

USDA Forest Service | 2009

# MONITORING AND EVALUATION REPORT

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## CHIPPEWA NATIONAL FOREST LAND AND RESOURCE MANAGEMENT PLAN



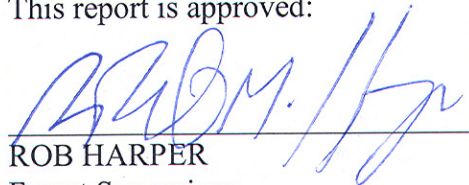
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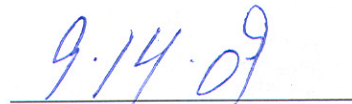
# FISCAL YEAR 2008 MONITORING AND EVALUATION REPORT

## APPROVAL AND DECLARATION OF INTENT

I have reviewed the FY 2008 Monitoring and Evaluation Report for the Chippewa National Forest that was prepared by forest employees during the winter of 2008 and 2009. I am satisfied with the findings and intend to consider recommendations made during project development and plan revision. The Monitoring and Evaluation Report meets the intent of both the Forest Plan (Chapter IV) as well as the 36 CFR 219.

This report is approved:

  
ROB HARPER  
Forest Supervisor

  
Date

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## EXECUTIVE SUMMARY

### FISCAL YEAR 2008 MONITORING & EVALUATION REPORT

#### Chippewa National Forest

This is the fourth Monitoring and Evaluation Report compiled under the 2004 Chippewa National Forest Plan. The plan was signed by Regional Forester, Randy Moore, on July 30, 2004. Our Monitoring and Evaluation plan is described in Chapter IV of the Forest Plan. As explained in detail in Chapter IV, monitoring items consist of mandatory components you will find in every forest plan as well monitoring items that are tailored to address issues raised through public scoping and interdisciplinary team review.

#### Monitoring and Evaluation Report

The information gained from the Monitoring and Evaluation Report is used to determine how well the desired conditions, goals, objectives, and outcomes of the forest plan have been met. However, at this point, four years after implementation of the revised Forest Plan, trends, patterns, and results generally are not clearly defined and are just beginning to emerge. Evaluations and conclusions that would lead to changes in the Forest Plan are not expected. Rather, this report focuses more on what we monitored, how it was monitored, what we found and recommendations.

#### Highlights from the Report

- Tribal Rights and Interests-- The forest continues to work with the Leech Lake Band of Ojibwe to strengthen our cultural awareness, consultation and communication, employment and outreach, partnerships, and resource management.
- Social & Economic Stability-- Timber target slightly decreased from 37,163 MBF in FY 2007 to 37,095 MBF in FY 2008. The actual volume offered and sold in FY 2008 was 35,203 MBF also a decrease of 2,354 MBF from the previous year.
- Given the current rate of thinning, clearcutting, and uneven-aged management, some shifts will need to be made in timber harvest planning and implementation treatments to meet the decadal Forest Plan objectives. At this time, clearcutting and uneven-aged management is lower than projected and thinning higher. Acres *planned* show some similar patterns. Clearcutting is below the Forest Plan projected percentage, thinning exceeds it, and uneven-aged management and shelterwood harvest are closer to the projected treatment percentages. Adjustments need to be made to meet the projections by the end of the decade. Thinnings, particularly in red pine stands, are based on recent inventories that show stands are growing faster than projected and require multiple entries to maintain their growth.
- Outputs--The Wildlife, Fisheries and Rare Plant program is implementing projects at a level consistent with that proposed in the Forest Plan for aquatic and terrestrial habitat enhancement and restoration. Many of these projects are accomplished through partnerships. Sensitive plant habitat restoration projects are underway. A partnership to

transplant several thousand Showy Lady's Slippers along a highway upgrade is underway. Canada yew was planted on a couple of districts. One of our most exciting projects, the American Elm Restoration project, is detailed in the Research and Studies section.

- Costs-- Many programs have experienced a steady decline in their annual budgets although overall the forest budget was up slightly from FY 2007. The Forest entered into 37 new agreements in addition to the 22 existing agreements for a total value of \$620,000. Projects include agreements for fire protection, youth work programs, internships, dumpsite cleanup, habitat improvement, workshops, and tree planting. The Forest also has six Stewardship Contracts approved or awarded.
- Off-Highway Vehicles--Off-Highway Vehicle Road Travel Access planning was completed in November 2007. The Motor Vehicle Use Map was available in 2008. Concerted efforts have been and will continue to be made to increase public awareness and to collaborate with other law enforcement units for more effective road closures.
- Wildlife: Management Indicator Species (MIS)— Four species are monitored: gray wolf, eagle, goshawk, and white pine. The current *gray wolf* estimates far exceed the recovery plan goal for wolves in Minnesota. The wolf was de-listed in September 2008. Monitoring will continue for five years after de-listing to ensure recovery continues. For *eagle*, monitoring in FY 2007 showed the total number of active nests, the number of successful nests, and the number of fledged young per active nest are all below those recorded in the past. The reason for these results is uncertain. Activity and productivity flights are planned for 2009. For *goshawk*, the number of breeding territories has risen steadily on the CNF from 9 known in 1996 to 48 known in 2008. The number of known active breeding territories and number of successful breeding pairs has more than doubled, from 7 in 1996 to 21 in 2008 and successful breeding pairs from 3 to 8 over the same time period. For *white pine*, 137,000 bareroot seedlings were planted in 2008 and approximately 150 acres seeded. Deer predation and aspen competition continue to jeopardize the successful establishment of seedlings.
- Regional Forester Sensitive Species—In FY 2008, 10,439 acres were surveyed for RFSS. A total of 179 new RFSS locations were detected for Bog Adder's Mouth, Snail-seed Pondweed, blustered bur-reed, fairy slippers, and goshawk.
- Vegetation Composition and Structure—Information presented updates the species composition acres and percentages from 2003 to 2008 and compares the 2008 numbers to Decade 1 estimates. Although there is some variation based on the landscape ecosystem, in general the forest needs to increase the amount of jack pine, white pine, and spruce-fir on the landscape. The numbers indicate there is a surplus of northern hardwoods and aspen. More detailed information is presented for species composition and age class distribution for each of the landscape ecosystems.
- Timber--Generally harvested lands are adequately restocked. Drought and deer predation have contributed to difficulties in getting adequate stocking on some sites within the five year timeframe. Actions have been taken to increase stocking.
- Also included are the results from sampling on a disc trenched site to assess species frequency. Overall diversity on the site looked good. The plant community appeared in tact and functional. On the trenched plots that was a higher incidence of horseweed and



thistle which should diminish over time. There was also more cherry and paper birch on trenched sites.

- Insect and Disease--An evaluation of insect and disease trends did not indicate increases in populations that warranted management concern or actions. Vigilance in monitoring is warranted with the pending threat of both gypsy moth and emerald ash borer.
- Fire --Fire monitoring focused on effects of harvest and proposed prescribed fire on blueberry plants in the Sand Plains area. Burning has not been implemented due to droughty conditions or funding limitations. Based on data collected on the unburned plots, it appears that without fire, objectives for increased blueberry production may not be met. Monitoring should continue for at least two years after burning is complete.
- Other activities included a prescribed fire review, an Eastern Region Integrated Vegetation Management Review, and the National Fire Plan Monitoring of Fuel Reduction Treatment.
- Watershed Health and Riparian—Lake water quality was sampled in 10 lakes. These lakes are sampled at regular intervals to determine if there is a change in water quality over time. Based on the results, water quality conditions in lakes on the Forest are not showing evidence of degrading.
- Other activities include a partnership with the Jessie Lake Association and other agencies to determine the Total Maximum Daily Load of pollutants of Jessie Lake. The Reservoir Operating Plan and Evaluation (ROPE) Draft EIS went out for public comment. A decision is expected during the summer 2009. Annual riparian planting occurred on the Blackduck district. Aquatic Organism Passage culverts were installed along the Woodtick Trail.
- Soils—A number of sites, including harvest units and recreation sites, were monitored for soil erosion. Some erosion was noted on a harvest landing, a mechanically scarified site, and near a campground. However, the amount observed was relatively minor and was not considered detrimental.
- Biomass Harvesting Monitoring was also conducted on three sites that contained low nutrient soils. Sites had biomass removed from landings and slash piles. A concern was that too much material may have been removed from these sites. However, a field review showed that amount of woody debris left on site was adequate to maintain soil productivity.
- All resources: monitoring of harvest units--And finally, monitoring of several harvest units on the Deer River District indicates that harvest activities, sale design features, BMPs, and mitigation measures identified and planned in EA are being implemented. On this sale, the absence of good stand inventory data for planning and developing prescriptions resulted in modifications at the time of sale layout. Recommendations include additional training on recognizing wetland and riparian features during all seasons, effective implementation of 50% crown closure, prioritization of broadcast burning, and continued communication and coordination between planners and implementers.
- Research and Studies-- There are a number of studies and research projects on the forest. An elm restoration project is underway. New studies by Northern Research look at the structures of old-growth red pine forests and another that focuses on the relationship between stand age and carbon storage. Ongoing are the Goblin Fern administrative

study, red pine retention study, long-term soil productivity study, and non-native invasive earthworm research.

### **Activity Review**

Employees interested in reviewing a couple of timber sales on the Deer River district met to spend a day in the field looking at several recently harvested units. The intent of the day was to evaluate whether what we said in the environmental assessments matched what was implemented on the ground. Employees considered and evaluated if planning direction and mitigation for wildlife, soils, silviculture, and riparian were implemented as planned and if treatments were effective. Generally, the forest did a good job of following through on planned activities, implementing mitigation measures, and meeting site objectives.

### **Other**

Twenty five Chippewa employees attended “Adapting Natural Resource Management in Northern MN to a Changing Climate” in November, a workshop on climate change adaptations jointly sponsored by Bemidji State University, the MN DNR, Forest Service branches, and the Leech Lake Band of Ojibwe.

### **Other Project Monitoring**

Monitoring of projects, large and small, occurs on all the districts and involves numerous resource professionals across the forest. Examples include sale administrators checking for compliance; field checking of timber marking to meet prescription objectives; conducting regeneration surveys to determine stocking levels, checking to determine if harvest units incorporate and reflect the silvicultural prescriptions and EA direction, checking application of mitigation measures to determine if they are appropriate and effective. Often times the monitoring is informal consisting of general field observations. Other times monitoring is more formal and entails following protocols; the results are generally included in the monitoring and evaluation reports.

### **Public Involvement**

We continue to publish the *Chippewa National Forest Quarterly*, a schedule of proposed actions and decisions that implement the Forest Plan. We encourage the public to become part of our management process by commenting on project proposals through the NEPA process.

Information about planning our projects and project contacts can be found on the Internet at [www.fs.fed.us/r9/forests/chippewa/projects & plans](http://www.fs.fed.us/r9/forests/chippewa/projects&plans).

# MONITORING & EVALUATION REPORT

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# I. INTRODUCTION

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This is the fourth Monitoring and Evaluation Report compiled under the 2004 Chippewa National Forest Plan. The plan was signed by Regional Forester, Randy Moore, on July 30, 2004. Our Monitoring and Evaluation plan is described in Chapter IV of the Forest Plan. As explained in more detail in Chapter IV, monitoring items consist of mandatory components you will find in every forest plan as well as items that are tailored to address issues raised through public scoping and interdisciplinary team review.

The annual monitoring and evaluation report (M&E) provides an opportunity to track progress towards the implementation of revised forest plan decisions and the effectiveness of specific management practices. The focus of the evaluation is in providing short and long term guidance to ongoing management. The M&E report should include components such as:

- (1) Forest accomplishments toward desired conditions and outputs of goods and services.
- (2) Forest Plan Amendment Status.
- (3) Status of other agency/institution cooperative monitoring.
- (4) Summary of available information on MIS or comparable species.
- (5) Summary of large scale or significant projects or programs.
- (6) Update of research needs

Chapter II consists of monitoring for elements from the Monitoring Matrix of the Forest Plan tied to specific resource areas. Each of these includes some background information, a brief explanation of the monitoring activities and protocol used, and discussion on the evaluation or conclusions when feasible.

Chapter III provides a brief summary of on-going research and studies on the Forest.

Chapter IV addresses adjustments or corrections to the Forest Plan.

Chapter V is a list of the Forest Service employees that provided information contained in this report.



## II. DISCUSSION OF MONITORING

The following table consists of elements from the Monitoring Matrix, Table MON-4 of the Forest Plan. It identifies the resource element, the monitoring question, drivers, and frequency of measure that are discussed on the pages that follow in this report.

**Table 1.** Resource areas, monitoring questions drivers, and measure frequency discussed in this report.

Resource	Monitoring Question(s)	Driver (Applicable CFR's, FP Desired Conditions, and FP Objectives)	Measure Frequency
Tribal Rights and Interests	Is Forest management helping to sustain American Indians' way of life, cultural integrity, social cohesion, and economic well being?	D-TR-1. O-TR-1. O-TR-3.	Throughout the year
Tribal Rights and Interests	Are government to government relationships functional?	D-TR-2. O-TR-2. O-TR-4.	Throughout the year
Tribal Rights and Interests	Is the Forest facilitating the right of the Tribes to hunt, fish, and gather as retained via treaty?	D-TR-3.	Throughout the year
Social & Economic Stability	To what extent does output levels and location of timber harvest and mix of saw timber and pulpwood compare to those levels projected?	CFR 219.19.12(k)[1]. A quantitative estimate of performance comparing outputs and services with those projected by the forest plan;. 36CFR 219.7(f).A program of monitoring and evaluation shall be conducted that includes consideration of the effects of National Forest Management on land, resources, and communities adjacent to or near the National Forest being planned and the effects upon National Forest management from activities on nearby lands managed by other Federal or other government agencies or under the jurisdiction of local governments. D-TM-1, O-TM-1	Annual
All-Outputs	How close are projected outputs and services to actual?	(36 CFR 219.12(k)[1]. A quantitative estimate of performance comparing outputs and services with those projected by the forest plan;	Annual
All-Costs	How close are projected costs with actual costs?	(36 CFR 219.12(k) [3]. Documentation of costs associated with carrying out the planned management prescriptions as compared with costs estimated in the forest plan.	Annual

Off-Highway Vehicles	To what extent is the Forest providing OHV opportunities; what are the effects of OHV's on the physical and social environment; and how effective are forest management practices in managing OHV use?	36 CFR 219.21[g]. Off-road vehicle use shall be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the National Forest System lands. Forest planning shall evaluate the potential effects of vehicle use off roads and, on the basis of the requirements of 36 CFR 295 part of this chapter, classify areas and trails of National Forest System lands as to whether or not off-road vehicle use may be permitted. D-RMV-1, 2. O-RMV-1, 2.	Annual
Wildlife: Management Indicator Species	What are the population trends of management indicator species? Gray Wolf Eagle Goshawk White Pine	36 CFR 219.19(a)(6). Population trends of the management indicator species will be monitored and relationships to habitat changes determined. This monitoring will be done in cooperation with state fish and wildlife agencies, to the extent practicable. O-WL-1, O-WL-15, O-WL-16, O-WL-32. O-WL-33.	Annual
Vegetation Composition and Structure	To what extent is Forest management, natural disturbances, and subsequent recovery changing vegetation composition and structure? To what extent are conditions moving toward short-term (1-20) and long-term (100 years) objectives at Landscape Ecosystem, Management Area, and other appropriate landscape scales?	D-VG-1, -2,-3, -4	1-5 years
Timber	Are harvested lands adequately restocked after five years?	(36 CFR 219.12(k)[5][i]. Lands are adequately restocked as specified in the forest plan	Annual
Insects & Disease	Are insects and diseases populations compatible with objectives for restoring or maintaining healthy forest conditions?	(36 CFR 219.12(k)[5][iv]. Destructive insects and disease organisms do not increase to potentially damaging levels following management activities. D-ID-3, O-ID-1, D-VG-5, D-VG-8, O-VG-11-13	Annual
Fire	How, where, and to what extent will prescribed fire be used to maintain desired fuel levels, and/or mimic natural processes, and/or maintain/ improve vegetation conditions, and/or restore natural processes and functions to ecosystems?	D-ID-4-5, O-ID-2-4	1-5 years

Watershed Health & Riparian-	To what extent is Forest management affecting water quality, quantity, flow timing and the physical features of aquatic, riparian, or wetland ecosystems?	All WS Desired Conditions and Objectives with the possible exception of D-WS-14, plus O-RWA-1 D-PH-3, D-PH-4, O-PH-3, O-TS-4 and O-TS-5	1-5 years
Soils	Are the effects of Forest management, including prescriptions, resulting in significant changes to productivity of the land?	36 CFR 219.12 (k) [2], Documentation of the measured prescriptions and effects, including significant changes in productivity of the land; D-WS-3, D-WS-12, O-WS-9, O-WS-10	1-5 years
All	Monitoring and evaluation requirements will provide a basis for a periodic determination of the effects of management practices. 36 CFR 219.11(d) At intervals established in the plan, implementation shall be evaluated on a sample basis to determine how well objectives have been met and how closely management standards and guidelines have been applied. Based upon this evaluation, the interdisciplinary team shall recommend to the Forest Supervisor such changes in management direction, revision, or amendments to the forest plan as are deemed necessary. (36 CFR 219.12(k))	Monitoring Regulatory Requirement, Table MON-1, Forest Plan, p 4-3.  (Includes BMP monitoring)	

# 1. Tribal Rights and Interests

## Monitoring Questions:

- Is Forest management helping to sustain American Indians' way of life, cultural integrity, social cohesion, and economic well being?
- Are government to government relationships functional?
- Is the Forest facilitating the right of the Tribe to hunt, fish, and gather as retained via treaty?

## Monitoring Driver:

D-TR-1 Lands within the Forest serve to help sustain American Indians way of life, cultural integrity, social cohesion, and economic well-being.

D-TR-2 The Forest Service continues to work within the context of a respectful government-to-government relationship with Tribes, especially in areas of treaty interest, rights, traditional and cultural resources, and ecosystem integrity. The Forests provide opportunities for traditional American Indian land uses and resources.

D-TR-3 The Chippewa National Forest facilitates the exercise of the right to hunt, fish, and gather as retained by Ojibwe whose homelands were subject to treaty in 1855 (10 Stat. 1165). Ongoing opportunities for such use and constraints necessary for resource protection are reviewed and determined in consultation with the Leech Lake Band of Ojibwe.

O-TR-1 Improve relationships with American Indian tribes in order to understand and incorporate tribal cultural resources, values, needs, interests, and expectations in forest management and develop and maintain cooperative partnership projects where there are shared goals.

O-TR-2 Maintain a consistent and mutually acceptable approach to government-to-government consultation that provides for effective Tribal participation and facilitates the integration of tribal interests and concerns into the decision-making process.

O-TR-3 The Forest Service will work with the appropriate tribal governments to clarify questions regarding the use and protection of miscellaneous forest products with the objective of planning for and allowing the continued free personal use of these products by band members within the sustainable limits of the resources.

O-TR-4 Consult, as provided for by law, with Tribes in order to address tribal issues of interest and National Forest management activities and site-specific proposals.

## Background:

Government to Government consultation is continuous between the Chippewa National Forest and Leech Lake Band of Ojibwe, who were signatory to the Treaty of 1855. Approximately 44%

of Chippewa National Forest lands lie within the Leech Lake Indian Reservation, and the Band has reservation lands within the boundary of Chippewa National Forest along with rights reserved by treaty throughout the Forest.

The Forest Plan management direction generally assures the availability of resources to support the continued exercise of treaty rights and cultural practices and not impair access to such resources and places of traditional practices. Specific availability of resources and access considerations may be determined through government-to-government consultation with the objective of maintaining sufficient availability of resources for the continued harvest or utilization needed to satisfy tribal needs.

The basis for government-to-government consultation and cooperation has been established by previous actions by LLBO and the Forest Service. In 2007, a part-time Tribal Liaison position was established in cooperation with the Leech Lake Band of Ojibwe. The National Forest and the Band agreed to four tribal relations goals for 2008 - 09 emphasizing outreach and recruitment, partnership building, developing mutual cultural awareness, and initiating development of a Memorandum of Understanding. Consultation is not isolated to the Forest Supervisor or Tribal Liaison and occurs broadly at all levels of both governments.

During the Chippewa National Forest centennial year, Forest Leadership met with the outgoing tribal council and Senator Norm Coleman to review successes and challenges of government to government consultation. A mid-year tribal election resulted in a change of tribal council leadership, and a new working relationship was established between the Forest Supervisor, Tribal Chairman and two Executive Directors of the Leech Lake Band of Ojibwe.

**Monitoring Activities:**

Efforts are underway to track activities and commitments made that contribute towards the tribe's way of life, cultural awareness, or economic well being. In addition, we have tried to identify and track the consultation activities and cooperative activities that occur between the Band and the Forest as they relate to the 4 strategic goals.

**CULTURAL AWARENESS**

In June the Forest Multi-Cultural Team coordinated a day-long event that included the outgoing Tribal Chairman acknowledging the benefits of working together in a Government –Government manner, his Native American traditions and values. A tribal Elder also spoke. The day included an Ojibwe dance group.

In May, a Diversity Day was hosted by the Leech Lake Band, including speakers on workplace culture and overcoming barriers in the workplace. Several FS employees attended.

**CONSULTATION/COMMUNICATION**

In February 2008 Forest Supervisor, Tribal Liaison, and Technical Services Team Leader met with the LLBO Tribal Council to provide an update on FS activities underway and planned that promote gov – gov relationships between the Chippewa National Forest and the Band. Additional coordination meetings occurred throughout the year including the LLBO Director of Division of Resource Management and Executive Directors for LLBO.

The Tribal Liaison has been meeting with Gina Lemon, Tribal Historic Preservation Officer at least quarterly to assess progress on the Section 106 programmatic agreement. In addition to discussing the agreement, the THPO has brought other issues forward for research and forest responses that the Tribal Liaison has facilitated.

The Tribal Liaison accompanied Rangers and Planning Teams in consultation and project planning meetings involving the LLBO Division of Resource Management.

### **EMPLOYMENT/OUTREACH**

On two separate occasions the Tribal Liaison made presentations to LLBO job club participants with the intent of informing participants about Forest Service careers and application procedures.

For at least the last five years Chippewa National Forest employees have participated in the Leech Lake band of Ojibwe annual career fair. The Chippewa N.F. is also represented at the annual Leech Lake Tribal College and White Earth Band of Ojibwe career fairs. Tribal Liaison visited the Fond du Lac Tribal College in October to present career information to students.

In FY 08 the Chippewa recruited two Native American students ages 15-18 who spent 8 weeks working in the Youth Conservation Corp program.

The Blackduck Ranger District hosted a STEP student, a member of the Navajo Tribe, from Southwest Indian Poly-Technical Institute. Recruitment was accomplished through the Native American Strategic Hiring Initiative. The student was exposed to wide variety of Forest Service projects.

In March the Chippewa Tribal Liaison participated in a futuring meeting organized by the Leech Lake Tribal College faculty. This meeting brought together leaders representing multiple private/state/federal entities to discuss employment outlook in their respective agencies.

The Forest hosted four STEM program students from the Leech Lake Tribal College for a period of 10-12 weeks. Three students were mentored by a Public Affairs Specialist. The fourth student worked on the Deer River R.D. with a Forestry Technician.

The Forest hosted three participants of the Native Employment Works (NEW) program. Funded by the U.S. Dept. of Health and Human Services, Administration for Children & Families, the NEW program provides culturally appropriate services to all Minnesota Chippewa Tribe members in the service area who receive Minnesota Family Investment Program funds (MFIP) and are not served by the bands. The Forests contribution was to provide employment and training to tribal MFIP recipients to increase independence from Welfare system.

The Blackduck Ranger District employed a member of the Red Lake Band of Ojibwe and a student at Red Lake Tribal College through the STEP program during the summer of FY 08.



The Forest hosted 22 Native American volunteers in various projects in FY 2008.

In FY 2008 there were several contracts and agreements with Native American businesses and cooperators. The Forest spent roughly \$2,760,586 in Contracting/Purchasing, of which \$473,228 (about 17%) went to Native American Owned Business. Roughly \$174,516 in Agreements for the Chippewa Forest was obligated of which \$102,074 (58%) was with Native American Owned cooperators.

### **PARTNERSHIPS**

Blackduck Public Services Team Leader and Camp Rabideau Coordinator hosted multiple meetings involving the Red Lake, Bois Forte and Leech Lake Bands in exploring options for utilizing Camp Rabideau CCC camp for learning academy activities. In July 2008, thirty young band members became the first group to conduct a language immersion course at the historic site.

The Forest participated in the Native American Fish and Wildlife Society annual conference held in Walker, Mn. The conference provided invaluable networking opportunities and a greater understanding of the various roles and challenges within the Tribal Resource Management programs.

Under a participating agreement with the Leech Lake Band, Solid Waste Department and the Chippewa National Forest a total of 27 illegal dumpsites were cleaned up in FY 2008. The amount of refuse removed was estimated at 260 cubic yds. Clean-up was conducted by the Leech Lake Band of Ojibwe Solid Waste Dept. and the Day Labor Program. The funds to pay for the tipping fees and equipment costs were provided by the Chippewa National Forest. The Forest Soils Scientist gave a presentation about the project in September at the Native American Great Lakes Fish and Wildlife Conference. The Leech Lake Band of Ojibwe (LLBO) and the Chippewa National Forest received a Forest Service Eastern Region Honor Award in December for Protecting Ecosystems Across Boundaries. Three LLBO Local Indian Councils (Bena, Mission and Ball Club) were attended to tell them about the clean-up efforts and to get their input on how to prevent more dumping. Publicity about the partnership was in the local newspapers and included in a presentation about burning barrels. Monitoring of sites that were cleaned up in 2007 was accomplished.

A total of five agreements were executed with the Leech Lake Band to accomplish mutual projects and goals. These included; Cass Lake Ranger Station Utilities, 2008 Heritage Surveys, Cooperative Fire Protection, Leech Lake Tribal College STEM Interns, Illegal Dumps clean-up. Roughly \$174,516 in Agreements for the Chippewa Forest was obligated of which \$102,074 (58%) was with Native American Owned cooperators.

### **RESOURCE MANAGEMENT**

Contacts with Division of Resource Management and Local Indian Councils (15 exist):

- to discuss project planning and current project implementation efforts and identify concerns, and
- to identify any historic sites or traditional uses within the project areas.

The project leaders met with LICs with regard to the following projects: Lower East Winnie, Lydick, Cuba Hill, and Non-native Invasive Plant (NNIP) Management projects. Except for the NNIP project, these are the larger projects completed in FY 2008. In addition there were 1-2 meetings per project with THPO and DRM.

Discussion via phone with THPO and the DRM Wildlife Biologist occurred after publication of each NEPA Quarterly (published quarterly) or Schedule of Proposed Actions. This publication lists all the ongoing and upcoming projects on the forest. This has been an effective way to identify any concerns and to assess the need for further discussion, information, or meetings-- particularly on smaller projects.

**Lydick Resource Management** project is located on the Blackduck district and is in a tribal high interest area. District personnel met with Local Indian Councils (LICs) 14 times, met with DRM 10 times and had 4 field trips to the project area. The FS responded to LLBO concerns and comments with the following actions.

- Deferred harvest and other treatments in 164 acres of over mature jack pine
- Changed 215 acres of mechanical scarification to prescribed burning which is consistent with natural ecosystem processes and would benefit blueberry production.
- Replaced mechanical scarification in a riparian area with hand scarification.
- Deferred clearcutting in a block of mature red pine.
- Planned conversion of some stands to jack pine.
- Planned for planting fruiting shrubs in permanent openings.

**Cuba Hill Vegetation Management Project** is on the Walker District. This project is in a tribal high interest area. District personnel met with LICs on 6 different occasions. In response to concerns raised early in the project, several stands in the Ten Section area were deferred from treatment. In the Cuba Hill Decision Notice, three stands were dropped to better respond to tribal concerns and interests. The Cuba Hill Environmental Assessment identified 21 acres of existing openings to plant to upland tamarack, white pine, and American plum.

