

Appendix D

Forest Road 424 (Denley Road) Reconstruction Project Biological Assessment

Executive Summary

This Biological Assessment (BA) documents the potential effects on federally proposed, candidate, threatened or endangered species and designated and proposed critical habitat that could result from a proposed road reconstruction project and associated activities as documented in the Draft Forest Road 424 (Denley Road) Reconstruction Environmental Assessment Chapters 1 and 2 (USDA FS 2006a). This BA tiers to the Programmatic Biological Assessment for the revision of the Forest Plan (USDA FS 2004c, pp. 6-7) and provides more specific information on site-specific effects of the project to threatened and endangered species.

The findings (determination of effect) of the BA are summarized below.

Effect of the Alternatives to Bald Eagle		
Alternative	Determination	Rationale
1 (proposed action) & 2 (no action)	No Effect	This project and the no action would likely have no effect on bald eagle because; suitable nesting habitat and foraging lakes would not be impacted. There are no known eagle territories within 1/4 mile of the project area so disturbance to nesting eagles would not occur. Existing habitat conditions would be maintained. The analysis area provides marginal suitable habitat and is not used by eagles in the winter.

Effect of the Alternatives to Gray Wolf and Canada Lynx		
Alternative	Determination	Rationale
1 (Proposed Action)	Likely to Adversely Affect	Highways are one of the major conservation issues for carnivores world wide. Activities associated with this project could cause lynx and wolf to avoid the area during operations. This project would result in higher traffic speeds, in combination with potentially higher traffic volumes and would likely lead to car/wildlife collisions and lynx/wolf mortality. This project would not likely lead to fragmentation, further development in the area, or create a barrier to dispersal and movement of wolf and lynx.
2 (no action)	Not Likely to Adversely Affect	These species are known to regularly cross FR 424. Although with existing traffic speeds ranging from 30-60mph mortality due to car collisions could occur but is highly unlikely because car collisions with lynx and wolf have not been documented along this road suggesting that these species whose home-ranges overlap this road are able to safely cross it in its existing condition. The existing condition of this road does not likely to increase the risks of Avoidance, Habitat Fragmentation, Movement or Development.

Effect of the Alternatives to Critical Habitat for Gray Wolf		
Alternative	Determination	Rationale
1 (proposed action) & 2 (no action)	Not Likely to Adversely Affect	Within critical habitat, the Recovery Plan emphasizes the need for space (for growth and movement of packs), food, and cover sufficient to assure the survival of gray wolves (USDI FWS 1992). Specifically, the Plan encourages management activities that maintain or develop these factors in critical habitat and minimize activities that would permanently remove forest cover, such as road construction and human development. Both alternatives would not alter the factors discussed above. Road density would remain below 1 mi/sq. mi, mitigating potential negative impacts of human development and roads in wolf recovery zone 2.

Effect of the Alternatives to proposed Critical Habitat for Canada Lynx		
Alternative	Determination	Rationale
1 (proposed action) & 2 (no action)	Not Applicable	This project area does not occur in Proposed critical habitat for lynx

1.0 Introduction

This Biological Assessment (BA) documents the potential effects on federally proposed, candidate, threatened or endangered species and designated or proposed critical habitat that could result from a proposed road reconstruction project and associated activities as documented in the Draft Forest Road 424 (Denley Road) Reconstruction Environmental Assessment (USDA FS 2006a).

This BA was prepared in compliance with the requirements of Forest Service Manual Directives sections 2670.31, 2670.5(3), and 2672.4, the Endangered Species Act of 1973 as amended, and the National Forest Management Act of 1976.

Information provided by the USDI Fish and Wildlife Service (USDI FWS 2006 Letter from Acting Field Supervisor Lori Nordstrom June 29, 2006) confirms the species and critical habitat that should be considered for projects conducted on the Superior National Forest:

- Bald eagle (threatened), with no designated critical habitat
- Gray wolf (threatened), with designated critical habitat
- Canada lynx (threatened), with proposed critical habitat

2.0 Consultation with USDI Fish and Wildlife Service

The Forest Service has initiated consultation with the Fish and Wildlife Service seeking formal consultation on the determination of effects in this BA, which concludes that the proposed action (Alternative 1) may affect, and is likely to adversely affect Canada lynx and gray wolf, and is not likely to adversely affect critical habitat for gray wolf. This project is not located within proposed lynx critical habitat.

No consultation has been requested for the bald eagle, since the BA concludes that the proposed action would have no effect on this species. However, the Forest Service has provided the analysis and determination of effects on bald eagle to the Fish and Wildlife Service Twin Cities Field Office to document the analysis.

In addition to formal consultation for Canada lynx and gray wolf requested for this project, programmatic consultation was recently undertaken for Forest Plan revision. The history of this consultation is documented in the Programmatic Biological Assessment for the revision of the forest plans (USDA FS 2004c, pp. 6-7). The relevance of program-level consultation to this project includes those agreements between the Forest Service and the Fish and Wildlife Service reached on defining elements of species' ecology and biology, risk factors and general effects, analysis parameters, monitoring, and management direction in the revised Forest Plan. The BA provides more specific

information on how relevant information in the program-level BA is incorporated. Additionally, other factors relevant to this project not discussed in detail in program-level consultation will be discussed in detail in this project BA.

Consultation specific to the Forest Road 424 Reconstruction is documented in the project file. It includes emails, telephone calls, and meeting notes between November 2004 and the submission of this BA to the FWS.

3.0 The Proposed Action:

- **Location:** Superior National Forest, Kawishiwi Ranger District, St. Louis and Lake Counties, Minnesota. (see Denley general view.pdf).
- **Ecological Setting:**

Landscape Ecosystem	Percent of Project Area	Miles
Dry-mesic red and white pine	25	2.55
Jack Pine/Black Spruce	75	7.65
<i>Data source: CDS data for Dunka, 2005 (Arc View)</i>		

- **Overview of species' Affected Environment:**

Eagle	Total #
Lakes >20 ac	5
Fish-bearing streams	0
Wolf	Percent of Project Area
Zone 1	0
Zone 2	100
Zone 3	0
Zone 4	0
Lynx	Percent of Project Area
LAU (1 in project area)	100
Proposed Critical Habitat	0
<i>Data source: Steams, Lakes, LAU, wolf zones data from Dunka, 2005, Lynx CH 12/21/05 (Arc View)</i>	

- **Other relevant setting features:**
FR 424 connects the northeast end of the Mesabi Range and Babbitt, MN with State Hwy 1 and the North Shore. It is considered a key connection route in the

Arrowhead Region and is functionally classed as a minor collector by State standards. It Provides access to three residences/cabins, Roaring Stony Resort, Cold Springs' Quarry at Harris Lake, North Shore Mine, Tire Cycle facility, the proposed Polymet Mine facility, and the city of Babbitt. Lake and St. Louis Counties currently snowplow and sand FR 424 each winter as a public service. FR 424 is a part of the Arrowhead Region Bikeways system, which requires 4-foot paved biking shoulders (USDA FS 2001). Annual Average Daily Traffic (ADT) is 130 with the majority (70%) of the traffic by light cars and trucks, and the rest (30%) commercial truck traffic (USDA 2006a).

The Denley Road project lies entirely within the Dunka Project area. The BA tiers to some of the analysis that was done for that project (USDA FS 2005a, 2005b).

- **Proposed action summary**

The USDA Forest Service Superior National Forest proposes 10.4 miles of road reconstruction. The proposed action and its 1 alternative (the no action) are described in Draft Forest Road 424 (Denley Road) Reconstruction Environmental Assessment (USDA FS 2006a, pages 6-8), and proposed mitigations are listed on pages 8-9. The action alternative includes the following activities, in different amounts and locations:

- Upgrade and pave a gravel road (see Denley FR 424.pdf)
- Relocate portions of snowmobile trail where it is impacted by road reconstruction (see Relocations of Stony Spur Trail.pdf)
- Use gravel from three existing gravel pits, closing and rehabilitating one upon completion (see Denley general view.pdf)
- Restore Denley Creek (see Denley Section B Wetlands.pdf)
- Decommission two unauthorized roads (see Unclassified Roads for analysis.pdf)

- **Purpose of the action:**

The purpose of the action is to upgrade the Denley road so that it meets county road design safety standards suitable for state-aid. Jurisdiction of the road would then be transferred to Lake and St. Louis Counties and is described in the Draft Forest Road 424 (Denley Road) Reconstruction Environmental Assessment (USDA FS 2006a, pages 3-5).

- **Time frame of the action:**

Anticipated timeframes of the action are described in the Draft Forest Road 424 (Denley Road) Reconstruction Environmental Assessment (USDA FS 2006a, page 3).

