



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Twin Cities Field Office

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**JUL 15 2004**

Mr. Jim Sanders and Mr. Norm Wagoner  
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Minnesota National Forests  
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Gentlemen:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion and is based on our review of the biological assessment (BA) for the revised Land and Resource Management Plans (Forest Plans) for the Chippewa and Superior National Forests and their effects on the bald eagle (*Haliaeetus leucocephalus*), gray wolf (*Canis lupus*), gray wolf critical habitat, and Canada lynx (*Lynx canadensis*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C., 1531 et seq.). The June 7, 2004, letter from the U.S. Forest Service (Forest Service) requesting formal consultation on the Revised Forest Plans was received in our office on June 8, 2004. A complete administrative record of this consultation is on file in this office.

### **Consultation History**

In 2000, the Service completed a national biological opinion on the effects of the National Forest Land and Resource Management Plans and Bureau of Land Management Land Use Plans on the Canada lynx (USFWS 2000). That consultation evaluated, in part, the effects of the current Chippewa and Superior National Forest Plans on Canada lynx. One or both of the Forest Plans were found to lack direction in each of the following categories: prohibitions to habitat conversion, integration of lynx habitat into thinning projects, suppression of fire to maintain or improve habitat, mitigation of effects of developed and winter recreation, protection against mineral exploration, prevention of barriers to connectivity, coordination of issues with neighboring units and agencies, and direction to monitor lynx and hare populations. The biological opinion concluded that the current Forest Plans were not likely to jeopardize the continued existence of the lynx and recommended the measures outlined in the Lynx Conservation Assessment and Strategy (LCAS; US Forest Service 1999) be incorporated in future Forest Plan revisions to minimize adverse effects on lynx.

On July 24, 2003, the U.S. Department of Interior responded to the Superior and Chippewa National Forests' request for comments on the draft Environmental Impact Statement (EIS) and Draft Revised Forest Plans. Within that response was a short discussion of the threatened eagle, lynx, and wolf, and the Forest Service was encouraged to incorporate elements of the Recovery

Plans for the eagle (USFWS 1983) and wolf (USFWS 1992), as well as the LCAS, into the Forest Plans. As the Forest Service had determined that all alternatives may affect the three threatened species, further discussion of these species was to be accomplished via a biological assessment (BA).

The Twin Cities Field Office (TCFO) received a preliminary draft BA on all of the Revised Forest Plan alternatives from the Superior and Chippewa National Forests on July 29, 2003. Comments on the preliminary draft BA were provided to the Forest Service during meetings on August 12 and 13, 2003. Throughout the following months, the Forest Service and TCFO worked in coordination to develop Forest Plan language and monitoring guidance relevant to listed species. Subsequently, TCFO reviewed the draft BA on the selected alternative during April and May 2004 and provided comments to the Forest Service throughout that time. A request for concurrence with a not likely to adversely affect determination for the eagle, request for formal consultation on the wolf and lynx, and a final BA were transmitted to the Service on June 7, 2004. The Service concurred with the determination for the eagle and agreed to initiate consultation for the wolf and lynx in a letter dated June 15, 2004. The draft EIS, draft and final BAs, and discussions and email transmissions with Forest Service biologists form the basis for this biological opinion.

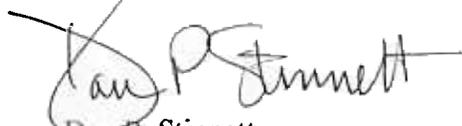
Throughout the development of the Forest Plans, the Service worked in cooperation with the Forest Service by attending meetings, reviewing documents, and providing comments regarding Revised Forest Plan language and guidance. These meetings and discussions are documented in the administrative record for this consultation.

### **Concurrence**

In a letter dated June 15, 2004, the Service concurred with your determination in the BA that the Revised Forest Plans are not likely to adversely affect the bald eagle. This concurrence was based on the guidance in the plans to follow the provisions set forth in the Northern States Bald Eagle Recovery Plan; direction to maintain and restore aquatic ecosystem composition; direction to maintain, protect, or improve habitat for endangered and threatened species and reduce or eliminate adverse effects on these species; and to consult at the project level once site specific information is available to ensure adverse effects are avoided.

The Service further concurs that the Revised Forest Plans are not likely to adversely affect critical habitat for the gray wolf. We concur with this determination because although no primary constituent elements were identified when critical habitat was designated in 1978, the Eastern Timber Wolf Recovery Plan emphasizes the need for space (for growth and movement of packs), food, and cover sufficient to assure the survival of the species in these areas. The Recovery Plan encourages any activities that maintain or develop these factors in critical habitat, including maintenance of the forest products industry and activities that promote forest habitat management. Conversely, the Recovery Plan discourages any activities that permanently remove cover, including road construction and human developments. Because the Revised Forest Plans continue forest management, incorporate effective road closure methods and monitoring, and do not promote development, the Revised Forest Plans are not likely to adversely affect critical habitat for the gray wolf.

If you have any questions or comments on this biological opinion, please contact Ms. Susan Rogers, Fish and Wildlife Biologist, at 612-725-3548 ext 219.

Sincerely  
  
Dan P. Stinnett  
Field Supervisor

enclosure

## **BIOLOGICAL OPINION**

### **Description of the Proposed Action**

#### Proposed Action

The U.S. Forest Service (Forest Service) proposes to revise the 1986 Forest Land and Resource Management Plans (Forest Plans) for the Superior and Chippewa National Forests (Forests). Under the National Forest Management Act, Forest Plans must be developed to guide all long-term natural resource management activities on National Forest System lands. They describe desired resource conditions, resource management practices, levels of resource production and management, the availability of suitable land for resource management, and monitoring and evaluation requirements for effective implementation. Forest Plans provide management direction for 10 – 15 years to ensure that ecosystems are capable of providing sustainable benefits to the public.

The goals of the Revised Forest Plans for the Chippewa and Superior National Forests are protection and enhancement of resources, sustained vegetation management, and enhancement of social and economic benefits. The Forest Plans identify desired conditions related to these goals that are broad statements specifying what the Forest Service will strive to achieve. Specific, measurable objectives are stepped down from these desired conditions. Finally, standards and guidelines provide the specific technical direction for managing resources. Standards are required limits to activities, while guidelines are preferred limits. Site-specific projects implement the Forest Plans and are developed to bring the Forests closer to the goals and desired conditions identified. However, the Revised Forest Plans do not propose any site-specific projects; they are programmatic in scope and do not contain decisions to implement specific actions or projects. Therefore, this consultation is limited to the consideration of effects of the broader programmatic strategy. The U.S. Fish and Wildlife Service (Service) expects future consultation on actions and programs that are proposed, analyzed, and implemented under these Forest Plans. Further, on the Superior National Forest, the biological opinion is generally narrowed in focus to those areas of the Forest outside the Boundary Waters Canoe Area Wilderness (BWCAW), though management direction developed by the Forest Service and analysis in the BA and in this biological opinion considered the contributions of the BWCAW.

This consultation is using a tiered consultation framework with the Forest Plans consultation resulting in a Tier I biological opinion and all subsequent projects implemented per the Forest Plans being Tier II consultations, with Tier II biological opinions issued as appropriate (i.e., whenever the proposed project will result in unavoidable adverse effects to listed species). This Tier I biological opinion evaluates the effects to threatened and endangered species at the Forest level based on the objectives and standards and guidelines that the Forests intend to follow in developing and implementing future projects. Tier II biological assessments (BAs) will be developed for future projects and, if necessary, Tier II biological opinions will be issued. The Tier II biological opinions will reference back to the Tier I biological opinion to ensure that the appropriate standards and guidelines are followed and the effects of the specific projects under consultation, taken together with all other Tier II projects, are commensurate with the effects

anticipated in the Tier I biological opinion. With each Tier II biological opinion, the cumulative total of incidental take exempted will be tracked.

The Revised Forest Plans (a modification of alternative E from the Draft Environmental Impact Statement; U.S. Forest Service 2003) emphasize providing sustainable amounts of timber, maintaining or enhancing biodiversity, contributing to economic and social needs of the community, and managing in an environmentally sound manner to produce goods and services that provide for long-term public benefits. Forest Plan activities assessed in this biological opinion are limited to those that are 1) directed or allowed and 2) proposed or probable. In many areas of the Forests, these activities include timber harvest, timber stand improvements, wildlife habitat management, road and trail construction and maintenance, construction and maintenance of dispersed recreation facilities and water accesses, hazardous fuels reduction, riparian and stream restoration, and habitat improvement. In other areas of the Forests, natural ecological processes will predominate.

The Revised Forest Plans include many objectives, standards, and guidelines for the protection of wolf and lynx and enhancement of their habitats, which are described in the BA (U.S. Forest Service 2004), as are the other objectives, standards, and guidelines that may affect listed species. Additionally, the Revised Forest Plans include information specific to analyses of project effects on lynx in Appendix E of the Forest Plans. While this appendix serves as guidance rather than management direction, it incorporates a number of the processes outlined in the Lynx Conservation Assessment and Strategy (LCAS) (U.S. Forest Service 1999).

Lynx Analysis Units (LAUs) were delineated on both Forests in 2000 as the smallest landscape scale on which to analyze effects to lynx. The boundaries have remained in place since that time to allow for long term analysis of project effects. However, the Superior National Forest Revised Forest Plan proposes several changes of current LAU boundaries, such as adding LAUs to the Virginia Management Unit of the Laurentian Ranger District; designating the BWCAW a lynx refugium (as defined in the LCAS) based on its large size (~1,000,000 acres), predominance of natural ecological processes, and security from human exploitation, habitat degradation, and substantial winter access; and refining boundaries of the LAUs that had overlapped into the BWCAW before its refugium designation. In doing so, two LAUs (44 and 46) were placed on highly developed land between areas of suitable lynx habitat. LAU 44 would be located in the narrow corridor of the Gunflint Trail between two portions of the BWCAW refugium, and LAU 46 would be delineated in the Virginia Management Unit in an area replete with campgrounds, subdivisions, mining lands, and other human developments. The primary purpose of these LAUs is to provide connectivity between areas of the BWCAW (LAU 44) and between two other LAUs (LAU 46). As such, and because lynx habitat within these LAUs is limited, in the Revised Forest Plans LAUs 44 and 46 were excepted from several of the standards and guidelines that apply to the rest of the LAUs on the Forest. Connectivity and travel habitat across these LAUs would be emphasized, and the amount of suitable foraging and denning habitat present would be deemphasized.

Included below, as presented in the Revised Forest Plans, are the desired conditions, objectives, standards, and guidelines specific to threatened and endangered species and key relevant direction from recreational motor vehicles and the transportation system.

-Desired Conditions

*Wildlife*

D-WL-3. Aquatic and terrestrial wildlife habitats and species populations, while constantly changing due to both management activities and naturally occurring events, are present in amounts, quality, distributions, and patterns so that National Forest lands:

(a) provide representation of the full spectrum of habitats and conditions possible for ecosystem composition, structure, and function. Representation considers time frames, a variety of landscape scales, and current biological and physical communities and environments.

(b) maintain viable populations for all existing native and desired non-native species. (Viable populations are those with the estimated numbers and distributions of reproductive individuals to insure their continued existence is well distributed within their range in the planning area.)

(c) contribute to the conservation and recovery of federally-listed, proposed, or candidate threatened and endangered species and the habitats upon which these species depend.

D-WL-5. Roads and trails are managed to maintain native plants and animals, protect water quality, and to manage for compatible human uses and types of access.

D-WL-8. Fish populations are productive and support sustainable recreational, subsistence, and commercial fisheries while meeting the needs of fish-dependant threatened, endangered, or sensitive wildlife species.

-Objectives

*Wildlife*

O-WL-4. Maintain, protect, or improve habitat for all threatened and endangered species by emphasizing and working toward the goals and objectives of federal recovery plans and management direction in the Forest Plan.

O-WL-5. Seek opportunities to benefit threatened and endangered species by integrating habitat management objectives into plans for the full spectrum of management activities on National Forest System (NFS) land.

O-WL-6. Reduce or eliminate adverse effects on threatened and endangered species from the spectrum of management activities on NFS land.

O-WL-7. Minimize building or upgrading of roads in areas that are important for threatened and endangered species habitat and for habitat connectivity.

O-WL-8. Promote the conservation and recovery of Canada lynx and its habitat.

O-WL-9. In LAUs on NFS land, manage vegetation to retain, improve, or develop habitat characteristics suitable for snowshoe hare and other important alternate prey in sufficient amounts and distributions so that availability of prey is not limiting lynx recovery.

O-WL-10. In LAUs on NFS land, manage vegetation to provide for foraging habitat in proximity to denning habitat in amounts sufficient to provide for lynx.

O-WL-11. Maintain and, where necessary and feasible, restore sufficient habitat connectivity to reduce mortality related to roads and to allow lynx to disperse within and between LAUs and between LAUs and Boundary Waters Canoe Area Refugium on NFS land.

