3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This Chapter summarizes the physical, biological, social and economic environments of the project.

Chapter Preview

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3.2 Soil Resources

3.2.1 Summary

Ecological units at the landtype association level and below, best delineate the affected environment for soil resource issues. The soil resource within the project area is currently of high quality, with no evidence of reduced productivity from past events or activities. Impacts to the existing soil resource from the proposed activities in Alternatives 2-5, will be estimated based on the potential to cause: 1) erosion and displacement; 2) compaction and rutting; 3) effects from fire, and 4) reduced productivity.

3.2.2 Glacial Geology and Soils

The glacial geology and soil resources of the Chequamegon-Nicolet NF are characterized within a hierarchical, ecological classification framework (Ecomap, 1993), which allows delineation of geographic areas with similar landform and association of soils. This system sets the context of the landforms, soil resources and potential natural vegetation of a project area, across land ownerships and within multiple scales. The McCaslin project area is within three Landtype Associations (LTAs) on the Lakewood-Laona Ranger District. At a landscape scale, LTAs are ecological units delineated based on similar patterns of glacial landforms, topography, soil complexes and associated patterns of vegetation and succession, within climatic regions.

Glacial deposits provided the parent material for the soils in northern Wisconsin. The integrated effects of climate and living organisms (plants and animals) on these parent materials, as conditioned by the slope and aspect components of topography over the last 10,000 years, has led to the development of the existing soil resource of the project area.

The inherent productivity of the soil in the project area has also evolved with disturbance. Windstorm, fire, drought, flood and erosion, occurred at various spatial and temporal scales, associated with climate and related plant community fluctuations and along with human disturbance, have affected soil physical, chemical, and biological properties. A succession of forest species, a random disruption, and a subsequent re-establishment of this succession by natural perturbations were the pattern before the advent of humans as a dominant ecological factor (Ahlgren and Ahlgren, 1983, p.33). Natural disturbance patterns are described in the Forest's Terrestrial Ecological Unit Inventory LTA characterizations.

3.2.3 Ecological Unit Descriptions

The project area is comprised of land within three LTAs. A map and full characterization of each LTAs is available at the Laona-Lakewood Ranger District offices. A brief LTA description is outlined in the next several paragraphs.

LTA Xc06, Wabeno Drumlins, occurs on about two-thirds of the land in the northern half of the project area. Landscape pattern is primarily rolling drumlin uplands with some areas of exposed quartzite bedrock ridges.

Parent materials are gravelly, loamy sand glacial till, with silt loam or fine sandy loam textured wind-blown deposits on the surface.

LTA Xc07 Wabeno Plains, occurs on about one-third of the land in the northern half of the project area. Landscape pattern is primarily undulating pitted outwash between drumlin uplands. Finer textured wind-blown sediments overlie sandy outwash deposits.

LTA Ta01, Lakewood Plains and Moraines, occurs on the southern one-half of the project area. Landscape pattern is characterized by the rolling topography of collapsed and uncollapsed outwash plains, with some collapsed moraine. Loamy windblown sediments overlie sandy outwash or loamy sand till.

LTAs are further subdivided into Ecological Landtypes (ELTs) to map and define similar ecological conditions relating to soil moisture, nutrients, drainage, slope and other chemical and biological characteristics. ELT descriptions are available at the Laona-Lakewood Ranger District offices. A map of the ELTs found in the McCaslin Project area can be found in Figure C-3 in Appendix C. The tables in Appendix A display ELTs by project timber stands. The following describes the ELTs occurring in the stands proposed for treatment and also those ELTs that are adjacent to treatment areas.

Forest Habitat Types of Northern Wisconsin (Kotar et al 2002) have been correlated to ecological units at the LTA, ELT and landtype phase, LTP, levels of the hierarchy, for the Chequamegon-Nicolet NF land base. Habitat types provide information on potential natural vegetation and successional pathways for forest plant communities, including ground flora and shrubs. Abbreviations are commonly used to indicate names of component species for a given habitat type. Acer-Tsuga/Maianthemum or ATM has the complete scientific name of Acer saccharum – Tsuga Canadensis/Maianthemum canadense and the common name of Sugar Maple- Hemlock/Wild Lily of the Valley. Appendix E displays abbreviations and complete names for habitat types found in the project area.

The Iron River ELT occurs on approximately 44-54 percent of the project sites. These sites are very stony in the surface, with soil textures of fine sandy loam or silt loam to a depth of 25 inches, over gravelly sandy loam in the subsoil. The soil is moderately well-drained (due to seasonally perched water above a dense pan), with a mesic moisture regime and a rich nutrient status. Forest Habitat Types may include; AVb, ATFD, AOCa and AH. Permeability is moderate in the surface and moderately rapid in the subsoil, but slow in the fragipan, where present. Slopes commonly range from 2-15 percent, with some areas where slopes range from 15-25 percent. Ratings for woodland equipment use are moderate. Potential for soil erosion is slight. Potential for soil compaction, rutting and displacement is moderate to severe if operation of rubber-tired equipment occurs when the surface soil is saturated. Season of operation would be winter (frozen ground) or dry summer and fall.

The Stambaugh-Padus ELT occurs on about 31-41 percent of the project sites. The soil texture at these sites is fine sandy loam or silt loam to a depth of about 20 inches, over sand or gravelly sand. The soil is well drained with a dry-mesic to mesic moisture regime and a medium to rich nutrient status. Forest Habitat Types may include; ATM, ATD, AVb, ATFD and AOCa. Permeability is moderate in the surface and rapid in the subsoil. Slopes range from 2-15 percent, with a few areas of short steep slopes greater than 15 percent. Ratings for woodland equipment use (as listed above) are moderate. Season of operation would be restricted during spring thaw and following significant rain events that saturate the soil surface. Potential for soil erosion is slight. Potential for soil compaction, rutting or displacement is moderate if operation occurs when surface is saturated.

The Pence ELT occurs on about 13 percent of the project sites. The soil texture at these sites is sandy loam to a depth of about 20 inches over sand or gravelly sand. The soil is well drained with a dry-mesic moisture regime and a medium nutrient status. Forest Habitat Types are commonly PArVAa or ATM. Permeability is moderate in the surface and rapid in the subsoil. Slopes range from 2-15 percent, with a few areas of short steep slopes ranging from 15-25 percent. Ratings for woodland equipment use on logging areas, skid trails, log landings, and haul roads are slight for these sites. Season of operation would not be restricted, other than during spring thaw when soils are saturated. Potential for soil erosion, compaction, rutting or displacement is slight.

The Vilas ELT occurs on about 2 percent of the project sites. The soil texture at these sites is loamy sand or sand in the surface 10-15 inches, over sand or gravelly sand. The soil is excessively well drained with a dry moisture regime and a poor nutrient status. Forest Habitat Types are commonly PArVAa or PArV. Permeability is rapid. Slopes commonly range from 2-15 percent, but may range to 25 percent in some areas. Ratings for woodland equipment use are generally slight, with a moderate rating for haul roads and landings, because loose sand may interfere with the traction of wheeled equipment. Potential for soil erosion, compaction, rutting and displacement are slight. Potential exists for excess nutrient removal from a site, if total tree harvest occurs, due to poor inherent nutrient status. Season of operation would be year round on these sites.

The Sarona-Keweenaw ELT occurs on less than 1percent of the project sites. These sites are stony in the surface, with soil textures of fine sandy loam or loamy fine sand to a depth of about 20 inches, over sandy loam or loamy sand. The soil is well drained with a dry-mesic moisture regime and a medium nutrient status. Forest Habitat Types include AVb, ATM, ATFD and PArVAa. Permeability is moderate. Slopes commonly range from 2-15 percent, with a few areas of short steep slopes greater than 15 percent. Ratings for woodland equipment use on logging areas, skid trails, log landings and haul roads are slight. Season of operation would not be restricted, other than during spring thaw, when soils are saturated. Potential for soil erosion, compaction, rutting or displacement is slight.

The Carbondale ELT occurs adjacent to some of the project sites. The soils are slightly acid to neutral organic material (peats and mucks) formed from the remains of both woody and herbaceous plants and are commonly more than five feet thick. These sites are very poorly drained with a very wet moisture regime and a poor nutrient status. Permeability ranges from moderately slow to moderately rapid. Slopes range from 0-2 percent. The rating for use of equipment on these sites is severe. Where the organic deposits are shallow over sandy mineral soil, it is possible to operate heavy equipment under frozen ground conditions, but it is not recomended. Potential for erosion is slight.

The Greenwood ELT occurs adjacent to some of the project sites. The soils are extremely acid organic material (peats and mucks) formed from the remains of bog plants and are commonly more than five feet thick. These sites are very poorly drained with a very wet moisture regime and a very poor nutrient status. Water tables are at or above the surface for most of the year. Permeability is moderately rapid. Slopes range from 0-2 percent. The rating for use of equipment on these sites is severe. Where organic deposits are shallow over sandy mineral soil, it is possible to operate heavy equipment under frozen ground conditions, but it is not recommended. Potential for erosion is slight.

Land-types are subdivided into phases, LTPs, to further define soil characteristics at a site specific scale (currently in development on the Nicolet National Forest).

3.2.4 Current Conditions

Existing information used to assess the current condition and trends of the soil resource within the project area, in addition to those listed in section 3.2.4 above, includes:

1) Chequamegon-Nicolet NF Ecological Classification and Inventory mapping, interpretations and characterizations for the LTA, ELT and ELTP scales (includes soil/landform/potential vegetation information) of the National Hierarchy of Ecological Units;
2) The Nicolet land-base detailed soil resource inventory;
3) The Natural Resource Conservation Service detailed Soil Survey of Forest and Oconto (1998) Counties;
4) Ecological reference area data collection plots (1991-1996);

Detailed soil descriptions that serve as the basis for map unit characterizations and interpretations have been made at more that 2000 representative field locations within the Nicolet land-base by Forest Service, NRCS and University soil scientists, as part of the National Cooperative Soil Survey program and the FS Ecological Classification and Inventory program. Representative sites within this project area that are proposed to have ground disturbing activities, have been field checked by a soil scientist

Landtypes where soil quality may have been impaired by historical activities have been re-vegetated naturally or through tree planting. Ground cover and organic matter accumulation has halted erosion and nutrient levels

have been restored over the last 70-100 years. Old woods roads and railroad beds have grown up and adversely compacted soil is not evident. In many cases the old road locations are used in the existing transportation system.

Field monitoring of the soil impact indicators (listed in section 3.2.4) for the McCaslin project area has shown no long-term impairment of the soil resource from recent activities. Current conditions for key soil properties affecting ecosystem health such as porosity, organic matter content and nutrient availability are representative of the natural range soil conditions inherent to the Chequamegon-Nicolet National Forest (USDA Forest Service, 1998, p6) . There are healthy populations of soil microorganisms such as bacteria and fungi in the forest litter and soil surface layers.

Storage of carbon in vegetation and the soil was reduced on these land types after exploitive harvesting, wildfires, and conversion to agriculture or brush land. Grigal and Ohmann (1992, p937) found most terrestrial carbon in the Lake States is stored in the upper meter of mineral soil (55%) and the forest floor (9%). These values are very similar to those estimated for carbon storage in the average U.S. forest, with 59% in the mineral soil and 9% in the forest floor (Birdsey and Heath, 1997, p 81). Thus, the physical soil resource is an important factor in the global, regional and landscape scale carbon budget. Carbon in the atmosphere is currently increasing primarily from fossil fuel burning and terrestrial ecosystem land use changes. The major terrestrial source is believed to be destruction of tropical ecosystems through land clearing. While more study of the global carbon cycle is needed, recent studies show the non-tropical terrestrial ecosystem roughly in carbon balance. Some analysts suggest that forest ecosystems in the temperate regions may be a sink rather than a source (Armentano and Ralston, 1980, Schimel et al 1994). This is attributed to increasing total forest biomass, soil carbon and forest floor carbon-sequestering litter. USDA Forest Service timber inventories for the past 4 decades indicate a continuous increase in net timber volume on federal lands (growth in biomass exceeds removal). Birdsey and Heath (1997, p82) also note that U.S. forests have been a significant carbon sink since 1952, and that additional carbon will be sequestered through 2040, but at a slower rate.

USDA- Natural Resource Conservation Service 1995 summary report of National Resources Inventory for the years 1982-1992 indicates an increasing trend in forested lands in the United States, Lake States and Wisconsin primarily due to conversion from pastureland and cropland to forest. A substantial volume of harvested timber stores large amounts of carbon in long-lived solid wood and wood fiber products, adding another terrestrial carbon sink to the temperate region.

3.2.5 Soil Resource Impact Indicators

Ground disturbing activities are proposed in Alternatives 2-5 that have potential to impact the soil resource. The extent, intensity and duration of impacts to soil quality will be estimated using four main indicators.

1) Soil erosion and displacement potential
2) Soil compaction and rutting potential
3) Prescribed fire effects
4) Soil productivity effects

Estimates of potential impacts will be based on:

- applicable research;
- site-specific soil properties;
- design features and mitigation measures proposed;
- past monitoring of the same type of activities on similar soils;
- professional judgement of a soil scientist and other resource specialists.

3.3 Water Resources

3.3.1 Summary

The McCaslin Project area is located within three 5th level watersheds. There are approximately 40 miles of streams and 32 lakes within the project area. The water quality of these streams and lakes is generally good. Clean Water Act standards are easily met. Monitoring has indicated that past management activities (after the

logging era at the turn of the Century) including timber harvesting and road construction have not resulted in any long-term deleterious effects on the water quality in the area.(WDNR, 1998).

3.3.2 Watersheds

The majority of the project area falls within the North Branch (N.B.) Oconto River watershed. The extreme northwestern corner of the project area falls within the Otter/Rat watershed and the finger protruding along the eastern boundary of the project area falls within the Middle Peshtigo/ Thunder watershed.

The N.B. Oconto River watershed includes the N. B. Oconto River and its tributaries, Knowles Creek and its tributaries, Spring Creek, Shawano Creek and is tributaries, Battle Creek, a tributary to Sellin Lake, McCaslin Brook, and an unnamed stream between John Lake and the N.B. Oconto River.

The Middle Peshtigo/Thunder Watershed includes Spring Creek, Thunder Creek, and two tributaries to the East Fork Thunder River. There is also an unnamed lake.

The Otter/Rat watershed includes Pemma Creek and a tributary to Pemma.

3.3.3 Lakes

There are 29 lakes and 3 flowages within the N.B. Oconto River watershed portion of the project area. The lakes include Bear, Binder, Birch, Crab, Glocke, Hidden, John, Lincoln, Little Bear, Little Pickeral, Long, Miriam, Munger, Pickeral, Pine Ridge, Plantation, Seal, Sellin, Smoke, Spring, Surprise, Turtle, Wheeler, and six unnamed. The flowages include Bluegill Creek Impoundment, Knowles Creek Impoundment, and the Townsend Flowage. The water quality of these lakes is good and meets Clean Water Act standards. Detailed information on the lakes within the project area can be obtained from the "Water Resources Specialist Report" in the project file, or from the Wisconsin Department of Natural Resources Surface Water books for Forest and Oconto Counties. Section 3.8 Fisheries also contains some lake information.

3.3.4 Streams

The Chequamegon-Nicolet National Forest has conducted an Aquatic Ecological Classification and Inventory for the streams within the forest boundary. The ecological units, called valley types, are based on stream bank full width, alkalinity, maximum water temperature, and aquatic biota. Most of the streams within the McCaslin project area are 0-20 feet wide, with moderate alkalinities, maximum water temperatures less than 26 degrees Centigrade, and cold water aquatic species populations. The streams within the McCaslin project area are healthy resilient systems that meet Clean Water Act standards. The "Water Resources Specialist Report" in the project file contains specific information for most of the streams within the McCaslin project area, as well as information about the Chequamegon-Nicolet Aquatic Ecological Classification and Inventory that has been underway since 1991. Aquatic biota for these streams is described in Section 3.8 Fisheries.

3.3.5 Monitoring

Water quality data including temperature, alkalinity, pH, color, and width has continued to be collected for most of the streams within the Chequamegon-Nicolet National Forest since the Aquatic Classification and Inventory first began. This water quality data has enabled the Classification System to be refined and serves as monitoring data that can be used to detect changes over time.

A road/stream crossing inventory was conducted on the Chequamegon-Nicolet National Forest in 1997 and 1998. The purpose of the inventory was to obtain information to help with prioritizing watershed restoration projects. During the survey, each road/stream crossing was investigated to determine the general extent of erosion and sedimentation. A number of observations were made at each site including the road surface material, slope, length, drainage, culvert size and condition, evidence of road surface erosion, evidence of culvert failures or washouts, and condition of the embankments. Based on these observations each site was rated according to the apparent erosion and sedimentation that was occurring as either major, moderate, minor, and none. These ratings are one tool used to prioritize and schedule stream crossing replacement or restoration projects. Approximately 10 percent of the road/stream crossings within the Forest boundary were identified to be in need of some sort of improvement to minimize sedimentation of streams or lakes. This sedimentation is still far below the allowable thresholds by Clean Water Act standards.

Monitoring of a variety of streams, which have undergone culvert replacement and/or stream channel restoration has taken place over several years and is planned to continue into the future. Data collected

includes surveys of the stream channel profiles and cross-sections, water chemistry data, discharge levels, and fish species information. The data collected may be used for a variety of purposes including effectiveness monitoring, monitoring of changes over time, and comparisons of restored to un-restored stream system dynamics, to name a few.

Best Management Practices (BMP's) for Water Quality monitoring was conducted on random timber sales within the Chequamegon-Nicolet National Forest, in 1995, 1996, and 1997. Several of these sales were located on the Lakewood/Laona Ranger District. The use and effectiveness of Best Management Practices (BMP's) across all land ownerships in Wisconsin, including the National Forest, was monitored by interdisciplinary and interagency teams, during the years of 1995 to 1997. The field evaluations indicated that ninety-nine percent of the time no adverse impact to water quality occurred when a BMP was applied correctly where needed. They also indicated that the one percent of time that there was an impact, it was minor.

Timber sales outside of the national forest on private, state, county, and industrial lands were also monitored during this time frame. Internal water quality monitoring of timber sales has also occurred over the years as part of Forest Plan Effectiveness monitoring, as well as for District Timber Sale and Sale Administrator reviews. The majority of Forestry BMP monitoring relates to roads, skid trails, and landings.

Lake monitoring has also taken place across the Chequamegon-Nicolet National Forest. It has consisted primarily of dissolved oxygen and temperature profiles, pH and alkalinity levels, clarity, color, and fish species present. This information is useful for fish management, as a recreational pressure index, and for general comparisons of water quality trends over time. No negative trends have been identified to date. The WDNR has identified select lakes as having higher than normal mercury levels. In these cases, fish consumption advisories are issued for the affected lakes.

