

12/22/04

Mr. Kevin Kliethermes
Construction and Contract Administration Engineer
Federal Highway Administration
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St. Paul, Minnesota 55101-2904

Dear Mr. Kliethermes:

This responds to your July 13, 2004, letter regarding the proposed upgrade of a segment of Trunk Highway (TH) 1, in Lake County, Minnesota. By your letter, you requested to enter into formal consultation with the U.S. Fish and Wildlife Service (Service), under section 7 of the Endangered Species Act (Act) of 1973, as amended, following your determination that this action may affect Canada lynx (*Lynx canadensis*), a federally-threatened species. In addition, you requested concurrence with your determination that this action may affect, but is not likely to adversely affect bald eagle (*Haliaeetus leucocephalus*) and gray wolf (*Canis lupus*), both federally-threatened species in Minnesota.

The bald eagle and the gray wolf are present in the project vicinity. However, the Federal Highway Administration (FHWA) has made the determination that the proposed action may affect, but is not likely to adversely affect either the bald eagle or the gray wolf. The Service concurs with that determination. This precludes further action as required under section 7 of the Act for the bald eagle and the gray wolf. However, if new information indicating that the bald eagle or the gray wolf may be affected in a manner not previously considered, consultation must be reinitiated.

This document transmits the Service's final biological opinion (enclosed) based on our review of the TH 1 project and its effects on the Canada lynx in accordance with section 7 of the Act. A complete administrative record of this consultation is on file in this office.

We appreciate this opportunity to provide this information for your planning purposes. Please contact Mr. Paul Burke, of this office, by calling (612) 725-3548, at extension 20, if you have any questions or if we can be of further assistance.

Sincerely,

Dan P. Stinnett
Field Supervisor

cc: David Holmbeck
Minnesota Department of Natural Resources
Grand Rapids, MN

Kimberly Sannes
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Duluth, MN

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BIOLOGICAL OPIONION
Trunk Highway 1
Lake County, Minnesota
(S.P. 3801-13, 3801-18, 3801-19, 3802-18, 3802-20)
Federal Highway Administration
Saint Paul, Minnesota

December 22, 2004
U. S. FISH AND WILDLIFE SERVICE
TWIN CITIES FIELD OFFICE
BLOOMINGTON, MINNESOTA

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I. BIOLOGICAL OPINION

Introduction

This document transmits the Fish and Wildlife Service's (Service) Biological Opinion (Opinion) based on our review of the proposed reconstruction of Trunk Highway 1 (TH 1) located in Lake County, Minnesota, and its effects on the Canada lynx (*Lynx canadensis*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended. The Federal Highway Administration's (FHWA) July 13, 2004, request for formal consultation was received on July 15, 2004. There was one project planning delay caused by design reconsiderations, from September through October of 2004, which temporarily delayed this consultation.

The Opinion is based on information provided in the Biological Assessment, the project proposal, regular telephone conversations with project biologist Jason Alcott, project engineer Kimberley Sannes, three field investigations, and other sources of information. A complete administrative record of this consultation is on file at the Office of Environmental Services, Minnesota Department of Transportation, St. Paul, Minnesota and at the Service's Twin Cities Field Office.

The bald eagle and the gray wolf are present in the project vicinity. However, the Service has concurred with the FHWA determination that the proposed action may affect, but is not likely to adversely affect either the bald eagle or the gray wolf. This precludes further action as required under section 7 of the Act for the bald eagle and the gray wolf. However, if new information indicates that the subject action may cause adverse effects to bald eagle or gray wolf, consultation must be reinitiated.

The Canada lynx has recently expanded its range and it has begun to re-occupy former habitats in the Spruce-Fir Forest Section of the Laurentian Mixed Forest Province (Bailey 1995) in Minnesota. Projects that modify existing conditions have come under closer scrutiny for potential impacts to Canada lynx. Highway reconstruction projects that result in significantly wider rights-of-way and higher vehicle speeds may affect the Canada lynx due to vehicle collisions. Information reviewed by the Service indicates that the Canada lynx is present in the project area and that adverse effects to this species are likely.

Consultation History

On July 13, 2004, the FHWA sent a letter to the Service requesting to enter into formal consultation under section 7 of the Act following a determination that the reconstruction of TH 1 may affect the Canada lynx (*Lynx canadensis*), a federally-listed threatened species. In addition, the FHWA requested concurrence with the determination that the TH 1 project may affect, but is not likely to adversely affect the bald eagle (*Haliaeetus leucocephalus*) and the gray wolf (*Canis lupus*), which are both federally-listed threatened species in Minnesota.

The FHWA and the Mn/DOT have provided complete coordination with the Service on this project. The Service has attended meetings with project staff and conducted on-site reviews of the preliminary project plan on several occasions. In addition, frequent direct

communication through telephone and electronic mail contacts has been afforded throughout the planning phases for this project.

II. DESCRIPTION OF THE PROPOSED ACTION

The Federal Highway Administration (FHWA), of the U.S. Department of Transportation and the Minnesota Department of Transportation (Mn/DOT) are proposing to reconstruct and improve a segment of Minnesota Trunk Highway (TH) 1 from the South Kawishiwi River Bridge to County State Aid Highway 2 in Lake County, Minnesota (Appendix 1). The scope of the proposed action will result in further habitat fragmentation and road hazards within the known range of the Canada lynx.

Trunk Highway 1 extends across northern Minnesota from Illgen City in Lake County, Minnesota, to the North Dakota border. Trunk Highway 1 is a key route through the Superior National Forest for recreational, residential, and commercial travelers, as well as bicyclists. This segment of TH 1 passes through approximately 12.0 miles of Superior National Forest, 1.6 miles of the Bear Island State Forest, and 1.1 miles of privately owned lands. Currently within the project area, TH 1 is a rural two-lane roadway that averages approximately 24 feet in width with little to no shoulder or ditches, and varying side slopes that are often steep and heavily timbered. Wetlands, rock outcroppings, and mature forest cover exist in close proximity to the roadway.

The proposed project consists of reconstructing 14.7 miles of TH 1 from the South Kawishiwi River Bridge (inclusive) to County State Aid Highway 2 in Lake County, Minnesota. The project will result in a strengthened roadbed, improved drainage, and increased safety from softened horizontal and vertical curves. In addition, the project includes replacement of bridges over both the Kawishiwi and Stony Rivers. The reconstructed roadway will have a frost-free sub-grade and be constructed as a 10-ton road to support commercial traffic.