**Lower East Winnie Vegetation Management Project** is located on the Deer River District. The majority of the project area is in tribal high interest area. District personnel met with LICs on 10 different occasions. Project was designed to make balsam boughs available, minimize impacts to understory species of interest such as princess pine, and address harvest in 100 year old red pine which is of spiritual value by reducing the acres of clearcutting in tribal areas of high interest. In addition, about 50 acres of permanent openings are planned for planting with fruiting shrubs; during release activities fruiting shrubs will be protected; some red pine will be converted to jack pine stands that are more natural in appearance (varied spacing & density); some stands will be managed for blueberry by harvesting and burning; firewood and birch bark will be made available; and regeneration of paper birch will occur to ensure a future resource.

An **American Elm Restoration Project** is currently being planned to restore tolerant species to the land. LLBO is one of the partners.



The **Boy River prescribed burn** is one of several safely executed burns. This fire-dependant wet meadow has had one rotation of fire to each part of its ecosystem, which provides habitat for Yellow Rail and other wetland species. Partners include Cass County, two regions of MN DNR, private owners, the Leech Lake Band, and the Forest Service. The Burn Partnership project was awarded the National Wings Across the Americas "Habitat and Partnership" award for habitat improvement affecting the Yellow Rail.

In 2008, **planting or seeding of fruiting shrubs** --cranberry, mountain ash, white cedar, hawthorn, plum, chokecherry, and tamarack occurred on the districts. In addition, Canada yew – a Regional Forester Sensitive Species, and LLBO sensitive species-- was planted on two districts.

The CNF planned and hosted a **Forest Insect and Disease Workshop** in March. Employees from the Minnesota DNR, Leech Lake Division of Resource Management and BIA were in attendance. Presentations by the Northern Research Station– St. Paul office and the MN Department of Agriculture addressed the advent of the emerald ash borer, siren wood wasp and gypsy moth to our area.

### **Stewardship projects**

*“Little Pinky” Stewardship* project between Blackduck District & LLBO was awarded in August 2007. The project will use funds generated from a timber harvest to reforest 7 permanent openings in 2008 (14 ac). The site preparation for the opening planting is about 2/3 complete. Timber harvest is scheduled to begin in 2009. This contract was designed to build relationships between the LLBO and the CNF.

*Lydick Stewardship* project was approved August 2007. Regeneration of jack pine will promote undergrowth such as blueberry, a traditional use plant important to the LLBO. The contract is intended to restore traditional plants and improve relations with regard to trust responsibilities. Contract award is anticipated in 2010.

### **Evaluation and Conclusions:**

During FY 2008, a wide variety of cooperative activities and consultation efforts have been implemented. Work on a Memorandum of Understanding is still in progress. Each of these items helps establish mutual measures and expectations in support of resource management, opportunities for partnering to accomplish Forest Plan objectives, and strengthen government--to--government relations. Further recommendations include:

- Continue steps to draft Memorandum of Understand with the LLBO to help guide working relationships and define a more consistent manner for working together. Focus will be on OHV and tree stand use.

- Develop participating agreement with the Leech Lake Tribal College, that provides Science, Technology, Engineering and Math (STEM) program participants greater exposure and practical training in the Forest Service.
- Continue consultation with the LLBO and Forest Staff Specialists on the status of the Section 106 Programmatic Agreement with the goals of obtaining a signed agreement in FY 09.
- Continue efforts that facilitate greater involvement of all Tribal members in FS programs and activities afforded the general public.
- Continue connecting key leaders from both governments to help address key issues that may have potential to disrupt relations. Continue to develop relationships and partnerships with LLBO.

## 2. Social & Economic Stability

### **Monitoring Question:**

To what extent does output levels and location of timber harvest and mix of sawtimber and pulpwood compare to those levels projects?

### **Monitoring Driver:**

D-TM-1 The amount of commercial timber sales available for purchaser is at a level that is sustainable over time. Mill operation in northern Minnesota can depend on a consistent level of timber harvest on the National Forest.

O-TM-1 Provide commercial wood for mills in northern Minnesota. Harvested material supplies sawmills, veneer mills, paper mills and mills constructing engineered wood products (hardboard, particleboard, oriented strandboard, etc.). The Forest provides posts, poles and logs for log home construction.

### **Background:**

This information was compiled from actual sales that were offered during Fiscal Year (FY) 2008 and is a reflection of the forest's ability to satisfy local demand for wood products.

### **Monitoring Activities:**

Types of information monitored include the amount of volume offered, amount of volume harvested, amount of uncut volume under contract, and the number of acres offered. The volume offered is further broken down into sawtimber and pulpwood. The amount of volume offered is negotiated with the regional office each year and is more a reflection of the budget than the

capability of the land. Information provided below is from the FY 2008 Annual Bid Monitoring Report and the Timber Cut and Sold Report (Timber Sale Statements of Account (TSA)).

**Evaluation and Conclusions:**

**Table 2.** Timber Target, Volume Offered & Sold, Volume Harvested, and Uncut Volume under contract, and acres offered by FY

	FY 2005	FY 2006	FY 2007	FY 2008
Timber Target	27,000 MBF	28,900 MBF	37,163 MBF	37,095 MBF
Volume Offered & sold <sup>1</sup>	27,184 MBF	28,929 MBF	37,557 MBF	35,203 MBF
Volume Harvested	26.8 MMBF	20.6 MMBF	21.4 MMBF	19.6 MMBF
Uncut volume under contract	43.2 MMBF	53.1 MMBF	68.8 MMBF	84.7 MMBF
Acres offered	3868	3523	5500	4654

<sup>1</sup> FY 2005 target was for volume offered; FY 2006- 2008 target was for volume sold.

The target assigned in FY 2008 decreased slightly from 37,163 MBF in FY 2007 to 37,095 MBF (less than 1%). The actual volume offered and sold decreased from 37,557 MBF in FY 2007 to 35,203 MBF (approximately 7%). The forest negotiated with the Regional Office to offer slightly less than the assigned target and to concentrate on preparing sales to sell in 2009. This better positions the forest to adjust to shrinking budgets because the total amount of work to be done (volume sold and prepared to sell in future years) is less for 2009.

Uncut volume under contract increased in FY 2008 for a fourth year in a row. Volume harvested levels decreased by approximately 10% in FY 2008 from the amount harvested in FY 2007 and is still below what has traditionally been harvested (27-33 MMBF) in the years prior to 2006.

In FY 2008 markets for housing materials, oriented strandboard (OSB) and lumber, continued to be depressed due to the slump in the housing market. Mills continued with periodic temporary shutdowns and prices paid for delivered material were less than what loggers had paid for stumpage. For the second year, in November 2007, the Assistant Secretary of Agriculture offered one year contract extensions to qualifying purchasers. Also, in June 2008, as part of the 2008 Farm Bill, rate redeterminations were offered to qualifying purchasers. This reduced the rates paid for timber by as much as 70% for uncut portions of sales. Harvest decreased due to a soft market coupled with the offer of a one year extension on certain contracts. Like 2007, in 2008 we offered for sale a similar volume amount, which is larger than the years prior to 2007. That coupled with less harvest caused our volume under contract to rise.

Competition for the Chippewa National Forest timber volume was strong with an increase in the number of bidders by approximately 10%. There were 21 bidders during FY 2008 compared to 19 in FY 2007. On average, there were 3.7 bidders per sale, which compared to 1.3 bidders last fiscal year. The number of bidders per sale ranged from two to nine. All large sales (value greater than \$10,000) had multiple bidders. This increase in competition may be due to the need

to have cheaper wood to harvest. This allows loggers to average the cost of recently purchased lower cost wood with higher priced wood from older contracts.

**Table 3.** Ratio of sawtimber to pulpwood volume sold

	<b>Decade 1 (Proposed)</b>	<b>Actual Ratio FY 2005</b>	<b>Actual Ratio FY 2006</b>	<b>Actual Ratio FY 2007</b>	<b>Actual Ratio FY 2008</b>
Sawtimber:Pulpwood	32:68	15:85	18:82	21:79	19:81

As shown above, the ratio of sawtimber to pulpwood is quite a bit lower than what was predicted in the Plan. This is due to more thinning and partial harvests where the trees removed are mainly classified as pulpwood.

In FY 2008, prices bid for timber decreased for the second year with sawtimber prices of most species dropping by 16% and the prices paid for pulpwood dropping by 8% compared with FY 2007. This resulted in a 2% decrease in average bid prices for all species/products combined to \$63.59 per MBF.

A comparison of the actual revenues generated to the estimated revenues from timber harvest is displayed in the table below. The estimated revenues are taken from Forest Plan Revision, Volume II Appendices, Table BEIS-7, pg B-11.

**Table 4.** Actual verses Estimated Revenues from Timber Production in FY 2008

<b>Species</b>	<b>Product</b>	<b>1996-1998 Avg. Price/MBF Expected Revenue</b>	<b>FY 2008 Avg. Price/MBF</b>	<b>Percent Difference</b>
Aspen	Pulpwood	59.30	48.98	(17)
Mixed Hardwood	Pulpwood	28.13	35.97	22
Mixed Hardwood	Sawtimber	54.12	45.96	(15)
Balsam Fir	Pulpwood	61.96	49.20	(21)
Spruce	Pulpwood	64.38	59.57	(7)
Spruce	Sawtimber	75.41	79.59	5
Pine	Pulpwood	28.50	72.40	61
Jack Pine	Sawtimber	127.13	111.32	(12)
Red/White Pine	Sawtimber	238.63	134.43	(78)

Overall revenues in FY 2008 were lower than those generated in FY2007. They are also lower than those estimated in the FEIS analysis. The exceptions are mixed hardwood pulpwood, spruce sawtimber and pine pulpwood. Much of the decline in prices was due to slowing demand for OSB, which can utilize many of the species listed. Hardwood pulp can also be used for firewood and that market remains steady. Spruce sawtimber and to some degree the pine pulpwood can be sawn for lumber and that market has not declined locally as much as the OSB market.

The bid ratio (advertised value/bid value) for FY 2008 decreased to 73%. While this is a decrease over 2007, it still reflects tight market conditions and less room for increases in bids due to lower profit margins.



***Acres Harvested***

The Chippewa National Forest *harvested* timber on a total of 2182 acres in FY 2008. These numbers are obtained from our corporate database (FACTS) and are reported when harvest in a stand is complete. The table below compares the acres harvested by treatment method to the acres Proposed for Decade 1 (Table APP-D2: Forest Plan, D-3, Estimate of Acres of timber harvest by treatment method (Forest Wide)). Table APP-D2 was changed as part of an administrative correction on September 14, 2007. Table APP D-2 is corrected to increase the acres and percentage of thinning treatments and to reduce the acres and percentage of uneven-aged treatment in red pine, white pine, spruce fir, northern hardwood, oak and black ash in Decade 1. Total acres treated is unchanged

**Table 5.** Comparison of *harvested* acres by treatment method to that Proposed for Decade 1

Treatment Method	Decade 1 (Proposed) Corrected 9/07		Actual Accompl (FY 2005)		Actual Accompl (FY 2006)		Actual Accompl (FY 2007)		Actual Accompl (FY 2008)		Total (FY 2005-2008)	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Thinning	<b>16000</b>	<b>21</b>	2172	54	1371	53	1439	51	803	37	<b>5785</b>	<b>50</b>
Clearcutting	<b>29866</b>	<b>39</b>	949	24	782	31	709	25	728	33	<b>3168</b>	<b>27</b>
Shelterwood/ Partial Cut 30	<b>11149</b>	<b>14</b>	489	12	295	11	495	17	469	22	<b>1748</b>	<b>15</b>
Uneven-aged (all types)	<b>20124</b>	<b>26</b>	387	10	124	5	198	7	182	8	<b>891</b>	<b>8</b>
Totals	<b>77139</b>	<b>100</b>	3997	100	2572	100	2841	100	2182	100	<b>11592</b>	<b>100</b>

The Decade 1 harvest treatment numbers projected in the Forest Plan are decadal projections not annual projections and are based on full funding and implementation of the Plan. Mixes of potential harvest treatments is a tool to accomplish Forest Plan objectives but are not an objective in and of themselves. Harvest treatment acres in any fiscal year are a reflection of the relatively few environmental decisions being implemented during that year. Each environmental analysis (EA) and the set of harvest treatments resulting from that decision are based on meeting the vegetation objectives for the Landscape Ecosystem (LE) in which the project is being implemented. Vegetation objectives and existing conditions vary by LE, so some peaks and valleys are expected in annual harvest treatment types, but over the decade meeting the vegetation objectives across a mix of project areas should yield harvest treatments similar to those projected in the Plan. Comparing the percentages on an annual basis may be useful as harvest treatments are tracked over time.

Even with the administrative correction, thinning acres continue to be over accomplished. There are several reasons for this. This is in part a reflection of a large thinning project that was implemented in the first two years of Forest Plan implementation. Many of the sales in this project were completed in 2008. In addition, our highest priority landscape ecosystems (LE) for treatment tend to be the Dry Mesic Pine and Dry Mesic Pine-Oak LEs. These are the LEs that are most out of sync ecologically and have the highest fire hazards. Red pine is a significant component on these LEs and has been a focus for treatment. When the plan was modeled, the assumption was that thinning acres would be entered once during the 15 year life of the plan. In reality, to maintain a healthy stand and increase growth in these stands, they may need to be thinned more than once in a 15 year cycle.

Clearcutting is lower than Forest Plan projections. During Forest Plan revision it was recognized that there would be less regeneration in the initial years of Forest Plan implementation as the youngest vegetation age classes were over-represented in most LEs. Some of the recent planning projects recognize the need to create more acres in the 0-9 age class which would be reflected in the acres of clearcutting, coppice, or seedtree treatments. It takes about 5 or more years for acres that are planned to be harvested.

The actual percentage of shelterwood and partial harvest is comparable to that proposed in the Plan and are not a concern at this time.

Uneven-aged harvest prescriptions are less than projected thus far. More emphasis has been placed on uneven-aged treatments in hardwood and some conifer stands in recent planning projects.

It is recognized that some shifts will need to be made in planning and implementation to meet the decadal Forest Plan objectives at the current rate.

### ***Acres of Harvest Planned***

The above discussion focuses on the acres actually *accomplished* or harvested for each fiscal year since FY 2005. Acres harvested may be from projects planned and sold prior to completion

of the 2004 Forest Plan Revision. The time lag between planning and harvesting exists because it typically takes 1-2 years to do the field work to prepare the sales. Length of timber sale contracts vary from 2-5 years so harvesting may occur at anytime within that timeframe. The following discussion highlights the acres *planned* for harvest by treatment type since the 2004 Forest Plan went into effect in August 2004.

**Table 6.** Summary of *planned* treatment acres and percent from August 2004 through FY 2008 compared to decade 1 projections from Forest Plan Administrative Correction 9; Table APP-D2.

Treatment Method	Decade 1 (Proposed)		Project Decisions under 2004 FP FY 2005-2008	
	Acres	Percent	Acres	Percent
Thinning	16,000	21	12,878	36
Clearcutting	29,866	39	11,349	32
Shelterwood/ Partial Cut 30	11,149	14	2,999	8
Uneven-aged (all types)	20,124	26	8,338	23
Totals	77,139	100	35,524	100

This information was compiled for treatment acres in the decisions signed by the line officers since August 2004. Acres are approximations based on GIS data used during the project planning process. During implementation some acres may be dropped due to inaccessibility, mitigations for wetlands or other resources. For the purposes of this exercise, individual tree and group selection, and improvement cuts were put in uneven-aged category. Planned partial cuts were assumed to have a residual basal area greater than 30 sq.ft. per acre so were combined with shelterwoods.

Information from the above tables shows the acres and percent of a particular treatment with respect to all the treatments proposed. For example, the FP projected that thinning would occur on approximately 21% of the treatment or harvest acres; whereas thus far it actually comprises 36% of the acres planned for harvest. Looking at the treatments for project decisions made under the 2004 FP, not quite halfway through the decade, note the following trends:

- Thinning acres comprise 36% of the treatments which is considerably higher than the 21% estimated at the end of decade 1.
- Clearcutting and seed tree harvests account for approximately 32% of the treatments which is still below the projected 39% for decade 1.
- Shelterwood acres are about 8% of the planned treatments, several percentage points below the 14% expected at the end of decade 1.
- Uneven-aged treatment acres are roughly 23% which at this point is in line with the 26% projected for the end of the decade.
- In general, we are doing fewer even-aged regeneration harvests than projected. These treatments create the 0-9 age class on the landscape.
  - During the last two years the majority of our projects have been in high interest tribal areas. Due to Native American values and interests, clearcutting especially,

and shelterwood harvests to a lesser extent, are not well accepted practices. Consequently, there are more thinning and uneven-aged management treatments prescribed for these areas. The Forest Plan did not recognize or incorporate more conservative prescription in tribal high interest areas.

- Conversely, in our projects we are planning more thinning than projected in the Forest Plan which may warrant a future FP correction or amendment.
  - As mentioned in the previous section, this is in part a function of the drier LEs we are focusing on, especially on the Deer River District. But there is also recognition that the data for plantations used for the Forest Plan planning process was in many cases 20 years old or older. Recent inventories have indicated that stands have grown much faster than anticipated and require multiple entries to maintain their growth.

**Table 7.** Percent of planned treatment acres in projects compared to FP projected treatment acres.

Treatment Method	Forest Plan Decade 1 (Proposed)	Project Decisions under 2004 FP FY 2005-2008	
	Acres	Acres	Percent
Thinning	16,000	12,878	80
Clearcutting	29,866	11,349	38
Shelterwood/ Partial Cut 30	11,149	2,999	27
Uneven-aged (all types)	20,124	8,338	23
Totals	77,139	35,524	

The total project acres for each treatment planned during FY 2005-FY 2008 compared to the Forest Plan projected acres at the end of Decade 1 are displayed in the above table. For example, thus far 11,349 acres have been planned for clearcutting in decisions compared to the FP projected 29,866 acres; this is 38% of the projected clearcutting decadal acres. Approximate percent of decade 1 acres for each treatment planned since August of 2004 is as follows:

- 80% of thinning acres
- 38% of clearcuts or seed tree acres
- 27% of shelterwood acres.
- 23% of uneven-aged harvests

Assuming that each of these treatments should be roughly 50% since we are about halfway through the decade, we are over-accomplishing thinning and under-accomplishing all the other treatments.

**Table 8.** Comparison planned project acres and volumes to FP numbers.

Forest Plan Decade 1 (Proposed)		Acres planned in Project Decisions under 2004 FP		
		Estimated	Acres	Percent
**Total Acres Harvested 1st 10 years of implementation	77,139	Total Acres Planned for Harvest	35,524	46
***Timber Volume (MMBF) 1st 10 years of implementation	580	Estimated Volume (MMBF)	204	35

\*\* Total acres from Forest Plan Table APP-D2.

\*\*\*Volume (Allowable Sale Quantity) from Forest Plan pg. D-1.

- roughly 46% of the projected decadal acres for harvest have been planned.
- about 35% of the projected decadal timber volume has been planned.
- Comparing the volume output to the acres treated, the average expected volume per acre is 7.5 MMBF/ac compared to 5.7 MMBF/ac from our planned projects. This may be in part due to fewer even-aged harvests than projected. Even-aged harvests typically remove more volume per acre.

#### *Tribal interests and rights*

The Forest Plan identifies areas of high interest to the Leech Lake Band of Ojibwe (p. 2-37). These tend to be areas of high use by tribal members. Some tribal members do not support clearcutting any treatments in red pine stands over 100 years old on the forest and particularly in the high interest areas. Projects planned in recent years (Portage, Steamboat, Lydick, Lower East Winnie) have been in high interest areas and treatments have been modified to address tribal concerns (refer to Tribal rights section, Natural Resource Management). Modifications include changing prescriptions from intensive harvest such as clearcutting or seedtree to uneven-aged treatments to dropping stands entirely.

The CNF identified 459,313 acres of lands suitable for timber (FEIS, Volume I, p. 3.4-13). There are 160,516 acres of National Forest land that are identified as high interest areas for the tribe. Of the 160,516 acres, approximately 107,378 acres are suitable for timber. Roughly 23% of the CNF timber suitable lands fall within the high interest areas. The Forest Plan, however, did not modify or adjust its treatments or outcomes when in high interest areas.

#### **Payments to Counties:**

The federal government makes payments to states to cover some of the cost of local government services on tax-exempt National Forest System lands. The states pass those payments on to the counties in which national forests are located. Payments in Lieu of Taxes (PILT) payments are calculated and made by the Department of Interior, Bureau of Land Management. These payments are appropriated annually by Congress based on available funding and formulas that take into account the population in the affected counties, the number of acres of federal land in those counties, and other payments received by the counties based on federal land payments. The PILT payments in fiscal year 2008 averaged 61 percent greater than fiscal year 2007.



Payments are also made to states amounting to 25 percent of gross receipts from activities on national forests, such as timber sales, mining, special uses and recreation. Congress passed the Secure Rural Schools and Community Self-Determination Act (SRS) in 2000, which allowed counties to choose a level payment based on the high-three year average of 25 percent payments, or to continue to receive 25 percent of the current year's receipts. On the Chippewa National Forest, Itasca County and Cass County opted for the level payment. Beltrami continued with the payment based on current annual receipts.

The SRS expired in 2006, but Congress extended it through 2007 under P.L. 110-28. In October 2008 the SRS was amended and reauthorized under P.L. 110-343 which allowed the counties to choose a transition payment through fiscal year 2011 or a payment based upon a seven year rolling average of the 25 percent payments. All three counties have now elected to receive their payments as shares of the state transition payment through fiscal year 2011 and will be forming Resource Advisory Committees (RACs) to identify proposed projects for the Title II portion of their payments. The 25% (SRS) payments in FY 2008 averaged 26 percent greater than fiscal year 2007.

**Table 9.** Payments to Counties.

FY 2008		25% FUND (SRS share of state payment)		Payment in Lieu of Taxes		Grand total	
County	Acres	Total \$	Per Acre	Total \$	Per Acre	Total \$	Per Acre
Beltrami	64,722	\$165,840	\$2.56	\$115,494	\$1.78	\$281,334	\$4.35
Cass	290,696	\$590,181	\$2.03	\$332,020	\$1.14	\$922,201	\$3.17
Itasca	311,123	\$755,330	\$2.43	\$361,037	\$1.16	\$1,116,367	\$3.59
<b>Total</b>	<b>666,541</b>	<b>\$1,511,351</b>	<b>\$2.27</b>	<b>\$808,551</b>	<b>\$1.21</b>	<b>\$2,319,902</b>	<b>\$3.48</b>

**Table 10.** Summary of total payments to Counties from FY 2006 – FY 2008.

County	Acres	FY 2008		FY 2007		FY 2006	
		Total \$	Per Acre	Total \$	Per Acre	Total \$	Per Acre
Beltrami	64,722	\$281,334	\$4.35	\$130,322	\$2.01	\$123,881	\$1.91
Cass	290,696	\$922,201	\$3.17	\$754,937	\$2.60	\$754,284	\$2.59
Itasca	311,123	\$1,116,367	\$3.59	\$811,411	\$2.61	\$811,197	\$2.61
<b>Total</b>	<b>666,541</b>	<b>\$2,319,902</b>	<b>\$3.48</b>	<b>\$1,696,670</b>	<b>\$2.55</b>	<b>\$1,689,362</b>	<b>\$2.53</b>

### 3. All-Outputs

**Monitoring Requirement:**

How close are projected outputs and services to actual?

**Monitoring Drivers:**

A quantitative estimate of performance comparing outputs and services with those projected by the forest plan; (36 CFR 219.12(k).

**Background:**

Information in this section is specific to the estimated amount of an activity or Practice listed on Table APP-D4 in the Forest Plan, Appendix D. Proposed and Probable Practices, Goods Produced, and Other Information.

Table APP-D4 lists forest management activities, other than timber harvest, that are proposed to work toward the desired conditions and objectives during the first 10 years of Plan implementation. Accomplishments are from the Performance Accountability Report (PAR) database. The Social and Economic Stability section presents and discusses information tied to timber harvest.

**Table 11.** Proposed Practices and accomplished by FY and total.

Table APP-D4: Proposed Practices (Forest-wide)		Accomplished*				
Activity or Practice	Estimated Amount for decade 1	Total	FY 2008	FY 2007	FY 2006	FY 2005
Stream Channel Reconstruction	5 to 30 miles	16 miles	5 miles of stream restored or enhanced	4 miles of stream restored or enhanced	2 miles of stream restored or enhanced 0.1 mile of reconstruction	5 miles of stream restored or enhanced
Sensitive Plant Habitat Restoration	20 projects	0	In progress	0	0	0
Wildlife Habitat Restoration	80 projects	2409	650 acres terrestrial	500 acres terrestrial	655 acres terrestrial	1254 acres terrestrial
		234	40 structural improvements	35 structural improvements	66 structural improvements	133 structural improvements
		561	102 acres aquatic	0 acres aquatic	60 acres aquatic	399 acres aquatic
New ATV trail designated (maximum amount listed)	90 miles	0	0	0	0	0
New Snowmobile trail designated (maximum amount listed)	100 miles	0	0	0	0	0
New Water Access Sites (maximum amount listed)	5 sites	0	0	0	0	0

Roads Constructed (only OML –1 roads being constructed)	19 miles	0	0	0	0	0
Roads decommissioned (system)	200 miles	88	12.4; 14.8 miles unauthorized	1.1	14.8; 2.52 miles unauthorized	13.2; 28.9 in FY 2004

\*Accomplishments include projects completed using Forest Service and partnership funds combined

Discussed below are areas of accomplishment pertinent to stream channel reconstruction, wildlife habitat restoration, road decommissioning and sensitive plant restoration.

In FY 2008, the Chippewa’s Wildlife, Fish, and Rare Plants staff accomplished 30 projects totaling over \$464,000. Of these 30 projects, 22 were accomplished with partners, who include natural resource professionals from Tribal and governmental agencies, lake and watershed associations, local schools and universities, and civic organizations. These 22 partnership projects were accomplished by 16 partners who contributed over \$75,000 in goods and services for wildlife, fish, and naturewatch (interpretative) projects. Together we accomplished:

- 650 acres of terrestrial habitat improvements and 35 structural (wildlife) improvements
- 102 acres of lake/riparian habitat improvements & 4 miles of stream habitat improvements
- Maintenance and decommissioning of 20 forest-wide impoundments.
- 111 miles of shoreline habitat inventoried on 21 lakes and one river.
- 300 acres of Threatened, Endangered & Sensitive species habitat inventory (terrestrial & aquatic) for non-timber project related projects.
- 33 nest platforms, wood duck, Kestrel and owl boxes placed across the Forest.
- 1 administrative study on Goblin Fern (see Research & Studies section), and
- 5 naturewatch presentations on wildlife, fish, and rare plants which included “Bass Fishing on the Chippewa” aired on the North American Fisherman and “Take a Kid Fishing Events”.

Accomplishment data are stored in the Wildlife, Fish and Rare Plant Management System on line database at: [WFRP Management System Home - Watershed, Fish, Wildlife, Air & Rare Plants - USDA Forest Service](#)

*Woodcock Habitat*

On Blackduck District a decision for lowland brush shearing to improve habitat for the American Woodcock became a good example of facilitating the Executive Order on Hunting Heritage and Wildlife Conservation. The District collaborated with the MN DNR and Woodcock Minnesota to improve habitat near hunter-walking trails for a wildlife species experiencing decline.

*Road decommissioning*

Road decommissioning is defined as activities that result in the stabilization and restoration of unneeded roads to a more natural state. In order to meet the decadal objective of decommissioning 200 miles of road, the Forest would need to average approximately 20 miles of decommissioning per year. In FY 2008, 12.4 miles of system road was decommissioned and 14.6

miles of unauthorized (non-system) road. A total of 88 miles of system roads have been decommissioned since the inception of the Forest Plan. The decommissioning was completed through a mixture of tree plantings, placing rock berms at the entrances, and also through natural revegetation.