3.4 Air Resources

3.4.1 Introduction

No major issues were identified regarding the potential effect of the proposed action on air quality. In this analysis, air quality is a minor issue because the types and extent of activities with the potential to impact air are limited and are not expected to have measurable impacts.

3.4.2 Summary

The McCaslin project area has a typical northern Wisconsin climate. Precipitation averages 30.6 inches per year. About 20 percent of precipitation occurs as snow from mid-November through March and 80 percent as rain the remainder of the year. On average, there are 75 days from April through October with $\geq$0.01 inches of precipitation. On these days, there is little or no potential to generate road dust. Average monthly temperatures remain below freezing from November through March (little or no potential for fire and road dust) and peak in July at 65.5 degrees F. Winds average 10 mph from the southwest and range from 5 to 18 mph about 83 percent of the time. During March through May, winds average 10-11 mph with a prevailing direction from the northeast.

Prescribed burning has the potential to affect particulate matter in air. General air quality concerns with regard to particulate matter include potential health effects of particulate matter, impacts to visibility, whether the project area is in attainment for particulate matter and whether the proposed activity is in conformance with the State Implementation Plan for air quality.

Air quality with in the project area is generally good with low particulate matter. All of Wisconsin, including the project area, is an attainment area for particulate matter (PM10).

3.5 Vegetation Structure and Composition

3.5.1 Summary

This summary section will provide a overall picture of the existing composition and structure and sections 3.5.4 and 3.5.5 will have more detail.

The McCaslin project area has approximately 22,155 total acres of National Forest with over 85% of it being upland. Vegetative composition and structure are the result of historical and recent management activities that started in the late 1800's and have continued to the present. Natural events such as fire and windstorms have also had an effect on the area. **Figure 3-1** shows the overall forest type composition for the project area and **Table 3.5-1** shows it as a percentage. **Figure 3-2** shows the overall structure related to age distribution.

Figure 3.1 Forest Type Composition

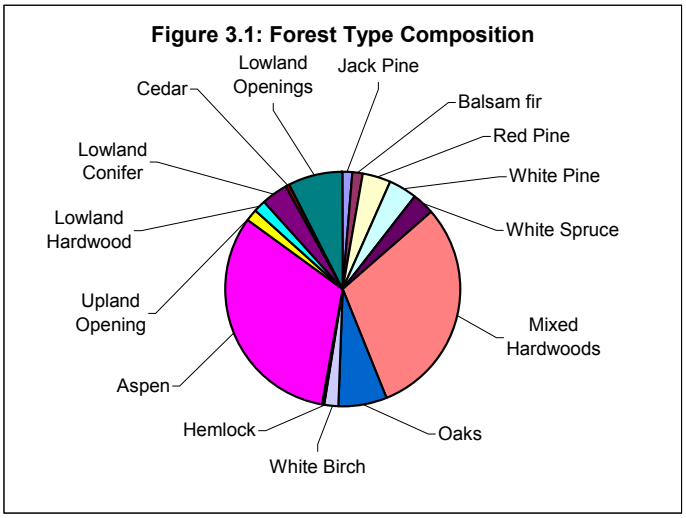
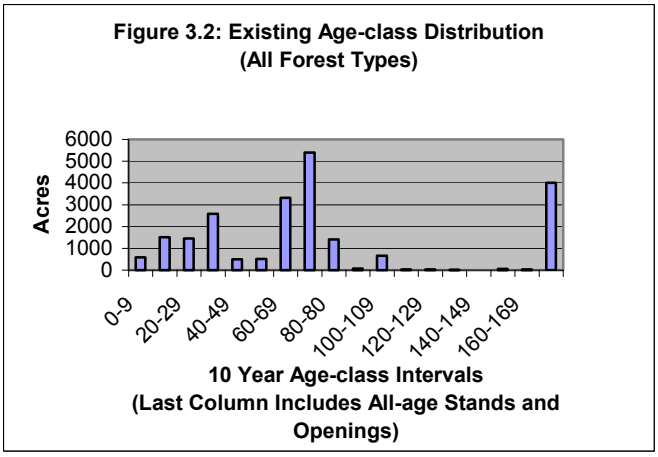


Table 3.5-1: Forestwide Type Composition	
Forest Type	**Percent**
Jack Pine	1.3
Balsam fir	1.4
Red Pine	3.9
White Pine	3.9
White Spruce	2.9
Mixed Hardwoods	30.4
Oaks	6.6
White Birch	2.0
Hemlock	0.5
Aspen	32.2
Upland Opening	1.5
Lowland Hardwood	1.9
Lowland Conifer	3.4
Cedar	0.6
Lowland Openings	7.5
Total	**100.0**

Figure 3.2 Existing Age-class Distribution (All Forest Types)



The Nicolet National Forest Land and Resource Management Plan identified forest type Desired Future Condition (DFC) objectives for different Management Areas (MA) on both the Lakewood and Laona districts. The major MA's in the McCaslin project area are 1.1, 1.2, 3.1, 3.2, 4.1, and 4.2. In general, MA 1.1 and 1.2 emphasize the aspen forest type, MA 3.1 and 3.2 emphasize an even-aged hardwood forest and MA 4.1 and 4.2 emphasize upland conifer forest types (For more details, see pp. 83 – 156 of the Nicolet Forest Plan). The following tables show, by MA, where important differences have been identified between the existing forest type composition of the McCaslin project and the Forest Plan DFC's:

Table 3.5-2: Key Differences Between DFC's and Existing Conditions- MA 1.1/1.2

Ma 1.1 and 1.2 for Lakewood Area				Ma 1.1 and 1.2 for Laona Area			
Forest Type	**DFC %**	**Existing %**	**Desired Change**	**Forest Type**	**DFC**	**Existing %**	**Desired Change**
White Pine	<1	20.2	Decrease	White Spruce	1	18.4	Decrease
Oak	8	0	Increase	Mixed Hardwoods	37	27.7	Decrease
Aspen	63	48.3	Increase				

Table 3.5-3: Key Differences Between DFC's and Existing Conditions- MA 3.1/3.2

MA 3.1 and 3.2 for Lakewood Area				MA 3.1 and 3.2 for Laona Area			
Forest Type	**DFC %**	**Existing %**	**Desired Change**	**Forest Type**	**DFC**	**Existing %**	**Desired Change**
Oak	20	4.1	Increase	Mixed Hardwoods	53	66	Decrease
Aspen	28	49.4	Decrease				

Table 3.5-4: Key Differences Between DFC's and Existing Conditions- MA 4.1/4.2

MA 4.1 and 4.2 for Lakewood Area				MA 4.1 and 4.2 for Laona Area			
Forest Type	**DFC %**	**Existing %**	**Desired Change**	**Forest Type**	**DFC**	**Existing %**	**Desired Change**
White Pine	9	2.1	Increase	Red Pine	28	6.4	Increase
Oak	2	34.4	Decrease	White Spruce	8	33.4	Decrease
Aspen	32	11.9	Increase	Aspen	20	32.6	Increase

The differences shown for the mixed hardwood forest type involve its total composition in the project area whether it is currently even-aged or uneven-aged.

MA's 8.2 and 9.1 are also in the project area but make up a very small acreage. These MA's have very limited or no management activities identified for them in the Forest Plan and none are prescribed for them in the McCaslin project. No further analysis of these areas will take place in this section.

3.5.2 Introduction

The majority of ownership within the project area is National Forest System land. Other ownership is discussed briefly later in this section. Ownership adjacent to the project area is mostly private along State Hwy 32 and County Hwy F and mostly USDA – Forest Service along the remaining boundary.

As a result of public and agency comments received during project scoping, several issues related to vegetative composition and structure were identified. This section will describe the relevant history of the area and the resulting vegetation composition that exists within the project area. It will also describe the desired composition objectives for each Nicolet Forest Plan Management Area within the project area (see section 1.3 for more details). Later in this section, vegetative structure will be described in terms of the area's age class distribution.

Other issues identified during project scoping (such as hemlock conservation and Non-native Invasive Species) will also be discussed within this section.

The information provided in this section will be used to assess effects on wildlife in Section 4.7.

For this discussion, the Chequamegon-Nicolet National Forest vegetation database was queried to gather information pertinent to the area. This data was loaded into spreadsheets, where it was sorted and analyzed to produce the figures given in the discussion. This information was also linked to a Geographical Information

System (GIS) to produce maps and other spatial information. More information on this analysis can be found in the McCaslin Project File at the Lakewood Ranger Station.

3.5.3 Historical Context

Pre-settlement forest composition and structure had its beginning after the retreat of the last iceage about 12,000 years ago. Pioneer species such as aspen, birch and some conifers were likely the first tree species to inhabit the area. Through time, longer lived and more shade tolerant trees began to inhabit the area leading to a forest composition and structure that was largely first described by the notes from the first public land surveys from the mid 1800's. The original survey notes indicate northern hardwoods dominated the northern portion of the McCaslin area and that pine and oak types were more common in the south portion (McBride, 1857; Findley, 1976; Frelich, 1995 – Note: McBride reference are original land survey notes with copies on file at the Lakewood Ranger District office). The majority of the uplands in the project area were essentially clearcut between 1900 and 1930.

Following the regeneration harvests in the early part of the last century, most of the mixed hardwood stands contained varying components of aspen. Subsequent forest management has identified which mixed hardwood areas are best suited for long-term hardwood management and those that are best suited for aspen management. In areas with a hardwood objective, many stands have been thinned or selectively harvested over the last 30 years. In areas with an aspen objective, the stands were usually clearcut on staggered intervals to regulate the acreage in each successive ten-year age class.

Prior to the initial harvesting around the turn of the century, aspen likely formed less than 10% of the forest type composition (Frelich and Lorimer, 1991). The amount of aspen on the Nicolet portion of this Forest has declined from about 27% in 1952 (Final Environmental Impact Statement for the Nicolet Forest Plan pg. 3-23) to about 21% now (Chequamegon-Nicolet National Forest vegetation data base). Aspen stands are widespread across the analysis area with most of them in the south portion. Most are less than 25 acres in size with stand ages ranging from newly regenerated areas to over-mature stands greater than 70 years old. Older aspen stands contain diseased, dying and dead trees. The southwest portion of the project area contains the largest amount of aspen patches of varying ages. This includes an identified grouse management area near Binder Lake.

What has occurred in the McCaslin Area is fairly indicative of what is happening with aspen and birch,statewide. Within the State of Wisconsin, aspen-birch acreage has declined by 36% since 1935 based on the last five inventory cycles (1935, 1956, 1968, 1983, 1996) of the state FIA forest inventories (Cunningham and Moser, 1938, Stone and Thorne, 1961, Spencer and Thorne, 1972, Raile, 1985 and Schmidt, 1997).

The extensive harvesting during the early 1900's resulted in logging slash over most of the area creating ideal conditions for fire. Anecdotal evidence indicates that most fires occurred in the Oconto County portion of this analysis area. The fires that occurred influenced the current forest composition. Species more dependent on fire for regeneration and survival such as oak, aspen, jack pine and white pine are likely more prevalent today than if the fires had not occurred. More recent management activities have involved efforts to maintain fire dependent species.

In general, within stand compositional diversity of some forest types has increased because commercial thinning and selection harvest methods have created light conditions more favorable to a variety of species such as oak, ash, basswood, yellow birch and white pine. In many areas in the south portion of the analysis area, white pine seedlings are regenerating and growing in the understory of other forest types. While many forest types have increased in within-stand diversity as a result of management, others have become less diverse such as regenerated aspen stands that are now more dominated by aspen.

3.5.4 Vegetation Composition

3.5.4.1 General Composition of Analysis Area

The McCaslin project area has approximately 22,155 total acres. The north portion is composed of fairly rich, mesic sites where the predominant upland forest cover type is mixed hardwoods and the forested lowland stands are somewhat evenly distributed between conifers and hardwoods. The southern portion has moderately productive sites but a more diverse forest composition. Aspen, mixed hardwoods, red pine and white pine form the predominant upland forest cover types and the forested lowland stands are mostly mixed conifers.

The McCaslin project area contains vegetative structure and composition that are the result of historical and recent management activities that started in the late 1800's and have continued to the present. Natural events such as fire and windstorms have also had an effect on the area. The primary upland forest types are mixed hardwoods (35%) and aspen (37%). See **Table 3.5-5** for the McCaslin forest type breakdown. The majority of the upland forest is in a young to mid-age condition. Very little of the area is in an old forest condition simply because not enough time has elapsed since the early 1900's when most of the timber was harvested. See the Landscape Pattern Section 3.6 for additional discussion on old growth and other landscape components.

The lowlands in the McCaslin project area are about equally divided between open areas and areas composed of lowland hardwoods, conifers and cedar. Cedar is the least common of the lowland tree species.

Most of the following discussion in the vegetation section of this document will relate to the upland forest types because no activities are proposed in any lowland areas.

Table 3.5-5: McCaslin Forest Type Composition for Upland and Lowland Forest Types.

FOREST TYPE	ACRES	%
Upland Types		
Jack Pine	286	1.5
Balsam fir	321	1.7
Red Pine	870	4.5
White Pine	872	4.5
White Spruce	641	3.3
Mixed Hardwoods	6730	35.1
Oaks	1459	7.6
White Birch	434	2.3
Hemlock	105	0.5
Aspen	7126	37.2
Upland Opening	326	1.7
Total Upland Acres	***19170***	***100.0***
Lowland Types		
Lowland Hardwoods	411	13.8
Lowland Conifer	769	25.8
Cedar	123	4.1
Lowland Openings	1681	56.3
Total Lowland Acres	***2984***	***100.0***
Total All Acres	***22154***	

3.5.4.2 Composition by Management Area

As discussed in Section 1.3 of this document, the McCaslin Project Area is divided into Forest Plan Management Areas with related Desired Future Conditions by Ranger District boundaries present at that time. See pages 83 to 156 of the Land and Resource Management Plan for the Nicolet National Forest for more detailed information on Management Areas. At the time the Forest Plan was written, the lands within the McCaslin Project Area were parts of two Ranger Districts: the Lakewood District and the Laona District. The northern portion of the McCaslin Analysis Area is located on the former Laona District; the southern portion on the former Lakewood District. The following tables (Tables 3.5-6 - 3.8) give a concise summary of the desired and existing conditions within each Management Area found in the McCaslin project area. The district and forest-wide existing forest type composition are also shown for a larger scale context.

Table 3.5-6: Primary Vegetation Goals and Existing Conditions for MA 1.1/1.2: Mixed forests with a large aspen component

Vegetative Type	*Desired and Existing Conditions for Lakewood Portion (values in percentages)*			*Desired and Existing Conditions for Laona Portion (values in percentages)*			*Nicolet NF Existing Condition*
	DFC	**McCaslin Existing**	**Lakewood RD Existing**	**DFC**	**McCaslin Existing**	**Laona RD Existing**	**Forest-wide Existing**
Jack Pine	<1	0.0	1.2	0	0.0	0.0	1.5
Balsam Fir	2	5.3	2.7	1	0.8	3.2	3.0
Red Pine	1	1.0	5.9	2	3.4	4.0	8.5
White Pine	<1	20.2	5.2	1	0.0	0.4	3.0
White Spruce	<1	4.3	1.7	1	18.4	3.5	3.3
EA Hardwoods	9	12.4	17.2	4	27.7	38.5	31.1
UEA Hardwoods	4	0.0	0.0	33	0.0	0.0	0.0
Oak	8	0.0	7.4	2	0.0	0.0	1.9
White Birch	8	7.8	6.8	1	0.0	0.4	2.5
Hemlock	2	0.0	1.1	1	0.0	0.5	0.6
Aspen	63	48.3	48.8	52	48.6	47.2	42.5

Upland Opening	3	0.7	2.0	3	1.2	2.3	2.1

Table 3.5-7: Primary Vegetation Goals and Existing Conditions for MA 3.1/3.2: Even-aged hardwood forests managed for large sawtimber

	Desired and Existing Conditions for Lakewood Portion (values in percentages)			*Desired and Existing Conditions for Laona Portion (values in percentages)*			*Nicolet NF Existing Condition*
Vegetative Type	**DFC**	**McCaslin Existing**	**Lakewood RD Existing**	**DFC**	**McCaslin Existing**	**Laona RD Existing**	**Forest-wide Existing**
Jack Pine	<1	0.7	0.7	<1	0.0	0.0	0.5
Balsam Fir	2	2.1	2.8	<1	0.1	1.0	2.5
Red Pine	4	3.4	6.1	3	0.9	2.4	5.8
White Pine	2	3.8	2.5	1	0.1	0.7	1.8
White Spruce	1	1.1	1.4	2	2.1	3.0	2.4
EA Hardwoods	29	29.4	40.0	22	66.0	61.4	46.4
UEA Hardwoods	3	0.0	0.0	31	0.0	0.0	0.0
Oak	20	4.1	8.7	6	6.5	1.9	5.5
White Birch	4	3.0	3.0	<1	0.0	0.4	2.4
Hemlock	3	0.8	0.3	3	0.0	0.1	0.8
Aspen	28	49.4	31.9	29	23.6	26.8	29.2
Upland Opening	3	2.1	2.7	3	0.7	2.2	2.8

Table 3.5-8: Primary Vegetation Goals and Existing Conditions for MA 4.1/4.2: Upland softwood forest managed for pulpwood and sawtimber

	Desired and Existing Conditions for Lakewood Portion (values in percentages)			*Desired and Existing Conditions for Laona Portion (values in percentages)*			*Nicolet NF Existing Condition*
Vegetative Type	**DFC**	**McCaslin Existing**	**Lakewood RD Existing**	**DFC**	**McCaslin Existing**	**Laona RD Existing**	**Forest-wide Existing**
Jack Pine	17	13.2	8.6	<1	0.0	0.0	7.3
Balsam Fir	1	1.3	1.9	7	0.0	5.2	2.8
Red Pine	24	27.7	30.5	28	6.4	33.4	28.9
White Pine	9	2.1	2.9	8	0.0	0.4	3.3
White Spruce	3	1.2	1.2	8	33.4	12.4	5.1
EA Hardwoods	2	0.6	16.5	2	21.9	25.2	18.9
UEA Hardwoods	2	0.0	0.0	21	0.0	0.0	0.0
Oak	2	34.4	8.2	2	0.0	0.0	4.7
White Birch	2	0.0	1.5	<1	0.0	0.9	1.7
Hemlock	1	2.9	0.7	1	0.0	0.0	0.8
Aspen	32	11.9	24.9	20	32.6	20.4	23.5
Upland Opening	4	4.7	3.0	3	5.7	2.2	3.1

At this time, the most important differences between desired and existing conditions are considered to be those found in the aspen and hardwood types. These types represent a large proportion of the area and also are key components of the DFC's. In many cases, the aspen in the stands are at or beyond their desired rotation age. Therefore, there is an opportunity to either convert the stands to hardwood through thinning or to regenerate the stands to aspen.

