PART C. CANADA LYNX

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DESCRIPTION OF THE PROPOSED ACTION

The description of the proposed action is located in the administrative record and grizzly bear portion of the biological opinion.

Consultation Background: The Fish and Wildlife Service's biological opinion is based on our review of the Biological Assessment (BA), as amended, for the proposed Rock Creek Mine Project and its effects on the threatened Canada lynx in accordance with section 7 of the Endangered Species Act. The Service received a BA amendment for lynx dated April 4, 2000. The project has been undergoing formal consultation for grizzly bear.

On December 26, 2002, the District Court for the District of Columbia issued an order that enjoins the Service from issuing any "written concurrence[s]" for actions proposed by any Federal agencies that "may affect, but are not likely to adversely affect" the Canada lynx. Until further notice, all consultations concerning effects to Canada lynx must be conducted in accordance with the direction of the Court. Specifically, any actions subject to consultation that may affect Canada lynx require formal consultation as described in 50 CFR 402.14 and preparation of a biological opinion that addresses how the proposed action is expected to affect Canada lynx in order to complete the procedural requirements of section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). A complete administrative record of this consultation is on file at the Service's Montana Ecological Services Field Office.

STATUS OF THE SPECIES/CRITICAL HABITAT

The following recapitulates the status and distribution information of Canada lynx that was presented in the *Biological Opinion on the Effects of National Forest Land and Resource Management Plans and Bureau of Land Management Land Use Plans* (USDI 2000).

Species/Critical Habitat Description

The 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). The winter pelage of the lynx is dense and has a grizzled appearance with grayish-brown mixed with buff or pale brown fur on the back, and grayish-white or buff-white fur on the belly, legs, and feet. Summer pelage of the lynx is more reddish to gray-brown (Koehler and Aubry 1994). 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.

Classification of the Canada lynx (also called the North American lynx) has been subject to revision. In accordance with Wilson and Reeder (1993), the lynx in North America is *Lynx canadensis*. Previously the Latin name *L. lynx canadensis* was used for lynx (Jones et al. 1992). Other scientific names still in use include *Felis lynx* or *F. lynx canadensis* (Jones et al. 1986; Tumlison 1987).

No critical habitat has been designated for the threatened population of Canada lynx in the contiguous United States. As explained in the final rule, designation of critical habitat would be prudent, but has been deferred until other higher priority work can be completed within the Service's current budget.

Life History

Home Range and Dispersal

Lynx home range size 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. 2000; Mowat et al. 2000). 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 2000; Mowat et al. 2000; Squires and Laurion 2000). 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 core of the range in Canada (Koehler and Aubry 1994; Apps 2000; Squires and Laurion 2000).

Lynx are capable of dispersing extremely long distances (Mech 1977; 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.

During the early 1960s and 1970s, there were numerous occurrences of lynx documented in atypical habitat, such as in North Dakota. In those 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. 2000b). Many of these unusual observations were probably dispersing animals that either were lost from the population or later returned to suitable habitat.

Diet

Snowshoe hares (*Lepus americanus*) are the primary prey of lynx, comprising 35 to 97 percent of the diet throughout the range of the lynx (Koehler and Aubry 1994). Other prey species include red squirrel (*Tamiasciurus hudsonicus*), grouse (*Bonasa umbellus*, *Dendragopus* spp., *Lagopus*

spp.), flying squirrel (*Glaucomys sabrinus*), ground squirrel (*Spermophilus parryii*, *S. Richardsonii*), porcupine (*Erethrizon dorsatum*), beaver (*Castor canadensis*), mice (*Peromyscus* spp.), voles (*Microtus* spp.), shrews (*Sorex* spp.), fish, and ungulates as carrion or occasionally as prey (Saunders 1963a; van Zyll de Jong 1966; Nellis et al. 1972; Brand et al. 1976; Brand and Keith 1979; Koehler 1990; Staples 1995; O'Donoghue et al. 1998).