Currently, TH 1 from South Kawishiwi River to TH 2 is a two lane highway with narrow right-of-way and posted speed limits that are at or below 45 miles per hour; there are more than 17 locations with substantially reduced posted speed limits. The proposed improvements will result in expanded right-of-way widths, straightened curves, leveled vertical gradients, and posted speed limits of up to 45 miles per hour. This in turn, is likely to result in higher average vehicle speeds, and over the life of the project, will moderately increase the number of vehicles per day.

III. STATUS OF THE SPECIES

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 upper side). The lynx's long legs and large, well-furred paws make it highly adapted for hunting in deep snow.

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).

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 (S. Williams, Texas Tech University, pers. comm. 1994). Other scientific names still in use include *Felis lynx* or *F. lynx canadensis* (Jones et al. 1986; Tumlison, 1987).

In 1998, the lynx was proposed for listing as a threatened species under the Act (63 FR, July 8, 1998). The lynx in the contiguous U.S. were listed as threatened effective April 23, 2000 (65 FR 16052, March 24, 2000). The Service identified one distinct population segment in the lower 48 states. No critical habitat has been designated for the threatened population of Canada lynx in the contiguous United States. A court order issued on January 15, 2004, however, requires the Service to propose critical habitat by November 2005.

Life History

Lynx require large areas containing boreal forest habitat¹. In the northeastern U.S., lynx were most likely to occur in areas containing suitable habitat that were greater than 100 square kilometers (km², Hoving 2001). The requirement for large areas also is demonstrated by home ranges that encompass many square miles. Lynx home range size varies with sex, age, density of snowshoe hares (*Lepus americanus*), season, and the density of lynx populations (Ward and Krebs 1985; Hatler 1988; Koehler 1990; Poole 1994; Slough and Mowat 1996; Aubry et al. 2000; Mowat et al. 2000). Based on a limited number of studies in southern boreal forest, the average home range is 151 km² (58 mi²) and 72 km² (28 mi²) for males and females, respectively (Aubry et al. 2000). Recent home range estimates from Maine are 70 km² (27 mi²) for males and 52 km² (20 mi²) for females (G. Matula, in litt. 2003). Documented home ranges in both the southern and northern boreal forest, however, vary widely from 8 to 800 km² (3 to 300 mi²) (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; Squires et al. 2001; 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).

Long-distance movements (greater than 100 kilometers) are characteristic of lynx (Mowat et al. 2000). Such movements are most likely to occur when hare densities are declining (Ward and Krebs 1985; Koehler and Aubry 1994; O'Donoghue et al. 1997; Poole 1997). These movements may consist of a series of relatively short distance movements between patches of relative hare abundance (Ward and Krebs 1985) or, if prey are abundant

¹ The term "boreal forest" broadly encompasses most of the vegetative descriptions of this transitional forest type that makes up lynx habitat in the contiguous U.S. (Agee 2000).

nowhere, a search for such patches. Long-distance movement may decline as prey densities stabilize (Ward and Krebs 1985). Subadult lynx also disperse even when prey is abundant (Poole 1997), presumably as an innate response to establish home ranges away from their natal area. Lynx also make exploratory movements outside their home ranges (Squires et al. 2001) and are capable of moving extremely long distances (greater than 500 km (300 mi)) (Mech 1977; Brainerd 1985; Washington Department of Wildlife 1993; Poole 1997; Mowat et al. 2000; Squires et al. 2001).

Snowshoe hares are the primary prey of lynx, especially in the winter when they comprise 35-97 percent of the diet (Koehler and Aubry 1994). Lynx are capable of switching to alternate prey and may modify hunting behavior when hare densities are low (O'Donoghue et al. 1998a). Other prey species include red squirrel (*Tamiasciurus hudsonicus*), other small mammals (e.g., *Microtus*), and birds; lynx also eat carrion and, uncommonly, large mammals such as deer (*Odocoileus virginianus*), 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. 1998a, b). Where hare populations are cyclic, their densities fluctuate in response to food availability and predation by a suite of predators, including lynx. When hare density declines, birthrates and litter sizes of female lynx, including yearlings, and survival of their kittens decreases (Nellis et al. 1972; Brand et al. 1976; Brand and Keith 1979; Poole 1994; Slough and Mowat 1996; O'Donoghue et al. 1997; Inchausti and Ginzburg 2002; Steury and Murray 2004). The reduction in production and survival of young is the primary cause of population declines in lynx. Lynx reproduction "virtually ceases at the low point of the cycle" (Quinn & Parker 1987) and recruitment of kittens may only occur during 4-5 years of the cycle when hare populations are high (Poole 1994). When hare populations are low, most kittens may die in the uterus or shortly after birth (Poole 1994). Hare densities of at least 0.5/ha may be necessary to support a resident lynx population (Ward and Krebs 1985) and persistence of a population may only be ensured with hare densities greater than 1.1hares/ha (Steury and Murray 2004). Even at those densities, however, high adult mortality or dispersal could erode the likelihood of population persistence (Steury and Murray 2004).

Population dynamics of southern populations of snowshoe hare are poorly understood relative to those in northern latitudes (Hodges 2000b, Murray 2000). There is some evidence that populations in Minnesota also undergo distinct fluctuations over a 10-15 year period (Fuller & Heisey 1986), although it is not yet clear whether snowshoe hare populations in Minnesota are able to reproduce at rates sufficient to support persistent lynx populations in the state. Lynx rely on alternative prey (e.g., red squirrels, O'Donoghue et al. 1998b) during hare population lows. Therefore, the ability to capture such alternate prey may be important in determining the persistence of lynx where hare populations are consistently low.

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 to escape predators, and thermal protection during extreme weather (Wolfe et al. 1982; Pietz & Tester 1983; Fuller & Heisey 1986; Pietz & Tester 1983; Monthey 1986; Koehler and Aubrey 1994; Wirsing et al. 2002). Hares require dense vegetation up to

about 30 cm to be hidden from terrestrial predators and may feed on vegetation up to about 45 cm when standing on their hind legs (Rouleau et al. 2002). Early successional forest stages generally have greater understory structure than do mature forests and therefore support higher hare densities (Pietz & Tester 1983; Hodges 2000a, b). It may take several years for conditions to become suitable for hares after disturbances, such as clearcuts and fire; such areas may not be optimal until 20-30 years after the initial disturbance (Monthey 1986; Koehler and Brittell 1990). Openings in mature forests with dense understory (e.g., some fens in north-central Minnesota, Pietz & Tester 1983) also provide high-quality hare habitat (Buskirk et al. 2000).