In some areas, other types, such as white pine, red pine, white spruce, and red oak have large differences between the desired and existing conditions. Most of these stands are of plantation origin and are not yet at recommended rotation ages. In the past, large investments of money and labor were made to establish and develop these stands. Also, when viewed at larger scales, the existing conditions are often closer to the

DFC's. It was for these reasons that an alternative to modify the composition of these types was not analyzed in detail (see section 2.4). Because of this, most discussion on composition changes will be on aspen and hardwood types.

3.5.4.3 Species of Concern

Butternut (*Juglans cinerea*) is a tree species on the Regional Foresters Sensitive Species (RFSS) list. It is present in the analysis area but only as a minor and scattered component on the richer mesic sites. Butternut is a very shade intolerant species and is fairly short-lived - usually less than 100 years (Rink, 1990). Most butternuts within the McCaslin area regenerated after the initial logging at the turn of the century. They are now 70 to 80 years old and considered mature. Butternut is extremely susceptible to a highly virulent exotic fungal disease called butternut canker (*Sirococcus clavigignenti-juglandacearum*) that has infected a large percentage of butternut throughout its natural range. Once infected, the tree almost always dies (Prey, et. al., 1996). Wisconsin currently has the most butternut of all the states in its natural range and the south half of the Nicolet portion of the forest has the highest concentration in the state (Ostry, 1999).

In accordance with recommendations from the Scientific Roundtable on Biological Diversity, efforts are currently underway to identify butternut phenotypes that display potential resistance to the disease. In addition, because of the tree's relatively short life span, managers are attempting to regenerate butternut trees before the parent trees die in order to maintain existing genetic resources. Researchers from the Northeast Area State and Private Forestry office and Forest Service managers are conducting research on an area located about 10 miles northwest of this analysis area. Because of its shade intolerance, butternut regeneration must become established in sparse shade or open canopy conditions if it is to survive and grow to maturity. The research has centered on this characteristic of butternut. Preliminary findings indicate that butternut regenerates best under about 30% crown closure. Treatment proposed around existing butternut in the McCaslin analysis area would be guided by the research findings.

Hemlock is a species of some concern because of its high habitat value for certain wildlife species and because of its low abundance across the McCaslin analysis area. Most hemlock trees are found in a very small number of patches usually less than five acres. Sections 10, 11 and 14 of T33N, R16E contain the largest amount of hemlock greater than 12 inches in diameter. These areas are generally within ¼ mile on either side of the North Branch Oconto River. Following recommendations from the Scientific Roundtable on Biological Diversity, district personnel have been trying to establish and restore hemlock through natural regeneration and planting. Within the project area, approximately 60 acres of hemlock were planted in 1998. One planted area is also along the Oconto River and the other is in the southwest area close to State Hwy 32. On the opposite side of Hwy 32 (outside the McCaslin project area) is a recent acquisition of about 2,500 acres. This area contains noteworthy amounts of larger diameter hemlock and some patches of seedling regeneration. The goal within treatment areas is to improve within stand composition and relative abundance of hemlock. Establishing regeneration has not been difficult but maintaining its survival and growth has not been very successful. Deer browsing is intense on this species and it is difficult to protect the seedlings until they have grown above browse height. Deer browse on hemlock seedlings seems to be less severe in Oconto County compared to Forest County. Fencing naturally regenerated or planted areas is the most feasible and effective way to eliminate deer browse and assure adequate survival and growth. Some of this is proposed in the McCaslin analysis area.

NNIS (Non-Native Invasive Species) were not present in the pre-settlement forest of the project area. A few of the more aggressive species of NNIS can now be found scattered throughout the project area including: Swamp thistle (*Cirsium palustre*), spotted knapweed (*Centaurea biebersteinii*), and Canada thistle (*Cirsium arvense*). Many other non-native species are found in the project area, but the majority of them are not considered invasive.

Roads are the primary pathways for NNIS dispersal, and in the project area, most NNIS have not yet spread outside the road corridor. An exception is swamp thistle, which can be found away from roadways in conifer swamps. Ground disturbance associated with road construction and reconstruction tends to promote the spread of NNIS (USDA Forest Service 2000). Haul roads have been shown to be the primary conduit for the dispersal of introduced species into the interior of managed stands (Buckley et al. 2002).

Road construction and reconstruction activities involve both soil disturbance, and filling with gravel from local gravel sources. Soil disturbance can create a substrate favorable for establishment of NNIS, and gravel

hauled from local gravel sources has a high likelihood of contamination with NNIS seeds. The combination of soil disturbance and contaminated gravel can contribute to increased spread of NNIS. Road decommissioning can help to reduce vehicle traffic in some areas and possibly lower the rate of NNIS dispersal in those areas.

NNIS can also spread via other methods such as mud on the undercarriage of vehicles, seeds attached to the fur of an animal such as deer or horses, wind dispersed seeds, or in some cases carried and dropped by birds.

3.5.5 Vegetation Structure

The existing upland forest type structure is mostly the result of harvest activities that took place starting in the late 1800's and up to the 1930's. Most of the merchantable timber was harvested resulting in landscape-scale regeneration. Recent harvesting, mostly since the 1960's, has also influenced forest structure. Clearcutting shorter-lived, shade intolerant species such as jack pine and aspen has started to develop age class distribution. Thinning and individual tree selection harvesting in longer-lived conifers and hardwoods has started to develop within stand and landscape structural components.

For purposes of this analysis, Table 3.5-9 shows the forest types of jack pine, balsam fir, white birch and aspen to be considered young forest structure if they are 20 years or younger, in a mid-aged forest condition between 21 and 60, and in an old forest condition if older than 60. The table shows red pine, white pine, white spruce, mixed hardwoods, oak and hemlock to be considered a young forest if they are 20 years or younger, a mid-aged forest if they are between 21 and 120, and in an old forest condition if older than 120. These age groupings correspond closely to those in the current Nicolet National Forest Land and Resource Management Plan (pgs. 46, 47). They will be used to estimate some of the effects on wildlife in section 4.7.

Table 3.5-9: Forest Type Age Structure Parameters

Forest Types	Young Forest	Mid-age Forest	Old Forest
Jack pine, balsam fir, white birch, aspen	≤ 20 years	21-60 years	>60 years
Red pine, white pine, white spruce, hardwoods, oak, hemlock	≤ 20 years	21 to 120 years	>120 years

Today, the age class distribution for the upland area is centered on two age class ranges. 32% is between the ages of 10 to 39 and 42% is between the ages of 60 to 79. Aspen is the major forest type in the 10 to 39 year age range and mixed hardwood is the major forest type in the 60 to 79 year age range. **Table 3.5-10** displays the existing composition and age-class distribution of the upland forest types in the McCaslin area and **Figure 3.1** displays them graphically. The table is shaded to show when the different upland forest types are considered to be in a young forest, mid-age forest and old forest condition. This will be described later in this section.

Table 3.5-10: McCaslin Age-class Distribution by Upland Forest Types.

Upland Forest Type	Ten Year Age Classes																		
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-80	90-99	100-109	110-119	120-129	130-130	140-149	150-159	160-169	no age	TOTAL
Jack Pine	59	48	0	0	0	37	142	0	0	0	0	0	0	0	0	0	0	0	286
Balsam fir	36	5	0	9	0	52	108	75	36	0	0	0	0	0	0	0	0	0	321
Red Pine	0	168	35	262	66	119	193	6	0	0	4	0	16	0	0	0	0	0	869
White Pine	0	0	0	3	38	0	759	37	11	0	20	0	0	0	0	0	0	4	872
White Spruce	11	0	0	218	17	50	330	3	12	0	0	0	0	0	0	0	0	0	641
Mixed Hardwoods	14	17	21	0	0	9	702	3297	243	0	443	0	0	0	0	0	0	1984	6730
Oaks	0	0	0	0	0	0	15	693	693	0	58	0	0	0	0	0	0	0	1459
White Birch	0	0	0	24	0	0	220	180	9	0	0	0	0	0	0	0	0	0	433
Hemlock	0	0	0	0	0	0	0	43	0	0	4	0	0	0	0	53	0	6	106
Aspen	462	1279	1377	2030	361	248	735	588	45	0	0	0	0	0	0	0	0	0	7125

Upland Opening	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	328	328
Tot upland ages	582	1517	1433	2546	482	515	3204	4922	1049	0	529	0	16	0	0	53	0	2322	19170

Young Forest	2099
Mid-age Forest	12542
Old Forest	4201
Upland Opening	328

Since no activities that would alter structure or composition are proposed in the lowland forest types of the McCaslin Area, discussion will be limited to the following summary.

The dominant age-class range for lowland forest types coincides with harvesting in the early 1900's. **Table 3.5-11** displays the existing composition and age-class distribution of the lowland forest types in the McCaslin area. This table is also shaded to show when the different lowland forest types are considered to be in a young forest, mid-age forest and old forest condition.

Figure 3.1: Existing Upland Age Class Distribution

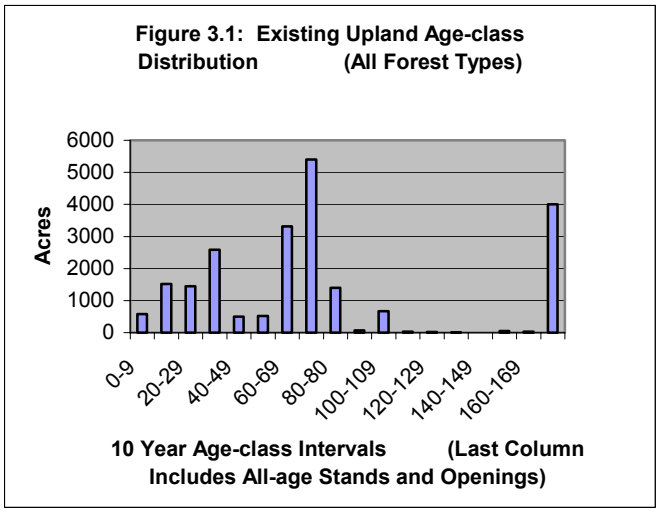


Table 3.5-11: McCaslin Age-class Distribution of Lowland Forest Types.

Lowland Forest Type	Ten Year Age Classes																		TOTAL
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-80	90-99	100-109	110-119	120-129	130-139	140-149	150-159	160-169	no age	
Lowland Hardwoods	0	0	9	0	20	0	50	216	85	32	0	0	0	0	0	0	0	0	412
Lowland Conifer	0	0	9	35	0	4	44	264	218	42	106	27	8	0	3	0	8	0	768
Cedar	0	0	0	0	0	0	12	3	49	0	33	0	0	8	0	0	18	0	123
Lowland Openings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1681	1681
Total Lowland ages	0	0	18	35	20	4	106	483	352	74	139	27	8	8	3	0	26	1681	2984

Young Forest	0
Mid-age Forest	557
Old Forest	746
Lowland Opening	1681

Existing forest vegetation on other ownership within or closely adjacent to the McCaslin project area is similar to that on National Forest land. Most private ownership is in the south area and is in larger blocks around the major lakes. A few hundred acres of the private land in the Townsend area are open farmland. Other ownership in the north portion is a combination of private, industrial, and Potawatomi Tribal Land. The industrial land is all in one section and has had repeated individual tree selection harvests designed for uneven-age management. The tribal land has been recently harvested or will be in the near future. There are about 440 acres of tribal land within the project area and about 800 acres along the areas north boundary. The ownership in Marinette County is a combination of industry and private individuals. Much of this ownership within one mile of the project area has had recent timber harvest activity similar to the types of actions proposed in this project. Detailed information on non-forest service lands in and around the McCaslin project area is located in the analysis file at the Lakewood Ranger Station.

3.5.5.1 Young forest

The young forests typically have small, dense seedling or sapling regeneration that has not yet increased in size to where a large number of trees are dying from competition. Seedling amounts vary from 750 to 30,000 seedlings per acre depending on whether they were planted or naturally regenerated. Canopy closures are normally at 100% except in young red pine plantations where crown closure does not usually occur until age 15 to 20. According to **Table 3.5-10,** 2,099 acres or 11% of the upland acres are in this young forest condition. Aspen comprises the large majority of the young forest with 1,741 acres (83%). Following aspen, red pine and jack pine are the next most common forest types in the young forest condition but with only 168 acres (8%) and 107 acres (5%) respectively. These red and jack pine stands are all of plantation origin.

In response to the initial proposal, the forest received specific comments related to young forest condition of aspen. Aspen stands are scattered throughout the project area with the largest concentration in the southwest area. In the north portion, aspen stands are more concentrated at lower elevations. The age distributions of these stands are also spread out over the landscape.

The existing age distribution in the aspen forest type is displayed in the **Figure 3.3**. The young aspen is the result of regeneration harvest during the 1980's and '90's. The current Nicolet National Forest Land and Resource Management Plan (pg 27) identifies a general long-term age class distribution for aspen as shown in **Table 3.5-12**. This table shows that aspen is below recommended levels in the age classes that form the young forest condition and above recommended levels in the older forest conditions.

Figure 3.3: Existing Aspen Age-class Distribution

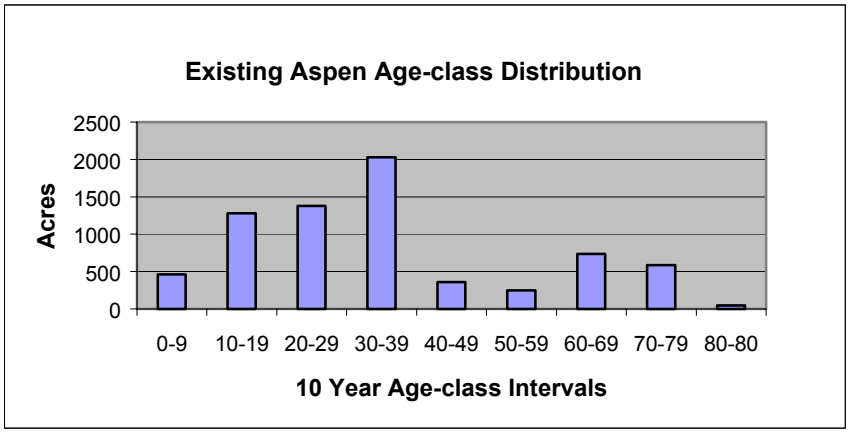


Table 3.5-12: Recommended and Existing Age Class Distribution for Aspen

Age Class Interval	Recommended %	Existing %
0 - 10	20	6
11 – 20	21	18
21 – 30	19	19
31 – 40	17	29
41 plus	23	28

3.5.5.2 Mid-aged Forest

The mid-aged forest vegetation involves tree diameters and densities that have developed beyond the sapling stage – usually 5 inches or greater in diameter. Stand structure has become more diverse in this forest age group since the 1930's. Most forested areas that have not had regeneration harvests since the 1930's are now developing structure from a variety of trees species of differing heights and diameters. Many mixed hardwood stands have trees that range from small poletimber to trees that may be up to 20 inches in diameter. Species composition is mostly a mix of sugar maple and basswood with ash, yellow birch, white birch, red maple and oak present in varying amounts. These hardwood stands range in size from less than 20 acres to contiguous groups of stands forming patches larger than 1000 acres separated by lowlands, streams or roads.

Conifer plantations of CCC origin have trees averaging close to 14 inches in diameter in stand sizes generally less than 40 acres. There is one 500 plus acre white pine plantation to the northwest of Plantation Lake.

As a result of trees getting older and taller, and thinning type harvest activities in many forest types, shrub layers in the understory and other improvements to vertical structure (another Roundtable recommendation) are present in most areas.

The mid-age forest condition as shown on **Table 3.5-10** comprises 12,542 acres or 65% of the upland portion of the McCaslin project area. Mixed hardwoods and aspen form the bulk of the mid-age forest condition followed by oak. The majority of the mixed hardwoods and oak is in the 60 to 89 year age groups. This corresponds to the extensive harvesting done during the early 1900's. Aspen, which has also resulted from the cutting of the early 1900's, has been periodically harvested over the last 40 years. Currently, the bulk of the aspen in the project area is between 20-39 years of age.

3.5.5.3 Old Forest

Old forest conditions are reached as the tree species in a forest type become older and get closer to their biological rotation age. Characteristics developed in old forest conditions include larger diameter trees, increased susceptibility to wind throw and insect and disease damage and increased development of shrub layers and vertical structure. Early successional forest types such as aspen will display old forest conditions sooner than hardwood types dominated by sugar maple.

There is very little old forest condition in the McCaslin area because not enough time has elapsed since the cutting from the early 1900's. Lowland areas on the forest have been impacted less than upland areas with past harvesting. This has allowed some lowland conifer stands on the forest to exceed 100 years in age. Also, some of the early successional forest type acreage in the project area has not been regenerated and has grown into an old forest condition. Virtually no forest type with longer-lived species has grown into an old forest condition. See **Table 3.5-10** for more details on the acreage and forest types that makeup the old forest condition in the project area.

There is one established Research Natural Area (RNA) in the McCaslin project area called the McCaslin Mountain RNA. This area will have no active management over time and will eventually grow into an old forest condition.

Four sites in the McCaslin project have been inventoried and identified as Landscape Analysis and Design (LAD) areas whose goal is for natural processes to develop an old forest over time. These areas are being evaluated under the Forest Plan revision. More information on the LAD and RNA sites can be seen in Chapter 3.6 under Landscape Patterns.

3.5.5.4 Snags, Cavities Trees, and Down Wood

Because of the relatively young age of the forest, not much natural development of large snag and cavity trees or down woody debris has occurred. In most areas, coarse woody debris in the 6-16 inch range is plentiful, but snags and down wood in the larger size classes are much less common in the analysis area. In most forest types, some older trees have developed into cavity and/or snag trees and some have been wind-thrown. In addition, slash from previous harvesting is contributing to woody debris on the forest floor. As the forest ages, these structural features will improve.

Some shorter-lived trees provide soft cavity and snag trees for a variety of wildlife species earlier than longer-lived species such as white pine and sugar maple. Aspen is the main species that provides for this earlier development of an old forest condition.

Detailed information on the amount and sizes of snags, cavity trees and down woody debris in the McCaslin Area is not available.

3.6 Landscape Pattern

3.6.1 Summary

Existing landscape patterns in the project area have been greatly influenced by three major historic events. First, the underlying landscape was shaped by glaciers which defined the topography, determined soil types, and influenced the location of rivers, lakes, and wetlands. Second, turn of the century logging removed nearly all the original forest converting predominately uneven-aged old growth types to even-aged early successional types. Finally, slash fires likely burned in many areas in the 1930's as happened in much of northern Wisconsin. The logging and fires influenced the forest types that were able to regenerate in the project area. These events led to the current landscape pattern dominated by mid-successional hardwood forest fragmented by permanent openings, roads, conifer plantations, and regenerating even-aged harvests. Most of the project area remains in a forested condition (88%) with the balance in non-forested wetlands and permanent openings (fields, right-of-ways, etc.)