During the cycle when hares become scarce, the proportion and importance of other prey species, especially red squirrel, increases in the diet (Brand et al. 1976; O'Donoghue et al. 1998a; Apps 2000; Mowat et al. 2000). However, Koehler (1990) suggested that a diet of red squirrels alone might not be adequate to ensure lynx reproduction and survival of kittens.

Most research has focused on the winter diet. Summer diets are poorly understood throughout the range of lynx. Mowat et al. (2000) reported through their review of the literature that summer diets have less snowshoe hare and more alternate prey species, possibly because of a greater availability of other species.

There has been little research on lynx diet specific to the southern portion of its range except in Washington (Koehler et al. 1979; Koehler 1990). Southern populations of lynx may prey on a wider diversity of species than northern populations because of lower average hare densities and differences in small mammal communities. In areas characterized by patchy distribution of lynx habitat, lynx may prey opportunistically on other species that occur in adjacent habitats, potentially including white-tailed jackrabbit (*Lepus townsendii*), black-tailed jackrabbit (*Lepus californicus*), sage grouse (*Centrocercus urophasianus*), and Columbian sharp-tailed grouse *(Tympanichus phasianellus*) (Quinn and Parker 1987; Lewis and Wenger 1998).

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, and differing interpretations of the population dynamics of southern populations of snowshoe hare have been proposed (Hodges 2000b).

Snowshoe hares have evolved to survive in areas that receive deep snow (Bittner and Rongstad 1982). Primary forest types that support snowshoe hare are subalpine fir, Englemann spruce, Douglas fir, and lodgepole pine in the western United States, and spruce/fir, pine, and deciduous forests in the eastern United States (Hodges 2000b). Within these habitat types, snowshoe hares prefer stands of conifers with shrub understories that provide forage, cover to escape predators, and protection during extreme weather (Wolfe et al. 1982; Monthey 1986; Koehler and Aubrey 1994). Hares' use of habitat is correlated with understory cover (Hodges 2000a). Early successional forest stages generally have greater understory structure than do mature forests and,

therefore, support higher hare densities (Hodges 2000a, b). However, mature forests also can provide snowshoe hare habitat as openings are created in the canopy when trees succumb to disease, fire, wind, ice, or insects, and the understory develops (Buskirk et al. 2000b).

Lynx seem to prefer to move through continuous forest, using the highest terrain available such as ridges and saddles (Koehler 1990; Staples 1995). Cover is important to lynx when searching for food (Brand et al. 1976) but lynx often hunt along edges (Mowat et al. 2000). Kesterson (1988) and Staples (1995) reported that lynx hunted along the edges of mature stands within a burned forest matrix, and Major (1989) found that lynx hunted along the edge of dense riparian willow stands. Lynx have been observed (via snow tracking) to avoid large openings (Koehler 1990; Staples 1995) during daily movements within the home range.

Den Site Selection

Lynx use large woody debris, such as downed logs, root wads, and windfalls, to provide denning sites with security and thermal cover for kittens (McCord and Cardoza 1982; Koehler 1990; Koehler and Brittell 1990; Mowat et al. 2000; Squires and Laurion 2000). During the first few months of life, kittens are left alone at these sites when the female lynx hunts. Downed logs and overhead cover provide protection of kittens from predators, such as owls, hawks, and other carnivores during this period.

The age of the forest stand does not seem as important for denning habitat as the amount of downed, woody debris available (Mowat et al. 2000). Den sites may be located within older regenerating stands (more than 20 years since disturbance) or in mature conifer or mixed conifer-deciduous (typically spruce/fir or spruce/birch) forests. 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 2000). 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 and is regenerating into hardwoods (U.S. Fish and Wildlife Service, in litt. 1999). The site had a dense understory and an abundance of dead and downed wood.

