

MANAGEMENT INDICATOR SPECIES (MIS)

Key Points

Gray Wolf

- Population trends on the Superior National Forest (SNF) appear to be increasing and the SNF continues to meet or exceed the Forest Plan goal of contributing to the statewide population of 1250-1400 individuals.
- Between 2004 and 2008 most vegetation management projects provided habitat for prey species such as deer and moose.
- De-listed from threatened status in 2007, re-listed in 2008 after a court challenge.

Bald Eagle

- Population trends on the SNF have increased since 2000 with the 90 active breeding territories, exceeding the Forest Plan goal of 85.
- Between 2004 and 2008 most vegetation management projects were beneficial by restoring white pine near lakes and streams.
- De-listed from threatened status in 2007.

Northern Goshawk

- In 1996 there were no known territories on the SNF, but by 2008 29 territories had been found.
- In 2008 there were seven active nests in which six pairs successfully produced young. The SNF goal is 20-30 breeding pairs.
- Between 2004 and 2008 most vegetation management projects impacted habitat, but were not likely to cause loss of viability or a trend toward listing.
- Mature and older upland forest, a key indicator of suitable habitat, was 55 percent, well above the 41 percent threshold and the 48 percent projected for the end of the first decade of the Forest Plan.
- The SNF partnered with state and federal agencies in the western Great Lakes bio-region to collect population data indicating they are widely distributed and occur at significant densities throughout the western Great Lakes region.

White Pine

- Between 2004 and 2008 over 2.1 million seedlings were planted.
- 4,059 acres were planted to change the forest type to white pine.
- Over a thousand acres were planted within other forest types to enhance diversity.
- 15,562 acres were treated to improve survival.
- In three of the five upland Landscape Ecosystems, objectives for white pine forest type have been met or surpassed.

A. MONITORING AND EVALUATION

Forest Plan Direction

This monitoring was conducted to address Forest Plan Direction: 36 CFR 219.19(a)(6). Population trends of the management indicator species will be monitored and

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relationships to habitat changes determined. This monitoring will be done in cooperation with state fish and wildlife agencies, to the extent practicable, Forest Plan Objective: O-WL-16 Promote the conservation and recovery of the bald eagle. Population goal minimum: 85 occupied breeding territories, Forest Plan Objective O-WL-17: Promote the conservation and recovery of the gray wolf. Population goal minimum: contribution to Statewide goal of 1250-1400, Forest Plan Objective: O-WL-31 Goshawk. Provide habitat to provide for population goal minimum: 20-30 breeding pairs and Forest Plan Objective: O-WL-32 Increase amount of white pine to amounts more representative of native plant communities by planting or naturally regenerating white pine trees.

The Forest Plan designates four species as management indicator species (MIS) which are gray wolf, bald eagle, northern goshawk, and white pine.

Monitoring MIS is accomplished in the various ways described below. They range from interagency cooperative statewide or regional monitoring programs to Forest-wide or project level surveys.

Since the Forest Plan went into effect in 2004 there have been 40 decisions made to implement projects. Eleven of these have been large landscape scale (tens of thousands of acres) vegetation management projects which are partially completed to manage, maintain, or enhance habitat for management indicator species. These include the following projects: Virginia, Tomahawk, Dunka, Inga South, Mid-Temperance, Whyte, Devil Trout, Echo Trail, Cascade, and Ham Lake salvage.

Monitoring Conducted

Population and Habitat Trends

Gray Wolf

The three main sources of population data for gray wolf on the Superior National Forest (SNF) are the Minnesota Department of Natural Resources (MN DNR) statewide wolf monitoring, the US Geological Survey long-term monitoring of radio-collared wolves in SNF and the SNF project-specific inventory and monitoring.