Currently, there are 854.6 miles of edge within the project area. There are approximately 13,974 acres of land in the project area that is considered interior forest habitat and approximately 20,685 acres of land that is considered edge affected.

3.6.2 Introduction

In response to the initial public scoping letter for the McCaslin Project, the Forest Service received a number of comments expressing concerns related to issues such as fragmentation, landscape pattern, vegetation composition and structure, wildlife populations, and biodiversity. These are complex and interrelated issues. For example, changes in landscape pattern resulting from even-aged harvests can result in increased forest fragmentation, changes in vegetation composition and structure, and population changes in the of some wildlife species. This section focuses on the existing landscape pattern within the McCaslin Project Area. It also includes discussion on the degree of forest fragmentation present in the area. Related information on existing wildlife populations and vegetation composition and structure is discussed in the Wildlife and Vegetation sections (3.5 and 3.7).

In the field of landscape ecology, a "landscape" is defined as a heterogeneous land area composed of a cluster of interacting ecosystems that is repeated in similar form throughout (Forman and Godron 1986, p. 594). Landscapes are generally described as having three basic kinds of elements: a matrix, corridors, and patches. These elements are usually dominated by vegetation, but may also include such features as water bodies, geologic features, or highway corridors. It is important to note that the description of these elements steadily changes depending on the scale at which the landscape is viewed. Generally, the larger the scale, the more "broad brush" the description will be. Finer scaled views, such as a view of a two-square-mile area, will give more detailed information, such as individual vegetation species patterns (as opposed to species groups) and more defined patch structure information. For the purpose of this discussion, the landscape being viewed is the entire McCaslin Project area.

The matrix is the most extensive and most connected portion of the landscape. Within the McCaslin analysis area, the matrix is generally described as mid-successional mixed hardwood forest. Patches are areas of vegetation that are relatively homogenous internally and that differ from what surrounds them. An example might be a group of red pine plantations surrounded by a larger landscape of mixed hardwoods. Corridors are landscape elements that connect similar patches through a dissimilar matrix or aggregation of patches. An example might be the Oconto River corridor, which traverses the center of the analysis area.

For the purposes of this discussion, a GIS model developed by the Forest Service will be used to determine fragmentation indicators. These indicators include: acres of interior habitat, acres of edge affected habitat, and miles of edge.

3.6.3 Fragmentation

During initial public scoping, the Forest Service received a number of comments that expressed concern that the proposal would increase forest fragmentation. Some members of the public are concerned that this could negatively impact certain species of wildlife and plants that do better in a more contiguously forested setting.

They are also concerned that this could benefit edge-adapted species of wildlife and plants and that this could, again, negatively impact those species that prefer "interior" forest conditions. Large, contiguous, generally unfragmented habitat is referred to as interior habitat. Fragmentation results when a large and contiguous ecosystem is converted to a network of small patches isolated from each other by interstitial areas of a different ecosystem type (Crow et al. 1994). In general, a more fragmented landscape will have a smaller average patch size.

Edge represents the places where two distinctly different habitats meet. Fragmentation and edge can be either a naturally occurring landscape feature or it can result from human activities. Some examples of naturally occurring fragmentation might be where a marsh meets a forested area or where a windstorm results in an opening within a forested area. Examples of human-caused fragmentation might be the clearing of a forested area for agriculture or the creation of temporary openings for even-aged regeneration harvests.

Given the great variability of habitat requirements and preferences, fragmentation and edge effects clearly benefit some species, are neutral to other species, and are detrimental to some species. This section does not attempt to list the effects on species, but merely describes the existing condition of those features in the landscape that appear to have potential effects on them. The information from this section and section 4.6 will be used to determine effects on plants and wildlife as discussed in section 4.7.

Roads are a feature often thought to contribute to fragmentation of the landscape. Roads of varying standards are present throughout the project area with a larger amount of higher standard roads in the south half, probably due to the larger amount of private inholdings present. Roads can contribute to fragmentation in a variety of ways, ranging from the alteration of the hydrologic regime due to the roadbed, to the maintenance of an open canopy along the road corridor.

Based on the literature, as well as personal communications with experts in the fields of bird conservation and landscape ecology (Howe, 2001; Martin, 2001) the Forest Service is assuming the extent of edge effect to be 100 meters for this analysis. In determining the areas of interior and edge-affected forests, the following assumptions were made: 1) all seedling/sapling and poorly-stocked pole-sized stands contribute to edge; 2) all non-forested types contribute to edge; and 3) all traffic service level A, B, and C roads (due to their wider corridors) contribute to edge (after Rich and Dobkin, 1994).

Currently, there are 854.6 miles of edge within the project area. There are approximately 13,974 acres of land in the project area that is considered interior forest habitat and approximately 20,685 acres that is considered edge affected.

3.6.3.1 Landscape Composition

Table 3.6-1 shows the extent to which the McCaslin vicinity would have been covered by forest prior to settlement. This includes all upland types. Detailed stand-level information is not available for presettlement conditions, but knowledge of the ecology of the species and disturbances present allows one to make reasonable estimates of the extent of forested land in the area. While it is expected that there would have been upland openings of various sizes, these would primarily have been temporary forest openings caused by windthrow, fire, or other natural disturbance. These are seen as *temporary* openings and would still be considered forested types.

Table 3.6-1: Expected Historical Forested/Nonforested Lands

Ownership	*Total acres*	*Forested Acres*	*Nonforested Acres*	*Percent Forested*
National Forest	21,887	20,211	1,676	92%
Private	11,336	10,948	388	97%
Tribal	576	564	12	98%
Industrial	600	600	0	100%
Total- All Ownerships	34,399	32,323	2,076	94%

Table 3.6-2 presents a breakdown of the major ownerships in the vicinity of the McCaslin project proposals. This includes those National Forest lands within the analysis area as well as private, corporate, and tribal

lands within the McCaslin and Virgin Island opportunity areas (**Figure 3.6-1**). **Table 3.6-2** also displays the extent of current forested land in this area.

Table 3.6-2: Current Forested/Nonforested Lands

Ownership	*Total acres*	*Forested Acres*	*Nonforested Acres*	*Percent Forested*
National Forest	21,887	19,901	1,986	91%
Private	11,336	9,092	2,244	80%
Tribal	576	563	13	98%
Industrial	600	600	0	100%
Total- All Ownerships	34,399	30,156	4,213	88%

Detailed information on the current composition of forest types within the McCaslin analysis area can be found in the Vegetation Composition and Structure section 3.5.

Table 3.6-3: Natural communities that are known to be present in the project area

Alder Thicket	Forested Seep	Northern Wet Forest
Bedrock Glade	Hardwood Swamp	Northern Wet-Mesic Forest
Bracken Grassland	Moist Cliff	Open Bog
Dry Cliff	Northern Dry-Mesic Forest	Poor Fen
Emergent Aquatic	Northern Mesic Forest	Submergent Aquatic
Ephemeral Pond	Northern Sedge Meadow	

- Based on Wisconsin Natural Heritage Inventory definitions (Epstein et al 2001)

The natural community, also called potential natural community can be described as follows: the biotic community that would be established if all successional sequences of its ecosystem were completed without additional man-caused disturbance under present environmental conditions. Grazing by native fauna, natural disturbances, such as drought, floods, wildfire, insects and disease are inherent in the development of potential natural communities, which may include naturalized non-native species (About.com 2002).

The two most common community types in the McCaslin Project Area can generally be described as follows:
Northern Mesic Forest
This forest complex covered the largest acreage of any Wisconsin vegetation type prior to European settlement. Sugar maple (*Acer saccharum*) is dominant or co-dominant in most stands, while hemlock (*Tsuga canadensis*) was the second most important species, sometimes occurring in nearly pure stands with white pine (*Pinus strobus*). Beech (*Fagus grandifolia*) can be a co-dominant with sugar maple in the counties near Lake Michigan. After old-growth stands were cut, colonizing trees such as quaking and bigtooth aspens (*Populus tremuloides* and *P. grandidentata*), white birch (*Betula papyrifera*), and red maple (*Acer rubrum*) became and still are important in many second-growth Northern Mesic Forests.

Northern Dry-Mesic Forest
In this forest community, mature stands are dominated by white and red pines (*Pinus strobus* and *P. resinosa*), sometimes mixed with red oak (*Quercus rubra*) and red maple (*Acer rubrum*). Stands usually occur on sandy loams, sands or sometimes rocky soils.

Northern Mesic Forest is the dominant community type in most of the project area and Northern Dry-Mesic Forest becomes dominant in the southeast. Other important community types include Northern Wet-Mesic Forest, Northern Sedge Meadow, and Alder Thicket. The remaining community types are important but occupy a small percentage of the project area. The Northern Mesic Forest and Northern Dry-Mesic Forest form the background matrix of the landscape and the remaining fifteen natural community types are embedded in that matrix.

Historic Patterns
Historical information on broad-scale landscape pattern can be inferred to a degree from a number of data sources. Finlay's (1976) Original Vegetation of Wisconsin estimated broad forest cover types based on notes from the first public land surveys. Information on tree species found at corners and along survey lines was

used to piece together a composite map that shows generalized forest types present at the time. This can be taken into context with landtype association (LTA) maps, topographical information, and knowledge of species autecology to get a general description of historical landscape structure and composition. However, it is not possible to display detailed and measurable information in the way this section treats the existing condition.

Much of the broad-scale historical landscape pattern in the McCaslin Area is largely a legacy of the Laurentide Ice Sheet, which sculpted the landscape during the Wisconsin Glaciation. The ice retreated from the area approximately 12,000 years ago. A strong northeast-southwest topographic grain characterizes the resulting landscape.

Because of this glacial activity, northern hardwood types in the northern and southwestern portions of the area dominated the historical landscape. Pine and oak types dominated the southeastern part of the area where more coarse-grained and drought-prone outwash material is present.

Little is known about the fire disturbance regime in the northern hardwood types of the project area. Information is generally anecdotal and gives little insight into the frequency or extent of fires in these types. It is known that in more drought-prone surrounding landscapes, Native Americans periodically maintained lands as grasslands, shrublands, and savannahs through the use of fire to improve game habitat (Pecore, 2001). It's possible that some of these fires, which burned in the southern portion of the Lakewood/Laona Ranger District, may also have affected the pine-oak types in the southeastern portion of the analysis area, but to what degree would be a matter of conjecture.

While small fires did occur on mesic sites, small-scale windthrow appears to have been the dominant disturbance during presettlement times and, as a result, the majority of the northern hardwood matrix was older (Frelich and Lorimer 1991; Frelich 1995; Runkle 1982). However, this is not to say that young patches or early successional species were uncommon. Contrarily, survey notes from the area from the first land survey, conducted in 1857, indicate the widespread presence of both large shade-tolerant species (maple, beech, and hemlock) and small shade-intolerant species (aspen, butternut, and birch) (McBride, 1857). This would seem to suggest that, in the project area, gaps large enough to provide regeneration of early-successional species were being created with some frequency.

Current Patterns

The landscape elements of matrix, patch, and corridor can be used to describe the current landscape patterns present in the project area. The arrangement, size, shape, and temporal stability of these elements can be used to describe the degree of fragmentation of the landscape. The underlying pattern of these elements is strongly influenced by the northeast-southwest topographic grain resulting from the last glaciation.

The matrix throughout the McCaslin project area is composed primarily of mid-successional mixed hardwoods. The hardwood matrix component is much more well developed in the north half of the project area. In the south half, aspen forest is the dominant matrix component.

The north half of the project area tends to have a larger average patch size than the south half. The north half presents a larger area of contiguous hardwoods with perhaps better opportunities for interior conditions and less edge. The south half tends to have a smaller average patch size with a greater interspersion of early successional and contrasting forest types, and more open lands present on private inholdings. This results in an increase in edge and a general reduction in interior conditions in the south half.

The large hardwood patches in the north half are generally closely arranged and have short corridors, with aspen and pine forest between the hardwood patches. In the south half, the smaller patches of aspen forest take on the pattern of a series of interconnected corridors surrounding mixed hardwood stands and pine stands.

3.6.4 RNA's, LAD Areas, and Old Growth

Research Natural Areas

RNA's (Research Natural Areas) are part of a national network of ecological areas designated in perpetuity for research and education and/or to maintain biological diversity on National Forest System lands. RNA's

are for nonmanipulative research, observation, and study. They may also assist in implementing provisions of special acts, such as the Endangered Species Act and the monitoring provisions of the National Forest Management Act (USDA Forest Service 1994). Proposed RNA's are subject to environmental analysis and are approved by the Regional Forester.

The project area includes one designated RNA, the McCaslin Mountain RNA (see Figure C-4, Appendix C). This RNA was designed to protect both geological and biological features and includes several rare plant and bird species.

- McCaslin Mountain RNA's significant features include: a large quartzite monadnock and associated rock outcrops, bedrock glades and balds forested with red oak, sugar maple, aspen, and American beech.

LAD

Some portions of the project area are less disturbed than others and these areas have been identified by a forest-level ecological inventory process commonly referred to as LAD (Landscape Analysis and Design). This Forest Plan Revision effort has attempted to identify the best available examples of community types (wetland, hardwood forest, pine forest) or natural features (aquatic, geologic, old growth) and associated surrounding stands which are also of good to high quality.

LAD Complexes were developed to respond to a number of issues in the ongoing Forest Plan Revision. As part of the Plan Revision, various LAD Complexes are proposed for a variety of designations under each alternative. These potential designations include RNA's, old growth areas, and special management areas.

The Forest Plan Revision uses LAD Complexes as part of an ecological reference area network. The goal is to represent, in a system of reference areas, all native ecosystem types and seral stages across their natural range of variation, stratified by the Landtype Association (LTA) level of the National Hierarchy of Ecological Units.

Table 3.6-4: Existing RNA's, Proposed RNA's and LAD Complexes in the McCaslin Project Area.

Name	*Designation*	*Acres*
McCaslin Mountain RNA	Existing RNA	524
McCaslin Mountain LAD	Proposed Old Growth in the Forest Plan Revision. Adjacent to the existing McCaslin RNA	379
Battle Creek LAD	Proposed RNA in the Forest Plan Revision	239
Glocke Lake LAD	Proposed SMA in the Forest Plan Revision	155
Knowles Creek Pines LAD	Proposed Old Growth in the Forest Plan Revision	977

LAD Attributes

- Battle Creek LAD – Primary features include: old growth northern mesic forest, northern wet-mesic forest, and a short segment of the North Branch Oconto River.
- Glocke Lake LAD – Primary features include: a bog lake with associated floating bog mat, and black spruce/tamarack forest.
- Knowles Creek Pines – Primary features include: mature oak northern mesic forest on bedrock, remnant super-canopy white pine, hemlock forest, segments of Knowles Creek and North Branch Oconto River.
- McCaslin Mountain LAD – Primary features include: the slope around McCaslin Mountain forested with red oak, sugar maple, aspen, and American beech.

Refer to Figure C-4 in Appendix C to see the locations of the LAD complexes found in the McCaslin Project area.

Old Growth

Table 3.6-5: Percentage designated upland old growth at the Forest, District, and Project level.

Area	*Current % Designated Old Growth*
Nicolet National Forest	6.89%
Lakewood-Laona District	4.17%
McCaslin Project Area	6.68%*

* Total Nicolet NF Upland Acres – 509,788 acres, Desired Future Condition for old growth – 5% of all upland managed timber stands (Nicolet NF 1986, p. 66). Includes McCaslin Mountain RNA

Because the analysis area already exceeds the Forest Plan DFC for old growth designation, no additional stands are proposed for old growth designation in the project area. However, there are undesignated old stands that have not been proposed for harvest; these may contribute old growth values to the landscape.

3.7 Wildlife Resources Including TES, RFSS and MIS

3.7.1 Summary

The McCaslin Project Area (MPA) includes a variety of habitat types that support a wide range of wildlife species. Certain Threatened, Endangered Species (TES), Regional Forester's Sensitive Species (RFSS), and Management Indictor Species (MIS) reside in this area and the status of their habitats and populations are presented in this section.

3.7.2 Introduction

The distribution of vegetative community types and age classes, and the structure of vegetation determine the number of different wildlife species (species diversity) that occur on a landscape (DeGraaf et al. 1992). There has been no attempt to quantify the entire species list of plants and animals for the Chequamegon-Nicolet National Forest (CNNF). However, it is estimated that over 400 vertebrate species, birds, mammals, fish, amphibians, and reptiles, inhabit the northern-forested region of the Lake States (Benyus et al. 1992). The Nicolet Forest Plan (1986) estimates that there are approximately 300 mammals, birds, reptiles and amphibians species on the Forest.

The vegetative composition within the McCaslin Project area consists of forest habitat types found throughout northern Wisconsin (see Section 3.5 for more information). The animal communities within the project area are also typical of northern Wisconsin, supporting such animals as white-tailed deer, bear, coyote, bobcat, fisher, red fox, beaver, otter, neotropical migrants, woodland raptors, and various species of small mammals, reptiles, amphibians, and insects. The northern half of the project area is mostly undeveloped and consists of large blocks of continuous forest that enhances the opportunities for many of these species to exist there. The various forest types available also create conditions suitable for supporting a wide variety of plant life. According to NNF Wildlife Documents (Rinaldi 1986, p36) approximately 1,000 species of plants are thought to occur on the forest, but not all of these would occur in the project area.

Analysis for TES, RFSS, MIS and other species of concern were conducted within and approximately 2 miles outside the MPA because at this scale it is large enough to address habitat and movement concerns for species that use relatively large home ranges. It was also selected because the vegetation analysis was evaluated at the project area scale and included information on the surrounding lands and most of the potential impacts to wildlife come from vegetation management. The information contained in this document was obtained through the cooperation of the U.S. Fish and Wildlife Service (USFWS) and Wisconsin Department of Natural Resources (WDNR) - Bureau of Endangered Resources (BER) and their Natural Heritage Database, district and forest wildlife records, population viability assessment documents (PVA), Scientific Roundtable information (Crow 1994), literature review, contact with other professionals knowledgeable of species habitat requirements and personal observations.

3.7.3 Threatened and Endangered Species

Early and informal consultation with the USFWS was initiated at the scoping stage of this proposal. The USFWS response (May 01, 2001 letter, Project File) identified the bald eagle (*Haliaeetus leucocephalus*), gray wolf (*Canis lupus*), Karner blue butterfly (*Lycaeides melissa samuelis*) and Canada lynx (*Lynx Canadensis*) as federally threatened or endangered species that have the potential to occur, or have potential habitat within Oconto or Forest County.

3.7.4. TES Known to Occur or Have Habitat in the Project Area

The bald eagle (*Haliaeetus leucocephalus*), classified as endangered, is the only Federally Listed vertebrate species documented as occurring in the analysis area. There are 2 documented bald eagle nests within the MPA and there are other opportunities for nesting in the area due to the large lakes and mature tree development. One nest is located on the north end of Pickerel Lake and the second is along the North Branch

of the Oconto River, about 0.50 miles west of Waubee Lake. At the Oconto River and Pickerel Lake nest there are 6 and 2 proposed harvests treatments, respectively. All stands are within the 660-1,320 foot buffer zone that is most outlying mitigation zone of the Standards and Guidelines established for protecting eagle nests (Nicolet Forest Plan, p. 58).