Denning habitat must be in or near foraging habitat to be functional. The hunting range of females is restricted at the time of parturition, and their need to feed kittens requires an abundance of prey. Lynx, like other carnivores, frequently move their kittens until they are old enough to hunt with their mother. Multiple nursery sites are needed that provide kittens with overhead cover and protection from predators and the elements. Downed logs and overhead cover also must be available throughout the home range to provide security when lynx kittens are old enough to travel (Bailey 1974).

Recruitment

Breeding occurs through March and April in the north (Quinn and Parker 1987). Kittens are born in May to June in southcentral Yukon (Slough and Mowat 1996). The male lynx does not help with rearing young (Eisenberg 1986). Slough and Mowat (1996) reported yearling females giving birth during periods when hares were abundant; male lynx may be incapable of breeding during their first year (McCord and Cardoza 1982).

In northern study areas during the low phase of the hare cycle, few if any live kittens are born, and few yearling females conceive (Brand and Keith 1979; Poole 1994; Slough and Mowat 1996). However, Mowat et al. (2000) suggested that in the far north, some lynx recruitment occurs when hares are scarce and this may be important in lynx population maintenance during hare lows. During periods of hare abundance in the northern taiga, litter size of adult females averages four to five kittens (Mowat et al. 1996).

Koehler (1990) suggested that the low number of kittens produced in northcentral Washington was comparable to northern populations during periods of low snowshoe hare abundance. In his study area, two radio-collared females had litters of three and four kittens in 1986, and one kitten in 1987 (the actual litter size of one of the females in 1987 was not determined) (Koehler 1990). Of the known-size litters in Washington, one kitten survived the first winter.

In Montana, Squires and Laurion (2000) reported that one marked female produced two kittens in 1998. In 1999, two of three females produced litters of two kittens each. In Wyoming (Squires and Laurion 2000), one female produced four kittens in 1998, but snow tracking indicated that the kittens were not with the female in November and were presumed dead. The same female produced two kittens in 1999.

Mortality

Reported causes of lynx mortality vary between studies. The most commonly reported causes include starvation of kittens (Quinn and Parker 1987; Koehler 1990), and human-caused mortality, mostly fur trapping (Ward and Krebs 1985; Bailey et al. 1986).

Significant lynx mortality due to starvation has been demonstrated in cyclic populations of the northern taiga, during the first 2 years of hare scarcity (Poole 1994; Slough and Mowat 1996). Various studies have shown that, during periods of low snowshoe hare numbers, starvation can account for up to two-thirds of all natural lynx deaths. Trapping mortality may be additive rather than compensatory during the low period of the snowshoe hare cycle (Brand and Keith 1979). Hunger-related stress, which induces dispersal, may increase the exposure of lynx to other forms of mortality such as trapping and highway collisions (Brand and Keith 1979; Carbyn and Patriquin 1983; Ward and Krebs 1985; Bailey et al. 1986).

Paved roads have been a mortality factor in lynx translocation efforts within historical lynx range. In New York, 18 translocated lynx were killed on highways (Brocke et al. 1990). It has been suggested by Brocke et al. (1990) that translocated animals may be more vulnerable to highway mortality than resident lynx. Two lynx were killed on 2- and 4-lane Colorado highways following their release as part of a reintroduction effort there (G. Byrne, Colorado Dept. of Wildlife, pers. comm. 1999).

Other than translocated animals, there have been two documented occurrences of highway mortality in Wisconsin (Theil 1987) and Minnesota (Don Carlos, unpubl. report 1997). Twelve resident lynx were documented being killed on highways in Canada and Alaska (Staples 1995; Gibeau and Heur 1996; T. Clevenger, pers. comm. 1999; Alexander, pers. comm. 1999).

