BIOLOGICAL OPINION
FOREST ROAD 424 (DENLEY ROAD) RECONSTRUCTION
LAKE AND ST. LOUIS COUNTIES, MINNESOTA

November 29, 2006
U.S. FISH AND WILDLIFE SERVICE
TWIN CITIES FIELD OFFICE
BLOOMINGTON, MINNESOTA

Table of Contents

Introduction and Consultation History

This document transmits the Fish and Wildlife Service's (Service) Biological Opinion (Opinion) based on our review of the proposed Forest Road 424 (Denley Road) Reconstruction located in Lake and St. Louis Counties, Minnesota, and its effects on Canada lynx (*Lynx canadensis*) and gray wolf (*Canis lupus*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended. Your July 14, 2006 request for formal consultation was received on July 17, 2006.

The Opinion is based on information provided in the July 14, 2006 Biological Assessment (Assessment, USDA FS 2006b), the draft Environmental Assessment (dated February 27, 2006, USDA FS 2006a), and other sources of information. Informal consultation on this proposed action between the Service and Superior National Forest (SNF) began in November 2004. A draft biological opinion was submitted to the Forest Service for its review on October 12, 2006. A complete administrative record of this consultation is on file at this office.

Concurrence

SNF found that the proposed action may affect, but is not likely to adversely affect critical habitat for gray wolf. We concur with this determination based on the following factors:

- The proposed action would not increase road density, a critical factor in determining habitat quality for gray wolf;
- The proposed action would have only minimal effects on total forest cover;
- Effects on food and cover for gray wolf are not likely to be detectable in terms of the local or statewide population of gray wolf.

BIOLOGICAL OPINION

1. Description of the Proposed Action

In its draft Environmental Assessment (USDA Forest Service 2006a), SNF describes five "projects" that comprise the proposed action. Three of the five projects are relevant to this opinion:

Project 1. Widen, reconstruct, and pave 10.4 miles of FR 424 to meet Minnesota Type II Natural Preservation Route standards. The existing alignment would remain the same except for two curves that may be straightened. All relocated sections of road would be within 66 ft of the cleared limit of the road. After completion of the improvements, FR 424 would be transferred to the jurisdiction of St. Louis and Lake Counties, who would then

be responsible for long-term maintenance and repair. The reconstructed road would be approximately twice the width of the existing road.

Project 2. Relocate the Stony Spur Trail in three locations where the trail is adjacent to the Denley Road. The trail would be relocated just outside the road corridor at two areas. In another area a rerouted section of trail and a new trail bridge across the Stony River would be constructed.

Project 5. Decommission unauthorized roads U542428 and U542423. Total length of these roads is 220 feet.

According to the DEA, all of the projects would likely be completed on a two-year construction schedule depending on obtaining adequate funding.

The DEA further states the following:

> The primary purpose of this project is to improve the Denley Road so that it meets county road design standards suitable for state-aid. Upon completion of the project, the Forest Service would transfer the jurisdiction to Lake and St. Louis Counties. FR 424 does not currently meet critical design requirements for safe site distances, safe driving width and surface, or adequate recovery zones. FR 424 has been in use since the 1940s, reconstructed in the 1980s, and has evolved into a major arterial road that is the major link between Babbitt (east end of the Iron Range) and Silver Bay, MN (the North Shore). The use includes daily travel by mine employees heading to and from work, logging and commercial trucking bringing commodities to and from the Iron Range towns and forest lands, commercial trucking associated with the Cold Spring Quarry, and general public travel across this part of northeastern Minnesota.
>
> The road receives a year-round daily average traffic of 130 vehicles, which is the second highest use of all Forest Service roads on the Forest. Heavy truck traffic accounts for about 30% of the total traffic. Currently load restrictions are placed on the road limiting commercial traffic in the spring. There is a need for this traffic to operate year round, therefore, there is a need to improve and strengthen the road to a 10-ton axle limit at a minimum. Forest Service Manual policy is to transfer the jurisdiction of roads to a more appropriate public road authority when more than half of the use is likely to be non-Forest Service-generated traffic. (FSM 7703.2 1. a. page 6).

The design speed of the reconstructed road would be 40 miles per hour (mph). That is, the road's "worst features (hills and curves) would be designed at 40 mph" (USDA Forest Service 2006b). Design speed on hills

and curves would be five mph higher than for those features on the existing road (USDA Forest Service 2006b:18).

1.1. Conservation Measures

If a den is discovered during construction, it will be protected during the denning season in accordance with Forest Plan guideline G-WL-10.

2. Status of the Species

2.1. Canada lynx

The Canada lynx in the contiguous U.S. were listed as threatened effective April 23, 2000 [65 Federal Register (FR) 16052, March 24, 2000]. The Service identified one distinct population segment (DPS) in the lower 48 states. On July 3, 2003, the Service published its Notice of Remanded Determination of Status for the Contiguous United States Distinct Population Segment of the Canada Lynx (68 Federal Register FR 40076, July 3, 2003) in which it clarified its findings in the 2000 final listing rule and reaffirmed the listing of the lynx DPS as threatened.

2.1.1. Species Description

The lynx is a medium-sized cat with long legs; large, well-furred paws; long tufts on the ears; and a short tail whose tip is entirely surrounded by black (McCord and Cardoza 1982, the tips of bobcat tails are black only on the upperside). The lynx's long legs and large, well-furred paws make it highly adapted for hunting in deep snow. 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).

2.1.2. Life History

Canada lynx prey primarily on snowshoe hares, especially in the winter when they comprise 35-97 percent of the diet (Koehler and Aubry 1994). Lynx may modify hunting behavior and switch to alternate prey when hare densities are low (O'Donoghue et al. 1998). Other prey species include red squirrel (*Tamiasciurus hudsonicus*), other small rodents, small carnivores, and birds, including ruffed grouse (Moen et al. 2004); lynx also eat carrion and, uncommonly, large mammals such as deer (*Odocoileus virginianus*), mule deer (*O. hemionus*), moose (*Alces alces*), and caribou (*Rangifer tarandus*) (Saunders 1963; van Zyll de Jong 1966; Nellis et al. 1972; Brand et al. 1976; Brand and

Keith 1979; Quinn & Parker 1987; Koehler 1990; Staples 1995; O'Donoghue et al. 1998, b; Poszig et al. 2004).

Snowshoe hares have evolved to survive in areas that receive deep snow (Bittner and Rongstad 1982) and prefer conifer habitats with dense shrub understories that provide food, cover from predators, and thermal protection during extreme weather (Wolfe et al. 1982; Fuller & Heisey 1986; Pietz & Tester 1983; Monthey 1986; Koehler and Aubrey 1994; Wirsing et al. 2002). In Maine, lynx are likely to occur in areas with deep snow in forest in which deciduous species are absent or only a minor component (Hoving et al. 2005). Within these broad areas lynx appeared to select forest habitats in successional stages that are likely to support high densities of snowshoe hare (Hoving et al. 2004.) Forest undergoing succession after disturbances, such as timber harvest or fire, may provide optimal hare habitat about 15-30 years after the initial disturbance, during what may be described as the sapling/large shrub stage – typically before the onset of self-thinning (Monthey 1986; Thompson et al. 1989; Koehler and Brittell 1990; Buskirk et al. 2000; Hoving et al. 2004).

In Canada and Alaska, lynx populations generally undergo marked and regular fluctuations in response to changes in snowshoe hare populations (Mowat et al. 2000). In the northern portions of their range, lynx densities drop to less than 3/100km^2 during population lows. A well studied population in Washington maintained a density of 2-2.6/100km^2 during a 7-year study period (Aubry et al. 2000).

In the northeastern U.S., lynx were most likely to occur in areas containing suitable habitat that were greater than 100 square kilometers (km^2, Hoving 2001). Studies in the southern portion of the species' range have found average home ranges of 151 km ^{2} and 72 km^2 for males and females, respectively (Aubry et al. 2000). Recent home range estimates from Maine, however, are lower - 70 km ^{2} for males and 52 km ^{2} for females (G. Matula, *in litt.* 2003). Home range size is likely inversely related to density of snowshoe hare (Koehler and Aubry 1994; Poole 1994; Apps 2000; Squires and Laurion 2000).

The most commonly reported causes of lynx mortality include starvation of kittens (Quinn and Parker 1987; Koehler 1990) and human-caused mortality (Ward and Krebs 1985; Bailey et al. 1986). Significant lynx mortality due to starvation (up to two-thirds of deaths) has been demonstrated in cyclic populations of the northern taiga during the first 2 years of hare scarcity (Poole 1994; Slough and Mowat 1996). Where trapping of lynx occurs legally, mortality of adults may be almost entirely human-caused during hare population lows (Poole 1994). Lynx are also killed by automobiles, disease, and other mammal species, although the significance of these factors to lynx populations is uncertain (Brand and Keith 1979; Carbyn and Patriquin 1983; T. Shenk, *in litt.* 2004; Ward and Krebs 1985; Bailey et al. 1986). During a lynx irruption in Minnesota in 1971-1974, 96 percent of 128 mortalities were caused by trapping

or shooting, whereas 4 percent were killed by cars (Henderson 1977). At that time trapping of lynx was legal in Minnesota, at least during a limited open season. Of the 37 lynx that have died of known or suspected causes in Colorado since the state began reintroducing the species in 1999, 13 (35 percent) died as a result of being shot or from other human causes (excluding vehicles), ten (27 percent) were killed by vehicles, nine (24 percent) starved, four (11 percent) died of plague, and 1 (3 percent) was predated (T. Shenk, *in litt.* 2004). Of the 21 lynx mortalities recorded in Minnesota since 2002, six died after being trapped, five died as a result of collisions with cars, four died of unknown causes, three were shot, two died after collisions with trains, and one was predated.