#### *Sensitive Plant Habitat Restoration*

For sensitive plant restoration the Forest has undertaken several projects in the last few years. Because restoration of plants takes several years to determine success, accomplishments have not yet been identified. Projects in progress include:

Transplanting and monitoring of *Botrychium* (moonworts) that were impacted during the 2002 Enbridge pipeline restoration. Details were included in the FY 2007 M&E Report, pp 78-79.

*American Elm Restoration* project is in progress. See details in the Research and Studies section at the end of this report.



#### *Canada Yew Planting*

Canada Yew (*Taxus canadensis*) is a Regional Forester Sensitive Species. Canada yew is an evergreen shrub that is native to cool moist area and is very shade tolerant. Populations can be easily eliminated by deer browsing. Planting of yew has been included in several recent project plans. The objective of the planting is to expand existing populations in an area known to be suitable for yew survival. Canada yew were planted in the spring of 2008 on Blackduck and Walker Districts. 250 seedlings were planted on each district. These were grown from cuttings collected a couple years ago and rooted at the Toumey Nursery.



#### *Showy Lady Slipper*

The Forest has developed a unique public-private partnership to mitigate and reduce impacts along 15 miles the Ladyslipper Scenic Highway. The major challenge of the partnership is to ensure that a population of several thousand Showy Lady's Slippers, the state flower of Minnesota, are not irreparably damaged or eliminated during the highway upgrade. The Pennington Orchid bog along this route, is one of the most prolific producers of orchids in the upper Midwest.

Accurate locations of the orchids (through GPS) are used to help design the road to maintain at least some of

the colonies. Having precise colony information also allows efficient transplant so that salvage operations can move the orchids to areas that contain a condition necessary for their survival. Plans are underway to transplant the flowers in 2009.

**Evaluation and Conclusions:**

The Wildlife, Fisheries and Rare Plants program on the Chippewa National Forest is implementing projects at a level consistent with that proposed in the Forest Plan for aquatic and terrestrial habitats enhancement and restoration. The program effectively leverages partnership funds to achieve program objectives, conduct surveys and inventories and outreach the public through educational programs.

Monitoring of recently decommissioned roads to ensure they remain effectively closed and are returning to a more natural state occurred and was reported in the FY 2005 and in the 2007 Monitoring and Evaluation Reports. Monitoring continues to occur on an annual basis.

**Recommendations:**

The program should continue active partnership outreach and look for further opportunities to restore sensitive plant habitats where necessary. The Fish and Wildlife Program should continue active collaboration with local DNR offices and the Leech Lake Band of Ojibwe Department of Resource Management and update and renew all applicable MOUs and working agreements with State, Federal, Tribal and user group partners.

Funding in other resource areas such as that for Watershed Restoration, Wildlife Habitat and Threatened, Endangered and Sensitive species protection should be directed toward road decommissioning and impoundment maintenance, prescribed burning in critical habitat areas, and operations when removal or closure of system or unauthorized roads meets objectives for those resources.

## **4. All-Costs**

**Monitoring Requirement:**

How close are projected costs with actual costs?

**Monitoring Drivers:**

Documentation of costs associated with carrying out the planned management prescriptions as compared with costs estimated in the forest plan (36 CFR 219.12(k) [3]).

**Background:**

The Forest Plan itself does not use cost estimates and does not propose objectives based on projected costs. It should be noted that during the analysis for alternatives for the Revised Forest Plan, budget constraints were used to estimate total Forest expenditures and applied to the alternatives. These expenditures, however, are not displayed in the FEIS. Details regarding expenditures are contained in the project record (FEIS, B-47). Regardless, a look at the annual budget and the changes from year to year in total and for each resource or fund area, may



provide some insight into when and where objectives become a challenge and are difficult to meet because of limited funds.

**Evaluation and Conclusions:**

**Table 12.** Budget allocations for the Chippewa National Forest for FY 2005 through FY 2008.

Fund	FY 2008	FY 2007	FY 2006	FY 2005
Inventory & Monitoring	\$ 591,900	\$ 434,000	\$ 494,000	\$ 864,000
Landownership Management	\$ 416,000	\$ 366,000	\$ 411,000	\$ 526,000
Minerals & Geology	\$ 152,000	\$ 96,000	\$ 105,000	\$ 150,000
Forest Planning	\$ 102,000	\$ -	\$ 50,000	\$ 183,000
Range	\$ 5,000	\$ 4,700	\$ 5,000	\$ 4,000
Recreation & Heritage	\$ 596,000	\$ 614,000	\$ 715,000	\$ 856,000
Timber	\$ 1,557,000	\$ 1,952,000	\$ 920,000	\$ 2,183,000
Vegetation, Watershed & Air	\$ 529,000	\$ 546,000	\$ 628,000	\$ 499,000
Wildlife & Fisheries	\$ 484,000	\$ 419,000	\$ 455,000	\$ 583,000
Rehabilitation & Restoration	\$ 26,000	\$ 13,000	\$ 19,640	
Facilities - Recreation	\$ 123,000	\$ 121,000	\$ 228,000	\$ 475,000
Facilities Maintenance	\$ 290,000	\$ 188,000	\$ 200,000	
Roads	\$ 826,900	\$ 758,300	\$ 697,000	\$ 950,000
Trails	\$ 175,900	\$ 156,600	\$ 168,000	\$ 209,000
Hazardous Fuels Reduction	\$ 615,000	\$ 741,000	\$ 826,000	\$ 1,192,000
Wildfire Preparedness	\$ 684,000	\$ 680,000	\$ 615,850	\$ 910,000
Land & Water Conservation Fund	\$ 70,000	\$ 70,000	\$ 61,000	\$ 69,000
Reforestation Trust Fund	\$ 270,000	\$ 321,000	\$ 314,000	\$ 565,000
Salvage Sales	\$ 620,000	\$ 650,000	\$ 800,000	\$ 900,000
10% Roads and Trails	\$ 1,000	\$ 165,000	\$ 187,000	\$ 133,000
Knutson-Vandenberg (KV) Funds - regular	\$ 905,000	\$ 777,000	\$ 800,000	\$ 878,000
KV - Regional Direction	\$ 947,000	\$ 899,000	\$ 778,000	
Recreation Fee Demo	\$ 365,000	\$ 375,000	\$ 447,000	\$ 319,000
Federal Highway Trust Fund	\$ 10,000	\$ 16,000	\$ 19,500	\$ 17,000
Federal Highway-- Planning Funds	\$ 6,000	\$ 19,500		
Federal Highway – Aquatic Passage	\$ 17,000	\$ 15,000		
Federal Highway – Marcell Discovery Center	\$ 280,721	\$ 161,764		
National Scenic Byways	\$ 10,000	\$ 56,000		
Maps for Visitors & Others	\$ 20,000	\$ 1,000		
Brush Disposal	\$ 5,000	\$ 2,000	\$ 1,000	\$ -
Quarters Maintenance	\$ 10,000	\$ 10,000	\$ 15,000	\$ 20,000
Coop Work -- Agreements	\$ 95,500	\$ 34,200	\$ 75,000	\$ 100,000
Coop Work – Non-agreement	\$ 96,000	\$ 52,800		
Timber Pipeline -- Recreation Backlog	\$ -	\$ -	\$ 151,000	\$ 200,000
Timber Pipeline – Botanical Products	\$ 2,000	\$ 2,000	\$ 3,000	
Timber Pipeline – Timber Sales	\$ 102,000	\$ 77,000	\$ 158,500	\$ 372,000
Cost Pools	\$ 1,649,020	\$ 1,759,400	\$ 2,432,842	
<b>Grand Total</b>	<b>\$ 13,138,941</b>	<b>\$ 12,556,164</b>	<b>\$ 12,780,332</b>	<b>\$ 13,157,000</b>

Although the overall budget allocation increased by about \$500,000 since FY 2007, the total budget is still slightly less than that for FY 2005. From the above table, a downward trend since 2005 is still evident for recreation & heritage, timber, hazardous fuels reduction, salvage sales, and 10% roads and trails. In contrast, the following areas showed a substantial increase since last year: minerals & geology, vegetation, watershed & air, facilities maintenance, and all KV funds.

Although Regional direction has been to fully implement the Forest Plan, it becomes a challenge in that we are required to do more with less. Dollars received do not necessarily align with the identified workload. The FS does not have the discretion to use dollars from one funding area to do work in a different resource area.

### **2008 Agreements**

In 2008, the Forest entered into 37 new agreements and completed 22 modifications of existing agreements bringing the total value of agreements to \$620,000.86. Of this amount, \$363,991.06 was provided by our cooperators as cash, in-kind or non-cash support to the work completed in these partnership agreements.

The cooperators and projects involved in these partnership agreements provide for a wide variety of work that is accomplished on the Chippewa. Of the 37 new agreements, 11 were new or renewed Cooperative Fire Protection Agreements with local fire departments and the Leech Lake Band of Ojibwe. We provided various work opportunities to the Minnesota Conservation Corps Young Adult and Youth Program with projects such as white pine pruning, road decommissioning work, stairway construction at Norway Beach Recreation Area, the creation of a pollinator garden at the Blackduck Ranger District office and resurfacing of the Lost 40 Trail, which was completed in partnership with the Minnesota Department of Natural Resources.

The Forest also continued its support of local colleges in providing internship opportunities for students in a variety of natural resource related areas. A new partnership with the Leech Lake Tribal College provided four students from the Science, Technology, Engineering and Math (STEM) program internship opportunities during the summer of 2008. Along with the Leech Lake Tribal College students, the Forest also continued its partnership with the Itasca Community College Wildland Firefighting program in providing training opportunities and internships in wildland and prescribed fires.

For the second year in a row, the Forest partnered with the Leech Lake Band of Ojibwe in the clean-up of illegal dumpsites located on National Forest and Leech Lake Reservation lands. This partnership has received an award from the R9 Regional Forester to help protect ecosystems across boundaries.



Special projects such as the Edge of the Wilderness Discovery Center took shape during 2008. Various agreements to support the design, construction and operation of the Edge of the Wilderness Discovery Center in Marcell, MN were established.





We also received funding and support from partners for the first year of the Rabideau Conservation Academy, located at Camp Rabideau on the Blackduck Ranger District. The Forest, the Red Lake Band of Chippewa, and the Minnesota Conservation Corps are planning together to make a youth Conservation Academy a reality.

Some specific highlights on agreements and partnerships include:

- On Blackduck District a decision for lowland brush shearing to improve habitat for the American Woodcock became a good example of facilitating the Executive Order on Hunting Heritage and Wildlife Conservation. The District collaborated with the MN DNR and Woodcock Minnesota to improve habitat near hunter-walking trails for a wildlife species experiencing decline.
- The Jessie Lake Interagency partners will undertake an analysis for their EPA-listed Impaired Water. The partner group includes the Itasca Soil and Water Conservation District, the Pollution Control Agency and others along with the MN DNR, Chippewa National Forest and Jessie Lake Association.



- The Chippewa National Forest received a collaborative grant from the National Forest Foundation. With a focus on impacts of non-native earthworms and mitigations, the funding will bring together various stakeholders and scientists involved with this issue in the Lake States. Stakeholders may include bait dealers, logging industry, environmental groups, ATV clubs and resort associations, and any group that may be connected to the transport of earthworms. Natural Resources Research Institute (NRRI) in Duluth will be the lead, and the group will include Leech Lake Band of Ojibwe and Minnesota Department of Natural Resources.
- Project Learning Tree/Project Wild workshops for area teachers were held in partnership with Sappi Paper Company, the Grand Rapids Forest History Center, and the Chippewa National Forest. Instruction at a workshop provides teachers with curriculum materials to teach natural resource subjects in and outside of the classroom.



- The Chippewa National Forest's Boy River Prescribed Burn partnership was selected for a national Wings Across the Americas "Habitat

and Partnership" award for habitat improvement affecting the Yellow Rail. This fire-dependant wet meadow has had one rotation of fire to each part of its ecosystem, which provides habitat for Yellow Rail and other wetland species. Partners include the Chippewa National Forest, Leech Lake Division of Resource Management, Cass County, two DNR Regions, and multiple private partners.

- A Forest Insect and Disease Workshop was coordinated by the forest and hosted by the Northern Research Station– St. Paul office and the MN Department of Agriculture. The workshop focused on what to watch for pending the arrival of the emerald ash borer, silviculture guidelines for ash stands, the gypsy moth and sirex wasp. Over 40 people attended the Forest Insect and Disease Workshop March 25<sup>th</sup> from Chippewa National Forest, Minnesota DNR, Leech Lake Division of Resource Management and BIA.

### ***Stewardship Contracts***

The general purpose of stewardship contracting is to achieve land management goals for National Forest lands while meeting local and rural community needs. Stewardship contracts should be used when it is the most effective tool for accomplishing land management objectives.

The Chippewa National Forest has seven on-going stewardship projects. Three have been awarded as contracts to local people. The other four are approved and will be awarded as contracts in the next couple of years. Details of those projects are listed below:

- The contract for the ‘Little Pinky’ stewardship project was awarded to the Leech Lake Band of Ojibwe (LLBO) in August, 2007 and will thin the density of two red pine stands and reforest seven permanent openings (14 acres) on the Blackduck district. Service work (site preparation for the opening planting) is about two thirds complete. Timber harvest is scheduled to begin in 2009. This sole source contract was designed to build relationships between the LLBO and the Forest Service as well as to accomplish resource work.
- The contract for the Juvenile Aspen Stewardship project was awarded in July 2007 to harvest young aspen and restore structural and compositional diversity to a 276 acre area on the Deer River district. After harvest, service work is to include planting white pine in the openings created by the harvest. Work is scheduled to begin in 2009. This was a competitively bid contract.
- The contract for the Nellie stewardship project was awarded to Cass County in September 2006 to harvest a variety of timber stands on the Walker district. Work included demolishing buildings from the former Cedar Spring Resort and restoring the resort site as a day use picnic area for public use as well as harvesting in selected stands. The buildings have been taken down and the site cleaned up. Timber harvest is under way and about half completed. This was a sole source contract between Cass County and the Forest Service designed to build relationships, provide a public recreation area, and accomplish resource work.

- The Northwoods stewardship project on the Blackduck district was approved in August 2007 and amended April 2008 to decommission roads and reconfigure specific roads into primitive trails. Approximately 15 miles of trail will provide access into the newly designated North Winnie Semi-primitive Non-motorized area. Harvest will consist of red pine thinning and hardwood management. This project will be designed for competitive bid. It is anticipated the contract and solicitation will be completed in 2009.
- The Lydick Stewardship project on the Blackduck district was approved in August 2007. This project was approved to harvest and regenerate jack pine as well as treating hazardous fuels in the area. An added benefit from the harvest is the resulting condition suitable for blueberry production, a traditional use plant important to the Leech Lake Band of Ojibwe. This project is also intended to be a sole source agreement between the LLBO and the Forest Service to help restore traditional plants and foster better relations about trust responsibilities. Contract development is anticipated in 2010.
- The Cuba Stewardship project on the Walker district was approved in October 2008. This project was approved to harvest timber, primarily aspen and hardwoods, scarify and seed the harvested areas with jack pine and decommission roads. This contract is intended to be competitively bid. It is anticipated that this contract would be offered in 2010.

## 5. Off-Highway Vehicles (OHVs):

### Monitoring Question:

To what extent is the Forest providing OHV opportunities, what are the effects of OHVs on the physical and social environment; and how effective are forest management practices in managing OHV use?

### Monitoring Driver – Desired Condition and Objectives:

The Forest Service OHV management is predicated on a number of policies, rules, regulations; including those detailed below.

36 CFR 219.21[g]. Off-road vehicle use shall be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the NF system lands. Forest planning shall evaluate the potential effects of vehicle use off roads and on the basis of the requirements of 36 CFR 295 part of this chapter, classify areas and trails of NF system lands as to whether or not off-road vehicle use may be permitted.

D-OHV-1 The forest provides OHV road and trail riding opportunities with experiences in a variety of forest environments, while protecting natural resources.

D-OHV-2 Allowed, restricted, and prohibited OHV uses are clearly defined to the public. Where practical, OHV policies are consistent with adjacent public land management agencies.

O-OHV-1 The Forest will determine which existing OML 1 and OML 2 roads are appropriate or inappropriate for OHV use.

O-OHV-2 A maximum of 90 additional ATV trail miles and 100 snowmobile trail miles with associated trail facilities (trailhead parking, signs, toilets, etc.) may be added to the designated NF trail system.

**Background:**

This monitoring information will be used to implement the Forest Plan and the National Travel Management Rule (2006). Travel Management Rule expectations are described below. There continues to be no cross country use of motorized vehicles on the Chippewa NF.

*Travel Management Rule:*

The Travel Management Final Rule (2006) provides expectations for OHV travel access management on the National Forests. The intent of the Rule is to provide regulation of OHVs as a result of the tremendous increases in the number and power of OHVs; widespread environmental and social impacts from unmanaged recreation; while recognizing that motorized recreation is a legitimate use of National Forest system lands in the right places.

*CNF Off-Highway Vehicle Road Travel Access Decision:*

The OHV Decision resulted in OHV access rules and policy summarized for Operational Maintenance Level roads as follows:

- There is no motorized cross-country travel.
- OML 1 roads are closed to all motorized travel.
- OML 2 roads may be designated for OHV travel and/or highway licensed vehicle travel.
- OML 3 and 4 roads may be designated for OHV travel in conjunction with existing highway licensed vehicle travel.
- OML 5 roads are closed to all OHV travel.

Additional Forest Service system road and OHV access information:

Some roads are currently closed to OHVs and/or highway licensed vehicle use for a variety of reasons. Reasons for closures include Forest Service policy, natural resource concerns and social issues described as follows:

- OML 1 Forest Service System Roads: OML 1 roads, the lowest standard of developed roads, are considered by policy (FSH 7709.58) to be closed to all vehicle traffic. These roads are not maintained for any vehicle use.
- Right of Way: Some FS system roads cross private lands. On some of these roads FS jurisdiction may not be fully verified.
- Previously Designated Closures: Prior decisions involving past management projects that the CNF has done may have closed and/or decommissioned roads.
- Resource Protection: Resource protection includes recognition of wetlands; sensitive resource conditions; or soil erosion conditions. Some roads have been closed that could least accommodate OHV use given resource conditions. Many of these roads would require significant realignment, re-routing, reconstruction, ditching, and other major improvements to meet guidelines established for road maintenance and user safety or to protect other resources.

- Forest Plan Management Area or Recreational Facility Protection: Some roads have been closed as part of Forest Plan direction or have regulatory issues within or directly adjacent to semi-primitive non-motorized management areas, research natural areas, and unique areas as identified within the Forest Plan, hunter walking trails and the North Country National Scenic Trail.
- Threatened, Endangered, Sensitive Species: Habitat of a variety of threatened, endangered, or sensitive species has been inventoried and roads that affect this habitat have been designated as closed in accordance with the species recommendation in the CNF Forest Plan.
- Roads that travel through sensitive soil types on the CNF will be closed to motorized vehicles over 1,000 pounds to protect natural resources and the road infrastructure.
- Roads that travel through threatened, endangered, or sensitive species habitat areas requiring limited access will be closed during times specified within the Forest Plan to that species.
- All roads open to OHVs will be closed to OHV use from March 15 to May 1 to improve enforceability and provide protection of the road bed.
- Road number identification signs will correlate with identification numbers on the Motor Vehicle Use map.

The following table indicates miles of road open and closed to OHV use by road operational maintenance level.

**Table 13.** Miles of Forest Service System Roads Open or Closed to OHV Use

Forest Service OML Road	Road Miles Open to OHV Use	Road Miles Closed to OHV Use
OML 1	0	377
OML 2	1,214*	477
OML 3	107	76
OML 4	165	81
OML 5	0	27
<b>Total</b>	<b>1,486</b>	<b>1,038</b>

\* 110 miles of roads are closed seasonally for threatened, endangered or sensitive species habitat protection.

*Motor Vehicle Use Map:*

The CNF Motor Vehicle Use Map (MVUM) identifies those roads and trails designated for motor vehicle use, including OHVs. The MVUM is the legal reference for roads open for OHV use on the Chippewa NF. The first edition of the CNF MVUM was distributed in 2008 with over 5,000 maps given to forest visitors.

*Law Enforcement:*

There are two law enforcement officers and 21 forest protection officers on the CNF. Enforcement of forest orders and other appropriate 36 CFR regulations occurs as needed on the Forest. For many years, including 2008, there has also been a Cooperative Law Enforcement agreement with Cass and Itasca Counties that provides for a county deputy to work a certain number of days per year that are concentrated on National Forest land.



*ATV Trail:*

The Soo Line Motorized Trail is currently the only designated ATV trail. It is approximately 20 miles and is a designated snowmobile trail in the winter.

**Monitoring Activities:**

*Monitoring through implementation of the Motor Vehicle Use Map (MVUM):*

The MVUM has been available since April, 2008. Over 7,000 copies of the map have been distributed during the intervening year, enabling people to use the maps to travel with their OHVs in the Chippewa NF.

During this year, changes in road access for motorized vehicles has been proposed and implemented. Forest projects, through the environmental assessment analysis, have closed roads and opened roads to OHV and/or highway licensed vehicle travel. Forest managers have been able to ground-truth some Forest Service system roads in terms of the 2007 Travel Access Decision. With additional in-depth knowledge of roads as it lies on the ground, a review of the appropriateness of the 2007 OHV Travel Access Decision has been done. Also, many individuals have commented to land managers about roads they are interested in and whether that road should be open or closed to OHV travel. Many times a single road would garner comments from people wanting opposite decisions about the road motorized accessibility. Miles of OHV access potential change across the Forest will be identified in the 2009 Monitoring Report.

The MVUM will be reprinted the spring, 2009. The 2009 edition will incorporate some changes in road access for OHVs as recognized via the environmental assessment process and through administrative decisions.

*Monitoring Road Closure Effectiveness:*

The effectiveness of existing road closures continues to be monitored. Information was gathered the field season of 2008. The information contained in this report is important to OHV use on the CNF because approximately 854 miles of roads of low standard roads are closed to OHVs and many of these roads have some form of visual closure devices. Field information indicates issues with the effectiveness of some closure devices and signing.

*Monitoring the Soo Line Trail:*

The Soo Line continues to be the only designated motorized ATV trail. Field observations of the Soo Line do not indicate any resource damage as a result of ATV use.

*Monitoring through the OHV Core Team:*

An OHV Core Team has been established on the CNF. Membership includes District Rangers, Recreation Program Managers and Public Contact Specialists; Supervisor's Office GIS, Transportation Planner, Forest Recreation Program Manager, Recreation Planner and Public Affairs; and Law Enforcement Officers. The charter of this group includes integration, planning, monitoring, and facilitation of OHV management across the Forest.

*Monitoring through Public Contacts:*

The MVUM has been available through the latter half of 2008, including big game hunting season. Forest Staff received approximately 100 written and verbal comments about roads open or closed to OHVs. Many of these comments were a result of people looking closely at the MVUM, riding the routes and conversations with FS Law Enforcement personnel.

Many people come into or called the District or Supervisors offices to find out more about the OHV policy and/or to comment on the policies. These conversations tend to occur at times of the year with higher OHV use – generally the fall and hunting seasons.

Public contacts are made year-round as FS employees talk with people that are using OHVs out in the Forest. This year, there was an emphasis on public contacts in the field in conjunction with the few days prior to the opening of deer hunting rifle season.

*Monitoring through Law Enforcement:*

Law enforcement personnel, (including Forest Service, State, Counties, Local and Tribal officers), monitor and respond to activities and behavior on the National Forest and adjoining lands. The primary intent of law enforcement contacts this year with OHV riders is one of education. Informing and educating people where legal riding opportunities exist through the MVUM and other OHV policies took precedence over issuing tickets (unless the behavior warranted a ticket in the Officer’s opinion). Following is a table indicating criminal OHV offenses by year as recorded in the Law Enforcement Annual Report (LEIMARS records).

**Table 14.** Summary of Law Enforcement Reports Related to OHVs

Incident	2002	2003	2004	2005	2006	2007
OHV	21	142	52	71	62	109

Criminal offenses relating directly to the illegal use of OHVs including CFR 261.56 (possesses or uses vehicles off road); 261.54A (using vehicle on road closed by order) are number two and four in the top ten offenses on the Chippewa in 2007.

**Evaluation and Conclusions:**

The outcome of monitoring is potential change in management within the context of the Forest Plan. The work done to implement the Forest Plan and Travel Management Rule is ongoing, iterative and specifically involves many components such as roads, signs, trails and available motor vehicle use maps, and law enforcement.

Collaboration with the Minnesota DNR, Itasca, Cass and Beltrami Counties and the Leech Lake Band of Ojibwe Department of Resource Management continues to be crucial for the visitor to the area and to the successful management of natural resources, social and economic conditions and infrastructure such as national forest roads.

*Public Contacts:*

Law enforcement personnel and other Forest employees talked to many people using OHVs (generally ATVs) out in the forest and on roads. These one-on-one conversations are an effective



means of communicating the CNF OHV regulations to an individual. Explanations of legal access, utilizing the MVUM, answering questions and conversations result in a more informed OHV user.

Ranger and Supervisor Offices have a public information employee that is the first contact for most visitors to the offices. The public contact staff answers OHV related questions and may refer people to others who are able to help. Many common questions were identified, resulting in a proposal to establish a “frequently asked question with an answer” paper to be made available to the public and employees. The questions and answers are under development to be completed spring 2009.

*Law Enforcement:*

Offenses are combined for reporting purposes into categories and reported in the Eastern Region-Northwest Zone Law Enforcement Annual Report. OHV offenses may be included in 1) occupancy and use offenses and 2) travel management restrictions on and off road offense categories. The trend from 2002 to 2007 has reflected an increase in the number of reported OHV incidents. Fluctuations in incidents can be accounted for a change in directed priorities of the law enforcement officers and a change in the numbers of forest protection officers. Qualitative information from Forest Service employees reflects no decrease in the illegal use of OHVs on the Forest over the past years.

The Law Enforcement Agenda and Action Plan for FY 2008 discusses continuing to assist Forest manager with the implementation of the travel management decision through public education, review and revision of Forest Supervisor’s orders, design and placement of road closures and postings. The Patrol Captain will coordinate with the CNF to ensure OHV rules are incorporated into widely dispersed documents such as the many different hunting regulation booklets. The Law Enforcement Officers will also assist Districts with the inventory and monitoring of unauthorized roads and trails.

The focus of law enforcement regarding the use of OHVs on the CNF during 2008 was to educate visitors on legal locations to ride. Blatant illegal use such as cross-country use (cross-country use has been illegal on the CNF since 1986) of OHVs was ticketed. Beginning in 2009, law enforcement intends to continue to educate OHV users, but will ticket people that are not legally using their equipment.

*CNF Road System and OHV use:*

The CNF system road connections and loops between local communities and locations within the CNF provide for longer OHV riding opportunities. There is also access to specific areas of the Forest on roads that bring the rider in and out on the same road. Forest Service system roads that are not gated or otherwise closed, continue to be open to highway-licensed vehicles during hunting seasons. There are no roads specifically opened for OHV access only during hunting season.

Roads are closed over the year due to a variety of reasons and subsequent decisions. Some Forest Service system roads have been closed to motor vehicle use due to environmental assessment related decisions such as timber sales. Other roads are closed due to new natural resource or road status information. Some unauthorized roads and/or corridors through the woods are closed,

especially if illegal OHV use is indicated. To use an unauthorized road with a motor vehicle is to be traveling cross-country – an illegal activity in National Forests.

The Chippewa NF has closed roads with a variety of methods over time. Some methods have been found to be more effective in a given circumstance than others. Gates, berms, rocks, vegetative closures (downed trees and brush, etc.) or a combination have all been used. Closures have been found to be successful in approximately 62% of the time. (2007 Road Closure Report, CNF).

Many roads have existing closures for motorized vehicles. Some closures prevent motorized travel, some do not. Forest Service employees and volunteers have worked as money and time permit to close a number of roads over the past year to motorized travel. Examples of closure locations include corridors or unauthorized roads accessing the forest interior and woods roads/trails accessing non-motorized trails such as hunter-walking trails and the North Country Scenic Trail.

