing was announced on August 26, 1998 (63 FR 45445). Open houses and public hearings, providing a forum for verbal comment on the proposed rule, were held in Colorado, Idaho, Montana,

Oregon, Washington, Wyoming, Maine, and Wisconsin. Announcements of the proposed rule and public hearings were made in local newspapers throughout the range of the lynx. The comment period on the proposed rule, originally closing on September 30, 1998, was twice extended by request. From the time a proposed rule is published, the Act allows 12 months in which to make and publish a final determination on a listing action. We extended the 1-year period for the lynx final listing determination for 6 months in a July 8, 1999, **Federal Register** announcement (64 FR 36836), specifically to allow for review, evaluation, and comment on the Science Report because there was substantial disagreement regarding the sufficiency and accuracy of the information. On August 18, 1999, we announced in the **Federal Register** that we were reopening the comment period for an additional 38 days to allow the public to review and comment on the proposed rule based on new information contained in the Science Report, which was placed on the Internet for accessibility. Press releases were issued to ensure the public was aware of the reopened comment period. While we received requests to extend the comment period on the Science Report, we declined to do so because of the time frames the Act allows for completion of a final listing determination, the amount of public notice about the Science Report and rapid availability of the Science Report to interested parties via the Internet.

*Issue 11*—Several individuals believe the lynx should be listed as endangered, not threatened because they believe the lynx is in danger of extinction throughout a significant portion of its range, that it is part of our cultural heritage and should be protected. They stated that in light of the uncertainties about the existing information collected on lynx status and threats, the Service should be cautious and protect existing populations of lynx while additional information is collected. If listed as endangered the lynx would receive the full protection of the Act. Listing would focus more attention on the precarious status of the species and encourage State wildlife agencies to do more educational outreach and encourage conservation on private lands. These commentors also stated that a listing would increase attention given to lynx by Federal land management agencies and would provide the oversight that is needed to ensure conservation and recovery activities are implemented and are effective. Some commentors also believed that failure to list the lynx as



endangered would be contrary to the settlement agreement and other court-ordered stipulations, as well as the Service's listing priority guidance. They stated that the proposed rule to list the lynx as threatened rather than endangered is inconsistent with the prior "warranted" petition finding of May 27, 1997, in which the Service assigned the lynx its highest listing priority number because of the magnitude and imminence of the threats. Conversely, some commentators believed that a listing as threatened was more appropriate and would provide the opportunity and resources to plan a conservation strategy at the landscape scale.

**Response**—When evaluating whether a species, or in this case a DPS, should be listed as threatened or endangered, we first assess the current status of the DPS and then analyze the degree, magnitude and imminence, of the threats to its continued existence. If we conclude that a DPS of a species is likely to go extinct in the foreseeable future, then we must list it as endangered. If we conclude that it is likely to become endangered in the foreseeable future then we must list it as threatened. While we made an extensive effort to find and assess all the available information on the status of lynx in the contiguous United States, the best scientific information available does not provide a clear picture as to the current status of the species (see "Distribution and Status" section). The lack of information on lynx does not allow us to determine with certainty whether the species' population trend is stable, increasing or declining. However, we can make several inferences from the available data. Resident populations continue to exist in the Northern Rockies/Cascades and Northeast regions. Available information provides evidence that within the contiguous United States, lynx continue to occur in most places with historical evidence of persistence except for possible range reductions in the Northeast and Southern Rockies. Given available information on current and historical lynx occurrence and threats, as identified in the "Summary of Factors" section, we conclude that the contiguous United States DPS of the lynx is threatened (see "Finding" section).

In the proposed rule, various threats were identified as potentially affecting lynx populations (see "Summary of Factors" section), including competition, habitat loss and fragmentation, and the inadequacy of existing regulatory mechanisms (in the form of land management plans) to

protect the species. However, there is inconclusive evidence that any of these factors, with the exception of inadequate regulatory mechanisms, may actually adversely affect the contiguous United States' lynx population. At the local level, particularly in the Southern Rockies, habitat loss and fragmentation may negatively affect lynx (see "Factor A" and "Factor E" of the "Summary of Factors" section). However, at the DPS scale, we conclude the factor threatening lynx is the inadequacy of existing regulatory mechanisms, specifically the lack of guidance for conservation of lynx and lynx habitat in Federal land management plans (see "Factor D" of the "Summary of Factors" section). A substantial number of the primary areas of lynx occurrence are on Federal lands (see "Factor A" of the "Summary of Factors" section) where programs, practices and activities allowed by current plans may cumulatively impact lynx.

In the settlement agreement dated February 12, 1998, we agreed to publish a proposed rule to list the lynx within the contiguous United States under section 4 of the Act. At the time, we had not determined whether it warranted threatened or endangered status. In the "warranted but precluded" petition finding of May 27, 1997, we assigned the lynx a listing priority number of 3. Guidelines for assigning listing priority numbers, published in the **Federal Register** on September 21, 1983 (48 FR 43098), describe a system for considering three factors in assigning a species a numerical listing priority on a scale of 1–12. The three factors are magnitude of threat (high or moderate to low), immediacy of threat (imminent or non-imminent), and taxonomic distinctiveness (monotypic genus, species or subspecies/population). For a population, such as the contiguous United States' Canada lynx population, listing priority numbers of 3, 6, 9, or 12 are possible. At the time of the "warranted but precluded" finding we concluded that the overall magnitude of threats to lynx was high and that the threats were imminent. Therefore, a priority number of 3 was assigned. New information indicates that threats are at a much lower magnitude than previously believed (see "Summary of Factors" section).

**Issue 12**—Several commentators were concerned that we did not propose a special 4(d) rule for incidental take of lynx along with the proposed listing. They encouraged us to cooperate with the respective States and Tribes in the development of a 4(d) rule and wondered what type of Federal

oversight role would follow the issuance of a special rule.

**Response**—Section 4(d) of the Act provides that whenever a species is listed as threatened, the Secretary of Interior will issue regulations deemed necessary and advisable to provide for the conservation of the species.

We have issued regulations that generally apply to threatened wildlife virtually all the prohibitions that section 9 of the Act establishes with respect to endangered wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to "take" any listed wildlife species; to harass, harm pursue, hunt, shoot, wound, kill, trap, or collect any threatened or endangered species or to attempt to engage in any such conduct (16 U.S.C. section 1532 (19)).

Our regulations for threatened wildlife also provide that a "special rule" under section 4(d) of the Act can be tailored to define the section 9 prohibitions for particular threatened species. In that case, the general regulations applying most section 9 prohibitions to threatened species do not apply to that species, and the special rule is to contain the prohibitions (and exemptions) necessary and appropriate to conserve that species.

Such regulations generally are issued and published as special rules in the **Federal Register** along with or following a listing. This final rule includes a special 4(d) rule that addresses the taking and export of captive lynx. To address incidental take of lynx while engaged in otherwise lawful hunting and trapping for bobcat we are currently consulting under section 7 of the Act with the U.S. Fish and Wildlife Service's Office of Management Authority which issues CITES permits for export of bobcat pelts. Additionally, we have worked with State and Tribal agencies and are currently preparing an additional special 4(d) rule to address incidental take of lynx resulting from otherwise lawful hunting and trapping for species other than bobcat (and other than lynx). This proposed amendment to the special rule will describe the Federal oversight that will be required if the rule is implemented. We hope to publish the proposed special rule in the **Federal Register** as soon as possible following this listing rule.

**Issue 13**—One commentator asked what role the Draft Lynx Conservation Assessment and Strategy (LCAS) would play in the long-term conservation of lynx if the species were listed. Another commentator was concerned about conferencing with other Federal agencies to conserve lynx and how we

intended to work with other agencies to identify and implement protective lynx measures. They suggested that a comprehensive review of the Forest Service Forest Management Plans is needed to assess their impacts upon potential lynx habitat and that management plans should be revised to improve snowshoe hare and lynx habitat. Many commentors also stated that Federal agencies should manage and protect public lands in a manner that will increase snowshoe hare habitat.

*Response*—The LCAS was developed to provide a consistent and effective approach to conservation of lynx on Federal lands in the contiguous United States (United States Forest Service *et al.* 1999). It was developed by the Forest Service, Bureau of Land Management (BLM), National Park Service, and the Service. The overall goals of the LCAS were to develop recommended lynx conservation measures, provide a basis for reviewing the adequacy of the Forest Service and BLM Land and Resource Management Plans with regard to lynx conservation, to facilitate section 7 conferencing and consultation under the Act should the lynx be listed (see “Factor D” of the “Summary of Factors” section) and to guide future recovery efforts. The “Draft Biological Assessment of the Effects of National Forest Land and Resource Plans and Bureau of Land Management Land Use Plans on Canada Lynx” (DBA) identified potential effects resulting from 57 Forest Service Land and Resource Management Plans and 56 BLM Land Use Plans within the 16-State area where lynx were proposed for listing (United States Forest Service and Bureau of Land Management 1999).

Section 7(a)(4) of the Act states that Federal agencies shall confer with the Service on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under section 4 of the Act or result in the destruction or adverse modification of critical habitat proposed to be designated for such species. Conferencing is a process of early interagency cooperation involving informal or formal discussions between a Federal agency and the Service regarding the likely impact of an action on proposed species or critical habitat. It is designed to help Federal agencies identify and resolve potential conflicts between an action and species conservation early in a project’s planning and to develop recommendations to minimize or avoid adverse effects to proposed species or proposed critical habitat. With this final rule to list the lynx within the

contiguous United States as threatened, conferencing is no longer applicable and any agency actions that may affect the lynx will need to be addressed under consultation in accordance with section 7(a)(2) of the Act.

For the lynx, the Forest Service, BLM, National Park Service, and the Service recognized that Federal agencies have a significant role in the conservation of lynx. They established a Lynx Steering Committee in 1998 consisting of representatives from each agency. The Steering Committee provides oversight and guidance to teams established to address various lynx conservation issues on Federal lands. One team developed the LCAS; another team developed the Science Report; a third team prepared a biological assessment to evaluate the effects of Forest Service and BLM Land Management Plans on lynx. All of these efforts are intended to plan and implement sound conservation actions and management decisions for lynx on Federal lands.

*Issue 14*—Numerous commentors were concerned about the economic, social, and cultural effects of listing the lynx. They believed a listing would result in increased burdens on local economies affecting jobs, culture and way of life, and that the cost of implementing a lynx conservation and recovery program is not an efficient allocation of tax dollars.

*Response*—When drafting the Act, Congress found in section 2(a)(1) that, “various species of fish, wildlife and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation.” In keeping with this finding, listing decisions, other than critical habitat designations, are not subject to economic analyses. The purpose of listing a species is to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to conserve the various species facing extinction. In accordance with 16 U.S.C. 1533(b)(1)(A) and 50 CFR 424.11(b), listing decisions are made solely on the basis of the best scientific and commercial data available. In adding the word “solely” to the statutory criteria for listing a species, Congress specifically addressed this issue in the 1982 amendments to the Act. The legislative history of the 1982 amendments states— “The addition of the word ‘solely’ is intended to remove from the process of the listing or

delisting of species any factor not related to the biological status of the species. The committee strongly believes that economic considerations have no relevance to determinations regarding the status of species \* \* \*,” H.R. Rep. No. 567, Part I, 97th Cong., 2d Sess. 20 (1982). Therefore, we have not considered the impacts of listing on economic development in making this listing determination. However, economic impacts will be considered in the designation of critical habitat.

*Issue 15*—We received numerous comments concerning the impact of a listing on the status of introduced lynx in Colorado and requests that these animals be declared a 10(j) “nonessential experimental population.”

*Response*—The term “experimental population” as defined in the Act, refers to any population (including any offspring arising solely therefrom) of an endangered species or a threatened species released outside the current range of the species to further its conservation. Experimental populations can only be established when they are wholly separate geographically from nonexperimental populations of the same species. Since there is no clear evidence of the absence of a lynx population within the area prior to reintroduction, establishment of an “experimental population” would not be possible and was not pursued in Colorado. The lynx that were recently introduced into Colorado from Canada and Alaska were released prior to this rule and the resulting placement of the species on the list of threatened and endangered species. Therefore, as of this final rule, they are considered resident lynx and do not qualify as an experimental population. Further, these reintroduced lynx are included as part of the listed entity and placed on the list of threatened and endangered species as of the effective date of this final rule.

*Issue 16*—Several commentors believed that there is a very limited potential, or none at all, for re-establishment, recolonization, and population expansion of historic lynx habitat because of habitat changes, human-induced mortality, and bobcat and mountain lion competition with lynx. They believed the lynx decline is the result of global warming, a natural factor which has allowed the prey generalists, and bobcat and mountain lion, to move into lynx territory and outcompete this less adaptable specialist.

*Response*—We recognize that some historic lynx habitat may no longer be suitable for recolonization of lynx because of habitat changes. However,

we do not agree that global warming or the expansion of the bobcat range has resulted in eliminating historic habitat from recolonization by lynx. There is no evidence that either the bobcat or mountain lion outcompete the lynx for habitat and food resources (see "Factor E" of the "Summary of Factors" section). The lynx, bobcat, and mountain lion co-evolved in similar, yet spatially segregated environments. The lynx is specially adapted for deep snow habitats while the bobcat and mountain lion are not. This special adaptation allows the lynx to outcompete bobcat and mountain lion in deep snow environments. Because we have limited understanding of lynx habitat requirements, it is difficult to determine precisely the amount of habitat available historically or currently. In the majority of the range of lynx in the contiguous United States, suitable habitat remains available (see "Factor A" of the "Summary of Factors" section). There is no evidence to support global warming as a threat to the lynx.

