

# Wildlife; Threatened and Endangered Species

## Introduction

The data described in this report outlines the history, actions, procedures, and direction that the Superior National Forest (aka the Forest or SNF) has implemented in support of the Gray Wolf Recovery Plan and Lynx Conservation Assessment and Strategy (LCAS). The Forest contributes towards the conservation and recovery of the two federally listed threatened and endangered species: Canada lynx and gray wolf, through habitat and access management practices, collaboration with other federal and state agencies, as well as researchers, tribal bands and non-governmental partners.

## Canada lynx

On 24 March 2000, the U.S. Fish and Wildlife Service designated the Canada lynx a “Threatened” species in the lower 48 states. From 2004-2009 the main sources of information about Canada lynx for the SNF included the following:

- Since 2003 the Canada lynx study has been investigating key questions needed to contribute to the recovery and conservation of Canada lynx in the Western Great Lakes. Study methods are described in detail in the annual study progress report available online at the following address: <http://www.nrri.umn.edu/lynx/>. These methods have included collecting information on distribution, snow tracking lynx, tracking on the ground and in the air radio-collared lynx, studying habitat use, collecting and analyzing genetic samples (for example, from hair or scat) and conducting pellet counts of snowshoe hare (the primary prey).
- In 2006 permanent snow tracking routes were established across the Forest. The main objective is to maintain a standardized, repeatable survey to monitor lynx population indices and trends. Scat, hair or other genetic material is collected to monitor the presence, distribution, numbers and persistence of individuals.
- Additional snow tracking surveys are conducted, when needed, to determine lynx presence in project areas, or where there have been sighting reports. Scat, hair or other genetic material is also collected to add to the data collected from the permanent Forest routes.
- In 2008 the SNF began a database of all DNA samples submitted to the lab for analyses since 2002. All lynx DNA locations are put into a Geographic Information System (GIS) layer which is updated on an annual basis.
- In 2009 the SNF partnered with the University of Minnesota-Duluth Natural Resource Research Institute (NRRI) to analyze 5 years of radio and GPS telemetry data to better understand lynx movement patterns within the Forest and into Canada.
- Monitoring lynx mortalities is a combined effort between the U.S. Fish and Wildlife Service (USFWS), SNF personnel and UMD-NRRI researchers, with additional information from Minnesota Dept. of Natural Resources (MN DNR). A mortality database is maintained by the Minnesota USFWS office.

## Gray wolf

In 1974 the gray wolf was federally-listed as threatened under the Endangered Species Act of 1973 (ESA). In 2007, the gray wolf was removed from the US Fish & Wildlife Service's (USFWS) list of endangered and threatened wildlife established under the Endangered Species Act of 1973. In 2008, a court ruling placed the gray wolf back on the list of endangered and threatened species until further analysis was completed. Monitoring gray wolf activities are primarily conducted by the U.S. Geological Survey and Minnesota Dept. of Natural Resources, with additional information collected by USDA-APHIS-Wildlife Service's depredation management program, and the Grand Portage Band annual wolf report. This information is accessed by the SNF to assess population trends and distribution.

### **Monitoring Questions**

1. To what extent is the Forest contributing to the conservation of threatened and endangered species and moving short-term (10-20 years) and long-term (100 years) objectives for their habitat conditions and population trends?
2. To what extent are road and trails closures effective in prohibiting unauthorized motorized use?

[Forest Plan direction](#) for both species includes O-WL-4. Maintain, protect, or improve habitat for all threatened and endangered species. O-WL-6 Reduce or eliminate adverse effects on threatened and endangered species from activities on NFS land.

Direction for Canada Lynx includes; O-WL-9; In LAUs on NFS land, manage vegetation to retain, improve, or develop habitat characteristics suitable for snowshoe hare and other important alternative prey. O-WL-10; In LAUs on NFS land, manage vegetation to provide 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. O-WL-13; Maintain or improve the natural competitive advantage of Canada lynx in deep snow conditions. G-WL-3; Limit disturbance within each LAU on NFS lands...(30%). S-WL-1; Management activities on NFS land shall not change more than 15% of lynx habitat. G-WL-4; Maintain or promote well distributed denning habitat. S-WL-2; Allow no net increase in groomed or designated over snow routes. G-WL-8; Maintain road and snow-compacting trail densities below 2 miles per square mile.

Direction for gray wolf includes; O-WL – 17; Promote the conservation and recovery of the gray wolf. Population goal minimum: contribution to State-wide goal of 1250-1400.

The Units of Measure were chosen because they directly ties to respective Forest Plan, Monitoring activities and/or project NEPA direction. The Units of Comparison were selected because they are measureable and verifiable through field documentation. This approach serves to compare 2004 baseline conditions to conditions existing in 2009.