All activities (includes: upgrading and paving, relocating portions of snowmobile trail where it is impacted by road reconstruction, using gravel from three existing gravel pits, restoring Denley Creek, and decommission two unauthorized roads)

- *Estimated start date:* fall, 2006
- *Estimated duration:* 2 years

- **Project activities analyzed in program-level BA**

Proposed actions	Alt. 1	Alt. 2	Addressed in Program-level BA?
Upgrade and pave a gravel road	X		No
Relocate portions of snowmobile trail where it is impacted by road reconstruction	X		Yes
Use gravel from three existing gravel pits	X		Yes
Restore Denley Creek	X		Yes
Decommission two unauthorized roads	X		Yes
<i>Data source:</i> Draft Forest Road 424 (Denley Road) Reconstruction Environmental Assessment (USDA FS 2006a) and Programmatic BA for Revised Forest Plans June 2004			

4.0 Status of the Species

4.1. Bald Eagle

Ecology (see section 2.3 of program-level BA)

- **Terrestrial Habitat:** No new information
- **Aquatic Habitat:** No new information
- **Diet:** No new information

Population Status (see section 2.4 of program-level BA)

- **Breeding population/trend in United States:** No new information
- **Breeding population/trend in Minnesota:** Statewide there appears to be a 28% increase in active nests from the 2000 survey (MN DNR 2006)
- **Breeding population/trend in the National Forest:** On the Superior National Forest the 2005 survey shows a 15.4% increase in active nests from 2000 (MN DNR 2006)

- **Wintering population/trend (United States, Minnesota, National Forest):** No new information

Population Status in Project Area:

- **Project site-specific surveys:** none
- **Known occurrences:** none
- **Potential habitat:** limited. There are 5 lakes within 1.5 miles of the Denley Road that are of suitable size for foraging by eagles. However suitable stands for nesting are isolated and none are located adjacent to these 5 lakes. These lakes have older aspen stands adjacent to them however no super-canopy pines occur adjacent to them.

Factors Affecting Eagle Environment (see section 2.5 of program-level BA)

- **Terrestrial habitat (habitat loss, forest management, etc):** No new information
- **Aquatic habitat (changes in aquatic prey base, etc):** No new information
- **Human Disturbance (forest management, roads, recreation activities, trauma, etc):** No new information
- **Other factors:** No new information

4.2 Gray Wolf

Ecology (see section 3.3 of program-level BA)

- **Breeding habitat:** No new information
- **Home range and dispersal:** The 2003-04 survey (Erb and Benson 2004) indicates total wolf range has remained stable since 1998 and pack territories have decreased in size.
- **Diet:** No new information

Population Status (see section 3.4 of program-level BA)

- **North America and Minnesota:** No new information
- **Superior National Forest:** Population estimates indicate a 26% increase since 1997-98 (Erb and Benson 2004).
- **Summary of wolf mortality in Minnesota:** No new information.

Population Status in Project Area:

- **Project site-specific surveys:** None. However, surveys were done in the Dunka Project Area (USDA FS 2005a and 2005b) for Canada lynx and occurrences of wolves were also documented. In addition, several packs tracked by the Minnesota Wolf Project are monitored in the analysis area.
- **Known occurrences:** 3 known pack territories overlap the analysis area, with many known/historically used den-sites (Nelson 2005 and 2006). Some of the project area is currently unoccupied. Foraging habitat is

abundant and well distributed across the analysis area (USDA FS 2005a). Den sites vary and consist of rock crevasses, blow-down patches, underground dug dens, and depressions on the ground (Nelson 2005).

3.5 Factors Affecting Wolf Environment

- **Prey habitat:** No new information
- **Human access:** The programmatic BA addresses many risk factors of human access into wolf environment (see 3.5.2 of program-level BA). Effects addressed include: increased chance of direct killing (legal and illegal); increased chance of introducing new diseases and parasite to wolves via pets; and possible deterrence to colonization of otherwise suitable habitat (barriers to dispersal). The effects of high standard roads (OML 3-5) are discussed however, the effects addressed are tied to road density and do not adequately address the all the relevant effects of upgrading and paving an existing gravel road. No analysis indicators were selected in the Programmatic BA to address the effects of high standard roads. Below is a discussion of additional effects that are relevant to the proposed Denley Road upgrade.

High Standard Roads (upgrades and highways)

The effects that high standard roads and highways have on wildlife are well known (Blanco et. al. 2005, Cain et. al. 2003, Jackson 2000, Ruediger 2000, Stein 2000, Whittington et al. 2004, Whittington et. al. 2005, and others). It is widely accepted that forest roads and highways can adversely affect carnivores by increasing direct and indirect mortality, causing displacement and avoidance of habitat near highways, increasing habitat fragmentation, and direct habitat loss and habitat loss due to associated human developments (Forman and Alexander 1998, Jackson 2000, Ruediger 2000, Ruediger et. al 2000, USDA FS. 2000, Whittington 2004, Whittington 2005.)

According to Ruediger (2000)

“The impact on carnivores resulting from upgrading and newly paving roads are often permanent and severe. The beginning point in the highway development cycle is where gravel forest roads are paved. The paving of forest roads has become more common as the Forest Service moves from commodity based programs like timber production to recreation programs. Paving creates several effects that adversely affect carnivores. Paving increases vehicle speed, which places wildlife at greater risk to injury and mortality. Where as road kills rarely occur on gravel roads. Traffic volumes increase with paving as access becomes faster and easier. Seasonal and permanent homes usually increase after paving. Potentially serious and permanent habitat fragmentation occurs as the density of highways is increased. The paving of forest roads,

while providing more efficient public access is almost always detrimental to wildlife.”

Gunther et. al. (1998) found that in Yellowstone Park large mammals were killed by vehicles significantly more than expected on roads that were fairly straight, having a wide paved surface (26-32 ft) including large paved shoulders and a wide clear zone on either side of the road; and significantly less than expected on road that had curving and winding configuration with narrow pavement widths (19-24 ft), abrupt edges, and little or no shoulders and cleared areas beyond the road edge. This study also found that on the straighter and wider roads within the park, actual driving speeds averaged 17 mph above the posted speed limit; and on the narrower and winding roads actual average vehicle speeds were within 1 mph of the posted speed limit. They further looked at the influence of upgrading portions of an existing road from a narrow (22-24 ft) road with tight curves, abrupt edges, no shoulders, and narrow roadside cleared zones; to a road with wider paved surface (30 ft), paved shoulders, gentler curves, and wide clear zone on either side of the road. Even though the old segment of road and the reconstructed portion had an identical posted speed limit, on average, vehicles traveled 5 mph faster on the newly reconstructed portion. They concluded that design of the road appeared to influence vehicle speed more than the posted speed limit.

Activities such as crossing structures have been attempted to mitigate adverse effects of highways on wildlife in various parts of the world (Jackson and Griffin 2000, Ruediger 2005, Ruediger 2001, Ruediger et. al 2000, and others). Most wildlife crossing structures targeting carnivore use have been designed and constructed on 4-lane highways, because these types of highways create the greatest barrier to carnivore movement and dispersal. Crossing structures are just beginning to be designed into highway project in Minnesota (Hwy 61 reconstruction, Hwy 2 reconstruction, and Hwy 1 reconstruction). In Minnesota, monitoring is needed to determine the effectiveness of crossing structure in our landscapes (Moen 2006a). As of this time, there is no known mitigation that can be proven effective [when upgrading a gravel road to a paved 2-lane highway] (Ruediger 2000).

- **Other factors:** No new information

4.3 Canada Lynx:

Ecology (see section 4.3 of program-level BA)

- **Home range and dispersal:** No new information
- **Diet:** No new information
- **Den site selection:** No new information

- **Mortality:** The programmatic Biological Assessment (USDA FS 2004c) identified paved roads as one of several factors contributing lynx mortality across its range. At that time, most documented lynx road mortality was in relocated animals suggesting that introduced animals may be more vulnerable to highway mortality than resident lynx (Brocke et al 1990 in USDA FS 2004c). Since the writing of the programmatic BA more information has become available on lynx road mortality. It is evident by the data that follows, paved and gravel roads are both factors that contribute to resident lynx mortality.
 - In Minnesota, since 2001, 6 lynx are known to have been killed on roads (USDA FS 2006b):
 - 3 were on paved highways (speed limits 46-60+ mph)
 - 2 were on secondary roads (speed limits?-60 mph)
 - 1 was on a gravel Forest Service Road (OML 3) (speed limits 26-45 mph)
 - In Maine, since 2000, all lynx road mortality (6 animals) documented has occurred on (gravel) logging roads. Most mortality occurred on two-lane haul roads where higher traffic volume and speed would occur. These roads are open to the public, and public traffic volume exceeds logging traffic by several fold (McCollough in Delphey 2006).