Monitoring of road closures has found that few historically standard closures such as gates, berms and/or rocks across the roadway can close a road to an ATV rider intent on using the road. Road closures must be done effectively and the specific strategy is dependant on the road and its' environment. Examples of effective closures include: large rocks weighing 5,000 pounds or more have been found to not be movable with an ATV and felling vegetation and brushing in a road for more than 50 feet in the road corridor. Other opportunities to implement successful closures based on the site should be taken every time a road is closed to OHVs and/or decommissioned.

#### *Motor Vehicle Use Map:*

The motor vehicle use map has been available free to the public since April of 2007. The MVUM is the legal reference and indicates the routes that OHVs may be legally driven on. The intent of the Transportation Rule and the CNF Off-Highway Travel Access Decision is that the system of roads available for OHV use will be monitored each year and adjustments made as appropriate. Public comments combined with CNF staff review of the existing OHV and other motor vehicle use opportunities have resulted in proposals to change motor vehicle access on some roads. These proposals will be reviewed in 2008 for potential changes to OHV access on CNF system roads and included in the 2009 edition of the MUVUM.

#### *Signing for OHV Use Along FS System Roads:*

A sign plan for OHV use on FS system roads was developed and implemented in 2007. Through a contract most of the system roads available for OHV use were signed. The sign indicates to the OHV driver that the road is available to ride an OHV on and also the length of the road is indicated in miles. Signage outside of the sign plan indicating no OHV use was also installed along a few roads. While these signs brought the message directly to the attention of OHV riders that were riding illegally along the road, the signs will not be installed on other roads. At issue with "closed to OHV" signs is the non-positive message, non-inclusion in the MVU map; cost of installation and maintenance. The MVUM, in conjunction with the OHV/mileage sign are appropriate legally to indicate where people may ride their OHVs on the Chippewa National Forest.



Damage at Milton Lake, Walker Ranger District, ATVs illegally accessing the riparian area and the North Country Trail.

Unauthorized road, Deer River Ranger District, illegal ATV use.



Minnesota Conservation Crew felling trees for a vegetative barrier across an unauthorized road with illegal ATV use.

## 6 Wildlife: Management Indicator Species

### Monitoring Questions:

What are the population trends of management indicator species?

To what extent is Forest Management contributing to the conservation of sensitive species and moving toward short term (10-15 years) and long-term (100 years) objectives for their habitat conditions.

### Monitoring Driver—Desired Condition and Objectives:

36 CFR 219.19(a)(6). Population trends of the management indicator species will be monitored and relationships to habitat changes determined. This monitoring will be done in cooperation with state fish and wildlife agencies, to the extent practicable.

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

- e. Provide for the desired quality and quantity of habitat for management indicator species and indicator habitats.

O-WL-1 Populations: Provide ecological conditions to sustain viable populations of native and desired non-native species and to achieve objectives for management indicator species and management indicator habitats.

O-WL-15 Promote the conservation and recovery of the bald eagle. Population goal minimum: 150 occupied breeding territories.

O-WL-16 Promote the conservation and recovery of the gray wolf. Population goal minimum: contribution to state-wide goal of 1250-1400.

O-WL-17 Maintain, protect, or improve habitat for all sensitive species.

Meeting this objective will involve two basic and complementary strategies that would be implemented based on species' habitat requirements and distribution, individual site conditions, expected management impacts, and other multiple use objectives. These strategies include:

- a. Landscape level (or coarse filter) management strategies: Addressing species' needs through integrated resource management at large landscape scales including, but not limited to: Landscape Ecosystem or Landtype scales for vegetation and management indicator habitat objectives; watersheds for aquatic and riparian condition objectives; and Management Areas for desired or acceptable levels of human uses.
- b. Site-level (or fine filter) management strategies: Addressing species' needs by managing specifically for high quality potential habitat or known locations of sensitive species.

O-WL-32 Provide habitat to provide for population goal minimum: 20-30 breeding pairs (Northern goshawk).

O-WL-33 Increase amount of white pine to amounts more representative of native plant communities by planting or naturally regenerating white pine trees in white pine forest types and



in other upland deciduous, mixed, and conifer forest types. This objective matches white pine objectives shown in the Landscape Ecosystems Objectives section.

**Background:**

This resource area monitors and evaluates population trends of designated Management Indicator Species (MIS). Management Indicator Habitats (MIH) were also identified for the Chippewa National Forest and along with MIS will be used to analyze the potential effects of management practices on wildlife habitats and populations. The monitoring and evaluation of MIHs began in 2006.

MIS are defined as species monitored over time to assess the effects of management activities on their populations and the populations of other species with similar habitat requirements (Forest Service Manual 2620.5). The rationale underlying the MIS concept is that by managing for and conserving the habitats in which MIS occur, other species that depend on these habitats would also be provided for. The Chippewa National Forest (CNF) has identified four MIS: gray wolf, bald eagle, northern goshawk and white pine. All four of these are species of high public interest, address major management issues, and can be practically monitored. Finally, the CNF and the other National Forests in the western Great Lakes region play a major role in contributing to the overall conservation of these species.

Gray wolf was selected as a management indicator species because:

- it was listed as a federally threatened species at the time of FP revision;
- the potential for impacts from National Forest management to affect its habitat, and existing opportunities to enhance wolf recovery efforts (FSM 2621.1); and
- the potential for management activities and human access/development to affect changes in wolf populations, prey habitat, and related prey species (deer, moose, and beaver).

Bald eagle was selected as a management indicator species because:

- it was listed as a federally threatened species at the time of FP revision;
- the potential for impacts from National Forest management to affect its habitat, and opportunities to enhance recovery efforts (FSM 2621.1);
- changes in eagle populations and habitat can indicate effects of management on other species requiring mature riparian forest; and
- it addresses major management issues related to riparian forests, large old trees and watershed health.

Northern goshawk was selected as a management indicator species because:

- population changes may indicate effects of management;
- it is a Region 9 Regional Forester's sensitive species;
- its habitat associations are well-documented in literature;
- it can function as an umbrella species – (its large area requirements and use of multiple habitats encompass habitat requirements of many other species); and
- its breeding productivity and population and habitat trends can be monitored at site and landscape level.

White pine is a high profile tree species in the forests of northern Minnesota and was selected as a management indicator species because:

- population changes are believed to indicate effects of forest management;
- it is a species with many social, economic and ecological values.
- it addresses major management issues about how much and where to promote white pine for its important wildlife habitat features, timber value, scenic quality and role in maintaining ecologically healthy forest composition and structure; and
- it is considered to be a keystone species, in that its overall effects on critical ecological processes and biodiversity are greater than would be predicted by its abundance.

The gray wolf and bald eagle were designated as MIS under the 1986 Land Management Plan for the CNF. As MIS, they have been monitored for the past 20 years. The northern goshawk and white pine are new MIS.

### **Monitoring Activities:**

#### **Gray wolf:**

The Minnesota Department of Natural Resources (MN DNR) has monitored its statewide wolf population since the late 1970s. These surveys are expected to obtain data on wolf distribution and abundance in Minnesota. In the last 30 years, the survey methods have remained relatively consistent, using several combined sources of data. Previous surveys have taken place at 10-year intervals (1978-79, 1988-89, and 1997-98). However, in anticipation of a federal de-listing proposal in 2004, the survey interval was lowered to 5 years, and following federal de-listing in 2007, MN DNR decided to move forward with another comprehensive wolf population and distribution survey conducted during the winter of 2007-08. As with past comprehensive wolf surveys, the CNF is contributing observation information to this survey.

The MN DNR mails out instructions, data forms, and maps to cooperating natural resource agencies and consultants including: MN DNR, USDA Forest Service, US Fish and Wildlife Service, USDA Wildlife Services, US Geological Survey, Tribal and Treaty Resource Authorities, County Land Departments, Camp Ripley, Voyageurs National Park and forest products industries and consultants. Cooperating participants are asked to record a location and group size estimate for all wolf sign (visual, track, scat) observed during the course of their normal work duties from October 2007 through April 2008. The MN DNR then uses this information, along with other wolf and deer data, to compute the total wolf range and the total occupied range, as well as estimate the wolf population within the state of Minnesota (MN DNR, 2005). The MN DNR maintains and stores the data collected.

#### **Bald eagle:**

The Chippewa National Forest has been monitoring bald eagle populations within its proclamation boundary for over 30 years. Nesting activities are monitored by air. All known eagle nests within the CNF proclamation boundary are mapped and visited by fixed-wing airplane twice during the nesting season. An April activity flight is made to ascertain whether known nest areas are 1) occupied (eagles within the vicinity of a nest), 2) active (eagles on the

nest or eggs visible), or 3) inactive (no eagles in the vicinity of the nest). All new nests detected along the flight path are recorded similarly and added to the list of known nest sites. A second productivity flight is made in July to record the number of eagle chicks in or around all previously identified active nest sites.

Nest locations are on an ARCINFO GIS coverage, and activity and productivity data collected from the eagle flights are stored in the FAUNA module of the Forest Service's Natural Resource Information System (NRIS).

### **Northern goshawk:**

Individual known goshawk nest sites occurring on the CNF have been monitored for approximately 10 years in order to determine if the nest structure still exists, the nest site is active, and the pair was successful at fledging young. This monitoring has been and continues to be an important aspect in assessing northern goshawk populations and habitat conditions on the CNF, in Minnesota and in the western Great Lakes region. The methodology of monitoring nesting activity and productivity at known nest sites consists of conducting specific survey activities at certain times of the season based on goshawk nesting chronology. The detection of nesting goshawks is fairly reliable because this species is highly responsive to conspecific alarm calls during the pre-incubation or courtship stage, when the nesting pair is establishing a nest. The methodology for detecting nesting goshawks has been described in the literature (Kennedy and Stahlecker 1993, Roberson 2001). More recently, Andersen et al. (2003) described the protocol they developed for monitoring goshawk breeding activity. Three types of surveys are conducted during the monitoring season: occupancy surveys, nesting surveys, and nesting success surveys.

- Occupancy surveys are conducted to detect whether goshawks are present within the territory. These surveys occur from early March through mid-April. They may include a combination of nest observation and broadcasting goshawk alarm calls at various distances within a 500m radius of all known nest sites within a particular breeding territory. Some follow-up occupancy surveys may occur in June.
- Nesting surveys are conducted for those breeding territories in which goshawk activity was detected during the occupancy surveys. The nesting surveys are conducted in late April or May during the incubation period. They consist of quietly entering an area where there is some reason to suspect activity, but where nesting activity had not been confirmed. The primary objective of this survey is to confirm nesting so that a territory can be classified as "Active".
- Nesting success surveys consist of quietly entering the nest area and searching for chicks within all previously identified active nest sites. These surveys occur in June and July during the fledging period, in order to determine the final reproductive outcome at that nest. The area within 100 meters of the active nest is searched for chicks to determine whether the breeding outcome was a success or failure.



These surveys have been conducted by CNF and MN DNR personnel as well as goshawk researchers from the University of Minnesota. Recently, the known goshawk territories on the CNF have been monitored as part of the Northern Goshawk Monitoring Project undertaken by the MN DNR non-game program. This project has been on-going since 2003 and its primary objective is to assess occupancy and productivity of known goshawk territories in northern Minnesota. This productivity data is stored, maintained, and shared with other agencies by MN DNR.

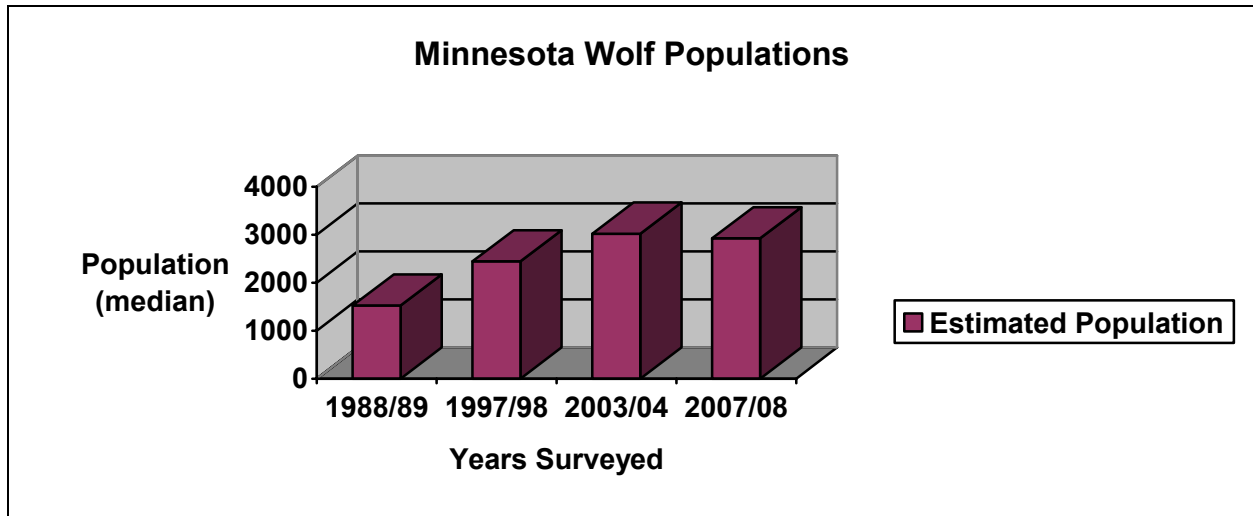
Nest locations are on an ARCINFO GIS coverage, and activity and productivity data are stored in the FAUNA module of the Forest Service's Natural Resource Information System (NRIS).

### **Evaluation and Conclusions:**

#### **Gray wolf:**

Wolf populations in the western Great Lakes have exceeded federal recovery goals for numerous years. This information led to actions to remove the species from the federal list of threatened and endangered species, and in February 2007, the western Great Lakes gray wolf population, which includes Minnesota, was de-listed. However, in September 2008, a Federal Court vacated the final rule and remanded the decision by the USFWS to de-list the gray wolf. This ruling to once again list the gray wolf as a threatened species under Endangered Species Act on the Chippewa NF did not impact the NFWF program in FY2008 due to the ruling taking place so late in the fiscal year

In recent years, there has been a gradual, long-term increase in the number of wolves in Minnesota. Although the Chippewa National Forest was not considered to be critical habitat for the wolf, it plays an important role in maintaining and sustaining wolf populations above the recovery goals due to a considerable amount of suitable habitat for the species and its prey. For the first time since consistent surveys were initiated in the late 1970s, total wolf range in Minnesota did not increase, and estimated occupied range declined only slightly. The 2007/08 population size estimate (2,921 wolves) is slightly smaller than in 2003/04; however, confidence intervals for the last two population estimates are largely widely overlapping. The MN DNR concludes that there has been no significant change in the distribution or abundance of wolves in Minnesota since 1997. In 1997-98, the survey estimated 2,445 wolves ranging over roughly 34,000 square miles of the state. This current wolf population estimate far exceeds the recovery plan goal of 1250-1400 wolves in Minnesota, as well as the MN DNR wolf plan's minimum population goal of 1,600 wolves to ensure the long-term survival of the wolf in Minnesota. Details of wolf survey methods, results and discussions can be found in the MN DNR report entitled "Distribution and Abundance of Wolves In Minnesota, 2007-08" authored by Erb and Benson.



The wolf population will continue to be monitored through population surveys every five years. The Endangered Species Act requires the U.S. Fish and Wildlife Service to monitor wolves in Minnesota for five years after de-listing to ensure that recovery continues.

**Bald eagle:**

Productivity flights were not completed on the Chippewa National Forest in 2008. Activity and productivity flights were last conducted for bald eagle surveys in 2007. A total of 259 nests were surveyed. Of these, 113 nests were active, meaning that eggs were visible or an adult was observed incubating on the nest. Of these 113 active nests, 55 of them were successful in raising at least one chick to the fledgling stage. A total of 66 eagle chicks were observed during the productivity flights; 0.58 young fledged per active nest (44 nests with 1 chick, 11 nests with 2 chicks). This productivity is up slightly from 2005, the last year bald eagles were monitored on the Chippewa, when the average was 0.41 young fledged per active nest.

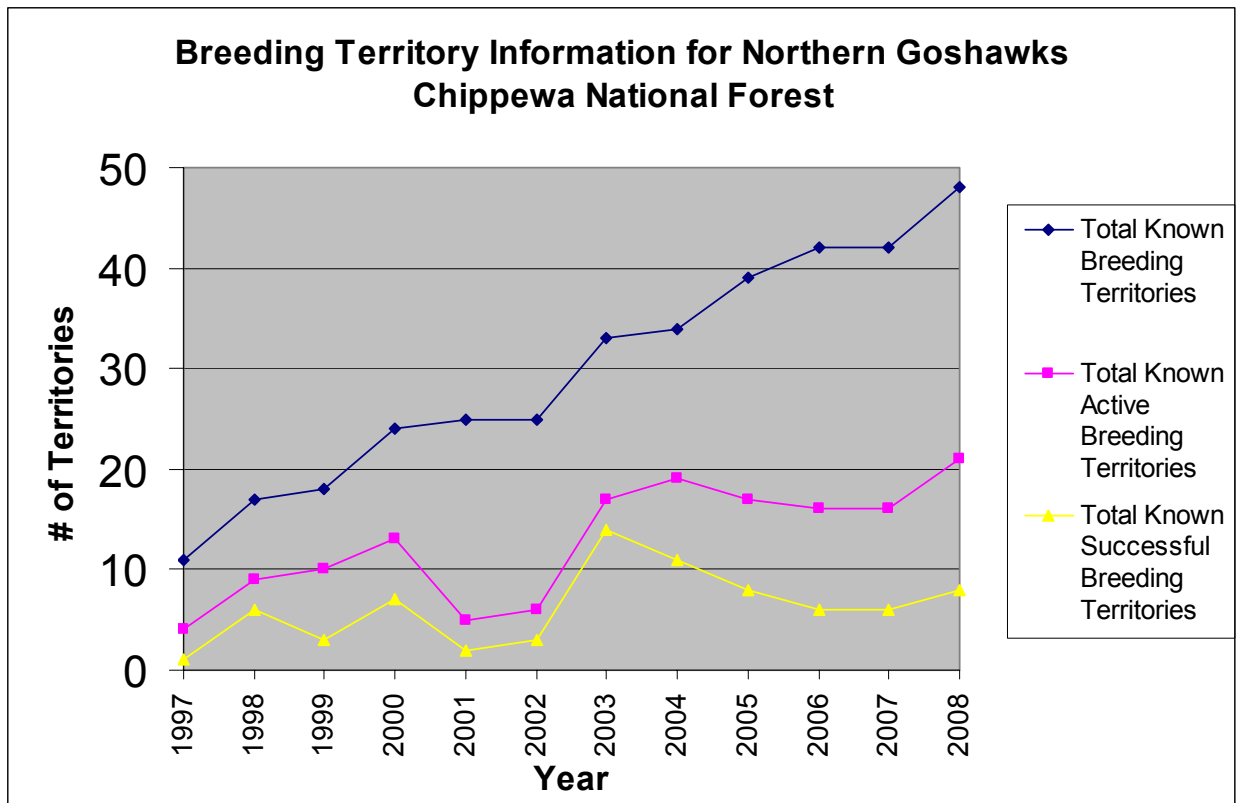
For the period from 1987 thru 2004 (18 years), Chippewa bald eagle monitoring shows an average of: 151 (range, 88-189) active breeding pairs; 96 successful breeding pairs (range, 66-108); and 1.02 young fledged per active nest (range, 0.76-1.39).

The total number of active eagle nests, the number of successful nests, and the number of fledged young per active nest are all below those recorded in the past. It is difficult to determine whether or not to attribute this to observer differences, timing of the flight, weather conditions during the nesting period or just a biological aberration for that year. While the increasing competition among breeding pairs at higher nesting densities is thought to be the primary factor in breeding success declines, there may be a need for further analysis of this aspect of eagle population dynamics. This may result in a somewhat different monitoring strategy geared toward more focused population sampling in portions of the Forest with varying eagle nesting densities.

Bald eagle activity and productivity flights are planned to occur again in 2009 with results from those surveys to be included in the FY2009 monitoring report.

**Northern goshawk:**

Over the past 12 years, the number of known goshawk breeding territories has risen steadily on the CNF, from 9 known in 1996 to 48 known in 2008. This is generally believed to be a product of increased activity in goshawk habitat and a higher interest in monitoring goshawk populations, nesting activities and habitat conditions in northern Minnesota. The number of known active breeding territories and the number of successful breeding pairs has more than doubled, from 7 active breeding territories in 1996 to 21 in 2008 and 3 successful breeding pairs to 8 over the same time period. However, these latter two aspects of breeding territory information do not show the same corresponding increase to that exhibited by the number of known breeding territories on the CNF. The table below provides breeding territory information over the past ten years.



The population dynamics of the goshawk in northern Minnesota are not clearly understood at this time. The data provided is primarily based upon goshawk territories discovered during on-going field operations on the CNF. Therefore, there may be some bias in how territories are found, the habitats they are found in and the results of their subsequent monitoring efforts. To more completely understand any long term monitoring data, there needs to be some level of randomized inventory of suitable nesting/breeding habitats.

The CNF will be participating in a cooperative effort to inventory northern goshawks across selected ecological landscapes in Wisconsin, Michigan, and Minnesota during the 2008 nesting

season. This Bioregional Monitoring of Northern Goshawks in the Western Great Lakes includes the Chippewa, Superior, Ottawa, Hiawatha, and Chequamegon-Nicolet National Forests, along with the states of Minnesota, Wisconsin, and Michigan. It will use a peer-reviewed and pilot study-tested design and survey protocol outlined in the U.S. Forest Service's Northern Goshawk Inventory and Monitoring Technical Guide (Woodbridge and Hargis 2006). The goal is to produce an estimate of goshawk presence within the study area. This survey is critical to accomplishment of Regional Forester Sensitive Species direction, and will provide data needed to assess if concerns about forest management and fragmentation are warranted in the western Great Lakes.

The CNF Forest Plan includes an objective of sustaining 20-30 breeding pairs of northern goshawks. Based upon current direction in the Forest Plan, the number of breeding pairs and suitable habitat conditions are expected to increase. Future monitoring at both the nest site and landscape scales will confirm this expectation.

**White Pine:**

One hundred thirty-seven thousand bareroot white pine seedlings were planted on the Chippewa in 2008. Additionally, 30.5 lbs of white pine seed was seeded onto approximately 150 acres.

Establishing white pine from seedlings has proven difficult due to deer predation and competition. This is especially true in "enhancement" plantings, where white pine is being introduced into existing forest types for diversity.



White pine seedlings growing from seed.

In 2008, an aspen stand, under the Round Island EA, had white pine spaded into it. The aspen stand was thinned, and 4 one acre gaps were created. Each of these gaps had 18 white pine, six to ten feet tall, spaded into them. The thinking is that these larger trees will not be subject to mortality from deer predation and though they may need to be released from aspen regeneration, the release will be less intense because of the tree's size and the fact that there are so few of them.



Tree spading white pine into openings in an aspen stand.

## Regional Foresters Sensitive Species Survey and Detection

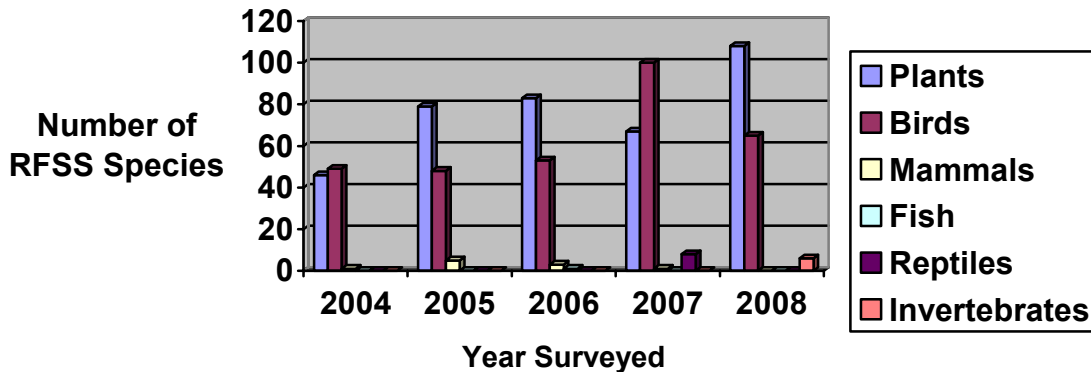
In FY2008, the Chippewa NF Monitoring and Survey Team (MIST) screened a total of 14,102 acres on the Forest for RFSS habitat and survey needs, of which, a total of 10,439 acres was surveyed for various projects across the Forest.

In 2008, a total of 179 new RFSS locations were detected across the Forest. Highlights from the surveys include:

- The detection of Bog Adder’s Mouth (*Malaxis paludosa*) and Snail-seed Pondweed (*Potamogeton bicupulatus*) on the Forest. Both species are two very rare plant species for the State of Minnesota. They will be recommended for addition to the Regional Forester’s Sensitive Species list.
- Twenty-eight additional clustered bur-reed (*Sparganium glomeratum*) on the Forest bringing the total for the Forest to one hundred and five.
- Sixteen new fairy slipper (*Calypso bulbosa*) locations detected on the Forest.
- Five new goshawk territories found within the Forest boundary. FY2008 monitoring brings the total of known goshawk territories to forty-eight on the Forest, of which, twenty-one detected as active territories.



**Regional Foresters Sensitive Species  
New Location Detections 2004-2008**



### Summary

In FY2008, management activities on all projects complied with 2004 Forest Plan direction for sensitive species. Projects either had no impact or were not likely to cause a trend to federal listing or loss of viability on the Chippewa National Forest.



The Monitoring and Inventory Survey Team continue to make improvements to the screening process in surveying various RFSS on the Forest. This improved screening process has made the surveys on the Forest that much more effective in detecting locations of RFSS.

## **7. Vegetation Composition and Structure**

### **Monitoring Questions:**

To what extent is Forest management, natural disturbances, and subsequent recovery changing vegetation composition and structure? To what extent are conditions moving toward short-term (1-20 years) and long-term (100 years) objectives at Landscape Ecosystem, Management Area, and other appropriate landscape scales?

### **Monitoring Drivers—Desired Condition and Objectives:**

D-VG-1 Native vegetation communities are diverse, productive, healthy, and resilient.

D-VG-2 Vegetation conditions contribute to ecosystem sustainability and biological diversity. They address current and future generations' needs for and interests in the many aesthetic, spiritual, consumptive, commodity, recreational, and scientific uses and values of forests.

D-VG-3 Vegetation (live and dead) is present in amounts, distributions, and characteristics that are representative of the spectrum of environmental conditions that would have resulted from the natural cycles, processes, and disturbances under which current forest ecosystems and their accompanying biological diversity evolved. The ecosystem composition, structure, and process representation considers time frames, a variety of landscape scales, and current biological and physical environments. Resource conditions exist that minimize undesirable occurrences of non-native invasive species.

D-VG-4 Tree vegetation is present in amounts, distributions, and characteristics that allow contribution to a sustained yield of timber and pulpwood products.

D-VG-5 Vegetation constantly changes through management activities and through naturally occurring disturbances and ecosystem recovery processes such as wind, fire, flooding, insects, disease, and vegetation succession. These fluctuations are within an ecologically and socially acceptable range of variability.

D-VG-6 Vegetation conditions that have been degraded or greatly diminished in quality or extent on the landscape by past land use are restored to conditions more representative of native vegetation communities.

O-VG-1 through 18. (See Forest Plan, pgs. 2-22,2-23)

### **Background**

Landscape Ecosystems (LEs) are the land and vegetation systems that occur naturally on the landscape. LEs are ecological areas derived from a combination of individual or groupings of native plant communities, ecological systems, and Terrestrial Ecological Unit Inventories at the Landtype and Ecological Landtype scales. Each LE is characterized by its dominant vegetation communities and patterns, which are a product of local climate, glacial topography, dominant soils, and natural processes, such as succession, fire, wind, insects, and disease. The LEs of the Chippewa National Forest nest into the Minnesota Drift and Lake Plains Section of the National Ecological Hierarchy.