Predation on lynx by mountain lion, coyote (*Canis latrans*), wolverine (*Gulo gulo*), gray wolf (*Canis lupus*), fisher (*martes pennanti*) and other lynx has been confirmed (Berrie 1974; Koehler et al. 1979; Poole 1994; Slough and Mowat 1996; O'Donoghue et al. 1997; Apps 2000; Vashon et al. 2003; Squires and Laurion 2000). Squires and Laurion (2000) reported two of six mortalities of radio-collared lynx in Montana were due to mountain lion predation. Observations of such events are rare, and the significance of predation on lynx populations is unknown.

Interspecific Relationships with Other Carnivores

Buskirk et al. (2000a) described the two major competition impacts to lynx as exploitation (competition for food) and interference (avoidance). Of several predators examined (birds of prey, coyote, gray wolf, mountain lion, bobcat, and wolverine), coyotes were deemed to most likely pose local or regionally important exploitation impacts to lynx, and coyotes and bobcats were deemed to possibly impart important interference competition effects on lynx. Mountain lions were described as interference competitors, possibly impacting lynx during summer and in areas lacking deep snow in winter, or when high elevation snow packs develop crust in the spring.

Exploitation competition may contribute to lynx starvation and reduced recruitment. During periods of low snowshoe hare numbers, starvation accounted for up to two-thirds of all natural lynx deaths in the Northwest Territories of Canada (Poole 1994). As described previously, major predators of snowshoe hare include lynx, northern goshawk, great horned owl, bobcat, coyote, red fox, fisher, and mountain lion. In southern portions of snowshoe hare range, predators may limit hare populations to lower densities than in the taiga (Dolbeer and Clark 1975; Wolff 1980; Koehler and Aubry 1994).

Based on only anecdotal evidence, Parker et al. (1983) discussed competition between bobcats and lynx on Cape Breton Island. Lynx were found to be common over much of the island prior to bobcat colonization. Concurrent with the colonization of the island by bobcats, lynx densities declined and their presence on the island became restricted to the highlands, the one area where bobcats did not become established.

Population Dynamics

In Canada and Alaska, lynx populations undergo extreme fluctuations in response to snowshoe hare population cycles, enlarging or dispersing from their home ranges and ceasing the recruitment of young into the population after hare populations decline (Mowat et al. 2000). In the southern portion of the range in the contiguous United States, lynx populations appear to be naturally limited by the availability of snowshoe hares, as suggested by large home range size, high kitten mortality due to starvation, and greater reliance on alternate prey. These characteristics appear to be similar to those exhibited by lynx populations in the taiga during the low phase of the population cycle (Quinn and Parker 1987, Koehler 1990, Aubry et al. 2000). This is likely due to the inherently patchy distribution of lynx and hare habitat in the contiguous United States and corresponding lower densities of hares.

A lack of accurate data limits our understanding of lynx population dynamics in the contiguous United States and precludes drawing definitive conclusions about lynx population trends. Formal surveys designed specifically to detect lynx have rarely been conducted. Many reports of lynx (e.g., visual observations, snow tracks) have been collected incidentally to other activities, but cannot be used to infer population trends. Long-term trapping data have been used to estimate population trends for various species. However, trapping returns are strongly influenced by trapper effort, which varies between years and, therefore, may not accurately reflect population trends. Another important problem is that trapping records of many States did not differentiate between bobcats and lynx, referring to both as "lynxcats." Overall, the available data are too incomplete to infer much beyond simple occurrence and distribution of lynx in the contiguous United States (McKelvey et al. 2000b).

Lynx populations in the contiguous United States occur at the southern periphery of a metapopulation whose core is located in the northern boreal forest of central Canada (McCord and Cardoza 1982; Quinn and Parker 1987; McKelvey et al 2000a). Lynx population dynamics may emanate from the core to the periphery, as evidenced by a lagged correlation of lynx trap records and observations (McKelvey et al. 2000b; Mowat et al. 2000). In the Great Lakes Geographic Area, population dynamics in recent decades appear to be strongly driven by immigration from Canada (McKelvey et al. 2000b). However, in other areas and time periods it is not known to what extent the correlation is due to immigration from Canada, population responses to the same factors controlling northern populations, or a combination of the two.