3.7.5. TES That Do Not Occur or Have Habitat in the Project Area

A number of species of potential occurrence identified by the USFWS were considered. No individuals or critical habitat were present to be affected in the project area, and, therefore, no affects would occur. For this reason, the following species were dismissed from further analysis.

The Canada lynx (*Lynx canadensis*) is listed as threatened. There is no confirmed evidence that lynx occurs anywhere and that suitable habitat is present on the CNNF (USFWS, 2000). A multi-year study to identify suitable lynx habitat conditions found the CNNF lacked snow conditions and other habitat related conditions necessary to sustain resident lynx populations (Weiland, 2000). Additionally, surveys conducted on the CNNF for lynx did not detect the species (Weiland, 2002). Therefore, the Forest has concluded the proposed alternatives will have no affect on lynx or their habitat.

The gray wolf (*Canis lupus*) is listed as threatened. No confirmed reports of wolves have been documented and there is no critical habitat identified in the area by the WDNR (Wydeven et al, 2002).

The Karner blue butterfly (*Lycaeides melissa samuelis*) has a historic occurrence recorded in southern portion of Oconto County. This county is over 50 miles long, and no habitat exists near the project area. There is no known occurrence near the project area. The Federally listed species; American burying beetle (*Nicrophorus americanus*) and Fassett's locoweed (*Oxytropis campestris var chartacea*) were not identified by the USFWS as potentially occurring in the project area. There are no records of occurrence or suitable habitat existing in the project area. Further discussion of threatened and endangered species habitats and populations are found in Appendix D (Tables 1 and 2-Likelihood of Occurrence and Existing Potential Habitat)and the project file (Analysis of Effects to TES).

3.7.6 Regional Forester's Sensitive Species

The Eastern RFSS list was first issued on March 8, 1994 and updated on February 29, 2000. The objectives of this listing are to help maintain species viability and avoid trends toward federal listing under the Endangered Species Act. RFSS analyzed for this project (see Appendix D) are the February 2000 list along with those species the CNNF added in April 2002 through the RFSS Update Process outlined in FSM Chapter 2670, R9 Supplement 2600-2000-1. Risk evaluations were completed for each species considered for new listing and these evaluations were incorporated into this analysis. These species were identified in cooperation with the Wisconsin DNR, State Natural Heritage Program, The Nature Conservancy, USDA Forest Service Region 9 TES staff, and other species experts outside the agency. RFSS that were determined to be present in the project area, or to have potential for occurring (Likelihood of occurrence) were evaluated in more detail in the BE. This RFSS list includes 13 birds, 5 fish, 4 butterflies, 4 dragonflies, 2 mussels, 1 mammal, and 1 reptile. A description of these species habitats and populations are analyzed in the BE (Project File) and a summary is presented in Appendix D (Table D-1 and Table D-2).

3.7.7 Management Indicator Species

Analysis of MIS is required by the National Forest Management Act of 1976. MIS were also identified during the NNF planning process as representatives for estimating the potential effects of forest management to the individual wildlife species, the habitat used by them, and all other species populations of other species that rely on that habitat. Monitoring requirements for MIS are addressed in the Land and Resource Management Plan, NNF (USDA FS, 1986a) on pages 57-64, 68 and 165. Further MIS data is presented in the Final Environmental Impact Statement (USDA FS, 1986b) on pages 2-75, 3-33 to 3-37, and D-30 to D-32. While the method of using MIS has potential limitations (Niemi, 1997), the FS has weighed them against the method's advantages and chosen to use them to track species population changes and ensure species viability.

Key MIS were selected that would be expected to show a response to activities proposed in the MPA. Their general habitat type description and reasons for selecting or not selecting these indicator species are given in Appendix D (Table D-3). More details are given for all MIS in "Monitoring Methods and Wildlife

Population Trend Data" Appendix D (Table D-4). Bird habitat and population estimates (except barred owl and ruffed grouse) were determined by using an updated version of the NNF Bird Information Retrieval and Display (NNFBIRD) V3.04 computer program (Dr. B. Howe, UWGB, personal communication, Dobiesz, 1998). This model predicts the population of singing males based on 16 years of NNF Breeding Bird Surveys (BBS) data, age class of the habitats and habitat types and acres. Habitats used in the analysis for each species were those with combined population estimates that totaled 80% of the projected population for that species in the MPA. These habitat guidelines were calculated for existing conditions and those in the year 2017 (estimated year of next management project for MPA) after the implementation of each alternative in 2002. It was not possible to predict exactly which year forest management activities would occur so for simplicity and consistency it was assumed all actions would take place during the year 2002. Also incorporated in effects to MIS habitat analysis was the MIS habitat identified in the NNF Forest Plan.

Table 3.7-1. Estimated populations and acres of habitat for selected MIS species in MPA.

MIS	Representative Habitat Type	Estimated Existing Habitat in MPA (acres)	Estimated Population Existing in MPA
White-tailed deer	All upland components	19,170 (29.95 mi^2)	750 [a]
Barred Owl	Mature n. hardwoods and lowland conifer.	8,100	12 [b]
Blackburnian Warbler	Mature aspen and n. hardwoods; intermediate white spruce	8,794	858
Black-throated Green Warbler	Mature aspen, n. hardwoods and oak	9,364	817
Chestnut-sided Warbler	Aspen, paper birch, n. hardwoods, white spruce, shrub conifer	16,107	713
Ovenbird	Aspen, upland hardwoods, oak, white pine	16,332	2,158
Pileated Woodpecker	Aspen, upland hardwoods, oak, lowland conifer	14,424	148
Pine Warbler	Young aspen, mature white pine and n. hardwoods; intermediate white spruce	12,187	213
Red-eyed Vireo	Aspen, n. hardwoods and oak	15,502	1,786
Ruffed Grouse	Aspen, hardwoods, pine, fir	6,461	337[c]
Scarlet Tanager	Aspen, n. hardwoods, oak, white pine and white spruce	17,286	388
Golden-winged Warbler	Aspen, paper birch, lowland conifer and shrub swamp	9,090	302

a WDNR estimate for DMU 45 in McCaslin = 25 deer / mi^2
b Nature Server (2002)
c Kubisiak and McCaffery (1985).

Neotropical Migrants

Most of the MIS birds selected are considered neotropical migratory birds (NTMB). These are birds that spend their summer in the northern portions of North America and winter in the tropics and neotropics of North and Central America. They are a diverse group, with birds that require almost every habitat type and this makes addressing their needs as a group difficult. DeGraaf et al (1993) showed that landscapes with multiple size-classes of forest support a far greater number of NTMB than areas with only one or two size-classes. Populations vary more in young stands, with some species appearing almost immediately and using the habitat for several years and other species gradually come in as the stand develops and use the young forest until it becomes unsuitable (DeGraaf 1991). Overall, the best management approach for NTM (as a group) is to maintain a diversity of forested and non-forested habitats across the landscape. Within forested habitats, this must include providing a variety of forest types and size-classes distributed in a mix of patch sizes, including large areas of mature closed canopy forest for interior species such as the black-throated green and blackburnian warblers and areas of young forest in different development stages for species like the common yellowthroat and chestnut-sided warbler. Sallabanks et al (2001) supports this in stating that in order to maintain viable populations of all species on the landscape, a mix of all forest conditions, from clearcuts to older forest is required. This diversity of managed forests habitat types also support an abundant, rich, diverse, and productive bird communities. The effects of forest management practices on birds have been

very mixed, but generally have resulted in few net changes in either abundance, or species richness. Effects of forestry seem relatively short-lived, tending to cause immediate reductions in bird numbers, but then becoming negligible in effects or leading to population increases in the long-term and severe deleterious effects are both rare and temporary (Sallabanks et al, 2001).

The two main issues related to NTM are fragmentation and edge. Fragmentation is a primary concern associated with habitat manipulation, and can cause or exacerbate other effects such as parasitism, predation, area sensitivity, and in extreme cases, patch or habitat isolation. Fragmentation has been defined as the disruption in the continuity of habitat (Robinson, 1996). This definition includes the extreme case of insularization of habitat patches by agricultural or residential land use (where contiguous forests are reduced to small patches) as well as more subtle forest fragmentation. Forest fragmentation can occur when activities such as clearcutting create a mosaic of successional stages within a large forest matrix. Fragmentation caused by permanent forest removal is thought to be more damaging to bird populations and can result in a permanent loss of habitat. The second type (forest fragmentation), which has also been referred to as "temporal fragmentation" (Manolis et al., 2000), represents the situation in the MPA proposal. This type may only cause temporary reductions in quantity or quality of habitat. Much of what is known about the effects of habitat fragmentation on breeding birds is based on evidence from studies of forest fragmentation within agricultural and urban areas. Much less is known about the effects in extensively forested landscapes, although more recent studies are focusing on this situation. Some researchers have suggested that the results of studies in agricultural areas should not be directly applied to contiguously forested areas (McRae, 1995).

As habitat fragmentation increases within a given area, so does the relative amount of habitat edge within that area. Thompson et al (1995) and Bayne and Hobson (1997) summarize the results of studies on the impacts of fragmentation due to logging on avian nesting success. Some studies have shown increased nest predation and/or parasitism near openings created by logging, while others have shown no such increase. The presence of agriculture or development on the landscape likely increases the diversity of predators and the potential for brown-headed cowbirds to be present. If agriculture or development is near, roads often provide corridors between the developed land and more interior forest habitats. A study by Robinson et al. (1995) analyzed fragmentation at a regional scale, comparing predation and parasitism rates in areas with varying percentages of forest cover. Both nest predation and cowbird parasitism declined with increasing levels of forest cover, even though local effects could still be detected. From a regional perspective, they felt that the extensive forests of northern Wisconsin, the Missouri Ozarks, and south-central Indiana could provide a surplus of birds to maintain populations in more fragmented forest areas. Brood parasitism can almost eliminate reproduction in heavily fragmented agricultural lands. However, in extensively forested tracts of northern Wisconsin and the Missouri Ozarks, insignificant levels of parasitism were reported. The north end of the MPA is not heavily impacted by agriculture or human settlement, and while the southern section is slightly more developed, most of the NNF can still be described as remote. Therefore wildlife species composition and predation in the project area, including predators and parasites (such as raccoons, blue jays, crows, ravens, cowbirds) should be at levels that would be found in a natural forested systems. In a study on the NNF, nests of eight common forest-nesting species were monitored and cowbird parasitism was documented on only 4 of the 488 nests (Flashpohler et al., 2001). In an unpublished summary at the end of the 1997 season, he reported only 1% of nests parasitized in each of the previous three years, although it did appear to occur more often within 100 meters of a clearcut edge. These low rates are probably due primarily to low numbers of cowbirds in forests of northern Wisconsin. The cowbird was recorded only 5 times in 105 individual site surveys within the MPA (15 survey sites each surveyed once every other year) in the period from 1987 to 2002. Where cowbirds do occur in forested tracts, it is more likely to be in sites near agricultural in holdings that can provide a food source. No management activities would be expected to artificially raise the predator population to create more predation in the project area as a whole.

Area sensitivity is another concept connected to forest fragmentation. In general, it states that forest interior or area sensitive bird species are less likely to breed in smaller forest segments, and are less likely to be successful if they do. Askins (1993) reports that many species of forest migrants have lower reproductive rates in small isolated forest fragments. In a comparison of small and large forest tracts, overall abundance and species richness is similar, but composition is very different, with the smaller forest tracts dominated by generalist species (Askins, 1993). In some cases, these species can't use small forest tracts because they have large home ranges or foraging areas. In other cases, as with songbirds with home ranges of only several acres, the reasons for area sensitivity are not completely understood. It should be noted, however, that this

concept applies primarily to more heavily fragmented habitats, as opposed to a large area of continuous forest as in northern Wisconsin. For example, area sensitivity was found to be more pronounced in a highly fragmented landscape in Illinois than in a heavily forested landscape in Ontario (Robinson, 1996). There are, however, some bird species that are attracted to edges for feeding and nesting. The golden-winged warblers have incorporated forested edge along at least 25% of its territory. Golden-winged warblers seldom occupy large areas of suitable forest interior habitat >100 acres due to the lack of forested edge (Hunter et al., 2001). Hunter also identifies the black-billed cuckoo, least flycatcher, and chestnut-sided warbler as shrub-type bird species that are associated with edge habitat.

These potential effects from habitat fragmentation can be considered both short term and long term. They could be realized within the first nesting season after harvest and could persist beyond a ten-year period. Edge effects would be gradually reduced as a treated stand matured, and the edge with an adjacent stand became less distinct. One study indicated that edge effects on forest songbird assemblages may persist up to 35-40 years after an aspen stand is clearcut, or at least until the aspen is 14m tall (Mason, 1992). Estimates of how far edge effects penetrate into adjacent forest areas differ, with figures from local studies ranging up to 250 meters (McRae, 1995) and 300 meters (Flashpohler et al., 2001). Manolis et al. (2000) reviewed a number of studies of edge effects and found variable results; it was felt that inconsistencies in results could be caused by differences in habitat studied, predator populations and communities, as well as differences in study design or statistical issues.

Roads and skidtrails can increase access to interior stands by some mammalian predators, and can act as foraging corridors for avian predators. In some studies within heavily forested areas edge effects associated with clearcuts were not observed, in contrast to the effects documented in agricultural landscapes (Green, 1995). Roads tend to be more permanent than skidtrails, as skidtrails revegetate within 5-10 years. Predation levels should be normal except along roads and recent harvest units in the MPA due to its remoteness. Along roads and clearcuts, predation may be higher at certain times of the year as found by Manolis et al. (2000). If predation levels were higher in these areas then it should be lower in other areas. Prey species would have lower survival rates in these areas as compared to areas with lower predation rates. No management activity would artificially raise the predator population to create more predation, in the project area as a whole.

White-tailed deer

The Northern Forest contains about 15,000 square miles of deer range that has an estimated population of 391,000 deer (WDNR 2000b, Rolley 2002). Deer populations in this area reached their all-time peak abundance in the early 1940's following extensive logging and fires that created ideal habitat. Populations remained high during 1940-50's and peaked again in the mid 1960's. The population then decreased during the early 1970's from several severe winters and has continued to show dramatic increase since than with a few short-term declines caused by severe winters (WDNR 2000b). Research has shown that high herd densities can cause excessive browsing that produce long-term impacts by reducing growth of certain plant species thus changing the natural species composition of a forest (WDNR 2000b). This over browsing can change the structure and composition of the forest understory, reduce habitat diversity, displace native species and eliminate other wildlife, such as bird species that rely on a diverse understory of herbaceous plants and woody shrubs. The young aspen and mixed aspen/spruce/fir stands, oak types and all stands containing oak provide high quality forage. The hardwood and mixed hardwood stands provide moderate habitat, with pockets of conifer habitat providing thermal cover and some forage in the form of hardwood saplings. The mature coniferous forests provide a majority of the thermal cover. These deer populations could be affected by an increase in woody browse and herbaceous forage following clearcutting, since quantity and quality of food is one factor governing their population. The effects could be both immediate, since freshly harvested stands produce high quantities of both herbaceous growth and woody stems, and long term, since an aspen stand even at maturity allows more understory development than the same stand would if converted to a hardwood type. However, there are other factors that have had a greater influenc on the current high deer populations and they are beyond the control of the proposed project.

Deer densities that have increased significantly over the last 30 years have been influenced mainly by mild winters, recreational feeding and baiting during hunting seasons (McCaffery, 2001b). Since 1987, post hunt deer populations in the northern forest region have been above WDNR population goal every year except 1992. As of January 2000, 42 of the 44 (95%) Deer Management Units (DMU) in the Northern Forest Region were 20% or greater over their management goals and the region was 66% over population goal. The MPA

area is within DMU #45 and has an estimated population of 14,500 deer (25 deer/mi^2), which is 25% over its management goal (Rolley 2001). Alverson et al (1988) and Balgooyen and Waller (1995) recommend deer densities of less than 10-13 deer/mi^2 to avoid detrimental impacts to individual species and systems. Winter severity index measurements for the Northern Forests of Wisconsin have been mild to moderate during 12 of the past 15 years (80%) (McCaffery, 2001). Mild winters allow deer to emerge from winter in good condition with minimal herd loss to winter mortality (WDNR 2000b).

The increased practice of baiting and feeding has provided deer with high-energy foods that can affect their ecology. Baiting is believed to impact daily and geographic behavior, increase survival and reproductive rates, impair harvest opportunities, and affect natural processes including timely yarding and winter mortality of deer (McCaffery 2000a, WDNR 2000b). The cumulative amount of energy that was placed in the environment by baiting and feeding deer has not been quantified in Wisconsin. There is serious doubt whether it could be measured, as a survey would depend on the veracity of respondents who are already suspicious of how the results might affect them personally. However, some very conservative assumptions estimate that 34% of the 240,000 bowhunters in the state used bait while hunting (McCaffery, 2000a). If these hunters placed only 100 pounds each during the fall, the cumulative quantity would exceed 4,000 tons. In addition, if a person feeding deer placed only 2 gallons of feed once per day for the "snow on ground" period (150 days), that amount would total 1 ton. Multiply that by any reasonable estimate of people that are feeding and the quantity of bait being deposited outside for deer becomes enormous. For comparison, at the height of State sponsored winter deer feeding (1950-51) there was only 1,131 tons of food distributed.

3.7.8 Other Concerns

Other concerns that were not part of the FS species lists but were mentioned during the scoping process included the golden-winged warblers (that will be included with the MIS bird species), amphibian populations and travel corridors. Amphibian populations would have little impact on them from proposed activities. This is because no activities or disturbance would occur in wetland habitats that are their main breeding and foraging areas (streams banks, lake shores, woodland ponds and wet lowland areas). All wetland areas would have protective buffers placed around them in accordance to guidelines in Wisconsin's Forestry Best Management Practices for Water Quality (BMP) (WDNR, 1995). Also, important down coarse woody material habitat would be maintained and improved through mitigation measures (see Section 2.3).

Habitat corridors are areas of a certain habitat type that connect other areas of the same or similar habitats across dissimilar areas. They may provide the primary movement route for wildlife and plant species across a fragmented landscape. Riparian areas often meet this need since they traverse the landscape and are used by most wildlife species at some time. The effectiveness of corridors in allowing daily, dispersal, and migratory movements varies depending on species involved and corridor size and location. Corridors are often relatively narrow swaths of habitat adjacent to unsuitable habitat, so unless they are fairly large, they contain a substantial amount of edge habitat. Species that use corridors at some time in their life are extensive and varied. Predators use them daily to traverse their large home ranges and adult amphibians, some birds, and others use them to travel to and from breeding grounds. This will be addressed with information obtained through the edge and fragmentation analysis in section 4.6 Landscape Patterns.