O-WL-12. Through partnerships with other agencies and landowners, participate in cooperative efforts to identify, map, and maintain or restore, where feasible, linkage areas that provide habitat connectivity sufficient to allow lynx to disperse between disjunct blocks of lynx habitat at larger landscape scales (for example, among National Forests in the Great Lakes region).

O-WL-13. Maintain or improve the natural competitive advantage of Canada lynx in deep snow conditions. Snow compacting activities (such as snowmobiling, snowshoeing, skiing, dogsledding) are planned and accommodated in areas best suited to the activity while maintaining large, interconnected areas of habitat with little or no snow-compacting, recreational activities.

O-WL-14. Through coordination with other agencies, participate in cooperative efforts to reduce, to the extent possible, the potential for lynx mortality related to highways and other roads within the proclamation boundary of the National Forest.

O-WL-15 SNF. In the Boundary Waters Canoe Area Wilderness Refugium lynx habitat conditions will predominantly result from natural ecological processes such as fire, wind, insects, disease, and vegetation community succession. However, some active management, with methods compatible with wilderness values, may be needed to restore or maintain desired vegetation characteristics. Lynx and its prey populations will fluctuate in response to changing environmental conditions.

O-WL-16 CNF/O-WL-17 SNF. Promote the conservation and recovery of the gray wolf. Population goal minimum: contribution to statewide goal of 1251-1400.

#### *Recreation*

O-RMV-1 CNF. The Forest will determine which existing Objective Maintenance Level (OML) 1 and 2 roads are appropriate or inappropriate for recreational motor vehicle (RMV) use.

O-RMV-1 SNF/O-RMV-2 CNF. A maximum of 90 additional all terrain vehicle (ATV) trail miles and 100 Chippewa NF/130 Superior NF snowmobile trail miles with associated trail facilities (trailhead parking, signs, toilets, etc.) may be added to the designated National Forest Trail system.

### *Transportation System*

O-TS-2. Few new OML 3, 4, 5 roads will be constructed.

O-TS-3. New roads built to access land for resource management will be primarily OML 1 or temporary and not intended for public motorized use. Temporary roads will be obliterated after their use is completed. All newly constructed OML 1 roads will be effectively closed to motorized road and recreational vehicles following their use unless they are needed for other management objectives.

O-TS-7. Unneeded roads will be decommissioned and closed to motorized vehicles. Roads that are not necessary for long-term resource management are considered “unneeded”.

### -Standards and Guidelines

#### *Wildlife*

S-WL-1. Management activities on NFS land shall not change more than 15% of lynx habitat on NFS land within an LAU to an unsuitable condition within a 10-year period.

S-WL-2. In LAUs on NFS land allow 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.

S-WL-3. Management direction from the Wolf Recovery Plan (USDI FWS 1992): *Road density standards:* The maximum road density standard for OML 3, 4, 5 in Zones 1 and 2 on the Superior would change from 0.9 to 1 mile per square mile. This would be applied to the north half of the Chippewa (north of Minnesota Highway 2), because that area is now in proposed Management Zone 3 (USDI FWS 1992, p. 73).

S-WL-4. Management activities for the gray wolf will be governed by Recovery Plan for Eastern Timber Wolf (1992).

G-WL-1. Within LAUs on NFS land, moderate the timing, intensity, and extent of management activities, if necessary, to maintain required habitat components in lynx habitat, to reduce human influences on mortality risk and inter-specific competition, and to be responsive to current social and ecological constraints relevant to lynx habitat.

G-WL-2. Provide for the protection of known active den sites during denning season.

G-WL-3. Limit disturbance within each LAU on NFS land as follows: if more than 30% of the total lynx habitat (all ownerships) within an LAU is currently in unsuitable condition, no further reduction of suitable conditions should occur as a result of vegetation management activities by the National Forest. *LAUs 44 and 46 are excepted from this guideline.* (Refer to Lynx Appendix Section 5 for information on exceptions.)

G-WL-4. Within an LAU, maintain or promote well distributed denning habitat in patches generally larger than five acres, comprising at least 10% of lynx habitat.

Where less than 10% of forested lynx habitat within an LAU provides denning habitat, defer those management actions on NFS land that would delay achievement of denning habitat structure. *LAUs 44 and 46 are excepted from this guideline.* (Refer to Lynx Appendix Section 5 for information on exceptions.)

G-WL-5. Following a disturbance on NFS land greater than 20 contiguous acres (such as a blowdown, fire, insect, or disease) that could contribute to lynx denning habitat, generally retain a minimum of 10% of the affected area on NFS land unless salvage or management-ignited fire is necessary to address human health and safety (such as in the Wildland Urban Interface) or scenic integrity.

G WL-6. Where a designated trail for snow-compacting activities is desired within LAUs, the proposed route should be planned to protect or improve the integrity of lynx habitat and minimize snow compaction in lynx habitat. The trail should be designed to:

- Move recreational use away from more sensitive or better quality lynx habitat,
- Concentrate use within existing developed areas rather than developing new recreational areas in lynx habitat, and/or
- Be located within the outer boundaries of a currently used road and trail system.

G-WL-7 SNF. For newly constructed snow-compacting trails, effectively close or restrict to public access those trails and OML 1, OML 2, temporary, and unclassified roads that intersect the new trails unless these trails or roads are being used for other management purposes.

G-WL-7 CNF. When constructing new snow-compacting trails, access would generally be restricted on those trails, OML 1, OML 2, temporary, and unclassified roads that intersect the new trails unless these trails or roads are needed for other management purposes.

G-WL-8 SNF. Within LAUs generally maintain road and snow-compacting trail densities below 2 miles per square mile to maintain the natural competitive advantage of lynx in deep snow. Where total road and regularly-used snow-compacting trail densities are greater than 2 miles per square mile and coincide with lynx habitat, prioritize roads for seasonal restrictions or reclamation in those areas, where practical or feasible. In this guideline “roads” include all ownerships of classified and unclassified roads and “regularly-used trails” are those that are used most years for most of the snow-season.

G-WL-8 CNF. Where existing road and regularly-used snow-compacting trail densities coincide with lynx habitat and are greater than 2 miles per square mile, prioritize roads for seasonal restrictions or reclamation. Where possible or feasible, road and trail densities will be reduced in order to maintain or improve the natural competitive advantage of lynx in deep snow. If reduction of road density is not possible or feasible, densities should not be increased above current levels. Roads include all ownerships of classified and unclassified roads. Regularly-used trails are those that are used most years for most of the snow-season.

G-WL-9. 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 foreseeably contributing to increases in human activity or adverse impacts to lynx and its habitat.

G-WL-10. Provide for the protection of known active gray wolf den sites during denning season.

#### *Recreation*

S-RMV-1 CNF. OHV use on unclassified roads is prohibited.

S-RMV-1 SNF/S-RMV-2: CNF. Motorized recreation use of designated trails is prohibited unless the trail is designated open for specific motorized uses such as for ATVs, OHMs, and snowmobiles.

S-RMV-3 SNF. Cross-country OHV travel is prohibited. Standards and guidelines for cross-country snowmobile use are described in Chapter 3 because direction for that use varies by Management Areas. *Summary from Chapter 3:* For most Management Areas: Cross-country snowmobile use is generally allowed unless prohibitions or restrictions are needed for resource protection to meet management objectives. *For Unique Biological, Research Natural, and Wilderness:* Cross-country snowmobile travel is prohibited.

S-RMV-4 CNF. Cross-country OHV and snowmobile travel is prohibited.

G-RMV-4 SNF. RMV use will generally be allowed on existing unclassified, OML 1, and OML 2 roads. (Except ORVs will generally be prohibited on OML 1 roads.) Roads that are determined through site-specific analysis to have immitigable resource and social concerns and/or do not meet management objectives would be effectively closed. (See exceptions for Management Areas: wild segments of Eligible Wild, Scenic, and Recreational Rivers, Semi-primitive Non-motorized Recreation, Research Natural Areas, Candidate Research Natural Areas, and Unique Biological Areas.)

G-RMV-4 CNF. Roads that are determined through site-specific analysis to have immitigable resource and social concerns and/or do not meet management objectives will be effectively closed.

### *Transportation System*

S-TS-3. As soon as access use is completed, stabilize temporary roads and effectively close them to motorized traffic. Vegetation will be established within 10 years after the termination of the contract, lease, or permit.

S-TS-4. Decommission unclassified roads that are not needed in the Forest road and trail system and special use permitted roads that are no longer needed. Decommissioning will make the road unusable by motorized vehicles and stabilize the roadbed.

G-TS-12. On existing OML 1 roads, an effective barrier will generally be installed as needed to prevent use by highway-licensed vehicles and ORVs. ATV and OHM use may continue to be allowed on some existing OML 1 roads

G-TS-14. Temporary roads are generally not intended for public use, but public use may be temporarily allowed if needed to meet management objectives

### *Monitoring and Evaluation*

The Revised Forest Plans also include broad, strategic guidance for monitoring and evaluation in Chapter 4. Monitoring will address the following questions for threatened and endangered species:

- To what extent is Forest management contributing to the conservation of threatened or 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 is Forest management moving toward short term (10-20 years) and long term (100 years) objectives for habitat conditions for management indicator species and species associated with management indicator habitats?
- What are the population trends of management indicator species?
- 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?

This monitoring, along with any effectiveness or compliance monitoring associated with future consultations under these Forest Plans, should allow the Service and Forests to assess consistency with the Forest Plans and with this biological opinion. Unanticipated effects on wolf and lynx would likely be detected, and the success of conservation and recovery efforts could be evaluated and adjusted as needed.

## Description of the Action Area

Regulations implementing section 7 of the Endangered Species Act (Act) define the action area as “all areas to be affected directly and indirectly by the proposed action.” The ranges of the species considered in this biological opinion vary, but both species encompass the Chippewa and Superior National Forests. The activities assessed in this biological opinion are limited to those that are 1) directed or allowed and 2) proposed or probable. These activities include timber sales, timber stand improvements, wildlife habitat management, road and trail construction and maintenance, construction and maintenance of dispersed recreation facilities and water accesses, hazardous fuels reduction, riparian and stream restoration, and habitat improvement. Physical effects of these projects include noise and habitat disruption. While direct and indirect effects will extend to private land inholdings within the Forest boundaries, all of these effects are expected to be contained within the proclamation boundaries of the Chippewa and Superior National Forests, as shown in Figure 1. The Chippewa National Forest proclamation boundary encompasses approximately 1.6 million acres on all ownerships; the Superior National Forest proclamation boundary encompasses approximately 3.9 million acres on all ownerships (U.S. Forest Service 2003).

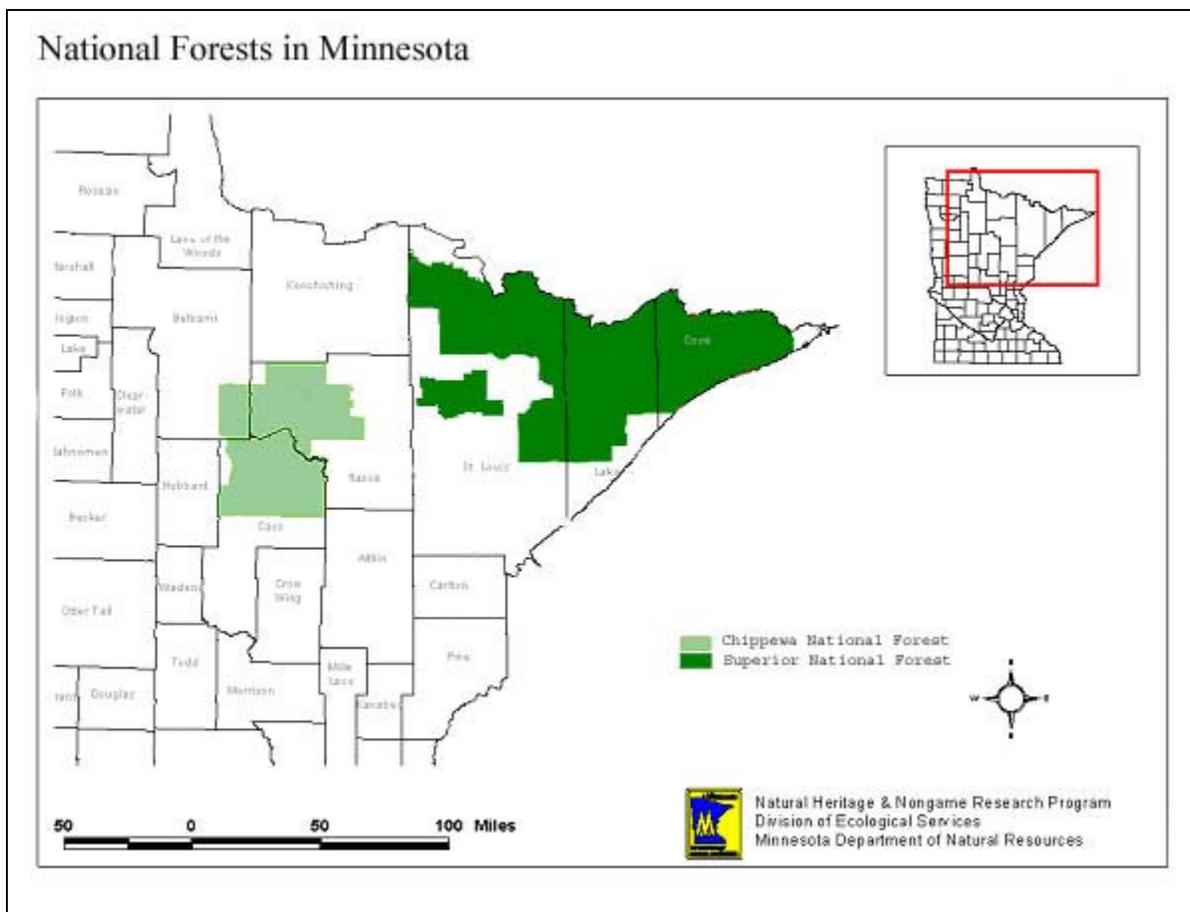


Figure 1. Location of the Chippewa and Superior National Forests in northern Minnesota.