*Issue 17*—Several commentors stated that in lieu of listing, we should pursue candidate conservation mechanisms that eliminate the need to list. Efforts should be focused on landscape planning, developing conservation agreements, forest management plans and lynx conservation criteria in lieu of listing. A multi-species forest planning process, incorporating not only species but special habitats and unique biological communities, would be a better approach, providing more protection to lynx and other wildlife communities, than a single species listing under the Act. They believed that managing for only one species might be detrimental to other species or communities.

Some commentors stated that we failed to take into account the continuing forest fragmentation and increased competition brought on by road construction, excessive timber harvest, off-road back country use and ski area development. They stated that we should implement strong standards to prevent excessive logging, road development, and other human developments in important lynx habitat. Lynx conservation can only be achieved at the landscape scale. They further believed that we failed to take into account the adequacy, inadequacy, political pressures, and limitations of current State and Forest Service programs and questioned the role of these existing programs for lynx as regulatory mechanisms.

*Response*—We fully support candidate conservation mechanisms, landscape planning, and changes in

forest planning as mechanisms to conserve candidate species and species at risk. We are signatories to numerous candidate conservation agreements across the country. The Act requires us to consider conservation efforts by the States and others in listing decisions. However, to conclude that a conservation effort removes the need to list a species, we must determine that the conservation effort is sufficiently certain to be implemented and effective.

In the case of amending forest management plans, we have specifically identified current Federal regulatory mechanisms as a threat to lynx because of the ongoing and potential future actions allowed by current Land and Resource Management Plans. Changes in land management plans to manage these potential threats would result in a significant reduction to the current threats facing the species and, therefore, would strongly factor in future lynx status determinations. In the case of State regulatory and conservation mechanisms, we also have identified that existing State programs will be essential in lynx conservation and recovery (see "Issue 19").

*Issue 18*—Numerous State agencies believe that Federal intervention is not necessary to manage and protect the lynx and that State regulatory protection is adequate. Some States hold that they are already doing everything they can to protect and conserve the lynx. They further believe that States are in a better position to manage the lynx in the future, as they maintain the bulk of the information and management expertise and that we should, as an interim step, assist the respective States and other Federal agencies in gathering biological information and implementing management plans through funding or joint ventures. They questioned how the Act provides for a species' recovery.

*Response*—The role of the Service, as mandated by the Act, is more encompassing than is the role of individual States, or even groups of States. States are responsible for the management of species within their boundaries and to their credit, most if not all States have implemented lynx management measures. The Service, pursuant to the Act, must evaluate the status of a species throughout its entire range and, when determined necessary, provide for its conservation and recovery. In the case of the lynx, this includes 14 separate States. While some States may still harbor resident populations of lynx, the status of lynx in other States is unclear. The Service, as a Federal agency, is responsible for coordinating recovery of a species such as the lynx that crosses State boundaries

and occupies substantial amounts of habitat on Federal lands. Furthermore, we have identified the major threat to lynx as the inadequacy of Federal regulatory mechanisms to provide for the long-term conservation of the species. Listing the lynx under the Act confers substantive protections not otherwise provided by State management.

We agree that the States maintain management expertise and knowledge of lynx within their boundaries, particularly concerning evidence of resident populations or individuals and local snowshoe hare abundance. Much of the available information on lynx status and threats comes from the reports of State wildlife agencies. States have already taken significant steps within their jurisdiction to conserve lynx. With the exception of Oregon, all States within lynx range have closed lynx trapping seasons. In some cases they have been closed for more than 2 decades. New York and Colorado have attempted lynx reintroduction as a means to re-establish viable populations. Long-term conservation of the lynx will not only be dependent on the States continuing their respective conservation programs, but on Federal agencies improving their efforts to conserve lynx and, where necessary, amending regulations, policies and/or practices for the conservation of the species.

When a species is listed under the Act, additional protections and prohibitions are applied. These efforts further conservation in several ways. When a species is listed under the Act as either threatened or endangered, it becomes illegal to "take" the species without a permit or incidental take statement from the Service. The term "take" means to harass, harm, hunt, should, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns, such as breeding, feeding, or sheltering. "Harass" is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which include but are not limited to breeding, feeding, or sheltering. Federal agencies are required to conserve species listed under the Act and to consult with the Service on any actions that may affect the species. Furthermore, the Act requires that the Service develop and implement a species recovery plan unless such a plan will not promote the recovery of the

species. When a species is considered recovered, it can then be removed from the list of threatened and endangered species.

*Issue 19*—One commentor stated that if the lynx were listed, restrictions imposed, such as limitations on trapping, would interfere with Tribal treaty rights.

*Response*—We have been communicating with Tribal governments regarding development of a special 4(d) rule (see “Issue 12”) that would address the incidental take of lynx resulting from otherwise legal trapping and hunting for species other than lynx on Tribal lands. Under Executive Order 13084 “Consultation and Coordination with Indian Tribal Governments” (63 FR 27655, May 14, 1998) we are to inform and receive input from Tribal governments of any actions, such as listings under the Act, that may affect Tribes and to work to resolve any conflicts. However, there are certain circumstances where we cannot resolve issues to everyone’s satisfaction. The Act applies to Tribal, as well as all other lands within the United States, and, therefore, the prohibitions brought on by the listing of a species, also apply. There are numerous Tribes within the range of the lynx that might be affected by this listing. On some Tribal lands lynx harvest seasons have already been closed. We will continue to work with Tribal governments to avoid or minimize conflicts should they arise.

*Issue 20*—In response to our reopening of the comment period for review of the Science Report we received numerous specific comments on the adequacy, accuracy and reliability of the Science Report. One commentor believed we should convene a Blue Ribbon panel to review the Science Report and make those deliberations part of the record. The information should be shared with the States and collaborative workshops conducted to ensure that all information is thoroughly evaluated and judged fairly against standards that are supportable.

*Response*—We employed a seldom-used section of the Act, section 4(b)(6)(B), in extending the time frame for issuance of a final listing rule by 6 months. We reopened the comment period on the lynx proposed rule specifically to allow for review, evaluation, and comment on the Science Report because there was substantial disagreement regarding the sufficiency and accuracy of the data relative to the listing determination in the proposed rule. We solicited comments on the Science Report from hundreds of agencies, Tribal governments,

organizations, scientific experts, and individuals. All comments received have been incorporated into the administrative record for this rule and have been reviewed and incorporated into our decision making process.

While we recognize that there are limitations to the Science Report and have attempted to explain these throughout this rule, we also believe that it provides a comprehensive review of the current knowledge concerning the lynx in the contiguous United States. Therefore, we could not ignore it during our review. We have conducted an exhaustive review of the Science Report and all available literature and data on lynx in the United States, as well as the extensive comments we received on the proposed listing. Because of the wide range of the species, sizable list of interested parties and time limitations, it was not possible to convene a workshop of all interested parties specifically to discuss the Science Report. However, we have been in contact with specialists knowledgeable about lynx, hares, forest ecology and management, and potential lynx competitors to discuss various issues about the Science Report. This also is part of the administrative record for this finding.

*Issue 21*—Numerous responses addressed and opposed a proposed reintroduction of lynx into Idaho.

*Response*—We received extensive comment on this particular issue and are addressing it here for clarification purposes. We have not proposed a reintroduction effort for Idaho. At this time, we have not proposed any reintroduction efforts for lynx. Past reintroduction, both in New York and in Colorado, have been initiated and conducted by State wildlife agencies because they believed the lynx had been extirpated or extremely reduced in numbers in specific, historically occupied habitat. In recent years, Idaho Department of Fish and Game considered reintroducing lynx into the State. If during the course of recovery planning for lynx, reintroduction are proposed, we would conduct extensive public outreach, with public hearings and comment periods, to determine the feasibility of such a project.

#### Peer Review

On July 1, 1994, we published a notice in the **Federal Register** announcing our interagency policy to clarify the role of peer review in activities we undertake under authority of the Act (59 FR 34270). This Interagency Cooperative Policy on Peer Review states that it is the policy of the Service to incorporate independent peer

review in listing decisions during the public comment period in the following manner—(1) Solicit the expert opinions of a minimum of three appropriate and independent specialists regarding pertinent scientific and commercial data and assumptions relating to the taxonomy, population models, and supportive biological and ecological information for species under consideration for listing; and (2) Summarize in the final decision document the opinions of all independent peer reviewers received on the species under consideration.

In accordance with this policy, in a letter dated August 21, 1998, we solicited the expert, independent professional opinion of six peer reviewers. We specifically asked the reviewers to address the following questions—(1) Does the information referenced and described in the “Distribution and Status” section of the proposed rule support the Service’s conclusions regarding the status of the lynx in the contiguous United States; and (2) Does the information referenced and described in the “Summary of Factors Affecting the Species” section of the proposed rule support the Service’s conclusions about threats to the lynx in the contiguous United States? We also requested the reviewers advise us of other available information that would assist us in making a final listing decision.

In response to our solicitation, we received two comment letters. Both commentors stated that they believed the status and threats to the lynx were reliably documented in the proposed rule. The commentors provided some additional information concerning an ongoing survey for lynx populations and the status of lynx in Idaho, Washington, and Wyoming, and also commented that our conclusion that resident populations of lynx historically occurred in Massachusetts, Pennsylvania, and Utah, and possibly Vermont and New Hampshire, was problematic. This information has been incorporated into our discussion of the status of the species. The same response also indicated that the forest practice of precommercial thinning was a greater threat than we had indicated and felt that conservation of lynx across southern Canada was important to conservation of lynx across the northern United States. These comments also have been incorporated into our analyses.

#### 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.

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

Factors affecting lynx habitat include human alteration of the distribution and abundance, species composition, successional stages, and connectivity of forests, and the resulting changes in the forest's capacity to sustain lynx populations. People change forests through timber harvest, fire suppression and conversion of forest lands to agriculture. Forest fragmentation may eventually become severe enough to isolate habitat into small patches, thereby reducing the viability of wildlife that are dependent on larger areas of forest habitat (Litvaitis and Harrison 1989).

Since the publication of the proposed rule, we received new information related specifically to lynx—habitat associations (McKelvey *et al.* 1999b; United States Forest Service and Bureau of Land Management 1999), the distribution and ownership of lynx forest types as well as the amount of habitat in specific Federal land allocations (United States Forest Service and Bureau of Land Management 1999), the types and effects of different forest management practices (United States Forest Service *et al.* 1999), the effects of fire suppression (Agee 1999), and some probable implications of forest management practices on lynx forest types (McKelvey *et al.* 1999d).

New information suggests that lynx in the contiguous United States occur at naturally low densities. Lynx are limited to moist, cool boreal forests that support some minimum density of snowshoe hares, where winters are snowy (Ruggerio *et al.* 1999b). Snowshoe hares in the contiguous United States occur at low levels compared to northern reaches of their range in Canada and Alaska (Hodges 1999a, 1999b). Two important human influences on snowshoe hare habitat are timber harvest and fire suppression; however, our knowledge of how lynx populations respond to these specific impacts is limited.

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. Timber harvest and associated

forest management can be benign, beneficial, or detrimental to lynx depending on harvest methods, spatial and temporal specifications, and the inherent vegetation potential of the site.

For example, intensive tree harvesting (large-scale clearcutting) can eliminate the mosaic of habitats and mix of forest stand age classes that promote lynx survival, including late successional seral stages that support lynx denning and red squirrel habitat, and early successional snowshoe hare habitat. The response of lynx populations to particular vegetative mosaics is unknown. However, timber harvest can result in reduced cover, unusable forest openings, and large monotypic stands with sparse understories that are unfavorable for lynx and snowshoe hare, the primary lynx prey (Brittall *et al.* 1989; de Vos and Matel 1952; Harger 1965; Hatler 1988; Koehler 1990; K. Gustafson, pers. comm. 1994; J. Lanier, pers. comm. 1994). Some studies indicate that lynx avoid openings such as clear-cut, unforested areas, and grasslands (Koehler *et al.* 1979; Koehler and Brittall 1990; Murray *et al.* 1994). Snowshoe hares also are unlikely to use such areas because of the lack of cover (Koehler *et al.* 1979; Koehler and Aubry 1994; H. Golden, Alaska Department of Fish and Game, pers. comm. 1994). Mechanical thinning of densely stocked young stands to promote vigorous growth of fewer trees can reduce the stem densities required to support high numbers of snowshoe hare (United States Forest Service *et al.* 1999a). Reductions in cone-bearing mature and older forests can result in decreases in habitat for red squirrel, an important alternate lynx prey (Koehler 1990; O'Donoghue 1997; Apps 1999; Mowat *et al.* 1999).