3.8 Fisheries Resources

3.8.1 Cold and Cool Water Fish and Habitats

The streams and rivers in the McCaslin EIS project area are characterized primarily by cold and cool water. During certain times of the year portions of these streams and rivers have the characteristics necessary to support species such as brook trout, brown trout and in limited areas rainbow trout. These streams and rivers vary considerably, especially in seasonal water temperatures. Some streams are capable of supporting all three species of trout, while others are more limiting.

Other species of fish that occur in these streams and rivers include black-nose dace, pearl dace, northern red belly dace, northern creek chub, white sucker, brassy minnow, mottled sculpin, Brook stickleback, common shiner, black-nose shiner, central mud-minnow, and Johnny darter.

3.8.2 Stream Classification

Wisconsin trout streams are placed into the following classes for fish management purposes:

Table 3.8-1: Miles of Stream in the McCaslin Area by DNR Classification

WDNR Classification	Description	Miles found in McCaslin Area
Class 1	High quality trout waters with sufficient natural reproduction to sustain wild trout populations at or near carrying capacity.	25.5
Class 2	Some natural reproduction, but not to carrying capacity. Stocking often used to bring population to carrying capacity.	8.5
Class 3	Marginal trout habitat with no natural reproduction. Stocking required annually to provide trout fishing.	0
Unknown	(undetermined as to whether stream is class 1, 2, or 3)	4.75

The following table (3.8-2) gives a summary of streams and rivers within the McCaslin project area:

Table 3.8-2. Streams and Rivers within McCaslin EIS Project Area

Name of Stream or River	WDNR Classification	Approximate miles within project area
Battle Creek	Class II trout water	3
Bluegill Creek/Spring Lake Trib	Status unknown	1.25
Fenske Creek (within Section 9)	Class I trout water	1
Fenske Creek (Sec 8 to headwaters)	Class II trout water	1.5
Unnamed Creek (Lake John Creek?)	Status unknown	1.25
Knowles Creek	Class I trout water	6.5
McCaslin Brook (Hwy F to Townsend)	Class I trout water	3
Mosquito Creek	Class I trout water	1.25
North Branch Oconto River	Class I trout water	9.25
Pemma Creek	Class II trout water	2
Shawano Creek	Class II trout water	1.5
Spring Creek	Class II trout water	0.5
Unnamed Trib. to Knowles Crk (Creek 34-7)	Status unknown	1.75
Unnamed Trib to Otter Crk (NW 1/4 Sec 24)	Status unknown	0.5
East Thunder Creek	Class I trout water	2.5
North Fork Thunder River	Class I trout water	0.75
West Thunder Creek	Class I trout water	1.25
		Total 38.75

The North Branch Oconto River is the major drainage within the McCaslin Project Area. It is located in the Oconto River Watershed, which is part of the Lake Michigan Basin. The streams within the project area feeding into the North Branch include Battle Creek, Bluegill Creek, Fenske Creek, Knowles Creek, Shawano Creek, and one unnamed tributary of the Oconto.

The End-of-the-Decade (1986-1996) Monitoring Report for the Chequamegon/Nicolet National Forest identified that there was an absence or low levels of large woody debris in streams. Large woody debris is important in supporting desirable populations of game and non-game fish. The fish communities in most streams depend on sustained recruitment of these structures to provide hiding cover, security areas to construct spawning beds, and foraging areas. This ultimately leads to healthier and more productive fish populations. Large woody debris is limited due to historic logging practices. White pine, northern white cedar, and eastern hemlock were largely removed from many streambanks during the turn-of-the-century pine logging era. Today, streamside trees are still not fully mature. Although some trees do fall into the streams, the amount of large woody debris (LWD) is not near what it was prior to presettlement conditions.

3.8.3 Beaver Management

Currently the Lakewood/Laona Ranger District has a contract with USDA-Animal Plant Health Inspection Service (APHIS) - Wildlife Services to control beaver on 19 streams and rivers (approximately 77 miles). McCaslin Brook is the only one of these streams included within the McCaslin project area. The contract does not cover the section of McCaslin Brook that is within the project area, but rather a section flowing through private property.

3.8.4 Warm Water Fish and Habitats

There are 23 lakes, about one-third of Townsend Flowage, and two waterfowl impoundments within the project area. The Townsend Flowage is entirely surrounded by private land. Bluegill Creek and Knowles Creek Impoundments are entirely surrounded by National Forest Land and were built primarily to create and enhance habitat for waterfowl, furbearers, and birds of prey. These impoundments are not managed as a fishery, were considered not to have any negative effects on fish populations and therefore will not be discussed further in this analysis. The 23 lakes are categorized as follows:

Table 3.8-3: Lakes within the McCaslin EIS Project Area

	Name of Lake	Acres	County	More than 90 percent private shoreline	More than 50 percent National Forest shoreline	Low level of existing shoreline develop-ment	High level of existing shoreline develop-ment	Maximum Depth	Muskie	Northern Pike	Panfish	LM bass	SM bas	Walleye
1	Bear	78	Oconto	X			X	16	X	X	X	X		
2	Binder	22	Oconto	X		X		17			X			
3	Birch	4	Oconto	X		X		10						
4	Crab	9	Oconto	X		X		10			X			
5	Glocke	28	Oconto		X	X		8						
6	Hidden	36	Oconto	X		X		45			X	X		
7	John	103	Oconto	X			X	26		X	X	X		
8	Lincoln	13	Oconto		X	X		16			X	X		
9	Little Bear	12	Oconto	X		X		14			X	X		
10	Little Pickerel	24	Oconto	X		X		23		X	X	X		
11	Long	17	Oconto		X	X								
12	Miriam	7	Oconto		X	X								
13	Munger	96	Oconto	X			X	19	X	X	X	X		
14	Pickerel	127	Oconto	X			X	15		X	X	X		
15	Pine Ridge	46	Oconto	X			X	27			X	X		
16	Plantation	21	Oconto		X	X		17		X	X			
17	Seal	6	Forest		X	X		3						
18	Sellin	16	Oconto	X		X		17			X			
19	Smoke	51	Oconto	X		X		7			X	X		
20	Spring	13	Oconto		X	X		14		X	X	X		
21	Surprise	70	Oconto	X			X	30		X	X	X		X
22	Turtle	13	Forest		X	X		13			X	X		
23	Wheeler	293	Oconto	X			X	35		X	X	X	X	X
	Total	1095												

Source: Wisconsin Department of Natural Resources, Wisconsin Lakes 2001.

Within the project area, several road/stream crossings are degrading streams to varying degrees by blocking fish passage and introducing sediment. These situations are present on both private and public roads and lands. Currently the Forest Service is actively fixing several of these poorly designed crossings on National Forest System Lands.

Specific road/stream crossing problem areas on public land are identified in Table 3.8-4 below.

Table 3.8-4 Locations of road/stream problems in the McCaslin Analysis Area

Road name/ number	Location of problem	Description of problem	How it will be addressed
County Road C	Tributary to Otter Creek	Culvert replacement, fish passage	Potential for future 10% project
County Road C	Pemma Creek	Culvert replacement, Culvert set too high and deteriorating	Replacement through routine County maintenance
Spring Lake Road	Bluegill Creek Crossing	Culvert washouts, road surface erosion, culvert location poor	Potential for future 10% project
County Road F	W Thunder Creek crossing	Culvert replacement, fish passage	Potential for future 10% project
Knowles Creek Rd	Shawano Creek crossing	Culvert replacement, fish passage	Scheduled for repair in year 2002 (10% projects)
Knowles Creek Rd	Battle Creek crossing	Embankment erosion, culvert too small	Potential for future 10% project
Knowles Creek Rd	Knowles Creek crossing	Culvert set too high	Potential for future 10% project
FR 833249	Turtle Lake (west side)	Road surface erosion	Scheduled for repair McCaslin Project
Lincoln Lane	Lincoln Lake	Road surface erosion, gullying	Scheduled for repair McCaslin Project
FR 938151	N Branch Oconto River	Bank erosion due to road location	Scheduled for repair McCaslin Project
FR 2670	End of road in NE 1/4 sec. 25 T34N R16E	Intermittent drains blocked	Scheduled for repair McCaslin Project
FR 832233	East ½ section 36 T34N R16E	Washouts, rutting, erosion of road in valley bottom	Potential for future 10% project

Recommendations to correct these sites include: replacing multiple culvert crossings with one large single culvert, setting the new culvert at a proper depth to facilitate fish passage through it, diverting ditch runoff into vegetated areas so sediment can settle out before the water enters adjacent water bodies, and either paving the crossing or modifying the crossing profile so water doesn't run down the road directly into adjacent streams and lakes.

Lincoln Lake has two dispersed campsites along the south shore. Currently there is excessive erosion occurring associated with these campsites, the access road and the foot trail to the lake from the camp sites/parking area. This erosion will be corrected with waterbars, diversion and outlet ditches, settling basins, grading and sloping of the access road and foot trail.

3.8.6 Aquatic Exotic Species

There is limited available information on known aquatic exotic species in the lakes, streams and rivers within the McCaslin project area. The zebra mussel has not been documented in any water bodies within the project area. However they were documented in Lake Metonga, Forest County in 2001, which is approximately 18 miles to the northwest of the project area.

The rusty crayfish is an aggressive non-native competitor that can reduce stream vegetation and native crayfish populations. They are known to be in a number of lakes in Forest and Oconto Counties, but none are known within the McCaslin analysis area.

Currently, within the project area, Eurasian water milfoil is located in John Lake and Munger Lake. Since it is present in these lakes it has a high potential to be introduced into other lakes within the project area. The

Wisconsin DNR is monitoring the spread and distribution of exotic species throughout Wisconsin. They are also educating the public on ways they can help stop or slow the spread of exotic species. The US-Forest Service will be conducting lake vegetation surveys in Forest and Oconto Counties during the summers of 2002-2003. These surveys will give us updated local information on the distribution of native and exotic vegetative species (WDNR, 2001 web site).

3.8.7 Monitoring of Fish and their Habitats

During the past 10 years, the Wisconsin Department of Natural Resources has completed several fish monitoring studies on the Nicolet side of the Chequamegon-Nicolet National Forest. The monitoring reports are specific to individual streams and lakes but, by looking at several different streams and lakes, local fish population trends can be interpreted for Management Indicator Species (MIS). The two MIS fish species associated with the Nicolet side are brook trout (streams) and largemouth bass (lakes). The recent history of streams on the Nicolet side needs to be understood to help understand stream fish population trends. These factors are as follows: Stream and river habitats were degraded in the 1980's and early 1990's from high populations of beaver. Beaver had degraded this habitat for many years by building dams, impounding water, cutting trees, and causing erosion and sedimentation. These activities caused blockages to trout migration, warming of water, killing of trees, and causing spawning gravel and pool (deep water) areas to be silted over. The current reduction of beaver populations on Class I trout streams has lead to increased brook trout populations because the streams have begun to heal themselves. In addition many stream habitat restoration projects have been completed in the last 15 years to restore degradation from past beaver and logging activities. Some of the techniques currently used to accomplish these objectives are the installation of brush bundles, sediment basins, channel restoration, boulder placement, and whole tree/log structures. The positive results of one stream restoration project on North Otter Creek (located half way between Crandon and Laona, Wisconsin) are very noticeable. The number of brook trout (Number/Acre of stream) increased by 145 percent in just two years of its completion and the biomass (Pounds/Acre of stream) increased by 155 percent (WDNR unpublished, 2001).

The lake habitats within the project area are in fair to good condition. Like the streams on the Nicolet side of the Chequamegon-Nicolet National Forest, lake habitat restoration projects for fish have also been completed on a number of lakes to restore structural diversity in the form of large woody debris (whole tree drops and log cribs). Historic logging and past beaver activities removed many of the large trees that naturally would have fallen into the shoreline area (littoral zone). Currently the majority of trees that occur along lakeshores are second or third growth which are smaller in size and less likely to fall into the lakes than large trees. Lakes have many unique attributes that affect their productive ability. Some are just naturally more productive than others. Based on recent Wisconsin Department of Natural Resources lake surveys for southern Forest County and northern Oconto County the large mouth bass populations are stable or increasing.

3.9 Transportation System

3.9.1 Summary

The project area encompasses portions of eight MAs: 1.1, 1.2, 3.1, 3.2, 4.1, 4.2, 8.1 and 9.1. Refer to the maps in Appendix C for a visual display of the existing transportation system. The Nicolet Forest Plan provides transportation management direction for each Management Area (MA). Part of that direction is the targeted road density for each MA (Forest Plan pages IV-93, IV-109, IV-117, IV-143-145, and IV-149, 151). The following table summarizes the target road densities and existing conditions in the McCaslin Area:

Table 3.9-1 Existing Open Road Density and Management Direction within the McCaslin Area

Management Area	Desired Conditions for Road Management	Existing Condition
1.1 (3468 acres)	Up to 4 miles/ square mile of improved open road.	4.34 miles/mi^2
3.1 (4509 acres)		3.18 miles/mi^2
4.1 (390 acres)		6.08 miles/mi^2
1.2 (1170 acres)		1.58 miles/mi^2
3.2 (9436 acres)		2.96 miles/mi^2

4.2 (2564 acres)		4.27 miles/mi^2
8.1 (631 acres)	Roads may be present or nearby but are often closed to protect the uniqueness of the area	3.33 miles/mi^2
9.1 (82acres)	Emphasizes minimal investment and management while protecting and maintaining environmental values and public health and safety.	5.84 miles/mi^2

3.9.2 Introduction

The bounds of the transportation system analysis is the project area boundary. This area was selected because of the immediate direct and indirect changes to the transportation network that would occur within the confines of the project area. The indicators for the analysis will include road densities within each management area within the project and the effect on the forest wide road system within each management area. The road densities are calculated by measuring the actual mileage that lies on Forest Service ownership. The roads that bound the project area or divide Forest Service ownership from private ownership are measured and their mileages are divided in half. Roads that run totally through private ownership are excluded from the mileage calculations. The total number of miles, within each management area that lies on Forest Service ownership is then divided by the number of square miles, of Forest Service ownership, in each management area, to provide the road density, miles/square mile. Road densities include only NFS lands and include all roads within those lands. The Nicolet Forest Plan recognizes all roads that the public is driving with at least a four wheel drive some portion of the year.

3.9.3 Road Density

3.9.3.1 Total Road Density

The total road density for the McCaslin Project is 5.30 miles per square mile. This includes all measurable roads within the project area, open and closed, classified and unclassified. Classified roads are those that are part of the official Forest Service inventory for long-term use. Roads are considered open if they are unobstructed by gates or similar closures and are readily accessible. There are 2.26 miles per square mile of classified roads and 3.04 miles per square mile of unclassified roads.

The McCaslin Project Area is accessed from State Highway 32, County Highway C, County Highway F. These roads are double lane paved asphalt surface and account for 6.07 miles of open road within the project area. They are classified as Traffic Service Level A. They are maintained and under the jurisdiction of the State and counties. County Highway C lies within Forest County and County Highway F in Oconto County.

The next level of roads within the project area are the collector roads. These roads are under federal ownership and jurisdiction or under joint jurisdiction between the Forest Service and the towns of Lakewood, Townsend and Wabeno. There are 19.20 miles of collector roads, 17.19 miles of Traffic Service Level B, and 2.01 miles of Traffic Service Level A roads, which provide year round access. With the exception of several double lane asphalt town roads, these are double lane roads with gravel surfacing. They are maintained on a regular basis to provide for public safety and a moderate level of comfort.

There are 27.19 miles of Traffic Service Level C local system roads. These are generally single lane with turnouts and constructed of improved pit run surface or native surface. They are only maintained periodically, either for high clearance vehicles or basic custodial care to minimize deterioration of the roadbed, reduce damage to the road surface, and provide for public safety. Of these, 21.30 miles are open to vehicle traffic and 5.89 miles are open only to foot traffic or administrative use

There are 25.57 miles of Traffic Service Level D local system roads. These are generally single lane constructed of native surface. These roads are only maintained periodically, normally when resource management activities occur. Of these, 14.60 miles are open to vehicle traffic and 10.97 miles are open only to foot traffic or administrative use

There are approximately 104.61 miles of unclassified local non-system roads. These are usually single lane with native surfacing. Of these, 55.36 miles are currently open to vehicle traffic, and 49.25 miles are currently closed to vehicle traffic. None of these are maintained since they are not part of the existing Forest Service road system unless environmental damage is occurring, and many roads are overgrown or otherwise

no longer usable. There is an unknown amount of non-system private roads (not included in the project record data tables), located on the approximately 20.03 square miles of private land within the McCaslin project area. The non-system private roads are used to access private camps or other resources and are not included in the road density figures presented below.

The current combined open road density of existing system roads and unclassified roads (non-system roads) is 3.38 miles /sq. mi. This figure includes all open system roads, and unclassified roads for a total of 116.53 miles of open roads on federal land within the project area. This figure is provided for comparison purposes only. It is intended with this project to reduce the overall road density on NFS lands and move toward an optimum road system to support land management activities as identified in the Forest Plan. The Forest Service must find an appropriate balance between benefits of access to National Forests and the costs of road-associated effects to ecosystem values. This is the purpose of the roads analysis.

The objective of roads analysis in the Forest Service is to provide line officers with critical information to develop road systems that are safe and responsive to public needs and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions. Roads analysis assesses the extent and current condition of the road system on a National Forest. Comparing the current condition to a desired condition identifies needs for change such as relocating, upgrading, or decommissioning existing roads. This process was implemented for the McCaslin Project. The results of this analysis are located in the project file and drove many of the recommended closures in the McCaslin alternatives. A detailed breakdown of the system road densities and mileages within the project area (by MA) is provided in Table 3.9-2 below.

3.9.3.2 Open Road Density

The open road density for the McCaslin Project is 3.38 miles per square mile. This includes all measurable open roads within the project area. There are 1.77 miles per square mile of open classified roads and 1.61 miles per square mile of open unclassified.