## **PART I – GRAY WOLF (*Canis lupus*)**

### **Status of the Species**

The gray wolf historically occurred across most of North America, Europe, and Asia. The only areas of the conterminous United States that apparently lacked gray wolf populations since the last ice age are parts of California and portions of the eastern and southeastern United States (an area occupied by the red wolf). Widespread persecution of wolves began following European settlement of North America (Boitani 1995). Poisons, trapping, and shooting spurred by federal, state, and local government bounties extirpated this once widespread species from more than 95 percent of its historic range. In the late 1960s a diminished population (several hundred) of wolves was known to occur in northeastern Minnesota and on Isle Royale, Michigan; a few scattered wolves also may have occurred in Michigan's Upper Peninsula, Montana, and the southwest United States.

In response to their vastly declining numbers rangewide, the gray wolf was determined to be endangered in 1967 (32 FR 4001) under the Endangered Species Preservation Act of 1966. In 1974, the species was formally listed as endangered through the authority of the Endangered Species Act, and the Minnesota population was reclassified to threatened in 1977 (42 FR 29527-295336). In April 2003, gray wolf populations in the United States were separated into three Distinct Population Segments (DPS) (68 FR 15804-15875) to more effectively manage the species. The Minnesota population is a designated portion of the Eastern DPS. In 1978, critical habitat was designated for the Eastern DPS of gray wolf (43 FR 9607, March 9, 1978). That rule (50 CFR 17.95(a)) identified critical habitat at Isle Royale National Park, Michigan, and Minnesota wolf management zones 1, 2, and 3, as delineated in 50 CFR 17.40(d)(1). Wolf management zones 1, 2, and 3 comprise approximately 9,800 miles<sup>2</sup> in northeastern and north-central Minnesota and include all of the Superior National Forest and portions of the Chippewa National Forest.

Three comparable surveys of wolf numbers and range in Minnesota have been carried out since 1979. These surveys estimated that there were 1235, 1500-1750, and 2445 wolves in Minnesota in 1979, 1989, and 1998, respectively (Berg and Kuehn 1982, Fuller et al. 1992, Berg and Benson 1999). Based on these surveys, wolf populations in Minnesota have increased at annual rates of about three percent between 1979 and 1989 and by about four to five percent between 1989 and 1998. The 1998 survey revealed that the number of wolves in Minnesota was two times greater than the planning goal (1400 wolves) as specified in the Recovery Plan for Minnesota.

Wolves were considered to have been extirpated from Wisconsin by 1960, and no formal attempts were made to monitor that state's wolf population from 1960 until 1979. During that time, individual wolves and an occasional wolf pair were reported. There is no documentation, however, of any wolf reproduction occurring in Wisconsin, and the wolves that were reported may have been animals dispersing from Minnesota.

Wolf population monitoring by the Wisconsin Department of Natural Resources (DNR) began in 1979 and a statewide population of 25 wolves was estimated at that time. This population remained relatively stable for several years, and then declined to approximately 15 to 19 wolves in the mid-1980s. In the late 1980s, the Wisconsin wolf population began an increase that has continued to date. In 2002, wolf numbers in Wisconsin alone surpassed the planning goal as specified in the Recovery Plan for a second population near Minnesota (100 wolves for a minimum of five consecutive years; geographically isolated populations should have 200 wolves for a minimum of five years). There is some indication that the Wisconsin wolf population may be starting to level off (Wydeven et al. 2003).

Michigan wolves were extirpated as a reproducing population long before they were listed as endangered in 1974. Before 1991, and excluding Isle Royale, the last known breeding population of wild Michigan wolves occurred in the mid-1950s. As wolves began to reoccupy northern Wisconsin, the Michigan DNR began noting single wolves at various locations in the Upper Peninsula of Michigan. In the late 1980s, a wolf pair was verified in the central Upper Peninsula and was known to have produced pups in 1991. Since that time, wolf packs have spread throughout the Upper Peninsula, with immigration occurring from both Wisconsin to the west and Ontario to the east. They now are found in every county of the Upper Peninsula.

When the wolf population estimates of Wisconsin and Michigan are combined, the total population has exceeded the second population recovery goal, as specified in the Recovery Plan, of 200 wolves for five consecutive years for a geographically isolated wolf population. The two-state wolf population, excluding Isle Royale wolves, has exceeded 200 wolves since late winter 1995 - 1996.

The number of wolves in the Eastern DPS exceeds the recovery criteria (USFWS 1992) for (1) a secure wolf population in Minnesota and (2) a second nearby population of 100 wolves for five successive years; thus, based on the criteria set by the recovery team in 1992, there are sufficient numbers and distribution of wolves to ensure the long-term survival of the Eastern DPS. Due to the increased numbers of wolves in the Eastern DPS, the fulfillment of numerical delisting criterion for two populations (Minnesota and Wisconsin-Michigan), and the establishment of state management plans for the species, the Service published in April 2003 (68 FR 15876 - 15897) an advanced notice of a proposed rule to remove the Eastern DPS of gray wolf from the list of threatened and endangered species (50 CFR Part 17). The Service is expected to publish a proposed rule to delist the Eastern DPS of gray wolf by the end of July 2004. The publication of the proposed rule does not change the status of the wolf; it is a threatened species under the Act until a final rule to delist the Eastern DPS is published. Therefore, this consultation will not be affected by the publication of a proposed rule to delist the DPS.

### Species Description

Gray wolves are the largest wild members of the dog family (Canidae) with adults ranging from 18 – 80 kilograms (kg), depending on sex and subspecies (Mech 1974). Wolves have a gray fur coat that can vary from pure white to coal black (USFWS 2003). Wolves may look similar to coyotes (*Canis latrans*) and some domestic dogs, such as the Siberian husky (*C. familiaris*),

although longer legs, wider head and snout, and straight tail distinguish the gray wolf from the other two canids (USFWS 2003).

### Life History

Wolves are carnivorous predators that prefer a diet of medium and large mammals. Wild prey species in Minnesota include white-tailed deer (*Odocoileus virginianus*), moose (*Alces alces*), beaver (*Castor canadensis*), and snowshoe hare (*Lepus americanus*), with small mammals, birds, and large invertebrates sometimes being taken (Mech 1974, Stebler 1944, Wisconsin DNR 1999). Wolves are habitat generalists that do not depend on the type, age, or structure of vegetation; instead, they are indirectly influenced by vegetative condition through the distribution of their primary prey species.

Wolves are social animals, normally living in packs of two to 12 wolves, although two packs in Yellowstone National Park had 22 and 27 members in 2000, and Yellowstone's Druid Peak pack increased to 37 members in 2001 (USFWS et al. 2001, 2002). Winter 2001 – 2002 pack size in Michigan's Upper Peninsula averaged 4.3 wolves (Potvin et al. submitted). Packs are primarily family groups consisting of a breeding pair, their pups from the current year, offspring from the previous year, and occasionally an unrelated wolf. Packs typically occupy, and defend from other packs and individual wolves, a territory of 20 to 200 miles<sup>2</sup>, with territories of 42 – 100 miles<sup>2</sup> in the Great Lakes region (Fuller 1989). In the northern Rocky Mountains of the United States, territories tend to be larger, usually from 200 to 400 miles<sup>2</sup>; in Canada's Wood Buffalo National Park, territories of up to 1,050 miles<sup>2</sup> have been recorded (Carbyn in litt. 2000).

Normally, only the top-ranking (alpha) male and female in each pack breed and produce pups. Litters are born from early April to May and range from one to 11 pups but generally include four to six pups (Michigan DNR 1997; USFWS 1992; USFWS et al. 2001). Normally a pack has a single litter annually, but the production of two or three litters in one year has been documented in Yellowstone National Park (USFWS et al. 2002). Yearling wolves frequently disperse from their natal packs, although some remain with their natal pack. Yearlings may range over large areas as lone animals after leaving their natal pack or they may locate suitable unoccupied habitat, pair with a member of the opposite sex, and begin their own pack. Dispersal distances of 500 miles have been documented (Fritts 1983; James Hammill, MI DNR, in litt. 2001); individual wolves have recently traveled from central Wisconsin to east-central Indiana (400 miles) and northern Illinois, from the Upper Peninsula of Michigan to northern Missouri (600 miles), and from the Minnesota-Wisconsin-Michigan population to east-central Nebraska.

### **Environmental Baseline**

The environmental baseline is defined as the impacts from all federal, state or private actions and other human or natural activities in the action area, the anticipated impacts from all federal projects in the action area that have already undergone formal or early section 7 consultation, and the impacts of state or private actions that are contemporaneous with the consultation in process.

### Status of the Species within the Action Area

National Forests, and the prey species found in their various habitats, are important to wolf conservation and recovery in the western Great Lakes states. In Minnesota, the Chippewa and Superior National Forests' wolf populations range from approximately 100 - 125 on the Chippewa National Forest (U.S. Forest Service 2004) to an estimated 300 - 400 on the Superior National Forest (Mech 2000, U.S. Forest Service 2004). Both Forests are operated and managed through current Forest Plans in conformance with standards and guidelines that follow the 1992 Recovery Plan's recommendations for the wolf.

### Factors Affecting the Species within the Action Area

On the Chippewa and Superior National Forests, various land management practices potentially may affect wolves and wolf habitat. These practices include management of timber, vegetation, wildland or prescribed fire, wildlife habitat, recreation, roads and trails, and other human developments. Further, developments by other landowners or agencies within the boundaries of the Forests (on other ownerships or by authorization on National Forest System land) such as roads, railroads, utility corridors, land ownership patterns, and developments may affect wolf movements. Risks of direct wolf mortality may come from shooting, trapping, predator control, vehicle collisions, and competition or predation as influenced by human activities. Other large-scale risk factors on both Forests are disease and fragmentation and degradation of wolf habitat and illegal shooting. These risk factors are discussed in detail below in the primary categories of influence.

#### *Prey habitat*

Wolf density is heavily dependent on prey availability (Fuller 1989). Conservation of primary wolf prey, such as white-tailed deer, is clearly a high priority for the Minnesota DNR, which typically manages ungulates to ensure a harvestable surplus for hunters, nonconsumptive users, and to minimize conflicts with humans. To ensure a harvestable surplus for hunters, the agency must account for all sources of natural mortality, including loss to wolves, and adjust hunter harvest levels when necessary.

Deer, moose, and beaver, the primary prey species for wolf, are closely associated with forage from young upland forest less than 10 years old. Deer and moose rely on upland conifer more than nine years old for thermal and hiding cover. Currently, the Forests provide ample habitat for prey species, and densities of these species (particularly deer) have been high; therefore, prey availability is not likely to threaten wolves in the Eastern DPS

#### *Human access*

Human settlement and roads are considered to be major determinants in wolf distribution. These activities have multiple effects, including increased human presence causing an increase in illegal poaching and legal predator control, increased chance of introduced diseases and parasites via pets (e.g., canine parvovirus), and potential deterrence to colonization of otherwise suitable habitat (Mech 1995, Gogan et al. 1997). The Recovery Plan recommends that density of higher

standard roads [equivalent to Forest Service Objective Maintenance Level (OML) 3, 4, and 5] remain below one mile/mile<sup>2</sup> in critical habitat to limit the extent of associated effects to wolves. The Superior National Forest high standard road density outside the BWCAW is 0.46 miles/mile<sup>2</sup>. Density of high standard roads on the Chippewa National Forest is 1.2 miles/mile<sup>2</sup> (U.S. Forest Service 2004).

Although the Recovery Plan addresses the impact of low standard roads (generally equivalent to Forest Service OML 1 and 2, temporary, and some unclassified roads), it does not recommend a density threshold for such roads. Low standard roads may have a greater potential for human impact on wolves than high standard roads due to the potential for human access for trapping and shooting. These roads typically are accessed by recreational motor vehicles (RMV) or on foot.