Forestry practices can be beneficial when the resulting understory stem densities and structure meet the forage and cover needs of snowshoe hare (Keith and Surrendi 1971; Fox 1978; Conroy *et al.* 1979; Wolff 1980; Parker *et al.* 1983; Litvaitis *et al.* 1985; Monthey 1986; Bailey *et al.* 1986; Koehler 1990; McKelvey *et al.* 1999d). Hodges (1999a, 1999b) illustrated that snowshoe hare densities are highest in regenerating stands with very high stem densities. Regeneration harvest can be used to create high quality snowshoe hare habitat, especially where natural regeneration would be expected to provide dense young vegetation. Although large openings may initially be underused by snowshoe hare and lynx, regeneration harvest units in appropriate habitat types eventually (in 15 years or more depending on the type of forest) achieve early successional

stages in forests preferred by snowshoe hares (Monthey 1986; Quinn and Parker 1987; Koehler 1990; Koehler and Brittall 1990; Washington Department of Wildlife 1993; McKelvey *et al.* 1999c). Lynx can readily move across landscapes fragmented by commercial forestry (Squires and Laurion 1999). Larger openings can often more closely resemble vegetative patterns that follow natural disturbance events, and decrease amounts of edge favorable to generalist predators (McKelvey *et al.* 1999c).

Natural fire has an important role in forest ecology in some forest types in the United States. During the early 20th century, Federal and State agencies in the contiguous United States enacted a policy of suppressing forest fires. The effects of fire suppression, as well as timber harvest, on lynx habitat vary among the geographic regions (Agee 1999) and will be discussed separately below for western and eastern regions.

McKelvey *et al.* (1999b) used lynx occurrence data to describe lynx distribution patterns and habitat associations. The primary vegetation classes encompassing the majority of lynx occurrences in the West were Rocky Mountain Conifer and Pacific Northwest Conifer, including Douglas-fir and western spruce/fir and fir/hemlock. In the Great Lakes, the primary vegetation class was Mixed Deciduous-Coniferous, and in the Northeast, Mixed Forest-Coniferous Forest-Tundra. These broad vegetation classes include areas that because of elevation or other physical factors are not considered lynx habitat and cannot easily be deleted from the data. Therefore, accurate assessments of the total amount of lynx habitat within these regions is not possible. However, we assume that the areas encompassed within these vegetation classes contain the majority of lynx habitat types in the regions. We also assume that pockets of lynx habitat may occur outside these broad vegetation classes. With these assumptions in mind, where our discussion is based on lynx/habitat associations as reported in McKelvey *et al.* (1999b), we shall refer to the landscapes characterized by these broad vegetation classes as lynx forest types.

**Northern Rockies/Cascades and Southern Rockies**

In the western regions, most lynx forest types occurs on Federal lands. Of all western forest types, the western boreal forests (subalpine fir/spruce forests which provide lynx habitat) have the highest proportion of reserved land, largely because they are primarily in public ownership and are the least productive timberland, making land use

trade-offs between preservation and extraction less controversial than for other public lands (Agee 1999). Human land use that changed areas of forest land, disturbance patterns, and dominant tree species is much less prevalent in the West than in the Great Lakes or Northeast boreal forest (Agee 1999). Broad-scale habitat assessments generally support these conclusions.

Large amounts of lynx forest types occur on Federal lands, within both developmental and nondevelopmental allocations within the western regions. Lands in developmental allocations are managed for multiple uses, such as recreation and timber harvest. Lands within nondevelopmental allocations are to be managed to allow natural ecological processes to dominate (United States Forest Service and Bureau of Land Management 1999). Nondevelopmental lands contain large portions of wilderness or other natural areas (D. Prevedal, United States Forest Service, *in litt.* 1999). Timber harvest and construction of roads typically do not occur or are very limited in lands managed in nondevelopmental allocations. Large proportions of Federal lands in each of the western regions are managed under nondevelopmental allocations. In an assessment of the Columbia River Basin of eastern Washington and Oregon, Idaho, and western Montana, more than 35 percent of cold forest types encompassing subalpine fir/spruce habitats, were in designated wilderness, wilderness study areas, or other administrative natural areas (United States Department of Agriculture and United States Department of the Interior 1997).

Raphael *et al.* (1999) developed a broad-scale landscape model for lynx that assessed conditions across the Columbia River Basin. The model was based on the changes from historic to current amounts of habitat, landscape mosaics, disturbance regimes, vegetation structures, road densities, and human population. The model produced two outcomes, a habitat outcome and a population outcome. We acknowledge that such coarse-scale analyses may not reflect finer-scale environmental requirements that potentially account for a large amount of variation in lynx demographics. Preliminary results of the model suggest that lynx habitat is broadly distributed and of high abundance (relative to historic conditions) across the historic range of the species in the Columbia River Basin, and provides opportunity for intraspecific interactions for the species (Raphael *et al.* 1999). The model's population outcome for lynx suggests that the potential distribution

of lynx in this area is restricted and characterized by patchiness and/or areas of low abundance. There is opportunity for subpopulations in most of the specie's range in this area to interact as a metapopulation; however, some subpopulations are essentially isolated.

At finer scales of analysis, the Forest Service and BLM concluded that many Forest and BLM administrative units have land and resource management plans that may adversely affect lynx due to timber harvest activities (United States Forest Service *et al.* 1999; United States Forest Service and Bureau of Land Management 1999). These plans may affect individual lynx or local lynx populations primarily in the developmental allocation areas of the Northern Rockies/Cascades and Southern Rockies regions, although the assessment did not quantify the level of impact.

Since publication of the proposed rule, we have received information related to past and projected timber harvest levels and precommercial thinning activities on Federal lands in the West. Timber harvest levels on Federal lands in the West have declined consistently and dramatically (approximately 80 percent) over the past decade or longer (R. Gay, United States Forest Service, *in litt.* 1999). Timber harvest in specific lynx forest types also has concurrently declined in the Northern Rockies (B. Ballenbacher, United States Forest Service, *in litt.* 1999; B. Ferguson, United States Forest Service, pers. comm. 1999) and Cascades (Fred Zenson, United States Forest Service, pers. comm. 1999), and the Southern Rockies (B. Short, United States Forest Service, *in litt.* 1999).

The Forest Service's projected need for future precommercial thinning on Forest Service lands over the next decade in the Northern Rockies, Cascades, and Southern Rockies will affect less than approximately 1–4 percent of primary lynx forest types within each of these regions (B. Ballenbacher, United States Forest Service, *in litt.* 1999; B. Ferguson, United States Forest Service, pers. comm. 1999; B. Short, *in litt.* 1999; F. Zenson, United States Forest Service, pers. comm. 1999). Past thinning and timber harvest impacted similarly low proportions of lynx forest types on Federal lands in the Northern Rockies (B. Ballenbacher, *in litt.* 1999; B. Ferguson, pers. comm. 1999), Cascades (F. Zenson, pers. comm. 1999) and the Southern Rockies (B. Short, *in litt.* 1999). Precommercial thinning has occurred in approximately one-fifth (B. Ballenbacher, *in litt.* 1999) to one-half (B. Short, *in litt.* 1999) of the early

successional vegetation created by timber harvest in lynx forest types on western Federal lands over the past decade. This likely reduced snowshoe hare habitat quality at local scales, adversely affecting individual lynx. However, considering the overall proportions of lynx forest types affected, timber harvest and precommercial thinning on Federal lands are not currently conducted, nor are they likely in the projected future to be conducted, at levels likely to impact lynx at the population level.

However, the Northern Rockies encompass more privately owned lynx forest types than elsewhere in the West. Almost one-third of lynx forest types are in private ownership. Although we lack specific information, large portions of this habitat likely occur on privately owned corporate timber lands where timber harvest and thinning occurs. There are no data available on these private lands which would allow us to make a conclusion concerning the quality of lynx and snowshoe hare habitat. However, there is a potential for current and future management of these lands to adversely affect lynx.

Most lynx forest types in the West occur on Federal lands, and large Federal acreage of this habitat in the Northern Rockies/Cascades and Southern Rockies are managed in nondevelopmental status, where timber harvest activities and precommercial thinning generally do not occur. Nondevelopmental allocations on Federal lands require that natural ecological processes play a dominant role in the landscape (United States Forest Service and Bureau of Land Management 1999), as opposed to developmental lands, which are managed for multiple uses, such as recreation and timber harvest.

Large portions of nondevelopmental lands occur in the Northern Rockies and Cascades regions, which encompass most of the lynx forest types in Wyoming, Utah, Montana, Idaho, Oregon, and Washington. We recognize the importance of wildlands and nondevelopmental lands in the Northern Rockies/Cascades Region to provide lynx habitat that is buffered from many human impacts, creating the most likely stronghold for lynx populations in the contiguous U.S.

In the Northern Rockies, nearly 50 percent of the 35 million acres of lynx forest types is in nondevelopmental allocations on Forest Service lands or occurs in National Parks. In the Northern Rockies, 67 percent of the lynx forest types are managed by the Forest Service, 5 percent by the BLM, and 28 percent are in other ownerships (see

“Table 1”). The Forest Service and BLM manage over 24 million acres of lynx forest types. Of federally managed lynx forest types, 57 percent (roughly 14 million acres) lies within areas with nondevelopmental status. Sixty-seven percent of this 14 million acres lie

within wilderness or scenic river designations (D. Prevedal, *in litt.* 1999), both of which provide restrictions on land use beneficial to lynx. Additional large tracts of lynx forest types occur in Glacier (735,310 acres) and Yellowstone (1,910,590 acres) National Parks (D.

Prevedal, *in litt.* 1999). However, the 43 percent of federally managed lynx forest types that are in developmental status are managed for multiple uses that may, on local scales, conflict with lynx conservation.

TABLE 1.—AMOUNT OF LYNX FOREST TYPES IN GEOGRAPHIC REGIONS IN THE CONTIGUOUS U.S., AMOUNT OF LYNX FOREST TYPES (LFT) ON FOREST SERVICE (FS) AND BUREAU OF LAND MANAGEMENT (BLM) LANDS, AND FEDERAL LAND ALLOCATIONS IN LYNX FOREST TYPES (DATA FROM U.S. FOREST SERVICE AND BUREAU OF LAND MANAGEMENT 1999)

Geographic region	Total acres LFT, all ownerships	Total acres LFT on FS/BLM	Total acres FS/BLM LFT non-developed allocations	Percent LFT on FS/BLM	Percent FS/BLM LFT in nondeveloped allocations	Percent all LFT in nondeveloped allocations
Cascades .....	4.2 M	4.1 M	3.6 M	99	87	85
Northern Rockies .....	34.3 M	24.8 M	14.1 M	72	57	41
Southern Rockies .....	6.5 M	5.3 M	1.4 M	82	25	23

The Cascades and Southern Rockies regions encompass substantively smaller proportions of lynx forest types. In the Cascades Region, 99 percent of lynx forest types are managed by the Forest Service, less than 1 percent by the BLM, and less than 1 percent is in other ownerships (see “Table 1”). The Forest Service and BLM manage approximately 4 million acres of lynx forest types. Of federally managed lynx forest types, 87 percent (3.5 million acres) lies within areas with nondevelopmental allocations and 13 percent occur in areas of developmental status, where multiple use management occurs. Ninety percent of this 3.5 million acres is in wilderness or in key watersheds under the Pacific Northwest Forest Plan, and the remaining 10 percent is in matrix lands including late successional reserves, which allows limited timber harvest such as salvage harvest (D. Prevedal, *in litt.* 1999). In Washington and Oregon, the National Park Service manages an additional 200,000 acres of lynx forest types (D. Prevedal, *in litt.* 1999).

In the Southern Rockies, 76 percent of the lynx forest types are managed by the Forest Service, about 5 percent by the BLM, and 19 percent is in other ownerships (see “Table 1”). Federally managed lynx forest types amount to over 5 million acres. Of the federally managed lynx forest types, only 25 percent (1.4 million acres) lies within areas with nondevelopmental status while the other 75 percent are in developmental status and are managed for multiple uses that may, on local scales, conflict with lynx conservation.

Considering the Northern Rockies, Cascades and Southern Rockies, a

cumulative total of 56 percent of Forest Service and BLM lands is managed in nondevelopmental status, comprising over 40 percent of lynx forest types, allowing for 44 percent to be managed for multiple uses which may conflict with lynx conservation. National Parks in the western regions add several million acres of lynx forest types in more or less undeveloped status.

We conclude that timber harvest activities and precommercial thinning may reduce the quality of snowshoe hare habitat and red squirrel habitat in local areas of the Northern Rockies/Cascades and Southern Rockies, and thus may negatively affect lynx at local scales. Furthermore, the large percentage of Federal lands in developmental status and managed for multiple use may, on local scales, conflict with lynx conservation. However, based on the large proportion of lynx forest types managed in nondevelopmental status compared to the proportion of managed lynx forest types affected, current regional effects of timber harvest and thinning appear to occur at levels that are not likely threatening the Northern Rockies/Cascades and Southern Rockies lynx populations.

Federal land management in developmental allocations often maintains conditions suitable for lynx, and these lands constitute important landscapes providing regional connectivity. Construction of roads, timber harvest, and fire suppression occur in developmental allocations. However, recent studies of lynx have documented lynx presence and reproduction in a variety of managed landscapes (Koehler 1990; Staples 1995;

Apps 1999; Squires and Laurion 1999; J. Organ, U.S. Fish and Wildlife Service, pers. comm. 1999). Lynx occurrence records provide evidence that lynx continue to be broadly distributed throughout lynx forest types in the Northern Rockies/Cascades and Southern Rockies (McKelvey *et al.* 1999b), both inside and outside of the nondevelopmental allocation areas within the last decade (U.S. Forest Service and Bureau of Land Management 1999).