We suspect that some areas in the contiguous United States naturally act as sources of lynx (recruitment is greater than mortality) that are able to disperse and potentially colonize other patches (McKelvey et al. 2000a). Other areas may function as sinks, where lynx mortality is greater than recruitment and lynx are lost from the overall population. Sink habitats are most likely those places on the periphery of the southern boreal forest where habitat becomes more fragmented and more distant from larger lynx populations. Fluctuations in prey populations may

cause some habitat patches to change from being sinks to sources, and vice versa. 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).

Status and Distribution

The "status and distribution" section is largely excerpted from the Service's final rule (2000) with later information cited. 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).

The distribution of lynx in North America is closely associated with the distribution of North American boreal forest (Agee 2000). In Canada and Alaska, lynx inhabit the classic boreal forest ecosystem known as the taiga (McCord and Cardoza 1982; Quinn and Parker 1987; Agee 2000; McKelvey et al. 2000b). The range of lynx extends south from the classic boreal forest zone into the subalpine forest of the western United States, and the boreal/hardwood forest ecotone in the eastern United States (Agee 2000; McKelvey et al. 2000b). Forests with boreal features (Agee 2000) extend 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. Within these general forest types, lynx are most likely to persist in areas that receive deep snow, to which the lynx is highly adapted (Ruggiero et al. 2000b). Lynx are rare or absent from the wet coastal forests of Alaska and Canada (Mowat et al. 2000).

At its southern margins in the contiguous United States, forests with boreal features, or southern boreal forests, become naturally fragmented as they transition into other vegetation types. Southern boreal forest habitat patches are small relative to the extensive northern boreal forest of Canada and Alaska, which constitutes the majority of lynx range. Many southern boreal forest habitat patches within the contiguous United States cannot support resident populations of lynx and their primary prey species.

The complexities of lynx life-history and population dynamics, combined with a general lack of reliable population data for the contiguous United States, make it difficult to ascertain the past or present population status of lynx in the contiguous United States. It is impossible to determine with certainty whether reports of lynx in many States were--(1) animals dispersing from northern populations that were effectively lost 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 resident and dispersing animals.

The final rule (2000) determining threatened status for the lynx in the contiguous United States summarized lynx status and distribution across four regions that are separated from each other by ecological barriers consisting of unsuitable lynx habitat. These distinct regions are the Northeast, the Great Lakes, the Northern Rocky Mountains/Cascades, and the Southern Rocky Mountains. While these regions are ecologically unique and discrete, the lynx is associated with southern boreal forest in each and, with the exception of the Southern Rocky Mountains Region, each area is geographically connected to the much larger population of lynx in Canada.

Northeast Region (Maine, New Hampshire, Vermont, New York)

Based on an analysis of cover types and elevation zones containing most of the lynx occurrences, McKelvey et al. (2000b) 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 United States 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. 2000b).

Based on documentation of lynx presence and reproduction in Maine, the substantial 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, we conclude that 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 between the United States and Canada north of the St. Lawrence River has been reduced by development in southeastern Canada and ice breaking to allow year-round shipping on the river.

Hoving (2001) found evidence of lynx presence and reproduction throughout all but the extreme southern portion of Maine from 1833 to 1999. Hoving further suggested that habitat conditions for lynx could contract significantly if the climate warms in the future and cause the elimination of suitable habitat south of the United States/Canadian border. From 1999 to 2003 the Department of Inland Fisheries and Wildlife documented the production of 17 litters in the northern portion of Maine (Vashon et al. 2003). Preliminary results suggest that predation and starvation is an important factor contributing to lynx mortality.

Great Lakes Region (Minnesota, Wisconsin, Michigan)

The majority of lynx occurrence records in the Great Lakes Region are associated with the "mixed deciduous-coniferous forest" type (McKelvey et al. 2000b). 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. 2000b). These types are found primarily in northeastern Minnesota, northern Wisconsin, and the western portion of Michigan's upper peninsula.

