BIOLOGICAL OPINION
Trunk Highway 371 North
State Project 1116-22
Cass and Crow Wing Counties, Minnesota
September 22, 2004

The Federal Highway Administration, of the U.S. Department of Transportation, and the Minnesota Department of Transportation are proposing to reconstruct and improve a segment of Minnesota Trunk Highway 371, from the Town of Nisswa, in Crow Wing County, Minnesota, to the Town of Pine River, in Cass County, Minnesota. The scope of the proposed action will result in further habitat fragmentation and road hazards within the known range of the Canada lynx, a federally-listed threatened species. The following is the biological opinion of the U.S. Fish and Wildlife Service (Service), an evaluation which documents the potential impacts of the proposed action and identifies measures to avoid, minimize and otherwise mitigate for those impacts in accordance with section 7(a) (2) of the Endangered Species Act of 1973, as amended.

EXISTING PROJECT CONDITION

Trunk Highway (TH) 371 is a major north-south highway that provides important links from U.S. Highway 10 and the Twin Cities metropolitan area (Minneapolis and St. Paul), north to the Central Lakes Region of Minnesota. It is also an important economic corridor connecting regional trade centers. Tourist travel along this segment of TH 371 creates high seasonal peaks that commonly cause substantial travel delays and unsafe driving conditions. The TH 371 project corridor extends from the intersection of Crow Wing County Road 18 in Nisswa, Minnesota to the intersection of Cass County Road 42 in Pine River, Minnesota. The existing two-lane highway does not meet design standards for the type and volume of traffic it carries. Other highway characteristics demonstrating the need for the project include high collision rates, large number of direct access points, pedestrian safety concerns, and heavy traffic congestions. Alternatives have been developed and have been evaluated in the Draft Environmental Impact Statement (DEIS), of which Alternative 2 has been selected as the Preferred Alternative.

PROPOSED ACTION

The Minnesota Department of Transportation (MN/DOT) is proposing to reconstruct 16 miles of TH 371 as a four-lane roadway on its existing alignment from County Road 18 in Nisswa to County Road 42 in Pine River (referred to as Alternative 2 in the DEIS). The segments of highway between the communities will generally be rural in design with grass medians and ditches used for drainage. Typical right-of-way widths in the rural areas are approximately 90 meters (300 feet). Through the communities, the highway will be an urban design, which includes raised medians, drainage conveyed through storm sewers, and a typical minimum right-of-way width of approximately 45 meters (150 feet).

Efforts will be made to widen within the existing MN/DOT right-of-way to the extent practical. The existing right-of-way width varies from 24 meters (80 feet) to over 68 meters (225 feet). Several additional design options are included to reduce, avoid or minimize adverse social, economic, and natural resource impacts.

CONSULTATION HISTORY

In October 2002 the Federal Highway Administration (FHWA) sent a letter requesting that the Service serve as a cooperating agency for State Project 1116-22. The Service accepted this role and was therefore involved early on in the National Environmental Policy Act process and participated in the both the preliminary and official review of the environmental documents.

In its July 30, 2004, letter, the FHWA requested to enter into formal consultation with the Service under section 7 of the Endangered Species Act (Act) of 1973, as amended, following a determination that the reconstruction of TH 371 may affect the Canada lynx (*Lynx canadensis*), a federal-threatened species. In addition, the FHWA requested concurrence with the determination that the TH 371 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 bald eagle and the gray wolf are present in the project vicinity. However, the 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 has concurred 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 indicates that the bald eagle or the gray wolf may be affected, consultation must be reinitiated.

The Canada lynx has recently expanded its range and it has begun to re-occupy former habitats in the forest and lakes ecoregion in Minnesota. Projects that modify existing conditions have come under closer scrutiny for potential impacts to federally-listed species. Highway reconstruction projects that result in significantly wider rights-of-way and higher vehicle speeds, may affect the Canada lynx due to the apparent vulnerability of this species to vehicle collisions. Information gathered by the Service and others indicates that the Canada lynx is now present in the project area. Therefore, formal consultation is required under section 7 of the Act.