The 2004 Forest Plan sets Desired Conditions, Goals and Objectives for vegetation at the Forest wide and at the Landscape Ecosystem scale for the eight LEs described on the Forest.

## **Monitoring Activities**

### ***Changes to 2003 Composition and Age Class***

The existing condition described in the Plan for each LE was based on data updated in 2003. Changes in composition and age class between existing condition in the Plan (2003) and current condition (2008) are the result of a combination of active forest management, stand re-delineation and typing which was completed a couple of years ago, ongoing inventory and natural aging. Since 2003, we have conducted Common Stand Exam (forest inventory) on approximately 128,000 acres.

A portion of the change in composition and age class can be attributed to stand re-delineation, database updates and recent inventory. There have been no efforts to ferret out which portion of a particular change is attributable to active management verses data corrections or better data. The combined results of these efforts have contributed to the following shifts:

- Finer scale mapping with greater accuracy accounts for some shifts in age and species composition and total acres of each. For instance an older pine inclusion may have been reserved in a previous regeneration harvest. After harvest, the age of the entire stand, including the older area of pine was set back to 0. Today this inclusion probably is mapped separately and is assigned an age of its own. While these are small areas individually, collectively these acres now contribute to the older age classes and have been subtracted from the younger age class totals.
- Thousands of acres that had previously been mapped as forested are now mapped as open or non-forested. This is largely the result of mapping open and wetland inclusions as separate units rather than as components of stands.
- As each stand is inventoried, the year of origin and forest type is determined and adjusted in the database if necessary. Based on inventory data, the forest type is mathematically calculated without regard to merchantability or management objective and is assigned based on the predominant species for a given variable such as basal area or trees per acre. With that in mind, a stand with a forest type of red pine might have significant components of jack pine, white pine, or hardwood species of which red pine is the majority. Compositional shifts include a reduction in jack pine and



spruce-fir, and a shift from aspen and birch to northern hardwoods. In the lowlands, a shift has occurred to more white cedar and fewer hardwoods.

In addition to inventory data, age can change from active management, natural aging, or natural disturbance.

- Clearcutting, seedtree, and some shelterwood harvests completed from 2003 to 2008 reset stand ages to 0 and add to the 0 – 9 year age class. A harvest such as thinning or individual tree selection does not change the age class or the resulting age class distributions. Because of the lag between planning and accomplishment, it may take five or more years before planned activities are accomplished on the ground.
- Some shifts have also occurred from conversions to hardwoods resulting from harvest activities.
- All stands other than those with even-aged regeneration harvests have aged five years since Forest Plan revision (2003 data).
- Natural disturbance has not played role in age class distributions. There has not been a major windstorm or wildfire on the forest since 2000.

***Forest-wide Summary Information***

The following tables and analysis are derived from the Forest GIS Stands Layer based on what *has been accomplished through 2008. It does not consider planned or unaccomplished activities.* The tables contain summary data. The numbers and percentages reflected in the tables represent the 2008 existing conditions based on the best available data. For the summary, the numbers and percentages for 2008 are compared to percentages for the 10 year objective. The first part of this section consists of forest-wide composition summary obtained by aggregating the information for each LE. It is followed by summary information on composition and age class for each of the LEs. A forestwide summary of the age class distribution was not included because each of the LEs has different age class categories. As a result, it was not possible to quickly aggregate the data. We will plan on doing this in a future report.

***Forest Composition Summary***

This information is an aggregate of the LE summary information presented later in this section. It should be emphasized that this information is for forest types (predominate species in a stand). The FP also has objectives to increase species diversity within stands which is not reflected in the analysis below.

**Table 15.** Forest-wide Vegetation composition Objectives for Uplands in the Minnesota Drift and Lake Plains Section. (Reference: Forest Plan, Table DLP-2, p. 2-57)

Forest Types	FP 2003		2008		10-yr Obj. %	20-yr Obj. %	100-yr Obj. %
	Acres	%	Acres	%			
Jack pine	14,500	3	11,742	2.7	5	6	6
red pine	73,900	16	73,196	16.8	17	17	19
white pine	4,600	1	5,391	1.2	2	3	6
spruce-fir	28,400	6	23,978	5.5	7	8	9
oak	9,500	2	6,953	1.6	2	2	2

Northern hardwoods	59,900	13	75,013	17.2	15	16	17
aspen	226,400	50	207,847	47.6	45	42	32
paper birch	38,100	8	32,095	7.4	8	7	9
<b>TOTAL</b>	<b>455,500</b>	<b>100</b>	<b>436,216</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

This table does not incorporate figures for White Cedar Swamp and Wet Sedge Meadow because they are lowland areas we have done little or no harvest in.

In general, the Forest needs to

- Increase the amount of jack pine, white pine, spruce-fir on the landscape.
- Decrease the amount of northern hardwoods and aspen on the landscape.
- Maintain basically the same amount of red pine and slightly increase the amount of paper birch.

Note that a 1% change in aspen which is by far the largest acreage by forest type requires many more acres than for example white pine which has a much smaller acreage.

More detailed information on trends for forest types by LE is presented in the table below.

**Table 16.** Need to maintain (m), increase (+), or decrease (-) acres based on comparing 2008 percentages to Decade 1 percentages for each LE (reference tables: Forest Plan pp 2-57 through 2-79).

Forest Type	Landscape Ecosystem						
	Hardwood LEs		Pine LEs			Lowland LEs	
	BHC	MNH	DP	DMP	DMPO	TS	WCS
<b>Uplands</b>							
Jack pine	-	m	+	m	+	m	m
red pine	m	m	-	m	+	-	m
white pine	+	m	m	+	m	m	m
spruce-fir	+	+	m	+	+	+	+
oak	m	m	-	+	m	-	m
Northern hardwoods	-	-	-	-	-	-	+
aspen	-	+	-	-	-	-	-
paper birch	m	+	-	+	m	-	m
ACRES (upland)	99,568	64,874	11,964	82,245	158,201	19,364	12,968
<b>Lowlands</b>							
black spruce	+	+	+	+	+	+	m
tamarack	-	m	-	-	m	m	m
lowland hardwoods	-	-	+	-	m	-	+
white cedar	m	-	-	-	-	-	+
ACRES (lowland)	31,947	6,759	402	7,505	20,341	31,512	

**Hardwood LEs:** BHC- Boreal Hardwood Conifer MNH – Mesic Northern Hardwood

**Pine LEs:** DP – Dry Pine DMP – Dry Mesic Pine DMPO – Dry-Mesic Pine/Oak

**Lowland LEs:** TS – Tamarack Swamp WCS – White Cedar Swamp

### General comments for uplands

- Jack pine –Increase jack pine across the landscape by maintaining or increasing the amount in all LEs except Boreal Hardwood Conifer. In particular, emphasis should be on increasing jack pine in the dry pine and dry mesic pine/oak LEs. Much of the mature, old or older jack pine has been planned for harvest except for the approximately 5300 acres needed during the first 10 years of plan implementation to meet FP standard S-WL-9 (FP, p. 2-32). Consequently, in the future, to increase jack pine will require the conversion of other forest types, most likely red pine or aspen, through harvest, site preparation, and reforestation.
- Red pine –Maintain red pine in the hardwood LEs, but the strategy to achieve the desired objectives will vary depending on the pine LE. Based on an analysis of old/older red and white pine (MIH 7) in the FY 2006 M&E Report, it is necessary to maintain or increase the amount of old/older red pine stands in the uplands to meet FP objectives.
- White pine –Increase the acres of white pine forest type in the boreal hardwood conifer and Dry-Mesic Pine LE (by 2325 and 2080 acres, respectively); maintain the existing amount of white pine in all other LEs. Note that the white pine forest type (white pine is the predominant species) should be distinguished from the overall forest objective of increasing conifer diversity in stands by increasing the amount of white pine. There has been considerable effort with planting and seeding of white pine to increase the white pine component in stands which adds to species diversity but may not change the forest type. It is necessary to maintain or increase the amount of old/older red pine stands in the uplands to meet FP objectives for MIH 7.
- Spruce-fir – Increase acres of spruce and balsam fir in all LEs except for Dry-Pine LE. This is being done by leaving the spruce and fir components in many of the stands harvested and by planting and seeding these species in regeneration harvest stands. In the last few years, spruce planting stock has under-run resulting in fewer spruce seedling being planted than planned.
- Oak – Except for the dry pine and tamarack swamp LEs, maintain or increase to result in an overall increase on the landscape. The oak component is currently being left in many of the stands harvested.
- Northern hardwoods and aspen – There continues to be a surplus of hardwoods and aspen on the landscape in almost all LEs. Recent projects have identified acres to convert, but in the case of aspen this is an expensive and intensive process that takes several years to accomplish and ultimately may not be successful. There are many stands across the forest where the conversion process has been started but is not yet completed. It is usually five years after harvest, at the time of the last regen survey, that success is determined. In the absence of adequate funding, the presence of heavy conifer browse by deer, or poor species survival due to drought or disease, attempts to convert a stand may not be successful and aspen may win out.
- Many aspen stands have been left to convert through the aging or the succession process. Aspen is a relatively short lived species; it sprouts if disturbed by harvest or fire. If untreated, it will die out and other species will take its place. At this time we have no way of tracking the number of acres we have deferred for harvest for other resource reasons that will naturally convert from aspen to another species. Although

stands may be deferred in one entry, they may be reconsidered and harvested in the next entry.

- Paper birch is variable depending on the LE.

### **General comments for lowlands**

- There has been very little harvest activity in the lowlands in the last decade or more for a couple of reasons. Although the 2004 FP considered and scheduled harvest in lowland sites, there remained a concern by some that lowland conifer stands fail to be adequately regenerated on the forest following harvest. This resulted in a hesitancy to prescribe harvest in black spruce, tamarack, and mixed lowland conifer types. In FY 2005, the majority of harvested lowland stands were surveyed for stocking and analyzed to determine the probability of regeneration success. The analysis indicated that there is a high probability that lowland conifer stands will be regenerated (refer to FY 2006 M&E report, pp 43-45). Aside from that, when dollars are limited to conduct TES surveys, lowland sites which tend to be lower volume sites with higher probability of having TES, are often dropped in favor of the upland sites. With this in mind, most of the changes in percentages from 2003 to 2008 are due to stand re-delineation and typing.
- Black spruce – Increase the acres of black spruce in all lowland LEs. The Plan identifies the need to increase acres of both young and old-growth lowland black spruce and tamarack forest communities (FP, O-VG-18, p, 2-23).
- Tamarack – Tamarack should either be maintained or decreased depending on the LE. Older tamarack stands are recognized as important habitat for black backed woodpecker. Consequently, there have been limited plans for harvest.
- Lowland hardwoods -- Amount of lowland hardwoods varies by LE. This forest type includes the lowland black ash stands. With the advance of emerald ash borer, the ash are at high risk (see Insect and Disease section) and in the future may be lost.
- White cedar –At the time of analysis for the 2004 FP, the existing amount was identified as the desired amount. Changes have occurred because of stand re-delineation, not because of harvest in these stands. Even though the numbers indicate it should be decreased, white cedar is recognized as a component within stands and native vegetation community that should increase (FP, Desired Condition D-VG-6d, p 2-21). The Forest Plan states: “Allow harvest of white cedar trees (in any forest type) only when re-growth of cedar is likely to be successful or for research purposes (G-TM-4, p. 2-19).

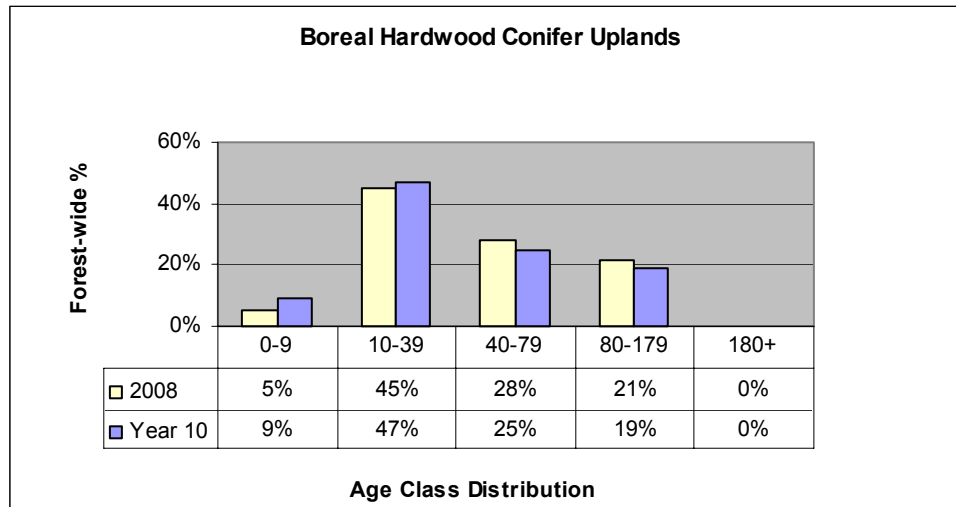
### Summary by Landscape Ecosystem for Species Composition and Age Class Distribution

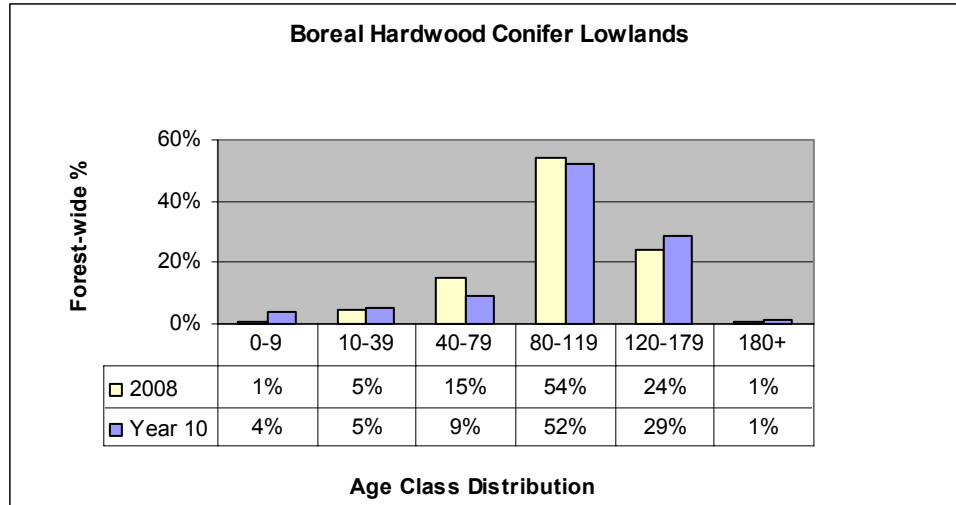
Details for each of the LEs follow with some of the highlights captured in the summary statements. Because there has been little harvesting in the lowlands, the data is presented but not discussed.

## BOREAL HARDWOOD CONIFER (BHC)

**Table 17.** Vegetation Composition for Boreal Hardwood Conifer.

FOREST TYPE	FP ACRES 2003	FP % 2003	ACRES 2008	% in 2008	10-yr Obj.	Meets, Exceeds, Below	% difference
Jack pine	500	0%	594	1%	0%	Exceeds	+1
red pine	3,700	4%	3,601	4%	4%	Meets	
white pine	600	1%	642	1%	3%	Below	-2
spruce-fir	11,000	11%	9,272	9%	12%	Below	-3
oak	100	0%	42	0%	0%	Meets	
Northern hardwoods	11,800	11%	14,881	15%	13%	Exceeds	+2
aspen	68,400	66%	64,647	65%	63%	Exceeds	+2
paper birch	6,900	7%	5,890	6%	6%	Meets	
<b>TOTAL</b>	<b>103,000</b>	<b>100%</b>	<b>99,568</b>	<b>100%</b>			
black spruce	14,800	49%	15,148	47%	49%	Below	-2
tamarack	2,400	8%	2,722	9%	8%	Exceeds	+1
lowland hardwoods	9,800	32%	10,407	33%	32%	Exceeds	+1
white cedar	3,300	11%	3,670	11%	11%	Meets	
<b>TOTAL</b>	<b>30,300</b>	<b>100%</b>	<b>31,947</b>	<b>100%</b>			





### Summary

This is the second largest LE in terms of acres on the forest. Historically, about half the landscape of the boreal hardwood conifer LE was composed of older, larger conifers. It takes about 1000 acres to make a 1% shift.

### Recommendations

- Continue efforts to increase the number of white pine stands,
- maintain the amount of jack pine which is limited in other LEs,
- develop spruce-balsam fir stands by retaining these species in existing stands and establishing young stands when regeneration is prudent,
- decrease the amount of aspen and hardwood stands (a couple thousand acres each) by shifting or converting to conifer species to increase the amount of white pine or spruce-fir stands.
- increase the upland 0-9 acres (about 4000 acres) with even-aged regeneration harvests in the 40-79 and 80-179 age classes. Aspen and hardwood stands would be the most likely candidates to regenerate to meet the objectives. The 0-9 age class has been difficult to achieve because of uneven-aged prescriptions developed to meet resource objectives in project planning areas.

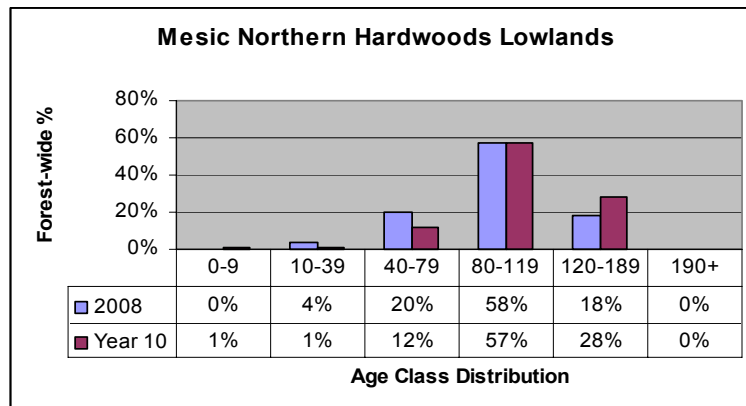
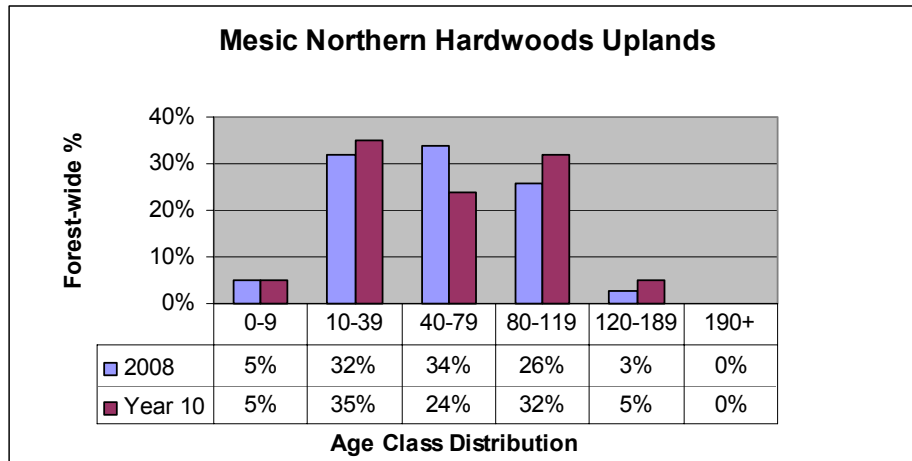
## MESIC NORTHERN HARDWOODS

**Table 18.** Vegetation Composition for Mesic Northern Hardwoods.

Forest Type	FP % 2003	FP ACRES 2003	2008 ACRES	% in 2008	10-yr Obj.	Meets, Exceeds, Below	% difference
Jack pine	0%	100	149	0%	0%	Meets	
red pine	3%	2,100	1,984	3%	3%	Meets	
white pine	1%	500	432	1%	1%	Meets	



spruce-fir	6%	4,000	3,170	5%	6%	Below	-1
oak	1%	800	634	1%	1%	Meets	
Northern hardwoods	30%	20,300	23,250	36%	32%	Exceeds	+4
aspen	48%	32,000	29,641	46%	47%	Below	-1
paper birch	10%	6,800	5,615	9%	10%	Below	-1
TOTAL	100%	66,600	64,874	100%			
black spruce	52%	3,100	3,105	46%	52%	Below	-6
tamarack	8%	500	532	8%	8%	Meets	
lowland hardwoods	32%	1,900	2,329	34%	31%	Exceeds	+3
white cedar	8%	500	793	12%	9%	Exceeds	+3
TOTAL	100%	6,000	6,759	100%			



**Summary**

Hardwoods consisting of sugar maple, basswood, and paper birch were predominant. Roughly 1/3 of this LE should be in northern hardwoods; approximately 1/2 of the LE should be in aspen. Red pine, white pine, jack pine, and balsam fir were rare in this LE; the low percentages for 10 year objectives have been met. A 1% in the uplands change is about 650 acres.

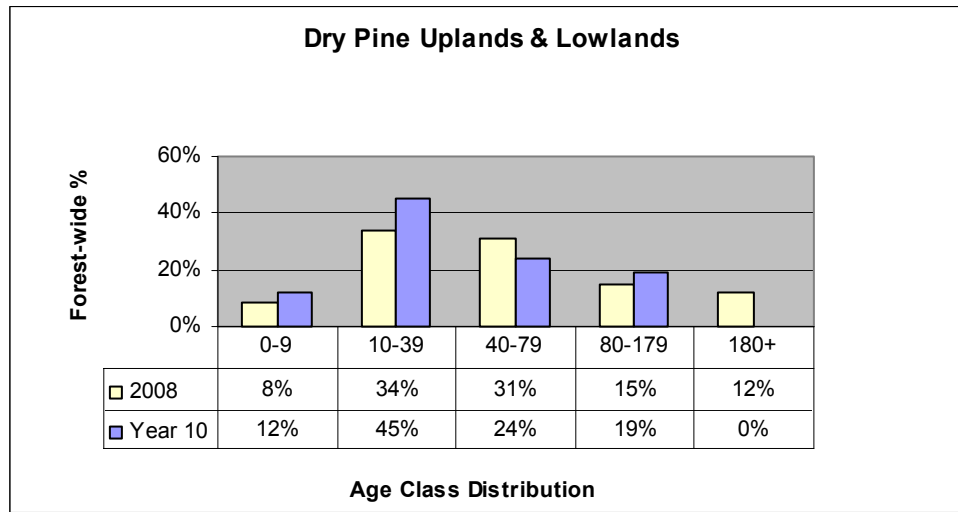
*Recommendations*

- The largest shift needs to reduce the existing amount of northern hardwoods by about 2500 acres.
- This decrease can be offset in part by a corresponding increase in spruce-fir or paper birch (about 600-700 acres, a 1% change) which would result in meeting that 10 year composition objectives.
- Because of the excess of aspen in other LEs, increasing the amount of aspen in this LE is not a priority.
- The 10-39 age class objectives in the uplands can only be met by allowing for ingrowth from the 0-9 age class.
- Reductions in the 40-79 age class could be achieved by harvesting some of it to replace 0-9 acres or by allowing some of it to grow into the 80-119 age class.
- Roughly 1/3 of this LE is northern hardwoods to which uneven-aged management prescriptions are applied, as specified in the Forest Plan. The 0-9 age class has been difficult to achieve because uneven-aged prescriptions, which do not set the age back to 0, are developed to meet resource objectives for project planning areas.

**DRY PINE**

**Table 19.** Vegetation Composition for Dry Pine LE.

FOREST TYPE	FP ACRES 2003	FP % 2003	2008 ACRES	% in 2008	10-yr Obj.	Meets, Exceeds, Below	% difference
Jack pine	3,300	27%	2,586	22%	35%	Below	-13
red pine	4,900	41%	4,987	42%	39%	Exceeds	+3
white pine	200	1%	222	2%	2%	Meets	
spruce-fir	200	1%	143	1%	1%	Meets	
oak	400	3%	504	4%	3%	Exceeds	+1
Northern hardwoods	100	1%	359	3%	1%	Exceeds	+2
aspen	2,700	23%	2,639	22%	16%	Exceeds	+6
paper birch	300	2%	524	4%	2%	Exceeds	+2
TOTAL	12,100	100%	11,964	100%			
black spruce	300	71%	222	55%	71%	Below	-16
tamarack	100	13%	63	16%	13%	Exceeds	+3
lowland hardwoods	100	13%	35	9%	13%	Below	-4
white cedar	<100	3%	83	21%	3%	Exceeds	+18
TOTAL	400	100%	402	100%			



### Summary

This is the smallest upland LE with approximately 12,000 acres. A 1% shift can be accomplished on about 120 acres. Historically, jack pine and red pine were the dominant species in this LE.

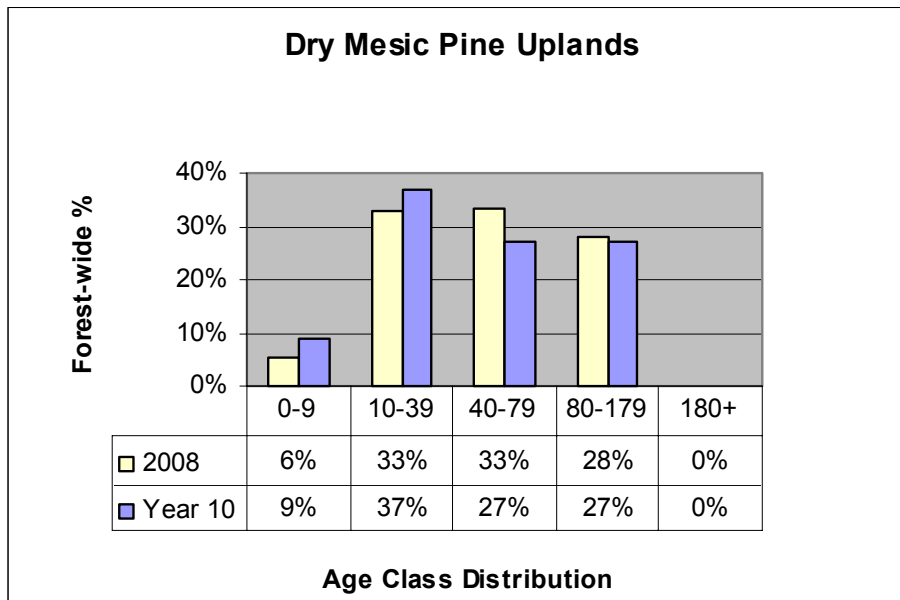
### Recommendations

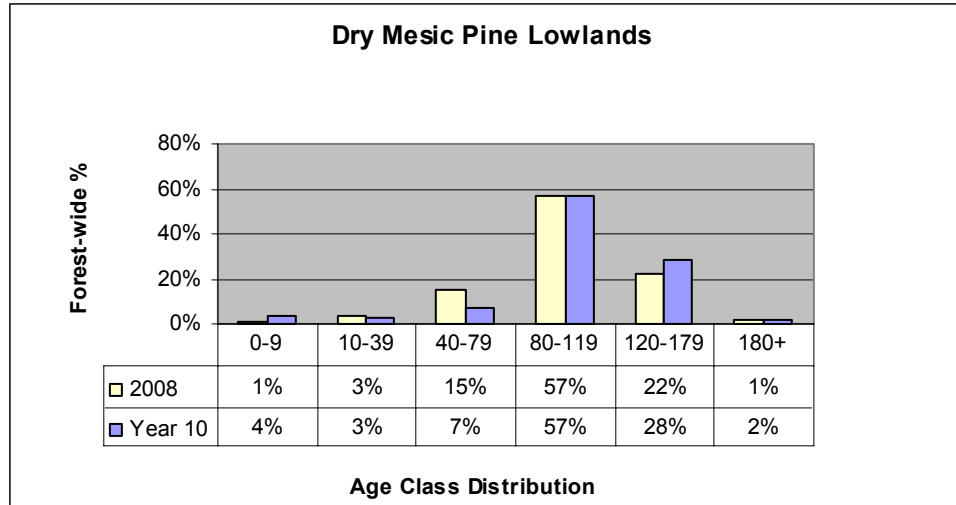
- There are some major shifts needed to increase the jack pine forest types by about 1500 acres and reduce the amount of aspen (~ 700 acres) in this LE. Consequently, in the future, to increase jack pine will require conversion through harvest, site preparation, and reforestation of other forest types, most likely aspen, or possibly red pine--particularly those stands in the 40-79 year age class. Jack pine is well suited to this landscape and well suited to even-aged regeneration which provides the open conditions needed for its establishment. However, successful regeneration of jack pine is sometimes difficult to achieve due to dense hazel brush competition on many of these sites.
- Much of the mature, old or older jack pine has already been planned for harvest except for the approximately 5300 acres needed during the first 10 years of plan implementation to meet FP standard S-WL-9 (FP, p. 2-32).
- Increase the amount of 0-9 age class by regenerating aspen and red pine.
- Retention of the northern hardwoods currently in the 40-79 age class would allow for recruitment into the 80-179 and older age classes. It may be difficult to reduce the amount of northern hardwoods by about 250 acres to meet the 10 year composition objectives and meet older age class objectives at the same time. Retention of northern hardwood stands would contribute to the additional acres needed in all the older age classes but would not result in fewer acres for that species. According to the Forest Plan, the minimum age for even-aged harvest of northern hardwood stands is 90 (FP, p 2-20).