Mixed deciduous-coniferous forest covers an extensive area in this region, but much of this area is considered 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. Snow depths within appropriate habitat that allow lynx a competitive advantage over other carnivores (i.e., coyotes) occur only in limited areas in northeastern Minnesota, extreme northern Wisconsin, and the upper peninsula of Michigan.

The historical 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. 2000b), as expected because of the connectivity of the boreal forest with that of Ontario, Canada, where lynx occur. The Minnesota Natural Heritage and Nongame Research Program has received 62 verified reports of lynx with 6 of these reports providing evidence of lynx reproduction (Minnesota Natural Heritage and Nongame Research Program 2003).

Wisconsin and Michigan have substantially fewer records of lynx (McKelvey et al. 2000b). 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. 2000b; 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. 2000b) as would have been expected of a resident lynx population.

Using the best available information, we cannot determine whether resident populations of lynx exist currently or existed historically in the Great Lakes Region. Within this region, we consider northeastern Minnesota to be most likely to support a resident population. We suspect that historically there might have been a small resident population in northeastern Minnesota, but the lack of evidence precludes confirmation of the past or present existence of a resident population. Records of lynx from Wisconsin and Michigan most likely were transient, dispersing animals.

Northern Rocky Mountain/Cascades Region (Washington, Oregon, Idaho, Wyoming, Utah, Montana)

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 Douglas fir (*Pseudotsuga menziesii*) and western spruce/fir forests (McKelvey et al. 2000b). Most of the lynx occurrences are in the 1,500 to 2,000-meter (4,920 to 6,560-foot) elevation class (McKelvey et al. 2000b). These habitats are found in the Rocky Mountains of Montana, Idaho, eastern

Washington, and Utah, the Wallowa Mountains and Blue Mountains of southeast Washington and northeastern Oregon, and the Cascade Mountains in Washington and Oregon. The majority of verified lynx occurrences in the United States 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.

The Northern Rocky Mountains/Cascades Region supports the most viable resident lynx populations in the contiguous United States, while recognizing that, at best, lynx in the contiguous United States 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. Resident lynx populations probably exist in contiguous habitats in Idaho and northwestern Wyoming. Lynx have probably always occurred intermittently in Oregon and Utah, although the historical or current presence of resident populations in either of these States has not been confirmed.

Southern Rocky Mountains Region (Colorado, Southeast Wyoming)

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. 2000b). These areas likely reduce or preclude opportunities for genetic interchange with the Northern Rocky Mountains/Cascades Region and Canada, effectively isolating lynx in the southern Rocky Mountains Region (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 to 12,300 feet)) than were all other occurrences in the West (McKelvey et al. 2000b).

The Service believes that a resident lynx population historically occurred in the Southern Rocky Mountains Region, 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 have been extirpated, which led the Colorado Division of Wildlife to undertake a reintroduction effort that is currently in progress.

Reports from Other Locations

During the early 1960s, concurrent with an unprecedented cyclic high in Canada, lynx moved into the Great Plains and the Midwest Region of the United States (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. 2000b). We consider lynx observations in Nevada, North Dakota, South Dakota, Iowa,

Nebraska, Indiana, Ohio, and Virginia to be individuals dispersing subsequent to periods of cyclic high lynx numbers in Canada (Hall and Kelson 1959; Burt 1954 in Brocke 1982; McKelvey et al. 2000b; S. Johnson, Indiana Department of Natural Resources, in litt. 1994; P. Jones, Ohio Department of Natural Resources, in litt. 1994; W. Jobman, Smithsonian Institute, in litt. 1998). We do not consider these States to be within the contiguous United States range of lynx (65 FR 16052, March 24, 2000).

