2/4/05

Ms. Cheryl Martin
Environmental Engineer
Federal Highway Administration
Galtier Plaza, Box 75
380 Jackson Street, Suite 500
St. Paul, Minnesota 55101-2904

Dear Ms. Martin:

This document transmits the Service's Biological Opinion based on our review of the proposed Trunk Highway 53 project (S.P. 6920-44) located in St. Louis County, Minnesota, and its effects on the Contiguous U.S. Distinct Population Segment of Canada lynx (*Lynx canadensis*), in accordance with section 7 of the Act. Your June 7, 2004 request for formal consultation was received on June 10, 2004.

A complete administrative record of this consultation is on file in this office and in the Office of Environmental Services, Minnesota Department of Transportation, Saint Paul, Minnesota.

In addition, you have requested the Service's concurrence with your determination that the proposed action may affect, but is not likely to adversely affect bald eagle (*Haliaeetus leucocephalus*) or gray wolf (*Canis lupus*); both are listed as threatened under the Act. The Service concurs with that determination for each species. This precludes further action as required under section 7 of the Act for bald eagle and gray wolf. If new information becomes available that indicates either the bald eagle or the gray wolf may be affected in a manner not previously considered, however, consultation must be reinitiated.

Please contact Mr. Paul Burke, of this office, at (612) 725-3548 extension 205, if you have any questions or if we can be of further assistance regarding this proposed action.

Sincerely,

Dan P. Stinnett
Field Supervisor

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

Brian Larson
Minnesota Department of Transportation
Duluth, MN

Jason Alcott
Minnesota Department of Transportation
St. Paul, MN

U.S. Fish and Wildlife Service

BIOLOGICAL OPINION

For the
Trunk Highway 53 Project
St. Louis County, Minnesota
(S.P. 6920-44)

Prepared by the
U. S. FISH AND WILDLIFE SERVICE
Twin Cities Ecological Services Field Office
Bloomington, Minnesota

For the
U.S. Department of Transportation
Federal Highway Administration
Saint Paul, Minnesota

February 4, 2005

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I. INTRODUCTION

This document transmits the Fish and Wildlife Service's (Service) Biological Opinion based on our review of the proposed reconstruction of Trunk Highway 53 (TH) 53 located in St. Louis County, Minnesota, and its effects on the Canada lynx (*Lynx canadensis*) in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended. The Federal Highway Administration's (FHWA) request for formal consultation was received on June 4, 2004,.

The Biological Opinion is based on information provided in the Draft and Final Environmental Impact Statement (DEIS, FEIS), the project proposal, regular telephone conversations with project biologist Jason Alcott, and project engineer Brian Larson, two 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 (Mn/DOT), St. Paul, Minnesota and at the Service's Twin Cities Field Office.

The bald eagle (*Haliaeetus leucocephalus*) and the gray wolf (*Canis lupus*) 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 populations fluctuate, and they have 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

November 27 2001, after meeting with Service staff, Mn/DOT sent a letter requesting a written statement of "no effect" for the project.

January 22, 2002, the Service issued a determination stating that …the project is not likely to adversely affect any federally listed or proposed threatened or endangered species or adversely modify their critical habitat."

June 2, 2004, the FHWA received a letter from the U.S. Department of the Interior commenting on the FEIS which stated new information had become available regarding the Canada lynx and recommended that consultation with the Service be reinitiated.

June 7, 2004, the FHWA sent a letter to the Service requesting to enter into formal consultation under section 7 of the Act for the Canada lynx and requesting concurrence for

the determination of may affect, but is not likely to adversely affect for the bald eagle and the gray wolf, which are both federally-listed threatened species in Minnesota.