2.1.3. Status and Distribution

Canada lynx range is associated closely with the distribution of North American boreal forest inhabited by snowshoe hares (Agee 2000). It extends from Alaska, the Yukon Territories, and Northwest Territories south across the United States border in the Cascades Range and northern Rocky Mountains, through the central Canada provinces and down into the western Great Lakes region, and east to New Brunswick and Nova Scotia, Canada, and south into the northeastern United States from Maine to New York (McCord and Cardoza 1982; Quinn and Parker 1987).

Within the transitional boreal forest within the contiguous United States there are core areas for Canada lynx in Maine, Minnesota, Montana, Washington and likely Idaho (U.S. Fish and Wildlife Service 2003). More generally, these core areas are contained within the Northeast, Great Lakes, Southern Rocky Mountains, and Northern Rocky Mountains/Cascades regions. The following summaries are derived from U.S. Fish and Wildlife Service (2003). Status of Canada lynx in the Minnesota/Great Lakes region is summarized below. Outside of Minnesota in the Great Lakes region, lynx may also occur in Wisconsin and Michigan, but there is no current evidence of reproduction there and suitable habitat is limited and disjunct from occupied habitat in Minnesota and Canada (68 FR 40076-40101, July 3, 2003).

2.1.3.1. Minnesota/Western Great Lakes Region

In Minnesota, recent and historical lynx records are primarily in the northeastern part of the state, especially in the Northern Superior Uplands Ecological Section. Historically, this area was dominated by red pine (*Pinus resinosa*) and white pine (*P. strobus*) mixed with aspen (*Populus spp.*), paper birch (*Betula papyrifera*), spruce, balsam fir (*A. balsamifera*) and jack pine (*P. banksiana*) (Minnesota Department of Natural Resources [Minnesota DNR]

2003). Unlike elsewhere within the Great Lakes and Northeast regions, most lynx habitat in northeastern Minnesota is on public lands, particularly the Superior National Forest. Mixed deciduous-boreal forest suitable for lynx habitat encompasses most of the Superior National Forest, which has been mapped into Lynx Analysis Units to promote lynx management under the SNF Land and Resource Management Plan (USDA Forest Service 2004).

Harvest and bounty records for Minnesota, which are available since 1930, indicate approximate 10-year population cycles, with highs in 1940, 1952, 1962, and 1973 (Henderson 1977; McKelvey et al. 2000). Lynx abundance in Minnesota appears to be directly related to population levels in nearby Canada (Mech 1980) – based on trapping records, lynx abundance in Minnesota appears to lag fluctuations in Manitoba, Ontario, and Saskatchewan by about three years (McKelvey et al. 2000). During a 47-year period (1930–1976) before cessation of legal harvest, the Minnesota lynx harvest ranged from 0 to 400 per year (Henderson 1977) and lynx were captured in the state through periods presumed to represent both population highs and lows.

In the 1990s there were only five verified records of lynx in Minnesota (M. Don Carlos, Minnesota Department of Natural Resources, in litt. 1994; S. Loch, pers. comm. 2006). Beginning in about 2000, Minnesota lynx numbers evidently began to rebound. Genetic analyses of scat and hair samples collected primarily along lynx snow trails and tissue samples from dead specimens as well as live-captured lynx have confirmed presence of 81 unique lynx and 4 lynx-bobcat hybrids in Minnesota from 2002 through March 2006 (USDA FS, unpubl. data). An additional 18 lynx have been documented as part of an ongoing lynx study (S. Loch, pers. comm. 2006) for a total of at least 99 unique lynx confirmed in the state since 2002. This number represents only a subset of the actual number of lynx that have been present in the state since 2002, which is unknown. Lynx researchers have confirmed nine lynx dens in Minnesota by following the activities of radio-collared females in the years 2004-2006 (R. Moen, Natural Resources Research Institute, Duluth, MN, pers. comm. 2006).

Snowshoe hare harvest in Minnesota (the only available long-term index to hare abundance in the state) shows a very inconsistent pattern from 1941-2000. Hare abundance, as indicated by harvest, peaked in the early 1940s and 1950s along with lynx harvest, but not in the early 1950s or 1960s. In contrast, hare harvest was double any previous year from 1977-1980, yet lynx did not increase. Based on counts of hares made during spring grouse drumming surveys and mid-winter furbearer track surveys, snowshoe hare numbers are currently “near a peak”, but remain far below the numbers observed in the late 1970’s (J. Erb, Minnesota Department of Natural Resources, *in litt.* 2004).

Canada lynx may not be legally trapped in Minnesota, where they are a protected species, but at least thirteen lynx have been captured incidentally in recent years by trappers in pursuit of other species – five of these lynx died as a

result (U.S. Fish and Wildlife Service (USFWS), Bloomington, Minnesota, unpubl. data).

In previous biological opinions for federal actions that are ongoing in Minnesota, the Service anticipated various levels of take. These anticipated levels of take are described below, along with the actual recorded take that may be ascribed to each action. The Service monitors all known take and mortality of lynx in Minnesota in cooperation with the Forest Service.

- Up to two lynx per year, but no more than 20 in total, over the 15 years after the approval of the Revised Land and Resource Management Plans, Chippewa and Superior National Forests. These plans were approved in July 2004. Thus, the Service has anticipated that this take would occur between July 2004 and July 2019. Thus far, only one incidental take may be ascribed to the Forest Service's implementations of these plans – a lynx was killed by an automobile in April 2005 on the Superior National Forest.

- Trunk Highway 371 North, Federal Highway Administration – One over a 30 year period (2005-2035). Thus far, no take may be ascribed to this action.

- Trunk Highway 1, Federal Highway Administration – Up to three lynx, over a 30 year period (2005-2035). Thus far, no take may be ascribed to this action.

- Clean Water Act permit for the discharge of dredged or fill material into navigable waters by Northshore Mine, U.S. Army Corps of Engineers – One lynx during the ten year project period (2006-2015). Thus far, no take may be ascribed to this action.

Collectively, we anticipate that these actions would result in the take of approximately 2 lynx per year within their combined actions areas.

2.1.3.2. Northeast

As it did historically, the boreal forest of the Northeast currently exists primarily in Maine where habitat is currently optimal and a resident, breeding population of lynx occurs. Maine's lynx population is directly connected to substantive lynx populations and habitat in southeastern Quebec and New Brunswick. Lynx numbers in Maine apparently increased between 1999 and 2003, coinciding with regeneration of forest clearcut in the 1970's and 1980's and high numbers of lynx in nearby Quebec (Hoving et al. 2004). The potential exists for lynx to occur in New Hampshire because of its direct connectivity with Maine, and we presume they currently occur there. Lynx in Vermont have

always existed solely as dispersers. Lynx occurring in New York since 1900 have been dispersers.

2.1.3.3. Northern Rocky Mountains/Cascades

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. 2000). Most of the lynx occurrences are in the 1,500-2,000 meters (4,920-6,560 feet) elevation class (McKelvey et al. 2000). 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. A substantial proportion of the verified lynx occurrences in the United States and confirmed breeding 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.

2.1.3.4. Southern Rocky Mountains

It is unclear whether lynx in this region historically occurred as a resident population or if historic records were of periodic dispersers. If a resident lynx population occurred historically in the Southern Rocky Mountains, then this native population has been lost. Isolation from potential source populations may have led to the extirpation of lynx in this region. Although habitats in the Southern Rockies are far from source populations and more isolated, it is still possible that dispersers could arrive in the Southern Rocky Mountains during highs in the population cycle.

Colorado Division of Wildlife (CDOW) has released 218 lynx from Canada and Alaska in 1999, 2000, 2003, 2004, 2005, and 2006. As of August 2004, CDOW was tracking 85 of the released animals and had confirmed 56 mortalities. Researchers found six litters containing 16 kittens in 2003; 14 litters and 39 kittens in 2004; 18 litters with 50 kittens in 2005; and four litters containing 11 kittens in 2006. Although total litters found were down in 2006, CDOW documented the first litter produced by a female that was previously born in

Colorado. CDOW biologists reportedly estimate that there are currently about 200 lynx in Colorado (http://wildlife.state.co.us/NewsMedia/PressReleases/Press.asp?PressId=3993 accessed 8/23/06). Den sites have been scattered throughout Colorado and one den was in southern Wyoming (T. Shenk, in litt. 2004).

2.2. Gray wolf

Gray wolf populations in the United States are currently protected under the Act as a threatened species in Minnesota and endangered in the remaining 47 conterminous states and Mexico (50 CFR 17.11(h)). Within this broad area, there are separate regulations establishing non-essential experimental populations in the Northern Rocky Mountains and for the Mexican wolf (*C. lupus baileyi*) in Arizona and New Mexico (50 CFR 17.84(i), (k), and (n)).

On March 27, 2006, the Service published a proposed rule to establish the Western Great Lakes Distinct Population Segment (WGL DPS) of the gray wolf. This DPS includes all of Minnesota, Wisconsin, and Michigan; the eastern half of North Dakota and South Dakota; the northern half of Iowa; the northern portions of Illinois and Iowa; and the northwestern portion of Ohio. At that time the Service further proposed to remove the WGL DPS from the List of Endangered and Threatened Wildlife.