Trapping, hunting, and other potential sources of human caused mortality are indirectly influenced by roads and are address in the programmatic BA. Since 2002, 3 lynx are known to have been shot and 13 lynx known to have been trapped in Minnesota. Of the trapped lynx 8 were released alive (USDA FS 2006b).

- **Interspecific relationships with other carnivores:** No new information
- **Population dynamics:** No new information

Population Status (see section 4.4 of program-level BA)

- **North America:** No new information
- **Minnesota:** According to the MN DNR as of July 6, 2006 (Lynx sighting website accessed July 13, 2006):
 - 402 reports with location information have been received to date
 - 53 (13%) reports have been verified as lynx
 - 35 (9%) reports are assumed to provide evidence of reproduction
- **Superior National Forest:** NRRI was captured and collared 32 lynx on the Superior NF. Radiocollared females had 10 kittens in 2004 and 12 kittens in 2005. Of the 2004 kittens at least 1 survived to the end of 2005. Of the 32 lynx radiocollared by December 31, 2005 2 died in 2003 and 14 deaths were recorded between 2004 and 2005 (Moen et.

al. 2005 and 2006). No updated information is available on lynx confirmed through genetic sampling.

- **Minnesota's lynx-hare cycles:** The 2004 grouse and hare census states that while we remain near a peak, a cyclic decline in hare numbers may be starting, or can be expected soon (Erb 2004a). Based on known cyclic patterns, snowshoe hare indices have been expected to decline. Following a 'prolonged' peak, hare winter track indices declined for the first time in 6 years (Erb 2004b). It appears that MN DNR stopped tracking snowshoe hare indices after 2004.

Population Status in Project Area:

- **Project site-specific surveys:** Snow tracking surveys were conducted in the analysis area during January-March 2004. Presence and relative abundance of large and mid-sized carnivores, snowshoe hare and red squirrel were documented. In all, there were 3 recorded instances of lynx (*Lynx canadensis*), 25 of fisher (*Martes pennanti*), 24 of marten (*Martes americana*), 6 of grey wolf (*Canis lupus*), 25 of coyote (*Canis latrans*), 1 of red fox (*Vulpes vulpes*), 4 of river otter (*Lutra canadensis*), 2 of unknown canid (likely domestic dog), 18 areas of snowshoe hare (*Lepus americanus*) activity, and 7 areas of red squirrel (*Tamiasciurus hudsonicus*) activity (USDA FS 2004e).
- **Known occurrences:** There are over 475 telemetry locations (including GPS locations) from collared animals in the analysis area (LAU SNF 11) from 5 individuals (2 males, 2 females and 1 kitten). Individual lynx were documented using habitats within the analysis area anywhere from a few days to several months. Locations are not well distributed throughout the analysis area and there are areas where no locations occur. These areas could be occupied by uncollared lynx or unoccupied. One collared female lynx localized (possible denning behavior) within SNF 11 in the spring of 2005. (Moen 2005 and 2006b).

Factors Affecting Lynx Environment (see section 4.5 of program-level BA)

- **Roads and trails:** See other factors below.
- **Winter dispersed recreation:** No new information.
- **Trapping and shooting:** A lawsuit was recently filed by the Animal Protection Institute (API) against the Minnesota Department of Natural Resources citing that actions must be taken to protect threatened and endangered species (including lynx) from illegal trapping (See previous section on mortality for specific data on trapping and shooting mortality in Minnesota).
- **Vehicle collisions:** See other factors below.
- **Other factors:** The program-level BA addresses many of the risk factors related to lynx Productivity, Mortality, Movement and Dispersal and other Large Scale factors (see section 4.5 of the program-level BA). However, the program-level BA did not address all the relevant effects of upgrading

Conservation Measures from the LCAS were incorporated into the Forest Plan to help recognize and address the potential adverse impacts to lynx. Specifically G-WL-9 was incorporated to address the impacts that can occur with the upgrading of a gravel road.

G-WL-9 States "Dirt and gravel roads that are under the jurisdiction of the National Forest and that traverse lynx habitat on NFS land (particularly those roads that could become highways) should generally not be paved or otherwise upgraded in a manner that is likely to lead to significant increases to lynx mortality or substantially impedes movement and dispersal.

If the dirt and gravel roads described above are upgraded or paved in order to meet human health and safety or other environmental concerns and essential management needs, conduct a thorough analysis on effects to lynx and its habitat to determine minimum road design standards practical (including measures to minimize traffic speeds), to minimize or avoid foreseeable contribution to increase in human activity or adverse impacts to lynx and its habitat."

Below is a discussion of additional risk factors associated with the upgrading and paving a gravel road.

Upgrading and paving a gravel road

Factors affecting lynx mortality

Range wide, there are few records of lynx being killed on highways, but direct mortality from vehicular collisions may be detrimental to small lynx populations in the lower 48 states (Ruediger et. al. 2000). Mortality levels can drastically increase with relatively small increases on traffic volume and speed. In Minnesota, since 2001, 6 lynx are known to have been killed on roads (USDA FS 2006b). Lynx in the Superior National forest do not avoid roads and some have been documented using highway shoulders and ditches for travel (Moen 2006a). Studies in various parts of the United States and the world have attributed highways as a major threat to lynx survival (Ruediger et. al. 2000).

Factors affecting lynx movement

Highways can alter landscapes by fragmenting large tracts of land. As the standard of road increases from gravel to 2-lane highways, traffic volumes increase. Lynx and other carnivores may avoid using adjacent habitat or become intimidated by highways traffic and may not cross (Gibeau and

Heuer 1996 in Ruediger et. al. 2000). The degree of impact increases as highways are upgraded from 2-lanes to 4-lanes. The impacts of traffic volume has not been studied but research on highways in Canada suggest that 2,000-3,000 vehicles per day could be problematic and volumes of 4,000 vehicles or more per day are considered serious impacts in terms of both mortality and habitat fragmentation (Ruediger et. al. 2000).

Highways impact lynx by fragmenting habitat and impeding movements. As traffic lanes, volume, speeds and right-of-way width increase, the effects on lynx are magnified. As human demographics change, highways tend to increase in size and traffic density.

Attempts to mitigate highway losses by signing, reducing speed limits and public education have had little or no effect on decreasing losses. Lynx use of highway underpasses constructed in Banff National Park has been documented (Heuer 1995 in Ruediger et. al. 2000). The Lynx Conservation Assessment and Strategy recommends that within key linkage areas, highway crossing structures should be employed to reduce effects. However crossing structures area just beginning to be designed into highway project in Minnesota (Hwy 61 reconstruction, Hwy 2 reconstruction, and Hwy 1 reconstruction). Monitoring is needed to determine the effectiveness of crossing structure in Northern Minnesota landscapes (Moen 2006a). As of this time, there is no known mitigation that can be proven effective [when upgrading a gravel road to a paved 2-lane highway] (Ruediger 2000).

5.0 Affected Environment and Environmental Consequences

5.1 EAGLE:

A. Analysis Area:

- **Direct/Indirect Effects Analysis Area:**
 - *Habitat indicators:* An area within 1 ½ mile of existing bald eagle nests and 1 ½ miles of the Denley Road is used to analyze Habitat indicators.
 - *Human Disturbance indicators:* An area within ¼ miles of proposed activities is used to analyze Human Disturbance indicators.
- **Cumulative Effects Analysis Area:** Cumulative effects are not analyzed because there would be no direct or indirect effects.

Rationale: The 1 ½ mile analysis area is chosen because all known eagle nests on the Superior National Forest are within 1 ½ miles of suitable foraging

areas. Most nest and roost trees are actually within ½ mile of suitable lakes and streams. The ¼ mile analysis area for human disturbance is chosen because it is identified by the recovery plan as the area within which effects to nesting eagles should be considered.

B. Effects Analysis:

- **Identify and analyze the direct and indirect effects of the action and the cumulative effects of other actions in the project area.**

Indicators

Forest Plan BA Indicator	Use?	Rationale for exclusion
1. Red and White pine mgt 0-9 yrs old	Y	This project would result in no change to the condition of these indicators however, data is considered and is contained in the Dunka BA (alt 4)
2a. Acres of RW pine forest		
2b. Acres of RW pine forest 100 yrs old		
3. Miles of ATV trails		
4. Miles of snowmobile trails		
5. Miles of temp roads		
Other Indicators		Rationale for inclusion
Habitat change for bald eagle within 1 ½ mile of FR 424		To assess the effects to eagle habitat
Human disturbance with ¼ miles of known bald eagle nests		To assess the effects of human access

CUMULATIVE EFFECTS

No cumulative effects are expected because no direct or indirect effects would occur to the eagle.