Illegal killing of wolves may result from a variety of reasons. Some of these killings are accidental (e.g., wolves are hit by vehicles, mistaken for coyotes and shot, or caught in traps set for other animals) and may be reported to state, tribal, and federal authorities. Most illegal killings, however, likely are intentional and are never reported to authorities (Mech 1995). Radiotelemetry studies (e.g., Gogan et al. 1997) are necessary to accurately estimate illegal mortality (Fuller 1989). The Minnesota DNR receives approximately two to six reports of wolves killed by vehicle collision annually. While human habitation and the associated network of roads and vehicle traffic increase, wolf mortality from vehicle collisions is expected to continue both in actual numbers and as a percent of total diagnosed mortality as wolves persist in the action areas.

A study conducted between 1980 – 1986 in north-central Minnesota found human-caused mortality occurred at a rate of 29 percent, a figure which includes two percent mortality from legal depredation control actions (Fuller 1989). Minnesota DNR is currently conducting a radio telemetry study of wolves and deer, and of 32 wolves fitted with radio collars between 1993 and 2001, seven of 11 documented mortalities were attributed to humans (DelGuidice et al. 2001). Minnesota DNR (2001:30-31) and the Forest Service (2004) use a variety of methods to encourage and support education of the public about the history and ecology of wolves in the state and the effects of wolves on livestock, wild ungulate populations, and human activities. Public outreach efforts have been in effect for years in Minnesota, and while these efforts may not further reduce illegal take of wolves from existing levels, these measures may be crucial in ensuring that illegal mortality does not increase. Illegal take of wolves is likely related to road and human population densities, but changing attitudes towards wolves may provide for their survival in areas where road and human densities were previously thought to be too high (Fuller et al. 2003).

It is important to note that despite the difficulty in measuring the extent of illegal killing of wolves, all sources of wolf mortality, including legal (e.g., depredation control) and illegal human-caused mortality, have not been of sufficient magnitude to stop the continuing growth of the wolf population in Minnesota. Between 1993 and 1998, wolf numbers increased annually by about four percent in Minnesota, which indicates that total gray wolf mortality continues to be exceeded by wolf recruitment (that is, reproduction and immigration) during that time, and we assume that illegal human-caused mortality has not increased in importance since 1998 in the action area.

### *Other factors*

Den site disturbance may occur during timber harvest, site preparation, prescribed burning, and other activities; however, wolves at dens and rendezvous sites have been known to tolerate nearby activities. The likelihood of a project site disturbing a significant number of wolves across the Forests is minimal, due to the large home range size of wolves in Minnesota.

Both the Chippewa and Superior National Forests currently are implementing the guidelines set forth in the Recovery Plan for all Forest activities, as directed by the current Forest Plans. Thus, the aforementioned risk factors are being minimized and managed appropriately to promote the conservation of gray wolf.

### **Effects of the Action**

#### Direct and Indirect Effects

Direct effects are impacts on species and habitat that occur at the same time and place as the action and are caused by the action. Indirect effects are impacts caused by or resulting from actions of specific projects that are later in time and are reasonably certain to occur.

The Revised Forest Plans incorporate integrated resource conservation measures, including applicable measures from the Recovery Plan, that address management of wolf by promoting the conservation of wolf and its habitat and identifying ways to reduce or eliminate adverse effects to the species. Specifically, the incorporation of Recovery Plan recommendations, including the maximum road density standard (S-WL-4), the protection of known active den sites (G-WL-10), and the effective closure of roads and trails (G-RMV-4; O-TS-3; O-TS-7; S-TS-3; S-TS-4; G-TS-12; and G-TS-14) should continue to benefit gray wolf across both Forests. However, all potential adverse effects of projects under the Forest Plans could not be eliminated. Following is an analysis of potential direct and indirect effects on gray wolf from specific management actions. Categories of management covered in the Forest Plans and not shown here either have no effect on the species, have risks that are completely eliminated by Forest-wide direction, or are irrelevant to this analysis.

#### *Prey Habitat*

Vegetation management activities, such as timber harvest and prescribed fire, that may be authorized or carried out under the Revised Forest Plans are likely to have both positive and negative effects to moose and deer habitat and therefore would have both positive and negative effects on wolf. The Forest Service used the model Dualplan to analyze vegetation changes as a result of Revised Forest Plan implementation. This model uses multiple factors to determine long term vegetation changes; a description of the model may be found in the draft Environmental Impact Statement for the Forest Plan Revision, Volume II, Appendix B (U.S. Forest Service 2003). As shown in Table 1, projected acreage of forage and cover habitats for moose and deer over 100 years shows decreasing forage habitat (upland forest younger than nine years) and greatly increasing cover habitat (upland conifer older than 10 years). Although the

amount of available forage would decrease from current levels, the amount provided over the life of the Forest Plans should remain sufficient for healthy ungulate populations, based on the response of populations of these species on the Forests over the last two decades under current Forest management. Overall, although the Forest Plans would provide significantly more young upland forage habitat and less upland conifer than would be found in the range of natural variability (U.S. Forest Service 2004), moose and deer populations should not be limiting factors for wolves under the Revised Forest Plans.

Table 1. Projected acres of suitable wolf prey habitat after implementation of the Revised Forest Plans (U.S. Forest Service 2004). Percentages refer to the percent of all forest types on National Forest lands that are in the specified category.

Decade	Chippewa				Superior			
	Upland forest <9 years		Upland conifer >10 years		Upland forest <9 years		Upland conifer >10 years	
	Acres	%	Acres	%	Acres	%	Acres	%
current	51,100	11.3	110,900	25	125,000	13	322,000	34
1	37,300	8.3	120,800	26.8	100,000	10.4	371,300	38.7
2	37,900	8.3	138,800	31	101,700	10.4	411,700	43
5	39,100	8.7	159,700	36	97,700	10.2	531,000	55
10	33,100	7.4	176,900	40	94,200	9.8	554,000	58

### *Human Access*

Many of the projects and actions that would be implemented in the Revised Forest Plans involve road construction for access to project sites. Further, road and trail maintenance and construction for recreational access would occur under direction of the Revised Forest Plans. The Revised Forest Plans would continue implementation of the recommended measures in the Recovery Plan, including maintaining or striving toward high standard road densities below one mile/mile<sup>2</sup> (S-WL-4). Although the scale is not prescribed in the Recovery Plan, the Forests have chosen to analyze the density at the scale of the Lynx Analysis Unit (see Description of the Proposed Action and Lynx Environmental Baseline sections), which average approximately 40,000 acres. However, as discussed above, this road density standard does not apply to temporary, OML 1, or OML 2 roads, which are generally the only new roads expected to be built on the Forests under the direction of the Forest Plans.

Human access occurs by foot and motorized vehicle, including RMVs and off-road vehicles, and generally occurs on trails, low standard roads, and temporary roads developed for management operations, particularly timber harvests. These roads provide access to wolf habitat when open for forest management purposes. As northern Minnesota has become more developed and the human population has increased, the Forests have sustained increased visitation in recent years (U.S. Forest Service 2004), which increases the opportunity for human-wolf encounters and the likelihood of poaching of wolves.

The Revised Forest Plans provide for a maximum designation of 90 additional ATV miles on each Forest, and 130 additional snowmobile trail miles on the Superior National Forest (O-RMV-2) and 100 additional snowmobile trail miles on the Chippewa National Forest (O-RMV-1). Both Forests prohibit cross country travel of ATVs [S-RMV-3 (Superior National Forest); S-RMV-4 (Chippewa National Forest)]; the Chippewa National Forest also prohibits cross country travel of snowmobiles, (S-RMV-4). The Superior National Forest generally allows cross country snowmobile travel except for the BWCAW, Research Natural Areas, and Unique Biological Areas (S-RMV-3).

The Superior National Forest Revised Forest Plan projects a large number of temporary (754 - 764 miles) and OML 1 roads (1,132 – 2,022 miles) over the life of the Forest Plan; the Chippewa National Forest Revised Forest Plan projects 367 – 484 miles of temporary roads and 155 – 343 miles of OML 1 roads over the life of the Forest Plan. This difference is likely due to the heavily roaded nature of the Chippewa National Forest currently; most portions of the Chippewa National Forest are relatively accessible by road or trail, which is not the case on the Superior National Forest. Both Forests are likely to receive requests for special use roads to access state, county, and private inholdings, for a total of approximately 182 miles on the Chippewa National Forest and 326 miles on the Superior National Forest over the first 10 years of Revised Forest Plan implementation (U.S. Forest Service 2004). In addition to the National Forest System land traversed by the special use roads, these roads also cross much state, county, and private lands, and the resource protection methods discussed above and implemented by the Forest Service would not apply on non-Forest Service lands (i.e., special use roads, especially temporary roads or roads used for forest management purposes, generally must be effectively closed or gated on Forest Service land, but the portion off Forest Service land would not necessarily be effectively closed or gated). All of these types of low standard roads provide the highest potential for den site disturbance, shooting, trapping, and vehicle collisions with wolves.

Due to the ATV and snowmobile trails that currently exist on each Forest, the additional miles of each trail type to be added per the Revised Forest Plans, the temporary roads projected to be built for access to project sites, and the new system roads that will be built, human access is expected to continue to increase on both Forests. Any corridor open to RMVs provides the potential for Forest visitors to shoot, harass, incidentally trap, injure, or collide with wolves. These effects would be minimized by the standards and guidelines directing all temporary roads and any unneeded system or unclassified roads to be closed effectively, but during the time the roads are open and available, human access (and therefore adverse effects to wolves) is likely. Further, on the Superior National Forest, cross country snowmobile travel is allowed (G-RMV-4), while cross country snowmobile travel is prohibited on the Chippewa National Forest (S-RMV-4). Generally, the tree and shrub density on the Superior National Forest relegates snowmobiles to existing roads, trails, or traditional travel routes; however, recently closed roads may be legally accessed by snowmobiles, even though this activity is not encouraged. The guidance for monitoring the effectiveness of road closures will be critical to minimizing the adverse effects of roads and trails on wolves; road closures must be performed so as to effectively eliminate snowmobile use. All of the road and trail guidance calls for “effective” road closures or obliteration, and this, in combination with monitoring guidance, will ensure minimization of effects.

Although data are inconclusive and scarce regarding wolf mortality, particularly illegal killing, it is unlikely that mortality would increase significantly from current rates, and as such, it is not anticipated to hinder wolf recovery and population stability on the National Forests or in northern Minnesota. Despite undocumented current levels of suspected poaching, harassment, incidental trapping, injury, or vehicular collisions, there are no indications that wolf populations are declining in the action areas. Wolf populations in Minnesota are resilient with average litters of five to six pups per year, high summer survival, and significant capabilities of dispersal (Mech 2001). This resiliency, in conjunction with conservation measures that will tend to minimize illegal take, will allow wolves to sustain limited levels of illegal take under the current baseline conditions. The Forest Service and Minnesota DNR are engaged in an extensive outreach program to help limit wolf mortality (particularly poaching), and these programs would continue under the Revised Forest Plans.

While the Forest Service has no jurisdiction or authority over illegal hunting of wolves, the agency would manage to the limit of its authority the factors that lead to poaching through effective road closures and environmental education efforts.

#### *Other Factors*

Vegetation management activities that may be authorized or carried out under the Revised Forest Plans have the potential to affect gray wolves through disturbance and disruption of den sites. However, a maximum of 12 percent of the Chippewa National Forest and five percent of the Superior National Forest would be disturbed in one decade; the large size of wolf pack territories (approximately 100 miles<sup>2</sup> or 64,000 acres) makes it unlikely that management activities would coincide with den site locations. Additional protection is afforded in the Revised Forest Plans to protect known active den sites during the denning season (G-WL-10).

#### Effects of Interrelated and Interdependent Actions

The Service has not identified any actions interrelated or interdependent to the adoption of the Forest Plans that have the potential to affect gray wolves. It is possible that future specific programs and actions implemented under the Forest Plans may have relevant interrelated and interdependent actions and they will be considered in the context of consultations for those programs or actions.

#### Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Most occupied wolf habitat on the Forests is in areas of mixed land ownership, including other public (state, county), tribal, and private ownership. Actions on those lands have the potential to affect wolves in the action area. Future activities on non-federal lands that are reasonably certain to occur and could affect wolves and their habitat include timber harvest, road construction,

recreation, prescribed burning, and fragmentation through human developments. State, county, and private land timber harvest, related road construction activities, and fire management are not regulated and would not necessarily provide the same level of protection and conservation for threatened and endangered species and their habitats as the Forest Plans do for the Forests' administered lands. Human disturbance and loss of suitable habitat could result from timber harvest and fire management. Conversely, forest management that increases numbers and distribution of moose and deer could have a beneficial effect on wolves. Recreational activities associated with state, county, and private lands will continue in the action area, and are reasonably certain to increase over the life of the Forest Plans as human population increases in northern Minnesota.

Vegetation and fire management and winter recreation will continue to occur on non-federal lands. These activities are occurring at approximately the same levels on non-federal land as on Forest Service land, and these levels are expected to remain steady in the future. More detailed analysis will occur at smaller geographic scales in context with actions or programs carried out under the Forest Plans.

## **Conclusions**

After reviewing the current status of the gray wolf, the environmental baseline for the proposed action areas, the proposed management direction for the species, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Eastern DPS of the gray wolf. Critical habitat has been designated for the gray wolf in northern Minnesota; however, as stated above, the proposed action is not likely to adversely affect critical habitat.