2.2.1. Species Description

Gray wolves are the largest wild members of the Canidae, or dog family, with adults ranging from 18 to 80 kilograms (kg) (40 to 175 pounds (lb)) depending upon sex and subspecies (Mech 1974). The average weight of male wolves in Wisconsin is 35 kg (77 lb) and ranges from 26 to 46 kg (57 to 102 lb), while females average 28 kg (62 lb) and range from 21 to 34 kg (46 to 75 lb) (Wisconsin Department of Natural Resources (WI DNR) 1999). Wolves' fur color is frequently a grizzled gray, but it can vary from pure white to coal black. Wolves may appear similar to coyotes (*Canis latrans*) and some domestic dog breeds (such as the German shepherd or Siberian husky) (*C. lupus familiaris*). Wolves' longer legs, larger feet, wider head and snout, and straight tail distinguish them from both coyotes and dogs.

2.2.2. Life History

Wolves primarily are predators of medium and large mammals. Wild prey species in Minnesota include white-tailed deer (*Odocoileus virginianus*), moose (*Alces alces*), beaver (*Castor canadensis*), snowshoe hare (*Lepus americanus*), and muskrat (*Ondatra zibethicus*), with small mammals, birds, and large

invertebrates sometimes being taken (Chavez and Gese 2005, Mech 1974, Stebler 1944, WI DNR 1999, Huntzinger et al. 2005).

Wolves are social animals, normally living in packs of 2 to 12 wolves. Winter pack size in Michigan's Upper Peninsula (UP) averaged from 2.7 to 4.6 wolves during the 1995 through 2005 period and ranged from 2 to 14 wolves per pack (Huntzinger et al. 2005). Pack size in Wisconsin is similar, averaging 3.8 to 4.1 wolves per pack, and ranging from 2 to 11 wolves in winter 2004– 2005 (Wydeven and Wiedenhoeft 2005). In Minnesota the average pack size found in the 1988–89, 1997–98, and 2003–2004 winter surveys was higher – 5.6, 5.4, and 5.3 wolves per pack, respectively (Erb and Benson 2004).

Packs are primarily family groups consisting of a breeding pair, their pups from the current year, offspring from one or two previous years, and occasionally an unrelated wolf. Packs typically occupy, and defend from other packs and individual wolves, a territory of 50 to 550 square kilometers (km^2) (20 to 214 square miles (mi^2)). Midwest wolf packs tend to occupy territories on the lower end of this size range. Michigan Upper Peninsula territories averaged 267 km^2 in 2000–2001 (Drummer et al. 2002), Wisconsin territories 37 mi^2 in 2004–2005 (Wydeven and Wiedenhoeft 2005), and Minnesota territory size averaged 102 km^2 in 2003–2004 (Erb and Benson 2004). Litters range from 1 to 11 pups, but generally include 4 to 6 pups (Michigan Department of Natural Resources (MI DNR) 1997). Normally a pack has a single litter annually, but the production of 2 or 3 litters in one year has been routinely documented in Yellowstone National Park (Smith et al. 2005).

2.2.3. Status and Distribution

Below we describe the status and distribution of the gray wolf within the proposed Western Great Lakes DPS. In the lower 48 states, an experimental population of gray wolf is also established in the Northern Rocky Mountain states of Idaho, Montana, and Wyoming and an experimental population of the Mexican wolf is established in Arizona and New Mexico. For a description of the status of gray wolves in the Northern Rocky Mountains and of the Mexican wolf, see USFWS et al. (2006) and Arizona Game and Fish Department et al. (2005).

2.2.3.1. Minnesota

Since 1997, Minnesota DNR has conducted two statewide surveys of wolf abundance and distribution. During these surveys, DNR queries staff of Federal, State, Tribal, and county land management agencies and wood products companies to identify occupied wolf range in Minnesota. DNR also uses data from radio telemetry studies representative of the entire Minnesota wolf range to determine average pack size and territory area. Those figures are then used to calculate a statewide estimate of wolf and pack numbers in the occupied

range, with single (non-pack) wolves factored into the estimate (Erb and Benson 2004).

The 1997–98 survey indicated that approximately 2,445 wolves existed in about 385 packs in Minnesota during that winter (Berg and Benson 1999). This figure indicated that the Minnesota wolf population had grown at an average rate of about 3.7 percent annually from 1970 through 1997–98. Between 1979 and 1989 the annual growth rate was about 3 percent and it increased to between 4 and 5 percent in the next decade (Berg and Benson 1999; Fuller et al. 1992). As of the 1998 survey, the number of wolves in Minnesota was approximately twice the goal for Minnesota, as specified in the Eastern Recovery Plan (USFWS 1992). Minnesota DNR conducted another survey of the State's wolf population and range during the winter of 2003–04, using similar methodology. That survey concluded that an estimated 3,020 wolves in 485 packs occurred in Minnesota. The 90 percent confidence interval for this estimate encompassed a range of 2,301-3,708 wolves. Due to the wide overlap in the confidence intervals for the 1997–98 and 2003–04 surveys, there was no statistically significant increase in the State's wolf population during that period (Erb and Benson 2004).

As wolves increased in abundance in Minnesota, they also expanded their distribution. During 1948–53, the major wolf range was estimated to be about 11,954 sq mi (31,080 sq km) (Stenlund 1955) – about 14 percent of the state. As of 2003-2004, wolf range in Minnesota may have stabilized and now covers about 40 percent of the state (Erb and Benson 2004).

2.2.3.2. Wisconsin

Wisconsin DNR intensively surveys its wolf population annually using a combination of aerial, ground, and satellite radio telemetry, complemented by snow tracking and wolf sign surveys (Wydeven et al. 1995, 2005). Wolves are trapped from May through September and fitted with radio collars, with a goal of having at least one radio-collared wolf in about half of the wolf packs in Wisconsin. Snow tracking is used to supplement the information gained from aerial sightings and to provide pack size estimates for packs lacking a radio-collared wolf. Tracking is done by assigning survey blocks to trained trackers who then drive snow-covered roads in their blocks and follow all wolf tracks they encounter. The results of the aerial and ground surveys are carefully compared to properly separate packs and to avoid over-counting (Wydeven et al. 2003). The number of wolves in each pack is estimated based on the aerial and ground observations made of the individual wolves in each pack over the winter.

Based on these methods, Wisconsin DNR estimated that the state contained 425 to 455 wolves in 108 packs in early 2005, representing a 14 percent increase from 2004 (Wydeven et al. 2005). Wisconsin wolf population estimates are conservative in two respects: they undercount lone wolves and the count is made

at the annual low point of the population. This methodology is consistent with the recovery criteria established in the 1992 Recovery Plan, which established numerical criteria to be measured with data obtained by late-winter surveys. Wisconsin population estimates for 1985 through 2005 increased from 15 to 425–455 wolves (see Table 1 above) and from 4 to 108 packs (Wydeven et al. 2005). This represents an annual increase of 21 percent through 2000, and an average annual increase of 11 percent for the most recent five years.

2.2.3.3. Michigan

The MI DNR annually monitors the wolf population in the Upper Peninsula by intensive late-winter tracking surveys that focus on each pack. The Upper Peninsula is divided into seven monitoring zones, and specific surveyors are assigned to each zone. Pack locations are derived from previous surveys, citizen reports, and extensive ground and aerial tracking of radio-collared wolves. During the winter of 2004–05 at least 87 wolf packs were resident in the Upper Peninsula (Huntzinger et al. 2005). A minimum of 40 percent of these packs had members with active radio-tracking collars during the winter of 2004–05 (Huntzinger et al. 2005). Care is taken to avoid double-counting packs and individual wolves, and a variety of evidence is used to distinguish adjacent packs and accurately count their members. Surveys along the border of adjacent monitoring zones are coordinated to avoid double-counting of wolves and packs occupying those border areas. In areas with a high density of wolves, ground surveys by 4 to 6 surveyors with concurrent aerial tracking are used to accurately delineate territories of adjacent packs and count their members (Huntzinger et al. 2005, Potvin et al. 2005). As with Wisconsin, the Michigan surveys likely miss many lone wolves, thus underestimating the actual population.

Annual surveys have documented minimum late-winter estimates of wolves occurring in the Upper Peninsula as increasing from 57 wolves in 1994 to 405 in 87 packs in 2005. The rate of annual increase has varied from year to year during this period, but there appears to be two distinct phases of population growth, with relatively rapid growth (about 25 percent per year from 1997 through 2000) and slower growth (about 14 percent from 2000 to the present time). Similar to Wisconsin, this may indicate a slowing growth rate as the population increases, although the 2005 late-winter population was up 13 percent from the previous year's estimated population (Huntzinger et al. 2005).

The wolf population of Isle Royale National Park, Michigan, is not considered to be an important factor in the recovery or long-term survival of wolves in the WGL DPS. This small and isolated wolf population cannot make a significant numerical contribution to gray wolf recovery, although long-term research on this wolf population has added a great deal to our knowledge of the species. The wolf population on Isle Royale has ranged from 12 to 50 wolves since 1959, and was 30 wolves in the winter of 2004–05 (Peterson and Vucetich 2005).

3. Analysis of the Species Likely to be Affected

As stated above, SNF concluded that the proposed action may affect and is likely to adversely affect gray wolf and Canada lynx. It also concluded that it may affect, but is not likely to adversely affect gray wolf critical habitat and we concurred with this determination. Thus, we do not address gray wolf critical habitat in the rest of the biological opinion.

4. 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 already undergone section 7 consultation, and the impacts of state and private actions which are contemporaneous with the consultations in progress. Such actions include, but are not limited to, previous timber harvests and other land management activities.