Additionally, the Service was a cooperating agency on this project and was involved in the review of all environmental reports. 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 project plan on three occasions. 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 FHWA and the Mn/DOT are proposing to reconstruct a segment of TH 53 from two to four lanes beginning approximately 0.75 miles south of St. Louis County Road 307 to the south limits of the City of Cook (Appendix 1,2). The scope of the proposed action will result in further habitat fragmentation and road hazards within the known range of the Canada lynx (*Lynx canadensis*).

The proposed project consists of reconstructing TH 53 providing for a four-lane divided highway using existing and/or new alignment that meets applicable standards for a rural expressway with a 70 mph design speed and controlled access. The project begins approximately 0.75 miles south of County Road (CR) 307, connecting with the new four-lane highway that will be completed as part of the TH 169 and TH 53 interchange and DWP bridge reconstruction project. The proposed roadway follows the existing highway north to CR 306. The additional two lanes will be constructed to the east of the existing highway.

AT CR 306, the proposed highway diverges from the existing alignment, to the north, on new alignment. The proposed highway then turns northwesterly, and traverses the area to the north of the existing housing developments of Donnywood East. Just west of the Donnywood neighborhood, the proposed roadway roughly parallels the existing road 800 ft. to the north. The proposed highway is positioned to provide access on the north side of the existing businesses located near Sand Lake.

The proposed roadway continues on new alignment northwesterly, crossing the exiting highway approximately 2,000 ft. northwest of CR 65. The preferred alternative then swings to the west of the existing highway for a distance of approximately 7,000 ft. The proposed alignment provides a more desirable crossing of Johnson Creek with fewer wetland impacts, and a shorter less costly bridge than if the roadway was expanded on the existing alignment.

The proposed roadway connects with the existing highway about 4,000 ft. north of the Taconite Trail crossing. From this point north, to the south limits of the City of Cook, the proposed roadway follows the existing alignment, with the construction of the two new lanes occurring to the east of the existing highway.

III. STATUS OF THE SPECIES

Species Description

The Canada lynx (*Lynx canadensis*) 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 the 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 habitat[1]. 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). 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 km^2 (58 mi^2) and 72 km^2 (28 mi^2 for males and females, respectively (Aubry et al. 2000). Recent home range estimates from Maine are 70 km^2 (27 mi^2) for males and 52 km^2 (20 mi^2) 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 km^2 (3 to 300 mi^2 (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).

[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).

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 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] 990; 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] 990). 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 km^2 (4,800 mi^2)) (Great Lakes Ecological Assessment, in litt, undated). In Minnesota, the deepest snows occur in the northeast comer 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 verified[2] 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, Appendix 3). 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 "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)

Status of Lynx in Core Areas Outside of the Minnesota/Great Lakes Region

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.

[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.

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 above. Outside of Minnesota, lynx may also occur in Wisconsin and Michigan in the Great Lakes region. In those two states, however, there is no current evidence of reproduction and suitable habitat is limited and disjunct from occupied habitat in Minnesota and Canada (U.S. Fish and Wildlife Service 2003).

As it did historically, the boreal forest of the Northeast continues to exist primarily in Maine where habitat is currently optimal and a resident, breeding population of lynx continues to exist. Maine's lynx population is currently much larger than we knew at the time of the final rule in 2000 and habitat is directly connected to substantive lynx populations and habitat in southeastern Quebec and New Brunswick. 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.

The Northern Rocky Mountains/Cascades Region supports resident lynx populations in north-central and northeastern Washington, western Montana and likely northern Idaho. We conclude that lynx have always occurred as dispersers in Oregon and Utah. In northern Wyoming it appears habitat is less suitable to support resident populations and, therefore, we conclude animals in this area are most likely dispersers.

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 historically occurred in the Southern Rocky Mountains, then this native population has been lost. Isolation from potential source populations may have let 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.