C. Consistency with Forest Plan:

Forest Plan Guidance	Direction	Alts In Compliance	Basis for Compliance	Remarks
O-WL-4	Maintain or improve habitat	both	Rationale for exclusion of indicators	
O-WL-5	Seek opportunities to benefit TE spp.	Nether alternative is designed to further this objective		Species and habitat not impacted

Forest Plan Guidance	Direction	Alts In Compliance	Basis for Compliance	Remarks
O-WL-6	Reduce or eliminate adverse effects to TE	both	Effects analysis	Species and habitat not impacted
O-WL-7	Minimize building or upgrading roads in TE areas	both	Analysis areas	This project area provides marginal suitable habitat for eagles and is not likely to be very important for the recovery of the species.
O-WL-16	Promote the conservation and recovery of bald eagle	Nether alternative is designed to further this objective		Species and habitat not impacted
S-WL-3	Management will be governed by Bald Eagle Recovery Plan	Both	Effects analysis	Species and habitat not impacted

D. Determination of Effect – Bald Eagle

Alternative	Determination	Summary of Rationale
1 (proposed action) & 2 (no action)	No effect	This project would likely have no effect on bald eagle because; suitable nesting habitat and foraging lakes would not be impacted. There are no known eagle territories within 1/4 mile of the project area so disturbance to nesting eagles would not occur. Existing habitat conditions would remain. This area provides marginal suitable habitat and is not used by eagles in the winter.

GRAY WOLF:

A. Analysis Area:

- **Direct/Indirect Effects Analysis Area:**
 - *Habitat indicators:* Dunka Project Area
 - *Human Disturbance indicators:* Dunka Project Area

- **Cumulative Effects Analysis Area:** Cumulative effects analysis area is the Dunka project area. 10 years is a reasonable timescale to realistically predict future federal and non-federal actions.
- **Rationale:** The analysis area boundaries are appropriate because they are large enough to overlap the territories of three packs and are an appropriate size to address the impacts to these packs. The programmatic BA has done a complete job of considering cumulative effects to wolf habitat across a broad landscape, in which effects are similar at the project scale. It is not necessary to go out to the Wolf Zone scale because this project does not change the road density of OML 3-5 roads. The appropriate scale for cumulative effects is the Dunka project scale because the concern for negative impacts comes primarily from human access which is best measured at the site-specific scale. Therefore, cumulative effects should be measured at this scale. The time scale is appropriate because it includes all known future projects and provides a reasonably reliable estimate of what is expected to happen.

B. Effects Analysis:

- **Identify and analyze the direct and indirect effects of the action and the cumulative effects of other actions in the project area.**

Indicators

Additional indicators selected to address Human Access: Upgrading and Paving a gravel road.

As identified in the Factors Affecting Wolf Environment section of this BA (section 3.5), projects that upgrade and pave gravel forest roads can have detrimental negative effects to wildlife. Please refer to that section for more detailed discussion. In summary, these risks include:

- Mortality
- Habitat Fragmentation
- Avoidance (barriers to dispersal)
- Development

Indicators are chosen to address these risk factors of the proposed Denley Road. These indicators are listed in the following tables with rationale for their inclusion.

Forest Plan BA Indicator	Use?	Rationale for exclusion
1. Acres and percent of young upland forest <10 years old	Y	This project would result in no change to the condition of these indicators however, data is considered and is contained in the Dunka BA (alt 4)
2. Acres and percent of upland conifer (spruce and pine) > 9 years old on all uplands		
3. Miles of RMV trails		
4. Cross-country use policy for RMVs		
5. Miles of temp and OML 1 roads		

Other Indicators	Rationale for inclusion
6. Road width (driving surface, shoulders, and recovery area)	These two indicators are chosen to as a means to help assess indirect effects to wolf, specifically the risks of mortality and avoidance. As traffic speed and volume increase so does the potential for car/wolf collisions. It is generally accepted that driving speed can be influenced by many factors including: driver's age and gender, perceived risk of law enforcement or crash, driver familiarity with the road, weather, and various road characteristics (such as width and design). Studies have shown that road design rather than posted speed may have a greater influence on how fast people drive (Gunther et. al 2000). Avoidance will also be assessed with these indicators. In general, as roads get wider and traffic volumes increase they can become barriers to wildlife movement.
7. design speed*	
8. OML	This indicator is chosen to as a means to help assess the impacts to one of the features identified by the recovery plan as important in critical habitat. The feature that will be addressed is: Space for normal growth and movement of packs (USDI FWS 1992). Other important features of critical habitat (specifically sufficient supply of food and cover) would not be impacted by this project. Road density of high standard roads (OML 3-5) is thought to be good indice to the amount of human activity (Fuller, 1995) or human access and by extension human disturbance (Stein, 2000) in an area. This appears to support one of the main points of the federal Recovery Plan: maintain large blocks of habitat relatively free of human access. When used in this context, road density can be used as predictor of the capability of critical habitat to sustain a breeding population of wolves and can be used to assess the impacts to space for normal growth and movement of packs. 1992 Recovery Plan calls for road density of high standard roads to remain below one mile per square mile in Zones 1, 2 and 3. This indicator will be used to consider the risk of Avoidance, Development and Habitat Fragmentation.

* note about design speed: Speed limits are only peripherally related to the design speed of the road. In the United States, the design speed is "a selected speed used to determine the various geometric design features of the roadway" according to the 2001 AASHTO Green Book, the highway design manual. It has been changed from previous versions which considered it the "maximum safe speed that can be maintained over a specific section of highway when conditions are so favorable that the design features of the highway govern." The design speed has largely been discredited as a sole basis for establishing a speed limit. Current U.S. standards for design speed derive from outdated, less-capable automotive technology. Also,

the design speed of a given roadway is the theoretical maximum safe speed of the roadway's worst feature (e.g., a curve, bottleneck, hill, etc.). The design speed usually underestimates the maximum safe speed for a roadway and is therefore considered only a very conservative "first guess" at a limit.

[<http://www.speedingtickethelp.info/facts-on-speeding/road-speeds.shtml>]. For example, curves designed for 40 mph may actually be posted/driven 5 to 10 mph higher (R. Pekuri, personal communication 7/3/2005).

Existing Conditions and Effects

Affected Environment

Mortality: At least three known wolf pack home ranges overlap the analysis area. No wolves are known to have been killed along roads within the analysis area, although few records of any animals killed along forest roads in the area have been recorded.

Currently, annual Average Daily Traffic (ADT) on the Denley road is 130 with the majority (70%) of the traffic by light cars and trucks. Most of this traffic is people commuting from the Babbit area to areas near the North Shore of Lake Superior. Existing traffic speeds on FR 424 have been observed between 30-60 mph, the road has one 35 mph speed limit sign, however this speed limit is not enforced (R. Pekuri personal communication 7/3/2006).

Habitat Fragmentation: Habitat for wolves and its prey is abundant in the analysis area (USDA FS 2005a). Two high standard roads (FR 424 and Highway 1) are located within the analysis area, both are (or are proposed for) two-lane highways. The majority of the analysis area is in public ownership and is forested. Based on the movements of radio collared packs the existing amount of habitat fragmentation in the analysis area does not appear to be an issue for wolves.

Avoidance (barriers to dispersal): Wolves are known to cross roads within the analysis area (including FR 424 and Hwy 1). Home ranges of known packs currently overlap both the Denley road and Highway 1, and wolves regularly cross both roads. The roads do not appear to act as barriers or restrict wolf movement across the landscape.

Development: Over 87% of the analysis area is currently under public ownership (USDA FS 2004b). FR 424 connects the northeast end of the Mesabi Range and Babbitt, MN with State Hwy 1 and the North Shore. It is a key connection route in the Arrowhead Region and is functionally classed as a minor collector by State standards. In its existing condition, FR424 does not meet the minimum design safety standards for this designation. It Provides access to three residences/cabins, Roaring Stony Resort, Cold Springs' Quarry at Harris Lake, North Shore Mine, Tire Cycle facility, the proposed Polymet Mine facility, and the city of Babbitt. In addition Franconia uses the 424 rd in mineral exploration activities in the Birch Lake area. FR 424 is a part of the Arrowhead Region Bikeways system.