Although lynx depend greatly on the availability of hares and, thus, hare habitat (see above), habitat for denning in proximity is also necessary. Lynx use coarse woody debris, such as downed logs (e.g., from windthrow in mature forests), root wads, and deadfalls (e.g., in burned areas), 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). Mowat et al. (2000) summarized lynx selection of den sites in northern Canada and Alaska: "...female lynx appear to select den sites in a number of forest types in the North. Lynx do not appear constrained to select specific stand types; rather, the feature that was consistently chosen was the structure at the site itself. Wind-felled trees were the most common form of protection selected by female lynx, although other structures such as roots and dense live vegetation were also used." In Maine, 17 den sites have been located in a variety of stand types, including 10- to 20-year-old clear-cut and adjacent residual stands (J. Organ, U.S. Fish and Wildlife Service, in litt. 1999; G. Matula, Maine Department Inland Fisheries and Wildlife in litt. 2003). Maine den sites are characterized by regenerating hardwoods and softwoods, dense understory, and abundant coarse woody debris (J. Organ, in litt. 1999, 2003). In Washington, lynx denned in lodgepole pine (*Pinus contorta*), spruce (*Picea*), and subalpine fir (*Abies lasiocarpa*) forests older than 200 years with an abundance of downed woody debris (Koehler 1990). A den site in Wyoming was located in a mature subalpine fir/lodgepole pine forest with abundant downed logs and dense understory (Squires and Laurion 2000). Three den sites found in Minnesota in 2004 also were located in downed woody debris (P. Delphey, U.S. Fish and Wildlife Service, pers. comm. 2004). Downed logs and overhead cover must be available throughout the home range of females with kittens to provide alternative den and nursery sites and security when lynx kittens are old enough to travel (Bailey 1974).

Lynx breed in spring and females give birth in late May to early June to litters of up to five kittens; hare densities are positively correlated with litter size and age at first breeding is lower when hare populations are high. During the low phase of the hare cycle, few if any kittens are born (Brand and Keith 1979; Poole 1994; Slough and Mowat 1996). Mean litter sizes may be smaller in the southern lynx range due to lower peak hare densities (Koehler 1990; Squires and Laurion 2000; Steury and Murray 2004). Kittens wean at about 12 weeks after birth and stay with females during their first winter when they may hunt cooperatively (Quinn & Parker 1987); family units break up at the onset of breeding (about mid-March, (Quinn & Parker 1987).

The most commonly reported causes of lynx mortality 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 (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, mortality of adults may be almost entirely human-caused during hare population lows (Poole 1994). Lynx are also killed by automobiles and other mammal species (see below), although the significance of these factors to lynx populations is uncertain (Brand and Keith 1979; Carbyn and Patriquin 1983; Ward and Krebs 1985; Bailey et al. 1986).

Buskirk et al. (2000) suggested that when other hare predators, particularly coyotes (*Canis latrans*), can access lynx winter hunting areas via compacted snow they may compete for prey sufficiently to affect local lynx populations. When hunting hares, coyotes are capable of kill rates and capture efficiencies equal to or greater than those of lynx (O'Donoghue et al. 1998b), although the ability of coyotes to capture hares likely vary with snow depth and firmness. The paws of lynx support twice as much weight on snow than bobcats (Parker et al. 1983; Quinn & Parker 1987). Therefore, lynx are likely to occur in areas with deep snow where bobcats cannot efficiently travel and hunt. Canada lynx may occasionally kill bobcats (Giddings et al. 1998), although the opposite has also been reported. Buskirk et al. (2000) suggested that direct killing by coyotes, bobcats, and mountain lions (*Puma concolor*) could affect lynx numbers where these competitors' ranges overlap substantially with lynx; in addition, (Quinn & Parker 1987) stated that "(G)ray wolves (*Canis lupus*) will kill lynx that they catch in the open."

Hybridization of lynx with bobcats has been confirmed with DNA analysis in both Maine and Minnesota. In Minnesota, three of 46 animals analyzed as of October 2004 were lynx-bobcat hybrids, whereas the remaining 43 were confirmed as lynx (U.S. Fish and Wildlife Service and U.S. Forest Service, in litt. 2003; S. Loch in litt. 2004). Of the three hybrids in Minnesota, biologists possessed entire carcasses of two and only a hair sample of the third. All three were from male bobcats mating with female lynx. This constituted the first confirmed evidence of hybridization between the two species. In Maine, tests of hair and tissue from 31 individual animals identified two as hybrids – one male and one female – and 29 as lynx (Maine Department of Inland Fisheries and Wildlife, in litt. 2003). The female hybrid in Maine was accompanied by kittens. In both states, the hybrid animals had external physical characteristics of both species.

In Canada and Alaska, lynx populations generally undergo marked and regular fluctuations in response to similar changes in snowshoe hare populations (Mowat et al. 2000). A lack of accurate data limits our understanding of lynx population dynamics in the contiguous United States at the southern periphery of their range. A better understanding of lynx population dynamics in the southern boreal forest "is a critical research need" for understanding lynx population dynamics and likelihood of persistence in this portion of their range (Aubry et al. 2000; Steury and Murray 2004). Southern lynx populations may be limited naturally by the availability of snowshoe hares, as suggested by their large home range sizes, high kitten mortality due to starvation, and greater reliance on alternate prey.

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 arid 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). In the western Great Lakes region, lynx range extends south from the classic boreal forest zone into the boreal/hardwood forest ecotone (Agee 2000; McKelvey et al. 2000). At its southern margins in the contiguous United States, forests with boreal features become fragmented naturally as they transition into other vegetation types, and many patches cannot support resident populations of lynx and their primary prey species.

In response to the emerging awareness of the uncertain status of Canada lynx populations and habitat in the conterminous United States and the onset of the listing process, an interagency Canada lynx coordination effort was initiated in March 1998. The Service, Forest Service, Bureau of Land Management, and National Park Service have participated in this effort. Three products important to the conservation of Canada lynx on federally managed lands have been produced: “The Scientific Basis for Lynx Conservation” (Ruggiero et al. 1999); the Lynx Conservation Assessment and Strategy (LCAS; U.S. Forest Service 1999); and Lynx Conservation Agreements (CA) among the Service and various land management agencies. The CA promotes the conservation of Canada lynx and its habitat on federal lands and identifies actions the federal agencies agree to take to reduce or eliminate potential adverse effects or risks to Canada lynx and their habitat. The LCAS was produced in 1999 to provide a consistent and effective approach to conservation of Canada lynx on federal lands and was used as a basis for assessing the effects of the preferred alternative on Canada lynx.

Status of the Species in Minnesota

As was true historically, northeastern Minnesota supports a substantial amount of boreal forest (roughly estimated at 12,500 km² (4,800 mi²)) (Great Lakes Ecological Assessment, in litt, undated). In Minnesota, the deepest snows occur in the northeast corner of the state (Minnesota Department Natural Resources in litt. 1998). 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 LCAS.