Because of the preponderance of lynx forest types on Forest Service, BLM, and National Park system lands, Federal land management assumes the largest single role in the conservation of lynx in western portions of its range. We believe that the large amounts of lynx forest types managed in nondevelopmental allocations, especially in designated wilderness areas, protects lynx in the Northern Rockies/Cascades and Southern Rockies and contributes to the likelihood of persistence of lynx into the future. The forests upon which lynx depend have had less timber harvest, road construction, and have been modified much less than other drier forests (U.S. Forest Service and Bureau of Land Management 1997). In addition, significant portions of these forests are within areas that do not have roads and have habitat that has been classified as wilderness. Natural fires are more likely allowed to burn in wilderness or areas without roads, which helps retain diversity in structural stages and create habitat mosaics in forests for the future. Also, in the Northern Rockies/Cascades Region there are strong habitat connections to lynx populations in



Canada. The Northern Rockies/Cascades Region has the highest potential for maintaining a viable lynx population within the DPS, based upon the large amount of lynx forest types, the large portions of habitat in nondevelopmental management, and strong regional connections to lynx forest types and lynx populations in Canada.

Natural fire has an important role in forest ecology in western mountain ranges of the United States. Some researchers believe that fire suppression during the past 50 years has allowed certain forest types 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; W. Hann, U.S. Forest Service, *in litt.* 1999).

However, others argue that fire suppression is most likely affecting lynx habitat in areas where the historical frequency of fires is shorter than the length of time fires have been suppressed (P. Stickney, U.S. Forest Service, pers. comm. 1994; Agee 1999). Fire suppression in areas with a history of infrequent fire has probably not had much impact (Habeck 1985; Agee 1993). In the western boreal forest zone, long natural fire return intervals (150–300 years) signify that removal of fire has not been as significant as in the West with lower-severity fire regimes and return intervals (30–90 years), even though fire suppression has been in effect for much of this century (Agee 1993, Agee 1998 *in* Agee 1999). More frequent fires of lower intensity do occur in some boreal forest types (W. Hann, *in litt.* 1999), although they typically comprise a small proportion of the total area burned (Agee 1999). In forests with high-severity fire regimes, a number of smaller fires burn a small proportion of the forests, while fewer larger fires account for most of the area burned (McKelvey and Busse 1996 *in* McKelvey *et al.* 1999d; Agee 1999). Lynx forest types in the West include a preponderance of forest types with long natural fire return intervals and high-fire intensity (S. Arno, U.S. Forest Service, *in litt.* 1998; Agee 1999), which suggests that removal of fire in lynx forest types has not been as significant as in the lower-severity fire regimes of the West (Agee 1998 *in* Agee 1999).

In the Northern Rockies, most of the wilderness areas in Montana and Idaho have fire management plans that affect more than 5 million acres that allow naturally caused fires to burn during certain periods and in certain areas (N. Warren, U.S. Forest Service, *in litt.* 1999). In Wyoming and Utah, one-third

of the wilderness areas also have completed similar fire plans, with the remaining plans close to completion (B. Noblit, U.S. Forest Service, *in litt.* 1999). Glacier and Yellowstone National Parks allow natural fires to burn under many conditions. In the Cascades, two of three wilderness areas have fire management plans in place (B. Naney, U.S. Forest Service, Okanogan, pers. comm. 1999). Further, the 1994 Federal Wildland Fire Policy directs the Department of the Interior and the Department of Agriculture to use a full range of potential responses to fire, from full suppression to allowing more fires to burn large areas thereby allowing fires to assume a larger role in maintaining forest health in the future (B. Meuchel, pers. comm. 1999; D. Milburn, pers. comm. 1999). However, natural fire regimes are not necessarily restored because prescriptive criteria to manage these natural wildland fires remain conservative.

Currently, outside large wilderness areas in all western regions, most fires are suppressed. Most fires (98 percent) are successfully extinguished when small and only a small proportion of fires burn large areas (B. Meuchel, U.S. Forest Service, pers. comm. 1999; D. Milburn, U.S. Forest Service, pers. comm. 1999). Fires are extinguished largely due to costs, firefighter safety, local human safety and property concerns. The majority of these fires occur outside lynx forest types at lower elevations in drier forests. However, fires igniting in the lynx forest types outside, and some fires inside, wilderness are suppressed, which can reduce the amount of early seral forests compared to natural conditions and/or change species composition and structural components of forests (W. Hann, *in litt.* 1999). The total area that would have burned had such fires been allowed to burn is likely not substantive when compared to the proportion of the landscape burned by the large, high-intensity fires typical of lynx forest types. However, the resulting pattern of vegetation mosaic and the mix of stand age classes may be altered, as the large fires may burn areas more uniformly due to lack of fire breaks that would have been created by past, smaller fires (D. Milburn, pers. comm. 1999). Other natural processes such as insects, disease, and wind-throw also can play a role in affecting the vegetation mosaics.

Based on available information on fire suppression and upon available habitat assessments, we conclude that at the present time, fire suppression effects are less evident in lynx forest types than in many other forest types in the West. In

the Cascades, fire return intervals in many lynx forest types are very long, 200–500 years (Agee 1999). Mixed-severity fire regimes were not common; therefore, fire suppression is not a factor limiting lynx in the Cascades. In the Northern and Southern Rockies, fire intervals also are long and fire regimes are typically intense (Agee 1999). Where mixed-severity fire regimes occur in the Northern and Southern Rockies, lynx habitat quality may be affected at some local scales, especially outside of wilderness areas, resulting in adverse effects to individual lynx. However, considering a larger scale, the current effects of fire suppression alone are not threatening the Northern Rockies/Cascades and Southern Rockies lynx at the population level at this time.

While recent studies of lynx have documented lynx presence and reproduction in a variety of managed landscapes (Koehler 1990; Staples 1995; Apps 1999; Squires and Laurion 1999; J. Organ, U.S. Fish and Wildlife Service, pers. comm. 1999), we remain concerned about the maintenance of lynx habitat conditions, especially since a large percentage of lands managed by the Forest Service and BLM are in developable status and allow programs, practices and activities that may impact lynx and their primary prey, snowshoe hare. Lynx occur naturally at very low densities in the contiguous United States (see “Background” section). It is imperative that snowshoe hare and alternate prey populations be supported by habitat on Federal lands into the future, to ensure the persistence of lynx in the contiguous United States. Substantive declines in prey species, especially snowshoe hare, may result in a prey base insufficient to support lynx populations. Therefore, amendment of Forest Plans to provide protection for lynx and lynx habitat is needed to conserve habitat for lynx and its prey on Federal forest lands. Without such amendments, the species is threatened.

### Northeast

In the Northeast Region, softwoods that provided Canada lynx habitat were logged extensively during the late 1800s and early 1900s (Jackson 1961; Barbour *et al.* 1980; Belcher 1980; Irland 1982). Over a short time period, timber extraction during this era resulted in the replacement of late-successional conifer forest with extensive tracts of very early successional habitat, which eliminated cover for lynx and hare (Jackson 1961; Keener 1971). In the Northeast Region, slash, accumulated during logging operations, fueled wildfires that burned vast acreage of softwood forest (Belcher 1980; J. Lanier, pers. comm. 1994). This

sudden alteration of habitat may have resulted in sharp declines in snowshoe hare numbers over large areas, subsequently reducing lynx numbers (Jackson 1961; Keener 1971; K. Gustafson, pers. comm. 1994; J. Lanier, pers. comm. 1994).

The impacts of the logging conducted in the Northeast Region during the late 1800s continue to affect lynx forest types. 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 1800s and early 1900s were subsequently replaced with regenerating hardwoods (D. Degraff, pers. comm. 1994; J. Lanier, pers. comm. 1994). Hardwood forests do not typically supply adequate cover for snowshoe hares (Monthey 1986). For a period of time, this extensive area would have provided the early successional habitat used by snowshoe hare. However, such extensive tracts may not have provided a suitable mosaic of forest habitats and as succession progressed, these large tracts eventually became unsuitable for both snowshoe hare and lynx. Declines in snowshoe hare habitat may have occurred during the 1940s and 1950s 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 1960s to reduce the incidence of spruce budworm. During early successional stages, these forests may provide high quality hare habitat. However, 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 clear-cut size to be substantially reduced. The Maine Department of Conservation recently analyzed Statewide timber production on Maine's 17 million acres of forest land (Gadzick *et al.* 1998). The report indicated 25 percent of the forest was in seedling/sapling stages, which likely includes quality snowshoe hare habitat. However, the report concludes that increasing the number of acres under high-yield silvicultural practices, which will likely include precommercial thinning, to a cumulative total of 9 percent of Maine's forest land by the year 2015 is necessary to sustain the current timber harvest levels into the future. Such high-yield techniques may temporarily reduce snowshoe hare habitat quality, but the long-term effects

on lynx on a landscape scale are not known.

Forested habitat in the Northeast has increased because of land-use changes during the past century (Irland 1982; Litvaitis 1993), including the abandonment of agriculture in many areas. 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 northeastern 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).

In 1990, the Forest Service published a report that examined the Northern Forest Lands in New York, Vermont, New Hampshire, and Maine (Harper *et al.* 1990). Eighty-four percent of northern forest lands in the region are currently privately owned and 16 percent are in public ownership. According to another analysis, the Forest Service manages only 7 percent of lynx forest types in the Northeast, of which 23 percent is managed in nondevelopmental status (U.S. Forest Service and Bureau of Land Management 1999). Federal land management will have minimal effect on the persistence of lynx in the Northeast, due to the small amount of lynx forest types managed by the Forest Service.

Commercial forestry continues to be the dominant land use on 60 percent of the private lands in northeastern forests. The rapid pace of subdivision for recreational home sites has been identified as a concern in maintaining the integrity of Northeast forests (Harper *et al.* 1990), though this is not currently posing a significant threat to lynx. 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). Historic declines in some forest types may have contributed to reducing the quality of lynx habitat in the Northeast. Current lynx research in Maine is contributing to our knowledge about lynx habitat use in the Northeast (J. Organ, pers. comm. 1999).

In Northeast forests, fire return intervals are very long, due to the moist maritime influence (Agee 1999). Thus, fire did not historically play a significant role in creating early successional habitats. Insect infestations and wind were the primary disturbance

events that created early successional habitats. While current fire suppression on public and private lands may have localized effects, it is not likely affecting overall lynx forest types in the Northeast. We conclude that fire suppression in the Northeast does not threaten lynx subpopulations there.

We conclude that most lynx forest types are in private, State, or county ownership in the Northeast. Timber harvest and associated activities exert the most influence on lynx forest types in the Northeast, although the extent of influence of current forest practices on lynx is not known.

### Great Lakes

In the Great Lakes Region, as in the Northeast, softwood forests were logged extensively during the late 1800s and early 1900s (Jackson 1961; Barbour *et al.* 1980; Belcher 1980; Irland 1982) and over a short period resulted in the replacement of late-successional conifer forest with extensive tracts of very early successional habitat, which eliminated cover for lynx and hare (Jackson 1961; Keener 1971). Coniferous forests also were cleared for agriculture during this period in the Great Lakes.

In the Great Lakes Region, the Forest Service manages about 19 percent of the area within which lynx forest types occur, of which 40 percent is managed in nondevelopmental status (U.S. Forest Service and Bureau of Land Management 1999). The remaining 80 percent of the area encompassing lynx forest types in the Great Lakes is in State, county, or Tribal lands, or is privately owned. Public or Tribal ownership accounts for 41 percent of all lynx forest types in the region (J. Wright, *in litt.* 1999 in U.S. Forest Service *et al.* 1999).

Timber harvest levels on Federal lands in the Great Lakes have declined by approximately 20 percent over the past decade (R. Gay, U.S. Forest Service, *in litt.* 1999). While specific information on timber harvest levels or pulpwood production on non-Federal lands in the Great Lakes was not available, timber harvest is generally prevalent on these lands. Past habitat fragmentation likely occurred from forestry management programs, agricultural conversions, residential development and highways. As in the Northeast, regenerating forests now occupy abandoned farmlands in northern portions of the Great Lakes. However, mixed conifer/hardwood stands are often replaced by pure deciduous seral stands, which have been maintained in deciduous stages in recent years because of the importance of aspen as a crop tree (Agee 1999). In the East, hare densities were higher in

coniferous forests than deciduous (Litvaitis *et al.* 1985; Fuller and Heisey 1986). On managed timber lands in all ownerships, the maintenance of aspen seral components to produce pulpwood precludes the establishment of coniferous forest types, which in turn likely diminishes snowshoe hare habitat quality, adversely impacting lynx.

In the Great Lakes, natural fire regimes are frequent and intense (Agee 1999). Fire suppression in the Great Lakes area has changed the dominant successional pathways, perhaps permanently (Agee 1999). However, in the northeastern portion of Minnesota fires are allowed to burn in the Boundary Waters Canoe Area. This portion of the Great Lakes Region may provide the highest quality lynx habitat, as the largely coniferous forests here more closely resemble the northern boreal forests of Canada than do the transitional coniferous/deciduous forests to the south. On other Federal lands in the Great Lakes, fire suppression policies are such that fire is unlikely to assume its natural role in creating a mosaic of vegetation communities and age classes across the landscape. Escaped fires and other natural processes such as insects, disease, and wind throw maintain natural mosaics to some degree. Lynx foraging habitat is likely to be maintained at levels less than would be provided under natural disturbance regimes. Fire suppression is likely reducing the quality of lynx habitat in the Great Lakes.