Units of measure and comparison reflect the incorporation of conservation measures in the "Lynx Conservation Assessment and Strategy" into the Forest Plan, and the use of the Gray Wolf Recovery Plan to managing for lynx and gray wolf designated critical habitat and the species recovery.

- Existing habitat conditions, and the effects of management activities on forest vegetation indicators of lynx foraging and denning habitat, and upland forest conditions for gray wolf, are evaluated for every ground-disturbing project on the Forest.
- Indicators of potential human disturbance such as road and trail density, miles and effectiveness of road closures are also selected and monitored to assess connectivity and security conditions for both species. These units of measure and comparison are also used for lynx to assess the potential for competition from other carnivores such as coyote and bobcat.
- This information is used to determine whether projects are in compliance with Forest Plan direction for both species and is documented in a Biological Assessment (BA) for each project.

Units of Measure and Units of Comparison for Canada lynx and Gray wolf, in Table 1.

Table 1 – Units of Measure and Comparison	
Unit of Measure	Unit of Comparison
<b>Lynx</b>	
Lynx population location and distribution.	Lynx population inventory based on ongoing monitoring
LAU Habitat. Amount of habitat suitable for snowshoe hare (the primary prey)	Limit disturbance within each LAU on NFS land as follows: if more than 30%.ii. Lynx habitat within an LAU shall not change more than 15% within a 10-year period.
Denning habitat	Denning habitat in patches >five acres, and at least 10% of lynx habitat
Connectivity habitat between LAU's and between LAU's & BWCAW.	Limit disturbance within each LAU on NFS land as follows: if more than 30%.ii. Lynx habitat within an LAU shall not change more than 15% within a 10-year period.
Groomed or designated over the-snow trail routes.	No net increase in groomed or designated over the-snow trail routes.
Road Closure Effectiveness	Newly constructed snow-compacting trails that intersect OML 1, OML 2, temporary, and unclassified roads are effectively closed.
LAU Road and Trail Densities	Maintain road and snow-compacting trail densities below 2 miles per square mile.
Disturbances (natural)	For disturbances >20 acres, retain a minimum of 10% of disturbed area for denning.
LAU monitoring and genetic data base	Lynx population inventory based on ongoing monitoring
<b>Gray Wolf</b>	
Wolf population	Wolf population. Contribute to the state-wide population of 1250 - 1400 wolves.
Wolf habitat indicators. 1) Acres and % of young upland forest < than 10 years old. 2) Acres and % of mature upland conifer	Wolf habitat indicators. 1) 2003 and first decade estimates of acres and percent of young upland forest less than 10 years. 2. 2003 and first decade estimates of acres and percent of mature upland conifer (spruce and pine) on all uplands.
High standard Road Densities (mi/sq mile)	High standard Road Densities (mi/sq mile < 1 mi per sq mile)

**Monitoring Methods**

Monitoring for Canada lynx and gray wolf involves a variety of methods including: field data collection by Forest personnel, collaboration with other federal agencies, MN state natural resource departments, and researchers, and contributions from private individuals. Information collected and methodology is shown in Table 2 by Unit of Measure elements.

Table 2 – Monitoring Methods	
Unit of Measure	Methods
<b>Lynx</b>	
Lynx population location and distribution and Lynx LAU monitoring and genetic data base.	Lynx population location and distribution – USFWS database, and NRRI Research
	Assessment of mortality information from the USFWS database and any other sources to determine any relationship to Forest management activities.
	Snow tracking lynx, tracking on the ground and in the air radio-collared lynx, studying habitat use and distribution, collecting and analyzing genetic samples (for example, from hair or scat) and conducting pellet counts of snowshoe hare (the primary prey) – USFS and other field personnel
	Lynx LAU monitoring and genetic (DNA) data base results
LAU Habitat. Amount of habitat suitable for snowshoe hare and denning habitat	Appendix D of the 2004 Forest Plan Revision Biological Assessment. The LAU analysis process ( <a href="http://www.fs.fed.us/r9/forests/superior/projects/forest_plan/2004Plan/feis/documents/1920_2670_BAforMNForestPlanRevision_June2004.pdf">http://www.fs.fed.us/r9/forests/superior/projects/forest_plan/2004Plan/feis/documents/1920_2670_BAforMNForestPlanRevision_June2004.pdf</a> )
Connectivity habitat between LAU's and between LAU's & BWCAW.	Connectivity habitat between LAU's and between LAU's & BWCAW - NRRI Research
Groomed or designated over the-snow trail routes.	Forest-wide roads analysis by Lynx Analysis Unit (LAU).
Road Closure Effectiveness	
LAU Road and Trail Densities	
<b>Gray Wolf</b>	
Wolf population	USGS research, MN DNR and USDA-APHIS reports
Wolf habitat indicators. 1) Acres and % of young upland forest less < 10 years old. 2) Acres and % of mature upland conifer.	Forest-wide vegetation analysis of acres and % of young upland forest l< than 10 yrs old, by Recovery Zone.
High standard Road Densities (mi/sq mi)	Forest-wide roads analysis by Recovery Zone