The gray wolf population in the action area and in the rest of northern Minnesota is evidently stable and may be increasing as it was during the period between 1989 and 1997. The desired conditions, objectives, standards, and guidelines are intended to contribute to the recovery of the gray wolf and are expected to have long term beneficial effects. The risk of adverse effects of actions that could be implemented under the Forest Plans is expected to be minor and is moderated by direction to maintain or improve conditions for the species. Therefore, the Minnesota Revised Forest Plans would contribute to the recovery of the Eastern DPS of the gray wolf and would provide long term management assurance for the wolf within the DPS.

As such, the Service does not anticipate any reduction in reproduction, numbers, or distribution of the species to result from implementing the Revised Forest Plans. The action will not appreciably reduce the likelihood of survival and recovery of gray wolves.

## **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 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 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.

#### Amount or Extent of the Take

The risk of incidental take of gray wolf, though low, is not completely eliminated by provisions in the Forest Plans. Take could occur in the form of harassment during project implementation and death related to human disturbance and vehicle collisions. The Service does not anticipate that harassment would rise to the level of mortality to individuals. Mortality could only occur through vehicle collisions and illegal hunting or shooting. Any take that occurs due to illegal hunting or shooting is outside the jurisdiction and authority of the Forest Service and not exempted by this Incidental Take Statement.

The Service expects no more than six wolves would be taken annually per Forest and no more than 90 wolves would be taken over the 15-year life of the Forest Plans per Forest due to vehicle collision on all roads on all ownerships within the Chippewa and Superior National Forest proclamation boundaries. Because there is limited information from which to draw and we are unaware of the timing and location of roads that would be built or upgraded, this estimate is based on past reports of road kill. Across Minnesota, two to six road-killed wolves are reported to Minnesota DNR per year (U.S. Forest Service 2004); it is reasonable to assume we are aware of roughly one-quarter of the mortality that occurs, as wolf deaths are not reported regularly. Therefore, approximately 24 wolves per year have been killed in northern Minnesota due to vehicle collisions. Because the Forests encompass a subset of wolf habitat in northern Minnesota, the number of wolves killed by vehicle collisions is a subset of the number killed in northern Minnesota. We may assume that roughly half of the wolves killed in northern Minnesota are killed within the proclamation boundaries of the National Forests, and this rate is likely to continue under Revised Forest Plan implementation. The Forest Plans provide descriptive management direction and are prescriptive in terms of “sideboards” that would guide or limit future project design. They do not, however, specify what management actions would be carried out nor when or where actions will occur. Therefore, site-specific consultation will occur and section 7(o)(2) exemptions will be provided, as needed and appropriate, when these actions are expected to result in the incidental take described above.

#### Effect of the Take

In this biological opinion, the Service has determined that any incidental take that may result from the proposed action does not result in jeopardy to the species due to the adherence to the Recovery Plan recommendations for road density, continuation of forest management to benefit gray wolf prey species, and road closure methods included in the Forest Plans. These measures will minimize take and overall provide for increasing wolf populations in northern Minnesota. We do not expect any action implemented under the Forest Plans to result in levels of take that would affect the growth or stability of the Eastern DPS of gray wolves.

## **Reasonable and Prudent Measures**

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize effects of incidental take of the Eastern DPS of gray wolves:

Document and report to the Service annually any known wolf mortality within the National Forest proclamation boundaries in Minnesota due to vehicle collisions or poaching.

## **Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the Act, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are non-discretionary.

1. Mortality reports should be provided to the Service by December 31 of each calendar year the Revised Forest Plans are implemented. Reports should include, to the extent known, the cause of mortality, location, and sex of wolves killed.
2. Rather than establishing a discrete field monitoring effort to document wolf mortality, the Forest Service should coordinate with partners in state, tribal, county, municipal law enforcement, wildlife management agencies, wolf researchers, federal wolf trappers, and the public to collect information necessary for this reporting system. Information voluntarily provided by these agencies, researchers, and others would fulfill the requirements of the reasonable and prudent measure.

## **PART II – CANADA LYNX (*Lynx canadensis*)**

### **Status of the Species**

In 1998, the lynx was proposed for listing as a threatened species under the Act (63 FR, July 8, 1998). The lynx in the contiguous United States were listed as threatened effective April 23, 2000 (65 FR 16052, March 24, 2000). The Service identified one distinct population segment (DPS) in the lower 48 states. No critical habitat has been designated for the threatened population of Canada lynx. As explained in the final rule (65 FR 16052, March 24, 2000), designation of critical habitat would be prudent but has been deferred until other higher priority work can be completed within the Service's current budget.

In response to the emerging awareness of the uncertain status of Canada lynx populations and habitat in the contiguous 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 (see U.S. Forest Service and USFWS 2000). The CA promotes the conservation of Canada lynx and its habitat on federal lands and identifies actions the federal agencies agree to take to reduce or eliminate potential adverse effects or risks to Canada lynx and their habitat. The LCAS was produced in 1999 to provide a consistent and effective approach to conservation of Canada lynx on federal lands and was used as a basis for assessing the effects of the Revised Forest Plans on Canada lynx.

### Species Description

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

The winter pelage of the lynx is dense and has a grizzled appearance with grayish-brown mixed with buff or pale brown fur on the back, and grayish-white or buff-white fur on the belly, legs and feet. Summer pelage of the lynx is more reddish to gray-brown (Koehler and Aubry 1994). Adult males average 22 pounds in weight and 33.5 inches in length (head to tail), and females average 19 pounds and 32 inches (Quinn and Parker 1987).

Classification of the Canada lynx (also called the North American lynx) has been subject to revision. In accordance with Wilson and Reeder (1993), the lynx in North America is *Lynx canadensis*. Previously the Latin name *L. lynx canadensis* was used for lynx (S. Williams, Texas Tech University, pers. comm. 1994). Other scientific names still in use include *Felis lynx* or *F. lynx canadensis* (Jones et al. 1986; Tumlison 1987).

### Life History

Lynx evidently require large areas containing boreal forest<sup>1</sup> habitat. In the northeastern U.S., lynx were most likely to occur in areas containing suitable habitat that were greater than 40 miles<sup>2</sup> (Hoving 2001). The requirement for large areas also is demonstrated by home ranges that encompass many square miles. The size of lynx home ranges varies with sex, age, abundance of prey, season, and the density of lynx populations (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 58 miles<sup>2</sup> and 28 miles<sup>2</sup> for males and females, respectively (Aubry et al. 2000). Recent home range estimates from Maine are 27 miles<sup>2</sup> for males and 20 miles<sup>2</sup> for females (G. Matula, in litt. 2003). Documented home ranges in both the southern and northern boreal forest, however, vary widely from three to 300 miles<sup>2</sup> (Saunders 1963; Brand et al. 1976; Mech 1980; Parker et al. 1983; Koehler and Aubry 1994; Apps 2000; Mowat et al. 2000; Squires and Laurion 2000; Squires et al. 2001; G. Matula, in litt. 2003). Generally, it is believed that larger home ranges, such as have been documented in some

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<sup>1</sup> 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).

areas in the southern extent of the species' range in the west, are a response to lower-density snowshoe hare populations (Koehler and Aubry 1994; Apps 2000; Squires and Laurion 2000).

Long-distance movements (greater than 60 miles) are characteristic of lynx (Mowat et al. 2000). Lynx disperse primarily when snowshoe hare populations decline (Ward and Krebs 1985; Koehler and Aubry 1994; O'Donoghue et al. 1997; Poole 1997). Subadult lynx also disperse even when prey is abundant (Poole 1997), presumably as an innate response to establish home ranges. Lynx also make exploratory movements outside their home ranges (Squires et al. 2001). Lynx are capable of moving extremely long distances (greater than 300 miles) (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 throughout the range of the lynx (Koehler and Aubry 1994). Other prey species include red squirrel (*Tamiasciurus hudsonicus*), other small mammals, 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 and Parker 1987; Koehler 1990; Staples 1995; O'Donoghue et al. 1998a, b). When hare densities decline due to reduced availability of high-quality food and increased predation, birthrates and litter sizes of female lynx and survival of kittens decrease (Nellis et al. 1972; Brand et al. 1976; Brand and Keith 1979; Poole 1994; Slough and Mowat 1996; O'Donoghue et al. 1997). The reduction in production and survival of young is the primary cause of population declines in lynx, and reproduction "virtually ceases at the low point of the cycle" (Quinn and Parker 1987). Population dynamics of southern populations of snowshoe hare are understood poorly relative to those in northern latitudes (Hodges 2000b). There is some evidence that populations in Minnesota also undergo distinct fluctuations over a 10 - 15 year period (Fuller and Heisey 1986), although it is not yet clear whether snowshoe hare populations in Minnesota are able to grow at rates sufficient to support persistent lynx populations in the state.

Lynx populations are tied closely to snowshoe hare distribution and density. Snowshoe hares have evolved to survive in areas that receive deep snow (Bittner and Rongstad 1982) and prefer conifer habitats with dense shrub understories that provide food, cover to escape predators, and thermal protection during extreme weather (Wolfe et al. 1982; Pietz and Tester 1983; Fuller and Heisey 1986; 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 and Tester 1983; Hodges 2000a, b). Openings in mature forests with dense understory [e.g., some fens in north-central Minnesota (Pietz and Tester 1983)] also provide high-quality hare habitat (Buskirk et al. 2000).

Lynx use coarse woody debris, such as downed logs, root wads, and windfalls, 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). 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). In Minnesota, two dens have been discovered in lowland black spruce bogs with much coarse downed woody debris. The third den was found in a red pine plantation with old white birch both standing and as downed logs.

Lynx breed in spring, and females give birth in late May to early June to litters of up to five kittens; hare densities are correlated positively 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). A lynx den found in Minnesota near Superior National Forest in 2004, however, contained five kittens. Therefore, although mean litter sizes may be smaller on the southern edge of the species’ range, large litter sizes do occur. Kittens wean at about 12 weeks after birth and stay with females during their first winter when they may hunt cooperatively (Quinn and Parker 1987); family units break up at the onset of breeding, about mid-March (Quinn and 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 two years of hare scarcity (Poole 1994; Slough and Mowat 1996). Lynx also are killed by automobiles and other predators (see below), although the significance of these factors to lynx populations is unknown (Brand and Keith 1979; Carbyn and Patriquin 1983; Ward and Krebs 1985; Bailey et al. 1986).

Buskirk et al. (2000) suggested that when other hare predators, particularly coyotes (*Canis latrans*), can access lynx winter hunting areas via compacted snow they may compete for prey sufficiently to affect local lynx populations, and preliminary study results support that theory (Bunnell et al. 2004). Buskirk et al. (2000) also 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 and Parker (1987) stated that “(G)ray wolves (*Canis lupus*) will kill lynx that they catch in the open.” Bobcat home ranges often exhibit elevational or latitudinal separation from those of Canada lynx, which are better adapted to deep snow. The paws of lynx support twice as much weight on snow than bobcats (Quinn and Parker

1987). Bobcats are thought to displace Canada lynx where both felids are locally sympatric. Canada lynx occasionally may kill bobcats (Giddings et al. 1998), although the opposite also has been reported.

Hybridization of lynx with bobcats has been confirmed in Maine, Minnesota, and New Brunswick with DNA analysis. In Minnesota, three of 19 animals (16 percent) 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 possessed entire carcasses of two and only a hair sample of the third. All three were from male bobcats mating with female lynx. This constituted the first confirmed evidence of hybridization between the two species. In Maine, tests of hair and tissue from 31 individual animals identified two as hybrids (seven percent) – 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 and a better understanding of lynx population dynamics in the southern boreal forest “is a critical research need” (Aubry et al. 2000). Southern lynx populations may be limited naturally by the availability of snowshoe hares, competition, and hybridization with bobcats, as suggested by large home range size, high kitten mortality due to starvation, and greater reliance on alternate prey.

### Distribution

Canada lynx range is associated closely with the distribution of North American boreal forest inhabited by snowshoe hares (Agee 2000) and 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, 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 the 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.

A recovery plan and associated recovery units for the Canada lynx have not yet been developed by the Service. Although we do not know if lynx are consistently present in Minnesota during the low portion of the hare cycle, it is important for habitat to be available in northern Minnesota so that lynx may have suitable areas in which to migrate when populations expand past carrying capacity in Ontario. Whether Minnesota is designated as a recovery unit, this suitable habitat is important to the species during high portions of the hare cycle. Until such time as a recovery plan is developed, for the purposes of this consultation we will assume that lynx presence in Minnesota is required to recover this species

## **Environmental Baseline**

The environmental baseline is defined as the impacts from federal, state or private actions and other human or natural activities in the action area, the anticipated impacts from all federal projects in the action area that have already undergone formal or early section 7 consultation, and the impacts of state or private actions that are contemporaneous with the consultation in process.

### Status of the Species Within the Action Area

As was true historically, northeastern Minnesota supports a substantial amount of boreal forest (roughly estimated at 4,800 miles<sup>2</sup>) (Great Lakes Ecological Assessment, in litt, undated). In Minnesota, the deepest snows occur in the northeast corner of the state (Minnesota DNR, in litt. 1998). Unlike elsewhere within the Great Lakes and northeast regions, most lynx habitat in northeastern Minnesota is on public lands.