**DRY-MESIC PINE**

**Table 20.** Vegetation Composition for Dry Mesic Pine

FOREST TYPE	FP ACRES 2003	FP % 2003	2008 ACRES	% in 2008	10-yr Obj.	Meets, Exceeds, Below	% difference
Jack pine	1,200	1%	761	1%	1%	Meets	
red pine	13,000	15%	12,717	15%	15%	Meets	
white pine	800	1%	1,209	1%	4%	Below	-3
spruce-fir	4,000	5%	3,470	4%	8%	Below	-3
oak	5,100	6%	3,128	4%	6%	Below	-2
Northern hardwoods	12,300	15%	17,266	21%	15%	Exceeds	+6
aspen	38,800	46%	36,778	45%	41%	Exceeds	+4
paper birch	9,100	11%	6,915	8%	10%	Below	-2
<b>TOTAL</b>	<b>84,300</b>	<b>100%</b>	<b>82,245</b>	<b>100%</b>			
black spruce	3,600	54%	3,330	44%	53%	Below	-9
tamarack	600	9%	720	10%	9%	Exceeds	+1
lowland hardwoods	1,600	24%	2,206	29%	24%	Exceeds	+5
white cedar	900	13%	1,248	17%	13%	Exceeds	+4
<b>TOTAL</b>	<b>6,700</b>	<b>100%</b>	<b>7,505</b>	<b>100%</b>			





**Summary**

Historically, this LE had mature and older stands dominated by a supercanopy of red and white pine with red maple and paper birch in the subcanopy. A 1% shift requires about 820 acres.

*Recommendations*

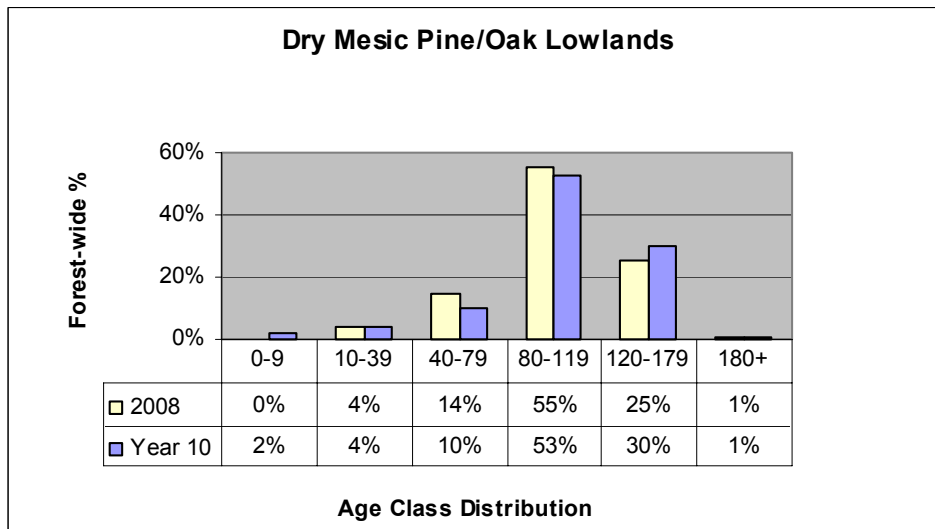
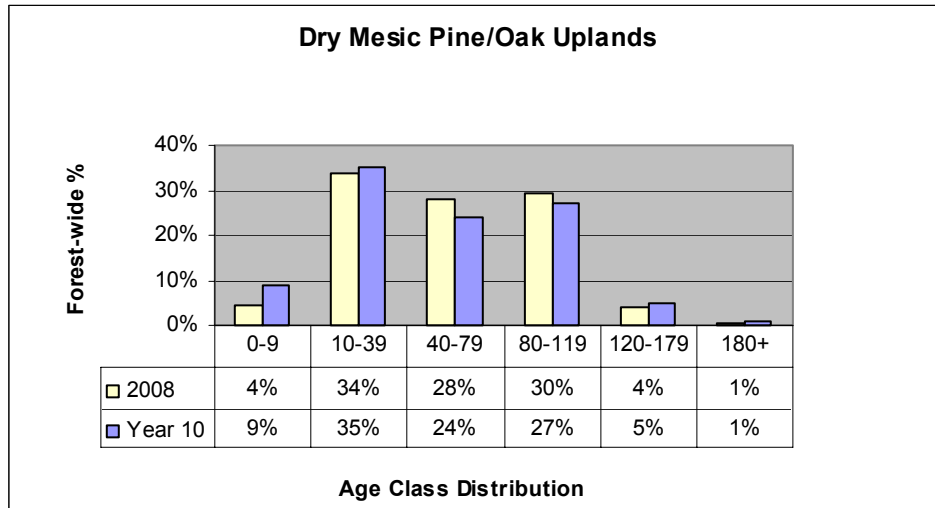
- To achieve the 10 year composition objectives significant decreases in aspen and hardwoods (3200-4800 acres) should be accompanied by corresponding increases in paper birch, white pine, and spruce-fir (1600-2500 acres, each).
- Conversion opportunities are high but may be limited by funding, deer browse of white pine, and the difficulty in converting aspen stands.
- Regenerating a portion of the 40-79 or low levels of harvest in the 80-179 age class in aspen or northern hardwood stands would move towards meeting objectives. To achieve the uplands 10 year objective in the 0-9 age class, another 2400 acres would be needed.

**DRY-MESIC PINE/OAK**

**Table 21.** Vegetation Composition for Dry Mesic Pine/Oak

FOREST TYPE	FP ACRES 2003	FP % 2003	2008 ACRES	% in 2008	10-yr Obj.	Meets, Exceeds, Below	% difference
Jack pine	9,200	6%	7,439	5%	9%	Below	-4
red pine	48,900	30%	48,212	30%	31%	Below	-1
white pine	2,500	2%	2,788	2%	2%	Meets	
spruce-fir	7,000	4%	5,980	4%	5%	Below	-1
oak	2,900	2%	2,479	2%	2%	Meets	
Northern hardwoods	13,300	8%	16,785	11%	10%	Exceeds	+1
aspen	65,700	40%	62,784	40%	34%	Exceeds	+6
paper birch	13,700	8%	11,733	7%	7%	Meets	

TOTAL	163,200	100%	158,201	100%			
black spruce	10,100	52%	10,214	50%	52%	Below	-2
tamarack	2,800	15%	3,138	15%	15%	Meets	
lowland hardwoods	3,500	18%	3,650	18%	18%	Meets	
white cedar	2,900	15%	3,339	16%	15%	Exceeds	+1
TOTAL	19,300	100%	20,341	100%			



**Summary**

This is the largest of the LEs on the Forest—roughly 160,000 acres--1.5 times larger than the next largest LE. Historically this LE had a jack pine, red pine, and white pine supercanopy either alone or as mixed pines. In mature stands there was a subcanopy of deciduous species. . To make a 1% shift, approximately 1600 acres needs to change.



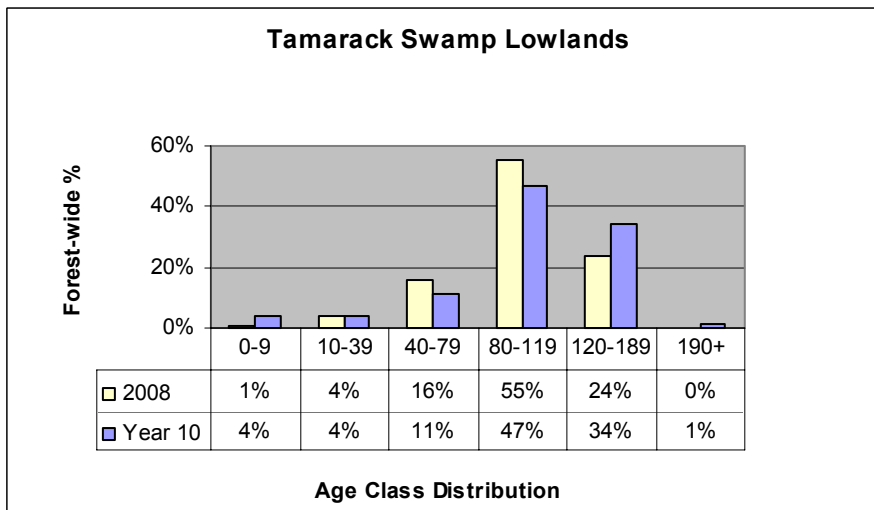
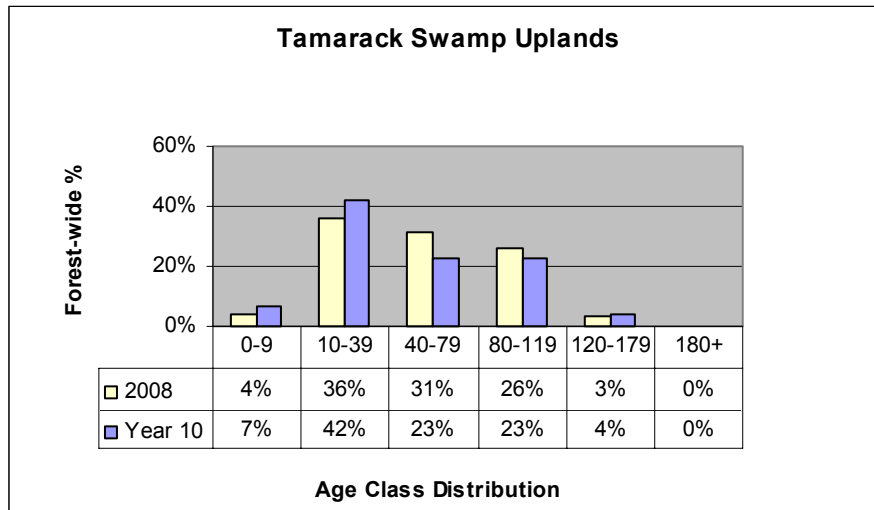
*Recommendations*

- The greatest shifts in species composition and age class needs to occur in this LE.
- The greatest need is to decrease aspen by 9500 acres and increase jack pine by about 6500 acres.
- Increases in jack pine may come from existing aspen and hardwood stands.
- A reduction in northern hardwoods and an increase in red pine and spruce-fir (1600 acres each) is also needed to meet the 10 year composition objective.
- The aspen conversions are the most difficult and expensive to make because of the quick growth and high density of aspen shoots after harvest. Without the use of herbicides, conversion of aspen stands requires heavy site preparation, planting, and numerous releases to be successful. This series of treatments dictates a significant and sustained financial investment in these stands for five or more years just to get the stand regenerated to the desired species.
- To meet first decade objectives, another 8000 acres is needed in the 0-9 age class. Given that jack pine is a seral species, establishing and meeting the goals for jack pine would also contribute to meeting this age class goal. It would be possible to regenerate from the 40-79 or 80-119 age classes where there is currently a 6400 and 4800 acre surplus, respectively.
- Much of the mature, old or older jack pine has been planned for harvest except for the approximately 5300 acres needed during the first 10 years of plan implementation to meet FP standard S-WL-9 (FP, p. 2-32). Consequently, in the future, to increase jack pine will require the conversion of other forest types, most likely aspen through harvest, site preparation, and reforestation.

**TAMARACK SWAMP**

**Table 22.** Vegetation Composition for tamarack swamp.

FOREST TYPE	FP ACRES 2003	FP % 2003	2008 ACRES	% in 2008	10-yr Obj.	Meets, Exceeds, Below	% difference
Jack pine	200	1%	214	1%	1%	Meets	
red pine	1,300	7%	1,695	9%	8%	Exceeds	+1
white pine	<100	0%	98	1%	1%	Meets	
spruce-fir	1,900	11%	1,944	10%	16%	Below	-6
oak	200	1%	166	1%	0%	Exceeds	+1
Northern hardwoods	2,000	11%	2,473	13%	11%	Exceeds	+2
aspen	10,800	61%	11,358	59%	56%	Exceeds	+3
paper birch	1,400	8%	1,418	7%	6%	Exceeds	+1
upland white cedar	0	0%	0	0%	1%		
<b>TOTAL</b>	<b>17,800</b>	<b>100%</b>	<b>19,364</b>	<b>100%</b>			
black spruce	14,400	47%	13,443	43%	47%	Below	-4
tamarack	8,400	27%	8,588	27%	27%	Meets	
lowland hardwoods	3,200	10%	3,946	13%	11%	Exceeds	+2
white cedar	4,800	16%	5,535	18%	15%	Exceeds	+3



**Summary**

Tamarack is the dominant tree species that occurs on this system. Changes that have occurred in percentages are primarily the result of stand re-typing and better data obtained through inventories. A 1% change requires about 200 acres. There has been very little harvest activity in the lowlands the last decade or more for a couple of reasons. Although the 2004 FP considered and scheduled harvest in lowland sites, there remained a concern by some that lowland conifer stands fail to be adequately regenerated on the forest following harvest. This resulted in a hesitancy to prescribe harvest in black spruce, tamarack, and mixed lowland conifer types. In FY 2005, the majority of harvested lowland stands were surveyed for stocking and analyzed to determine the probability of regeneration<sup>23</sup>success. The analysis indicated that there is a high probability that lowland conifer stands will be regenerated (refer to FY 2006 M&E report, pp 43-45). Additionally, older tamarack stands are recognized as important habitat for black backed woodpecker. Aside from that, when dollars are limited to conduct TES surveys, lowland sites

which tend to be lower volume sites with a higher probability of having TES are often dropped in favor of the upland sites.

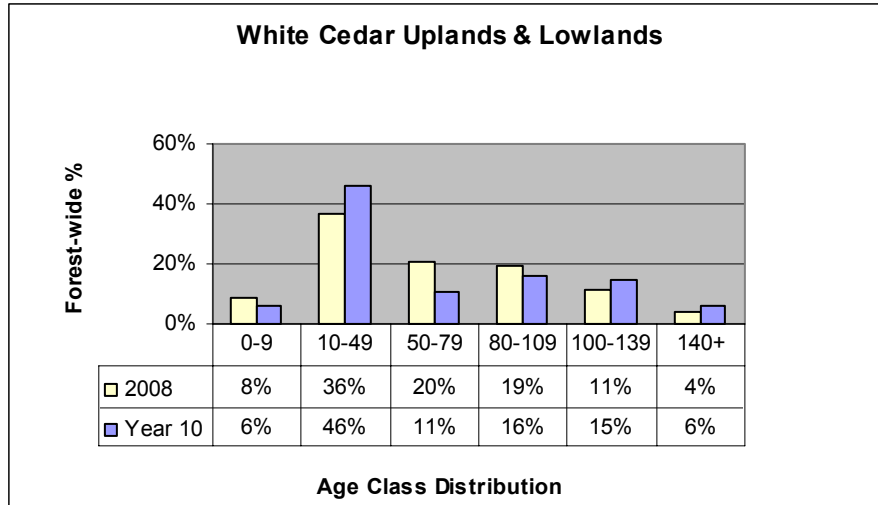
*Recommendations*

- Regenerating aspen and northern hardwood and establishing spruce-fir would move towards meeting the 0-9 age class objective. Approximately 600 acres more of regeneration is needed to meet this objective.
- Harvest could come from the 40-79 age class.
- Retention of the 80-119 age group would allow for ingrowth and recruitment in the 120-189 age class.
- Treatment of ash whether concentrated in stands or dispersed in mixed species stands would may reduce the potential impact of Emerald Ash Borer.

**WHITE CEDAR SWAMP**

**Table 23.** Vegetation Composition for white cedar swamp.

FOREST TYPE	FP ACRES 2003	FP % 2003	2008 ACRES	% in 2008	10-yr Obj.	Meets, Exceeds, Below	% difference
Jack pine	0	0%	23	0%	0%	Meets	
red pine	0	0%	31	0%	0%	Meets	
white pine	0	0%	0	0%	0%	Meets	
spruce-fir	500	4%	472	4%	6%	Below	-2
oak	0	0%	21	0%	0%	Meets	
Northern hardwoods	200	2%	184	1%	2%	Below	-1
aspen	8,100	62%	7,977	62%	57%	Exceeds	+5
paper birch	0	0%	64	0%	0%	Meets	
black spruce	1,100	8%	1,036	8%	8%	Meets	
tamarack	100	1%	101	1%	1%	Meets	
lowland hardwoods	2,300	18%	2,245	17%	18%	Below	-1
white cedar	800	6%	814	6%	9%	Below	-3
TOTAL	13,100	100%	12,968	100%			



**Summary**

This LE is dominated by white cedar and balsam fir. There has been little, if any harvesting in this LE. Any shifts in percentages since 2003 are due to stand re-typing.

**8. Timber**

**Monitoring Question:**

Are harvested lands adequately restocked after five years?

**Monitoring Driver:**

(36 CFR 219.12(k)[5][i]. Lands are adequately restocked as specified in the forest plan.

**Background:**

National Forest Management Act (NFMA) regulations require that cutover lands be adequately restocked within five years. Stocking surveys on regenerated stands are conducted the first, third and fifth years after harvest to assess stocking levels. Regeneration may occur naturally or by planting or seeding.

**Reforestation Monitoring:**

Fifty stands (1,146 acres) received treatment by regeneration harvests in 2003 (Table 24). NFMA compliance was met on 74% of these sites by being fully stocked and certified by the end of 2008. For those stands not certified by the end of 2008 (271 acres), 46% (125 acres) were due to record keeping errors and 54% (146 acres) were due to inadequate stocking (Table 25). Drought and animal damage were major factors in these low stocking levels. Some of these sites have already been inter-planted, replanted, or reseeded and are waiting for the cycle of stocking and survival surveys to be completed prior to certifications.

These harvests fall in a time period of transition between CDS (regional corporate stand information database which is being phased out) and FACTS (new national corporate database). Compounding the problem of tracking was a major stand re-delineation project that caused several stands to have their stand identification numbers (STAND\_ID) changed. These factors have made tracking difficult in some cases. Those stands that were missed due to the difficulty of tracking will receive stocking surveys in 2009 and certifications if stocking is adequate.

**Table 24.** 2003 regeneration harvests by district

District	Stands	Total Acres
Blackduck	5	120
Deer River	43	983
Walker	2	43
Total	50	1,146

**Table 25.** List of stands not yet certified as regenerated, harvested in 2003.

STAND_ID	REASON	ACRES
09030100003002	not certifiable yet	6
09030100003027	not certifiable yet	6
09030100264005	not certifiable yet	20
09030100261002	missed stocking survey	50
09030400073030	missed stocking survey	16
09030300058038	failed planting of white pine, replanting in '09	8
09030300058047	will certify planting in 2009	13
09030300082026	missed stocking survey	15
09030300211033	failed planting, needs replanting	37
09030300211001	needs fill in planting	25
09030300240006	failed planting, needs replanting	31
09030500086048	missed stocking surveys on natural portion	17
09030500086017	missed stocking surveys on natural portion	26
	<b>TOTAL</b>	<b>271</b>

As a follow-up to the 2007 Monitoring and Evaluation Report, the stand listed in Table 26 displays stands that are still awaiting certification following regeneration harvests in 2002.

**Table 26.** List of stands not yet certified as regenerated, harvested in 2002.

STAND_ID	REASON	ACRES
<b>2002 harvests</b>		
09030300055017	replanted	11
09030500022020	waiting for stocking survey	16
09030500096007	low stocking	12
09030500100054	seeded 2007 - fire delayed	24
09030500087019	replanted	12
	<b>TOTAL</b>	<b>74</b>

**Evaluation and Conclusions:**

Adequate restocking of regeneration harvest stands was met on 74% of the sites harvested in 2003. Sites not adequately stocked have already been inter-planted, replanted, or reseeded and are waiting for the cycle of stocking and survival surveys to be completed prior to certification.

### Site Preparation by Disc Trenching Monitoring

Question: How has disc trenching affected the species diversity of the herbaceous plant community?

In late summer 2008, forest silviculturists and reforestation technicians monitored a disc trenched site two years following the site preparation treatment. The Jack pine stand was harvested by clearcutting. Prescribed burning was planned following the harvest but never occurred. In 2006, because the site needed to be regenerated and fire had not been used to reduce slash, the site was disc trenched prior to planting.

A 2' x 2' quadrat was used to measure species frequency. Simply put, frequency is the percentage of plots in a sample occupied by a target species. Frequency was selected as the monitoring variable because:

- It was late in the growing season and conditions were dry. Frequency measures are fairly stable throughout the growing season and would be less affected by dry conditions (where plants are wilting or dehydrated) than cover measures which can change dramatically from week to week.
- Minimal training needed on methodology. The only decision required by the observer is whether or not the species occurs within the plot (no abundance measure).
- Once species are recognized, frequency plots can be evaluated quickly.

Two transects were randomly established that crossed the site, aligned with the direction of disc trenching, to capture variability. Sampling quadrats were placed every thirty feet along these transects in paired plots, one in a trench and the other on undisturbed ground between trenches. Plot centers averaged 8 feet apart. Forty plots were sampled in trenches and forty plots between trenches. Pre-treatment data was not collected.

#### Evaluation and Conclusions:

Jack Greenley, Forest Botanist, Superior NF reviewed the data. A comparison of the results showed *Cirsium* (thistle) was found 10% more frequently in trenches than outside of trenches. *Conyza* (horseweed) was found four times more frequently in trenches than outside of trenches. Both of these however are expected to diminish over time as the stand develops and the canopy closes. *Betula papyrifera* (paper birch) and *Prunus pennsylvanica* (pin cherry) regeneration appear to have been enhanced in the trenches. Overall diversity on the site looked good. The plant community appears in tack and functional. Result details are available upon request.

## 9. Insects and Disease

### Monitoring Question:

Are insects and diseases populations compatible with objectives for restoring or maintaining healthy forest conditions?



**Monitoring Driver—Desired Condition and Objectives:**

(36 CFR 219.12(k)[5][iv]. Destructive insects and disease organisms do not increase to potentially damaging levels following management activities.

D-ID-3 Native insects and diseases are present and fulfilling their ecosystem function. Epidemics, when they occur, do not last longer than would be expected in a healthy ecosystem.

O-ID-1 Increase the amount of forest restored to or maintained in a healthy condition to with reduced risk of and damage from fires, insects, and diseases.

D-VG-5 Vegetation constantly changes through management activities and through naturally occurring disturbances and ecosystem recovery processes such as wind, fire, flooding, insects, disease, and vegetation succession. These fluctuations are within an ecologically and socially acceptable range of variability.

D-VG-8 The ecological processes of native vegetation communities are maintained, emulated, or restored at multiple landscape scales to provide representation of their natural range of distribution and variation within context of multiple-use goals and ecosystem sustainability. These include: processes such as disturbance from fire, wind, flooding, insects and disease; biological community and species interactions; nutrient cycling; and vegetation succession.

O-VG-11 Increase amount of a variety of prescribed burning practices to restore the ecological process of fire and provide habitat for threatened and endangered species and other wildlife that benefit from or require burned vegetation.

O-VG-12 Retain an adequate representation of naturally disturbed forest that is not salvaged, such as burned, flooded, blowdown, or insect- or disease-killed areas. Maintain these in a variety of patch sizes and distributions on the landscape.

O-VG-13 Where natural disturbances, human influences, or stand age or composition have combined to perpetuate stands that are brush-dominated or have sparse tree canopy on sites that could otherwise provide productive timber management opportunities, and where there may be adequate ecological representation of these types of conditions, seek to re-establish adequately stocked stands to address timber management objectives.

**Background**

Past Monitoring and Evaluation Reports discuss agents, changes in populations and the need for management actions. The 2004 Forest Plan identifies this as an annual item to be monitored and reported.

**Monitoring Activities**

Since the early 1950's, aerial surveys have been a valuable tool for monitoring the status of forest insects and pathogens across the 16 million acres for forest land in Minnesota. For the past fourteen years, these surveys have been accomplished through the partnership of the Minnesota DNR Forest Health and Resource Assessment Unit and USFS, State and Private

Forestry. Aerial sketch maps are digitized, ground truthed, and made available as a State-wide shapefile. These data are obtained by the Forest Silviculturist, clipped to the Forest's boundary and summarized.

The 2008 Chippewa National Forest survey results are displayed in the table below. These aerial surveys record currently active damage. For example, the pine killed by bark beetles in 2006 are still dead, however, no new bark beetle damage was observed in 2007 or 2008.

## Evaluation and Conclusions

**Table 27.** Acres within the boundary of the Chippewa NF affected by agent, forest type and severity. Differences in acre totals between categories are due to rounding.

AGENT NAME	ACRES AFFECTED 2008	ACRES AFFECTED 2007	ACRES AFFECTED 2006	ACRES AFFECTED 2005	ACRES AFFECTED 2004
Aspen defoliation	0	5,107	0	0	0
Unknown	1,148	1,685	509	198	3,998
Spruce Budworm	0	837	0	0	155
Larch casebearer	785	378	255	351	83
Jack pine budworm	43	222	2,322	1,368	274
Eastern larch beetle	416	142	250	0	0
Ash decline	179	102	0	0	0
Flooding/Beaver	30	47	148	258	22
Bark beetles	0	0	4	0	0
Porcupine Damage	0	0	0	2	13
Two-lined chestnut borer	0	0	0	341	0
Abiotic	0	0	0	912	0
Fire	79	no data	no data	no data	no data
Wind Damage	1	no data	no data	no data	no data
HOST FOREST TYPE					
Aspen	129	5,107	0	912	656
Hardwoods	640	1,469	411	75	1,736
Balsam Fir	346	626	42	0	155
Tamarack	1,200	519	560	733	696
Jack Pine	143	243	2,322	1,346	274
Softwoods	30	242	141	0	3
Black Spruce	0	211	0	0	0
White Spruce	1	no data	no data	no data	no data
Black Ash	179	102	0	0	366
Red Pine	10	0	13	24	16
Oaks	0	0	0	342	0
Birch	0	0	0	0	222
Unknown	0	0	0	0	423
<b>TOTAL</b>	2,678	8,519	3,489	3,432	4,547

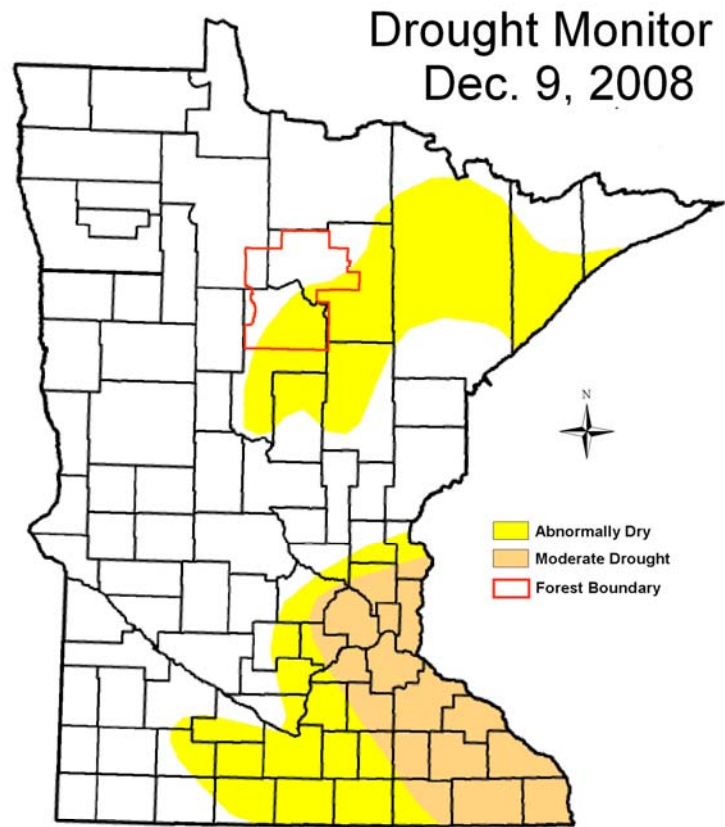
SEVERITY					
Trace	663	2,152	673	257	2,339
Light	1,299	6,328	541	3,133	1,994
Moderate	511	39	2,246	12	46
Heavy	207	0	29	30	167

**Drought:**

Many agents affecting forest health are opportunistic. Stressed trees are more vulnerable to these agents, and drought causes stress. During 2006 and 2007 the Chippewa NF experienced moderate to severe drought. This situation was ameliorated in 2008 with more moisture. On December 9, 2008 only the SE portion of the Forest was “abnormally dry”. Never-the-less, sustained drought for previous years influenced not only forest health but forest regeneration as well (see previous section).