Most lynx forest types are in private, State, or county ownership in the Great Lakes and timber harvest is prevalent on these lands. We conclude that timber harvest and fire suppression may be impacting lynx and prey habitat in the Great Lakes Region.

However, we further conclude that timber harvest and fire suppression may have regional or local impacts but do not currently threaten the contiguous United States population. Considering the entire United States distinct population segment, we remain concerned about maintenance of lynx habitat conditions, especially in areas outside nondevelopmental lands in the West. It is imperative that snowshoe hare and alternate prey populations be supported by habitat on Federal lands into the future, to ensure the persistence of lynx in the contiguous United States. We conclude that the single factor threatening the contiguous United States distinct population segment of lynx is the lack of guidance for conservation of lynx and snowshoe hare habitat in National Forest Land and Resource Plans and BLM Land Use

Plans (see "Factor D" of the "Summary of Factors" section). This lack of guidance allows the potential for future degradation of lynx habitat on Federal lands through timber management and other Federal activities (see "Factor D" of the "Summary of Factors" section).

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

One of the primary reasons we proposed to list lynx, based on available information at the time, was our conclusion that the low numbers of lynx in the contiguous United States and southern Canada were the residual effects of overtrapping that was believed to have occurred in the 1970s and 1980s, in response to unprecedented high pelt prices, a concern that was widely shared (Brand and Keith 1979; Todd 1985; Bailey *et al.* 1986; Hatler 1988; Washington Department of Wildlife 1993).

Since the publication of the proposed rule, we have received substantive new information related to relative numbers of lynx in the northern and southern portions of its range. We now understand that lynx in the contiguous United States always existed at low densities, comparable to lynx populations of the northern boreal forest during cyclic lows (Aubry *et al.* 1999) (see "Background" and "Distribution and Status" sections). These low densities of lynx do not appear to be the result of declining population trends. Rather, lynx are relatively rare in the contiguous United States because of habitats that are inherently unable to support cyclic, high-density snowshoe hare populations and are thus unable to sustain cyclic, high-density lynx populations.

Trapping records are the best, long-term lynx data available. Harvest returns are generally indicative of, but do not represent, real population changes because of the number of factors that influence trapper effort and success, such as changes in socioeconomic conditions, season length, quotas and trapping restrictions, and ease of access (Hatler 1988; Mowat *et al.* 1999). Mowat *et al.* (1999) suggest that fur prices likely affect harvest over the short-term but that it may not be valid to compare and contrast inflation-adjusted prices and harvests that occurred decades apart. Mowat *et al.* (1999) conclude trapping can reduce lynx numbers and that lower lynx harvest levels in Canada in the first half of the 20th century were possibly a result of overtrapping. However, prior to 1921, harvest data were maintained by the Hudson Bay Company. Lower lynx harvest returns in Canada coincide

with Hudson Bay Company's going out of business and Provinces starting to maintain harvest records; we surmise that the lower harvests are, at least in part, more likely an artifact of changes in recordkeeping.

Human-induced mortality was generally believed to be the most significant source of lynx mortality (Ward and Krebs 1985). Trapping mortality was considered to be entirely additive (i.e., in addition to natural mortality) rather than compensatory (taking the place of natural mortality) (Brand and Keith 1979). However, Canadian researchers determined that natural mortality during the declining phase of the lynx cycle is high; therefore, trapping mortality during some portions of the cyclic decline may compensate for natural mortality (Hatler 1988; Poole 1994; Slough and Mowat 1996; Poole 1997; Mowat *et al.* 1999). Therefore, we recognize that trapping of lynx can be both additive and compensatory, depending on when it occurs in the cycle.

From the mid-1970s until the late 1980s, prices of lynx pelts were at record highs throughout the United States and Canada (Todd 1985; Hatler 1988; Hash 1990). In Montana, the 1974 average pelt price was \$63; by 1978 the average price increased over 500 percent to \$348 (B. Giddings, *in litt.* 1994). Lynx pelt prices peaked in the mid-1980s at nearly \$500 per pelt and remained above \$200 per pelt for 12 years until 1989 (B. Giddings, *in litt.* 1994).

In response to declining harvests in the late 1970s and 1980s, Washington, Montana, Minnesota, Alberta, British Columbia, Manitoba, Ontario, Quebec, and Alaska severely restricted or closed their lynx harvest seasons because of concern that lynx populations had been overexploited (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. McPetridge, Alberta Environmental Protection, *in litt.* 1994; I. McKay, *in litt.* 1994).

Based on information obtained since the proposed rule, we now recognize that the cyclic peak harvest returns of the early 1960s and 1970s were unprecedented highs for the 20th century (e.g., Figures 8.3 and 8.6 in McKelvey *et al.* 1999b; Figure 9.4 in Mowat *et al.* 1999). Wildlife managers may have expected harvest returns during the 1980s and 1990s to be comparable to the anomalous cyclic peaks of the 1960s and 1970s. When harvest returns failed to be as high as anticipated, managers appear to have interpreted the lower returns to be caused by overtrapping when pelt prices

were high (Bailey *et al.* 1986; Hatler 1988; Hash 1990; Washington Department of Wildlife 1993). We compared the lynx harvest returns in the 1980s and early 1990s to harvest data dating back over a longer period of time (i.e., prior to 1960) and found that lynx harvest returns were not unusual nor appreciably lower than those recorded prior to the 1960s.

Trapping data for the contiguous United States during the 1970s and 1980s is available from Minnesota, Montana, and Washington. Only Minnesota has long-term trapping records (Henderson 1978). Minnesota lynx harvest data indicate cycles approximately every 10–12 years (McKelvey *et al.* 1999b). Lynx harvest in Minnesota was relatively high, but also highly variable, ranging from as low as 0 to as high as 400 per year over the 40 years of recordkeeping (Henderson 1978). The Minnesota harvest is believed to have consisted, at least partially, of lynx dispersing from Canada (Henderson 1978; McKelvey 1999b). The amplitude of Minnesota lynx harvest cycles was high and, therefore, the exceptionally high peaks of the early 1960s and 1970s that are evident in all other regions do not appear extraordinary in the Minnesota data. After two seasons in the mid-1970s when no lynx were harvested, a quota of five lynx was established from 1977 through the 1982 season. This quota presumably influenced trapper effort and likely was a factor in the reduced harvests in the late 1970s and early 1980s. However, the quota was always exceeded by at least three times the quota. Although the quota was further reduced to two in 1983, nine lynx were taken, providing evidence of the continued occurrence of lynx in Minnesota. The Minnesota lynx season has been closed since 1984. Given the history of lynx cycles reflected in Minnesota data, a cycle would have been expected to return between 1983 and 1985. However, strict season limits were in place or the season was closed so that evidence of cycles from harvest data is not available after the mid-1980s. During the decade preceding the 1984 closure, over 160 lynx were trapped despite restrictive quotas beginning in 1977. These levels of harvest do not differ substantially from previous cyclic lows considering the effects of restrictive quotas on trapper effort.

Montana has maintained lynx harvest records since 1950 (see Figure 8.5 in McKelvey *et al.* 1999b). The most conspicuous features of the data are the cyclic peaks in the 1960s and 1970s. There is no clearly evident peak in the 1950s. In the mid-1980s, in response to

concerns that lynx were being overharvested when returns did not compare to those of the 1960s and 1970s, Montana set lynx trapping quotas. Over successive years, initial annual quotas were set at 135, 120, and 100, but were established without the benefit of long-term harvest data to gauge the range of cyclic highs and lows. These quotas were not filled. However, if returns in the 1950s are a better indication of average long-term harvest, it is possible that these quotas were unrealistically high. Further, despite the quotas, a small cyclic peak is evident in the early 1980s. Since 1991, the quota has been very low, two annually, and has been filled or slightly exceeded every season. The low quota likely affects trapper effort and masks any recent population cycles that could have been reflected in harvest data. Beginning with the 1999 season, all lynx trapping is closed in Montana unless another State is in need of lynx for a reintroduction, in which case five lynx can be taken and translocated to the reintroduction site.

Harvest data for Washington is available only since 1960 (Figure 8.7 in McKelvey *et al.* 1999b). Without harvest information prior to 1960, we cannot know the range of cyclic lows and highs over time in Washington. The 1960s and 1970s cyclic highs are evident in the harvest data, but the data do not clearly track a 10-year cycle. Following the 1970s peak, there were five seasons during which no lynx were harvested. As a result, low quotas were set and seasons were shortened. However, despite the low quotas and restricted seasons, harvest returns increased during the final three seasons of the 1980s and the numbers of lynx harvested were high relative to past records. The final season in 1989 was the fifth highest return ever recorded in Washington. Although the data is limited, the annual number of lynx harvested increased in the late 1980s, perhaps leading to or indicative of a cyclic high. No harvest data are available since a Statewide lynx trapping closure went into effect in 1990.

At the time that Washington, Minnesota, and Montana closed their seasons, lynx were still being trapped, which demonstrates that lynx persisted in these States. We recognize that the States did not have lynx population trend information and so relied on trapping data, deciding to take conservative measures when trapping returns decreased.

Mowat *et al.* (1999) suspected that high harvest pressure during the low phase in the lynx cycle of the mid-1980s

or where trapping intensity was severe may have had more of an impact on lynx populations in the southern part of the range (southern Canada and the contiguous U.S.) than on northern lynx populations (Canada and Alaska) (Mowat *et al.* 1999). Mowat *et al.* (1999) also expected that dispersal by lynx from healthy populations will lead and has led to the repopulation of areas where overtrapping had depleted the local lynx population. Mortality of lynx through legal trapping has been virtually eliminated in the contiguous United States, except in locations where Tribal regulations permit the taking of lynx. We now believe that ongoing precautions taken by States and Provinces to restrict lynx trapping since the 1980s possibly prevented the overharvest of resident populations of lynx. However, the lack of available data (trapping or otherwise) for the past 15 years makes it difficult to discern the effect trapping restrictions may have had on resident populations.

We conclude that in the contiguous United States, lynx populations occur at naturally low densities; the rarity of lynx at the southern portion of the range compared to more northern populations is normal. The rarity of lynx is based largely on limited availability of primary prey, snowshoe hares. At southern latitudes, low snowshoe hare densities are likely a result of the naturally patchy, transitional boreal habitat. Such habitat prevents hare populations from achieving high densities similar to those in the extensive northern boreal forest (Wolff 1980; Buehler and Keith 1982; Koehler 1990; Koehler and Aubry 1994; Hodges 1999a, 1999b; McKelvey *et al.* 1999c). Comparatively low numbers of lynx in the contiguous United States occur not as a result of overtrapping, but because lynx and their prey are naturally limited by fragmented habitat, topography, and climate.

Legal trapping activities for bobcat, coyote, wolverine 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 in many areas because bobcat or coyote trapping generally occurs outside of areas where lynx would be found, although we know that incidental capture occurs (Wydeven 1998; M. DonCarlos *in litt.* 1994; R. Naney, U.S. Forest Service, pers. comm. 1999). Although we are concerned about the loss of lynx that are incidentally captured, we have no information to indicate that the loss of these individuals has negatively affected the overall ability of the contiguous United States DPS to persist. Additionally, we

believe that lynx have been incidentally trapped throughout the past, and still they persist throughout most of their historic range.

In summary, we conclude that past and present overutilization is not a factor threatening lynx.

#### *Factor C. Disease or Predation.*

Disease and predation are not known to be factors threatening Canada lynx.

#### *Factor D. Inadequacy of Existing Regulatory Mechanisms*

For the reasons discussed below, existing regulatory mechanisms do not adequately address the needs of the lynx, or reduce the threats to the species or its habitat. Within the contiguous United States range of the lynx, all States, except Oregon, provide the lynx regulatory protection by specifically prohibiting hunting and trapping for lynx. However based on pelt tags records we believe that Oregon's trapping programs have not resulted in take of any lynx (Carol Carson, pers. comm. OMA, 2000). Four States classify the lynx as endangered—Vermont (1972), New Hampshire (1980), Michigan (1987), and Colorado (1976). Lynx are classified as "threatened" in Washington (1993), "sensitive" in Utah (1979), and "species of special concern" in Maine (1997), and in Wisconsin are "protected" (1997).

Five States classify lynx as small game or furbearers with closed seasons—Idaho (1997), New York (1967), Minnesota (1984), Wyoming (1973), and Montana (1999). It is legal to harvest lynx in Oregon because the lynx is not protected under Oregon State Law. However based on pelt tags records we believe that Oregon's trapping programs have not resulted in take of any lynx (Carol Carson, pers. comm. OMA, 2000). The contiguous United States range of the lynx extends across tribal reservation lands and ceded territories of numerous Tribes. Lynx trapping and hunting are permitted under the regulations of some Tribes, although the Confederated Salish and Kootenai Tribes of the Flathead Nation have prohibited the trapping and taking of lynx since 1986 (M. Pablo, Confederated Salish and Kootenai Tribes Tribal Council, *in litt.* 1998). In the Great Lakes Region, lynx harvest is prohibited on off-reservation ceded lands by the Voigt Intertribal Task Force of the Great Lakes Indian Fish and Wildlife Commission and the 1854 Authority of the Bois Forte and Grand Portage Bands (J. Schlender, Voigt Intertribal Task Force of the Great Lakes Indian Fish and Wildlife Commission, *in litt.* 1998; M. Schrage, Fond du Lac

Resource Management Division, *in litt.* 1998; M. Myers and A. Edwards, 1854 Authority, *in litt.* 1999). We conclude that current hunting and trapping regulations are not threatening the continued existence of the contiguous United States DPS; however, other regulatory mechanisms, as described below, are inadequate.