MN DNR has monitored statewide wolf distribution and abundance since the late 1970s. In the last 30 years, the survey methods have remained relatively consistent, using several combined sources of data. Previous surveys have taken place at 10 year intervals (1978-79, 1988-89, and 1997-98). However, in anticipation of a federal de-listing proposal in 2004, the survey interval was lowered to five years (2003/2004 and 2007/2008). SNF field staff contributed observation information to all surveys. The MN DNR used this information, along with other wolf and deer data, to estimate the total wolf range, total occupied range and the wolf population within the state of Minnesota. More information on the methods that were used is available online at the following address: http://files.dnr.state.mn.us/fish_wildlife/wildlife/wolves/2008_survey.pdf

USGS research and monitoring has been ongoing since 1966 in a 2,060 km² census area in the middle of the SNF (this represents five percent of all the wolf range in Minnesota and 17 percent of the SNF). The project area includes some lands within the Boundary Waters Canoe Area Wilderness (BWCAW). Wolves were live-trapped and radio-tagged during summer and fall, and then aerially observed for their pack sizes during winter. Besides providing population trend estimates, this project is also the basis for a vast amount of information on many aspects of wolf biology, ecology and management impacts.

In general, project level surveys are not needed to search for wolves because their distribution across the SNF is well-established. Additionally, the MN DNR cooperative wolf surveys, winter track survey routes and predator/furbearer scent station survey routes intersect most of the project areas. This provides the basis for determining trends while confirming presence and distribution. Nevertheless, between 2004 and 2008 winter wolf track surveys, to confirm presence and distribution, were conducted in conjunction with lynx surveys on the Tomahawk, Dunka, Mid-Temperance, Whyte, Glacier and Echo Trail vegetation management projects.

Bald Eagle

The two main sources of population data for bald eagle on the SNF are the MN DNR statewide eagle periodic monitoring and the SNF long-term Forest-wide and project level inventory and monitoring

The MN DNR, in cooperation with the Fish and Wildlife Service (USFWS), National Park Service, USGS, and the Chippewa and Superior National Forests, conducted statewide bald eagle surveys during the 2000 and 2005 nesting seasons. The surveys were designed to visit all known nests, including all on the SNF (including in the BWCAW), estimate the number of nests missed, provide a baseline for monitoring the state's bald eagle population in the future and clarify current habitat needs of the species. In 2005 a random plot survey was completed to better estimate the total number of nests in Minnesota. More information on the methods that were used is available online at the following address:

http://files.dnr.state.mn.us/eo/nongame/projects/eagle_report_2005.pdf

The SNF monitored bald eagles annually Forest-wide (including the BWCAW) between 1964 and 1994. Population trends were estimated by surveying eagle nests which included follow-up checks for nesting success indicated by the number of eggs, nestlings and fledglings. Originally, nests were found either by observers on the ground or on low-level flights searching likely habitat early in the breeding season (April).

Since 1995, the SNF has changed its monitoring methods to rely more on the MN DNR's five year eagle nest survey. For this reason, and because most projects are designed to protect or maintain potential habitat near lakes and streams, project level surveys are generally not completed. Nevertheless, during project planning and analysis, potential impacts to eagle are considered and, if warranted, project-specific low level aerial

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surveys are completed to search for new nests or check known nests. A couple of examples include the Whyte project surveys conducted in potential habitat in 2008 and surveys flown (inside and outside the BWCAW) to detect whether eagles were affected by the Ham Lake Fire (2007).

Northern Goshawk

The three main sources of population data for northern goshawk on the SNF are the MN DNR nest territory monitoring, the SNF project-specific inventory and monitoring and the bioregional monitoring.

Since 2004 the Forest Service has made substantial efforts to survey for goshawk in the upcoming landscape scale vegetation management project areas. Known nests have generally been monitored annually for occupancy, nesting, and nesting success. The methods used are similar to those used by the MN DNR (summarized below). Random transects and habitat identified by biologists as potentially good for nesting were surveyed within project areas.

MN DNR has been monitoring nest territories since 2003. Its primary objective is to assess occupancy and productivity (nesting success) of all known territories in northern Minnesota. The methods used include occupancy surveys using nest observation or broadcasting alarm calls to which goshawk generally respond, nest surveys in late April or May and productivity surveys in June and July.