**Aspen defoliation:** The aerial survey found no aspen defoliation on the Forest, or Statewide, in 2008. In 2007, 5,107 acres were seen on the Chippewa. There was evidence that the defoliation in 2007 may have in part been caused by an early aspen leafroller complex. Whatever the cause it was ephemeral, occurring for just a single year and now having disappeared.

**Unknown:** The “unknown” agent category involved 1,148 acres on the Chippewa. Of these, 640 acres were hardwoods with the damaged classified as “dieback”. Balsam fir was involved on 346 acres with the damaged being “mortality”. On 129 acres aspen damage was classified as “dieback”. Jack pine was “defoliated” on 23 acres with an unknown agent, and red pine was involved on 10 acres as “mortality”. Causes for this defoliation, dieback and mortality have not been determined, but it’s likely that a combination of factors are involved including drought stress from dry periods during 2002-2003 and again in 2006-2007, and stress from forest tent caterpillar defoliation in 2000-2003, along with other site specific factors and age.



Drought monitor map showing the boundary of the Chippewa National Forest. Source: <http://drought.unl.edu/dm>. Author: M. Brewer/L. Love-Grotak, NOAA/NESDIS/NDCD

Severity of “unknown agent” damage was classified as “trace” (5%-25% affected) on 476 acres, “light” (26%-50% affected) on 437 acres, “moderate” (51%-75% affected) on 148 acres and “heavy” (>75% affected) on 86 acres.

**Spruce budworm:** No spruce budworm was detected on the Forest in 2008. In 2007, 837 acres of balsam fir and black spruce were affected.

**Larch casebearer:** Larch casebearer is an exotic insect which reached the Lake States in the 1950’s and is now considered to be “naturalized”. Casebearer adults are moths that fly from late May to August and lay eggs on needles. Larvae hatch from the eggs and bore into needles and mine during the summer. The larvae use a hollowed out needle as a portable shelter or “case”. They overwinter in the case fastened to a twig at the base of a bud. In the spring they resume needle mining before pupating and changing to a moth to complete the life cycle. Each larva needs to feed on 24 to 76 needles to complete its development. The most severe damage is done by the larvae in the spring of the year. Damaged trees and stands look off color, tan or brown, very similar to flooding damage. Needles have to be examined carefully to see the entrance hole in the mined out needle or to find the cases containing the larva.



Larch casebearer larvae carrying it’s “case” (hollowed out needle).

In 2008, 17,409 acres were found to be affected statewide during the aerial survey (up from about 10,000 acres statewide in 2007). On the Chippewa affected acres rose from 378 in 2007, to 785 in 2008. Of these acres 639 were classified as “light”, 62 as “heavy”, 46 as “moderate”, and 37 as “trace”. Damage has mostly been seen on young or stagnant trees. A number of parasites imported from Europe, were introduced in the 1950s as a bio-control, and subsequently reduced outbreak severity. It’s theorized that these parasites are becoming “out of sink” with their host due to global climate change, allowing populations of the casebearer to build.

**Jack pine budworm (JPBW):** Jack pine budworm defoliation was almost nil in 2008 as the population has finally collapsed. Only 43 acres were detected on the Forest. Most of these acres were concentrated in one stand on the SE side of Cass Lake between the Norway Beach campground and Highway 10. Five additional sites were involved of about ¾ acre each. Defoliation was classified as “light” on all six sites.

JPBW is such a perennial concern that larval counts are taken each spring and egg mass surveys are done each fall in the Northwest Region of Minnesota. Egg mass surveys were completed by October 1 in Becker, Beltrami, Hubbard, Lake of the Woods, Roseau and northern Wadena Counties. No egg masses were observed on any of the foliage in any of the samples. It appears we have some breathing space before the next cycle begins.

**Eastern Larch Beetle:** This is an insect to watch. Eastern larch beetle (larch beetle) damage was detected on 416 acres of the Chippewa NF in 2008, on 100 sites ranging in size from less than an acre to 55 acres (mean = 4 acres). Eastern larch beetle is a native bark beetle. The adults are just over 1/8 inch long and they create small 1/16 inch diameter holes in the bark as they

enter and exit the tree. Small holes, lots of dark brown boring dust and resin flow indicate attack during the summer.

Larch beetles overwinter under the bark as larvae, pupae and adults in tamarack trees. Adult beetles emerge from the trees in the spring, seek out and bore into suitable live trees or fresh logging slash. There they construct galleries and lay eggs. Larvae hatch from the eggs, feed in the inner bark and eventually pupate and change into adults. Larval feeding in the inner bark girdles and kills the trees.

Larch beetles are usually considered a secondary pest attacking stressed and recently cut trees. Flooding, drought, defoliation and old age have been associated with larch beetle attack. However, larch beetle also appears to be able to develop widespread outbreaks and kill healthy trees. Only species of larch are attacked by the larch beetle.

Statewide, an outbreak of larch beetle has been occurring for the past 7 years. Significant levels of mortality have occurred on over 65,000 acres of tamarack in Minnesota. No consistent stress factor contributing to the current mortality has been found, however, the droughts in 2002 - 2003 and 2006 - 2007 have probably contributed. Damage levels vary from scattered individual trees killed by the beetles to 30 to 50% of trees in stands being killed. In some instances up to 75 to 80% of trees in stands have been killed. Because eastern larch beetles are currently so abundant and so widespread, attempts to control the beetles through management are unlikely to be successful in most situations. Salvage harvest of stands with high mortality is recommended to utilize the wood.

**Ash decline:** Ash decline is an abiotic problem. Fluctuating water tables during the last few years is thought to be playing a major role in ash decline in flood-plain plant communities. There are a number of other factors involved with some variation from site to site. On the Chippewa in 2008, active ash decline was detected on three sites totaling 179 acres. Severity was ranked as “moderate” on all three sites.

Ash decline is difficult to map, because it has no eye-catching visual symptoms like those of vascular wilts, defoliating insects or bark beetle infestations. Statewide, aerial sketch mappers started seeing widespread ash decline in the summer 2004. In 2007, ash decline was observed all the way from the Canadian Border to the Metro. In 2008, 7,561 active acres were detected across the State.

**Damage by other agents:** Damage by other agents shown in Table 27 are minor and within endemic levels. These will continue to be monitored from year to year but do not warrant further discussion at this time.

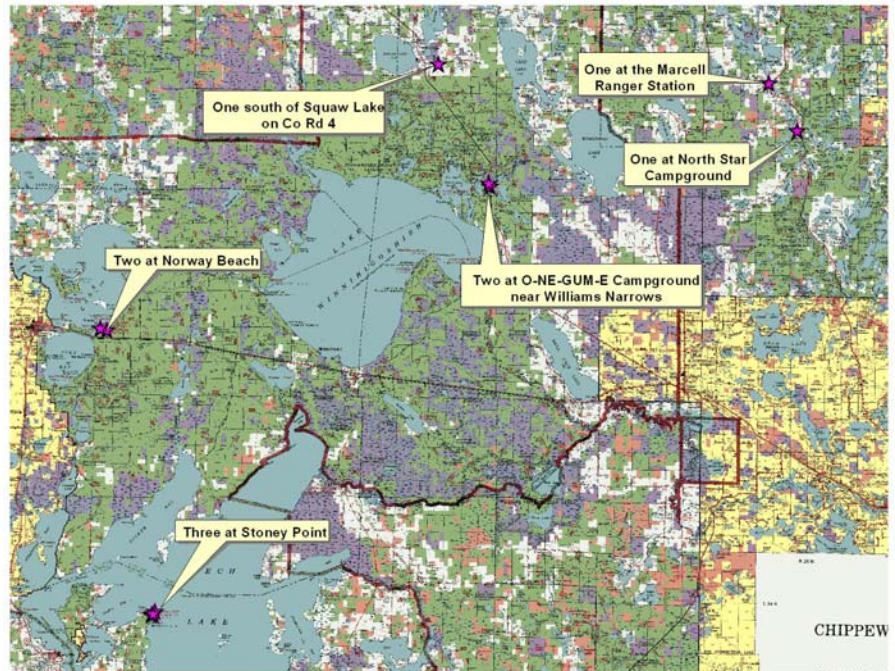


Ash Decline. Photo by Mike Albers, MN-DNR



**Emerald ash borer (EAB):** EAB, *Agrius planipennis* Fairmaire, is an exotic beetle that was discovered in southeastern Michigan near Detroit in the summer of 2002. The adult beetles nibble on ash foliage but cause little damage. The larvae feed on the inner bark of ash trees, girdling the tree. As of January 2009, EAB had not been found on the Chippewa NF or in Minnesota. However, during 2008, EAB was discovered in a number of new locations in North America including Quebec (near Montreal), eastern Virginia, central Illinois, southeastern Missouri, Ottawa (Ontario), southeastern Wisconsin and the central upper peninsula of Michigan. With these new finds, EAB is now known to be established in ten U.S. states as well as two Canadian provinces.

The Minnesota Department of Agriculture created 10 EAB trap trees on the Chippewa NF in the spring of 2008. Trap trees are ash trees purposefully wounded by girdling. These trees act as a sink for the EAB by attracting the insect. Eight of these trap trees were peeled and surveyed for EAB in the fall of 2008 with negative results. The remaining two will be peeled and surveyed in 2009.



EAB trap tree locations on the Chippewa NF in 2008.

Firewood restrictions continue to be an important component in limiting the artificial spread of EAB. The Chippewa and Superior National Forests have prohibited firewood on Forest Service lands, originating outside of Minnesota, by ORDER NO. R903-07-02 ([www.fs.fed.us/r9/forests/superior/documents/CHIP\\_SUP\\_EABFSORDER.pdf](http://www.fs.fed.us/r9/forests/superior/documents/CHIP_SUP_EABFSORDER.pdf)).

**Gypsy moth:** In Minnesota, the gypsy moth detection program has been a cooperative effort between state and federal agencies since 1999. A strategic plan was created by representatives of the Minnesota Departments of Agriculture (MDA) and Natural Resources (DNR), USDA Animal and Plant Health Inspection Service, Plant Protection and Quarantine (USDA APHIS-PPQ), and USDA Forest Service (USDA-FS). In 2008, 20,188 gypsy moth traps were set across the State with a total of 12,255 male moths being caught. This was a record for moth numbers with high catches being identified over 100 miles west of the “Slow the Spread (STS) Action Area” which has remained stable the last couple of years along the east edge of the State, and even moved eastward in the southeast portion of the State in 2007.

Thirty traps were set on the Leech Lake Reservation in cooperation with USDA APHIS-PPQ in 2008. Of these, four traps contained male gypsy moths at the end of the trapping season. Delimited trapping is planned in the areas of these traps in 2009 to test if populations have



become established. The Forest is also in the trapping grid being laid out by MDA for 2009. The Forest will partner with MDA and USDA APHIS-PPQ in this trapping effort.

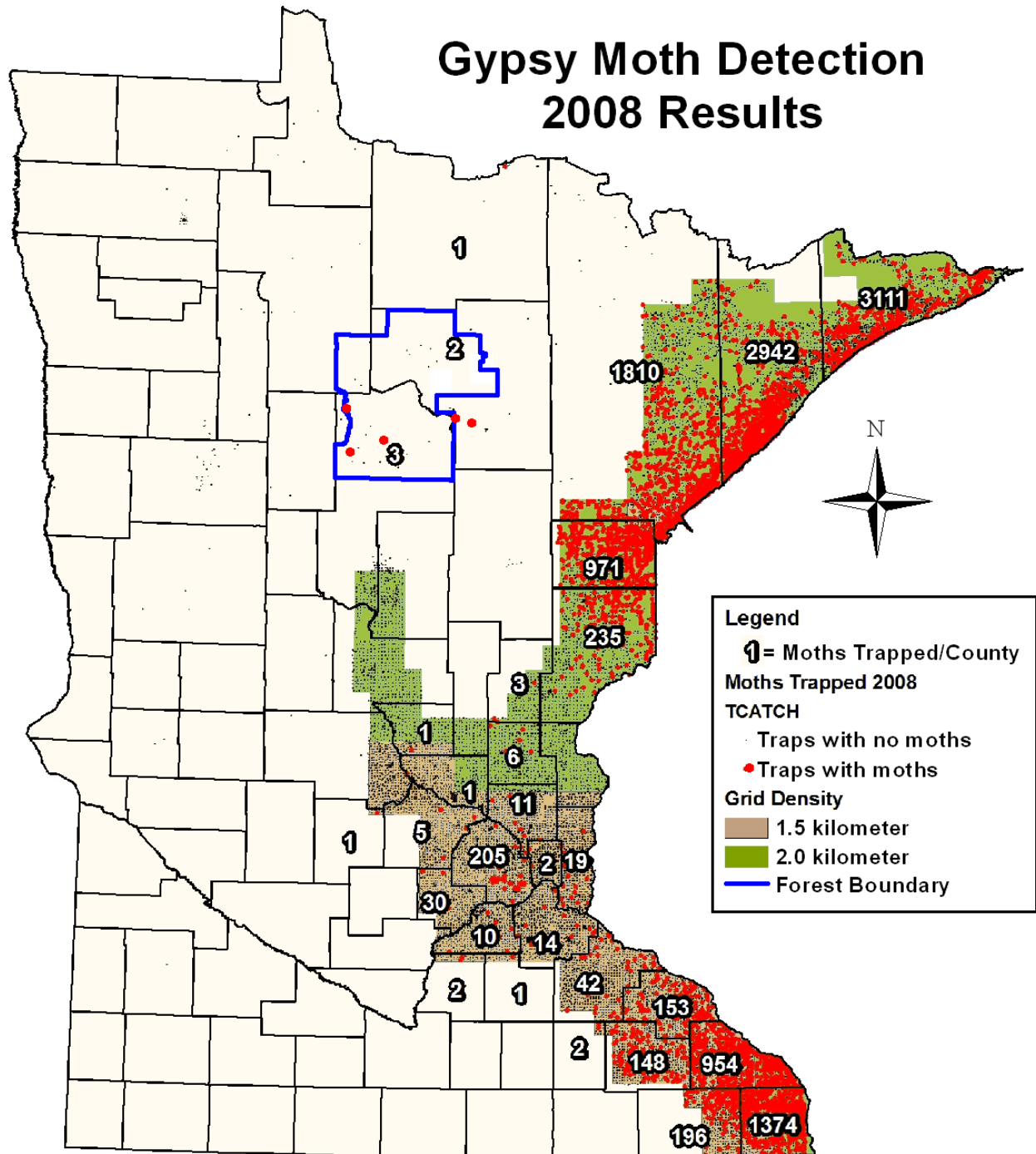
**Other**

Over 40 people from Chippewa National Forest, Minnesota DNR, Leech Lake Division of Resource Management and BIA attended the Forest Insect and Disease Workshop. Presentations by the Northern Research Station– St. Paul office and the MN Department of Agriculture addressed the advent of the emerald ash borer, sirex wood wasp and gypsy moth to our area.

**Recommendations**

At this time, surveys, trapping results, and on the ground visits do not indicate upswings in population trends that warrant management concern or actions. However, vigilance in monitoring is warranted with the pending threat of both gypsy moth and emerald ash borer.

The Forest, USDA APHIS-PPQ, and the Leech Lake Band of Ojibwe (LLBO) are working cooperatively with the Minnesota Department of Agriculture in a gypsy moth trapping effort on the Forest in 2009. It is not yet determined how many traps will be set on the Forest in 2009, but the trapping program will include both delimited trapping around the sites where moths were caught in 2008 and traps set as part of the regular MDA detection grid. The same group is coordinating the setting of EAB “purple traps” in 2009, which have replaced trap trees for EAB detection.



Location & results of 2008 Gypsy moth traps. Numbers indicate male moths caught by county. Source: Minnesota Department of Agriculture.

## 10. Fire

### **Monitoring Question:**

How, where, and to what extent will prescribed fire be used to maintain desired fuel levels, and/or mimic natural process, and/or maintain/improve vegetation conditions, and/or restore natural process and functions to ecosystems?

This portion of the report focuses on blueberry plots that were established several years ago, fuels accomplishments and wildfire summaries.

### **Monitoring Driver—Desired Condition and Objectives:**

D-ID-4-5 Fire is present on the landscape, restoring or maintaining desirable attributes, processes, and functions of natural communities

O-ID-2-4 Establish, maintain, or improve the condition of vegetation conditions using prescribed fire, mechanical treatments, and other tools.

### **Background**

Blueberries are a traditionally gathered resource that was much more common decades ago than it is now (according to verbal accounts from local residents). A common theme in discussions with the public about vegetation management projects is the need to increase the production of native blueberries. In an attempt to do this we planned several stands for harvesting (thinning and shelterwood cutting) and followup treatments (burning) that would favor blueberry plant growth. Harvesting has been accomplished in four stands and monitoring plots were installed. The residual trees are large enough to withstand understory burning. Introducing fire into these stands would maintain fairly open stands with reduced brush competition which should provide for good areas of blueberry production.

### **Monitoring Activities**

Four sets of plots for monitoring changes in blueberry production were established in 2004 in four stands on sandy soils near Cass Lake. (A fifth set of plots is in stands that have just been harvested, but the monitoring plots have not been re-measured yet.) Two of the stands were harvested prior to the plots and they subsequently received mechanical scarification for site preparation (one was also burned), so we can see the effect of this on the blueberries. No further treatments are planned in these two stands. A third stand is the best of the blueberry stands. It was harvested shortly after the plots were established but is still waiting for the prescribed burning, which was planned for 2008 but not accomplished due to limited budgets; it is now planned for 2009. The fourth stand was just harvested in 2007 so only was included in plots taken in 2004 and 2007-2008.

Monitoring by Forest Service personnel occurred in July/August of 2004, 2005, 2006, and 2007 and September of 2008 when the plants are easily visible. Numbers and sizes of plants were counted in 321 (238 in the three stands) 7.6 square foot plots along transect lines. Comparisons between years was made for the number of plants in the plots and for the number of plots that contained plants to see if new plants were becoming established and if old ones grew. One stand is only included in 2004 and 2007/2008 because it was not harvested and would not give useful results in the other two years.

**Evaluation and Conclusions**

**Table 28.** Number of plots with blueberry plants by year.

<b>MONITORING RESULTS</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Total Blueberry Plants on Plots	119 (157)*	75	59	122 (131)*	108 (118)*
Total Plots with Blueberries	39 (48)*	31	20	42 (48)*	38 (40)*

\*Number in parentheses includes the fourth stand that was not cut until 2007.

As the previous table shows, the number of blueberry plants and the number of plots with blueberry plants both decreased in 238 plots in the three stands from 2004 to 2005 and again to 2006, then a large increase into 2007, and a small decrease in 2008. Some of the differences in the numbers are due to difficulty in locating plants in the dense competition from grass, forbs, and hazel and the way the plots are located with transects rather than staked plots. Except in 2007 there has not been an increase in number of plants, although the size of the existing plants has increased. The two stands proposed for long-term management for blueberries have yet received the prescribed followup treatments of prescribed burning. Initially there was some damage from logging and scarification for site preparation in the four stands. Prescribed burning has been limited the last few years by drought conditions that prevented the ignition of prescribed burns when they were needed in these stands and by limited budgets that did not allow these stands to receive priority treatment. There was not an abundance of plants at the beginning, even though these are stands with sandy soil and pine overstories that should be good for blueberries. It would be difficult to locate and pick blueberries in the parts of the stands that are being monitored due to dense brush and logging slash and the limited number of plants. Prescribed burning on a regular schedule should improve both of these conditions, but that is yet to be seen.

The conditions of the overstory after the harvesting are well-suited for blueberries, but the dense understory counteracts this. The objective of increasing blueberry production has not been met in this area because the full range of prescribed treatments has not been implemented. There was an increase in plants but not an apparent increase in berry production, with the plants remaining quite small.

**Recommendations**

The remaining post-harvest activities (prescribed fire) should be conducted. Without fire the objectives for blueberry production will not be met. Monitoring of blueberry plots was scheduled to continue through 2006 but has been extended to continue monitoring for at least two years after burning is complete. If the results of this monitoring do not show increases in blueberry production, then harvest and post-harvest activities used to promote blueberries should be re-evaluated.

It should be noted that prescribed fire on similar sites on the district have appeared to result in improved blueberry vigor and production. Unfortunately, plots were not established on these sites before treatment to quantify the results.

Results of blueberry study on Tamarack Point were included in the FY 2007 Monitoring & Evaluation Report.

### **Other Activities**

#### *Prescribed Fire Review*

This was held in October 2007 with numerous participants from the Forest Leadership Team, the Walker Ranger District and the Supervisors Office. The objective was to discuss the prescribed burn program and accomplishment of fuels targets. Discussion points were:

- The 18,000+ acres to be treated by prescribed fire from signed NEPA documents since 2003. Typically we have only accomplished 5% of these acres per year.
- Planners and implementers need to work together closely to develop projects that can be accomplished.
- The Forest has an excellent tool in a map developed that identifies all the wildland urban interface (WUI) areas.
- Need to articulate the role fire will play in vegetation management projects.
- Prescribed fire had not resulted in good site preparation for reforestation, especially natural regeneration. Usually mechanical site preparation is also needed.

As result of the meeting, a task team was formed to develop a long term prescribed burn strategy to accomplish critical work with the allocations given.

#### *Eastern Region Integrated Vegetation Management Review*

Originally planned as a Fire/Fuels Functional Assistance Trip, this November 2007 review focused on the planning, integration, and collaboration of the fuels/fire program with vegetation management and other resources. Regional Office and Forest employees were involved. With regard to fuels/fire there was discussion on:

- The role of fire on the landscape; the relationship between existing and desired conditions; and the implementation tools available to achieve the objectives.
- Prioritization, rationale, and implementation of treatments.
- Availability of fuels data and analysis techniques.
- The map of the Wildland urban interface (WUI) areas provides a valuable forest-wide assessment tool for location of potential hazardous fuels projects.

#### *National Fire Plan Monitoring of Fuel Reduction Treatment*

This monitoring was conducted on three projects on the Forest to fulfill requirements found in the 10-Year Comprehensive Strategy and Congress' Healthy Forest Restoration Act. The monitoring checked the effectiveness of fuels treatment and answers how fuels treatments impact the environment. The projects and treatment types were randomly selected and consists of:

- Commercial thinning in red pine with mechanical mastication of slash mats in the skid trails
- Mechanical piling and burning
- Commercial thinning, whole tree yarding to the landing, and slash removal along the road.

Monitoring found that in all three projects

- Fuel treatments had a positive effect on other resources, including wildlife habitat, air and water quality.
- Fuel treatments implemented were effective in reducing the fire risk or fire behavior by changing the fuel concentrations and arrangements. The treatments lowered the possibility of wildfire converting to a crown fire and lowered the fire severity potential. This met the goals stated in the NEPA analysis.

*Fuel Reduction Accomplishments and Wildfires*

**Fuel Reduction Accomplishments**

Approximately 6461 acres within 30 projects were treated to reduce fuels during FY 2008. Of the total acres treated for fuels, 2,636 acres were accomplished as primary fuels projects, and 3,825 acres were accomplished as integrated projects with other disciplines. Treatment methods included pile burning, hand and machine piling, prescribed burning, and harvesting.

**Wildfires**

There were 32 wildfires during FY 2008 that occurred within the FS protection area which encompasses all ownerships. The smallest fire was 0.1 acres, the largest 12.6 acres, and the average wildfire acreage burned was 0.9 acre. Table 29 displays FY 2008 fires, acres burned, and time of year fires occurred for fires one acre or larger. Table 30 shows wildfire acres burnt during the past 5 years. Table 31 shows the number of wildfires by statistical cause during the past 5 years.

**Table 29.** 2008 Wildfires 1 Acre or Larger

Fire	Acres Burned	Time of Year
Chesapeake	1.2	April
Highway 2 Complex	12.6	May
Pipeline	1.0	May
Grave	3.0	May
Mississippi - Leech	2.3	May
Jessica	5.0	June

**Table 30.** Wildfire Acres During Past 5 Years and Fire Cause

Cause	2004	2005	2006	2007	2008	5-Year Avg
Lightning	29	0	1	0	0	6
Equipment	1	0	1	2	5	2
Smoking	0	3	2	0	0	1
Campfire	1	1	3	1	1	1
Debris Burning	35	4	21	2	2	13
Railroad	3	1	1	1	0	1
Arson	39	25	40	25	3	26
Children	1	0	16	3	2	4
Misc.	8	453	3	13	16	99
TOTALS	117	487	88	47	29	



**Table 31.** Number of Wildfire by Statistical Cause During Past 5 Years

Cause	2004	2005	2006	2007	2008	5-Year Avg
Lightning	2	0	4	0	0	1.2
Equipment	2	0	2	3	2	1.8
Smoking	0	1	1	0	0	0.4
Campfire	4	4	3	2	3	3.2
Debris Burning	32	11	32	11	9	19.0
Railroad	6	1	1	1	0	1.8
Arson	27	24	21	7	5	16.8
Children	3	0	4	3	3	2.6
Misc.	12	8	5	15	10	10
TOTALS	88	48	73	42	32	

## 11. Watershed Health and Riparian

### Monitoring Question:

To what extent is Forest management affecting water quality, quantity, flow timing and the physical features of aquatic, riparian, or wetland ecosystems?

### Monitoring Driver—Desired Condition and Objectives:

D-WS-1 Watersheds and their components:

Are part of healthy ecosystems that meet the needs of current and future generations.

Provide for State, tribal, and local beneficial uses.

Are protected or enhanced to provide for unique plant and animal communities, special habitat features, habitat linkages, wildlife corridors, aquatic ecosystems and riparian ecosystems.

D-WS-4 Management activities do not reduce existing quality of surface or groundwater or impair designated uses of surface and groundwater.

D-WS-5 Water quality, altered stream flow, and channel stability do not limit aquatic biota or associated recreational uses. Water in lakes, streams, and wetlands meets or exceeds State water quality requirements.

D-WS-6 Watersheds provide an appropriate quantity, quality, and timing of water flow. Stream channels and lakeshores are stable. Stream temperatures are maintained within their natural range and are not increased by lack of shading or because of channel instability.