Environmental Consequences

Indicators	Alt 1 Proposed Action	Alt 2 No Action = existing condition
6. Total Road width (Feet)	54	22-28
drive surface	24 (paved)	20-22 (gravel)
shoulder	5 (4 foot paved)	2 (gravel)
recovery zone	10	0-4
7. Design Speed (miles/hr)*	40	35 (however most of the alignment meets 45 currently)
8. OML	5 (paved surface)	5 (gravel surface)
<p><i>Data source:</i> Existing condition - Forest Development Road #424 0 Denley Road Fact Sheet (USDA FS 2001), and Draft Forest Road 424 (Denley Road) Reconstruction Environmental Assessment Chapters 1 and 2 (USDA FS 2006a). Proposed condition - Draft Forest Road 424 (Denley Road) Reconstruction Environmental Assessment Chapters 1 and 2 (USDA FS 2006a)</p> <p><i>*Footnote on design speed:</i> Most of the current alignment meets 45 mph. The proposed action would not result in a slower design speed but that the roads “worst features” (hills and curves) would be designed at 40 mph.</p>		

Direct Effects

Alternative 1 (proposed action)

The direct effects of all activities (including upgrading and paving the road, relocating the snowmobile trail, using gravel pits, decommissioning two roads and restoring Denley creek) are considered together here as the “proposed project” because all activities are interrelated and/or interdependent to the upgrading and paving of FR 424. The proposed project may have direct effects to wolf by causing them to avoid the area during reconstruction activities. These direct effects are expected to be negligible because they would be relative short in duration (~ 2 years) with wolves likely returning to the area when activities return to more predictable levels. In the unlikely event that a den is discovered during operations the den site would be protected during the denning season in accordance with Forest Plan G-WL-10.

Alternative 2 (no action)

This alternative would have no direct effects to wolf because no actions would occur that could disturb wolves.

Indirect Effects

Analysis indicators show that the end result of the proposed Denley road upgrade and associated activities would result in a road corridor that would be nearly twice the existing width, an overall 5 mi/hr higher design speed on hills and curves, wider paved driving surface and shoulders, and wider cleared zones. These upgrades could compound risk factors (mortality, habitat fragmentation, avoidance, and development) having harmful indirect effects on wolf. Each risk factors and effects to wolf critical habitat is discussed below.

MORTALITY

Alternative 1 (proposed action)

Studies have shown that upgrading roads leads to higher traffic speeds which in turn can lead to higher mortality of wildlife. Using the Yellowstone study for comparison, the proposed Denley road upgrade would put it in the class were large mammals were killed by vehicles significantly more than expected. There is debate over the benefit to wildlife of wide roadside clear zones. Some feel that wide roadside clear zones give drivers and animals more sight distance to see and avoid each other. While this may be true, wide cleared roadsides can be attractive foraging areas to animals such as deer and moose which can lead to higher vehicle collision with these species. Wide cleared roadsides also provide greater sight distance for those humans wishing to do harm to wolf. The speed limit at which FR 424 road would be posted is unknown. A traffic study would be done during the design phase of the project to determine this. As stated before speed limits are only peripherally related to the design speed of the road, but can be used to make an educated guess as to what the posted speed and actual driving speed might be. When reconstruction is completed most of FR 424 would be designed at 45 mph, with the slowest curves designed at 40 mph. According to Roger Pekuri, Forest Engineer, posted speeds could be 5-10 mph above the design speed. Again, using the Yellowstone study for comparison, if posted speeds are between 50-55 mph, actual average driving speeds could be between 67 and 72 mph. This would be an increase of 37-42 mph over the speeds that at which drivers are currently going. If the road is reconstructed, the counties would take over jurisdiction including enforcement of the speed limit. However, the reality is that with shrinking county budgets, enforcement of posted speed limits on this road would likely be minimal. With known wolf packs having home ranges that overlap the Denley road and increase in traffic speeds, there is a much greater risk and high likelihood that car/wolf collisions could. Impacts to individual wolves would be likely, however based on increasing wolf populations over the past two decades wolf populations in the project area would likely remain stable.

Alternative 2 (no action)

Radio-collared wolves regularly cross FR 424. Although with existing traffic speeds ranging from 30-60mph wolf mortality due to car collisions could occur but is highly unlikely because wolf/car collisions had not been documented along this road suggesting that wolves whose home-ranges overlap this road are able to safely cross it in its existing condition.

HABITAT FRAGMENTATION and AVOIDANCE (BARRIERS TO DISPERSAL)*Alternative 1 (proposed action)*

The risk of this project creating habitat fragmentation or a barrier to dispersal for the wolf is low for the following reasons. Habitat fragmentation and avoidance may be more of a factor for wolves when 2-lane highways are upgraded to 4-lane highways. It is generally accepted that traffic volumes of 4,000 vehicles or more per day are considered to have serious impacts in terms of both mortality and habitat fragmentation (Clevenger and Alexander 1999 in Ruediger 2000). It is unknown how traffic volume may increase on this road but with existing ADT of 130 it is extremely unlikely that it would approach anywhere close to that level within the next 10 years. Snowmobile trail reroutes would occur within the 66 feet of the cleared-limits or the road containing its use within the same corridor so it would not lead to further fragmentation of this area. Wolves may avoid the Denley road area while reconstruction activities are occurring (see direct effects), but it is very unlikely that the proposed upgrade would become a barrier to dispersal or limit wolf movement across the landscape. The incorporation of crossing structures in the reconstruction design may help maintain permeability of the road for wolf movement; however the effectiveness of these structures for wolves in Minnesota landscapes has not been studied. There is ample suitable habitat available throughout the analysis area (USDA FS 2005a), and wolves are known to cross and not avoid roads with similar and faster design speeds in Northern Minnesota.

Alternative 2 (no action)

Habitat for wolves and its prey is abundant in the analysis area (USDA FS 2005a). Two high standard roads (FR 424 and Highway 1) are located within the analysis area, both are (or are proposed for) two-lane highways. The majority of the analysis area is in public ownership and is forested. Based on the movements of radio collared packs the existing amount of habitat fragmentation in the analysis area does not appear to be an issue for wolves.

DEVELOPMENT*Alternative 1 (proposed action)*

The risk of this project leading to more development that could affect wolf is low for the following reasons. Private lands are being subdivided and sold throughout the Superior National Forest (Diane Soland, Superior National Forest Realty Specialist, pers. communication). The primary demand appears to be for recreation residences. This trend is likely to continue over the next 10 years. However, it is unlikely that this project would cause more development in the analysis area. Currently, more than 87% of the analysis area is in public ownership. Although some private lands within the analysis area would likely be sold over the next 10 year the impacts from development of these lands would be minor, because of the small amount of private lands in the analysis area.

Alternative 2 (no action)

Currently, more than 87% of the analysis area is in public ownership. Although some private lands within the analysis area would likely be sold over the next 10 year the impacts from development of these lands would be minor, because of the small amount of private lands in the analysis area.

CRITICAL HABITAT

Alternative 1 (proposed action)

The existing Operational Maintenance Level (OML) of FR 424 is a level 5. This indicates the highest level of maintenance intensity and is assigned to Forest system roads that provide a high degree of user comfort and convenience (normally double lane, and may be aggregate surfaced or paved). The proposed upgrade of FR 424 and associated activities would maintain the road at an OML 5, resulting in no change to existing road density of high standard roads in critical habitat. Road density would remain below 1 mi/sq. mi. mitigating potential negative impacts of human development and roads in wolf recovery zone 2.

The recovery plan outlines the need to providing space for the normal growth and movement of established packs in critical habitat. The recovery plan identifies that projects that permanent removal of forest cover thru activities such as road building and development should be minimized. The proposed project would result in a cleared road corridor that is approximately 30 feet wider than the existing road corridor. This would permanently convert approximately 38 acres (15 feet on either side of road for the entire length) of existing forest habitat to non-forest. The impact of this loss of forested habitat would likely be insignificant because it would not likely limit or create a barrier to wolf movement or dispersal across the landscape in this area (see analysis above on the risks of habitat fragmentation, avoidance and development).

Therefore, upgrading FR 424 this project is not expected to result in any direct or indirect alteration that would appreciably diminish the value of critical habitat for both the survival and recovery of the species because. Space for the normal movement and survival of packs would be maintained.

Alternative 2 (no action)

The existing Operational Maintenance Level (OML) of FR 424, level 5, would be maintained. Road density would remain below 1 mi/sq. mi. mitigating potential negative impacts of human development and roads in wolf recovery zone 2 (see analysis above on the risks of habitat fragmentation, avoidance and development).