The action area includes FR 424 and its right-of-way, the portions of Stony Spur trail to be relocated, three existing gravel pits, and the two unauthorized roads to be decommissioned, which are immediately adjacent FR 424.

4.1. Status of the Species in the Action Area

4.1.1. Canada lynx

There is significant evidence of recent (i.e., post-2000) lynx activity along and within approximately 14 km (the approximate diameter of a lynx male home range, see above) of FR 424. An ongoing radio/GPS-collar study of lynx has documented intensive use of the area by approximately nine lynx (R. Moen, Natural Resources Research Institute, University of Minnesota, unpubl. data) and DNA analysis of scat collected while backtracking lynx has confirmed at least seven lynx within 14 km of FR 424 since 2003. The DNA data, combined with the radio/GPS-collar data indicates that at least ten lynx have been confirmed within 14 km of FR 424 since 2003 – an area equal to approximately 1058 km^2.

4.1.2. Gray wolf

Gray wolves have been well established in the action area for many years. In its biological assessment, SNF described the status of gray wolves in the Dunka Project Area, which contains the action area (Fig. 1). Three pack territories overlap with the Dunka Project Area, which contains abundant and well distributed foraging habitat and “many known/historically used den-sites” (M.

Nelson, U.S. Geological Survey-Biological Resources Division, pers. comms. 7/12/2005 and 6/15/06 *cited in* SNF 2006; USDA FS 2005). Snow-tracking surveys targeting lynx were conducted in 2004 in the Dunka Project Area and recorded gray wolf six times (USDA FS 2005).

4.2. Factors Affecting Species in the Action Area

Vehicle traffic on Forest Road 424 and snowmobile traffic may affect Canada lynx and gray wolf in the action area. As stated above, current vehicle traffic is approximately 130 vehicles per day. Current traffic speeds on FR 424 are 30-60 miles per hour and there is one 35 mph speed limit sign (R. Pekuri, USDA FS, pers. comm. 7/3/06 *cited in* USDA FS 2006a). Design speed is 45 mph on most of the current road alignment (USDA FS 2006b).

Conifer forest habitat suitable for both lynx and wolves lies immediately adjacent to the road shoulder of FR 424 throughout most of the action area. The U.S. Forest Service is the predominant landowner in and near the action area - over 87 percent of the land in the Dunka Project Area is in public ownership.

4.2.1. Canada lynx

Although not as well documented as for gray wolves (see below) road access to Canada lynx habitat likely increases the likelihood of human-related adverse effects, simply by increasing the number of humans present in the area. Human-related causes were confirmed for five of 11 lynx deaths in Minnesota among radio- and GPS-collared lynx in an ongoing study [trapping (2), automobile (1), shooting (1), and train (1), Moen et al. 2005:15). Of the remaining six, three died of unknown causes with suspected human involvement (Moen et al. 2005:15). Four additional lynx deaths have been confirmed in Minnesota due to collisions with vehicles on roads since the species was listed as threatened in 2000 (USFWS, Twin Cities Field Office, Bloomington, MN, unpubl. data). These deaths have occurred on a wide variety of roads with average daily traffic volume ranging from 19 to 19400 vehicles per day (USFWS, Twin Cities Field Office, Bloomington, MN, unpubl. data). Since 2000, all lynx road mortality (six animals) documented in Maine has occurred on logging roads (Maine Department of Inland Fisheries and Wildlife, unpubl. data). Most mortality occurred on two-lane haul roads that are open to the public and dominated by non-logging traffic. In Colorado nine lynx deaths due to vehicle collisions have been recorded since 1999 (two other lynx from Colorado were killed in adjacent states, K. Broderdorp et al., USFWS, *in litt.* 2006). As in Minnesota, estimated traffic volumes vary widely among roadkill locations, from 480 to 27,600 vehicles per day.

Lynx populations characteristically fluctuate during approximately 10-year cycles in response to changes in numbers of their primary prey, snowshoe hare. Hare numbers may have begun to decline in Minnesota in 2004 (Erb 2004). In

addition, lynx numbers in Minnesota may peak three years after harvest levels in nearby Canadian provinces and lynx harvest in Manitoba and Ontario may have reached a peak during the winter of 2002-2003 (McKelvey et al. 2000). Thus, reduced prey densities and reduced movement of lynx from Canada may soon affect lynx densities in the action area. This would likely be followed, however, by a cyclic increase within the next ten years.

4.2.2. Gray wolf

Road access to wolf habitat generally increases the risk of human-related mortality of wolves, due to various causes including shooting, trapping, and automobile (Mech et al. 1988; Fuller 1989; Mech 1989). In the action area, territories of wolf packs overlap FR 424 and wolves cross the road "regularly" (USDA FS 2006b). In a 1980-1986 study of wolves in north-central Minnesota, Fuller (1989) found that vehicle collisions accounted for approximately 11 percent of overall mortality, although other studies in the Midwestern U.S. have found automobile collisions to represent at much as 31 percent of overall mortality (Kohn et al. 2000) and as little as 4 percent (northeastern Minnesota, Mech 1977). The former study (Kohn et al. 2000) was conducted in an area that contained U.S. Highway 53 during an eastward expansion of wolves in Wisconsin.

Snowmobile use may also have physiological effects on wolves near the Stony Spur Trail (Creel et al. 2002).

5. Effects of the Proposed Action

Effects of the action are defined as "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with the actions, that will be added to the environmental baseline" (50 CFR §402.02). Direct effects are defined as the direct or immediate effects of the action on the species or its habitat. Direct effects result from the agency action, including the effects of interrelated and interdependent actions. Indirect effects are caused by or result from the agency action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the immediate footprint of the project area, but would occur within the action area as defined.

5.1. Direct and Indirect Effects

5.1.1. Gray Wolf

The proposed action will increase the likelihood of direct mortality by vehicle collision by increasing vehicular speeds. Wolves are known to use low-use roads (e.g., <10,000 vehicles/month, Whittington et al. 2004) for travel and, as stated above, wolves are known to cross roads in the action area.

Although wolves prefer to avoid roads and trails relative to undeveloped habitats (Whittington et al. 2004; Whittington et al. 2005) the traffic volume on FR 424 is too low to significantly affect wolf dispersal. Kohn et al. (2000) documented the precise locations of 37 wolf crossings of U.S. Highway 53 in Wisconsin and found that 81 percent of those crossings were made by dispersing wolves. Traffic volume on U.S. Highway 53 (4700 vehicles/day) was approximately 36 times the current traffic volume on FR 424. In their study wolves were most likely to cross the highway where visibility was relatively high – for example, where there was relatively little shrub cover at eye level – and where adjacent habitat was unfragmented by human-related disturbances, such as buildings, logging, and gravel pits (Frair 1999). Therefore, the extent of landscape fragmentation, not traffic volume on FR 424, is likely to be the predominant factor influencing the ability of wolves to move freely in the vicinity of the proposed action. In addition, the width of the reconstructed FR 424 (approximately 16.5 m, USDA FS 2006b:17) is unlikely to impede wolf movements. Mean road width at 19 wolf crossing locations on Wisconsin Highway 35 was 14.36 m (SD = 7.65) and was significantly wider than at randomly measured locations (Frair 1999).

To estimate the number and frequency of wolf-vehicle collisions as a result of the paving and reconstruction of FR 424, we will rely on the results of the Wisconsin study referred to above (Kohn et al. 2000). In that study three wolves were confirmed dead from automobile collisions in a 44-mile length of U.S. Highway 53 during a seven-year study period (Kohn et al. 2000) – i.e., approximately 0.01 wolves/mile/year. Even intensive studies, such as this one, are unlikely to document all road-related mortality and the proportion documented is typically unclear (Clarke et al. 1998). In the Wisconsin study (Kohn et al. 2000), the likelihood of detecting wolf-automobile collisions during the winter was probably very high because a biologist drove the road every day looking for signs of wolves crossing the road, but detection likelihood was probably low during the summer (E. Anderson, University of Wisconsin – Stevens Point, pers. comm. 11/29/06). The low incidence of road-kill and the study design does not allow for an estimate of the proportion of road-kill detected. We will assume that Kohn et al. (2000) documented 50-100% of the wolf mortalities due to automobile collision on Highway 53 during their study – i.e., that actual mortality was 0.01-0.02 wolves/mile/year.

Traffic volume on Highway 53 was 4700 vehicles/day (Kohn et al. 2000), whereas current traffic volume on FR 424 in the action area is about 130 vehicles/day. To estimate the post-construction frequency of wolf deaths due to automobile collisions on FR 424 we will make the following assumptions:

1. The probability of death due to automobile collision is directly proportional to traffic volume;

2. Post-construction traffic volume on FR 424 will approximately triple to 400 vehicles/day due to the opening of Polymet mine and/or other factors;
3. Traffic speeds will approximate those on Highway 53 during the study described above;
4. Wolf densities in the Wisconsin study area, where wolves were becoming reestablished during the study, were about 15 percent of the current estimated wolf densities in the proximity of FR 424 [0.006 wolves/square km in the Wisconsin study area (Kohn et al. 2000) vs. approximately 0.04 wolves/square km in the central Superior National Forest[1] (Mech 2006)];
5. The current probability of road mortality in the action area approaches zero.

Based on those assumptions, the paving of 10.4 miles of FR 424 would result in 0.06 to 0.1 road-killed wolf/year – about one every 10-16 years. Traffic speeds will likely be lower on the reconstructed FR 424 than on U.S. Highway 53 in the Wisconsin study area; thus, assumption #3 above may result in an overestimate of the potential road-kill that will be caused by the proposed action.