**Results**

Overview for Both Species

The following discussion discloses the monitoring results using 2009 monitoring data for the two threatened and endangered terrestrial wildlife species – Canada lynx and Gray wolf. These results are compared to information disclosed in the 2004 Forest Plan for these species. These results provide a measure of the application of Forest Plan objectives, standards, guidelines, and Recovery terms and conditions into Forest management projects. Site-specific field monitoring summaries and other reports can be found in Appendices B through F.

Since 2004, 37 projects have been developed to implement the Forest Plan through 2009. Most of the 14 landscape-scale vegetation management projects (Virginia, Dunka, Tomahawk, Inga South, Devils Trout, Mid-Temperance, Whyte, Cascade, Echo Trail, Maple Hill, Glacier, Clara and Border) were designed, in part, to benefit lynx and gray wolf by maintaining or providing for future suitable habitat. All projects were either not likely to adversely affect these species, or were expected to have no effect. All projects were in compliance with relevant Forest Plan management direction.

The SNF has consulted with the USFWS on these, and smaller projects, that had the potential to affect federally-listed species. In all cases concurred with SNF determinations in complying with the Forest Plan. The biological assessments for each project are available online at the following address: <http://www.fs.fed.us/r9/forests/superior/projects/>.

In 2009 most projects that occurred on the Superior National Forest were in lynx and wolf habitat and had the potential to affect these species and/or their habitat. All projects were successfully developed to reduce or eliminate adverse effects by designing them to; 1) maintain, protect or improve habitat, and/or 2) reduce the risk of mortality through Forest road management. Informal consultations with the U.S. Fish and Wildlife Service confirmed that no projects warranted a “may affect” determination, which would have triggered “formal” consultation and a USFWS biological opinion to reduce or eliminate adverse effects to both species.

By implementing the Forest Plan, which incorporated the “Lynx Conservation Assessment and Strategy” as guidance for appropriate and beneficial lynx management, and the use of the Gray Wolf Recovery Plan, the SNF is managing for lynx and gray wolf designated critical habitat and the recovery of both species. Existing monitoring efforts are important because the results provide critical information to enable the Forest to measure or success in moving towards, meeting, or exceeding habitat objectives and population trends for species recovery.

Through habitat management the SNF is reducing the potential adverse impacts of roads and motorized trails on NFS lands to the extent practicable for both species. In addition, the Forest is cooperating with other organizations and individuals in the collection of distribution, habitat use, prey availability, abundance and persistence information for Canada lynx management. Forty-seven Lynx Analysis Units (LAUs) are designated on the Forest.

### Canada Lynx

#### *Lynx population location and distribution*

Being a rare species in northern Minnesota the most reliable lynx population location and distribution information comes from research conducted by NRRI. The majority of the SNF is located in Cook, Lake, and St. Louis counties. Much of this landscape is not suitable habitat for lynx because of human development, the lack of conifer understory, rivers and lakes, and because lynx are approaching the southern edge of their range (Moen, 2010).

Approximately 25% of northeastern Minnesota contains areas of predicted higher quality hare habitat that also roughly corresponds to area classified as better lynx denning habitat (Moen et al., 2008a). If lynx were present on all of the higher quality hare habitat in Cook, Lake, and St.

Louis counties, about 200 lynx would be supported at a density of < 3 per 100 km<sup>2</sup> (Moen et al., 2008b).

The 2004 Biological Opinion includes a “term and condition” requiring mortality reports for lynx and gray wolf to be provided to the USFWS by December 31 of each calendar year. These reports have not been produced by the SNF to date. However, mortality information is freely available, shared and used by the USFWS and SNF in cooperation with other federal and state agencies (USDA Wildlife Services, MN DNR), researchers (NRRI), northeastern Minnesota tribal bands, and non-governmental organizations.

NRRI maintains a database of verified and unverified lynx sightings. Both Ron Moen (NRRI) and Rich Baker (MN DNR) collect sightings information. However, this information is no longer made available to the public. Since 2000, the USFWS have maintained a database of lynx mortality. Tamara Smith (R3 FWS) is the current database manager. Tables 3 and 4 display the known lynx mortality from 2000-2010 from incidental mortality causes and trapping incident types.