C. Consistency with Forest Plan:

Forest Plan Guidance	Summary of Direction (see Forest Plan)	Alternatives In Compliance	Basis for Compliance	Remarks
O-WL-4	Maintain or improve habitat	both	Effects analysis Summary of rationale for effects to critical habitat	Habitat is maintained
O-WL-5	Seek opportunities to benefit TE spp.	Nether alternative is designed to further this objective		
O-WL-6	Reduce or eliminate adverse effects to TE	both	Mitigations Effects analysis	Crossing structures
O-WL-7	Minimize building or upgrading roads in TE areas	2	Draft EA Ch 1 and 2	Road is not upgraded
O-WL-17	Promote the conservation and recovery of gray wolf	both	Summary of rationale for effects to critical habitat	Habitat is maintained and road density remains below 1 mi/sq. mi.
S-WL-4	Management will be governed by Gray Wolf Recovery Plan	both	Mitigations Effects analysis Summary of rationale for effects to critical habitat	Habitat is maintained and road density remains below 1 mi/sq. mi.
G-WL-10	Provide for the protection of known active den sites	both	mitigations	Active dens would be protected

CUMULATIVE EFFECTS

Known future timber harvests on federal and non-federal lands (see the Dunka BA (USDA FS 2005a and 2005b for expected harvest activities) will contribute to foraging habitat for prey species. 20 miles of roads that are currently open to RMV's will be decommissioned in the analysis area over the next 5-10 years. These activities would benefit wolves by reducing human access to wolf habitat and maintain foraging opportunities. A potential future ATV trail and special use access requests could cause impacts to wolves by increasing road mileage in the project area, although likely by minor amounts. The effects of these federal projects would be addressed in separate analyses and wolf would be considered in planning for these projects. If the proposed Polymet mine is developed, it could lead to and increase in traffic volume on FR 424. At this time it is impossible to predict how much. However, based on increasing wolf populations over the past two decades, these cumulative impacts would not likely have a major impact on wolf population in the reasonably foreseeable future. When the effects of future mine proposals are analyzed the effects to wolves of population growth in surrounding communities would need to be addressed. There would be no cumulative effects of using existing gravel pits, restoring Denley creek and decommissioning unauthorized roads however, human population grows in Northern Minnesota so does the demand for recreational snowmobile trails. It is very likely that, over time, the snowmobile use on this trail would increase.

It is important to note that the upgrading and paving of a gravel forest road is the beginning point in a highway development and is a permanent and potentially severe change to the wolf environment. It is an action that once put into place, can not be undone. Highways are one of the major conservation issues facing carnivores world wide.

D. Determination of Effect

Effect of Alternative 1 (proposed action) on Wolf		
Management Activity	Determination	Summary of Rationale
Upgrade and pave a gravel road	Likely to Adversely Affect	Higher traffic speeds in combination with potentially higher traffic volumes would likely lead to car/wolf collisions and wolf mortality. Crossing structures could be considered as a possible way to mitigate negative effects; however their effectiveness has not been studied in Northern Minnesota. See effects analysis above for more details. This project is not likely to increase the risks of Avoidance, Habitat Fragmentation, or Development.

Effect of Alternative 1 (proposed action) on Wolf		
Management Activity	Determination	Summary of Rationale
Relocate portions of a snowmobile trail	Not Likely to Adversely Affect	The direct effects of this activity are considered with the upgrade of the Denley road, because it would occur as part of the reconstruction project. Indirectly, the use of these rerouted sections, combined with the use of the entire trail segment in the project area, still allows for human access into wolf habitat, which could have negative effects from disturbance and from people looking to do harm to wolves. However these effects are expected to be negligible because use of the relocated trail would be contained within 66 feet (1 chain) of the outer clearing limit of the upgraded road essentially keeping the impacts within existing road/trail corridor and not creating new additional access into wolf habitat or further habitat fragmentation.
Use three existing gravel pits	Not Likely to Adversely Affect	This activity could cause wolves to avoid the area during reconstruction activities. These direct effects are expected to be negligible because they would be relative short in duration (~ 2 years) with wolves likely returning to the area when activities return to more predictable levels.
Restore Denley Creek	Not Likely to Adversely Affect	This activity could cause wolves to avoid the area during reconstruction activities. These direct effects are expected to be negligible because they would be relative short in duration (~ 2 years) with wolves likely returning to the area when activities return to more predictable levels.
Decommission two unauthorized roads	Not Likely to Adversely Affect	This activity could cause wolves to avoid the area during reconstruction activities. These direct effects are expected to be negligible because they would be relative short in duration (~ 2 years) with wolves likely returning to the area when activities return to more predictable levels. Because of the short lengths of these roads (200ft and ~20ft) indirectly and cumulatively this activity would have no beneficial or negative effects. Decommissioning roads of this type do little to reduce human access into wolf habitat.

Effect of Alternative 1 (proposed action) on Wolf Critical Habitat		
Management Activity	Determination	Summary of Rationale
Upgrade and pave a gravel road	Not Likely to Adversely Affect	Road density would remain below 1 mi/sq. mi. potentially mitigating negative impacts of human development and roads in wolf recovery zone 2. This project maintains space for normal growth and movement of packs.
Relocate portions of a snowmobile trail		

Effect of Alternative 1 (proposed action) on Wolf Critical Habitat		
Management Activity	Determination	Summary of Rationale
Use three existing gravel pits	No Effect	These activities would have no effect on critical habitat because they would not alter space for normal growth and movement of established packs and would not impact the supply of sufficient food and cover for the assured survival of the species.
Restore Denley Creek		
Decommission two unauthorized roads		

Effect of Alternative 2 (no action) on Wolf	
Determination	Summary of Rationale
Not Likely to Adversely Affect	There would be no direct effects to wolves because no activities would occur. Radio-collared wolves regularly cross FR 424. Although with existing traffic speeds ranging from 30-60mph wolf mortality due to car collisions could occur but is highly unlikely because wolf/car collisions had not been documented along this road suggesting that wolves whose home-ranges overlap this road are able to safely cross it in its existing condition. This project is not likely to increase the risks of Avoidance, Habitat Fragmentation, or Development.

Effect of Alternative 1 (proposed action) on Wolf Critical Habitat	
Determination	Summary of Rationale
Not Likely to Adversely Affect	The existing Operational Maintenance Level (OML) of FR 424, level 5, would be maintained. Road density would remain below 1 mi/sq. mi. mitigating potential negative impacts of human development and roads in wolf recovery zone 2 (see analysis above on the risks of habitat fragmentation, avoidance and development).

CANADA LYNX:

A. Analysis Area:

- **Direct/Indirect Effects Analysis Area:**
 - *Habitat indicators:* Lynx Analysis Unit SNF 11
 - *Human Disturbance indicators:* Lynx Analysis Unit SNF 11
- **Cumulative Effects Analysis Area:** Lynx Analysis Unit SNF 11. (See Dunka BA for more on cumulative effects)
Rationale: See Superior National Forest Plan Appendix E: Canada Lynx Section 5. Scales of Analysis, pg E-3 for rationale for spatial analysis boundary.

Table 1 provides a list of all Lynx analysis units (LAUs) that overlap the Forest Road 424 Reconstruction project area.

Acres and Percent of each Lynx Analysis Units (LAU) within the Forest Road 424 Reconstruction Project Area.

LAU	Gross Acres	Acres of LAU in Project Area ¹	% of LAU in Project area
SNF11	57,220	N/A	N/A
1 Based on ArcView analysis			

B. Effects Analysis:

Indicators

Additional indicators selected to address the effects of Upgrading and Paving a gravel road Mortality and Movement

As identified in the Factors Affecting Lynx Environment section of this BA (section 4.5), projects that upgrade and pave gravel forest roads can have detrimental negative effects to lynx. Please refer to that section for more detailed discussion. In summary, these risks include:

- Mortality
- Movement (barriers to dispersal)

For the Proposed Denley Road upgrade, indicators are chosen to address these risk factors. These indicators are listed in the following table with rationale for their inclusion.

Forest Plan BA Indicator	Use?	Rationale for exclusion
1a. Snowshoe hare habitat acres	Yes	This project would result in no change to the condition of these indicators however, data is considered and is contained in the Dunka BA (alt 4)
1b. Percent of unsuitable habitat on NFS land		
2. Acres of red squirrel habitat		
3. Denning habitat in patches > 5 acres		
4. Percent of lynx habitat in LAUs with adequate canopy cover- upland forest > 4 years old and lowland forest > 9 years old		
5. Miles of ATV trails allowed		
6. Miles of snowmobile trails allowed		
7. Miles of temp and OML 1&2 roads		
8. Policy on cross-country use of ATVs and snowmobiles		
9. Policy on use of ATVs and snowmobiles on OML 1&2 roads		
Other Indicators		Rationale for inclusion
10. Road width (driving surface, shoulders, and recovery area)		These two indicators are chosen to as a means to help assess the factors that affect lynx mortality and movement. As traffic lanes, volume, speeds and right-of-way width increase, the effects on lynx are magnified. As human demographics change, highways tend to increase in size and traffic density. It is generally accepted that driving speed can be influenced by many factors including: driver’s age and gender, perceived risk of law enforcement or crash, driver familiarity with the road, weather, and various road characteristics (such as width and design speed). Some studies have shown that road design rather than posted speed may have a greater influence on how fast people drive (Gunther et. al 2000).
11. Design Speed (miles/hr)		

Existing Conditions and Effects

Affected Environment

MORTALITY

At least 5 collared lynx are known to have used habitats in the analysis area. Collared lynx commonly cross FR424. Of the 5 lynx that have used the project area 3 have died (1 hit by train and 2 of unknown causes). No collared or un-collared lynx are known to have been killed along FR 424, although few records of any animals killed along FR 424 have been recorded. Annual Average Daily Traffic (ADT) on the Denley is 130 with the majority (70%) of the traffic by light cars and trucks. Much of this traffic is people commuting from the Babbit area to areas near the North Shore of Lake Superior. Existing traffic speeds on FR 424 have been observed between 30-60 mph, the road has one 35 mph speed limit sign, however this speed limit is not enforced (R.Pekuri personal communication 7/3/2006).