3.9.4 Existing Road Densities by Forest Plan Management Areas

For the following discussion, refer to Tables 3.9-2 - 3.9-4, below (density=miles /square mile):

Table 3.9-2 Existing Road Densities within the McCaslin Project Area

MA	A	B	C Open	C Closed	D Open	D Closed	Unclassified Open	Unclassified Closed	Total Open	Total Closed
1.1 mileage	1.11	3.05	4.44	0.09	3.72	0.22	11.31	6.25	23.63	6.56
density	0.20	0.56	0.82	0.02	0.68	0.04	2.08	1.15	4.34	1.21
1.2 mileage	0.78	1.22	0.00	1.05	0.00	0.00	0.88	5.74	2.88	6.79
density	0.43	0.67	0.00	0.57	0.00	0.00	0.48	3.14	1.58	3.72
3.1 mileage	1.19	2.36	6.61	0.28	1.83	7.25	8.97	6.02	20.96	13.55
density	0.18	0.36	1.00	0.04	0.28	1.10	1.36	0.91	3.18	2.06
3.2 mileage	0.00	8.40	5.76	3.49	4.45	3.50	25.04	26.85	43.65	33.84
density	0.00	0.57	0.39	0.24	0.30	0.24	1.70	1.82	2.96	2.30
4.1 mileage	0.52	0.34	0.00	0.00	0.86	0.00	1.14	0.29	2.86	0.29
density	1.10	0.72	0.00	0.00	1.83	0.00	2.42	0.62	6.08	0.62
4.2 mileage	3.59	1.50	2.37	0.41	3.74	0.00	7.61	3.72	18.81	4.13
density	0.82	0.34	0.54	0.09	0.85	0.00	1.73	0.85	4.27	0.94
8.1 mileage	0.00	0.32	1.99	0.57	0.00	0.00	0.38	0.38	2.69	0.95
density	0.00	0.40	2.46	0.71	0.00	0.00	0.47	0.47	3.33	1.18
9.1 mileage	0.89	0.00	0.13	0.00	0.00	0.00	0.03	0.00	1.05	0.00
density	4.95	0.00	0.72	0.00	0.00	0.00	0.17	0.00	5.84	0.00
total miles	8.08	17.19	21.30	5.89	14.60	10.97	55.36	49.25	116.53	66.11
	0.23	0.50	0.62	0.17	0.42	0.32	1.61	1.43	3.38	1.92

Table 3.9-3 Existing Road Densities within the Lakewood/Laona Ranger District

MA	A	B Open	B Closed	C Open	C Closed	D Open	D Closed	Unclassified Open	Unclassified Closed	Total Open	Total Closed	Total
1.1 mileage	16.19	65.96	0.00	49.81	4.09	30.61	5.44	241.86	83.05	404.43	92.58	497.01
density	0.15	0.62	0.00	0.47	0.04	0.29	0.05	2.26	0.78	3.78	0.87	4.65
1.2 mileage	1.21	5.97	0.00	3.71	5.03	2.21	2.56	24.83	19.24	37.93	26.83	64.76
density	0.07	0.35	0.00	0.22	0.29	0.13	0.15	1.45	1.12	2.21	1.56	3.77
2.1 mileage	24.25	63.06	0.00	63.61	4.83	23.32	1.28	331.40	86.35	505.64	92.46	598.10
density	0.20	0.53	0.00	0.53	0.04	0.20	0.01	2.78	0.73	4.25	0.78	5.02
2.2 mileage	1.16	11.49	0.00	20.76	7.40	4.21	3.78	34.21	73.78	71.83	84.96	156.79
density	0.04	0.07	0.00	0.73	0.26	0.15	0.13	1.20	2.59	2.52	2.98	5.51
3.1 mileage	36.10	63.12	0.13	62.80	7.44	24.67	6.88	339.28	95.23	525.97	109.68	635.65
density	0.28	0.50	0.00	0.49	0.06	0.19	0.05	2.67	0.75	4.14	0.86	5.00
3.2 mileage	1.39	12.78	0.00	8.56	3.36	7.03	1.45	41.57	8.46	71.33	13.27	84.60
density	0.07	0.15	0.00	0.42	0.17	0.35	0.07	2.05	0.42	3.52	0.65	4.17
4.1 mileage	33.07	40.29	3.04	43.18	8.09	39.14	0.81	212.96	47.14	368.64	59.08	427.72
density	0.38	0.46	0.03	0.49	0.09	0.44	0.01	2.42	0.53	4.18	0.67	4.85
4.2 mileage	3.18	1.67	0.00	1.77	0.00	2.54	0.01	10.69	1.98	19.85	1.99	21.84
density	0.61	0.08	0.00	0.34	0.00	0.49	0.00	2.06	0.38	3.83	0.38	4.21
4.3 mileage	0.76	2.83	0.00	1.08	0.00	0.60	0.00	5.48	1.84	10.75	1.84	12.59
density	0.20	0.73	0.00	0.28	0.00	0.15	0.00	1.41	0.48	2.78	0.48	3.25
5.0 mileage	0.00	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.84	0.03	0.87
density	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00	2.02	56.59	2.02	58.61
6.2 mileage	2.18	7.88	0.00	0.71	9.06	3.64	1.97	13.50	16.18	27.91	27.21	55.12
density	0.14	0.52	0.00	0.05	0.60	0.24	0.13	0.89	1.06	1.84	1.79	3.62
8.2 mileage	0.02	8.59	0.00	0.00	0.00	0.00	0.00	2.42	0.72	11.03	0.72	11.75
density	0.01	3.93	0.00	0.00	0.00	0.00	0.00	1.11	0.33	5.05	0.33	5.38
9.2 mileage	0.00	0.48	0.00	0.00	0.00	0.00	0.00	2.23	1.90	2.71	1.90	4.61
density	0.00	0.25	0.00	0.00	0.00	0.00	0.00	1.15	0.98	1.40	0.98	2.38
Lk/Ln	119.51	284.96	3.17	255.99	49.30	137.97	24.18	1260.43	435.90	2058.86	512.55	2571.41

Mileage=miles of road
Density=miles per square mile

Table 3.9-4 Existing Road Densities within the Nicolet National Forest

MA	A	B Open	B Closed	C Open	C Closed	D Open	D Closed	Unclassified Open	Unclassified Closed	Total Open	Total Closed	Total
1.1 mileage	37.68	106.53	0.00	87.14	10.56	61.23	14.95	371.83	146.54	664.41	172.05	836.46
density	0.22	0.63	0.00	0.51	0.06	0.36	0.09	2.19	0.86	3.91	1.01	4.92
1.2 mileage	5.01	15.10	0.00	11.36	6.54	2.50	2.87	46.00	47.50	79.97	56.91	136.88
density	0.18	0.54	0.00	0.41	0.23	0.09	0.10	1.65	1.70	2.86	2.04	4.90
2.1 mileage	89.14	142.77	1.51	162.22	21.57	91.74	16.69	730.27	285.68	1216.14	325.45	1541.59
density	0.31	0.50	0.01	0.57	0.08	0.32	0.06	2.57	1.01	4.28	1.15	5.43
2.2 mileage	15.73	30.20	0.00	39.52	11.58	15.03	6.22	164.00	129.80	264.48	147.60	412.08
density	0.21	0.07	0.00	0.53	0.15	0.20	0.08	2.19	1.73	3.53	1.97	5.50
3.1 mileage	55.00	78.93	0.64	74.29	7.46	34.34	7.13	389.10	128.60	631.66	143.83	775.49
density	0.37	0.54	0.00	0.50	0.05	0.23	0.05	2.64	0.87	4.28	0.98	5.26
3.2 mileage	4.14	37.14	0.00	24.11	7.52	22.27	4.61	138.60	62.10	226.26	74.23	300.49
density	0.07	0.12	0.00	0.38	0.12	0.36	0.07	2.21	0.99	3.61	1.19	4.80
4.1 mileage	55.67	79.76	3.04	74.31	10.34	62.53	9.84	349.20	88.90	621.47	112.12	733.59
density	0.38	0.55	0.02	0.51	0.07	0.43	0.07	2.40	0.61	4.27	0.77	5.04
4.2 mileage	5.48	8.96	0.25	5.10	0.94	4.38	1.61	40.30	19.10	64.22	21.90	86.12
density	0.30	0.10	0.01	0.28	0.05	0.24	0.09	2.23	1.06	3.55	1.21	4.76
4.3 mileage	0.76	2.83	0.00	1.08	0.00	0.60	0.00	5.48	1.84	10.75	1.84	12.59
density	0.20	0.73	0.00	0.28	0.00	0.15	0.00	1.41	0.48	2.78	0.48	3.25
5.0 mileage	7.43	22.39	0.00	1.17	0.02	0.31	0.01	0.40	79.59	31.70	79.62	111.32
density	0.14	0.20	0.00	0.02	0.00	0.01	0.00	0.01	1.50	0.60	1.50	2.10
6.2 mileage	7.39	10.89	0.00	6.43	10.45	3.82	2.61	23.90	44.50	52.43	57.56	109.99
density	0.29	0.42	0.00	0.25	0.40	0.15	0.10	0.92	1.72	2.03	2.23	4.25
8.2 mileage	3.29	16.73	0.00	8.59	0.57	0.42	0.15	20.06	1.18	49.09	1.90	50.99
density	0.27	1.37	0.00	0.70	0.05	0.03	0.01	1.64	0.10	4.01	0.16	4.16
9.2 mileage	0.00	0.57	0.00	0.00	0.00	0.00	0.20	2.23	1.90	2.80	2.10	4.90
density	0.00	0.29	0.00	0.00	0.00	0.00	0.10	1.15	0.98	1.45	1.08	2.53
Entire Nicolet	286.72	552.80	5.44	495.32	87.55	299.17	66.89	2281.37	1037.23	3915.38	1197.11	5112.49
	0.28	0.54	0.01	0.48	0.09	0.29	0.07	2.22	1.01	3.81	1.17	4.98

Mileage = miles of road
Density = miles per square mile

3.9.4.1 Management Areas 1.1/1.2

The total road density in Management Area 1.1 is 5.55 miles per square mile. Of this, 4.34 miles per square mile are open. This compares to an open road density of 3.79 miles/sq. mile on the Lakewood/Laona District and 3.91 miles/sq. mile on the Nicolet. The open road density for the classified road system in this management area is 2.26 miles per square mile.

The total road density in Management Area 1.2 is 5.29 miles per square mile. Of this, 1.58 miles per square mile are open. This compares to an open road density of 2.22 miles/sq. mile on the Lakewood/Laona District and 2.87 miles/sq. mile on the Nicolet. The open road density for the classified road system in this management area is 1.09 miles per square.

3.9.4.2 Management Areas 3.1/3.2

The total road density in Management Area 3.1 is 5.24 miles per square mile. Of this, 3.18 miles per square mile are open. This compares to an open road density of 4.13 miles/sq. mile on the Lakewood/Laona District

and 4.28 miles/sq. mile on the Nicolet. The open road density for the classified road system in this management area is 1.82 miles per square.

The total road density in Management Area 3.2 is 5.26 miles per square mile Of this, 2.96 miles per square mile are open. This compares to an open road density of 3.04 miles/sq. mile on the Lakewood/Laona District and 3.14 miles/sq. mile on the Nicolet. The open road density for the classified road system in this management area is 1.26 miles per square mile.

3.9.4.3 Management Areas 4.1/4.2

The total road density in Management Area 4.1 is 6.70 miles per square mile. Of this, 6.09 miles per square mile are open. This compares to an open road density of 4.19 miles/sq. mile on the Lakewood/Laona District and 4.27 miles/sq. mile on the Nicolet. The open road density for the classified road system in this management area is 3.66 miles per square mile.

The total road density in Management Area 4.2 is 5.21 miles per square mile. Of this, 4.28 miles per square mile are open. This compares to an open road density of 3.58 miles/sq. mile on the Lakewood/Laona District and 3.15 miles/sq. mile on the Nicolet. The open road density for the classified road system in this Management Area is 2.55 miles per square mile.

3.9.4.4 Management Areas 8.1/9.1

The total road density in Management Area 8.1 is 4.51 miles per square mile. Of this, 3.33 miles per square mile are open. This compares to an open road density of 5.05 miles/sq. mile on the Lakewood/Laona District and 4.01 miles/sq. mile on the Nicolet. The open road density for the classified road system in this management area is 2.86 miles per square mile.

The total road density in Management Area 9.1 is 5.84 miles per square mile. Of this, 5.84 miles per square mile are open. This compares to an open road density of 1.4 miles/sq. mile on the Lakewood/Laona District and 1.44 miles/sq. mile on the Nicolet. The open road density for the classified road system in this management area is 5.67 miles per square mile.

3.10 Recreation Resources

The Recreation Opportunity Spectrum (ROS) Classification System is a land management tool used to classify lands based on the different recreation settings they provide. It considers several indicators when classifying an area of land including remoteness, access, naturalness, facilities and site management, social encounters, visitor impacts, and visitor management. The setting, activities, and opportunities for experiences have been arranged along a continuum, or spectrum, divided into six classes: primitive, semi-primitive (motorized and non-motorized), roaded natural, rural, and urban (USDA Forest Service ROS Users Guide).

The McCaslin analysis area is inventoried as providing a rural (in the south half) and roaded natural (north half) recreation experience. A small area directly associated with the town of Lakewood is inventoried as urban; all property within this ROS class is privately owned. The primary recreational pursuits occurring in this analysis area are developed camping, dispersed camping, fishing, hunting, swimming, boating, waterskiing, berry picking, and snowmobiling. While there are many other recreational pursuits in this analysis area, these are the most popular.

There are two developed campgrounds within this analysis area. They are Heaven's Up North Campground in the central part of the area and Smith's McCaslin Mountain Campground in the eastern part of the analysis area. Both campgrounds are privately owned and offer several amenities including electrical, water, and sewer hookups. Both rent several campsites to seasonal visitors.

There are nine dispersed campsites within the analysis area that receive moderate amounts of use. These campsites are situated near lakes or streams and are used generally by campers, fishermen, or hunters. Two campsites are located at Hemlock Dam, one campsite is at Lincoln Lake, two campsites are on the south side of Knowles Dam, two campsites are on the north side of Knowles Dam, one campsite is at Long Lake, and one campsite is at Knowles Creek. There are several other occupancy spots that receive very low amounts of

use, generally by hunters or fishermen during their respective seasons. A few of the more popular campsites have facilities present that are intended to protect the environment, such as steel fire rings or wilderness style toilets. These campsites are somewhat accessible to disabled visitors.

There are approximately 34 miles of snowmobile trails that traverse the analysis area. They are maintained by the Red Arrow Snowmobile Club and the Paul Bunyan Riders Snowmobile Club. There are no facilities provided along these trails. These trails receive a high amount of use during a good winter snow season.

This analysis area includes 22 named lakes, several unnamed lakes, one flowage and part of another flowage, the North Branch of the Oconto River, McCaslin Brook, the North Fork of the Thunder Creek, and several creeks that flow into these major rivers. Lakes range in size from three acres up to 305 acres and in depth from six to 45 feet. Rivers and streams are Class I and Class II trout streams. Fish species include walleye, muskellunge, northern pike, large- and small-mouth bass, crappies, bluegills, perch, brook trout and brown trout.

The North Branch Oconto River traverses about eight miles through this analysis area. This is a Class I trout stream with naturally produced brook and brown trout and stocked rainbow trout. Rainbow trout have not been stocked for several years and there are probably very few remaining. There are six dispersed campsites associated directly with the North Branch. The North Fork Thunder Creek flows about one mile along the border of this analysis area. This also is a class I trout stream with naturally produced brook trout and stocked brown trout. The McCaslin Brook traverses about four miles in this analysis area. This also is a Class I trout stream with naturally produced brook trout and stocked brown trout.

There are two flowages and part of another flowage within this analysis area. The flowages are Bluegill Creek Impoundment, Knowles Creek Impoundment and Townsend Flowage. Bluegill Creek and Knowles Creek Impoundments were constructed by the Forest Service for waterfowl habitat improvement. All the land surrounding these impoundments is Forest Service owned. There are short nature trails, several interpretive signs, overlook platforms, and a parking area associated with each of these impoundments. All the land adjacent to the Townsend Flowage is privately owned. There are four boat access points for the Townsend Flowage.

Swimming, waterskiing and jet skiing occur on several of the larger lakes in the analysis area. The only developed swim area is the Forest Service facility on Wheeler Lake. This area has a vault toilet, drinking water, two picnic tables and sand beach. Use here varies daily, ranging from low to very high use. As previously indicated, most of the lakeshore property of most of the larger lakes is in private ownership.

All National Forest System land within the analysis area (with the exception of Wheeler Lake Day Use Area) is open to hunting and is subject to state regulations. Grouse, deer, rabbit and waterfowl are the more popular species hunted. The analysis area also contains several miles of grassy trails and openings that are periodically mowed and managed for grouse and deer.

3.11 Visual Quality

3.11.1 Summary

The majority of the Forest Service-owned land in the McCaslin analysis area is made up of forested areas that are at least 60 years old that form a fairly continuous view of trees and associated understory plants. Much of the analysis area can be seen from open roads that transect it. The view is primarily foreground except during the winter when the view into the forest is increased. There are some middle ground and background views along Highway 32 north of Townsend. The views are mainly of open fields that are used to raise hay or small grains.

Some clearcutting of mature aspen stands has occurred throughout the analysis area during the last 5 to 20 years; these harvest activities have created contrast where young regenerated stands are interspersed with taller and more mature stands of trees. While these clear-cuts occurred throughout the entire analysis area, most are concentrated in the western portion of the analysis area. Most of these clearcuts are not visible from the main roads. The area currently meets visual quality objectives

The analysis area contains several lakes. The lakes surrounded by National Forest system lands are undeveloped except for one dispersed site on Long Lake and another on Lincoln Lake. The lakes having a mixture of Forest Service ownership and private ownership range from having no development to being highly developed with seasonal and year-round homes and resorts.

The North Branch of the Oconto River, as well as several small tributary streams, is located in the center of the analysis area. The Oconto River is very picturesque with rapids in areas 15 to 20 feet wide and slower moving areas greater than 50 feet in width. Canoeing is possible so the surrounding landscape can be seen from the river. Vegetation along the river ranges from non-forested openings to forested areas composed mostly of aspen and white birch. Small portions of the North Fork Thunder River and McCaslin Brook are also in the analysis area. These rivers and streams provide pleasing variety to the landscape.

The Knowles Creek Impoundment, located in the northern half of the analysis area, was constructed several years ago to improve habitat for waterfowl and some fish species. This area includes a public access trail and viewing platforms. From these points, as well as one point on the McCaslin Tower Road (FR 2141), a panoramic view of the wetland and background can be seen.

3.11.2 Existing Management Direction

Under the existing Forest Plan, scenery resources are managed using the Visual Management System (VMS). Using this system, forestlands along travel routes, trails, use areas, and water bodies have been assigned Variety Classes, Sensitivity Levels, and ultimately, Visual Quality Objectives (VQO's).

The landscape in the McCaslin analysis area is in the common Variety Class. Variety Class is determined by analyzing landscape features such as landforms, rock forms, water features, and vegetation. Landscapes displaying a common Variety Class do, by definition, contain a level of variety in their landscape that is common throughout the landscape character type.