Finally, in 2008, the SNF partnered with state and federal agencies in the western Great Lakes bioregion (portions of Minnesota, Wisconsin, and Michigan) to collect data to determine goshawk population status.

White Pine

The number of acres in the white pine forest type, amount of white pine planted and activities completed to improve white pine survival are all monitored annually by SNF. Forest type and forest stand diversity inventories or “stand exams” are conducted in the landscape scale vegetation management project areas. Conditions are tracked Forest-wide in vegetation databases and management activities such as timber harvest and tree planting are recorded. Planting success is monitored through periodic field surveys including the condition of white pine trees in areas that were treated to improve survival.

Evaluation and Conclusions

Gray Wolf

In the most recent survey by the MN DNR (2007-2008), for the first time since consistent surveys were initiated in the late 1970s, total wolf range in Minnesota did not increase, and estimated occupied range declined slightly (Figure 9a.1). The 2008 population size estimate (2,921) is slightly less than in 2004. However, the MN DNR concluded that because of overlapping ranges in the estimate of population, there has been no significant

change in the distribution or abundance of wolves in Minnesota since 1997. This estimate far exceeds the recovery plan goal of 1250-1400 wolves in Minnesota, as well as the MN DNR wolf plan's minimum population goal of 1,600 wolves to ensure long-term survival. Details of wolf survey methods, results and discussions can be found in the MN DNR report by Erb and Benson (2005).

Due primarily to this increasing population, the USFWS removed the Western Great Lakes Distinct Population Segment (MN, WI, MI) of wolves from its list of endangered and threatened wildlife in 2007. It was put back on the list in 2008 (Threatened and Endangered Species chapter).

Figure 9a.2 shows the results of over 40 years of wolf monitoring on the SNF through the winter of 2007 to 2008 by the USGS. During the last survey, eight radioed packs and six non-radioed packs of two to 12 individuals used all or part of the census area. Approximately 82 wolves were present with a density of four wolves per 100 km sq. This density is slightly higher than the winters of 2006 to 2007 and 2007 to 2008 therefore being the highest known population of the study area (Mech 2007).

Winter wolf track detection surveys on the SNF confirmed presence of wolf in all project areas surveyed including Tomahawk, Dunka, Mid-Temperance, Whyte, Glacier, Border and Echo Trail.

Gray Wolf Management and Habitat Trends

Of the 32 projects outside the BWCAW since 2004, 19 did not adversely affect wolves and the remaining projects had no effect. In fact, many of these projects, especially the nine landscape scale projects, had beneficial impacts on wolf habitat. Table 9a.1 shows the changes to wolf habitat as indicated by conditions favored by prey species (deer and moose) from the beginning of the Forest Plan implementation to the present. Young upland forest foraging habitat has decreased, however much of the change is from stands aging to beyond ten years old. Replacement habitat has been or will be created from timber harvest in all eight of the large vegetation management projects as well as other small projects.

Since 2004 completed projects as well as those approved but not yet implemented will generally move habitat conditions toward those predicted in the Forest Plan. Projects will continue to create young forest habitat to the benefit of wolves.

The SNF has not conducted any new Forest-wide wolf habitat analyses within the BWCAW since the Forest Plan revision. However, since 2004 there have been a substantial number of acres burned within the BWCAW from both wildfires and prescribed fires to reduce fuel hazards created by the 1999 blowdown. For example, in 2007 the Ham Lake wildfire burned over 20,000 acres within the BWCAW. In 2006, the Cavity, Red Eye, and Famine Lakes wildfires burned over 40,000 acres. In 2004 and 2005, the Alpine Lake wildfire burned over 1300 acres. Additionally, over 40,000 acres of 2001 BWCAW Fuel Treatment project prescribed fires have been accomplished. Even

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though it cannot be assumed that all burned acres changed to young forest habitat, many acres of habitat for deer and moose have been reestablished. The areas that were partially burned to maintain older forest also provide good habitat. All of the fires should improve wolf habitat in the BWCAW (Fire and Fuels chapter).