	Mortality	Released Alive	Total
Railroad	2	0	2
Road	6	0	6
Trapped	10*	10	20
Shot	7	0	7
Unknown	13	0	13
Total	38	10	48
* - Four of these incidents were legal			

	Mortality	Released Alive	Total
Body grip	0	2	2
Leg hold	1	4	5
Snare	5	4	9
Unknown	4	0	4
Total	10	10	20

NRRI telemetry analysis indicates lynx regularly conduct long-distance movements to and from Ontario, Canada. Because lynx populations in northern Minnesota appear to be closely linked to Ontario lynx populations, movements between the SNF and Canada makes determining lynx population numbers problematic and susceptible to fluctuations in lynx abundance in Canada. Changes in the numbers of lynx that use the SNF can occur due to legal trapping in Canada, and due to prey and habitat availability in Canada.

The SNF Forest Plan contains conservation measures for lynx recovery. Many of these conservation measures rely on monitoring of local lynx populations to gauge the effects of National Forest management. The SNF implements a standardized, repeatable survey effort to detect and monitor lynx populations across the Superior National Forest. In addition, SNF personnel collects lynx genetic material for analysis to identify lynx living on the SNF, determine whether these individuals are known from past studies and/or inventory efforts, and

to augment the existing lynx DNA database and further our knowledge of lynx presence and persistence on the Forest and in Minnesota. These efforts are described in detail in the *Lynx LAU Project Monitoring* and *Genetic Data Base* discussions below.

#### *LAU Habitat*

The 2009 LAU habitat analysis was calculated for the 2009 existing condition and that reflecting land management decisions made in 2009 in the following categories: LAU Habitat Summary, LAU 30% Habitat Threshold, Unsuitable 15% threshold Habitat, and Forage Habitat. Tables 5, 6, 8-11 for Existing Condition and Decisions-Only, in each category and Table 7 LAU 30% Habitat Threshold only displays the existing condition are shown in Appendix B.

While part of the Forest Plan lynx analysis process, red squirrels have not been found to be a prey item of importance as earlier thought. Hanson and Moen (2008) found in a winter diet composition study of lynx in northern Minnesota was dominated by snowshoe hare. Other prey species occurred rarely in the analysis and appear not to be a significant component of Minnesota lynx diets in winter. The study also indicated that lynx are opportunistic and will also scavenge on food items such as road-kills if available. Finally, there is little information available on lynx diets in summer months, but it is essentially impossible to gather lynx scat in the summer months due to tracking difficulties and decomposition rates (Moen 2010 pers. com). Therefore, using red squirrel habitat as a contributing factor for lynx foraging may not be relevant for management.

#### *Denning habitat*

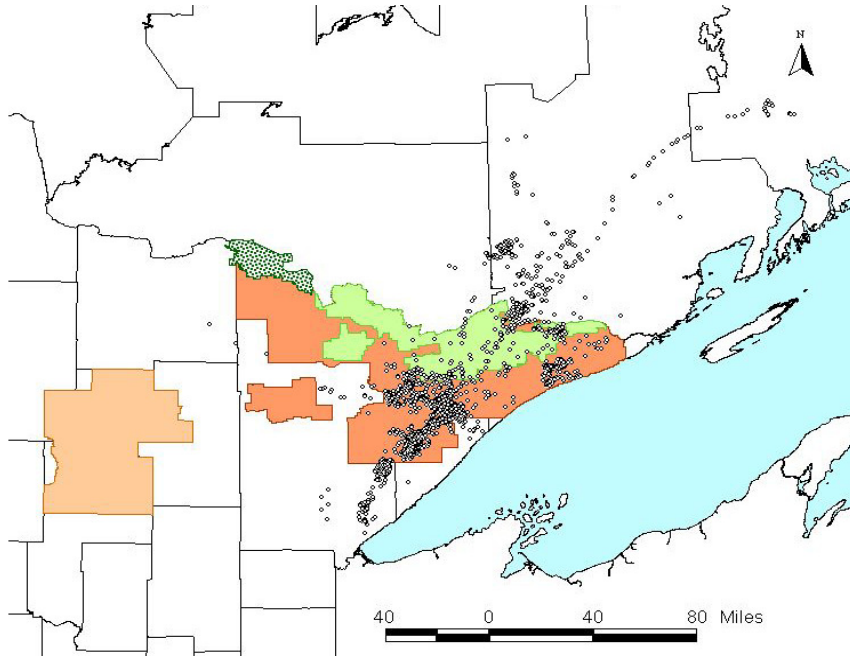
The 2009 denning habitat analysis was calculated for the 2009 existing condition and that reflecting land management decisions made in 2009. The average all LAU existing condition (2009) acres and percent of SNF forested acres of Contiguous Denning Habitat areas over 5 acres was 11,530 acres and 48 percent respectively. This compares to the average acres and percent of SNF forested acres for not yet implemented decisions of 11,368 acres and 47 percent respectively. It can be seen that little change in denning habitat will occur as pending decisions are implemented. See Appendix C for further details.