The loss of one wolf every 10-16 years to vehicle collision in the project area would have relatively minimal impacts on the population of wolves in Minnesota. This would represent the loss of less than one percent of the wolf population in the central Superior National Forest [as defined in Mech (2006)] once every 10-16 years and it would represent about 0.02 percent of all wolves in Minnesota (Erb and Benson 2004). In a worst-case scenario, a female with dependent pups could be killed, resulting in the potential loss of a litter of pups in addition to the adult. Mean litter size in northeastern Minnesota may be about four pups (Mech 1977). Therefore, the proposed action could result in a 0.2 percent decrease in the Minnesota wolf population, once every 10-16 years. This is unlikely to result in any appreciable effects on the survival of wolves in Minnesota.

5.1.2. Canada lynx

As stated above, lynx are also susceptible to being road-killed – since the species was listed as threatened in Minnesota in 2000, biologists have documented five road-killed lynx in the state on a wide variety of roads. One of the lynx was killed by an automobile on a gravel road with approximately one-tenth the traffic volume of FR 424 and a design speed of 30 mph (T. Catton, U.S. Forest Service, Ely, MN, pers. comm. 9/12/06). In addition, the close proximity of numerous lynx records near FR 424 indicates that there is some risk of lynx being killed on this road; the expected increase in traffic speed will raise that risk.

1 The "central Superior National Forest", as defined for this wolf study, includes approximately the eastern half of the action area.

As with wolves, numerous assumptions would have to be made to estimate the number of lynx that would likely be hit by vehicles as a result of reconstructing FR 424. For lynx, we do not have a study like that of Kohn et al. (2000) on which to base an estimate of the quantitative impact. Therefore, we will assume that lynx are equally susceptible to being killed by vehicles as are wolves and that the factors considered above for wolves will also determine the likely number of lynx killed, although we can use a different basis for estimating lynx density in the action area.

To estimate lynx density in the vicinity of FR 424, we assumed that there are approximately 1.3 females per male home range, based on weighted mean home ranges of 87 sq. km for males and 68 sq. km for females [studies summarized by Moen et al. (2006)] and assuming continuous and non-overlapping home ranges among males and females, respectively.[2] Therefore, we assume that there are 2.3 lynx per 87 sq. km (i.e., 1 male and 1.3 females in each male home range) – approximately 0.03 lynx/sq. km. Although data are insufficient to predict an absolute density of lynx in the vicinity of FR 424, this is likely a reasonable estimate. Lynx densities in the southern boreal forest (e.g., Minnesota) are similar to those found in the taiga (the core of lynx range) during times of hare scarcity (i.e., "less than 3 lynx/100 km^2, Mowat et al. 2000). For example, a well studied population in Washington maintained a density of 0.02-0.026/km^2 during a 7-year study period (Aubry et al. 2000). We would predict greater densities in the action area if we assumed some degree of overlap among female home ranges, as has been demonstrated (Mech 1980; Carbyn and Patriquin 1983). It is unclear, however, what degree of overlap is likely to occur in the action area and our assumption of continuous home ranges offsets the negative influence on the predicted density.

Based on the above assumptions regarding traffic volume, susceptibility to vehicle collisions, traffic speeds, lynx densities, and current likelihood of vehicle collisions, we estimate that the proposed action will result in about one lynx getting hit and killed by a vehicle on FR 424 every 10-20 years. The likely frequency of lynx-automobile collisions is slightly less than for wolves due to the lower predicted densities of lynx in the vicinity of FR 424.

Data are currently insufficient to accurately estimate lynx densities in Minnesota, but the assumptions used above to arrive at an estimate of one dead lynx every 10-20 years can also allow us to estimate the proportional impact to the lynx population. To estimate lynx density at 0.03/km^2 in the action area we assumed that lynx home ranges were continuous and non-overlapping within sexes – that is, female home ranges did not overlap with other female home ranges and were continuous across the landscape – we assumed the same for males. Lynx Analysis Units (LAU) and the Boundary Waters Lynx Refugium (BWLR) cover approximately 12,700 km^2 and represent the approximate area

[2] We could have used the home ranges found thus far for lynx in Minnesota, but the sample size is relatively low (i.e., two females – Moen et al. 2006).

occupied by lynx in and around the Superior National Forest. For the purposes of this analysis, we will assume that this is the approximate area occupied by lynx in Minnesota. There are areas within LAUs that are unsuitable for lynx, but lynx also occur in Minnesota beyond the area contained within LAUs and the BWLR, therefore, this may be a fair approximation of total lynx range in Minnesota (Fig. 2). If lynx occur throughout the area contained within LAUs and the BWLR at a density of 0.03/km^2, then there are approximately 381 lynx in this area. If one lynx is killed every 10-20 years, this would represent an approximate loss of 0.3 percent of the lynx population, once every 10-20 years.

5.2. Effects of Interrelated or Interdependent Actions

Interrelated actions are those that are a part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

We can think of no actions that would have effects on either species that have not already been addressed in the previous section.

5.3. 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 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.

Snowmobile use of the Stony Spur Trail in the action area may increase in the future (USDA Forest Service 2006b:22). Increased use of the trail may increase physiological stress in wolves in the vicinity of the trail (Creel et al. 2002) or may cause them to increasingly avoid the trail (Whittington et al. 2005). This does not mean that the wolves would avoid the trail entirely. In fact, they will probably sometimes travel on it, but they may use the areas near the trail disproportionately less than other areas in their territories.

All other future actions that are reasonably certain to occur in the action area and that may affect lynx or wolves will likely have some federal component that will require section 7 consultation. These include Forest Service actions and the potential development of Polymet mine.

6. Conclusion

After reviewing the current status of gray wolves and Canada lynx, the environmental baseline for the action area, the effects of the proposed FR 424 (Denley Road) Reconstruction and the cumulative effects, it is the Service's Opinion that the action, as proposed, is not likely to jeopardize the continued

existence of the gray wolf or the Contiguous United States Distinct Population of Canada lynx and is not likely to destroy or adversely modify designated critical habitat for gray wolves or Canada 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.

The measures described below are non-discretionary, and must be undertaken by the U.S. Forest Service so that they become binding conditions of any grant or permit issued to any applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The U.S. Forest Service has a continuing duty to regulate the activity covered by the incidental take statement. If the U.S. Forest Service (1) fails to assume and implement the terms and conditions or (2) fails to require any applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the U.S. Forest Service must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

1. Amount or Extent of Take Anticipated

In the attached biological opinion, we described the anticipated incidental take in terms of one wolf and one lynx killed by a vehicle as frequently as once every 10 years, respectively, on the 10.4 miles of FR 424 to be reconstructed.

2. Effect of the Take

In the attached biological opinion, we concluded that the anticipated incidental take would not jeopardize the continued existence of gray wolves in Minnesota or of the Contiguous United States Distinct Population Segment of Canada Lynx.

3. Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures (RPM) are necessary and appropriate to minimize take of gray wolves and Canada lynx.

1. Implement measures to reduce the likelihood of vehicle collisions with lynx and wolves on FR 424.

2. If the road is transferred to Lake and St. Louis Counties, work with the counties to reduce road-kill after the transfer is completed.

4. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the U.S. Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

RPM 1: Implement measures to reduce the likelihood of vehicle collisions with lynx and wolves on FR 424.

Term and Condition #1: Data are available on lynx road crossings from the existing lynx research study on and around the Superior National Forest that may be sufficient to identify factors that influence where lynx cross roads and highways (R. Moen, pers. comm., 10/23/06). Before construction, provide the Service with a plan to analyze these data to determine whether lynx behavior suggests actions that may reduce collisions with automobiles on FR 424.

Term and Condition #2: Wider areas of open, grassy vegetation may reduce lynx crossings near curves, where driver visibility is low. Therefore, after completion of the analysis described in Term and Condition #1, meet with the Service to agree on the width of maintained open/grassy areas within 200 meters of curves and to determine whether other conclusions of the analysis may be incorporated into the design of the reconstructed FR 424 to reduce take of lynx.

Term and Condition #3: Place "Caution!! Entering Wildlife Crossing Area" or similar signs where motorists enter any areas where lynx or wolf crossing may be most likely, based on the analysis described in Term and Condition #1.[3]

[3] Kohn et al. (2000) suggested that such signs would "have to be obvious and unique to catch and hold motorists' attention." They also recommended erecting "smaller, "reminder signs" at well-used crossing sites to keep motorists alert. To limit wolf mortality, they also suggested "Planting of grasses less desirable to deer in the right-of-way and quick removal of any deer killed by vehicles."

RPM 2: If the road is transferred to Lake and St. Louis Counties, work with the counties to reduce road-kill after the transfer is completed.

Term and Condition #1: Before transferring ownership or management of the road, develop an agreement or memorandum of understanding with Lake and St. Louis Counties that would allow the Forest Service to cooperate with the counties on measures that would reduce lynx and wolf deaths due to automobile collisions in the future. Such measures may include erecting warning signs in areas found to be important crossing areas for wolves or lynx (see below), roadside vegetation management, etc.

The Service believes that no more than one gray wolf and one Canada lynx will be incidentally taken once every ten and thirteen years, respectively as a result of the proposed action. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

5. Reporting Requirements

5.1. Any vehicle collisions with gray wolves or lynx must be reported within 30 days to U.S. Fish and Wildlife Service, Twin Cities Field Office, Bloomington, Minnesota (612/725-3548). These reports shall include all known information regarding the incident, including the species involved, date of incident, fate of the animal (e.g., dead), location of the carcass, geographic coordinates of the accident location, sex of the animal, and approximate age (i.e., adult, juvenile, yearling).