Most States across the range of lynx have laws and regulations regarding environmental issues. Indirectly, these regulations may promote the conservation of lynx habitat on non-Federal lands; however, few are specific to lynx habitat conservation. Two programs in the Northeast and in Washington may provide some benefit to the species. The majority of lynx forest types in the Northeast occur on private land, ranging from small residential lots to large industrial timber company ownerships (Harper *et al.* 1990). The Northern Forest Lands Council has a charter to maintain traditional patterns of landownership and use in the Northeast; part of this effort includes a forest inventory (Northern Forest Lands Council, *in litt.* 1994). The maintenance of traditional patterns of landownership may prevent the fragmentation and/or development of lynx habitat.

In response to the Washington State Wildlife Commission listing the lynx as threatened, the Washington Forest Practices Board allowed the three primary, non-Federal land managers of Washington lynx habitat to develop "special wildlife management plans" for lynx. Upon approval by Washington Division of Fish and Wildlife, these plans were adopted in lieu of the development of forest practices rules to protect lynx habitat under the State's critical habitat designation. These three land managers have adopted and implemented lynx habitat management plans in Washington—"Lynx Habitat Management Plan for Department of Natural Resources Managed Lands" (Washington Department of Natural Resources 1996a), "North American Lynx Habitat Management Plan for Boise Cascade Corporation" (Whitwill and Roloff 1996), and a plan originally developed by Plum Creek Timber Company and adopted by Stimson Lumber Company "Salmo-Priest and Little Pend Oreille Lynx Management Plan" (Gilbert 1996; Duke Engineering and Services 1998). These plans represent efforts to improve habitat conditions for lynx in Washington, but only on State managed lands and those lands managed by the plan developers.

A substantial amount of the primary areas of lynx occurrence is on National Forest Service lands (Cascades (99

percent), Northern Rockies (67 percent), Southern Rockies (76 percent), Great Lakes (19 percent), Northeast (7 percent)) (U.S. Forest Service and Bureau of Land Management 1999). National Forest Management Act regulations (36 CFR 219.19) provide the following direction to the Forest Service—"Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species." Additionally, the lynx is classified as a sensitive species by all Forest Service regions within the contiguous United States lynx range. There is no regulatory mandate specific to sensitive species; however, the Forest Service Manual (FSM 2670.32) provides the following policy guidance for sensitive species—"avoid or minimize impacts to sensitive species; if impacts cannot be managed to maintain viable populations, a decision must not result in loss of existing native and desired non-native vertebrate species viability or create a significant trend toward Federal listing." At present, Federal land management plans do not adequately address lynx, as described below.

The LCAS was developed to provide a consistent and effective approach to conserving lynx on Federal lands in the contiguous United States (U.S. Forest Service *et al.* 1999). The overall goals of the LCAS were to recommend lynx conservation measures, provide a basis for reviewing the adequacy with regard to lynx conservation of Forest Service and BLM land and resource management plans, and facilitate conferencing and consultation under section 7 of the Act, should the lynx be listed. The LCAS identifies an inclusive list of 17 potential risk factors for lynx that may be addressed under programs, practices, and activities within the authority and jurisdiction of Federal land management agencies. For example, these risk factors include programs or practices that result in: Habitat conversion, fragmentation or obstruction to lynx movement; roads or winter recreation trails that facilitate access to historical lynx habitat by competitors; and fire exclusion, which changes the vegetation mosaic maintained by natural disturbance processes. The risks identified in the LCAS are based on effects to either individual lynx or population segments, or both. Therefore, we do not necessarily consider all of the risks identified in the LCAS to be factors threatening the contiguous United States DPS of lynx. For example, one risk factor identified for the Southern Rockies Region is accidental death to

individual lynx from being hit by a vehicle while crossing roads. While this may result in incidental take of lynx, it is not considered to be a significant threat to the contiguous United States DPS.

The DBA determined that Federal land management plans are likely to adversely affect the lynx (U.S. Forest Service and Bureau of Land Management 1999). The DBA identified potential effects resulting from 57 Forest Service Land and Resource Management Plans (Plans) and 56 BLM Land Use Plans (Plans) within the 16-State area where lynx were proposed for listing. The direction found in the Plans was compared to direction proposed in the LCAS. If it were determined that a Plan may adversely affect either an individual lynx or a population segment through failure to meet any one of the programmatic conservation measures in the LCAS (U.S. Forest Service *et al.* 1999), then the Plan was deemed overall as likely to adversely affect lynx (U.S. Forest Service and Bureau of Land Management 1999). In other words, a risk was deemed harmful to lynx if the possibility of any adverse effect existed due to Plan direction or if the Plans did not address lynx conservation issues.

The Federal agencies chose a conservative approach in determining whether Plans might result in adverse effects to lynx. The determination was based only on what the Plans directed or allowed, not on a quantitative assessment of the effects to lynx from actual actions as a result of past or current implementation of the Plans. We acknowledge that many activities allowed by Plans, such as timber harvest and road construction, are never carried out for a variety of reasons, such as funding limitations and environmental, wildlife or policy considerations (U.S. Forest Service and Bureau of Land Management 1999).

The DBA identifies 15 criteria that contribute to some level of adverse effects to either an individual lynx or a population segment through failure to meet any one of the programmatic conservation measures in the LCAS. These criteria included, but are not limited to, precommercial thinning, fire management, landscape patterns, winter recreation, and monitoring. Individually, these criteria may not impart substantial impacts on the DPS, however, current Plans do allow actions that cumulatively could result in significant detrimental effects to the DPS. We cannot predict the future levels of impacts to lynx that would result from continued implementation of current Plans. However, the DBA concludes that there is reasonable

potential for adverse effects to lynx as a result of actions directed or allowed by existing Plans. Because the Forest Service and BLM manage a substantial amount of lynx forest types in the contiguous United States, particularly in the West, it is imperative that lynx habitat and habitat for lynx prey be maintained and conserved on Federal lands. Though a large percentage of these lands are in nondevelopmental status, a large proportion remain subject to management under multiple use mandates. Until Plans adequately address risks such as those identified in the LCAS, we conclude that the lack of Plan guidance for conservation of lynx, and the potential for Plans to allow or direct actions that adversely affect lynx (as evidenced by the assessment in the DBA), is a significant threat to the contiguous United States DPS of the lynx. On February 4, 1977, the lynx was included in Appendix II of the 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 and therefore does not contribute to protection of the lynx in the United States.

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

Based on mapping of lynx forest types for the contiguous United States (McKelvey *et al.* 1999b), we know that the southern boreal forests that support lynx and hares in the contiguous United States are naturally fragmented and disjunct compared with the northern boreal forests in Canada and Alaska (see "Background" section). Connectivity of appropriate habitat types and cover provide travel corridors between habitat patches, thereby increasing the likelihood of successful lynx dispersal. However, we know that lynx can traverse a variety of habitat types and obstacles, including rivers, nonforested habitats, and various types of roads, based on records of lynx occurrences in habitats and locations far from their traditional range and forest habitat types, such as Nebraska, Nevada, Iowa, and South Dakota (Aubry *et al.* 1999; McKelvey *et al.* 1999b; Ruggiero *et al.* 1999b).

For most areas of the contiguous United States, we have no evidence that

human-caused factors have significantly reduced the ability of lynx to disperse or have resulted in the loss of genetic interchange. No information is currently available to identify whether any genetic concerns exist for lynx in the contiguous United States.

In western regions of lynx range, naturally fragmented patches of lynx habitat, typically occurring along mountain ranges, are often connected by a variety of intervening habitats, including shrub steppe, grassland, low-elevation forested or unforested valleys, and in some cases, desert. This natural fragmentation becomes more pronounced in the more southern extremes of lynx range. We have little information to compare these intervening landscapes to the historical condition, nor do we fully understand the environmental or physiological requirements of lynx as they attempt to disperse across them. We do know that much of the intervening landscapes between patches of lynx forest types in the Northern Rockies/Cascades is either used for agriculture or is Federal land; human population centers and other large human developments are limited across the western range of lynx.

In the Northeast, development along the St. Lawrence seaway and ice breaking for winter navigation may reduce the ability of lynx to move between northern Quebec and the area south of the St. Lawrence that includes southern Quebec, New Brunswick, Nova Scotia, and the northeastern United States (R. Lafond, pers. comm. 1999). Historically, lynx populations in the Northeast were periodically supplemented with transient or dispersing individuals from northern Quebec (Litvaitis *et al.* 1991). South of the St. Lawrence, movement is still possible between southeastern Quebec, western New Brunswick, Maine and New Hampshire, because the habitat is contiguous along the Appalachian Mountains and there are no natural or human-caused barriers to dispersal.

In the Great Lakes Region, winter navigation on the St. Mary's River between Ontario and Michigan's Upper Peninsula may reduce the ability of lynx to migrate across the St. Mary's shipping channel from Ontario to Michigan (Robinson and Fuller 1980).

Lynx movements may be negatively influenced by high traffic volume on roads that bisect suitable lynx habitat. In southern British Columbia, lynx movements and selection of home ranges appear to be influenced by highways (Apps 1999). Apps (1999) surmised that highway influence on lynx varies according to local habitat conditions, roadway width, traffic

volume, and possibly gender and reproductive status of individual lynx. Given the distances and locations where known lynx within the southern boreal forest have moved, we know that lynx successfully cross many types of roads, including unpaved forest roads, secondary paved roads, State and interstate highways (Mech 1980; Smith 1984; Brainerd 1985; Aubry *et al.* 1999; Squires and Laurion 1999). We suspect that highways with high volumes of traffic and associated suburban developments inhibit lynx home range movement and dispersal, and may contribute to loss of habitat connectivity. Such highways occur in the Southern Rockies Region connecting cities, towns, and ski areas, and also in the Northern Rockies/Cascade Region through the Cascade Range along the Columbia River. However, no information currently exists to determine the level at which traffic volume or roadway design may influence lynx movements or create an impediment to movement.

Although we assume that high-volume, high-speed traffic presents a barrier to dispersal, roads do not appear to be a significant direct cause of lynx mortality (Staples 1995; Ruggiero *et al.* 1999b). Few records exist of native lynx being killed by vehicles (Wydeven 1998; M. DonCarlos, *in litt.* 1994). None of the animals tracked by radiotelemetry in various studies throughout the contiguous United States were killed in vehicle accidents (Aubry *et al.* 1999). The majority of records of lynx mortalities from vehicle accidents are of recently translocated animals, who generally move large distances before settling (Brocke *et al.* 1991; Brocke *et al.* 1993; G. Byrne, Colorado Division of Wildlife, pers. comm. 1999). The high incidence of translocated lynx killed by cars is likely not typical of resident lynx populations in southern boreal forests (Aubry *et al.* 1999).

At the time of the proposed rule, we thought that the existence, density, and human use of unpaved forest roads also negatively impacted resident lynx populations by causing displacement or avoidance by lynx and degradation of lynx habitat. Evidence now available indicates that lynx tolerate some level of human disturbance (Staples 1995; Aubry *et al.* 1999; Bailey and Staples 1999; Mowat *et al.* 1999). No evidence exists that human presence displaces lynx. Although information regarding indirect effects of roads on lynx populations is lacking, recent analyses on the Okanogan National Forest in Washington indicate that lynx show no preference or avoidance of forest roads, and that road density does not appear to

affect lynx habitat selection (McKelvey *et al.* 1999c). Lynx have been documented using some types of roads for hunting and travel (Parker 1981; Koehler and Brittell 1990; Koehler and Aubry 1994). We find no information demonstrating that forest roads negatively impact resident lynx populations.

In the proposed rule, we stated that increasing ease of human access into forests increased the vulnerability of lynx to intentional or unintentional shooting and trapping (Todd 1985; McKay 1991; Washington Department of Wildlife 1993; Koehler and Aubry 1994). We know that lynx are taken during legal trapping and hunting for other species, such as wolverine and bobcat, even when lynx seasons are closed (McKay 1991; Staples 1995; Wydeven 1998; M. DonCarlos *in litt.* 1994; R. Naney, pers. comm. 1999). We do not know how many lynx may be purposefully poached, but are concerned about radio-collared lynx that have been killed but not reported (G. Byrne, pers. comm. 1999; M. Amaral, pers. comm. 1999). No reliable recordkeeping exists to determine how frequently such taking occurs, nor if it has increased because of the increasing accessibility of forests. Further, lynx were likely captured incidentally in the past during regulated and unregulated trapping for other predators, and still they have persisted throughout much of their historic range. We are concerned about the loss of lynx through legal or illegal trapping and shooting; however, we have no information to indicate that the loss of these individuals is negatively affecting the overall ability of the contiguous United States DPS to persist (see "Factor B" of this section).