Although Minnesota may support a resident population of lynx, the abundance of the species in the state appears to be highly influenced by population levels in Ontario. Minnesota has a substantial number of historical lynx reports, primarily trapping records (McKelvey et al. 2000). 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 1978; McKelvey et al. 2000). Because lynx numbers did not

increase in the early 1980s on the expected 10-year cycle (very few were harvested or reported observed), Minnesota closed its lynx season in 1984. During a 47-year period (1930-1976), the Minnesota lynx harvest was substantial, ranging from 0 to 400 per year (Henderson 1978) and lynx were trapped in the state through periods presumed to represent both population highs and lows. Minnesota harvest levels have been consistent with cyclical patterns in Ontario. Ontario harvests were highest in 1926-27, 1962-63, and 1972-73 (Neil Dawson, personal communication 2002) and especially low during the presumed time of the 1990s “peak” (only one-fifth the 1972-73 harvest). In the 1990s there were only four verified records of lynx in Minnesota (Minnesota Department of Natural Resources in litt. 2003).

Beginning in about 2000, Minnesota lynx numbers evidently began to rebound. Between 2000 and April 2004, there were 92 verified² reports of lynx in Minnesota, eighteen of which included evidence of reproduction (kittens, Minnesota Department of Natural Resources, in litt. 2004; S. Loch, in litt. 2003). This marked increase in reports corresponds with a cyclic population high directly adjacent in Ontario (S. Loch, in litt. 2003). Research has been initiated that will help determine whether these animals are members of an established resident population in Minnesota or if these animals fail to persist when the cyclic population declines (University of Minnesota, in litt. 2002). In the summer of 2004, researchers confirmed three lynx dens in Minnesota by following the activities of radio-collared females. Two of the dens were visited when the kittens were approximately one-month old and contained three and five kittens, respectively. The third den was discovered too late to ensure an accurate count of kittens, although researchers confirmed that kittens were present.

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. Hares remained at relatively low densities through the 1990s (S. Loch, in litt. 2003). Based on surveys in northern Minnesota, snowshoe hare numbers are currently high (J. Erb, Minnesota Department of Natural Resources, in litt. 2003)

² Because of the possibility of misidentification (e.g., overlap in the ranges of Canada lynx and bobcat (*Lynx rufus*) within Minnesota), the following criteria were used to “verify” a Sighting as a lynx: a photo showing distinguishing characteristics was provided; conclusive behavioral observations were provided (e.g., lynx demonstrate curiosity and little fear of humans while bobcats are very secretive & elusive); DNA analysis of a tissue sample confirmed the identification; the observer is a known expert or otherwise has considerable experience with lynx; a detailed description of physical characteristics (e.g. very big feet, long hind legs, flat face, black tip of tail, etc.) was provided.

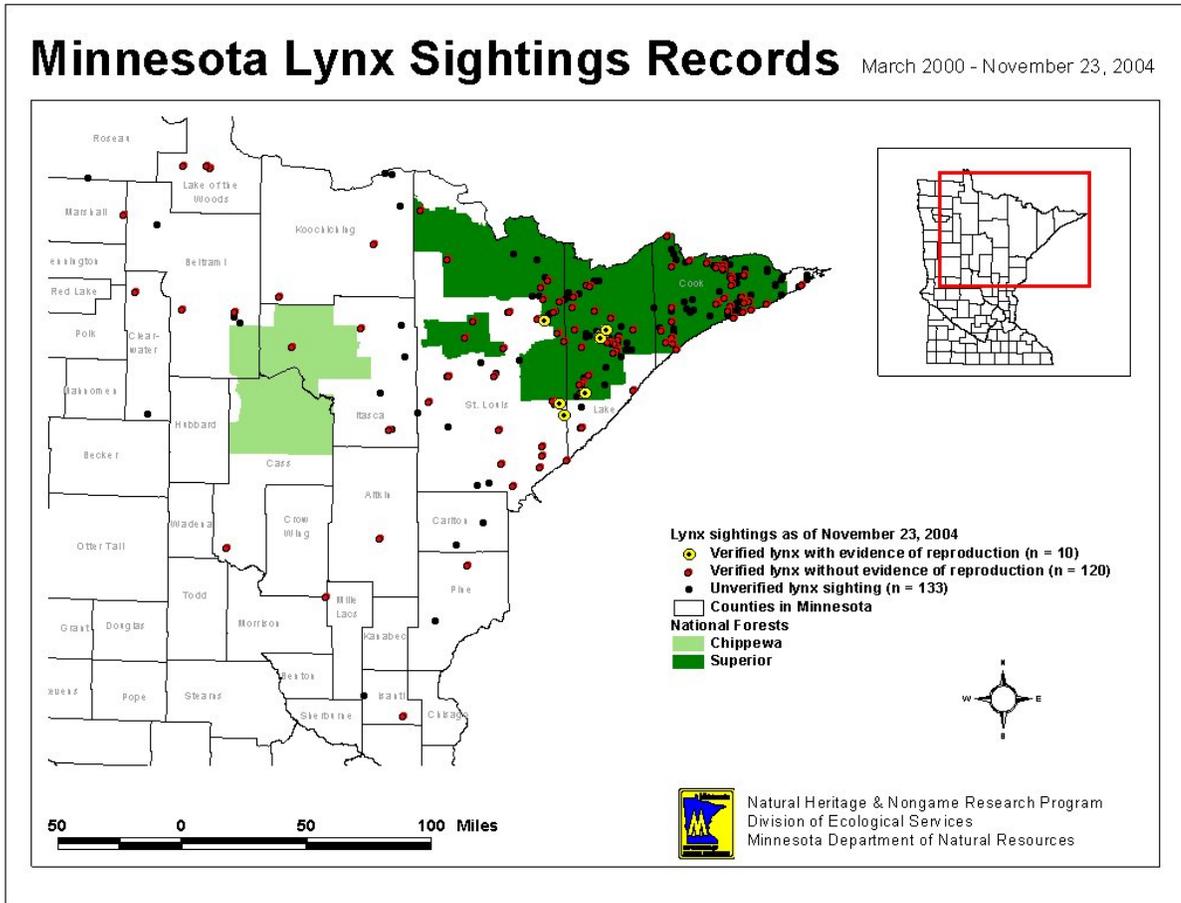


Fig.1. Lynx records in the Minnesota Department of Natural Resources' (MNDNR) database as of November 23, 2004.

IV. 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 consultations, 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.