#### *Connectivity habitat between LAU's, and between LAU's & BWCAW.*

Nearly the entire SNF is comprised of 47 Lynx Analysis Units (LAUs). Connectivity habitat is not defined in the Forest Plan therefore connectivity will be assessed through a combination of research findings, and LAU habitat conditions.

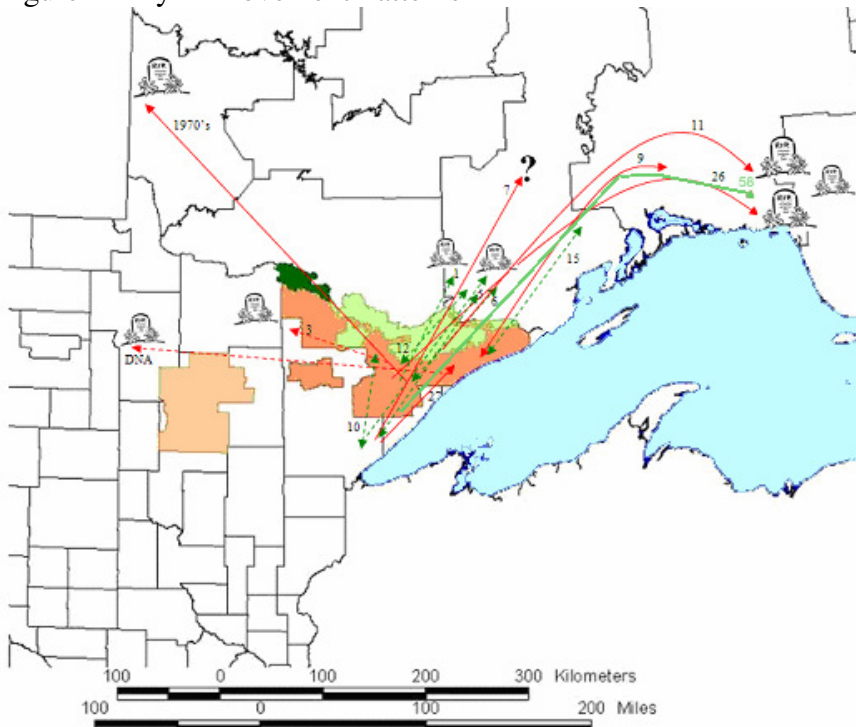
In 2009 the SNF sponsored a collaborative project with the Natural Resources Research Institute (NRRI) of the University of Minnesota to assess lynx habitat use and movement patterns both within the SNF, and long-distance movements to and from Canada. This project (Moen et al. 2010) used ongoing lynx telemetry research data dating back to 2003. Over 15,000 lynx locations from the ongoing Canada lynx GPS and VHF radio-telemetry study, collected between 2003 and 2009 is shown below in figure 1. LAU habitat connectivity for Existing Condition and Decisions Only, is shown in Appendix D.

Figure 1 – Lynx telemetry locations 2003-2009



The study data and a prior study (Burdett 2008) indicates many lynx radio/GPS-collared in the SNF portion of northern Minnesota travel through the SNF, and into and back from Ontario. Movement paths are not exact but illustrate the distance moved by both males and females. Most movements have followed a SW-NE orientation. Figure 2 shows Lynx movements.

Figure 2 – Lynx Movement Patterns





The NRRI study results indicate that no specific wildlife travel corridors are known to exist that facilitate the movements of lynx. The analysis of the telemetry data has indicated that the species move freely across the landscape in spite of forest management projects, road networks and the numerous lakes in northeastern Minnesota. Lynx moved through and along roads in the general forest portion of the SNF, and across the Boundary Waters Canoe Area Wilderness (BWCAW) in their movements. Lynx may also use forest road corridors for hunting snowshoe hare based on the availability this prey species in these areas (Moen et al 2010, and Burdett 2008).

Habitat conditions in LAUs also characterize connectivity. Both upland and lowland northern Minnesota forests typically have dense canopies and multi-storied structure. Only water bodies, roads and recent harvest areas are considered to lack connective cover. Created openings are relatively small on USFS lands so distance to connective cover is considered short.