Road density is another indicator of habitat quality for wolves outside the BWCAW (no roads in BWCAW). While the Forest Plan Biological Assessment (BA) looked at potential impacts from a variety of road types, Forest Plan standard S-WL-4 provides direction to maintain high standard road density (Objective Maintenance Levels 3, 4, and 5) below one mi/sq mi., since Forest Plan implementation (USDA Forest Service 2004). This standard has been met since 2004 (Table 9a.2) even though there appears to be a slight decrease in miles (corrections to INFRA database or road closures). These data were not calculated for 2008 since the Travel Management project will make changes to the road system.

In summary, wolf management on the SNF has been fully consistent with Forest Plan objectives, standards and guidelines, both inside and outside of the BWCAW (since Forest plan implementation). This holds true for wolf in its former status as a threatened species and its status as a RFSS and MIS because all projects with decisions have been determined to be unlikely to adversely affect wolf as a threatened species. As a sensitive species, project Biological Evaluations (BE) have determined that the Forest Plan standard S-WL-5 (projects must not have negative impacts that could lead toward federal listing) has been met. Also as a MIS, population goals continue to be met or exceeded. Furthermore, all relevant standards and guidelines are met for all projects, all vegetation projects continue to maintain or improve habitat for wolf, road density of high standard roads (OML 3-4-5) has not increased and remains well below the one mile per square mile threshold standard on a Forest-wide basis and substantial acres of wildfire and prescribed fire have likely improved habitat for wolves by providing both forage and cover for their primary prey. Finally, population and habitat trends will continue to be monitored as the SNF expects to continue to play an important role in sustaining wolf populations in the best available habitat in the Western Great Lakes.

Bald Eagle

The 2005 bald eagle survey of all known nest sites in Minnesota identified 872 nests with adult eagles present, a 28 percent increase over the 681 active nests found in 2000, the year of the most recent similar survey (MN DNR 2006). A separate, first-time survey of 61 random plots yielded an estimate of 1,312 active bald eagle nests within Minnesota. This indicated the locations of only 66 percent of the state's nests had been found in the known nest survey. Additional information on these results is available online at the following address:

http://files.dnr.state.mn.us/eco/nongame/projects/eagle_report_2005.pdf.

On the SNF, the number of active nests increased from 78 in 2000 to 90 in 2005, bringing the SNF back in compliance with Forest Plan population objectives (minimum of 85 occupied breeding territories) (Table 9a.3).

With these results and other population information in the lower 48 states, the USFWS removed the bald eagle from its list of endangered and threatened wildlife in August of 2007. Currently, eagles are not protected by the Endangered Species Act but are still protected under the Bald and Golden Eagle Protection Act.

The MN DNR, with cooperation from the SNF and others, intends to conduct the next random plot and known nest surveys in 2010.

The only project-specific eagle surveys conducted since 2004 were in the Tomahawk area which found no nests and in the Mid-Temperance project area which found one of two known nests to be active. During the Ham Lake fire in the spring of 2007, one new active nest was found within the burn perimeter in the BWCAW.

Bald Eagle Management and Habitat Trends

Of the 32 projects since 2004, 12 affected, but did not adversely affect eagles. The remaining projects had no effect. In fact, many of these projects, especially the nine landscape scale projects, had beneficial impacts on eagle habitat where they restored white pine in areas close to lakes and streams.

At a Forest-wide level, the amount of both regenerating (zero to nine years old) and old growth (120 plus years old) red and white pine serves as an indicator of current and future eagle nesting habitat. At the site-specific project level, these indicators are refined to look more closely at conditions within one-half mile of fish-bearing lakes and streams where eagles prefer to nest. Since the beginning of the Forest Plan implementation in 2004 both young and old growth forest is increasing (Table 9a.4). While it appears that the amount of young white pine could exceed projected amounts for 2014, much of this acreage will succeed into sapling stage, providing consistency with Forest Plan objectives. Old growth forest is also trending toward consistency with Forest Plan objectives.