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 historic 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, observations of Minnesota lynx evidently began to rebound. Since 2000, there have been at least 86 verified<sup>2</sup> reports of lynx in Minnesota (Figure 2), six of which included evidence (kittens) of reproduction (Minnesota DNR, in litt. 2003; S. Loch, in litt. 2003); researchers have verified two lynx dens in 2004 with three and five kittens, respectively (R. Moen, University of Minnesota, pers. comm., 2004), and a third with two verified kittens (S. Loch, University of Minnesota, pers. comm., 2004). This marked increase in reports and first documentation of lynx dens in Minnesota 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

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<sup>2</sup> 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.

in Minnesota or if these animals fail to persist after the population declines (University of Minnesota, in litt. 2002). Approximately 13 radio-collared animals are being monitored currently.

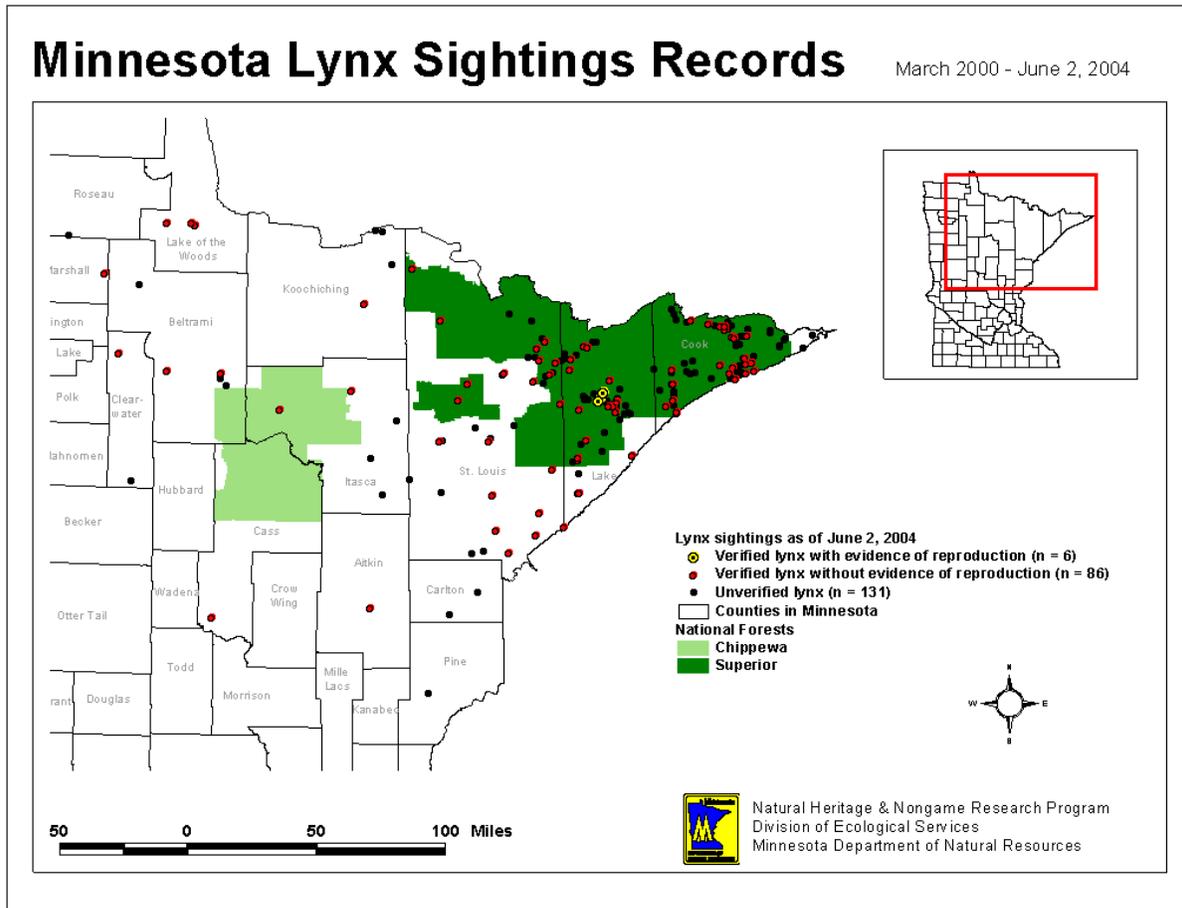


Figure 2. Lynx records in the Minnesota Department of Natural Resources' (MNDNR) database as of June 2, 2004. MNDNR uses the following criteria to determine whether to describe a record as "verified": a photo showing distinguishing characteristics was provided; conclusive behavioral observations were 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.

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 DNR, in litt. 2003).

Unlike other Great Lakes and northeast regions of lynx range in the United States, most lynx habitat in northeastern Minnesota is on public lands, particularly the Superior and Chippewa National Forests. Mixed deciduous-boreal forest suitable for lynx habitat encompasses most of the Forests, which have been mapped into LAUs to promote lynx management under the LCAS. Currently, the majority of LAUs provide much more than minimum requirements for suitable habitat (Table 2). Approximately 51 percent of land in LAUs on the Chippewa National Forest and 62 percent on the Superior National Forest are owned by the Forest Service; the remainder is owned by state, county, and private landowners (Forest Service 2004). Recent observations of lynx on or near the Chippewa and Superior National Forests indicate that lynx are present on these Forests at this time.

Table 2. Existing condition of LAUs on the Chippewa and Superior National Forests (Forest Service 2004). Percentages indicate the extent of suitable prey and denning habitat and unsuitable lynx habitat for all LAUs.

	<b>Average Size</b>	<b>Snowshoe Hare Habitat</b>	<b>Red Squirrel Habitat</b>	<b>Lynx Denning Habitat</b>	<b>Unsuitable Habitat</b>
<b>Chippewa</b>	43,140 acres	250,200 acres (70%)	118,100 acres (33%)	140,600 acres (45%)	12,100 acres (3.4%)
<b>Superior</b>	42,910 acres	666,600 acres (54%)	385,600 acres (31%)	514,600 acres (45%)	57,300 acres (4.6%)

Lynx persist in the action area currently, a presumed high in the hare cycle. However, we have little information on their population levels in Minnesota during hare lows. As stated above, lynx have been trapped in the state during periods representing both low points and high points in the hare cycle. Given current factors affecting the species it is likely that a small number of lynx may remain in Minnesota during the anticipated future lows, although this will be ascertained in future years of the Minnesota lynx study.

#### Factors Affecting the Species Within the Action Area

In the LCAS, the Lynx Biology Team identified potential risk factors to lynx that are within the authority and jurisdiction of the federal land management agencies. These risk factors include management of timber, wildland or prescribed 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 may come from trapping, shooting, predator control, vehicle collisions, and competition or predation as influenced by human activities. Other large-scale risk factors are fragmentation and degradation of lynx habitat. Each of these potential risk factors may occur in the action area except livestock grazing; predator control is unlikely and restricted to depredated wolves in all areas except Zone 1 (50 CFR 17.40), where no predator control activities may take place. Timber management, wildland fire, recreational use, roads and trails, and developments on private land inholdings are most likely to affect lynx in this area.

The following is a summary of issues in the action area that are relevant to the identified risks.

### *Reduction in Habitat Quality or Quantity*

The LCAS defines habitat characteristics that provide adequate foraging and denning habitat, particularly conditions that support adequate abundance of prey. Activities that change forest structure can affect habitat quality for lynx and snowshoe hares, their primary prey source. Thinning and other timber management practices that reduce stem density and downed material and promote more open, mature stands can reduce habitat quality and quantity. Much of the Chippewa and Superior National Forests outside the BWCAW has been managed in ways that have altered forest age class, stand structure, and species composition. However, with the implementation of the LCAS in the last four years, no more than 30 percent of potential lynx habitat on all ownerships within an LAU could be in an unsuitable condition (generally less than three years old), nor could more than 15 percent of National Forest system lands be converted to an unsuitable condition within 10 years; therefore, habitat alteration has not been a limiting factor in the action areas.

### *Habitat Fragmentation*

Throughout the Forests and northern Minnesota, human activities have reduced connectivity between patches of suitable lynx habitat. Development for residential and commercial uses, as well as roads, railroads, and utility corridors have all interrupted linkage corridors. Still, much of the land within and between the Forests remains undeveloped and lynx habitat remains relatively intact and well connected. This is particularly true on the Superior National Forest, which has a high standard road density of 0.46 miles/mile<sup>2</sup> outside the BWCAW.

### *Increased Access for Competing Carnivores*

Lynx have evolved a competitive advantage in deep, soft snow environments; their large paws are adapted to hunt prey in areas that are inaccessible to other predators. This capability has made winter foraging habitat available to lynx that is unavailable to other carnivores. Snow compacts under natural conditions; however, snow compacted by human activity may increase access by coyotes and bobcats to prey in deep snow conditions where historically they were excluded or rare. Winter road use, snowmobiling, cross country skiing, and dogsledding all have the effect of compacting snow. On the Forests outside the BWCAW snowmobile activity is extensive and increasing significantly. The Chippewa National Forest currently has 378 miles of snowmobile trails and 681 miles on all ownerships within the proclamation boundary; the Superior National Forest has 686 miles of snowmobile trails and 1,509 mile on all ownerships within the proclamation boundary (U.S. Forest Service 2004). Advances in snowmobile capabilities have raised concerns about intrusion and new snow compaction in areas previously not vulnerable to high levels of snowmobile use. In addition, new road construction in lynx habitat has made more areas accessible during winter. These routes could be used by snowmobiles even if new roads are designated as closed to motorized public travel during other seasons. The Chippewa National Forest currently has 2,432 miles of low standard roads (temporary, OML 1, and OML 2 roads), and the Superior National Forest has 2,182 miles of low

standard roads (U.S. Forest Service 2004). All of these factors have potential to reduce the competitive advantage of lynx in areas that typically receive deep snows.

### *Human-caused Mortality*

Roads are a factor in human-caused lynx mortality where they provide access to areas where lynx occur, increasing the risk of negative interactions between people and lynx. Throughout the Forests outside the BWCAW, high and low standard roads bisect many areas that provide potential or suitable lynx habitat. Paved roads have been a mortality factor in lynx translocation efforts within historical lynx range. Other than translocated animals, there has been one documented occurrence of highway mortality in Wisconsin (Thiel 1985), and, in Minnesota since 2000, there have been two apparent highway mortalities (U.S. Forest Service 2004). Single, rare mortality events could be significant when lynx numbers are low. In Minnesota, lynx trapping is no longer legal, though lynx are vulnerable to legal trapping for other mammals. Since 2000, there have been at least eight documented incidents of trapped lynx, and of these at least three are known to have died (U.S. Forest Service 2004). One of these killed lynx was discovered to be a lynx-bobcat hybrid.

The Chippewa and Superior National Forests are implementing the LCAS and Canada Lynx Conservation Agreement (CA) between the Forest Service and the Service (2000) for all forest activities that occur within LAUs. Thus, the aforementioned risk factors are being minimized and managed to promote the conservation of lynx within the Chippewa and Superior National Forests.

## **Effects of the Action**

### Direct and Indirect Effects

Direct effects are impacts on species and habitat that occur at the same time and place as the action and are caused by the action. Indirect effects are impacts caused by or resulting from actions of specific projects that are later in time and are reasonably certain to occur.

The Revised Forest Plans incorporate the vast majority of the conservation measures outlined in the LCAS; Appendix B of the BA (U.S. Forest Service 2004) cross references Forest Plan direction to the LCAS conservation measures. In some instances, conservation measures that were recommended to be standards were incorporated into the Forest Plans as guidelines. While guidelines are not as strict as standards (i.e., to violate a standard the Forest Service must amend the Forest Plan, while exceptions to guidelines only require justification in the project planning record), any exceptions to guidelines would be evaluated on an individual project basis, and if the resulting action may affect Canada lynx, the Forests would consult with the Service. Therefore, at this time and at the programmatic scale, the Service is evaluating standards and guidelines as having essentially equal authority.

The Forest Service developed the Revised Forest Plans as strategic rather than procedural guidance. Some conservation measures in the LCAS were not conducive to inclusion in the Revised Forest Plans due to their strategic nature. These measures include those relating to

procedures such as promoting outreach, reducing impacts of highways through identification of areas of high lynx use, and identifying and promoting linkage areas. These procedures are not prescriptive outcomes; rather, they are analyses that should be performed. These measures were included in the Lynx Appendix (E) of the Revised Forest Plans. Other information from the LCAS and incorporated in the Lynx Appendix includes direction on development and implementation of LAUs, habitat definitions, and incorporation of new information. This appendix ensures the context and application of the LCAS is carried forward as Revised Forest Plans are implemented and is critical to the conservation of lynx on the Forests.