A connective habitat analysis was calculated for existing condition and that reflecting land management decisions made in 2009 is shown in Appendix D. The average all LAU existing condition (2009) of total connective habitat acres and percent connective habitat was 23,640 acres and 87 percent respectively. This compares to the average connective habitat acres and percent of connective habitat for not yet implemented decisions of 23,820 acres and 88 percent respectively. It can be seen that little change in lowland and upland connective habitat will occur as pending decisions are implemented and is being maintained on the SNF. Research findings indicate that lynx move freely across the landscape in spite of forest management projects, road networks and the numerous lakes in northeastern Minnesota.

#### *Groomed or designated over the-snow trail routes.*

There has been no net increase in groomed or designated over-the-snow trail routes on the SNF in 2009.

#### *Road Closure Effectiveness*

In 2009 the “Nira Project” was monitored for road closure effectiveness. This monitoring was undertaken to evaluate the effectiveness of typical road closure methods used on the SNF to restrict large and small motorized vehicle use. Twenty seven sites were evaluated. 81 percent (22) of the closures were found to be effective. While differences may occur depending on sight conditions similar results are expected with successful installation of these road closure methods elsewhere on the SNF.

#### *LAU Road and Trail Densities*

In the Forest M&E Reports from 2005 through 2008 a math error occurred in calculating Lynx Analysis Unit (LAU) road and trail densities. This resulted in higher road and trail densities than actually exists for many LAUs. For 2009 the usual density analysis road and trail densities were calculated, and also for both summer and winter to reflect the differences when traditional winter routes (area and miles) are in use. Appendix E displays the correct densities using 2009 data.

Of the 47 LAUs on the SNF 15 LAUs (32%) have road and trail densities above 2.0 miles per square mile in two of the three density analysis categories. There are 14 LAUs (30%) with road and trail densities above 2.0 miles per square mile in the summer. The average road density for all LAU's was summer road density 1.78 miles per square mile and winter road/trail density 1.79 miles per square mile. During project identification and design in these LAUs efforts to locate and implement road closures to reduce densities should be undertaken because of existing conditions.

Implementation of the Forest Travel Management Rule should allow for road closures that may help reduce the risk of mortality to Canada lynx.

#### *Disturbances (natural)*

Forest Plan guideline, G-WL-5, specifies that generally a minimum of 10 % of an affected area that can contribute to lynx denning habitat be retained following a natural disturbance; such as blow-down, wildfire, insect and or disease, if that disturbance is greater than 20 contiguous acres on NFS lands. An exception is for salvage or management-ignited fire that is necessary for human-health and safety or scenic integrity. Appendix F lists LAUs where disturbances have occurred.

#### *LAU Project Monitoring and Genetic Data Base*

From 2004-2009 project-specific snow tracking surveys were conducted for five of none landscape-scale vegetation management projects (Dunka, Mid-Temperance, Whyte, Tracks and Echo Trail). Lynx tracks, confirming presence, in the Dunka, Tracks, and Whyte project areas. Project-specific monitoring was not necessary on the other projects because the NRRRI long-term lynx study had confirmed lynx presence in those areas.

During the winter of 2008-2009 snow tracking surveys were conducted on 197 miles of roads and trails along 6 Primary Survey Routes (see protocol) within 6 Lynx Analysis Units. These 6 LAUs translate to 293,527 acres surveyed. There were 425 miles of roads and trails that were surveyed along Secondary Survey Routes. These routes were primarily in the Tracks project area. Due to access limitations and various ownerships, 75% of the Tracks project area was adequately surveyed. This project area is 142,563 acres in size (all ownerships) with 106,992 acres being adequately surveyed. Another 273 miles were surveyed on Opportunistic Survey Routes. This translates to approximately 3,358 acres surveyed (Catton 2009).

Forty-seven DNA samples were collected with 3 agencies contributing. (Not all samples were collected as part of snow tracking surveys.) All samples contained enough quality mitochondrial DNA to determine species with 44 samples coming back as lynx (bobcat and canid species were also detected). Of these 44, enough quality nuclear DNA was present to determine gender and individual identification on 29 samples. Thirteen unique individuals were identified, 7 males and 6 females. Two of these individuals have been known since 2005, 1 since 2006, 3 since 2008, and 7 are new individuals to our database this year. SNF Field personnel did not delineate how many tracks and how many individual genetic samples were collected as part of each survey route during data collection. However, personnel will be collecting that data during future Canada lynx surveys (Catton 2009).