MOVEMENT

Lynx are known to cross roads within the analysis area including FR 424 and Hwy 1. Roads within the analysis area do not appear to currently act as barriers or restrict lynx movement across the landscape. Suitable habitat for lynx is abundant in the analysis area and parts of the analysis area may currently be unoccupied (USDA FS 2005a). Over 87% of the analysis area is currently under public ownership (USDA FS 2004b). FR 424 connects the northeast end of the Mesabi Range and Babbitt, MN with State Hwy 1 and the North Shore. It is a key connection route in the Arrowhead Region and is functionally classed as a minor collector by State standards. It Provides access to three residences/cabins, Roaring Stony Resort, Cold Springs' Quarry at Harris Lake, North Shore Mine, Tire Cycle facility, the proposed Polymet Mine facility, and the city of Babbitt. In addition Franconia uses the 424 rd in mineral exploration activities in the Birch Lake area. FR 424 is a part of the Arrowhead Region Bikeways system.

The project does not fall within a key linkage area as defined by the LCAS and forest plan.

Environmental Consequences

Indicators	Alt 1 Proposed Action	Alt 2 No Action = existing condition
10. Total Road width (Feet) drive surface shoulder recovery zone	54 24 (paved) 5 (4 foot paved) 10	22-28 20-22 (gravel) 2 (gravel) 0-4
11. Design Speed (miles/hr)*	40	35 (however most of the alignment meets 45 currently)
<p><i>Data source:</i> Existing condition - Forest Development Road 424 - Denley Road Fact Sheet (USDA FS, 2001) and Draft Forest Road 424 (Denley Road) Reconstruction Environmental Assessment Chapters 1 and 2 (USDA FS 2006a). Proposed condition - Draft Forest Road 424 (Denley Road) Reconstruction Environmental Assessment Chapters 1 and 2 (USDA FS 2006a)</p> <p><i>*Footnote on design speed:</i> Most of the current alignment meets 45 mph. The proposed action would not result in a slower design speed but that the roads “worst features” (hills and curves) would be designed at 40 mph.</p>		

Direct Effects

Alternative 1 (proposed action)

The direct effects of all activities (including upgrading and paving the road, relocating the snowmobile trail, using gravel pits, decommissioning two roads and restoring Denley creek) are considered together here as the “proposed project” because all activities are interrelated and/or interdependent to the upgrading and paving of FR 424. The proposed project may have direct effects on lynx by causing them to avoid the area during reconstruction activities. These direct effects are expected to be negligible because they would be relative short in duration (~ 2 years) with lynx likely returning to the area when activities return to more predictable levels and in the unlikely event that a den is discovered during operations the den site would be protected during the denning season in accordance with Forest Plan G-WL-2.

Alternative 2 (no action)

This alternative would have no direct effects to lynx because no actions would occur that could disturb lynx.

Indirect Effects

Analysis indicators show that the end result of the proposed Denley road upgrade would be a road corridor that is over twice the existing width, a 5 mi/hr higher design speed on curves and hills, wider paved driving surface and shoulders, and wider cleared zones. These upgrades could magnify lynx risk factors having harmful indirect effects. Each risk factor is discussed below.

MORTALITY

Alternative 1 (proposed action)

Studies have shown that upgrading roads leads to higher traffic speeds which in turn can lead to higher mortality of wildlife. Using the Yellowstone study for comparison, the proposed Denley road upgrades would put it in the class where large mammals were killed by vehicles significantly more than expected. There is debate over the benefit of wide roadside clear zones for wildlife. Some feel that wide roadside clear zones give drivers and animals more sight distance to see and avoid each other. Lynx are known to travel along shoulders of highways and in cleared ditches putting lynx at greater risk from people wishing to do harm to lynx. The speed limit at which FR 424 road would be posted is unknown. A traffic study would be done during the design phase of the project to determine this. As stated before speed limits are only peripherally related to the design speed of the road, but can be used to make an educated guess as to what the posted speed and actual driving speed might be. If reconstructed, most of FR 424 would be design at 45 mph, with the slowest curves designed at 40 mph. According to Roger Pekuri, Forest Engineer, posted speeds could be 5-10 mph above the design speed. Again, using the Yellowstone study for comparison, if posted speeds are between 50-55 mph, actual average driving speeds could be between 67 and 72 mph. This would be an increase of 37-42 mph over the speeds that at which drivers are currently going. If the road is reconstructed, the counties would take over jurisdiction including enforcement of the speed limit. However, the reality is with shrinking county budgets, enforcement of posted speed limits on this road would likely be minimal. With known use of the area by lynx and lynx lack of avoidance of roads increases in traffic speeds has a high likelihood of resulting in car/lynx collisions. Impacts to individuals are likely, however impacts to lynx population is less certain. The impacts to lynx populations would be greater when lynx is at a low in its 10 year cycle however; the likelihood that a lynx would be hit is lower due to their reduced density.

Alternative 2 (no action)

Collared lynx are known to regularly cross FR 424. Although with existing traffic speeds ranging from 30-60mph lynx mortality due to car collisions could occur but is highly unlikely because wolf/car collisions had not been documented along this road suggesting that lynx whose home-ranges overlap this road are able to safely cross it in its existing condition.

MOVEMENT

Alternative 1 (proposed action)

The risk of this project restricting lynx movement is low for the following reasons. Risk to lynx movement is thought to become more of a factor when 2-lane highways are upgraded to 4-lane highways and when traffic volumes exceed 2,000 vehicles or more per day. It is unknown how traffic volume may increase on this road but with existing ADT of 130 it is extremely unlikely that it would approach anywhere close to this level in the next 10 years. Snowmobile trail reroutes would occur within the 66 feet of the cleared-limits or the road containing its use within the same corridor so it would not lead to

further fragmentation of this area. Lynx may avoid the Denley road area while reconstruction activities are occurring (see direct effects), but it is very unlikely that the proposed upgrade would become a barrier to dispersal or limit lynx movement across the landscape. The incorporation of crossing structures in the reconstruction design may help maintain permeability of the road for lynx movement, however the effectiveness of these structures for lynx in Minnesota is unknown. There is ample suitable habitat available throughout the analysis area (USDA FS 2005a), and lynx are known to cross and not avoid similar roads throughout their range (including highways 1 and 2). It is also unlikely that this project would cause more development in the analysis area that would restrict lynx movement. Currently, more than 87% of the analysis area is in public ownership. Although some private lands within the analysis area would likely be sold over the next 10 year the impacts from development of these lands would likely be minor, because of the small scale on which it may occur.

Alternative 2 (no action)

Habitat for lynx and its prey is abundant in the analysis area (USDA FS 2005a). Two high standard roads (FR 424 and Highway 1) are located within the analysis area, both are (or are proposed for) two-lane highways. The majority of the analysis area is in public ownership and is forested. Based on the movements of radio collared lynx the existing amount of habitat fragmentation in the analysis area does not appear currently limit lynx movement.