Overall, management for and consideration of lynx in the Revised Forest Plans is assured during project-specific actions due to the inclusion of many objectives, standards, and guidelines specifically designed for lynx conservation and management (O-WL-8-15; S-WL-1-2; G-WL-1-6, 8-9). Risks to lynx would be minimized by these protective measures and by the continued use of LAUs to assess effects of proposed actions to lynx on the Forest; the use of LAUs ensures continued assessment of lynx habitat over time as projects are implemented under the Forest Plans.

Following is an analysis of potential direct and indirect effects on lynx from program direction for each of the specific management actions likely to occur under Forest Plan direction. Categories of management covered in the Forest Plans and not addressed here either have no effect on the species, have risks that are completely eliminated by Forest-wide direction, or are irrelevant to this analysis.

### *Vegetation Management*

In the Dualplan model used by the Forest Service to predict vegetation changes after Revised Forest Plan implementation, lynx habitat was broken down into several components: snowshoe hare habitat, red squirrel habitat, denning habitat, and unsuitable habitat. These categories were defined in the model by the forest types that fall into descriptions of these habitats in the LCAS. Suitable hare habitat is defined as vegetation that provides food, security from predators, and thermal protection during extreme weather and may be generally described as forest that supports a high density of young trees or shrubs (> 4,500 stems or branches per acre), and tall enough to protrude above the snow (three to ten feet). In northern Minnesota these conditions may occur in a wide variety of habitats, including lowland conifer bogs and forests; early successional forest typically three to 12 years following disturbances such as fire, insect infestations, catastrophic wind events, disease outbreaks, and timber harvest; older forests with a substantial understory of shrubs and young conifer trees; and willow/alder swamps (Pietz and Tester 1983; Fuller and Heisey 1986; Koehler 1990). In addition, coarse woody debris or brush piles, especially in early successional stages (created by harvest regeneration, management-ignited fire, or natural disturbances such as fires or blowdown) provide important cover for snowshoe hares and other prey.

Red squirrels are found in a variety of habitat types, but their densities tend to be highest in mature cone-bearing forests with substantial quantities of coarse woody debris (Ruediger et al. 2000). Red squirrels prefer mature conifer forests because of their forage preference for conifer

seeds, but they may also be found in hardwood or younger forests that provide mast forage such as oak and hazel, fruits, mushrooms, and other seeds.

Denning habitat is used by female lynx during parturition and rearing of young until they are mobile. The common component appears to be large amounts of coarse woody debris, with downed logs or root wads in sufficient amounts to provide escape and thermal cover for kittens. Denning habitat may be found in a variety of forested habitats, especially older mature forest of conifer or mixed conifer/deciduous, or in regenerating stands (greater than 20 years since disturbance). Forest disturbed by blowdown, fire, insect, or disease also may provide denning habitat.

Unsuitable habitat is strictly defined in the LCAS and in the model as young forest where vegetation has not developed sufficiently to support snowshoe hare populations during all seasons. Unsuitable habitat results from either natural disturbances such as fire, flooding, blowdown, or insect and disease outbreaks or from human management activities.

Probable vegetation management practices conducted under the Revised Forest Plans include timber harvest, such as thinning, clearcutting, shelterwood, partial cut, and uneven-aged cutting; wildlife restoration projects that involve tree cutting, shearing, burning, seeding, and planting; prescribed burning for ecological purposes, hazardous fuel reduction, and site preparation; mechanical site preparation (definitions of these management actions may be found in the Revised Forest Plans). Natural processes such as succession, fire, wind, insects, disease, flooding, and nutrient cycling will also continue to affect the structure and composition of vegetation on the Forests.

Vegetation and timber management authorized under the Forest Plans have the potential to adversely affect lynx by reducing habitat quality for denning, foraging, and dispersal; disrupting travel, resting, and foraging patterns; disturbing denning females; and reducing habitat quality for lynx prey species, especially snowshoe hare. Depending on the timing, frequency, intensity, extent, amount, or other conditions, impacts may be variable among similar projects. Using the LCAS as a basis, the Forest Plans have incorporated a number of components that would reduce the risk of those impacts.

The Forest Plans include broad direction to design and implement vegetation management projects within LAUs to maintain or restore conditions for lynx foraging and denning habitat (O-WL-4-5, 8-9; G-WL-1, 4-5) and to maintain or improve juxtaposition of required habitat types and connectivity (O-WL-4-5, 7-8, 10-12; Lynx Appendix E). Actions intended to protect structures, forest resources, and communities from fire or actions whose short-term impacts are offset by longer term benefits to lynx may be excepted from several of these standards and guidelines. The LCAS specifically states that no more than 30 percent of lynx habitat in an LAU should be in unsuitable condition if that area is to support lynx. For vegetation management actions, this provision is incorporated into the Forest Plans as G-WL-3. Because this is a guideline, exceptions may exist (e.g., on the Superior National Forest, LAUs 44 and 46 are being managed primarily for connectivity rather than foraging or denning habitat); however, any actions that may affect lynx will be subject to project-specific consultation. Further, the Forest Plans incorporate the provision in the LCAS that states that no more than 15 percent of lynx

habitat within an LAU may be converted to an unsuitable condition by the National Forests within a 10 year period (S-WL-1). No exceptions (aside from Superior National Forest LAUs 44 and 46) may occur to this standard without amending the Forest Plans.

Over the long term, the Revised Forest Plans will alter vegetation patterns on the landscape. On both Forests, suitable hare habitat would decrease with the Superior National Forest showing the most marked decrease (Table 3). Management activities that create unsuitable conditions for hare generally include clearcut and seed tree harvest, and might include management-ignited fire, mechanical site preparation, salvage harvest, and shelterwood and commercially-thinned harvest, depending on unit size and remaining stand composition and structure. In all decades, suitable hare habitat remains above the range of natural variation, which is essentially a description of conditions that existed prior to European settlement (1600 – 1900 A.D.) of the area (U.S. Forest Service 2004). Moreover, this reduction would be mediated by an increase in available red squirrel habitat on both Forests. Further, unsuitable habitat for lynx would vary only slightly with implementation of the Revised Forest Plans and would remain distinctly below the maximum of 15 percent unsuitable in a decade prescribed in the LCAS and incorporated into the Revised Forest Plans (S-WL-1). Because suitable habitat on National Forest lands alone is such a high percentage within LAUs and the Forests are the majority landowner within most LAUs, we expect that the Forests would not approach the LCAS maximum of 30 percent of lynx habitat on all ownerships in an unsuitable condition within an LAU at any time, which would be ensured by corresponding guidance in the Forest Plans (G-WL-3).

Table 3. Projected amounts of suitable and unsuitable habitat for lynx forage on all LAUs on National Forest land after implementation of the Revised Forest Plans (U.S. Forest Service 2004). Percentages refer to the percent of total lynx habitat within LAUs on National Forest land.

Decade	Chippewa			Superior		
	Snowshoe Hare Habitat (%)	Red Squirrel Habitat (%)	Unsuitable Habitat (%)	Snowshoe Hare Habitat (%)	Red Squirrel Habitat (%)	Unsuitable Habitat (%)
Current	69.5	32.8	3.4	53.6	31.0	4.6
1	59.1	34.4	3.9	48.4	32.5	3.8
2	56.1	36.1	4.0	41.9	33.5	3.9
5	62.1	42.1	3.8	30.0	19.7	4.0
10	64.3	47.8	3.6	32.1	48.4	3.6

Although denning habitat would decrease across both Forests, projected vegetation changes indicate denning habitat for lynx on National Forest lands would remain far above the 10 percent minimum prescribed by the LCAS and incorporated into the Revised Plans (G-WL-4), as shown in Table 4. This guidance to ensure minimum amounts of denning habitat in each LAU would further guarantee that denning habitat would be well distributed across the Forests.

Table 4. Projected availability of denning habitat in patches five acres or greater for lynx after implementation of the Revised Forest Plans (Forest Service 2004). Denning habitat is calculated on all LAUs on National Forest land, and percentage refers to the percent of total lynx habitat. LAUs should have a minimum of 10 percent denning habitat.

Decade	Denning Habitat			
	Chippewa		Superior	
	Acres	%	Acres	%
Current	140,600	39.0	514,600	45.1
1	119,400	33.4	475,300	41.8
2	106,600	30.2	429,500	37.8
5	112,400	32.7	216,300	19.0
10	118,100	34.7	502,000	44.1

Additionally, juxtaposition of foraging and denning habitats would improve in many areas due to harvest practices creating young forest within older stands. Guidance would further provide an emphasis at project level to promote denning habitat in appropriate spatial distributions and juxtaposition to foraging habitat (O-WL-10). Within-Forest connectivity would be amply provided for on both Forests, as both are projected to have more than 95 percent forested cover on LAUs over the life of the Forest Plans (U.S. Forest Service 2004), which provides lynx travel habitat between foraging and denning areas. However, connectivity is less assured between Forests in Minnesota and other large blocks of suitable habitat in the Great Lakes geographic area, due to the extent of agriculture, roaded, or developed land use. The Forests have limited ability to influence connectivity outside of their boundaries, although guidance is provided in the Forest Plans to promote public and interagency cooperation and support for restoring or maintaining connectivity (O-WL-12).

The objectives and standards and guidelines promote lynx habitat and these provisions reduce and minimize risks to lynx and lynx prey habitat. Although specific projects may render some areas less suitable for lynx and through implementation of projects could result in the potential for adverse effects to individual lynx, the Forest Plans ultimately ensure conservation of lynx over the long term on the Forests.

#### *Human Disturbance*

There are a number of threats to lynx from management of roads and facilities and management of recreation resources. They include increased risk of disturbance and negative human-lynx interactions (harassment and/or mortality), alteration of habitat and dispersal corridors, and snow compaction associated with winter recreation that may increase competition with other carnivores. Currently the LCAS identifies the indirect effects of human access and disturbance as a greater risk than direct impacts; this is primarily a result of increased snow compaction that may allow competing carnivores, such as bobcat or coyote, to access lynx habitat.

Direct effects of human disturbance (including dispersed recreation and low standard roads) result from disruption of travel, resting, and foraging patterns; disturbance of denning females during construction; and collision with vehicles. Travel is disrupted directly via collision with vehicles and indirectly via avoidance of roads and populated areas. Due to the extensive acreage

of Forest Service land, the scattered dispersal and timing of road and trail construction, guidance to protect known dens (G-WL-2), the relatively few lynx present on the Forests at a given time, and the small area and short timing of construction, the direct effects of road and trail construction are likely to be temporary and very low in magnitude. However, vehicle collisions, particularly on high standard roads, may have a greater effect on lynx populations. Since 2000 in Minnesota, three apparent incidents of lynx road kill in northern Minnesota have been documented: two off the National Forests on highways and one on the Superior National Forest on the Gunflint Trail (a high standard road: OML 5) (U.S. Forest Service 2004). When lynx prey populations are low, hunger-related stress often compels lynx to travel, and the likelihood of road crossings increases. Road upgrades are not proposed in the Revised Forest Plans; however, they are likely to occur to meet human health and safety or other environmental concerns and essential management needs. Upgrading results in wider roads and generally increased travel speeds. A guideline is proposed in the Forest Plans to minimize upgrading and reduce impacts of higher standard roads (G-WL-9), although there is very little information available in the literature on road design to minimize effects to lynx. The guideline and the Lynx Appendix require, during project-specific analysis, an assessment of linkage areas and habitat use in the project area. However, there is little opportunity to minimize the effects of high standard roads, and lynx will likely be killed in vehicle collisions at a continued low level. A greater effect is more likely to occur from increased human use of the National Forests than from direct mortality as a result of collisions with vehicles.

Indirect effects of human disturbance are more extensive: designated winter recreation trails and policies that allow recreational vehicles on low standard roads or cross country facilitate access to lynx habitat by competitors. Further, human access via these roads and trails creates the potential for incidental trapping or shooting. Recent evidence of three incidental trapping deaths is an indicator of this potential problem (U.S. Forest Service 2004). These effects are generally long term on trails and low standard open roads. Temporary and low standard closed roads, if closed effectively, only contribute to these effects of increased competition and human interaction while open (generally several years or less for temporary roads, and intermittently for low standard closed roads).

The Revised Forest Plans include components that would minimize these risks by generally maintaining road density within LAUs below two miles/mile<sup>2</sup> (G-WL-8). If an LAU exceeds that density, the Forests would consider opportunities to close or seasonally restrict access. Additionally, the Forests would allow no net increase in groomed or designated trails (S-WL-2) unless such designation consolidates use. This standard includes those user-developed trails, particularly on the Superior National Forest, that receive regular use each winter. Under the Revised Forest Plans, both Forests would allow additional snowmobile trail mileage (100 and 130 new miles for the Chippewa and Superior National Forests, respectively). When a new trail is to be developed, an equivalent amount of trail (user-developed or Forest Service designated) must be decommissioned. Alternatively, the Forests may designate new snowmobile trails on user-developed trails, which results in no on-the-ground increase in trail miles but increases the designated trails on the Forest. For this second scenario to accurately represent no net increase in on-the-ground trail miles, the use of a “baseline” map of user-developed trails is required. User-developed trails that are created after Revised Forest Plan implementation would not be eligible for designation as an exception to the no net increase standard. In the first several years

of implementation it is unlikely these baseline maps would be complete; during road and trail inventories managers would be able to identify user developed trails that had been in place for several years versus those that were newly developed. Therefore, this designation of user-developed trails should not adversely affect lynx. Further, the consolidation of winter recreation (and associated closure of remote trails) would benefit lynx by providing large blocks of habitat unavailable to competitors.