The FHWA and the MN/DOT have provided full and complete coordination with the Service on this project. The Service has attended meetings with project staff on several occasions and on two recent occasions we have participated in on-site reviews of the preliminary project plan. In addition, frequent, direct communication through telephone and electronic mail contacts has been afforded throughout the planning phases for this project.

STATUS OF THE SPECIES

Species Description

The Canada 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). The lynx's long legs and large feet make it highly adapted for hunting in deep snow.

Classification of the Canada lynx (also called the North American lynx) has been subject to revision. In accordance with Wilson and Reeder (1993), the lynx in North America is *Lynx canadensis*. Previously the Latin name *L. lynx canadensis* was used for lynx (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 Federal Register, July 8, 1998). The lynx in the contiguous U.S. was 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, however, a court order issued on January 15, 2004 requires the Service to propose critical habitat by November 2005, and that action is underway.

Life History

Lynx require large areas containing boreal forest[1] habitat. In the northeastern U.S., lynx were most likely to occur in areas containing suitable habitat that were greater than 100 km ^{2} (40 mi^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

[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).

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 snowshoe hare density (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 spp.)*, 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 (1.2/ac) 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 1.1 hares/ha (1.7/ac) (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 under stories 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). 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 wind throw 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* spp.), 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). 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; family units break up at the onset of breeding (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 overall 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), the occurrence of such mortality is not uncommon and the significance of such mortality is normally greatest where a population is sparse, such as with a recovering population near the edge of its range.

Where the Canada lynx occupies habitats near highways, mortalities caused by collisions with vehicles have been reported across the range of the listed population. In Maine there have been six lynx lost to collisions with vehicles in the past two years (M. McCollough, pers. comm.). In Colorado, where there was an attempt to reintroduce lynx into remote areas of historic range, two lynx were lost to collisions with vehicles. In Minnesota, with a field study that included a total of 13 lynx being radio-collared for tracking purposes, at least one lynx has been apparently lost to collisions with vehicles in the past two years (R. Moen, pers. comm.). In addition, three other lynx have been reported lost to vehicular collisions in Minnesota. Lynx mortalities from vehicle collisions on surface transportation facilities have been documented.

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 in both Maine and Minnesota with DNA analysis. In Minnesota, three of 19 animals analyzed were lynx-bobcat hybrids, whereas the remaining 16 were confirmed as lynx (U.S. Fish and Wildlife Service and U.S. Forest Service, *in litt.* 2003). Of the three hybrids in Minnesota, biologists retained 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 and down into the western Great Lakes region, and east to New Brunswick and Nova Scotia, Canada, and south into the northeastern United States from Maine to New York (McCord and Cardoza 1982; Quinn and Parker 1987). 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.

Status of the Species in Minnesota

As was true historically, northeastern Minnesota supports a substantial amount of boreal forest (which is estimated to be an area of 12,500 km ^{2} (4,800 mi ^{2})) (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.

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 June 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. 2003; 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.

[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.

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).

ENVIRONMENTAL BASELINE

Status of the Species Within the Action Area

Given the species penchant for wide-ranging movements, we can assume that individual animals may have recently crossed through habitat immediately adjacent to this portion of Trunk Highway 371 project (State Project 1116-22). However, as yet, no lynx records have been confirmed within the project impact zone[3].

Factors Affecting the Species Environment Within the Action Area

In the Lynx Conservation Assessment and Strategy the Lynx Biology Team identified potential risk factors to Canada 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, land ownership patterns, and developments may affect lynx movements. Risks of direct lynx mortality come from trapping, shooting, predator control, vehicle strikes, 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. Timber management, wildland fire, recreational use, roads and trails, and developments on private land inholdings are most likely to affect lynx in this area.

EFFECTS OF THE ACTION

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 or continuing use of existing roads and trails. Thus, the greatest level of effect anticipated is that animals would temporarily move away from the impact zone when it is being used or worked on. 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

[3] The term "impact zone" refers to a defined area that extends out a distance of a ¼ mile from the designated construction limits.