5.2. Ensure that there is a process in place to document the occurrence of any lynx or wolf road-kill incidents along the subject 10.4 miles of FR 424 until both species are removed from the list of endangered and threatened species. Develop and provide a description of this record-keeping process to USFWS, Twin Cities Field Office within 60 days of the receipt of this biological opinion. Data recorded and maintained for each incident shall include, at a minimum, the information required under requirement 5.1.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act, directs 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 programs, or to develop information.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their or their habitats, the Service requests notification of the implementation of any conservation recommendations.

- Study the effectiveness of any measures implemented as part of this action to limit automobile collisions with lynx or wolves (e.g., measures described above in Terms and Conditions).

- If highly used crossing areas for lynx or wolves are identified, we recommend the construction of fencing and crossings (e.g., underpasses) to prevent them from crossing the reconstructed/paved road segment in those areas. Some carnivores climb over (e.g., cougars, *Puma concolor*) or under (coyote) some road mitigation fencing (Clevenger et al. 2001). Thus, fencing should be constructed that would ensure that lynx would not climb under or over it – Parks Canada buried a fence along the Trans Canada Highway to prevent access to carnivores (Clevenger et al. 2001). Extensions at a right angle to the fence may deter climbing. Crossings may most effectively reduce mortality if they are placed at the end of any fencing, where wildlife-automobile collisions may be clustered in the absence of crossings at those locations. Also, wolves may be most likely to use crossings in areas of little human activity. Note that fencing and underpasses are not yet proven methods of reducing automobile collisions with lynx or wolves and some have suggested that overpasses may be more effective for wolves (Kohn et al. 2000). In addition, lynx in Alberta "used underpasses infrequently" and instead traveled up to 9 km to cross the Trans Canada Highway in unfenced section (Gibeau and Heuer 1996 *cited in* Cain et al. 2003). Maximizing height of underpasses and other factors might increase use of underpasses by lynx or wolves (Clevenger and Waltho 2000).

- Continue to look for opportunities to close roads to reduce the likelihood of wildlife mortality that might be directly or indirectly related to the roads. One lynx was killed on a forest road with measured average daily traffic of only 19 vehicles/day. Therefore, closure of even lightly used roads in some areas could reduce lynx mortality.

REINITIATION – CLOSING STATEMENT

This concludes formal consultation for the potential effects of the FR 424 (Denley Road) Reconstruction on the gray wolf in Minnesota and on the Contiguous United States Distinct Population Segment of Canada Lynx. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

LITERATURE CITED

Agee, J.K. 2000. Disturbance ecology of North American boreal forests and associated northern/mixed subalpine forests. Chapter 3. In L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, technical editors. Ecology and conservation of lynx in the United States. University Press of Colorado, Boulder.

Apps, C.D. 2000. Space-use, diet, demographics, and topographic associations of lynx in the southern Canadian Rocky Mountains: a study. Chapter 12. In L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, technical editors. Ecology and conservation of lynx in the United States. University Press of Colorado, Boulder

Aubry, K.B., G.M. Koehler, J.R. Squires. 2000. Ecology of Canada lynx in southern boreal forests. In Ruggiero, L.F., K.B Aubry, S.W. Buskirk, et al., tech. eds. Ecology and conservation of lynx in the United States. Gen. Tech. Rpt. RMRSGTR-30. Ogden, UT: U.S. Dept. Agriculture, Forest Service, Rocky Mountain Research Station.

Bailey, T.N., E.E. Bangs, M.F. Portner, J.C. Malloy, and R.J. McAvinchey. 1986. An apparent over exploited lynx population on the Kenai Peninsula, Alaska. Journal of Wildlife Management 50:279-290.

Berg, W.E., and S. Benson. 1999. Updated wolf population estimate for Minnesota, 1997-1998. Minnesota Department of Natural Resources Report. Grand Rapids, Minnesota. 14 p.

Beyer, D.E., B.J. Roell, and D.H. Lonsway. 2004. 2004 Survey of the gray wolf population in Michigan's Upper Peninsula. Unpublished report by Michigan DNR. Lansing, MI. 8 p.

Bittner, S.L., and O.J. Rongstad. 1982. Snowshoe hare and allies. In J.A. Chapman ,and G.A. Feldhamer, editors. Wild mammals of North America biology, management and economics. Johns Hopkins University Press, Baltimore, Maryland.

Brand, C.J., and L.B. Keith. 1979. Lynx demography during a snowshoe hare decline in Alberta. Journal of Wildlife Management 43:827-849.

Brand, C.J., L.B. Keith, and C.A. Fischer. 1976. Lynx responses to changing snowshoe hare densities in central Alberta. Journal of Wildlife Management 40:416-428.

Buskirk, S.W., L.F. Ruggiero, C.J. Krebs. 2000. Habitat fragmentation and interspecific competition: implications for lynx conservation. Chapter 4. In L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, technical editors. Ecology and

conservation of lynx in the United States. University Press of Colorado, Boulder.

Cain, A. T., V. R. Tuovila, D. G. Hewitt, and M. E. Tewes. 2003. Effects of a highway and mitigation projects on bobcats in Southern Texas. Biological Conservation [Biol. Conserv.]. 114:189-197.

Carbyn, L.N., and D. Patriquin. 1983. Observations on home range sizes, movement, and social organization of lynx (*Lynx canadensis)* in Riding Mountain National Park, Manitoba. Canadian Field Naturalist 97:262-267.

Chavez, A.S. and E.M. Gese. 2005. Food habits of wolves in relation to livestock depredations in northwestern Minnesota. Am. Midl. Nat. 154; 253-263.

Clarke, G. P., P. C. L. White, and S. Harris. 1998. Effects of roads on badger Meles meles populations in south-west England. Biological Conservation 86:117-124.

Clevenger, A.P., B. Chruszcz, and K. Gunson. 2001. Highway mitigation fencing reduces wildlife vehicle collisions. Wildlife Society Bulletin. 29: 646-653.

Clevenger, A.P. and N. Waltho. 2000. Factors Influencing the Effectiveness of Wildlife Underpasses in Banff National Park, Alberta, Canada. Conservation Biology 14:47-56.

Creel, S., J.E. Fox, A.Hardy, J. Sands, R. Garrott, and R. Peterson. 2002. Snowmobile activity and glucocorticoid stress responses in wild wolves and elk. Conservation Biology 16:809-814

Drummer, D.D., B. Huntzinger, J.S. Johnson, R.O. Peterson, M.J. Potvin, L.M. Vucetich, and J.A. Vucetich. 2002. Recovery of the gray wolf (Canis lupus) in Upper Michigan. 1999-2001. Final Report from MTU: for Michigan Dept. of Natural Resources Grant Amendment Number 149-01 and Pictured Rocks National Lakeshore Cooperative Agreement Number 1443 CA 682098001. 158 p.

Erb, J. 2004. Minnesota grouse and hares, 2004. Minnesota Department of Natural Resources, Grand Rapids, MN. 1 p.

Erb, J., and S. Benson. 2004. Distribution and abundance of wolves in Minnesota, 2003-2004. Minnesota Department of Natural Resources. 5 p.

Frair, J.L. 1999 Crossing paths: gray wolves and highways in the Minnesota-Wisconsin border region. M.S. Thesis, University of Wisconsin - Stevens Point, Stevens Point, Wisconsin.

Fuller, T. K. 1989. Population dynamics of wolves in north-central Minnesota. Wildlife Monographs 105:1-41.

Fuller, T. K., W. E. Berg, G. L. Radde, M. S. Lenarz, and G. B. Joselyn. 1992. A history and current estimate of wolf distribution and numbers in Minnesota. Wildlife Society Bulletin 20:42-55.

Fuller, T. K., and D. M. Heisey. 1986. Density-related changes in winter distribution of snowshoe hares in northcentral Minnesota. Journal of Wildlife Management 50:261-264.

Gibeau, M.L. and K. Heuer. 1996. Effects of transportation corridors on large carnivores in the Bow River Valley, Alberta. In: G.L. Evink, P. Garrett, D. Zeigler and J. Berry, Editors, Proceedings of the Transportation related Wildlife Mortality Seminar (FL-ER-58-96), Florida Department of Transportation, Tallahassee, Florida.

Henderson, C. 1977. Minnesota 1977 Canada lynx status report. Report by the Minnesota Department of Natural Resources. 23 p.

Hoving, C.L. 2001. Historical occurrence and habitat ecology of Canada lynx (*Lynx canadensis*) in eastern North America. M.S. Thesis, University of Maine.

Hoving, C. L., D. J. Harrison, W. B. Krohn, W. J. Jakubas, and M. A. McCollough. 2004. Canada lynx *Lynx canadensis* habitat and forest succession in northern Maine, USA. Wildlife Biology [Wildl. Biol.]. 10:285-294.

Hoving, C. L., D. J. Harrison, W. B. Krohn, R. A. Joseph, and M. O'Brien. 2005. Broad-scale predictors of Canada lynx occurrence in eastern North America. Journal of Wildlife Management 69:739-751.

Huntzinger, B., J.A. Vucetich, T.D. Drummer, and R.O. Peterson. 2005. Wolf recovery in Michigan, 2005 annual report. Michigan Technological University, Houghton, MI. 39 p.