In addition to these acres of red and white pine habitat, a substantial number of white pines have been planted to improve diversity within stands of other forest types. Part of the purpose for these plantings within one-half mile of lakes and streams is to provide future nesting habitat. Refer to the section on white pine below for more information. Together with red and white pine forest types, habitat conditions for bald eagle should continue to be maintained and enhanced now and into the future.

The SNF has no new Forest-wide estimates of habitat or potential nest trees within the BWCAW since the Forest Plan FEIS. Therefore, it considers the acres of red and white pine forest type to be similar to what was analyzed in 2004: 20,300 acres of zero to nine years old and 30,500 acres of 50 plus years old. However, the wildfires of 2004 through 2007 described in the wolf section above may have changed those conditions. Also, potential nest trees such as old growth white pines are known to have burned. Loss of old pines is of concern, so management actions are taken when possible to protect existing

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old growth pines. For example, in the Ham Lake wildfire of 2007 one of the three known nests that survived, had been treated in a previous year to remove nearby ladder fuels (brush, small conifer trees) to help increase the odds of the tree surviving wildfire.

In summary, eagle management on the SNF since the beginning of Forest Plan implementation has been fully consistent with Forest Plan objectives, standards and guidelines, both inside and outside of the BWCAW. This holds true for eagle in its former status as a threatened species and its current status as a RFSS and MIS. All projects with decisions have been determined to be unlikely to adversely affect eagle as a threatened species. As a sensitive species, project BEs have determined that the Forest Plan standard S-WL-5 has been met. Also, relevant standards and guidelines are met for all projects, all vegetation projects continue to maintain or improve (increase) habitat, and substantial acres of both wildfire and prescribed fire have likely impacted habitat for eagles by killing large old growth red and white pine trees preferred for nesting yet will likely regenerate young pines to replace old growth trees being lost to windthrow and age.

Northern Goshawk

In northern Minnesota, as a result of the Minnesota DNR collaborative monitoring effort, over 75 goshawk territories (of the known 109) were surveyed in 2008. A total of 27 territories were occupied by goshawks and 17 territories were successful (MN DNR 2008).

Within the SNF boundary, 29 territories have been identified since 2000, more than double the 12 known nests during Forest Plan revision in 2003 and 2004. This increase is likely the result of higher interest and greater effort in monitoring goshawk populations, nesting activities and habitat conditions in northern Minnesota. Seven territories were active of the 23 that were checked and six were successful.

Figure 9a.3 below shows total known breeding territories on the SNF from 2000-2008. Although known territories have steadily increased over the last seven years, breeding success has remained modest relative to the number of territories checked. The Forest Plan objective is 20-30 breeding pairs (O-WL-31).

In 2008, Region 9 collaborated with other federal agencies, state DNR agencies, state university and private land management companies to conduct a study of northern goshawks in the western Great Lakes bioregion on federally and non-federally managed land (Bruggeman et al. 2009). The study identified 23,989 primary sampling units (PSUs) based on an analysis of historical goshawk locations and the habitat characteristics of those sites.

Project collaborators surveyed 86 PSUs (12 on the SNF) throughout the bio-region in four habitat categories. Field crews searched for goshawk presence between mid-May and late June 2008, and again between July and mid-August 2008. In the bioregion, 30 goshawk detections were found in 21 different PSUs. Based on the study's' detection

rates, detection probabilities were developed to estimate potential goshawk populations on Forest Service land and throughout the bioregion. Using these detection probabilities it was estimated that there was a potential of 5,184 (+/- 199 SE) PSUs with goshawk occupancy, or 27 percent of the total 23,989 PSUs the study identified in the bioregion. Based on detection probabilities for the SNF, the study estimated that there was a potential of 216 PSUs (+/-210 SE) with goshawk occupancy. Due to the large standard error for the SNF, the study's estimated goshawk population on the SNF has been questioned.