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 371, does not measurably improve human access to lynx habitat and the Service believes this effect to be insignificant.

The vulnerability of the lynx to vehicle collisions has been documented 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 significantly to this vulnerability. With such road reconstruction projects, the Service expects an increase in the death and injury of lynx in the project area. This increase is not so great as to endanger the existence of the listed species, but it is likely to result in the take of individual animals within the listed population.

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 371 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 metropolitan area in Minnesota. An increase in transportation efficiency, as is anticipated with this project, can result in increased development activities. An increase in development activities can result in a gradual decrease in lynx habitat suitability due to the loss of cover, a decrease in prey availability, and an increase in vulnerability to collisions with motor vehicles.

Cumulative effects have been considered during review of project plans and the preparation of this biological opinion. Other future actions that are unrelated to the proposed action are not considered in this section because they cannot be quantified at this time. Further, future actions, as they present themselves, will require separate consultation pursuant to section 7 of the Act.

CONCLUSION: BIOLOGICAL OPINION

After reviewing the current status of Canada lynx, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed project is not likely to jeopardize the continued existence of the listed population of the lynx. No critical habitat has been designated for the listed species; therefore, none will be affected.

To date, the Service has anticipated the incidental take of not more than three individual Canada lynx resulting from projects in formal consultation since the listing as a Final Rule in the Federal Register publication of March 24, 2000. Given the reproductive potential of the lynx, and immigration from a stronger population to the north, the loss of a relatively small number of individuals to projects such as the proposed action is not likely to significantly impede the survival and recovery of the listed species.

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 vulnerability of the lynx to vehicle collisions has been documented in Minnesota and other states. 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. With such road reconstruction projects, the Service expects an increase in the death and injury of lynx in the project area. This increase is not so great as to endanger the existence of the listed species, but it is likely to result in the take of individual animals within the listed population. This take would be incidental to the purpose of the project.

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.

Reasonable and Prudent Measures

Wildlife habitat suitability is species specific and is comprised by a set of parameters that meet minimum life requirements (e.g. food, cover, water, space). One parameter, the size of an area, can be affected by landscape alterations, such as highways, which can cause the fragmentation of the area into smaller and less suitable units of otherwise suitable habitat. However, 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.

The TH 371 project's existing plans can be modified to include features that reduce the impacts of habitat fragmentation. Habitat continuity features (wildlife crossings) should be added to the existing project plans at appropriate locations, using designs that benefit the targeted species. The project area has been reviewed for this purpose and opportunities for plan modifications have been identified. These modifications are described in both the Terms and Conditions and Conservation Recommendations sections of this biological opinion.

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 371 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.

Terms and Conditions

When it has been determined that a proposed project will result in incidental take and that the level of take is permissible, then it becomes the responsibility of the Service to identify reasonable and prudent measures that will serve to minimize, or reduce the likelihood of incidental take. These measures are then included with the incidental take statement as terms and conditions of such authorization. It is important to note that the terms and conditions of this incidental take authorization are not discretionary on the part of the action agency. If it is later determined that, for whatever reason, these terms and conditions cannot be incorporated as project modifications or otherwise effectively realized, consultation must be reinitiated. The terms and conditions are as follows:

A. Habitat Continuity Measures (Appendix 1)

1) Site 1 (Cullen Brook)
Approximate Reference Post 46+00.284
The current plan is to replace the existing box culvert with a single span bridge. The bridge height would accommodate small recreational boats and the bridge width would provide wildlife passage opportunities by pulling back the abutments (increasing the distance between the abutments) thus providing a terrestrial corridor.

2) Site 6 and 7 (Hay Creek and Stream South of Hay Creek)
Approximate Reference Posts 55+00.534, 56+00.027
The current plan is to replace the existing water structures with oversized box culverts. The oversized structures would provide wildlife passage opportunities for lynx and other wildlife species, but not for larger animals such as white tailed deer which would be an ancillary benefit.