Using the Sensitivity Level and the Variety Class determinations for this area, the Visual Quality Objectives (VQO's) for this project area are:

Table 3.11-1 Visual Quality Objectives within the McCaslin Project Area

VQO	Travel Routes	Water
Retention	State Highway 32 Oconto County Hwy F	Bear Lake Munger Lake John Lake Wheeler Lake
Partial Retention	North Road (FR 2341) McCabe Road (FR Lake John Road (North of Hwy F to McCabe Road Junction) The east/west road between North and Lake John Roads Forest County Hwy C Knowles Creek Road (FR 2349)	North Fork Oconto River McCaslin Brook Little Bear Lake Sellin Lake Binder Lake Hidden Lake Lincoln Lake Glocke Lake Plantation Lake Spring Lake Pickerel Lake Little Pickerel Lake Smoke Lake Surprise Lake Mosquito Creek Turtle Lake
Modification	All Other Travel Routes	All Other Water Bodies

The following VQO descriptions are from the Nicolet National Forest Land and Resource Management Plan (Chapter 4, pages 41-2):

Retention
This VQO provides for management activities that are not visually evident. Activities may only repeat form, line, color, and texture, which are found frequently in the characteristic landscape. Reductions in contrast to form, line, color, or texture should be accomplished during management activities or immediately after. Evidence of management activities is low. Enhancement and rehabilitation projects are given highest priority for implementation in retention foreground.

Partial Retention
Management activities remain visually subordinate to the characteristic landscape. Reduction in contrast to line, form, color, or texture should be accomplished in the first year or as soon after project completion as possible. Partial retention areas are second in priority for implementation of enhancement an rehabilitation projects.

Modification
Management activities may dominate the original characteristic landscape. These activities, however, must borrow from naturally established form, line, color, and texture to appear natural or compatible to the natural surroundings. Few visual enhancement or rehabilitation projects will be planned in modification foreground areas.

3.11.3 Existing Condition

The Forest's current Land and Resource Management Plan has provided guidance for the management activities that have occurred in the analysis area for the past 16 years. Consequently, the landscape within the McCaslin Area has been managed in accordance with the VQO's offered in the plan and currently meets these visual quality objectives. Generally, the areas that are visible from Sensitivity Level 1 roads, water features, or use areas exhibit a relatively natural appearance consistent with the surrounding landscape character. Areas viewed from Sensitivity Level 2 roads, water features, or use areas provide evidence of even-aged management activities. Uniformly shaped areas of same-aged trees (usually aspen) attest to these forestry practices and tend to produce a less-than-natural appearance.

3.12 Heritage Resources

3.12.1 Introduction

This heritage summary is written to "fully integrate consideration of heritage resource values into the multiple resource management decision making process" (FSM 2361.21). The National Historic Preservation Act (NHPA) directs federal agencies to identify heritage resources and "take into account the effect of any undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places." (NHPA Section 106). A variety of other laws, regulations and policies also direct federal agency management of heritage resources, including the Antiquities Act of 1906, the Archaeological Resources Protection Act, the American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, Chapter 800 of Title 36 of the Code of Federal Regulations, and the National Environmental Policy Act (NEPA).

The Forest Service meets the requirements of Section 106 of the NHPA through a program designed to inventory lands that may be affected by any project meeting the definition of "federal undertaking" (NHPA Section 301 (7)). This inventory combines background research, records searches, use of historic aerial photographs, and field survey under the direction of a qualified archaeologist to identify heritage resources within the scope of effects of the proposed project. The results of that inventory are compiled in this heritage summary, which discusses eligibility to the National Register, potential effects of the proposed project alternatives, and management recommendations for protection, use, or mitigation.

Background research includes, at a minimum, use of Chequamegon-Nicolet National Forest heritage resource records and compiled historic overviews to identify any known or potential sites within the project area, and inspection of historic maps and aerial photos to identify potential sites and historic transportation routes.

Field methods use pedestrian transects along all historic and modern transportation systems (roads, trails, railroad grades), inspection of all areas identified as potential heritage resources during record searches, and screened shovel tests on level to moderately sloping well-drained landforms within 100 meters of significant water sources such as rivers and lakes. Additional field survey efforts or informant interviews may supplement these minimum standards if determined necessary in the professional judgement of the archaeologist directing the project. *Unless specifically determined ineligible for listing on the National Register of Historic Places, all sites are managed as though they are eligible.*

3.12.2 Heritage Resources in the Affected Environment

Heritage resources are the physical remains left by people who occupied or visited the area during historic and prehistoric times. These remains provide valuable insights into the lifestyles of past inhabitants and travelers through the region, which includes the Chequamegon-Nicolet National Forest. The remains may consist of sites, structures, or objects used by humans in the past. Heritage resources can also include those places that have traditional, cultural values to particular groups of people.

An eligible property is a cultural site that meets the criteria for nomination to the National Register of Historic Places. The National Register of Historic Places is a Department of the Interior registry of cultural resources of local, state, or national significance. It is a comprehensive list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture at the local, state, or national level.

3.12.2.1 Heritage Resources Identified Within the Project Area

Cultural resource reconnaissance (CRR) surveys have been conducted within the analysis area and all the stands proposed for treatment within the analysis area. All were conducted using the standard methods of intensive pre-field investigation, survey along modern and historic transportation routes, and shovel testing on level to moderately sloping , well drained landforms within 100 meters of a major water source such as the Oconto River and its tributaries. Cross-country transects were often used to cover areas lacking in transportation or water features. Qualified cultural resource professionals and archaeological technicians, either under Forest Service employment or contract services, have conducted all Chequamegon-Nicolet National Forest cultural resource field surveys and prepared documentation based upon fieldwork results. All project reports and forms relating to cultural resource fieldwork and the monitoring, evaluation, and mitigation of cultural resources are reviewed for adequacy by professionally qualified archaeologists employed by the Chequamegon-Nicolet National Forest.

All portions of the analysis area scheduled for a proposed action have been completely surveyed for heritage resources. No timber stand treatments are proposed in any unsurveyed areas. The treatment of any timber stand, wildlife habitat improvement, road improvement, or other projects proposed in previously unsurveyed areas would require additional cultural resource survey and consideration of heritage resource values prior to implementation.

Within the McCaslin analysis area, there are 31 known archaeological sites. They consist of:

- 23 historic sites related to the historic logging era, Civilian Conservation Corps, or the early homesteading of northern Wisconsin;
- 7 prehistoric sites; and
- 1 historic Potawatomi site

So far, 3 of these sites have been evaluated. Two of these were found ineligible and the third was found eligible for listing in the National Register of Historic Places. The remaining 28 sites have not yet been evaluated.

Until such time as qualified professionals, meeting the Secretary of Interior's standards, can evaluate these heritage sites according to established criterion outlined under Section 106 of the National Historic Preservation Act, all unevaluated sites within the proposed treatment areas are to be avoided and protected following the standards set forth under the guidelines of the Memorandum of Agreement between the U.S. Forest Service and the Wisconsin State Historic Preservation Office (SHPO).

All sites previously discovered and recommended for protection are to be avoided during project design and implementation. However, recognizing the potential for direct adverse impacts to be great and the difficulty in locating ephemeral cultural resource sites with even the most intensive surveys, the timber sale contract (special provision CT6.24) provides that the Forest Service may unilaterally modify or cancel the contract to protect cultural resources regardless of when they were identified. As a result, any new cultural resource sites found during project implementation will be brought to the attention of the Forest Archaeologist. Work in the area of the inadvertent discovery will halt until a Forest Archaeologist has completed all required recordation, SHPO consultation, and implemented necessary protective measures.

Most of the sites within the project area are not suited for interpretation due to their location and difficulty of access. However, up to four sites are potentially suitable for interpretation. These include historic logging sites and two prehistoric sites.

3.12.2.2 Heritage Resources Identified Within or Near Alternative Action Areas

Sixteen archaeological sites are located within or near treatment areas proposed in the alternatives. Fourteen of the sites are representative of either the early logging period of the 19th or early 20th century or homesteads dating from the 1890's to the 1930's. There were also two prehistoric sites.

Of these sixteen sites, two sites (both historic) have been evaluated for eligibility for listing on the National Register of Historic Places. One was found to be to be eligible while the other was not.

As discussed in the preceding section, all known sites and sites discovered during implementation would be protected and avoided.

3.13 Economic and Social Environment

3.13.1 Summary

Since two-thirds of the lands in "tri-county" area (Forest, Oconto, and Marinette Counties) are forested, the forest products and tourism industries play a vital role to the economic well-being of the local economy. National Forest timber harvests generate substantial economic benefits to the local economy. In recent years, approximately $34 million and 564 jobs have been generated by harvests on the Lakewood/Laona on an annual basis. No specific figures are available at the local level, but in the northeastern Wisconsin region, tourism accounts for about 7% of the total economic output. In comparison, within the same region, wood-based sectors account for about 21% of the total economic output.

Within the tri-county area, approximately 97.4% of the population is white and 2.6% of the population falls within minority groups. Approximately 46% of the families within the area are considered "low-income" families. These figures fall below USEPA thresholds for potential environmental justice issues.

3.13.2 Introduction

In this discussion, the economic environment is considered to be Forest, Oconto, and Marinette Counties because these are the communities that would receive the most impact as a result of the McCaslin Project. County boundaries were chosen because most available economic data is collected and reported at this level. To provide the reader with some context, some of the information is compared to information at the regional and state level. These contexts were also chosen due to the availability of data. Major sources of information used in this discussion were U.S. Census data, county workforce profiles from the Wisconsin Department of Workforce Development, USDA-Forest Service TSPIRS data, and regional studies conducted on the timber and tourism industries.

3.13.3 Economic Environment

The following table summarizes relevant information to give the reader some background information on the economic environment for the McCaslin Project.

Table 3-13-1: Population, Employment, and Income Statistics				
	Oconto Co.	Forest Co.	Marinette Co.	Wisconsin
Population [A]	33,397	9,540	42,947	5,201,226
State ranking [A] (72 counties)	39th	68th	31st	
Labor force[B]	15,500	4,400	20,800	2,878,000
Unemployment rate[B]	4.4%	5.2%	4.6%	3.3%
Per capita income [B]	$16,602	$16,919	$18,963	$24,048
State ranking (72 counties) [A]	64th	61st	40th	

(Sources: A- Government Information Sharing Project/ Regional Economic Information System, Oregon State University: *http://govinfo.kerr.orst.edu* ; B- County Workforce Profiles, Wisconsin Dept. of Workforce Development, 2001.

Approximately 66% of the "tri-county" area of Forest, Oconto, and Marinette Counties is forested. About 48% of Oconto and Forest Counties are in National Forest ownership (USDA-FS, 1997). Because of this, the forest products and tourism industries are vital to the local economy.

In their study of the economic impacts of the timber and tourism industry, Marcoullier and Mace (1999) provided the following economic profile for the ten-county northeast Wisconsin region. This provides useful background information, characterizing the economic nature of the region. The following table (3.13-2) provides an economic breakdown of the northeast Wisconsin region, by sector, in 1994 dollars.

As shown in **Table 3.13-2**, wood-based sectors account for about 21% of the total economic output in the Northeast Wisconsin Region.

Table 3.13-2: Industry Output in the Northeast Wisconsin Region

Economic Sector	1994 dollars (in millions)	% Total Industrial Output
Wood-based Sectors	1,590.72	21%
Tourism Sensitive Sectors	572.772	7%
Agriculture	308.489	4%
Non-wood Manufacturing	1603.014	21%
Construction	591.047	8%
Food/Textiles Manufacturing	350.559	5%
Wholesale Trade	355.123	5%
Non-tourism Retail	277.383	4%
Finance, Insurance, Real Estate	829.462	11%
Non-tourism Personal Services	154.795	2%
Professional Services	1093.315	14%
Total	**7726.679**	**100%**

Between the three counties, workforce statistics published by the Wisconsin Department of Workforce Development (1999) show that 8% of the workforce is directly employed in the Lumber, Wood Products, and Paper Industry Groups. This is a conservative figure since it does not include truck transportation of raw logs and finished material (which is also a significant occupation in the area).

Secondary labor groups, such as service, sales, and specialty fields are directly affected by the money that is generated locally from forest products. Averages obtained from the most recent available (1997) Chequamegon-Nicolet National Forest TSPIRS report (Timber Sale Program Information Reporting System) were used to estimate that the annual timber sale program on the Laona-Lakewood Ranger District generates about $34.3 million dollars of income to the local and area economies. In addition, an estimated 564 jobs are created/sustained from the timber harvested on the district. Annual timber removals from Federal forest land in NE Wisconsin in 1996 dollars was $13.255 million dollars (Marcoullier and Mace, p.13).

Tourism is also an important part of the local economy. The majority of tourists in the area are cabin owners, hunters, and snowmobilers. Information derived from a county-by-county report from the Wisconsin Department of Tourism (2000) and the U.S. Census Bureau indicate that about 10 percent of the Oconto County workforce is supported by tourism-related spending. As shown above in **Table 3.13-2**, Marcoullier and Mace (1999) estimated that in the ten-county northeast Wisconsin region the Tourism sensitive sectors accounted for approximately 7% of the total industry output in 1994.

Tourism is on the increase in Oconto County. Since 1993, tourism expenditures have more than doubled in Oconto County. Approximately 80% of the incoming tourism-related dollars in this region of the state came from pleasure travelers in the year 2000 (Davidson-Peterson Associates, 2001).

One of the comments received in the scoping for this project indicated that timber management was incompatible with recreational use and tourism in the area. A collaborative study was conducted with the Wisconsin DNR Bureau of Forestry and the University of Wisconsin-Madison/Extension (Marcoullier and Mace, 1999) to examine recreation and timber production in Wisconsin's forests by looking at extent, importance, performance and compatibility of these two uses. The study employed recreational use surveys, analysis of timber inventory data and regional economic modeling.

The following excerpts are from this study:
"In the past, local residents, interested stakeholder groups and industry representatives have disagreed on the best use of forest resources. Traditionally, many have viewed the simultaneous use of forests for extraction and recreation as being mutually exclusive. In this report, we put forward evidence that supports a more compatible coexistence." (p.i)

"In general, results of this study suggest that timber production and recreational use of forests were relatively compatible. This was more apt to be the case with hunters and motorized recreationists than with the broad category of "quiet" forest recreationists. Furthermore, recreationists generally felt that balanced use (for both timber and recreation) was an important component of local economic conditions for communities in forested regions and that forest land uses should account for these localized effects on rural populations." (Marcoullier and Mace, p. ii)

"Timber industry represents an important economic engine for the region and when combined with tourism, makes up a large part of this resource-dependent economy [of NE Wisconsin], (Marcoullier and Mace, p.10)." In Northeast Wisconsin almost 30% of the regional output is somehow tied to wood products and tourism sensitive businesses." (Marcoullier and Mace, p.20).

3.13.4 Social Environment

In 1994, President Clinton issued Executive Order 12898, "Federal Actions to Address Justice in Minority Populations and Low Income Populations." This executive order is designed to focus the attention of federal agencies on human health and environmental conditions in minority communities and low-income communities. For Wisconsin, the US Environmental Protection Agency established low income and minority thresholds at 28% and 9%, respectively (USEPA Region 5 website, 2002). According to these guidelines, environmental justice issues may occur when a project is proposed in an area where the population exhibits income and minority characteristics of twice the thresholds or greater.

Unemployment has historically been higher in the tri-county area and income levels have historically been lower relative to more urban areas of the state. Within the project area vicinity, approximately 46% of the families were considered to be in the low-income category. This compares to a statewide average of about 31%. According to USEPA guidelines, the potential for Environmental Justice concerns may be present if minority populations exceed twice the low income threshold value (twice 28% - or 56%). The existing population of low income families is below this level.

See **Table 3.13-1** in the preceding section for additional population, employment, and income statistics in the project vicinity.

In the 2000 census, the following information (**Table 3.13-3**) was collected regarding ethnicity in the project vicinity. It is compared to statewide population information for comparison:

Table 3.13-3: Distribution of Ethnicity for the Tri-County Area, based on the 2000 US Census*

Category	Oconto	Forest	Marinette	Tri-County Total	Tri-County Average	Wisconsin	State Average
White	34,836	8,607	42,550	85,993	97.4%	4,769,857	90.1%
Black	48	118	100	266	0.3%	304,460	5.7%
Native American	277	1,133	215	1,625	1.8%	47,228	0.9%
Asian	72	17	119	208	0.2%	88,763	1.7%
Pacific Islander	5	4	9	18	0.0%	1,630	0.0%
Other	84	23	91	198	0.2%	84,842	1.6%
Total	35,322	9,902	43,084	88,308	100.0%	5,296,780	100.0%

*American Fact Finder at http://factfinder.census.gov/servlet/BasicFactsServlet

In the 2000 census, approximately 97.4% of the population in Oconto, Forest, and Marinette Counties was identified as white. The remaining 2.6% of the population was distributed across other categories. According to USEPA guidelines, the potential for Environmental Justice concerns may be present if minority populations exceed twice the minority threshold value (twice 9% - or 18%). The existing minority population is well below this value.

3.14 Forest Plan Revision

In accordance with the National Forest Management Act (1976), the Chequamegon-Nicolet National Forest is currently in the process of revising its Land and Resource Management Plan ("Forest Plan"). The existing Forest Plans (Chequamegon N.F. and Nicolet N.F.) were adopted in 1986 and provide the primary direction for land management of the Forest. The National Forest Management Act directs that Forest Plans should ordinarily be revised every fifteen years.

Some of the comments received during the public scoping period suggested that the Nicolet Forest Plan is "expired" and all management activities must cease pending completion of the plan revision. The Congress addressed this concern in the passage of the 2002 Appropriations Bill:

"Prior to October 1, 2002, the Secretary of Agriculture shall not be considered to be in violation of subparagraph 6(f)(5)(A) of the Forest and Rangeland Renewable Resources Planning Act of 1974 (16 USC §1604(f)(5)(A)) solely because more than 15 years have passed without revision of the plan for a unit of the National Forest System. Nothing in this section exempts the Secretary from any other requirement of the Forest and Rangeland Renewable Resources Planning Act (16 USC §1604 et seq.) or any other law: *Provided*, that if the Secretary is not acting expeditiously and in good faith, within the funding available, to revise a plan for a unit of the National Forest System, this section shall be void with respect to such plan and a court of proper jurisdiction may order completion of the plan on an accelerated basis." (Conference Report for HR 2217: Dept. of the Interior and Related Agencies Appropriations Act, Oct. 11, 2001. Included in Section 327 of Public Law 107-63, signed November 6, 2001)

The Forest Service recognizes that, since the adoption of the existing Forest Plan, new information relevant to the management of the National Forest has become available. The Interdisciplinary Team (IDT) for the McCaslin Project has considered and utilized such appropriate information while being consistent with the direction of the current Forest Plan (as is legally required). It's important to note that the Plan Revision will not provide the legal land management direction until the Deciding Officer selects an alternative in the Record of Decision for the Chequamegon-Nicolet Land and Resource Management Plan FEIS.
The Interdisciplinary Team recognized that the McCaslin Project has the potential to reduce management options in the management areas of the Revised Forest Plan. Therefore, as part of the project development, efforts were made to maintain future management options. In addition, section 4.14 in the following chapter will identify potential losses of Forest Plan Revision management options that could result from implementation of the McCaslin Project alternatives.