These monitoring efforts have been valuable in helping better understand goshawk presence, distribution, habitat use, and management impacts. However, population trends and dynamics for goshawk in northern Minnesota are not clearly understood. Population data collected is primarily based upon goshawk territories discovered during project surveys and on-going field operations. Therefore, there may be some bias in how territories are found, the habitats they are found in and the results of their subsequent monitoring efforts.

Northern Goshawk Management and Habitat Trends

The FEIS for Forest Plan revision assessed potential suitable habitat for goshawk outside the BWCAW with three indicators of habitat: 1) percent and area of mature upland forest; 2) area and number of 100 acres or larger mature/older forest patches; and 3) use of management treatments that increase within-stand complexity. Table 9a.5 shows the current condition of the mature upland forest indicator. The conditions of the other indicators are available upon request.

The condition of mature upland forest habitat for northern goshawk remains well above the threshold for maintaining habitat suitability Forest-wide. The increase in mature and older forest since the Forest Plan FEIS in 2004 is due to a substantial area of forest succeeding into 40-50 year old age classes.

The difference between 2008 existing conditions and conditions projected in completed but not yet implemented decisions shows that mature forest should continue to decrease as expected by the Forest Plan FEIS.

While this single indicator of northern goshawk habitat does not address spatial configuration or stand complexity, it does show that, as coarse filter habitat, conditions remain sufficient for maintaining goshawks.

Additionally, all the large vegetation management projects assessed impacts to goshawk as a RFSS. BE's from these projects determined that the Forest Plan standard O-WL-5 has been met for all projects. Further, projects were designed to maintain and protect fine filter nesting and post-fledging habitat conditions, meeting Forest Plan standards and guidelines S-WL-10 and G-WL-22 (p. 2-34 – 2-35).

White Pine

Since the Forest Plan was revised, the diversity of white pine trees in Landscape Ecosystems as a percentage of all trees (Forest Plan Landscape Ecosystem objectives for tree species diversity) has not been reassessed. Presently Forest Inventory and Assessment plot data and tree planting data serves as an indicator of efforts to move toward this objective.

Through management activities such as planting, forest succession, and, in some cases, improved forest inventory data, total acres of white pine forest type continue to increase from the amount of white pine known at the time of Forest Plan revision (Table 9a.6).

In the Jack/Pine Black Spruce Landscape Ecosystem (JPB), for the first decade of the Forest Plan, data show that by 2008 the SNF has modestly exceeded the objectives for white pine forest types, while meeting the objectives for Dry-Mesic Red and White Pine and Mesic Birch/Aspen/Spruce-Fir. This increase has come from planting for conversion of stands to white pine and from succession of old aspen stands to white pine.

Exceeding objectives in JPB, may contribute to tree species diversity objectives. In this LE the historical condition of white pine was nine percent of the trees, compared to less than one percent during the last assessment in 1990. However, because of the challenges to white pine successfully growing to maturity (deer, blister rust) and the time needed (decades) to determine survival of planted white pine, exceeding objectives is reasonable.

Since the Forest Plan was revised approximately 2,100,000 white pine seedlings have been planted within the SNF. In 2008, 1,049 acres were planted on the SNF with mainly white pine while some had white pine as a smaller component. These plantings were intended to meet Forest Plan direction objectives of restoring white pine on different forest types such as aspen-conifer mix. Survival surveys since 2005 indicate an average third year white pine survival of 70 percent.

Besides listing objectives for increasing white pine, the Forest Plan calls for management to improve survival on planted sites and as many naturally regenerating sites as practical (O-WL-32, p. 2-35). Between 2004 and 2008, the SNF implemented the following projects to address this objective:

- Animal Browse Control: 272 acres. Two treatments were used. For some areas, protective cones or mesh tubing was placed over buds. In another area white pine was treated with pig's blood, a commercial method that has been successful in deterring deer from eating and killing young white pines.
- Pathological pruning: 2,002 Acres. This activity is done to minimize the likelihood of blister rust infecting & killing white pine by pruning lower branches & creating a dryer warmer microclimate that is less favorable to this pathogen.
- White pine release: 13,003 acres. "Release" is the cutting or removal of unwanted tree species to reduce competition for water, soil, and sunlight to benefit desired

species, in this case, white pine. It also reduces the cooler and moister microclimate that favors white pine blister rust.