The Colorado Division of Wildlife (CDOW) began reintroducing lynx from Canada and Alaska in 1999 and conducted additional releases in 2000, 2003, and 2004. Thus far, CDOW has released 166 lynx and plans to release an additional 50 in 2005 and 15 in 2006-2008. As of August 2004, CDOW was tracking 85 of the released animals and has confirmed 56 mortalities. In spring 2004, CDOW found that 18 of the 26 radio-collared adult females were mated; they subsequently located 11 dens. Den sites were scattered throughout Colorado and one den was in southern Wyoming (T. Shenk, in litt. 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, road construction 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. 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 La Croix Ranger District.

The Service has previously determined the incidental take of lynx as a result of four other federal actions in Minnesota (Appendix 4). Take associated with one of these actions will end in 2005 and is difficult to quantify in terms of numbers of lynx. The other three actions for which consultation has been concluded may result in the take of the following:

- Up to two 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 30 year period (Trunk Highway 371 North, Federal Highway Administration).
- Up to three lynx, over a 30 year period (Trunk Highway 1, 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, other than by vehicle collision (see below), 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 53, 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 of wildlife 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 11 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, four road killed lynx have been documented in Minnesota. One on the Gunflint Trail in Cook County in 2003, one on County Road 54 in Marshall County in 2003, one along Highway 61 in Cook County in 2004 and one on Interstate 35 in Pine County in 2004. No road-killed lynx have been confirmed in the action area, but the use of the area by one radio-collared lynx has been documented (R. Moen, Pers. Comm.).

Wildlife road-kills, in general, are 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 (confirmed) may actually mean that none have been hit in the action area, but the activity of lynx on and near the road 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 53 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 and the Iron Range Cities 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

The Service anticipates that four other federal actions that have already undergone consultation will incidentally take Canada lynx (Appendix 4). For one of these, the Service described the anticipated take in terms of a surrogate measure; thus, we can only sum the anticipated take for the three other actions, for which the Service described take in terms of numbers of lynx over a specified time periods. The three actions differ in duration – one (National Forest plans) will last approximately 15 years and is likely to incidentally take up to 20 Canada lynx; the other two, both highway projects, will each last 30 years and are likely to take one and three lynx, respectively. Thus, we can express the average annual take as a result of these three projects over either a 15-year or a 30-year period. We have already determined that this action is likely to take one lynx during each 10-year population cycle – three over the 30-year duration of the project. Thus, the proposed action, in combination with the three previous actions for which consultation has already concluded, is likely to result in the average take of approximately 1.5 lynx per year over a period roughly encompassing the next 15 years or 0.8 per year over the next 30 years. Because the proposed action has a duration of 30 years, that time-frame is most appropriate here. The total take resulting from this action and the other three actions could also be expressed as 8 lynx per 10-year period.

We previously stated that the number of lynx in Minnesota during each 10-year period is likely several times the number (approximately 50) that have been confirmed thus far by DNA analysis of scat, hair, and tissue samples collected, largely opportunistically, from lynx in a portion of their range in Minnesota. In addition, take that would occur as a result of the proposed action would only affect the Minnesota portion of the listed distinct population segment. Lynx populations in Maine, Colorado, Montana, and Washington, for example, would be unaffected by the proposed action. Overall, the proposed action is not likely to markedly affect the reproduction, numbers, or distribution of Canada lynx in the Contiguous U.S. Distinct Population Segment over the 30-year duration of the action.

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.

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.

   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 53 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 and Mn/DOT staff and were based on habitat continuity, vertical relief, constructability, feasibility, and efficacy (Appendix 5).

1) Rice River Crossing

The design of this crossing has been reviewed 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) Johnson Creek Crossings (North and South)

The design of this crossing has been review by the Mn/DOT and the Service. The modifications will include replacing the existing structures with single span structures. 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.

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. A report shall be provided to the Service no later than September 30, of each year.

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 shall 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) 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.

2) 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 should be used.

IX. REINITIATION -- CLOSING STATEMENT

This concludes consultation on the action outline in your June 4, 2004, request for consultation for TH 53 in St. Louis 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 (l) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that my 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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