In the proposed rule, we considered displacement or elimination of lynx when competitors (e.g., bobcat, coyote) expand into lynx range (de Vos and Matel 1952; Parker *et al.* 1983; Quinn and Parker 1987) to be a significant threat to the contiguous United States DPS of lynx. At this time, there are no data on competition between lynx and other species; therefore, we have only information on behavior of possible competitors from which to gain some inferences about the possibility of competition and its impact on lynx.

Coyote, bobcat, and mountain lion are hypothesized to be potential lynx competitors (Brocke 1982; McCord and Cardoza 1982; Parker *et al.* 1983; Quinn and Parker 1987; Aubry *et al.* 1999; Buskirk *et al.* 1999a; Ruggiero *et al.* 1999b). In the Northeast and Great Lakes regions of the contiguous United States range of the lynx, bobcat and coyote ranges generally overlap with lynx. In

the Northern Rockies/Cascades and Southern Rockies lynx generally overlap with bobcat, coyote and mountain lion. Lynx are highly evolved for hunting in deep snow: they have a morphological advantage because they are able to walk on snow rather than sink into it as do species with higher foot loads, such as the coyote, bobcat, or mountain lion (Murray and Boutin 1991; Buskirk *et al.* 1999a). Traditionally, where these species' ranges overlap with that of lynx, snow conditions exclude them from the winter habitats occupied by lynx (McCord and Cardoza 1982; Parker *et al.* 1983; Quinn and Parker 1987; Buskirk *et al.* 1999a).

However, today competition may be facilitated through human alteration of forests, creating habitats that may be more suitable to potential lynx competitors (McCord and Cardoza 1982; Quinn and Parker 1987; Buskirk *et al.* 1999a). The range of the coyote has significantly expanded, snowshoe hares are important prey for both coyotes and bobcats, mountain lion numbers appear to have increased, mountain lions have killed lynx, and snowtrails packed by humans facilitate the movement of potential lynx competitors into the deep snow habitats of the lynx.

Researchers believe the coyote's original range prior to European settlement was the North American Great Plains but over the past century its range has substantially expanded in all directions (Nowak 1979; 1999; Parker 1995). Nearly the entire North American range of the lynx now overlaps with that of the coyote. Coyotes expanded into the far western States in the mid to late 1800s, the western Great Lakes states in the early 1900s, and the Northeast by the 1950s (Nowak 1979, 1999; Parker 1995). Coyotes are generalist predators, feeding on rabbits and hares, rodents, deer, and plants (Parker 1995). In northern latitudes, particularly in winter, where the diversity of food items is limited, snowshoe hares are a primary food item for coyotes (Parker 1995; Staples 1995); the concern regarding competition with lynx stems primarily from diet overlap.

Extirpation of the wolf (*Canis lupus*) is one factor believed to have enabled the coyote to extend its range (Parker 1995). As wolf populations expand in the Northern Rockies Region in Montana, Idaho, and Wyoming, and the Great Lakes Region in Minnesota, Wisconsin, and Michigan, we expect coyote populations may be reduced (Crabtree and Sheldon 1999). An indirect result may be a reduction in the potential for coyotes to affect lynx in areas of overlap between lynx and wolves.



The range of the bobcat overlaps the lynx range within the contiguous United States and southern Canada. Like the coyote, the bobcat is a generalist predator that feeds on a wide variety of prey, including snowshoe hares (McCord and Cardoza 1982; Koehler and Hornocker 1991). Although lynx in the southern boreal forests evolved with bobcats, competition between these species is suspected because of their similar size and appearance (Buskirk *et al.* 1999a). Bobcats remain restricted to areas with low snow depths (Koehler and Hornocker 1991; Buskirk *et al.* 1999a). Parker *et al.* (1983) speculated that bobcats displaced lynx from all areas on Cape Breton Island, Nova Scotia, except high elevations, where snow accumulation limited the bobcat's range. We have no evidence that competition with bobcats has negatively affected the contiguous United States DPS.

Buskirk *et al.* (1999a) advanced the theory that mountain lions compete with lynx, based on a few records of mountain lions killing lynx and presumed increasing mountain lion populations. Interactions between lynx and lions would most likely occur during snowfree seasons because lions generally do not occupy the same winter habitats as lynx (H. Quigley, Hornocker Wildlife Institute, pers. comm. 1999). It is generally accepted that mountain lion numbers in the West have increased, therefore the rate of encounters between lynx and mountain lions has probably increased (H. Quigley, pers. comm. 1999). Deer (*Odocoileus* spp.) are the primary prey of mountain lions (Dixon 1982) and are an important food item for coyotes (Parker 1995) and bobcats (McCord and Cardoza 1982; Koehler and Hornocker 1991). In Idaho, mountain lion kills were frequently visited by bobcats and coyotes (Koehler and Hornocker 1991). Lions kill coyotes and bobcats, often in defense of food caches (Boyd and O'Gara 1985; Koehler and Hornocker 1991). Lynx occasionally feed on ungulates or scavenge from carcasses (Brand *et al.* 1976); we expect interactions between mountain lions and lynx would most likely occur in defense of food caches, as with coyotes and bobcats. Despite numerous mountain lion studies within the western range of the lynx, incidents of lions killing lynx are extremely rare (H. Quigley, pers. comm. 1999). No evidence exists that mountain lions exert a population-level impact on lynx.

Historically, interactions between lynx and potential competitors were limited in winter because most competitors cannot effectively move through the deep snow habitats of the

lynx (Buskirk *et al.* 1999a). Now, ski and snowmobile trails and roads that are maintained for winter recreation and forest management create packed snow corridors that give other species access to lynx winter habitat (Koehler and Aubry 1994; U.S. Forest Service *et al.* 1999), although significant amounts of habitat remain relatively undisturbed by humans in the interior of large blocks of lynx forest types on Federal lands in the West, especially in designated wilderness and National Parks (U.S. Forest Service and Bureau of Land Management 1999). It appears that bobcats remain restricted to areas with low snow depths (Koehler and Hornocker 1991; Buskirk *et al.* 1999a), and that lynx and lion winter habitats typically do not overlap (H. Quigley, pers. comm. 1999).

Coyotes use packed snowtrails and now occupy the winter habitats of lynx (Murray and Boutin 1991; Murray *et al.* 1994; Staples 1995; O'Donoghue *et al.* 1997, 1998a, 1998b) and, therefore, are a concern as a potential lynx competitor in winter. Studies of lynx, coyotes, and hares from the Yukon Territory and Alaska provide some information with which to consider potential for competition between lynx and coyote in winter (Murray and Boutin 1991; Murray *et al.* 1994; Staples 1995; O'Donoghue *et al.* 1997, 1998a, 1998b). Coyotes adapted their behavioral patterns for hunting in snow by selecting snow that was shallower and harder; whereas lynx successfully hunted in all habitats where hares were found (Murray and Boutin 1991; Murray *et al.* 1994; O'Donoghue *et al.* 1998a). Coyotes and lynx both preferred snowshoe hares over alternate prey during all phases of the hare cycle (O'Donoghue *et al.* 1998a). During the snowshoe hare decline, lynx switched to hunting red squirrels, whereas coyotes switched to hunting voles (O'Donoghue *et al.* 1998b). In Alaska, Staples (1995) believes that the 42 percent dietary overlap between lynx and coyote observed during a cyclic low in the hare cycle indicated the potential for competition; however, we are not aware of research or other evidence indicating that coyote competition has negatively affected the lynx populations in Canada. In fact, we expect that the variability of snow conditions and frequency of fresh snows in the winter habitats that support lynx continually reduce or alter the availability of snowtrails and shallow snow depths used by coyotes in lynx habitat, making it more difficult for coyotes to effectively hunt in these areas regularly during the winter. No evidence exists

indicating that coyote competition has negatively affected the contiguous United States lynx DPS (Aubry *et al.* 1999).

Little is known about lynx habits in snow-free seasons. A greater diversity of prey and habitats available during this time may reduce the negative effects of competition. Furthermore, because lynx have co-evolved with bobcats and mountain lions, and in most areas lynx have coexisted with coyotes for many decades, we suspect some level of segregation of habitat and prey among these species. In summer in Idaho, coyotes, bobcats, and mountain lions used different topographic and habitat features, allowing habitat and prey resources to be partitioned among these species; coyotes used lower elevations than bobcats who used lower elevations than lions (Koehler and Hornocker 1991). All of the elevations used in this study were within the range recorded for lynx occurrences in the West (McKelvey *et al.* 1999b); however, the data for lynx were not recorded by season. We suspect these data are more representative of elevations lynx use in winter rather than snow-free seasons because much of the lynx data are from trapping records, an activity that occurs during winter.

In summary, we conclude lynx movements may be negatively influenced by high traffic volume on roads that bisect suitable lynx habitat, such as in the Southern Rockies and in some parts of the Northern Rockies/Cascades Region. We suspect that highways with high volumes of traffic and associated suburban developments inhibit dispersal and movements within home ranges, and may contribute to loss of habitat connectivity. However, roads do not appear to be a significant direct cause of lynx mortality. We find no information demonstrating that forest roads negatively impact resident lynx populations. Packed snowtrails facilitate the movement of coyotes into formerly inaccessible deep snow habitats occupied by lynx; however, we have no evidence that competition with coyotes, mountain lions or bobcats is negatively affecting lynx at a population-level scale.

### Finding

We conclude that, in the contiguous United States, lynx populations occur at naturally low densities and that the rarity of lynx at the southern portion of their range compared to more northern populations is normal. This rarity is based largely on low densities of snowshoe hares, their primary prey. Low snowshoe hare densities are likely a result of naturally patchy, transitional

boreal habitat at southern latitudes that prevents hare populations from achieving densities similar to those in the extensive northern boreal forest of Canada. Low numbers of lynx reflected in harvest data for the contiguous United States are not a result of overtrapping, but of naturally limiting fragmentation, topography, and climate. Lynx in the contiguous United States are the southernmost extension of a larger metapopulation whose core is in central Canada.

We conclude the single factor threatening the contiguous U.S. DPS of lynx is the inadequacy of existing regulatory mechanisms, specifically the lack of guidance for conservation of lynx in National Forest Land and Resource Plans and BLM Land Use Plans as described in Factor D. Until Plans adequately address risks such as those identified in the LCAS, and described generally in Factors A, B and E, we conclude that the lack of Plan guidance for conservation of lynx, as evidenced by the fact that Plans allow or direct actions that cumulatively adversely affect lynx (as indicated by the assessment in the DBA), is a significant threat to the contiguous U.S. DPS of lynx. Therefore, we find that listing the lynx within the contiguous United States as threatened is necessary.

We conclude that Federal land management assumes the largest single role in the conservation of lynx in the contiguous United States because of the preponderance of lynx forest types on Forest Service, BLM, and National Park Service lands, particularly in the western United States. A substantial amount of lynx forest types occur on Forest Service and BLM lands (Northern Rockies-72 percent, Cascades-99 percent, Southern Rockies-82 percent, Great Lakes-19 percent, Northeast-7 percent). We believe that the large amount of lynx forest types properly managed in nondevelopmental allocations, especially in designated wilderness areas, and amendments to existing land use plans, such that management of lynx forest types in developmental areas does not conflict with lynx conservation, will be a substantial benefit to lynx in the Northern Rockies/Cascades and Southern Rockies and will contribute significantly to the likelihood of conserving lynx into the future within the contiguous United States.

It is imperative that snowshoe hare and alternate prey populations be supported by appropriate habitat management on Federal lands into the future to ensure the conservation of lynx in the contiguous United States. Substantive declines in prey species,

especially snowshoe hare, may result in a prey base insufficient to support lynx persistence.

Factors affecting lynx status vary among regions of the contiguous United States. The Northern Rockies/Cascades Region supports the largest amount of lynx habitat and has the strongest evidence of resident lynx populations, both historically and currently. This region has strong habitat connections to lynx populations in Canada, as well as large proportions of lynx habitat in wilderness and other areas with limited human influence. The Northern Rockies/Cascades Region has the highest potential to maintain a viable lynx population within the contiguous United States. Available evidence suggests that lynx populations within this region fluctuate, and we have no information suggesting a declining population trend. The primary factor affecting lynx in this region is the inadequacy of existing regulatory mechanisms, specifically the lack of guidance for conservation of lynx in Federal land management plans.

In the Southern Rockies Region, lynx habitat is naturally limited and highly fragmented, which leads us to conclude that lynx were rare historically. We conclude native lynx may now be extirpated from this region. The factors affecting lynx in this region are the inadequacy of existing regulatory mechanisms, specifically the lack of guidance for conservation of lynx in Federal land management plans, and loss of habitat connectivity resulting from high-use highways and associated suburban development.

The historic and current status of lynx in the Great Lakes Region is uncertain. We lack information to determine whether lynx in this region are simply dispersing from Canada, are members of a resident population, or are a combination of a resident population and dispersing individuals. Much of this region contains marginal habitat that may not sustain resident lynx populations. The factors affecting lynx in this region include the inadequacy of existing regulatory mechanisms, specifically the lack of guidance for conservation of lynx in Federal land management plans, and timber harvest and fire suppression on non-Federal lands.

In the Northeast, lynx reproduction and individual animals have recently been documented in Maine. Recent lynx harvests were substantial in adjacent southeastern Quebec. Therefore, we conclude that a resident population of lynx continues to exist in the core of the region; however, the range may have retracted northward. The main factor

affecting lynx forest types in this region is timber harvest on non-Federal lands, although the extent of influence of current forest practices on lynx is not known.