Koehler, G.M. 1990. Population and habitat characteristics of lynx and snowshoe hares in north-central Washington. Canadian Journal of Zoology 68:845-851.

Koehler, G.M., and K.B. Aubry. 1994. Chapter 4: Lynx. Pages 74-98 in American Marten, Fisher, Lynx, and Wolverine in the Western United States, L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, L.J. Lyon, W.J. Zielinski, editors. U.S. Forest Service, General Technical Report RM-251.

Koehler, G.M., and J.D. Brittell. 1990. Managing spruce-fir habitat for lynx and snowshoe hares. Journal of Forestry 88:10-14.

Kohn, B.E., J.L. Frair, D. E. Unger, T. M. Gehring, D. P. Shelley, E. M. Anderson, and P. W. Keenlance. Impacts of the US Highway 53 expansion project on wolves in northwestern Wisconsin. Wisconsin Department of Transportation. 55 p.

McCord, C.M., and J.E. Cardoza. 1982. Bobcat and lynx. In J.A. Chapman and G.A. Feldhamer, editors. Wild mammals of North America biology, management and economics. Johns Hopkins University Press, Baltimore, Maryland.

McKelvey, K.S., K.B. Aubry, Y.K. Ortega. 2000. History and distribution of lynx in the contiguous United States. Chapter 8. In L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, technical editors. Ecology and conservation of lynx in the United States. University Press of Colorado, Boulder.

Mech, L.D. 1974. Canis lupus. Mammalian spec. No. 37. Am. Soc. Mammal. 6 p.

Mech, L. D. 1977. Productivity, mortality and population trend of wolves in northeastern Minnesota. Journal of Mammalogy [J. Mammal.]. 58:559-574.

Mech, L.D. 1980. Age, sex, reproduction, and spatial organization of lynxes colonizing northeastern Minnesota. Journal of Mammalogy 61:261-267.

Mech, L. D. 1989. Wolf population survival in an area of high road density. American Midland Naturalist 121:387-389.

Mech, L. D. 2006. Wolf numbers in the central Superior National Forest, Winter 2005-2006. USGS - Biological Resources Division, St. Paul, MN. 4 p.

Mech, L. D., S. H. Fritts, G. L. Radde, and W. J. Paul. 1988. Wolf distribution and road density in Minnesota. Wildlife Society Bulletin 16:85-87.

Minnesota Department of Natural Resources. 2003. Field Guide to the Native Plant Communities of Minnesota: The Laurentian Mixed Forest Province. Ecological Land Classification Program, Minnesota County Biological Survey, and Natural Heritage and Nongame Research Program, MNDNR. St. Paul, MN. 352 p.

Moen, R., G. Niemi, C. Burdett, and L. D. Mech. 2004. Canada lynx in the Great Lakes region. Natural Resources Research Institute, University of Minnesota, Duluth, MN. 29 p.

Moen, R., G. Niemi, C. L. Burdett, and L. D. Mech. 2006. Canada lynx in the Great Lakes region: 2005 annual report to USDA Forest Service and MN Cooperative Fish and Wildlife Research Unit and Minnesota Department of Natural Resources. in. Natural Resources Research Institute, Duluth, MN. 28 p.

Monthey, R.W. 1986. Responses of snowshoe hares, *Lepus americanus*, to timber harvesting in northern Maine. Canadian Field Naturalist 100:568-570.

Mowat, G., K.G. Poole, and M. O'Donoghue. 2000. Ecology of lynx in northern Canada and Alaska. Chapter 9. In L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, technical editors. Ecology and conservation of lynx in the United States. University Press of Colorado, Boulder.

Nellis, C.H., S.P. Wetmore, and L.B. Keith. 1972. Lynx-prey interactions in central Alberta. Journal of Wildlife Management 36:320-329.

O'Donoghue, M., S. Boutin, C.J. Krebs, D.L. Murray, and E.J. Hofer. 1998. Behavioural responses of coyotes and lynx to the snowshoe hare cycle. Oikos 82:169-183.

Peterson, R.O., and J.A. Vucetich. 2005. Ecological studies of wolves on Isle Royale – Annual report 2004-2005. Unpublished report by School of Forest Resources and Environmental Science, Michigan Technological University, Houghton, Michigan. 16 p.

Pietz, P. J., and J. R. Tester. 1983. Habitat selection by snowshoe hares in north central Minnesota. Journal of Wildlife Management 47:686-696.

Poole, K.G. 1994. Characteristics of an unharvested lynx population during a snowshoe hare decline. Journal of Wildlife Management 58:608-618.

Poszig, D., C. D. Apps, and A. Dibb. 2004. Predation on two mule deer, Odocoileus hemionus, by a Canada lynx, Lynx canadensis, in the southern Canadian Rocky Mountains. The Canadian Field-Naturalist 118:191-194.

Potvin, M. J., T. D. Drummer, J. A. Vucetich, D. E. Beyer, R. O. Peterson, and J. H. Hammill. 2005. Monitoring and Habitat Analysis for Wolves in Upper Michigan. Journal of Wildlife Management 69:1660-1669.

Quinn, N., W.S., and G. Parker. 1987. Lynx. Pages 683-694 in M. Novak, J. A. Baker, M. E. Obbard, and B. Malloch, editors. Wild Furbearer Management and Conservation in North America. Ontario Ministry of Natural Resources, Toronto, ON.

Saunders, J. K. 1963. Food habits of the lynx in Newfoundland. Journal of Wildlife Management 27:384-390.

Slough, B.G., and G. Mowat. 1996. Population dynamics of lynx in a refuge and interactions between harvested and unharvested populations. Journal of Wildlife Management 60:946-961.

Smith, D.W., D.R. Stahler, and D.S. Guernsey. 2005. Yellowstone Wolf Project: Annual Report, 2004. National Park Service, Yellowstone Center for Resources, Yellowstone National Park, Wyoming. 18 p.

Squires, J.R., and T. Laurion. 2000. Lynx home range and movements in Montana and Wyoming: preliminary results. Chapter 11. In L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, technical editors. Ecology and conservation of lynx in the United States. University Press of Colorado, Boulder.

Staples, W.R. 1995. Lynx and coyote diet and habitat relationships during a low hare population on the Kenai Peninsula, Alaska. Unpublished M.S. Thesis, University of Alaska, Fairbanks.

Stebler, A.M. 1944. The status of the wolf in Michigan. J. Mammal. 25(1):37-43.

Stenlund, M. H. 1955. A field study of the timber wolf (Canis lupus) on the Superior National Forest, Minnesota. in. Minnesota Department of Conservation, St. Paul, MN. 55 p.

Thompson, I. D., I. J. Davidson, S. O'Donnell, and F. Brazeau. 1989. Use of track transects to measure the relative occurrence of some boreal mammals in uncut forest and regeneration stands. Canadian Journal of Zoology/Revue Canadien de Zoologie 67:1816-1823.

USDA Forest Service. 1999. Canada lynx conservation assessment and strategy. USDA Forest Service, Washington, D.C.

USDA Forest Service. 2004. Land and resource management plan: Superior National Forest. Forest Service, Eastern Region, Milwaukee, WI.

USDA Forest Service. 2005a. Dunka Project Biological Assessment, Superior National Forest, Ely, MN.

USDA Forest Service. 2006a. Draft environmental assessment - Forest Road 424 (Denley Road) Reconstruction. Kawishiwi Ranger District, Superior National Forest, St. Louis and Lake Counties, MN. 10 p.

USDA Forest Service. 2006b. Forest Road 424 (Denley Road) Reconstruction Project Biological Assessment. Kawishiwi Ranger District, Superior National Forest, Ely, MN. 41 p.

USDA Forest Service and U.S. Fish and Wildlife Service. 2000. Canada lynx conservation agreement between the Fish and Wildlife Service and the Forest Service. U.S. Forest Service Agreement Number 00-MU-11015600-013. U.S. Fish and Wildlife Service, Denver, Colorado.

U.S. Fish and Wildlife Service, Arizona Game and Fish Department, New Mexico Department, of Game and Fish, USDA-APHIS Wildlife Services, US Forest Service, and White Mountain Apache Tribe. Mexican Wolf Recovery Program: Progress Report #8. Reporting Period: January 1 – December 31, 2005. 43 p.

U.S. Fish and Wildlife Service, Nez Perce Tribe, National Park Service, Montana Fish, Wildlife & Parks, Idaho Fish and Game, and USDA Wildlife Services. 2006. Rocky Mountain Wolf Recovery 2005 Annual Report. C.A. Sime and E. E. Bangs, eds. USFWS, Ecological Services, 585 Shepard Way, Helena, Montana. 59601. 130p.

van Zyll de Jong, C.G. 1966. Food habits of the lynx in Alberta and the Mackenzie District, North West Territories. Canadian Field Naturalist 80:18-23.

Ward, R., and C.J. Krebs. 1985. Behavioural responses of lynx to declining snowshoe hare abundance. Canadian Journal of Zoology 63:2817-2824.

Whittington, J., C. C. St. Clair, and G. Mercer. 2004. Path Tortuosity and the Permeability of Roads and Trails to Wolf Movement. Ecology and Society [Ecol. Soc.]. 9: Wilson, D.E., and D.M. Reeder. 1993. Mammal species of the world. Smithsonian Institution Press, Washington, DC.

Whittington, J., C. Clair, and G. Mercer. 2005. Spatial responses of wolves to roads and trails in mountain valleys. Ecological Applications [Ecol. Appl.]. 15:543-553.