In the LCAS, the Lynx Biology Team identified potential risk factors to lynx that are within the authority and jurisdiction of the federal land management agencies. These risk factors include management of timber, wildland fire, recreation, roads and trails, grazing, and other human developments. Roads, railroads, utility corridors, and land ownership patterns, and developments may affect lynx movements. Risks of direct lynx mortality come from trapping, shooting, predator control, vehicle collisions, and competition or predation as influenced by human activities. Other large-scale risk factors are

fragmentation and degradation of lynx habitat. Each of these potential risk factors may occur in the action area except livestock grazing and railroads; predator control is unlikely and restricted to depredating wolves in Zone 2 (50 CFR 17.40). Timber management, wildland fire, recreational use, roads and trails, and developments on private land inholdings are most likely to affect lynx in this area. The Superior National Forest is implementing the LCAS and Canada Lynx Conservation Agreement (CA) between the Service and the Forest Service (February 2000) during all forest activities that occur within Lynx Analysis Units. Thus, the aforementioned risk factors are being minimized and managed appropriately to promote the conservation of lynx within the Superior National Forest and the proposed project sites within the Kawishiwi Ranger District.

The Service has previously anticipated the incidental take of lynx as a result of three other federal actions in Minnesota (Appendix 2). Take associated with one of these actions will end in 2005 and is difficult to quantify in terms of numbers of lynx. The other two actions for which consultation has been concluded will result in the take of the following:

- Up to 2 lynx per year, but no more than 20 in total, over the next 15 years (Revised Land and Resource Management Plans, Chippewa and Superior National Forests);
- One over a thirty-year period (Trunk Highway 371 North, Federal Highway Administration).

V. 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 and Indirect Effects

The proposed project may affect Canada lynx by temporarily disturbing any animals that are traveling near the project site during road reconstruction activities. Thus, the greatest level of effect anticipated is that animals would temporarily move away from the impact zone during the construction phase. The project proposal includes mitigation measures that require notification of this office to avoid effects in the unlikely event that lynx den sites are subsequently established or identified in the action area. Thus, the Service believes that direct effects on the lynx from project construction in the action area are likely to be insignificant.

Improved human access to lynx habitat can indirectly effect the lynx population due to mortality resulting from increased trapping activity in areas that were previously inaccessible, and trapping has been identified as one of the two principal causes of lynx mortality. The reconstruction of a trunk highway, such as TH 1, does not measurably improve human access to lynx habitat and the Service believes this potential effect to be insignificant.

The vulnerability of the lynx to vehicle collisions has been documented in Minnesota and other states, as cited above. The widening of rights-of-way and the increase in vehicle speeds that result from road reconstruction projects are two conditions that likely contribute

to this vulnerability. Traffic volume is also a critical factor in determining the magnitude of road kill. Lode (2000), for example, found that road kill increased exponentially with traffic volume. With such road reconstruction projects, the Service expects an increase (over existing condition) in the death and injury of lynx in the project area.

In the past five years, more than 10 lynx, across the range of the Contiguous U.S. Distinct Population Segment of Canada lynx, have died as a result of collisions with vehicles. Since 2000, three road killed lynx have been documented in Minnesota. One on the Gunflint Trail in Cook County in 2003, one along Highway 61 in Cook County in 2004, and one on County Road 54 in Marshall County in 2003. No road-killed lynx have been reported in the action area, but the use of the area by three radio-collared lynx has been documented (Appendix 3). Research conducted in 2004 in the immediate project area with these radio-collared lynx suggests that individuals were crossing this highway about once a day (R. Moen, University of Minnesota, pers. comm. 2004).

Roadkill of wildlife, in general, is likely to increase with an increase in traffic volume and speed and is likely also positively related to wildlife density in proximity to roads (Forman and Alexander 1998). The subject action will increase both traffic volume and speed and it is clear that lynx cross the road at their current densities. Therefore, the proposed action will increase the likelihood that vehicles will collide with lynx in the action area. How likely such collisions are and how often they will occur are more difficult questions to answer. Lynx populations fluctuate on about a ten-year cycle (McKelvey 2000) and the apparent increase in sightings in Minnesota since about 2000 suggest that lynx are at or near peak population densities in the action area. As lynx densities decline, the likelihood of a lynx getting hit by cars there will also decline. The lack of any reports of road-killed lynx may actually mean that none have been hit in the action area, but the activity of lynx on and near the road (Appendix 3) suggests that a lynx will be hit before the current population peak subsides. Therefore, we anticipate that one lynx will be taken as a result of a vehicle strike during each 10-year population cycle – a total of three lynx during the 30-year life of the project.

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. One issue related to the reconstruction of TH 1 relates to this highway's importance as a corridor for traffic associated with weekend and holiday activities and the development of rural lands for vacation homes and resorts.

Briefly stated, the market pressure for the development of rural lands is greatly influenced by the efficiency with which these areas can be accessed from metropolitan areas (human population centers), such as the Twin Cities and Duluth metropolitan areas in Minnesota. An increase in transportation efficiency, as is anticipated with this project, can result in increased development activities and traffic volumes. An increase in development activities and traffic volumes can result in an increase in vulnerability to collisions with motor vehicles. An increased likelihood of take of lynx due to vehicle collisions is addressed in the previous section.

VI. CONCLUSION

This project, in addition to three other actions for which the Service has anticipated incidental take of Canada lynx in Minnesota (see Environmental Baseline and Appendix 2), will result in a mean incidental take no greater than 0.8 lynx per year over the 30-year life of the subject action. Recent DNA analyses of hair, tissue, and scat samples collected have confirmed that at least 46 lynx have been present in Minnesota since approximately 2002. About five of these samples were taken from animals that are now dead. This number underestimates the current population because these samples are obtained opportunistically and only a portion of the lynx range in Minnesota has been intensively surveyed. Moreover, lynx likely continue to move into Minnesota from Canada and the listed DPS also includes populations of Canada lynx in Montana, Washington, Colorado, and Maine. Therefore, we conclude that the take of 0.8 lynx every year for the next 30 years in Minnesota is not likely to jeopardize the continued existence of the Contiguous U.S. Distinct Population Segment of Canada Lynx.

After reviewing the current status of Canada lynx, the environmental baseline for the action area, the effects of the proposed action (take of one lynx every ten years), and cumulative effects, it is the Service's biological opinion that the proposed project is not likely to jeopardize the continued existence of the Contiguous U.S. Distinct Population Segment of Canada lynx. No critical habitat has been designated for the listed species; therefore, none will be affected.