Analysis of the Species Likely to be Affected

Lynx are wide-ranging species requiring large, interconnected areas of suitable habitat. Habitat connectivity within geographic areas and with Canada may be important for long-term lynx population viability and maintenance of the contiguous United States DPS. Critical habitat has not been designated for Canada lynx. The proposed action will not reduce or degrade essential habitat elements used by lynx for denning, foraging, and recruitment, or increase habitat fragmentation and lynx mortality.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area which have undergone section 7 consultation, and the impacts of State and private actions which are contemporaneous with the consultation in progress.

Action area, as defined by the Act, includes the entire area that would be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. For the purposes of this biological opinion, the action area is defined as Lynx Analysis Unit (LAU) #14702 and the adjacent project sites that are located in non-habitat at lower elevations. The action area provides limited lynx habitat because most of it is lower elevation than lynx prefer.

The Kootenai National Forest delineated LAUs in accordance with the LCAS. Most of the Rock Creek project is nearest to, but falls outside of LAU #14702 (formerly referred to as LMU 7.2.1, see page 37 of original BA). The LAU #14702 covers approximately 23,000 acres. Less than 30 percent of the potential lynx habitat within the LAU has been made unsuitable due to management activities. The majority of LAU #14702 is designated Wilderness and areas without roads. Far less than 15 percent of the LAU has been changed in the last 10 years by management activities. Within the LAU, lynx habitat was mapped using the criteria for the Northern Rocky Mountains (USDA-FS 2000). Of the approximate 23,000 acres in the LAU, only 1,134 acres (5 percent) is considered denning habitat and 1,195 acres (5 percent) is considered foraging habitat. However, linkages to adjacent drainages do not appear to be limiting because forested cover is well represented.

Status of the Species in the Action Area

Lynx are known to occur on the Kootenai National Forest; however, there are no recent sightings or other reports in the Rock Creek drainage (USDA-FS 2000; Wayne Johnson, pers. comm. March 7, 2003). The status of the lynx in the project area and in the Cabinet Mountains is unknown but populations are probably low. Trapping records indicate only three lynx were trapped in Sanders County from 1977 to 1993 and all three were taken in 1984 (USDA-FS 2000).

Factors Affecting the Species Environment Within the Action Area

The factors affecting the environment of the Canada lynx in the action area are associated with dispersed and motorized recreation. Dispersed recreation includes hunting, fishing, camping, horseback riding, hiking, biking, off-highway vehicle use, cross-country skiing, snowshoeing, and snowmobiling among other recreational pursuits.

EFFECTS OF THE ACTION

Under section 7(a)(2) of the Act, "effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, with the effects of other activities interrelated or interdependent with that action. Indirect effects are those caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02). The effects of the action are added to the environmental baseline to determine the future baseline and to form the basis for the determination in this opinion. Should the Federal action result in a jeopardy situation and/or adverse modification conclusion, the Service may propose reasonable and prudent alternatives that the Federal agency can take to avoid violation of section 7(a)(2). The impacts discussed below are the result of direct and indirect impacts of implementing the proposed project, which was designed to be consistent with the management guidelines in the Lynx Conservation Assessment and Strategy (Ruediger et al. 2000).

Direct Effects/Indirect Effects

A total of 20 acres of lynx habitat, including 3 acres of denning habitat, would be impacted by the project. This amounts to less than 0.01 percent of lynx habitat in the LAU. Because less than 30 percent of the potential lynx habitat within the LAU is currently classified as “unsuitable,” the proposed activity will not result in more than 30 percent of potential habitat in the LAU to be converted to unsuitable or result in a permanent loss of habitat.

Far less than 15 percent of the LAU has been changed in the last 10 years by management activities, so the proposed 20-acre change (less than 0.01 percent) proposed with this project meets the standard (LCAS pg.79).