Wirsing, A. J., T. D. Steury, and D. L. Murray. 2002. A demographic analysis of a southern snowshoe hare population in a fragmented habitat: evaluating the refugium model. Canadian Journal of Zoology/Revue Canadienne de Zoologie [Can. J. Zool./Rev. Can. Zool.]. 80:169-177.

Wisconsin Department of Natural Resources. 1999. Wisconsin wolf management plan - October 27, 1999. Madison, WI 74 p.

Wolfe, M.L., N.V. Debyle, C.S. Winchell, T.R. McCabe. 1982. Snowshoe hare cover relationships in northern Utah. Journal of Wildlife Management 49:662-670.

Wydeven, A.P., R.N. Schultz, and R.P. Thiel. 1995. Monitoring of a recovering gray wolf population in Wisconsin, 1979-1991. p. 147-156 in Carbyn, L.N., S.H. Fritts, and D.R. Seip. 1995. Ecology and conservation of wolves in a changing world. Canadian Circumpolar Institute, Occasional Publication No. 35. Edmonton, Alberta. 642 p.

Wydeven, A.P., and J.E. Wiedenhoeft. 2005. Status of the Timber Wolf in Wisconsin Performance Report 1 July 2004 through 30 June 2005. Bureau of Endangered Resources: Wisconsin Department of Natural Resources. 33 p.

Wydeven, A.P., J.E. Wiedenhoeft, R.N. Schultz, R.P. Thiel, S.R. Boles, W.H. Hall, Jr E., and Heilhecker. 2003. Progress report of wolf population monitoring for the period October 2002 – March 2003. Unpublished report by Wisc. Dept. Natural Resources, Park Falls, WI. 48 p.

Wydeven, A.P., J.E. Wiedenhoeft, R.N. Schultz, R.P. Thiel, S.R. Boles, E. Heilhecker, and W.H.Hall, Jr. 2005a. Progress report of wolf population monitoring for the period October 2004 – March 2005. Unpublished report by Wisc. Dept. Natural Resources, Park Falls, WI. 39 p.

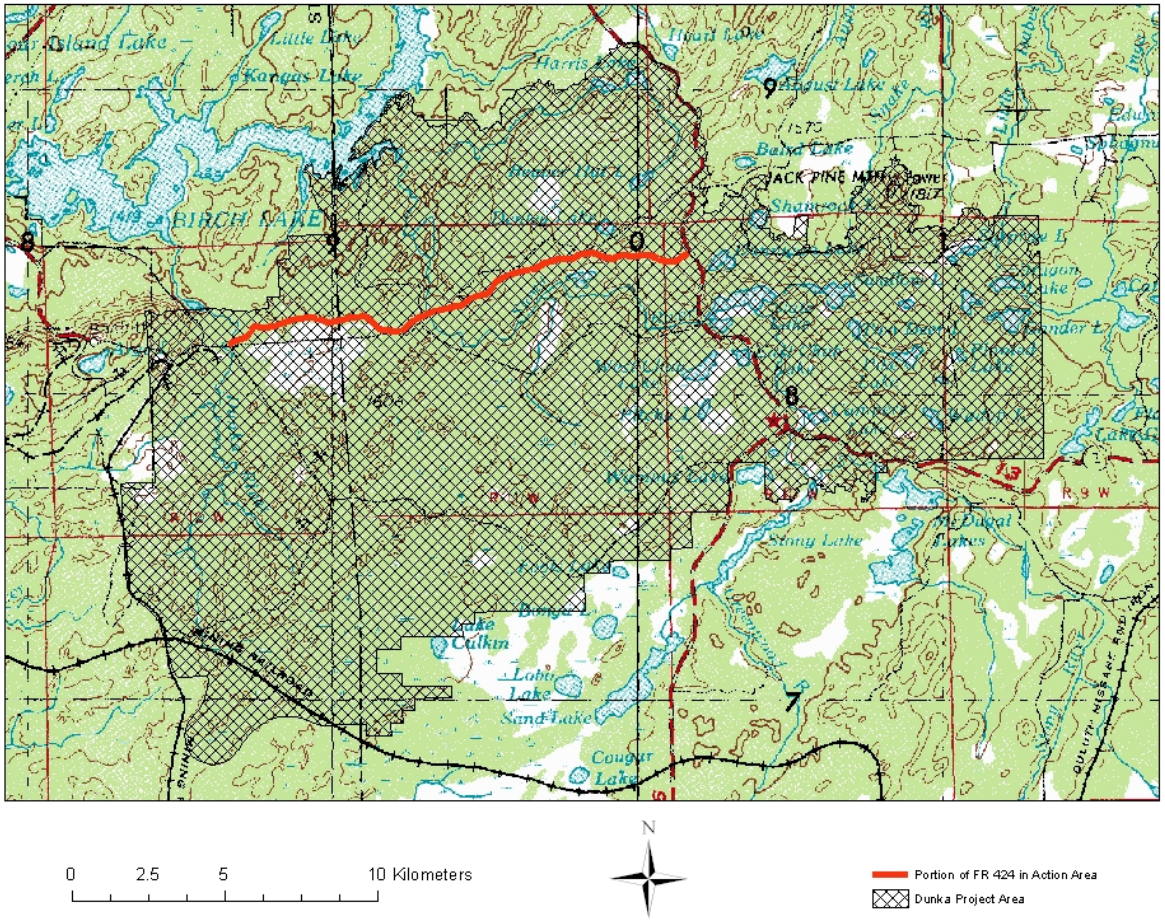

Figure 1. Location of Dunka Project Area relative to the portion of Forest Road 424 to be reconstructed.

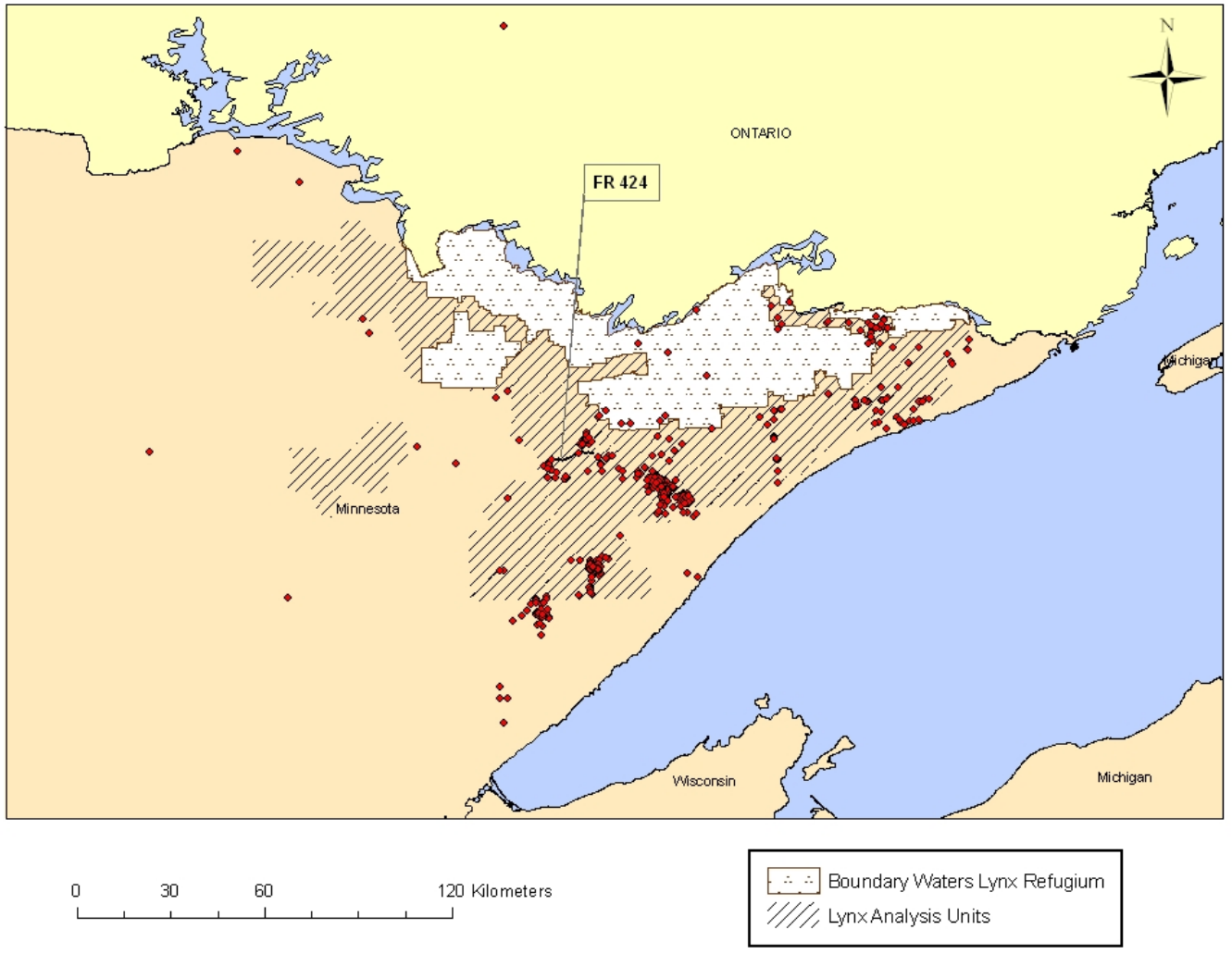

Figure 2. Lynx analysis units, the Boundary Waters lynx refugium, and recorded locations of lynx (radio- and GPS-collar and DNA records) relative to the action area (Forest Road 424).