Fewer restrictions are placed on the overall density of routes allowable for ATV use than snowmobile use on designated snow-compacting trails. ATV routes may invite snowmobile use, and adverse effects to lynx may occur where these routes coincide with lynx habitat. Although the standard allowing no net increase of designated over-the-snow routes (S-WL-2) would not apply to ATV trails, road and trail density would still be managed at or below two miles/mile<sup>2</sup> (G-WL-8).

The Superior National Forest Revised Plan includes a large number of new temporary (754 - 764 miles over the life of the Forest Plan), and OML 1 (1,132 – 2,022 miles over the life of the Forest Plan) roads, and the Chippewa National Forest Revised Forest Plan includes fewer of each type (367 – 484 miles of temporary roads and 155 – 343 miles of OML 1 roads over the life of the Forest Plan). This difference is likely due to the more heavily roaded nature of the Chippewa National Forest currently; most portions of the Chippewa National Forest are relatively accessible by road or trail, which is not the case on the Superior National Forest. Both Forests generally allow ATV and snowmobile use on existing OML 1 and 2 roads, an activity expected to continue under the Revised Forest Plans. However, effects on lynx would be minimized by the guidance in the Revised Forest Plans to effectively close new OML 1 roads (O-TS-3) and all temporary roads (S-TS-3) after they are no longer necessary to support a specific action (e.g., timber harvest).

Both Forests are likely to receive requests for special use roads to access state, county, and private inholdings, for a total of approximately 182 miles on the Chippewa National Forest and 326 miles on the Superior National Forest over the first 10 years of Revised Forest Plan implementation (U.S. Forest Service 2004). In addition to the National Forest system land traversed by the special use roads, these roads also cross state, county, and private lands, and the resource protection methods discussed above would not apply (although they would count toward road density calculations by the Forests). For example, special use roads, especially temporary roads or roads used for forest management purposes, generally must be effectively closed or gated on Forest Service land, but the portion off Forest Service land would not necessarily be effectively closed or gated. On these portions, winter use is likely to occur. All of the above types of low standard roads provide the highest potential for increased competition, den site disturbance, shooting, trapping, and vehicle collisions with lynx.

Human access occurs by foot and motorized vehicle, including RMVs and off-road vehicles, and generally occurs on trails and low standard roads developed for management operations, particularly timber harvest. While open, these roads provide access to lynx habitat. As northern Minnesota has become more developed and the human population has increased, the National Forests have sustained increased visitation in recent years (U.S. Forest Service 2004), which increases the opportunity for human-lynx encounters, especially by trappers. Lynx are likely to

continue to be incidentally trapped at the current rate as a result of continued access via low standard roads and trails on the Forests.

Due to the ATV and snowmobile trails that currently exist on each Forest, the additional miles of each trail type to be added per the Revised Forest Plans, the temporary roads projected to be built for access to project sites, and the new system roads that will be built, human access is expected to be fairly high on both Forests. Any corridor open to RMVs provides the potential for Forest visitors to incidentally trap, shoot, or collide with lynx. Further, these corridors increase potential competition through increased snow compaction. These effects would be minimized by the standards and guidelines directing the placement and density of roads and trails and ensuring all temporary roads and any unneeded system or unclassified roads would be closed effectively, but during the time the roads are open and available, human access (and therefore adverse effects to lynx) is likely. Further, on the Superior National Forest, cross country snowmobile travel is allowed and this activity would continue under the Revised Forest Plan (cross country snowmobile travel is illegal on the Chippewa National Forest and would remain so under the Revised Forest Plan). Generally, dense forest on the Superior National Forest relegates snowmobiles to existing roads, trails, or traditional travel routes, but it is legal for snowmobiles to access a recently closed road.

The guidance for monitoring the effectiveness of road closures will be critical to minimizing the adverse effects of roads and trails on lynx; road closures must be performed so as to effectively eliminate snowmobile use. All of the road and trail guidance calls for “effective” road closures or obliteration, and this, along with monitoring guidance, will ensure minimization of effects. Additionally, the guidance for monitoring the success of the Forests in achieving no net increase in groomed or designated over-the-snow routes would provide a thorough inventory of effects over the life of the Forest Plans.

Although the Forest Service has no jurisdiction or authority over trappers on the Forests, the agency would manage to the limit of its authority the factors that lead to incidental trapping through effective road closures and environmental outreach efforts. Further, protocols have been developed to ensure a trapped lynx is released unharmed, which would reduce the potential for any further mortality. Although adverse effects from incidental trapping remain likely under the Revised Forest Plans, these effects would result indirectly from the implementation of the Forest Plans and we do not expect these effects to be of a magnitude that would impair lynx population growth on the Forests or in northern Minnesota.

In summary, within LAUs total open roads and trails will remain under two miles/mile<sup>2</sup> (or, in those LAUs above two miles/mile<sup>2</sup>, the Forest Service will strive to reduce to two or fewer miles/mile<sup>2</sup>). This will minimize the potential for adverse effects to lynx from accidental trapping, increased competition, and vehicle collisions, although these effects would continue in LAUs at a low level. Due to minimization measures, we do not expect the mortality rate from open roads and trails to rise to a level that would impair population growth, even during the low portions of the hare cycle. This is primarily due to the relatively remote nature of the Superior National Forest, in particular. The BWCAW provides constant habitat for lynx during all periods of the hare cycle and is unfragmented by roads, and trails are not regularly compacted in the winter because snowmobiles are illegal in the wilderness. Although roads and compacted

winter routes will continue to exist on the remainder of the Superior National Forest, road and trail densities remain low, and the Forest provides secure habitat for lynx. Alternatively, the Chippewa National Forest likely provides habitat for lynx primarily during the high portions of the hare cycle when lynx are dispersing to new areas, as sightings remain scarce on the Forest.

### Effects of Interrelated and Interdependent Actions

The Service has not identified any actions interrelated or interdependent to the adoption of the Revised Forest Plans that have potential to affect lynx. It is possible that future specific programs and actions implemented under the Forest Plans may have relevant interrelated and interdependent actions and they will be considered in context of future consultations for those programs or actions.

### Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Lynx inhabit areas on National Forest and other adjacent ownerships including private, state, county, and tribal administration. Within the proclamation boundary of the Superior National Forest, non-federal landowners hold approximately 40 percent of land; non-federal landowners own approximately 60 percent of land within the Chippewa National Forest boundary. Vegetation management on non-National Forest lands may not consider the needs of the lynx or its primary prey species. Lynx in this part of their range may also be limited by non-habitat factors such as illegal take by hunters and trappers, collision with vehicles, low population size, hybridization with bobcats, and competition with other predators.

State, county, and private land timber harvest, related road construction activities, and fire management are not regulated and would not necessarily provide the same level of protection and conservation for threatened and endangered species and their habitats as the Forest Plans do for the Forests' administered lands. Human disturbance and loss of suitable habitat could result from timber harvest, fire management, and snow-compacting activities. Recreational activities associated with state, county, and private lands will continue in the action area, and are reasonably certain to increase over the life of the Forest Plans as human population increases in northern Minnesota.

Vegetation and fire management, winter recreation, and human developments will continue to occur on non-federal lands. These activities are occurring at approximately the same levels on non-federal land as on Forest Service land, and these levels are expected to remain relatively steady in the future. More detailed analysis will occur at smaller geographic scales in context with actions or programs carried out under the Forest Plans as the Forest Service considers actions and habitat on all ownerships within LAUs affected by specific projects.

## **Conclusions**

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

The Service's biological opinion in 2000 for effects of federal land management plans on lynx rangewide anticipated that consultations for future Forest Plan revisions would incorporate the LCAS and would tier to that document. In the 2000 opinion, the Service determined that lynx would not be jeopardized by continued land management that was consistent with interagency Conservation Agreements signed in February 2000. The revisions of the Chippewa and Superior National Forest Plans considered here fully incorporate the LCAS and tailor it to conditions in northern Minnesota. We concur that the LCAS guidelines are sufficiently protective to ensure reproduction, numbers, and distribution of lynx will not be appreciably reduced.

The Forest Plans include many provisions for protection and enhancement of lynx habitat, as well as measures that would maintain or reduce the risk that actions would increase human-caused mortality. Interspecific competition with other carnivores resulting from snow-compacting activities would continue under implementation of the Revised Forest Plans, but measures are included that would moderate those effects and curb their increase. The goals and objectives of the Forest Plans may render some areas less suitable for lynx and are likely to increase the incidences of negative interactions with humans. However, the objectives and standards and guidelines specifically proposed for lynx will ensure that throughout implementation of the Forest Plans lynx mortality will be minimized, and the habitat conditions will remain stable or improve, even during low population cycles. Based on these considerations, the Service concludes that implementing the Revised Forest Plans would not appreciably reduce the likelihood of survival and recovery of the contiguous U.S. DPS of Canada lynx by reducing reproduction, numbers, or distribution.

## **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 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 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.

### Amount or Extent of the Take

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

The Service expects no more than two lynx would be taken annually per Forest and no more than 20 would be taken over the 15-year life of the Forest Plans due to vehicle collision on all roads on all ownerships within the Chippewa and Superior National Forest proclamation boundaries. Because there is limited information from which to draw and we are unaware of the timing and location of roads that would be built or upgraded, this information is based on past reports of road kill. Two lynx are known to have been killed by vehicle collisions on the Superior National Forest since 2000; it is reasonable to assume we are aware of roughly half of the mortality that occurs. Therefore, an average of one lynx per year has been killed due to vehicle collisions and this is likely to continue under Revised Forest Plan implementation. The Forest Plans provide descriptive management direction and are prescriptive in terms of “sideboards” that would guide or limit project design. They do not, however, specify what management actions would be carried out nor when or where actions will occur. Therefore, site-specific consultation will occur and section 7(o)(2) exemptions will be provided, as needed and appropriate, when these actions are expected to result in the incidental take described above.

### Effect of the Take

In this biological opinion, the Service has determined that any incidental take that may result from the proposed action does not result in jeopardy to the species due to the incorporation of LCAS guidelines that limit unsuitable habitat, promote habitat for prey species, limit snow compaction, and ensure effective closure of roads. These measures will minimize take and overall provide for increasing lynx populations in northern Minnesota. Even during the low portions of the hare cycle, when lynx populations are scarce in Minnesota, road and trail densities remain low, and the Forests provide secure habitat for lynx. We do not expect any action implemented under the Forest Plans to result in levels of take that would affect the growth or stability of the contiguous U.S. DPS of Canada lynx.

## **Reasonable and Prudent Measures**

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize effects of incidental take of the contiguous U.S. DPS of Canada lynx:

Document and report to the Service annually any known lynx mortality within the National Forest proclamation boundaries in Minnesota due to vehicle collisions, accidental trapping, or poaching.

## **Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the Act, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are non-discretionary.

1. Mortality reports should be provided to the Service by December 31 of each calendar year the Revised Forest Plans are implemented. Reports should include, to the extent known, the cause of mortality, location, and sex of lynx.
  
2. Rather than establishing a discrete field monitoring effort to document lynx mortality, contribute to the currently established reporting system maintained by Minnesota DNR. The Forest Service should coordinate with partners in state, tribal, county, municipal law enforcement, wildlife management agencies, lynx researchers, and the public to collect information necessary for this reporting system. Information voluntarily provided by these agencies, researchers, and others and compiled by Minnesota DNR would fulfill the requirements of the reasonable and prudent measure. If Minnesota DNR abandons this reporting system in the future, the Forest Service should maintain a similar system to compile this information.

## **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 agency activities 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.

The Service believes that the Forest Service has initiated important efforts to increase our understanding of Canada lynx and its habitat with completion of the Science Report (Ruggiero et al. 1999) and initiation of critical research of the species in northern Minnesota. The LCAS identified known risk factors and conservation measures for Canada lynx, based on the best available knowledge to date. The following recommendations reflect those risk factors and actions needed to address them.

1. Accurately inventory and monitor areas of regular cross-country over-the-snow travel (those routes that are used most years for most of the snow season). Although cross-country snowmobile travel on the Chippewa National Forest is a violation of regulations, tracking and documenting its occurrence would ensure routes are assessed and analyzed as appropriate.
2. Co-location of ATV and snowmobile trails can be a benefit to lynx. Consider and co-locate, where possible, ATV and snowmobile trails to ensure no net increase of snow compaction.
3. Work with the Service, states, and tribes to help reduce incidental take of lynx by trappers in Minnesota through ongoing outreach efforts and interagency cooperation.

### **Reinitiation- Closing Statement**

This concludes formal consultation on the action outlined in your June 7, 2004, request for consultation for the Revised Land and Resource Management Plans for the Chippewa and Superior National Forests. 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.

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