VII. 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 FHWA so that they become binding conditions of any grant or permit issued to the Mn/DOT, as appropriate, for the exemption in section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered by the incidental take statement. If the FHWA (1) fails to assume and implement the terms and conditions or (2) fails to require

the Mn/DOT 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 FHWA or Mn/DOT 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)]

Based on the field research and reported events cited earlier in this document, we have determined that the proposed action is likely to result in the incidental take of three lynx over the life of the project, a period of approximately 30 years. Therefore, we have set the incidental take level of three lynx over that period, from the start of project construction. Should information become available that indicates the incidental take limit has been exceeded, consultation must be reinitiated. [50 CFR §402.14(i)(3)]

Effect of the Incidental Take

The Service has determined that the loss of three individual lynx from the Contiguous U.S. Distinct Population Segment of Canada lynx over the next 30 years (one every 10 years) will not jeopardize the continued existence of the DPS. Further, we have determined that this amount of incidental take, when included with the total of incidental take anticipated for projects in the Western Great Lakes area since listing (Appendix 2), will not impede the recovery of the listed species.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of Canada lynx.

- A. **Habitat Continuity Measures:** Implement measures to increase the likelihood that Canada lynx may cross through the road corridor without colliding with vehicles.

Highway designs can be modified to reduce the impacts of habitat fragmentation and these features can also serve to reduce the likelihood of wildlife collisions with motor vehicles. Habitat continuity features (wildlife crossings) should be added to the existing project plans at appropriate locations, using designs that reduce the likelihood that Canada lynx will be hit by vehicles. These designs are likely to also benefit other species. The project area has been reviewed for this purpose and opportunities for plan modifications have been identified. These non-discretionary modifications are described in the Terms and Conditions. The Conservation Recommendations section provides additional actions relative to habitat continuity that may facilitate lynx conservation. Scientific analysis and reports on crossing design and location have been conducted in many regions of the country along with several European nations. The information gathered from these analyses was vital during both the site selection process and the development of the design recommendations for the TH I project. However, as important as these studies are, the fact remains that the practice of designing features into the development of transportation projects where the primary purpose is to accommodate wildlife passage, is still relatively new. In addition, the available information often pertains to species or geographic features not present in

Minnesota and not necessarily transferable to the project at hand. Therefore, in order to more efficiently identify, select and design crossing opportunities in the future, more site specific information is needed. Monitoring the wildlife use of the crossings described below may provide that information.

- B. Reporting/Monitoring Requirements:** Monitor the use of the wildlife crossings and the incidence of Canada lynx roadkill in the project area and report the results of that monitoring to the Service for at least three years and throughout the project period, respectively.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the FHWA 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.

A. Habitat Continuity Measures: Below are the wildlife crossing opportunities identified and required as a term and condition of this biological opinion for the proposed project. The crossing locations were determined during numerous site reviews with Service, USFS and Mn/DOT staff and were based on habitat continuity, vertical relief, constructability, feasibility, and efficacy.

1) Replacement of the Stony River Bridge

The design for the new bridge has been reviewed and approved by the Mn/DOT and the Service. The modifications will include pulling back the abutments from the ordinary high water mark, thus providing a terrestrial corridor of sufficient height and width to accommodate wildlife movement under the new structure

2) Replacement of the Kawishwi River Bridge

The design for the new bridge has been reviewed and approved by the Mn/DOT and the Service. The modifications will include pulling back the abutments from the ordinary high water mark, thus providing a terrestrial corridor of sufficient height and width to accommodate wildlife movement under the new structure

3) Location: Reference Point 1844+0

Structure Type: Single span bridge

Length (distance between abutments): Approximately 40 feet.

Clearance (distance between low bridge member and ground): Approximately 8 feet.

4) Location: Reference Point 1939+7

Structure Type: Box Culvert

Height: Approximately 8 feet.

Width: Approximately 8 feet.

B. Reporting/Monitoring Requirements: To monitor the impact of incidental take, the FHWA or Mn/DOT must report the progress of the action and its impact on the species to the Service.

- 1) Report to the Service annually (1) the wildlife use of the crossings and (2) evidence, or lack thereof and descriptions of any incidents involving take of Canada lynx due to vehicle collisions in the action area. Monitoring and reporting on the use of the wildlife crossings may end after three years and shall not begin until construction is complete. Annual monitoring and reporting of any take of Canada lynx, however, shall continue for 30 years from the beginning of construction. These annual reports shall be provided to the Service no later than September 30.
- 2) No later than September 30, 2005, FHWA and/or Mn/DOT shall provide to the Service a final plan that contains detailed descriptions of how wildlife crossings and take of lynx will be monitored and reported. The monitoring plan and its technical aspects should be jointly developed by the Service, FHWA and the Mn/DOT. The monitoring can be accomplished in a number of ways, for example, recent work has involved the use of motion-detecting cameras that record each event by location, time and species. Another tool is the implementation of track boxes to help determine species-specific use. There may be other potential information gathering techniques available. The participating agencies should confer annually to review the progress being made under the plan.
- 3) One year after the completion of the three-year monitoring of wildlife use of the crossings, FHWA and/or Mn/DOT shall provide to the Service a comprehensive final report. This report should be a compilation of all data gathered during the monitoring effort. The information contained in the final report should be useful for improving the site selection process and design of future wildlife crossings.

The Service believes that no more than three Canada lynx will be incidentally taken 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.

VIII. 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.

1) Design Speed

The Service recommends that the reconstruction of TH 1 be designed to a speed of 40 miles per hour to limit the number of geometric corrections.

2) Coordination of monitoring with other highway projects in the range of Canada lynx.

The FHWA and the Service have recently entered into consultation on four highway reconstruction projects. The projects are TH 61 and TH 1 in Lake County, TH 53 in St. Louis County and TH 371, Cass and Crow Wing Counties, in Minnesota. Each of these projects presents unique challenges and therefore, the monitoring efforts must be adaptable to best fit the given situation. Therefore, it is recommended that a single monitoring project be designed that incorporates all four projects while maintaining the unique identities of each project. Given the diversity of project situations, the information gathered from this effort should prove extremely valuable in future transportation planning efforts.

3) Native Species

The Service recommends that all disturbed areas be re-established using native forbs and grasses. The seeds mix should appropriate to that region. In addition, only certified, weed-free mulch (Mn/DOT type 3) should be used.

4) Oversized Culvert to allow for Habitat Continuity

At reference point (odometer reading 7.25, measured from Highway 2) there are two wetland basins separated by TH I. U.S. Forest Service has reported that reptiles, amphibians, and other small animals are known to cross between the two basins, and at certain times of the year roadway mortality can be quite high. The Service recommends the installation of an oversized culvert to allow for small animal movement to occur under the roadbed at that location.