- Fertilization: 285 acres. Sites with very poor nutrient status were fertilized with packets applied when trees were planted to improve growing conditions.

In summary, white pine management on the SNF, since the beginning of Forest Plan implementation, has generally been consistent with Forest Plan guidance, moving the SNF towards the listed objectives.

B. REFERENCES

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9a.12 Management Indicator Species (MIS)

Table 9a.1. Gray wolf habitat indicators based on deer and moose habitat on the Superior National Forest.

Indicators	2004 Existing Condition (%)	2008 Existing Condition (%)	2014 Forest Plan FEIS Projected Condition (%)
Young upland forest less than 10 years old	13	7	10
Mature upland conifer (spruce and pine) on all uplands	16	21	17

Data source: 2004 & 2014: Forest Plan Biological Assessment for Forest Plan Final Environmental Impact Statement, (USDA Forest Service 2004, p. 69-70). 2007: SNF vegetation database, snapshot December 2008 of existing conditions (not including projects not yet implemented).

Table 9a.2. High standard road density in 2004 and 2007 on the Superior National Forest.

Year	Objective Maintenance Level 3, 4, and 5 Road Density mi/mi ² (mi)
2004	0.46 (1353)
2007	0.44 (1313)

Data source: 2004 Forest Plan Biological Assessment, (USDA Forest Service 2004, p. 58 [INFRA roads database]) 2007: INFRA roads database, snapshot December 2007.

Table 9a.3. Active bald eagle nests on the Superior National Forest from 1990 through 2005.

Year	Nests
1990	71
1991	101
1992	90
1993	93
1994	91
1995	85
2000	78
2005	90

Data Source: 1990-1995: SNF eagle nest databases 2000/2005: MN DNR 2006

Table 9a.4. Young and old growth red and white pine regeneration on the Superior National Forest.

Tree Species	2004	2008	2014
Regeneration - 0-9 years old			
Red pine	4,700	2,183	2,500
White pine	10,300	9,374	6,800
Total	15,000	11,557	9,200
Old Growth 120 + years old			
Red pine	1,700	2,048	4400
White pine	3,700	2,776	7700
Total	6,400	4,824*	12,100

Data Source: 2004 & 2014 Forest Plan record 1384: Dualplan vegetation model. 2008: SNF vegetation data base, snapshot December 2008 of existing conditions (not including projects not yet implemented). *Discrepancy in data, not an actual decrease. No old growth pine has been clearcut since Forest Plan implementation.

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Table 9a.5. Northern goshawk habitat conditions: percent of all upland forest in mature condition (excluding the Boundary Waters Canoe Area Wilderness (BWCAW) on the Superior National Forest.

Existing and Projected Conditions	Percent of all upland forest that is mature
Threshold of % for maintaining adequate habitat	40
2004	55
2008	56
2008 plus unimplemented projects that have decisions	55
Decade 1 Forest Plan FEIS projected condition	48

Data source: 2004 & 2014 Forest Plan Final Environmental Impact Statement, (USDA Forest Service 2004, p. 3.3.6-4) 2008: SNF vegetation database, snapshot December 2008 of existing conditions. 2008 + not yet implemented: same as 2008, but adding in those projects for which a decision has been made. Conditions would be as

Table 9a.6. Vegetation composition objectives for white pine by Landscape Ecosystem (LE) on the Superior National Forest.