3) Site 8 (Pine River)
Approximate Reference Post 58+00.882
The bridge was built in 1992 and the existing condition does allow for limited wildlife passage. It is not known at this time whether or not the existing bridge will be replaced. The Service requires that MN/DOT investigate ways of making the existing bridge more suitable for wildlife passage (i.e. smaller riprap, level passage shelf, etc.). If the structure is replaced, the Service requires it be designed to accommodate wildlife passage.

4) Site 9 (Norway Brook)
Approximate Reference Post 60+00.584
The existing structure is a triple box culvert in good working condition. It has not yet been determined whether or not this structure will be replaced. The Service requires that MN/DOT provide wildlife passage opportunities. For example, if the culvert is to remain in place, a dry box could be inserted at one or both ends to provided passage opportunities. If the culvert is removed, the Service requires that a bridge be designed to accommodate wildlife passage.

B. Monitoring and Reporting Measures

As a term of the biological opinion, the requirement of wildlife crossing monitoring and reporting is included. The monitoring can be accomplished in a number of ways, for example, recent work in this area 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; however, the monitoring plan and its technical aspects should be jointly developed by the Service, FHWA and the MN/DOT. The duration of the monitoring effort will be a minimum of three years. The participating agencies should confer annually to review the progress being made under the plan.

Further, a final report on the design of the monitoring effort will be made available for review within one year of the date of this opinion.

As a term of the biological opinion, at the end of each predetermined one year interval, the production of an annual report is required. The report should contain a reasonable comprehensive description of the use of the wildlife crossing features. Species-specific information on vehicle/wildlife collisions should also be incorporated. One year after the completion of the three-year monitoring effort, a comprehensive final report shall be made available. This report should be a compilation of all data gathered during the monitoring effort. It is intended that the information contained in the final report can then be used to improve the site selection process and to suggest modifications to the design recommendations.

It should be noted, that currently, 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.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act requires federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary measures that serve to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information that can be used in the recovery of the listed species. The following are the conservation recommendations for the proposed action:

1) Site 2 (County Rd. 107)
Approximate Reference Post 47+00.757
The current plan is to construct a bridge at the intersection of TH 371 and County Road 107. The Service recommends that the south abutments be pulled back from the riparian buffer, thus allowing for wildlife passage.

2) Site 3 (West and East Twin Lake)
Approximate Reference Post 48+00.500
The current plans do not call for a bridge or culvert at this location. The Service recommends that the MN/DOT examine this approach, and other mitigation measures that might work at this location to reduce habitat fragmentation impacts. Other mitigation measures may include improved highway lighting or electronic sensing devices that warn oncoming traffic of wildlife in the highway rights-of-way.

3) Sites 4 and 5 (Fill Areas)
Approximate Reference Posts 53+00.035, 53+00.225
The MN/DOT has presented information on planned or future residential and commercial development in the area adjacent to these sites. This new information brings into question the utility of structural wildlife crossings. The Service recommends that the MN/DOT investigate other mitigation measures that could be employed at this location to reduce habitat fragmentation impacts.

4) Site (Locations to be determined)
In addition to the above, the Service recommends that a Forward Looking Infra-Red system (FLIR) be installed at a minimum of one location, where most appropriate within the project boundary, to serve as an augmented warning device for oncoming vehicles. This technology has been used on other highway projects with some reported success in reducing vehicle/wildlife collisions (see Appendix 2). The functional value of this system should be analyzed and the results of this analysis included with the reporting requirement. Alternatively, should it be recognized that a more comprehensive (i.e., state-wide) research project would better evaluate the utility of such FLIR systems, the implementation of such a project would fully address the intent of this conservation recommendation.

REINITIATION-CLOSING STATEMENT

This concludes consultation on the action outlined in your July 30, 2004, request for consultation for TH 371 in Cass and Crow Wing Counties, 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 is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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

Sincerely,

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