C. Consistency with Forest Plan:

Forest Plan Guidance	Direction	Alts In Compliance	Basis for Compliance	Remarks
O-WL-4	Maintain or improve habitat	Both	Effect analysis	Habitat is maintained
O-WL-5	Seek opportunities to benefit TE spp.	Nether alternative is designed to further this objective		
O-WL-6	Reduce or eliminate adverse effects to TE	both	Mitigations Draft EA Ch 1 and 2	Crossing structures Road is not upgraded
O-WL-7	Minimize building or upgrading roads in TE areas	Alt 2	Draft EA Ch 1 and 2	Road is not upgraded
O-WL-8	Promote the conservation and recovery of Canada lynx	Alt 2	Draft EA Ch 1 and 2	Road is not upgraded
O-WL-9	Manage for hare and alt prey habitat	Both	Dunka BA (USDA FS 2005a)	Hare habitat not impacted by this project
O-WL-10	Provide foraging habitat in proximity to denning habitat	Both	Dunka BA (USDA FS 2005a)	Foraging and denning habitat not impacted by this project
O-WL-11	Maintain habitat connectivity to reduce road mortality	Both	Dunka BA (USDA FS 2005a)	Habitat connectivity is maintained
O-WL-12	Participate in efforts to identify, map, and maintain linkage areas	Nether alternative is designed to further this objective	n/a	Project is located within a Mapped LAU and not in a linkage area
O-WL-13	Maintain competitive advantage of lynx in deep snow	Both	Dunka BA (USDA FS 2005a)	

Forest Plan Guidance	Direction	Alts In Compliance	Basis for Compliance	Remarks
O-WL-14	Participate in efforts to reduce lynx mortality on roads	Alt 1	Consultation with FWS	
O-WL-15	In BWCAW, lynx habitat will result from natural processes	Nether alternative is designed to further this objective	n/a	Project does not effect BWCAW
G-WL-1	Moderate timing and intensity of mgt activities to maintain lynx habitat	both	Draft EA Ch 1 and 2	
G-WL-2	Provide protection of known den sites	both	Mitigations	
G-WL-3	No more than 30% of an LAU in unsuitable condition	Nether alternative is designed to further this objective	Dunka BA (USDA FS 2005a)	Project would not effect forest conditions
S-WL-1	No more than 15% change to unsuitable in 10 years	n/a	Dunka BA (USDA FS 2005a)	Project would not effect forest conditions
G-WL-4	Maintain at least 10% denning habitat	n/a	Dunka BA (USDA FS 2005a)	Project would not effect forest conditions
G-WL-5	Following disturbance, retain at least 10%	n/a	n/a	This project does not propose to salvage after natural disturbance
S-WL-2	No net increase in groomed or designated over-the-snow trails	n/a	n/a	This project would not create new over-the-snow trails.

Forest Plan Guidance	Direction	Alts In Compliance	Basis for Compliance	Remarks
G-WL-6	New over-the-snow routes should be designed to benefit lynx	n/a	n/a	This project would not create new snow-compacted trails, however re-routed snowmobile trail segments will be kept in the same corridor as the road reducing their impact.
G-WL-7	Close trails and roads that intersect with new snow-compacting trails.	n/a	n/a	This project would not create new snow-compacted trails.
G-WL-8	Maintain road density at or below 2mi/mi ²	neither	Dunka BA (USDA FS 2005a)	Road density in this LAU is 2.2 mi/sq mi (but will become 2.1 mi/sq mi when Dunka decision is implemented)
G-WL-9	Do not upgrade or pave dirt or gravel roads	Alt 1	Draft EA Ch 1 and 2	The proposed action is not in compliance with this guideline. However 1) the minimum road design standards to address safety are proposed 2) some curves and hills may be designed below the 40 mph and posted with cautionary signs, resulting in a reduction of speeds 3) the project is not likely to contribute to an increase in human activity.

CUMULATIVE EFFECTS

Known future timber harvests on federal and non-federal lands (see the Dunka BA (USDA FS 2005a and 2005b for expected harvest activities) will maintain and contribute to habitat conditions suitable for lynx. Approximately 11 miles of roads that are currently open to RMV’s in LAU 11 will be decommissioned over the next 5-10 years. This will reduce human access in to lynx habitat, benefiting the species. A potential future ATV trail and special use access requests could cause impacts to lynx by increasing road mileage in the project area, although likely by minor amounts. The effects of these federal projects will be addressed in separate analyses and lynx will be considered in planning for these projects. If the proposed Polymet mine is developed, it could lead to and increase in traffic volume on FR 424. At this time it is impossible to predict how much. When the effects of future mine proposals are analyzed the effects to lynx of human population growth in surrounding communities will need to be addressed. There would be no cumulative effects of using existing gravel pits, restoring Denley creek and decommissioning unauthorized roads however, human population grows in Northern Minnesota so does the demand for recreational snowmobile trails. It is very likely that, over time, the snowmobile use on this trail will increase.

It is important to note that the upgrading and paving of a gravel forest road is the beginning point in a highway development and is a permanent and potentially severe change to the lynx environment. It is an action that once put into place, can not be undone. Highways are one of the major conservation issues for carnivore’s world wide.

D. Determination of Effect

Effect of Alternative 1 (proposed action) on Lynx		
Management Activity	Determination	Summary of Rationale
Upgrade and pave a gravel road	Likely to Adversely Affect	Higher traffic speeds in combination with potentially higher traffic volumes would likely lead to car/lynx collisions and lynx mortality. Crossing structures could be considered as a possible way to mitigate negative effects; however their effectiveness has not been studied in Minnesota. This activity will not increase the risk to lynx movement. See effects analysis above for more details.
Relocate portions of a snowmobile trail	Not Likely to Adversely Affect	Lynx may temporarily avoid the area while the trail re-route work is occurring. The use of these rerouted sections, combined with the use of the entire trail segment in the project area, would still allows for human access into lynx habitat, which could have negative effects from disturbance and from people looking to do harm to the species.

Effect of Alternative 1 (proposed action) on Lynx		
Management Activity	Determination	Summary of Rationale
		However these effects are expected to be negligible because lynx would likely return to the area after activities return to a more predictable level and use of the relocated trail would be contained within 66 feet (1 chain) of the clearing limit of the upgraded road essentially keeping the impacts within existing road/trail corridor and not creating new additional access into lynx habitat and maintain the competitive advantage of lynx.
Use three existing gravel pits	Not Likely to Adversely Affect	Lynx have been known not to avoid active gravel pits and rock quarries (personal observation). Increased use of these pits for road re-construction activities could cause disturbance to lynx in the area, however this effect is expected to be negligible because it would be short-term in duration and lynx may avoid the area until activities return to a more predictable level.
Restore Denley Creek	Not Likely to Adversely Affect	The activity may cause lynx to temporarily avoid the area during reconstruction activities, however these effects is expected to be negligible because it would be short-term in duration and lynx may avoid the area until activities return to a more predictable level.
Decommission two unauthorized roads	Not Likely to Adversely Affect	Lynx may temporarily avoid this area while roads are being decommissioned however these effects is expected to be negligible because it would be short-term in duration and lynx may avoid the area until activities return to a more predictable level. Because of the short lengths of these roads (200ft and ~20ft) there would be no beneficial effects. Decommissioning roads of this type do little to reduce human access into lynx habitat.

Effect of Alternative 2 (no action) on lynx	
Determination	Summary of Rationale
Not Likely to Adversely Affect	There would be no direct effects to lynx because no activities would occur. Radio-collared lynx regularly cross FR 424. Although with existing traffic speeds ranging from 30-60mph lynx mortality due to car collisions could occur but is highly unlikely because lynx/car collisions had not been documented along this road suggesting that lynx whose home-ranges overlap this road are able to safely cross it in its existing condition. This project is not likely to increase the risks to lynx movement.

Lynx Critical Habitat		
Management Activity	Determination	Summary of Rationale
None in critical habitat		

6.0 Mitigations

Mitigation	Alternatives	Risk Factor addressed
If any threatened, endangered, sensitive or other plant or animal species of interest, or their nests, dens or roost trees, are located during planning layout, or operations, activities would be temporarily halted in the area. The District Biologist would be consulted and appropriate mitigation measure would be designed and carried out prior to restarting operations. (G-WL-10)	All alternatives	Human disturbance
Plant less palatable species next to the roadway to dissuade wildlife grazing in close proximity to traffic.	Alternative 1	Mortality
Maintain slower design speed or signage through the Snort Lake Deer Yard area on the west end (2.5 miles) of the project area.	Alternative 1	Mortality
Construct relocated snowmobile trail within one chain (66 ft) of the outer clearing limit of the road.	Alternative 1	Human Disturbance
Design crossing structure in the road to help maintain permeability for wildlife movement	Alt 1	Mortality and Movement

7.0 Monitoring

The Forest Plan identifies three monitoring elements related to threatened and endangered species (Chapter 4, Table MON-4):

- To what extent is Forest management contributing to the conservation of threatened and endangered species and moving toward short term (10-20 years) and long-term (100 years) objectives for their habitat conditions and population trends?

- To what extent are road and trail closures effective in prohibiting unauthorized motor vehicle use?
- To what extent is the Forest maintaining no net increase in groomed or designated over-the-snow trail routes unless the designation effectively consolidates use and improves lynx habitat through a net reduction of compacted snow areas?

Additional Monitoring Elements:

8.0 Signature

Conducted by: /s/ Susan C. Catton
Biologist Name

Date: 07/13/06

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