Included in the 20-acre habitat impacts, the loss of 3 acres of denning habitat is less the one tenth of one percent of existing denning habitat. As a whole, the proposed project will delay achievement of denning habitat structure on an estimated 17 acres, including non-denning habitat that is progressing toward denning conditions. The affected acres are in similar condition (age class) to most forested habitat in the LAU. That is, that they are forested stands that currently do not have an adequate down log component to provide denning habitat. Since there are thousands of acres progressing toward denning habitat, the delay on 17 acres is not significant.

To access the mill site, FDR-150 would be plowed for approximately the first 5 miles. This segment is not in lynx habitat, nor in any LAU. With the increased traffic level to the mill site, it is unlikely that the road would become an access point for snowmobile use into lynx habitat at higher elevations. There would be no increase in groomed or designated over-the-snow routes or snowmobile play areas.

The project proposes paving dirt FDR-150; however, the segment planned for paving is not in lynx habitat. The potential to increase mortality risk to wildlife due to higher traffic levels and increased speeds would be mitigated by busing employees to the mill site (see Appendix C). The road should not act as a movement barrier. Preliminary information from Canada suggests that lynx do not avoid roads except at very high traffic volumes exceeding 2,000 vehicles per day (Ruediger et al. 2000).

No new roads would be constructed in lynx habitat. However, the existing access route to the exploration adit (FDR-2741) goes through lynx habitat. Originally, the project proposed to close the portion of this road that currently extends beyond the adit. However, portions of FDR 150 would be closed instead, which also occurs in lynx habitat and would minimize disturbance around denning habitat.

The project proposes to provide funding for a position with the Montana Department of Fish, Wildlife and Parks as part of the mitigation for grizzly bear. Part of the duties of that position is information and education on grizzly bear but lynx would be addressed as well.

The project mitigation package includes the possibility of land easements and/or acquisitions to benefit grizzly bear. Most lands identified as possible mitigation for grizzly bear also could provide some value for lynx. Specifically, acquiring ownership or conservation easements could maintain or in some cases improve habitat conditions for movement and dispersal.

The project does not propose salvage harvest following a disturbance nor pre-commercial thinning. The project does not propose changes in recreation management during the winter season.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

There are no known major private land activities occurring within the action area.

CONCLUSION

After reviewing the current status of the Canada lynx, the environmental baseline for the action area, the effects of the action, and the cumulative effects, it is the Service's biological opinion that Rock Creek Mine Project as proposed, is not likely to jeopardize the continued existence of the Canada lynx. No critical habitat has been designated for this species, therefore, none will be affected. The impact to habitat for Canada lynx would be insignificant or discountable (less than 0.01 percent change in baseline).

The Service has reached this conclusion by considering the following:

1. The proposed action will not significantly alter or modify lynx denning or foraging habitat or impact prey species.

2. The effects of the action would not cause adverse impacts to the Canada lynx. All aspects of the project (Federal action) are in compliance with the Lynx Conservation Assessment and Strategy.

3. The action includes full implementation of the "Terrestrial Threatened and Endangered Species Mitigation Plan for the Proposed Sterling Rock Creek Mine" (administrative record, W. Johnson 2002) which will mitigate effects to grizzly bears and other wildlife including lynx.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent 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. Incidental take is defined as take

that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

Amount or Extent of Take

No incidental take is expected as a result of the proposed action.

Effect of the Take

Since no incidental take is expected, there will be no effects to lynx due to take.

Reasonable and Prudent Measures

There are no reasonable and prudent measures necessary and appropriate since no incidental take is expected. However, measures designed to mitigate for effects to grizzly bear will provide benefits for the lynx. These measures include road closures, replacement habitat, and bussing employees.

Terms and Conditions

No terms and conditions are necessary as no incidental take is expected and no reasonable and prudent measures are required.

Conservation Recommendations

Section 7(a)(1) of the Act requires Federal Agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. As we do not anticipate any adverse effects of the proposed action on Canada lynx, no conservation recommendations are necessary.

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