Canada lynx have been confirmed to persist on the Superior National Forest and across northern Minnesota using these monitoring methods and techniques which started in 2002. The 2009 efforts add to the thousands of miles of roads and trails have been surveyed. Over the years more than 419 genetic samples have been collected and analyzed identifying more than 89 individuals in 10 counties. These efforts were instrumental in the development of techniques to genetically detect lynx-bobcat hybrids and were in part responsible for the first ever documentation of these hybrids. Results from these early efforts also spawned a research project conducted by the Natural Resources Research Institute (NRRI) of the University of Minnesota (Duluth) which first confirmed lynx reproduction within the state. Currently, NRRI is continuing with their data analyses to produce a report “Analysis of long distance movements by Canada lynx” (Catton 2009).

In addition to these LAU and genetic monitoring results, the Forest enhanced 6,720 acres of lynx habitat through road closures. This was the result of effectively decommissioning approximately 21 miles of roads in lynx habitat. Acres enhanced were calculated by multiplying the miles of road closed by 320 acres per mile.

### Gray wolf

#### *Wolf population*

The SNF encompasses Recovery Zone 1, 2 and 4 as defined by the Gray Wolf Recovery Plan. The Gray Wolf Recovery Plan identified northeastern Minnesota as the key area occupied by the species in the state. The SNF Forest Plan contains conservation measures for wolf recovery. The 2004 Biological Opinion for the Forest Plan acknowledges that the SNF encompasses a subset of wolf habitat in northern Minnesota. The SNF collects and reviews several sources of information on the status wolf population, and documented wolf mortality to assess population status. These records include;

- The International Wolf Center, Ely, MN listing wolf mortality records from U.S. Geological Service research in northern MN.
- U.S. Geological Service research reports.
- The USDA-Wildlife Services-APHIS Wolf Damage Management in Minnesota 2009 and 2008 reports.
- Minnesota Department of Natural Resources (MN DNR) studies and conservation officer records
- 1854 Treaty Authority annual wolf project report

The Minnesota Department of Natural Resources (DNR) estimates that there were 2,921 wolves in Minnesota over the winter of 2007-2008 (being the last available data set). Considering a 90% confidence interval, the actual population size could range from 2,192 to 3,525 wolves (MN DNR 2008). These numbers exceed the defined Recovery Plan goal of a state-wide population of 1,250-1,400 wolves. Gray wolves occupy all suitable areas within the SNF and in the state, and the wolf population has been stable for at least 10 years in spite of all mortality causes, including canine parvovirus.

Based on information for 2004-2009 from the International Wolf Center, Ely, MN of the 66 wolves collared and monitored by the USGS on the Superior NF, there were 14 mortalities

(21%) of which approximately nine percent was attributable to human activities (Schmidt 2010). However, two mortalities occurred in Ontario, Canada and one wolf was killed by a MN DNR Conservation Officer. Subtracting these three mortalities lowers the mortality rate attributable to human factors that might occur on NFS lands due to undeterminable circumstances. In addition, while recent wolf pup studies vary, average pup mortality is estimated to be 25-40% naturally due to starvation, disease, and natural culling within the wolf packs (Schmidt 2010 pers. comm.)

In review of these data there is no cause/effect relationship that wolf mortality is directly attributable to road management on the Superior NF. In addition, the 2008 and 2009 USDA-Wildlife Service APHIS “Wolf Damage Management in Minnesota” reports document the number of gray wolves removed from the state-wide population due to control measures. In spite of these control measures the wolf population remains stable, continues to exceed the defined Recovery Plan goals, and wolves occupy all suitable areas within the state (including the SNF).

The SNF uses a site-specific analysis process that follows a detailed “template” developed with the USFWS to streamline projects consultations. This template tiers to the 2004 Forest Plan programmatic Biological Assessment (BA), where appropriate. Standardized analysis indicators are used for the analysis of effects to critical habitat and constituent elements (Primary Constituent Elements). This allows new information to be integrated continually including potential impacts to gray wolf that may occur on NFS lands.

*Wolf Habitat Indicators*

The habitat indicators below were identified in the 2004 Forest Plan programmatic Biological Assessment (BA) as factors needed to promote the conservation and recovery of the gray wolf. Acres and percent of upland forests represent the forage (less than 10 years of age) and cover (greater than 9 years of age) indicator conditions of prey habitat. Data is displayed by Wolf Recovery Zone and Forest-wide, excluding the BWCAW since detailed vegetation data is lacking for the wilderness.