Within the contiguous United States, the relative importance of each region to the persistence of the DPS varies. The Northern Rockies/Cascades Region supports the largest amount of lynx habitat and has the strongest evidence of persistent occurrence of resident lynx populations, both historically and currently. In the Northeast (where resident lynx populations continue to persist) and Southern Rockies regions, the amount of lynx habitat is naturally limited and does not contribute substantially to the persistence of the contiguous United States DPS. Much of the habitat in the Great Lakes Region is naturally marginal and may not support prey densities sufficient to sustain lynx populations. As such, the Great Lakes Region does not contribute substantially to the persistence of the contiguous United States DPS. Collectively, the Northeast, Great Lakes, and Southern Rockies do not constitute a significant portion of the range of the DPS. We conclude the Northern Rockies/Cascades Region is the primary region necessary to support the continued long-term existence of the contiguous United States DPS. However, the role that each region plays in the long-term conservation of the species will be explored further in recovery planning for the species.

### 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,” that is, 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. Our regulations (50 CFR 424.12(a)) state that critical habitat is not determinable if information sufficient to perform required analysis of impacts of the designation is lacking or if the biological needs of the species are not sufficiently well known to permit identification of an area as critical habitat. Section 4(b)(2) of the Act requires us to consider economic and other relevant impacts of designating a particular area as critical habitat on the basis of the best scientific data available. The Secretary may exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the conservation benefits, unless to do so would result in the extinction of the species.

In the proposed rule, we indicated that designation of critical habitat was not prudent for the Canada lynx because it could increase the vulnerability of lynx to poaching, because the species and its habitat are continually shifting spatially and temporally across the landscape making static designation of specific areas of little benefit to the species, and because designation of broad geographic areas would necessarily include many areas of unsuitable habitat that would not be used by and would not be critical to the species. We also indicated that designation of critical habitat was not prudent because we believed it would not provide any additional benefit beyond that provided through listing as threatened.

In the last few years, a series of court decisions have overturned Service determinations regarding a variety of species that designation of critical habitat would not be prudent. Based on the standards applied in those judicial opinions, we have reexamined the question of whether critical habitat for Canada lynx would be prudent.

The primary regulatory effect of critical habitat is the section 7 requirement that Federal agencies refrain from taking any action that destroys or adversely modifies critical habitat. While a critical habitat designation for habitat currently occupied by this species would not be likely to change the section 7 consultation outcome because an action that destroys or adversely modifies such critical habitat also would be likely to adversely affect the species, there may be instances where section 7 consultation would be triggered only if critical habitat is designated. Examples could include unoccupied habitat or

occupied habitat that may become unoccupied in the future. There also may be some educational or informational benefits to designating critical habitat. Therefore, we find that critical habitat is prudent for Canada lynx.

As explained in detail in our Final Listing Priority Guidance for Fiscal Year 2000 (64 FR 57114), our listing budget is currently insufficient to allow us to immediately complete all of the listing actions required by the Act. Deferral of the critical habitat designation for Canada lynx allows us to concentrate our limited resources on higher priority critical habitat (including court ordered designations) and other listing actions, while allowing us to put in place protections needed for the conservation of Canada lynx without further delay. However, because we have successfully reduced, although not eliminated, the backlog of other listing actions, we anticipate in FY 2000 and beyond giving higher priority to critical habitat designation, including designations deferred pursuant to the Listing Priority Guidance, such as the designation for this species, than we have in recent fiscal years.

We plan to employ a priority system for deciding which outstanding critical habitat designations should be addressed first. We will focus our efforts on those designations that will provide the most conservation benefit, taking into consideration the efficacy of critical habitat designation in addressing the threats to the species, and the magnitude and immediacy of those threats. We will develop a proposal to designate critical habitat for the Canada lynx as soon as feasible, considering our workload priorities. Unfortunately, for the immediate future, most of Region 6's listing budget must be directed to complying with court orders and settlement agreements, as well as due and overdue final listing determinations.

#### 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 us.

The Forest Service and the Fish and Wildlife Service recently signed a Lynx Conservation Agreement (Feb 2000) to promote the conservation of lynx and lynx habitat on Federal lands managed by the Forest Service. It identifies actions the signatories agree to take to reduce or eliminate adverse affects or risks to lynx and lynx habitat. Implementation of these actions within this agreement will provide immediate benefits to lynx.

Section 9 of the Act and implementing regulations set forth a series of general prohibitions and exceptions that apply to all endangered or 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 17.22, 17.23, and 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.

It is our policy, as published in the **Federal Register** on 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 (59 FR 34272). 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 wild lynx, we believe the following actions would not likely result in a violation of section 9 of the Act:

(1) Actions that may result in take of wild 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 us pursuant to section 7 of the Act;

(2) Actions that may result in take of wild lynx in the contiguous United States when the action is conducted in accordance with a permit issued under 50 CFR 17.32 or special rule issued under section 4(d) of the Act. These activities include take for educational purposes, scientific purposes, the enhancement of propagation or survival, zoological exhibition, and other conservation purposes consistent with the Act.

For the contiguous United States population of captive lynx, we believe the following actions would not likely result in a violation of section 9 of the Act:

(1) Take, transport, possess, sell, deliver, and receive of captive lynx and export of captive lynx or their pelts under valid CITES export permits.

For the contiguous United States population of wild lynx, the following actions likely would be considered a violation of section 9 of the Act:

(1) Take of lynx (including both purposeful and incidental)

(2) Possessing, selling, delivering, carrying, transporting, or shipping illegally taken lynx;

(3) Export of lynx or lynx parts or products (including pelts) without a permit under section 17.32 (a CITES permit would also be required in order to be in compliance with CITES);

(4) Significant lynx habitat modification or degradation to the point that it results in death or injury by significantly impairing essential

behavioral patterns, including breeding, feeding, or sheltering.

For the contiguous United States population of captive lynx, the following would likely constitute a violation of section 9 of the Act:

(1) export of any lynx part or products other than a properly tagged pelt or permitted parts or products;

For lynx that occur outside of the contiguous United States (Alaska and Canada), the Endangered Species Act listing and companion 4(d) have no effect. Lynx in those areas, as well as in the contiguous United States, remain covered by the designation of Appendix II under CITES. Therefore, the import of lynx into the United States and the transportation of lynx from Alaska to the contiguous United States may continue under current procedures established by State law and CITES.

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

#### Special Rule

Section 4(d) also states that the Service may, by regulation, extend to threatened species, prohibitions provided for endangered species under section 9. Our implementing regulations for threatened wildlife (50 CFR 17.31) incorporate the section 9 prohibitions for endangered wildlife, except when a special rule is promulgated pursuant to section 4(d) applies (50 CFR 17.31(c)).

This special rule applies the general take prohibitions for threatened wildlife to the wild population of Canada lynx in the contiguous United States. It also provides for the continuation of the take and export of captive lynx and their pelts under Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) export permits and provides for the transportation of lynx pelts in commerce within the United States. The export of properly tagged (with valid CITES export tag) pelts from lynx documented as captive is not prohibited under the special rule. Properly tagged pelts may be transported in interstate trade without permits otherwise required under 50 CFR 17.32.

CITES is an international treaty for the regulation of international trade in certain animal and plant species. The 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 are 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 the lynx (as well as the bobcat and river otter) were included in CITES Appendix II, we 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 pelts to be exported are required to be tagged with a permanently attached, serially numbered tag that identifies the species, State of origin, and season of taking. The tags are provided to the States and Tribes by the Service. In the past the States that have been approved for export of captive or wild lynx are Alaska, Idaho, Minnesota, Montana, and Washington. In the last few years Idaho, Minnesota and Washington have had zero quotas or closed seasons, and Montana has had a quota of two to three wild lynx trapped per year. Due to the listing all of the States in the contiguous U.S. will no longer be approved for export of wild lynx; Lynx in Alaska are not encompassed by this listing; all existing CITES requirements remain the same for lynx originating in Alaska.

Currently facilities in Idaho, Minnesota, Montana, North Dakota, and Utah raise captive 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 169 lynx pelts were tagged for export under the CITES program and these primarily originated from farmed animals. These captive-bred specimens have neither a positive nor negative effect on the species in the wild.

Current prices for lynx pelts are low so there is little present incentive to trap wild lynx. However, an increase in pelt prices could create a strong incentive to trap wild lynx and export their pelts. Lynx are easy to trap, and the illegal take of lynx would present an enforcement and inspection problem for Service personnel. Since they look the same, captive lynx pelts cannot be effectively differentiated from wild lynx pelts by Service law enforcement and inspection personnel without proper tagging.

This final rule would allow the export from the United States of live captive lynx or their pelts if the pelt is tagged with a CITES export tag and accompanied by a valid CITES export permit. The import of lawfully obtained live lynx or their parts or products

would continue to require the necessary CITES export permits from the exporting country, but no additional permits under 50 CFR 17.32 would be required. CITES permit requirements are found in 50 CFR part 23.

In summary, CITES permits will be required for the export of captive lynx or their parts or products from the United States. No permits under 50 CFR 17.32 will be required for the importation of lynx or their parts or products into the United States or for interstate commerce in pelts that are properly tagged with valid CITES export tags. However, interstate commerce of untagged pelts is prohibited.

#### Similarity of Appearance

In the proposed rule we proposed listing the wild population of lynx in the contiguous United States as threatened, and we proposed listing the captive population separately under the similarity of appearance provisions of the Act (section 4(e)). We proposed listing the captive population under the Similarity of Appearance provisions in order to aid law enforcement efforts to protect the wild populations. Upon further review we have determined that separate listings of the wild and captive populations are not necessary. Instead, we have revised the special 4(d) rule accompanying this listing rule to establish prohibitions for the wild and captive populations separately.

#### Paperwork Reduction Act for the Listing Rule

This rule does not contain any new collections of information other than

those already approved under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.*, and assigned Office of Management and Budget clearance number 1018-0094. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information, unless it displays a currently valid control number. For additional information concerning permit and associated requirements for threatened wildlife, see 50 CFR 17.32.

#### Required Determinations for the Listing and Special Rule

In accordance with Executive Order 12866, this document is a significant rule and has been reviewed by the Office of Management and Budget, under Executive Order 12866. We completed a Record of Compliance for the 4(d) rule, and published a notice of availability for the Record of Compliance in the **Federal Register** on July 26, 1999 (64 FR 40333). A copy can be obtained by contacting the Montana Field Office (see **ADDRESSES** section).

#### National Environmental Policy Act

We have determined that Environmental Assessments and Environmental Impact Statements, as defined in 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 our reasons for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

#### 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(s)

The primary authors of this document are Lori Nordstrom and Anne Vandehey, Montana Field Office, Helena, Montana; and Janet Mizzi, Mountain-Prairie Regional Office, Denver, Colorado.

#### List of Subjects in 50 CFR Part 17

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

#### Regulation Promulgation

Accordingly, we 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, Stat. 3500; unless otherwise noted.

2. Section 17.11(h) is amended by adding the following, in alphabetical order under “MAMMALS,” to the List of Endangered and Threatened Wildlife:

#### § 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> .....	U.S.A. (AK, CO, ID, ME, MI, MN, MT, NH, NY, OR, UT, VT, WA, WI, WY) Canada.	CO, ID, ME, MI, MN, MT, NH, NY, OR, UT, VT, WA, WI, WY.	T	692	NA	17.40 (k)
*	*	*	*		*		*

3. Section 17.40 is amended by adding paragraph (k) to read as follows:

#### § 17.40 Special rules—mammals

\* \* \* \* \*

(k) Canada lynx (*Lynx canadensis*).

(1) *What lynx does this special rule apply to?* The regulations in this paragraph (k) apply to all wild and captive lynx in the contiguous United States.

(2) *What activities are prohibited for wild lynx?* All prohibitions and provisions of 50 CFR 17.31 and 17.32 apply to wild lynx found in the contiguous United States.

(3) *What is considered a captive lynx?*

(i) For purposes of this paragraph (k), captive lynx means lynx, whether alive or dead, and any part or product, if the specimen was in captivity at the time of the listing, born in captivity, or lawfully

imported or transported into the contiguous United States.

(ii) Lynx that were either born or held in captivity and then released into the wild are considered wild.

(4) *What activities are allowed for captive lynx?*

(i) *Take.* You may take lawfully obtained captive lynx without a permit.

(ii) *Import and export.* You may export captive live lynx, parts or products of captive lynx provided the

specimens are tagged with Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) export tags and/or accompanied by a valid CITES export permit. You may import lawfully obtained lynx that originated outside the United States when you follow the requirements of CITES.

(iii) *Interstate commerce.* You may deliver, receive, carry, transport, ship,

sell, offer to sell, purchase, or offer to purchase in interstate commerce captive lynx and captive lynx parts and products in accordance with State or tribal laws and regulations. In addition, lynx pelts that are properly tagged with valid CITES export tags also qualify for this exemption on interstate commerce.

(5) *Are any activities not allowed or restricted for captive lynx?* You must comply with all applicable State and

tribal laws and regulations. Violation of State or tribal law will also be a violation of the Act.

Dated: March 16, 2000.

**Jamie Rappaport Clark,**

*Director, Fish and Wildlife Service.*

[FR Doc. 00-7145 Filed 3-21-00; 8:45 am]

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