IX. REINITIATION -- CLOSING STATEMENT

This concludes consultation on the action outline in your July 13, 2004, request for consultation for TH 1 in Lake County, Minnesota. 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; (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.

Please contact Mr. Paul Burke, of this office, by calling 612-725-3548, extension 205, if you have any question or comments on this biological opinion.

Sincerely,

Dan P. Stinnett
Field Supervisor

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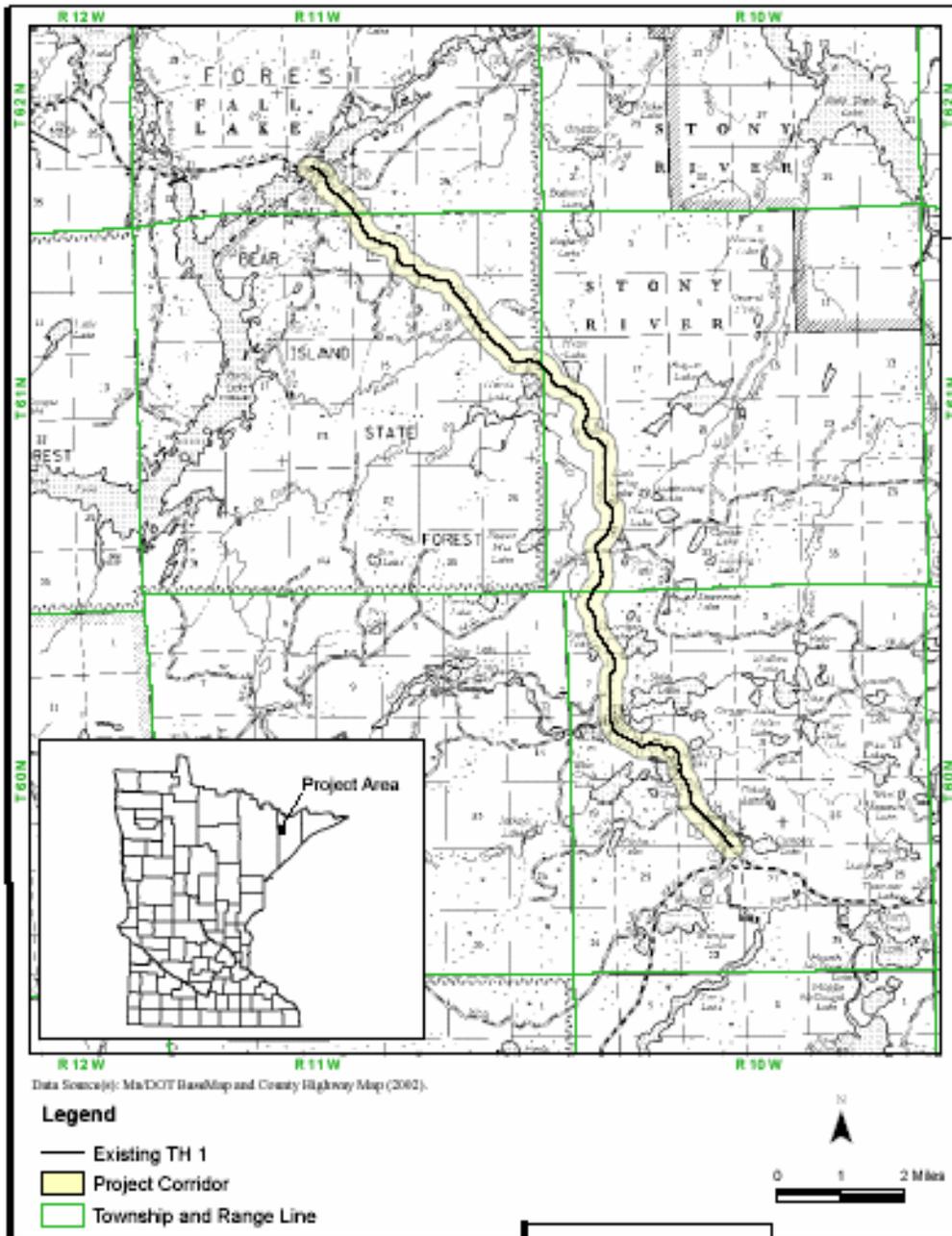
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Appendix 1 –Project Site Map



Data Source(s): MnDOT BaseMap and County Highway Map (2002).

Legend

- Existing TH 1
- Project Corridor
- Township and Range Line

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**Trunk Highway 1
Reconstruction**
Lake County, Minnesota

Site Location

Exhibit I

Appendix 2 -- Summary of previous anticipated incidental take of Canada lynx in Minnesota

Below are excerpted the “**AMOUNT OR EXTENT OF TAKE ANTICIPATED**” sections from incidental take statements written for all federal actions for which USFWS has anticipated incidental take in Minnesota prior to the current consultation. They are shown in chronological order with the date of the related biological opinions in parentheses.

Little East Creek Fuel Reduction Project, Superior National Forest (13 November 2000)

The Service anticipates that this action will take lynx by significantly reducing the habitat suitability of the Little East Creek area (i.e., the action area -- 93 km²) for lynx for the duration of this action, approximately 5 years. We expect incidental take to be in the form of harm due to significant habitat modification that results in death or injury to lynx by significantly impairing essential behavioral patterns, including feeding, breeding and sheltering. Incidental take of lynx will be difficult to detect because finding a dead or impaired specimen or documenting reduced fecundity or abandonment of a home range within the action area is unlikely.

The proposed action, as described by the USFS, includes the winter use of 19 miles of existing winter road and for the construction and winter use of 29 miles of proposed roads and trails for timber harvest and private access for approximately 5 years. This significant increase in designated over-the-snow routes is likely to result in the take of lynx by causing or exacerbating competition with bobcats and coyotes. This competition may result in a decrease in snowshoe hare density in the action area, where prey may already be limiting lynx productivity. Studies of lynx in North America have shown that when hare densities decline, dependence on alternate prey sources decreases productivity of adult female lynx and decrease survival of kittens. Competition with coyote and bobcat may also result in harm to lynx resulting from direct encounters with these two competing species.

Trunk Highway 371 North, Federal Highway Administration (22 September 2004)

Currently, TH 371 from Nisswa to Pine River, is a two lane highway with narrow right-of-way and posted speed limits that are at or below 55 miles per hour. The proposed project involves upgrading TH 371 from a two lane to a four lane divided highway. The improvements will result in expanded right-of-way widths and posted speed limits of up to 65 miles per hour. Based on the field research and reported events cited earlier in this document, we have determined that the proposed action is likely to result in the incidental take of one lynx over the life of the project, a period of approximately 30 years. Therefore, we have set the incidental take limit of one lynx over the period of 30 years from the start of project construction. Should information become available that indicates the incidental take limit has been exceeded, consultation must be reinitiated.