Landscape Ecosystems	Existing (2003)		2008	Forest Plan Objectives	
	Acres	Percent		Decade 1	100 Year Goal
All Landscape Ecosystems	31,100	3	4	4	6
Jack Pine/Black Spruce	7,400	3	4	3	2
Dry-mesic Red and White Pine	13,200	7	9	9	14
Mesic Red and White Pine	4,400	3	4	5	10
Mesic Birch/Aspen/Spruce-Fir	5,400	2	3	3	4
Sugar Maple	300	1	1.5	2	4

Data source: 2003, Decade 1, 100 year: Forest Plan, Tables -1 for each LE, pp. 2-59 to 2-73. 2008: 2008: SNF vegetation data base, snapshot December 2008 of existing conditions (not including projects not yet implemented).

Figure 9a.1. Minnesota gray wolf population estimates from 1976 through 2004.

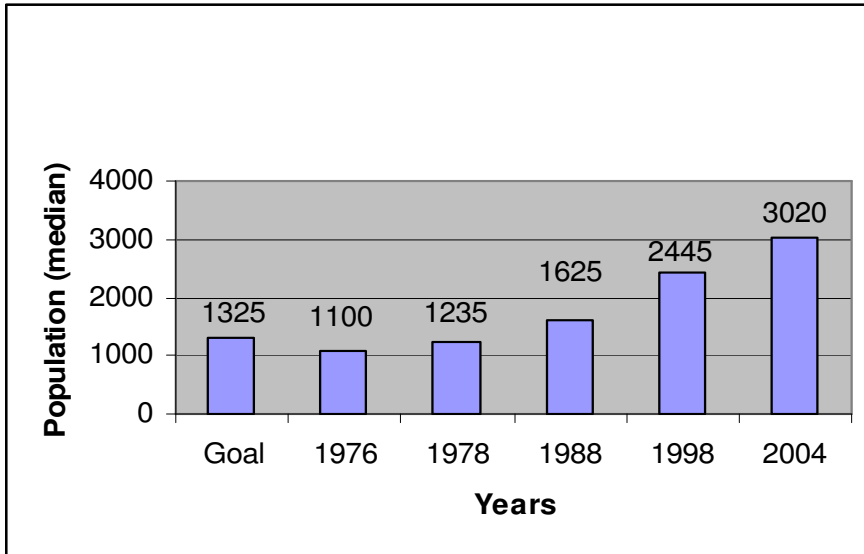


Figure 9a.2. Gray wolf populations in central Superior National Forest from 1965 through 2007.

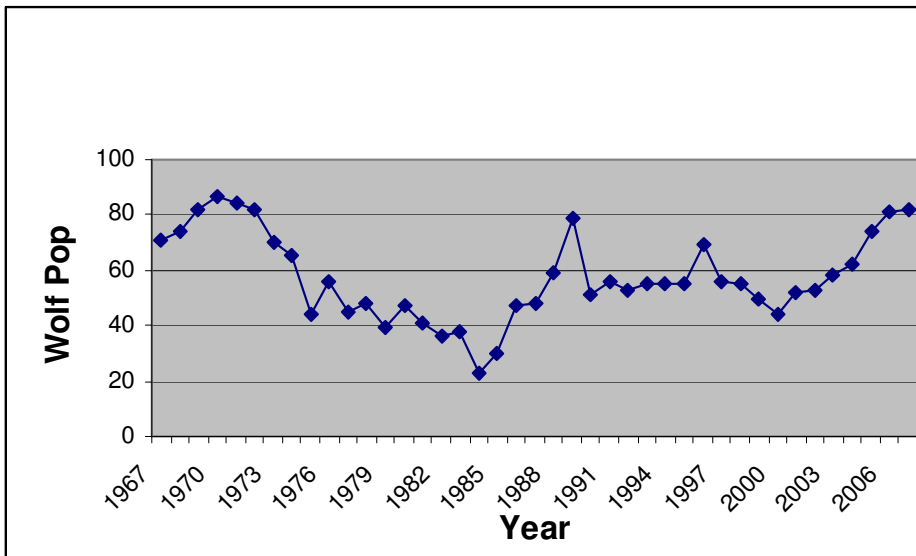


Figure 9a.3. Northern goshawk territories on the Superior National Forest from 2000 through 2008.