*Acres and percent of young upland forest less than 10 years old, and Acres and percent of upland conifer (spruce and pine) greater than 9 years old on all uplands.*

Table 5 – Upland Forest < 10 years old (Forage) and > 9 years old (Cover)					
Wolf Zone	Wolf Zone Acres	Acres of upland forest < 10 yrs old	% of upland forest < 10 yrs old	Acres of upland forest > 9 yrs old	% of upland forest > 9 yrs old
1	822,953.55	37,545.40	4.56	195,957.98	23.81
2	353,656.41	12,406.81	3.51	48,284.80	13.65
4	194,113.45	16,512.25	8.51	36,532.76	18.82
Forest-wide	1,370,723.41	66,464.45	4.85	280,775.55	20.48

*Comparison with the 2004 Biological Assessment data*

The units of comparison are the Biological Assessments' 2003 and first decade estimates of acres and percent of upland forest less than 10 years of age (Forage) and percent of upland conifer (spruce and pine) greater than 9 years of age (Cover) on all uplands.

Forest-Wide	Acres of Upland Forest < 10 yrs (1,000s)	% of Upland Forest < 10 yrs (1,000s)	Year 2003		Decade 1	
			Acres (1,000s)	%	Acres (1,000s)	%
		66.4	4.85	125.0	13	100.0

Forest-Wide	Acres of Upland Forest > 9 yrs	% of Upland Forest > 9 yrs	Year 2003		Decade 1	
			Acres (1,000s)	%	Acres (1,000s)	%
		280.7	20.48	322.0	34	371.3

A comparison of data on Tables 6 and 6 indicates that prey forage and cover conditions are below 2003 and predicted Decade 1 levels. This could be the result of several cumulative factors such as; fewer timber sales accomplished than predicted, and the 1999 blow-down salvage areas and un-salvaged areas have aged out of the less than 10 year age class. Also management areas could have limited opportunities due to site conditions therefore the Forest is not getting an even distribution of habitat treatments across the landscape.

An additional cover factor could be that the majority of the previously young stands that have aged out are in aspen and birch forest types vs. spruce and pine types, since past timber harvest has been dominated by aspen.

Another is that the SNF has not yet seen the full results of projects due to the lengthy time it takes to implement projects. It could be another decade before the results of 2004 and later projects are apparent for prey habitat.

*Road Density (High Standard Roads) less than 1 mi./square mile*

According to the Biological Assessment the threshold at which wolves can tolerate human disturbance is not known, and the Forest Plan does not specify a high standard road density standard or guideline for gray wolf. The 1992 Wolf Recovery Plan indicates that road densities be maintained at present levels, or be reduced to below 1 mi/sq mile levels. The wolf analysis areas are the portions of the SNF in Wolf Recovery Areas 1, 2 and 4. Tables 8, 9 and 10 and show the road densities by Recovery Zone (both with and without the BWCAW) and Forest-wide, respectively.

Recovery Zone	Miles of High Standard Roads	Square Miles per Zone	Road Density
1	934.71	2733.81	0.34
2	341.65	882.84	0.39
4	419.20	864.61	0.48

High Standard Roads = USFS Roads OML 3,4 and 5, US and State highways, and County and Township Roads

Recovery Zone	Miles of High Standard Roads	Square Miles per Zone	Road Density
1	934.71	1852.97	0.50
2	341.65	1055.96	0.32
4	419.20	1034.16	0.41

High Standard Roads = USFS Roads OML 3,4 and 5, US and State highways, and County and Township Roads

Forest-wide Road Density		
Miles of High Standard Roads	Square Miles	Road Density
1695.56	4481.25	0.38
Forest-wide Road Density without BWCAW		
1695.56	3943.09	0.43

These data indicate high standard road densities are well below 1 mi/sq mile levels across the SNF, in all three Wolf Recovery Zones and Forest-wide.

**Implications**

This monitoring information indicates that the Forest is maintaining lynx and gray wolf habitat within the parameters in Forest Plan documents. Natural disturbances are not adversely affecting lynx habitat.

Habitat is being managed to maintain connectivity between the general forest, the BWCAW and Canada allowing individual animals to move freely across the landscape. Research has indicated that no identifiable travel barriers or corridors are known to exist that affect the movements of either Canada lynx or gray wolves. Research has indicated that individuals of both species move freely across the landscape. A key linkage area as defined by the Lynx Conservation Assessment and Strategy (LCAS) and SNF Forest Plan is being freely used by lynx, and is being maintained by SNF management practices.

Mortality rates for both species are low, within incidental take allowances, and randomly occur on NFS lands. In review of these data there is no cause/effect mortality relationship that is attributable to road management on the Superior NF. Typical road closure methods used on the SNF to restrict large and small motorized vehicle use are effective.

The lack of formal consultations with the USFWS for these federally-listed species is an indicator that all Forest activities are evaluated, new information is incorporated, and risk factors are minimized and managed appropriately to further the conservation and recovery of both species.