Revised Land and Resource Management Plans, Chippewa and Superior National Forests (15 July 2004)

The risk of incidental take of Canada lynx is not completely eliminated by provisions in the Revised Forest Plans. Take in the form of harm from lynx habitat alterations may occur, as could harassment and/or death related to human disturbance and incidental trapping. However, the Service may only exempt incidental take that occurs as a result of discretionary actions of the Forests. The Forests do not have authority over furbearer trapping, nor do they have the discretion to allow or disallow its use on the Forests. Any take that occurs due to accidental trapping of lynx in furbearer sets is outside the jurisdiction and authority of the Forest Service and not exempted by this Incidental Take Statement.

The Service expects no more than two lynx would be taken annually per Forest and no more than 20 would be taken over the 15-year life of the Forest Plans due to vehicle collision on all roads on all ownerships within the Chippewa and Superior National Forest proclamation boundaries.

Because there is limited information from which to draw and we are unaware of the timing and location of roads that would be built or upgraded, this information is based on past reports of road kill. Two lynx are known to have been killed by vehicle collisions on the Superior National Forest since 2000; it is reasonable to assume we are aware of roughly half of the mortality that occurs. Therefore, an average of one lynx per year has been killed due to vehicle collisions and this is likely to continue under Revised Forest Plan implementation. The Forest Plans provide descriptive management direction and are prescriptive in terms of “sideboards” that would guide or limit project design. They do not, however, specify what management actions would be carried out nor when or where actions will occur. Therefore, site-specific consultation will occur and section 7(o)(2) exemptions will be provided, as needed and appropriate, when these actions are expected to result in the incidental take described above.

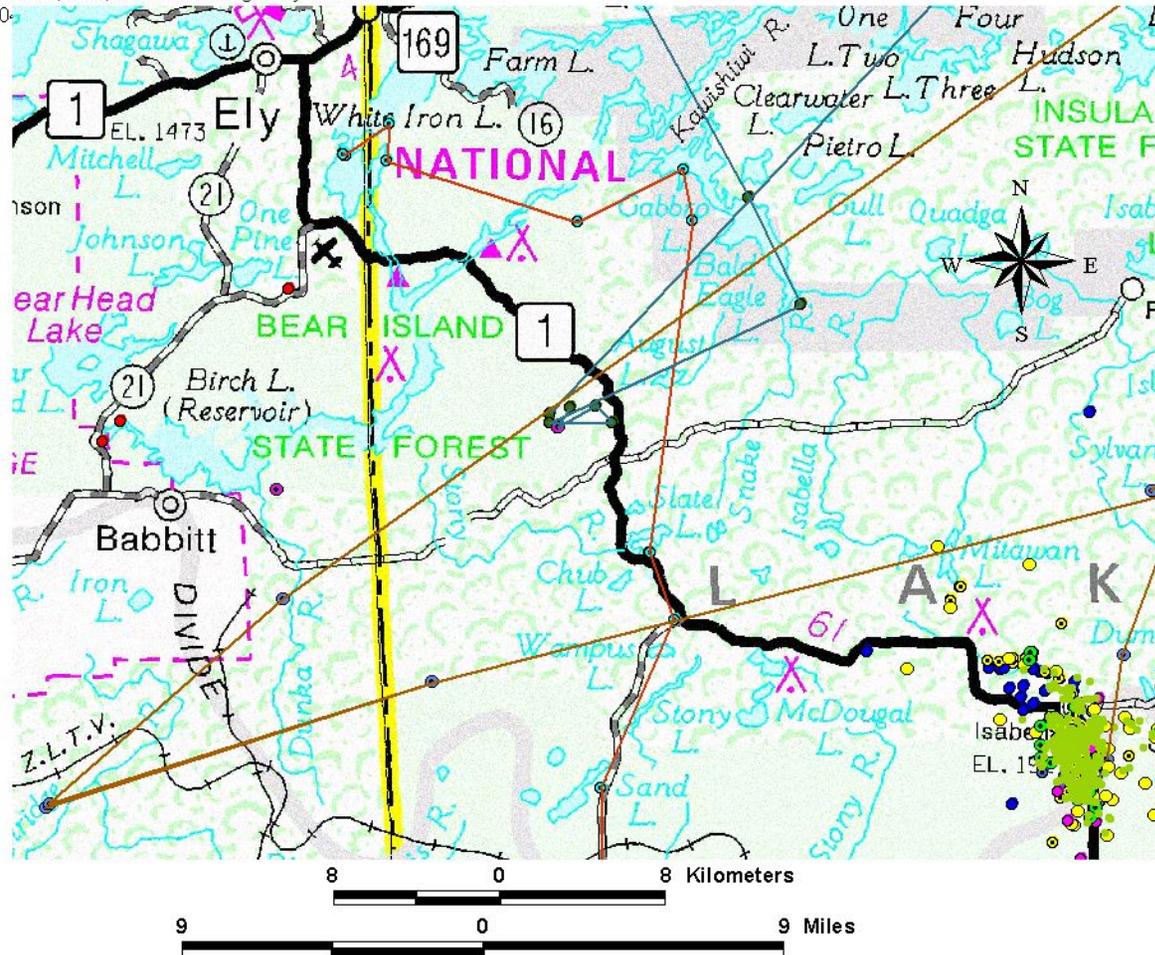
Summary

Action	Amount/Extent of Take	Time Period
Little East Creek Fuel Reduction Project	A surrogate for take was used -- winter use of 19 miles of existing winter road and for the construction and winter use of 29 miles of proposed roads and trails for timber harvest and private access for approximately 5 years.	Approximately five years (presumably from November 20, 2004, the date of that the Forest Service signed the Record of Decision)

Trunk Highway 371 North	one lynx over the period of 30 years from the start of project construction	30 years from start of construction; construction will likely start in 2005 or 2006
Revised Land and Resource Management Plans	The Service expects no more than two lynx would be taken annually per Forest and no more than 20 would be taken over the 15-year life of the Forest Plans due to vehicle collision on all roads on all ownerships within the Chippewa and Superior National Forest proclamation boundaries.	15 years beginning when the Forest Service signed the Record of Decision in 2004

Appendix 3 – Locations and presumed travel routes of radio-collared lynx in the action area (University of Minnesota 2004).

Movements of L10, L12, and L11 in Highway 1 area
 RM -- 12/12/0



Appendix 4: Existing bridges to be replaced with designs that will allow for improved wildlife passage.

Stony River Bridge



Kawishiwi Bridge