O-WS-1 Improve and protect watershed conditions to provide the water quality, water quantity, and the soil productivity necessary to support ecological functions and intended beneficial water uses.

### Background

Forest Plan direction calls for maintenance, enhancement, and restoration of watershed conditions. Forest management activities can potentially affect watershed conditions in a

number of ways. Activities designed to improve conditions are carried out by multiple programs and with various partners. Actions not directly tied to watershed improvements are carried out in such a way that, at a minimum, maintains watershed conditions. This is largely done by following Best Management Practices (BMPs) in the FP and the MFRC Gold Book. Monitoring actions undertaken in 2008 addressed lake water quality.

In fiscal year 2008 watershed conditions were improved by decommissioning over 27 miles of system and non-system road. One surface water impoundment was decommissioned which directly affected over a mile of stream channel and 60 acres of impounded wetland and upland area. Some of the sites implemented in 2008 may be monitored in future years to determine treatment effectiveness.

## Monitoring Activities

### Lake Water Quality

The Forest maintains a representative set of 10 lakes that are sampled at regular intervals to determine if there is a change in water quality over time. The Carlson Trophic State Index is a measure of the productivity of a lake. Trophic states of lakes are usually broken into four broad categories:

- **Oligotrophic:** TSI scores between 20 and 40. Low productivity lakes that have high transparencies (clear lakes), are often cold and deep, fishery is limited because of low productivity of plant community.
- **Mesotrophic:** TSI scores between 40 and 50. Moderately productive lakes, common in Minnesota, often support quality fishery.
- **Eutrophic:** TSI scores between 51 and 70. Highly productive lakes, experience frequent nuisance algal blooms, transparency is low, supports fishery.
- **Hypereutrophic:** TSI greater than 70. Extremely productive lakes, often clogged with vegetation, supports rough fish if any, highly subject to winter kill due to low oxygen levels, rare in Minnesota.

Beaver, Adele, Caribou, Mabel, Webster, Lake Thirteen and Little Cutfoot Sioux Lakes have been monitored since the mid-1970s. In 1989, Big Rice and Lower Sucker Lakes were added to the monitoring program. Lakes are sampled three times during the open water season on an alternating schedule so that each lake is monitored every two to three years. Adele, Beaver, Caribou, Dixon (a 2004 addition), Little Cutfoot Sioux, and Round Lakes were sampled in 2008. The results are in the table below. All of these lakes are exhibiting normal variability for water quality.

**Table 32.** Trophic State of Trend Lakes Sampled in 2008

Lake Name	TSI Score Pre-1980	TSI Score 2006	TSI Score 2008	Trophic State
Adele	45.0	41.7	42	Mesotrophic
Beaver	39.2	40.1	40	Mesotrophic
Caribou	36.8	25.6	30	Oligotrophic
Dixon	52.5 (2004)	54.0	52	Eutrophic
Little Cutfoot Sioux	59.9	54.2	53	Eutrophic
Round	57.9 (1999)	60.8	55	Eutrophic

### **Evaluation and Conclusions**

Monitoring results presented above and in other sections of this report show that Forest management is meeting the goal of maintaining or improving watershed conditions. Water quality conditions in lakes on the Forest are not showing evidence of degrading.

### **Recommendations**

Current monitoring efforts are providing the Forest with a good sense of the results of management activities. These monitoring efforts will be continued in the future. In addition, site specific monitoring of watershed improvements will be conducted in future years.

### **Other Activities**

The Jessie Lake Interagency partners are undertaking an analysis for their EPA-listed Impaired Water to determine the Total Maximum Daily Load (TMDL) of pollutants. The partner group includes the Itasca Soil and Water Conservation District, the Pollution Control Agency along with the MN DNR, Chippewa National Forest and Jessie Lake Association. The interagency group has determined how to establish the lake's existing condition and potential mitigations.

The Reservoir Operating Plan and Evaluation (ROPE) Draft EIS from the U.S. Army Corps of Engineers was available for comment. The DEIS addresses 7 water control dams on the Upper Mississippi River through and beyond the Chippewa National Forest. A Forest Service decision on our Knutson Dam responsibilities is expected sometime during the summer of 2009.

Employees (23) attended a workshop in Grand Rapids May on the current state of riparian emphasis. The workshop stimulated discussions about our proactive Forest Plan emphasis, and how we might accomplish restoration in riparian management zones such as the Mississippi River.

The Blackduck District conducted annual riparian planting at 3 sites near Wagner Lake. Five acres were planted with 3000 trees.

Two more Aquatic Organism Passage culverts were installed along the popular Woodtick Trail.

## **12. Soil**

### **Monitoring Questions:**

Are the effects of Forest management, including prescriptions, resulting in significant changes to productivity of the land?

Is soil erosion occurring on slope classes 3 - 5 (10%) or greater?

In FY 2008, the focus of monitoring was on soil erosion.

**Monitoring Driver – Desired Condition, Objectives and Guidelines:**

Excerpts from the Chippewa National Forest 2004 Land and Resource Management Plan pertinent to soil erosion:

D-WS-9 Fine sediment from management activities does not adversely affect lake, stream and wetland habitats.

D-WS-12 Soils recover from natural disturbance events and absorb the effects of human disturbances without reducing productivity and function. Soils contribute to ecosystem sustainability. Soil-hydrologic function and productivity is protected, preserving the ability to serve as a filter for good water quality and regulation of nutrient cycling.

O-WS-9 Protect and restore areas where soils are adversely impaired and contributing to an overall decline in watershed condition, soil productivity, soil quality and soil function. Do this by using management practices, inventory and monitoring results and findings from the inventory of ecological units.

O-WS-10 During all management actions involving soil disturbance:

- “Maintain adequate ground cover and soil organic layers, both during and after treatment, to minimize erosion (including rill and gully formation) and allow the water to infiltrate.”
- “Minimize soil displacement, nutrient loss, and effects of severe burning.”

Table G-WS-8, Limitations on Management Activities Designed to Safeguard Soil Productivity, Pg. 2-16

**Table 33.** Region 9 Soil Quality Standards

Indicator	Measure	Metric	Reliability
<i>Rills, gullies, pedestals, soil deposition</i>	Ocular	Presence of these erosion features	High – features easily detectable

From the Voluntary Site-Level Forest Management Guidelines (MN Forest Resource Council, 2005):

According to the 2004 Chippewa National Forest Land and Resource Management Plan, the Forest Service will implement the site-level guidelines unless the Forest Plan provides greater protection or there are different regulations, laws or policies that would dictate a different approach. Guidelines that apply to preventing soil erosion are as follows:

- Filter strip guidelines – Pg. 24-28, General Guidelines section
- Measures to prevent erosion on steep slopes – Pg. 75, General Guidelines section
- Pg. 9, 10, 28-32 Forest Roads
- Pg. 26 Timber Harvesting
- Pg 5,6 Mechanical Site Preparation
- Pg 9,10 Fire Management
- Pg. 8 Forest Recreation Management

**Background:**

Detrimental soil conditions may result in long-term net loss of soil organic matter and impaired nutrient cycling. Displacement of soil material, erosion, and mass movement in particular can remove soil surface organic matter and nutrients from a site (USFS, 2005).

The potential for accelerated soil erosion to occur is a function of slope length, steepness, soil type, intensity and amount of rainfall and the amount of bare soil (2002, IWR, Mich. State Univ.). Soil erosion on the Chippewa National Forest has occurred to some degree in the past from recreation areas, timber harvests, mechanical scarification, roads, wildfires or fire-related activities such as fire breaks. Basically, the objective of monitoring for soil erosion on the Chippewa National Forest is to answer one of the monitoring questions in the 2004 Land and Resource Management Plan: Are the effects of Forest management, including prescriptions, resulting in significant changes to productivity of the land?

Certain Landtype Associations (LTA's) have more steep terrain than others. For example, the Marcell and Itasca moraine have many short, steep complex slopes whereas the terrain on the Rosy Lake plain is relatively flat.

It was decided in 2004 that monitoring for soil erosion would be conducted on a three year rotation, with soil compaction and soil nutrients being conducted in the other years. Information from this monitoring can help determine if the Chippewa National Forest's recommended guidelines, such as minimizing adverse impacts to soil productivity, are being met.

Questions: If soil erosion is occurring – when and how much? Is the erosion active? Chronic? To what intensity?

**Monitoring Activities:**

The monitoring to observe if the Forest is meeting the guideline G-WS-8 for harvesting and mechanical site preparation on steep sites was done in Sept. 2008 by the Forest Soil Scientist and the Hydrologic Technician. Sites were selected by using an ArcMap GIS project that was built using a Terrestrial Ecological Unit (TEU) layer and a layer which showed harvested timber stands in the past 3 years.

Seven timber sites were monitored after a harvest; three were commercial thinnings and four were clearcut with reserves. Five sites chosen for sampling were on the Deer River District, two were on the Blackduck District. Another site was monitored after mechanical scarification.

The method used was to walk over the site. If there were steep slopes, then bisect the slope looking for visual signs of soil erosion. Visual signs are rill, gully and pedestal erosion and evidence of deposition on the site. The length and depth of the rill or gully, if any, was recorded. Pedestal erosion is more difficult to measure, but was recorded, if visible. In general, the length and steepness of the slopes were recorded as well. A soil erosion monitoring form was developed.

The site chosen for mechanical scarification monitoring was covered by the Sandplains Vegetation Management Project EA on the Blackduck District. The soil texture was fine sand and fine sandy loam. The soil was furrowed by the scarification process. The landform was likely a sand dune. The slope was bisected looking for signs of erosion. If the furrows were going directly downhill, check to see if erosion was occurring.

Since soil erosion occurs on sites other than harvest units, it was decided to look at recreation, roads, and fire-related sites. A dispersed campsite at the end of Seelye Point on Cutfoot Sioux Lake was selected. Although there was soil erosion work done in the past, some erosion was occurring near the campsite and a minor amount on the trail leading to the water. A prescribed fire burn and temporary logging roads were considered but not monitored.

During the 2008 field season, 6 other sites on the Forest that were monitored for best management practices. Monitoring was conducted either as a forestwide team or with district teams.

A more detailed report and an Excel spreadsheet will be maintained which lists the stands that were monitored, what they were monitored for and what was found on the site.



An example of soil erosion.

### **Evaluation and Conclusions:**

Of the three commercial thinnings two sites had soil erosion observed. One was coming from a landing and one in the general harvest area. The erosion on the landing was small rill erosion. The other was relatively minor, about 5 square feet of soil deposition.

There was no soil erosion observed on the four clearcuts. On 2 sites the slash was heavy and it was difficult to see the surface of the soil.

Erosion was observed at the scarification site, but due to coarse woody debris and rough surface conditions, the distance traveled by the soil particles was short. In some cases the furrows were along the contour of the slope and other times they went down the slope.



Even though work was done to correct it in the past, there was erosion at the dispersed recreation site on Seelye Point, especially near the campsite.

From the soil erosion monitoring done in 2008 it is evident that soil erosion occurs on other activities than actual timber harvest and that the situations that concentrate use and expose soil (landings, recreation trails, skid trails) have the most potential to cause soil erosion. However, the amount observed was relatively minor and may not be considered detrimental.

**Recommendations:**

- Monitor sites that have slopes less than 10% to see if soil erosion occurs on those sites. Or focus efforts on slope classes 4 (18 – 30%) and 5 (30%+)
- Site selection method should be reviewed to ensure all the harvest sites meeting the steep slope criteria are in the sample pool. The protocol used in the sampling should be reviewed for effectiveness.
- Create a partnership with Itasca Community College, Bemidji State University or Leech Lake Tribal College to assist with developing a protocol with choosing sites, gathering data, taking field measurements and analyzing data.
- Monitor other types of harvests, such as shelterwood cuts and select cuts on steep slopes. Clearcuts should still be a priority due to the amount of ground covered with heavy equipment is the highest.
- Timing is important, especially with aspen regeneration. Since regeneration can happen relatively quickly, it is easier to make observations before the vegetation re-sprouts. On the other hand, immediately after a harvest may be too soon to observe soil erosion.
- Support the acceleration of the Terrestrial Ecological Unit Inventory. A more precise inventory will help to identify stands that have greater potential for erosion.

**Biomass Harvesting Guidelines – Training and Field Trip**

An interagency training hosted by the forest raised awareness of Best Management guidelines for biomass removal.. We looked at three sites that contained low-nutrient soils to determine if adequate coarse woody debris was retained. The sites did not have biomass harvesting but did have the slash removed either by burning or mechanically. Overall, the group consensus was that the slash remaining would have met the guidelines.

The BMPs developed by the MN Forest Resource Council were incorporated into our Forest Plan (G-FW-1, p 2-8). This was followed by field visits to generate discussion on the potential pros and cons of biomass utilization.

**Future Monitoring**

After three years of focusing on specific aspects of soil monitoring – soil compaction, nutrients and erosion, it was decided to change strategy to either focus on specific questions that need to be answered from the Forest Plan or to monitor a site to look at all the factors that could affect soil productivity such as erosion, compaction, nutrient removal, severe fire. It was decided to try both approaches. A nationwide rapid monitoring assessment method was demonstrated on the Chippewa National Forest in October at the sub-regional soil, water and air workshop. This

method of monitoring will be utilized in the FY 2009 field season. One question to be answered from the 2004 Forest Plan would be: Is the recommended season of operation suggested in the guidelines for moderately well drained, loamy to clay loam sites appropriate? The downside of looking at both approaches is the dilemma of limited time, resources and funding.

**References:**

Institute for Water Research, Michigan State University, NRCS, Technical Guide to RUSLE Use in Michigan, 2002

Minnesota Forest Resources Council. Sustaining Minnesota Forest Resources: Voluntary Site-level Forest Management Guidelines for Landowners, Loggers, and Resource Managers. 2005

US Forest Service, Chippewa National Forest, Land and Resource Management Plan, 2004

## 13. All Resources

**Monitoring Question:**

Monitoring and evaluation requirements will provide a basis for a periodic determination of the effects of management practices. 36 CFR 219.11(d).

**Monitoring Driver:**

At intervals established in the plan, implementation shall be evaluated on a sample basis to determine how well objectives have been met and how closely management standards, guidelines, sale design features, and best management practices (BMPs) have been applied. Based upon this evaluation, the interdisciplinary team shall recommend to the Forest Supervisor such changes in management direction, revision, or amendments to the forest plan as are deemed necessary. (36 CFR 219.12(k)).

**Background:**

Informal monitoring of Forest Plan standards and guidelines, sale design features, and mitigation measures, and BMPs identified in the Environmental Assessment (EA) occurs at all phases of the timber sale design, layout and implementation. Periodically more formal monitoring trips are scheduled that involve an integrated team of specialists and district personnel. In 2008, four timber harvest units were monitored to see how well the project objectives were met, as well as Forest Plan standards, guidelines, project sale design features and mitigation measures, and BMPs. The monitoring group consisted of integrated team including the acting Forest Supervisor, Natural Resource Team leader, forest planner, district NEPA coordinator, timber sale administrator, timber specialist, forest fish & wildlife biologist, district wildlife biologists, forest soil scientist, and district silviculturist.

Sites were selected from a list of timber sale units harvested within the last year on the Deer River District. While not random, final site selections were not based on prior knowledge of the sites, but did consider logistics such as proximity of units, types of harvest, and ease of access by

a group. The criteria were that the Decision Notice for the project was signed under the 2004 Forest Plan and harvest had been completed within the last year. Four cutting units were selected from the Demro timber sale which was covered by the Mississippi River Vegetation Management EA and decision (signed 5/05).

The team was broken into four groups to address the following: wildlife, silviculture/vegetation, soils, and wetland/riparian. Each group was provided with maps, prescriptions, sale design features, and mitigation measures applicable to each unit. A briefing was provided on treatments planned, and timing of harvest activities, and difficulties or complications encountered during harvest. Team members spent 30 – 45 minutes looking at the stands, filled out forms, and met jointly to report out and discuss findings. The following is a brief overview of the results.

### **Monitoring Activities:**

#### **Site #1 – Demro Timber Sale Cutting unit 9      Compartment 169      Stand 3**

This was a 32 acres mature mixed stand of jack pine, red pine, and balsam fir with scattered hardwood species. Wetlands associated with the Mississippi River are on the east side of the stand. A clearcut with reserves was planned with site preparation obtained through logging activities and broadcast burning. Areas heavy to red pine were to be thinned. Natural regeneration of jack pine was anticipated. Several 1-acre reserve areas were prescribed along the roads to maintain scenic integrity.

#### Key Findings Site 1:

- Unit was harvested in March 2007 using a CTL processor. Harvest occurred on frozen soils.
- Silviculture/Vegetation – Due to a lack of good inventory data, the unit was primarily a thinning although portions were clearcut. Reserve areas were not necessary due to the amount of residual trees. Some oak appeared to be cut rather than saved. Burning has not been accomplished and if not done by 2010 mechanical site preparation will occur. Ground disturbance resulting from sale operations was not obtained due to harvest occurring on frozen ground. Consequently, natural jack pine regeneration is unlikely and planting will need to be planned. Additional dollars will need to be obtained.
- Wildlife -- Ample green tree residuals due to amount of thinning and adequate snags (6-12) were retained. Legacy patch were present but not needed due to amount of thinning in unit. There were no activity timing restrictions.
- Wetlands/riparian—The stand boundary extended into the riparian area but when the cutting unit boundary was put in, the riparian area was excluded. Consequently riparian area was protected.
- Soils – Area in skid trails was less than 10-15% of cutting unit. Skid trails were lightly compacted. Size of landings and total amount of area in landings was acceptable and within the 1-3% guideline for units (Voluntary Site Level Forest Management

Guidelines, Timber Harvesting section, p 26). There were no visual signs of rutting or erosion. A variety of sizes of coarse woody debris was retained and scattered across the site.

- In summary, prescription corresponded to what was planned in the EA. Prescription modifications and documentation of changes had to be made due to poor inventory data available during the planning process. Administration of the sale was excellent and the resulting condition of the stand was very good.

**Site #2 – Demro Timber Sale Cutting unit 12      Compartment 184      Stand 14 & 17**

Combined stands total 22 acres and consist of red pine with varying amount of white pine, balsam fir, spruce, and hardwoods. Thinning was prescribed to cut red pine and retain other species for diversity. 6-10 jack pine were to be left for snags. Broadcast burning was planned after harvest to reduce hazard fuels.

Key Findings Site 2

- Unit was harvested in April – May 2007. Frozen or dry soil requirement was met.
- Silviculture/Vegetation – Prescription was implemented and objectives met. Stands are 128 years old so thinning might not be the most appropriate prescription unless some wildlife objectives were incorporated that were not mentioned in the prescription.
- Wildlife -- Unthinned patches were retained as prescribed. Good species diversity, variability in size classes and spacing in residual trees. Recommend not burning since hazard fuels are essentially absent.
- Wetlands/riparian—Cutting unit did not contain any wetland or riparian features.
- Soils – Area consisting of skid trails and landings is within the percentage guidelines (10-15% and 1-3%, respectively). No soil compaction, rutting or erosion noted within unit. Road accessing unit had minor rutting.
- In summary, activities corresponded to those specified in the EA. Forest Plan objectives, standards and guidelines have been met. Mitigation was effective.

**Site #3 – Demro Timber Sale Cutting unit 8      Compartment 168      Stand 11**

This is a 9 acre, 110 year old aspen/balsam fir stand with an overstory of older red pine. Some hardwoods are present. Prescription was for clearcutting, broadcast burning for hazard fuel reduction, and planting to convert the stand to spruce/fir. Reserve areas, 6-10 snags, and other species were to be left.

Key Findings Site 3

- Unit was harvested in February 2008 on frozen soils.
- Silviculture/Vegetation – Accurate inventory data was not available during the planning process. Forest type and species composition were not accurate, consequently the prescription activities need to be modified. Nonetheless, the clearcutting prescription was appropriate given aspen composition and condition. Conversion from aspen to spruce/fir is difficult and costly; recommend changing the desired condition from spruce/fir to aspen and regeneration from planting to natural regeneration of aspen. In addition, mechanical site preparation rather than burning is more appropriate for this site. Tansy and knapweed occur along the pipeline road.
- Wildlife –Reserve areas and minimal snags were left but no scattered green tree residuals. Timing of harvest activities for eagle (October 1 through February 1) was met but as a result ground scarification during harvest was not achieved.
- Wetlands/riparian— Harvesting occurred within a small ash wetland which was consistent with FP standards and guidelines. There was virtually no soil exposure. However, MFRC *Voluntary Site Level Forest Management Guidelines* (2005) state “Forest management activities will not take place in wetlands, including building landings, skid trails and roads, harvesting or running equipment through the wetland depression” (General Guidelines, pg. 19). This was in conflict with mitigation elsewhere for management activities within wetlands. Personal communication with MFRC (Barott, 2008) indicates that the above statement is in error and will be removed from the next edition.
- Soils – Area consisting of skid trails and landings is within the percentage guidelines (10-15% and 1-3%, respectively). Winter logging resulted in no soil compaction, rutting or erosion. Ample coarse woody debris was left. Landing was outside the unit and along the pipeline road.
- In summary, lack of good inventory data during panning resulted in some prescription modifications. Activities in prescription correspond to those identified in the EA.

**Site #4 – Demro Timber Sale Cutting Unit 6      Compartment 155      Stand 38**

This was a 14 acre jack pine stand with mixture of other conifers and hardwoods. Jack pine is dying out. Conifer regeneration was to be protected. The EA specified a partial cut maintaining at least 50% crown cover. A portion of the stand was deferred because of the presence of an eagle’s nest and because it is in the Mississippi River Unique Biological Area (Management Area 8.3).

### Key Findings Site 4

- Harvest occurred after October 1, 2007.
- Silviculture/Vegetation –Although a good mix of species was retained, it appeared there was less than 50% canopy closure after harvest. However, this was an ocular estimate that would be more reliable to assess when leaves are on the hardwood trees. Additional training for the marking crews on how to achieve this objective would be helpful. There is not a good correlation between residual BA and crown canopy closure because of the crown variability due to species and crown position (dominant vs. intermediate). Stand had a good distribution of understory conifers that were damaged or lost during harvest operations.
- Wildlife –Several TES species were present: eagle, black backed woodpecker, and ternate grapefern. Activity timing was met. A five chain no treatment zone around the grapefern was met. There were plenty of green tree residuals, snags, and conifers to meet wildlife objectives.
- Wetlands/riparian— None within the cutting unit.
- Soils – Area consisting of skid trails and landings is within the percentage guidelines (10-15% and 1-3%, respectively). No soil compaction, rutting or erosion noted except on skid trails and landings. Coarse woody debris (2-5 logs greater than 12 inches diameter) throughout the unit. Retention of slash on low nutrient soils was met.
- In summary, activities corresponded to those specified in the EA. Forest Plan objectives, standards and guidelines have been met. Mitigation for TES was met. Need help with marking guides and training marking crew to achieve 50% crown closure. This is a variable that is difficult to consistently measure in a stand let alone mark trees to achieve after harvest.

### **Evaluation and Conclusions:**

- Overall, district personnel did a good job of implementing prescriptions, design features, mitigation measures, BMPs, and activities as planned in the EA.
- In some cases silvicultural prescriptions needed to be modified because data used during planning was lacking or inaccurate. Since this project, the Forest has more and better inventory data to work with. This also points to the importance of communication between planners and those implementing the project activities on the ground so that inconsistencies/discrepancies are worked through ASAP.
- Mitigation for wildlife was implemented and effective. Legacy patches, adequate numbers of green reserve trees, and species for diversity were left. Sufficient numbers of snags generally occurred in the regeneration units. Protection for TES species was implemented and effective.



- Harvest activities were conducted within the seasonal restrictions.
- Soils were well protected. There was little or no evidence of rutting or compaction. Coarse woody debris was adequate.
- Sale design features and mitigation for riparian/wetlands were implemented and effective.
- Winter logging and cleaning equipment has minimized non-native invasive species introduction and spread.

**Recommendations:**

- Additional training for the timber sale marking crews on recognizing wetland and riparian features during all seasons, especially winter when they are much harder to detect.
- Additional discussion on 50% crown closure. How is that measured? Does it include crown coverage contributed by the intermediate trees or just the dominants.
- Broadcast burning needs to be prioritized and achievable.
- Improve or facilitate communication between planners and implementers so that inconsistencies are recognized and changes made early.
- Monitor some units after sale layout but before harvest and then again after harvest.
- Establish some photo points so that changes that occur over time can be captured.
- In a couple of instances, mitigation requiring winter harvest conflicted with prescription requirements for ground disturbance to achieve natural regeneration. Planning teams should review all mitigation.

### III. RESEARCH AND STUDIES

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#### 1. American Elm Restoration Project

In 2007, the Chippewa National Forest (CNF), and the Northern Research Station (NRS), with support from USFS State & Private Forestry (SPF), MN Department of Natural Resources (DNR) and the Leech Lake Band of Ojibwa (LLBO), initiated a project to restore the American elm to the Forest's landscape. Dutch Elm Disease (DED) has greatly reduced or eliminated the American elm component of hardwood forests and riparian ecosystems on the CNF. The objective of this project is to strengthen the tolerance to DED in American elm on the landscape of the CNF without narrowing the genetic base of the remaining elm population. The eventual goal will be for American elms to resume their role in ecosystem function on a landscape scale.

With a two-phase approach, the Chippewa National Forest intends to combine the DED tolerance of a handful of existing American elm cultivars with the cold-hardiness and genetic diversity of the remnant local American elm population. The hope is this effort will hasten natural selection for resistance, and the return of the American elm component in the landscape of the Chippewa.

Phase 1 - During the summer of 2007, known large living "wild" American elms on the Chippewa National Forest were evaluated and four of these "survivor" elms were selected to use in cross pollination DED tolerant cultivars. A team of biologists and silviculturists selected a planting site on each district on the Chippewa for a total of three sites. These sites are 1.2 acres each and are located in natural plant communities where American elm occurred historically.



Pollinating Chippewa NF branches at NRS to produce seed.

During February 2008, branch material from the four survivor trees was collected and sent to the NRS office in Delaware, Ohio. There the branches were forced to bloom. Pollen was collected to be used for controlled pollination and these flowers were also then pollinated with pollen from trees known to possess high tolerance to Dutch Elm Disease. Seeds were produced on these branches in the lab as well as on field trees in the spring of 2008. The seeds from these crosses were then sown and grown, resulting in 575 seedlings. Some of these



Constructing the deer enclosure at the planting sites.

should possess both cold hardiness and disease tolerance characteristics.

While seedlings were being produced in Delaware, Ohio, the three sites on the Chippewa NF were being prepared. Each site was double disked to break up sod and brush. Nine foot tall fences were erected to exclude deer which could destroy the young elm seedlings.

On November 6, 2008, the 575 American elm seedlings shipped from the NRS at Delaware, Ohio arrived at the Chippewa NF. These potted seedlings, averaging six feet tall, are being stored in the tree cooler at Blackduck for the winter. In April, 2009 they will be planted on the three prepared sites.

These 575 seedlings account for about half the trees needed for this project. More branch material will be collected during February, 2009 and the process of cross pollination, seed development and seedling production will be repeated. The sites should be fully planting by the spring of 2010.

Tree growth and hardiness will be monitored on every tree each year. After growing for six years the elm trees will be tested for DED tolerance. This is done by putting the DED fungus into holes drilled into their trunks. The actual strain of fungus used will be collected on or near the Chippewa National Forest. Four weeks after the trees are inoculated with the DED fungus leaf wilting and foliage death will be recorded. The percent of crown dieback will be evaluated each year thereafter. Those individual trees that overcome the disease and survive will be known to have inherited DED tolerance from their disease tolerant parent. Trees that demonstrate both DED tolerance and good cold hardiness will be used in the second phase of this project.

Long term monitoring will be conducted by the NRS. Young trees that die will be replaced through time as to maintain fully stocked plantings of at least 330 trees on each one acre site. Once established these trees should cross pollinate with each other and with other wild trees, strengthening the genetic tolerance to DED in the native population over time. The sites will be used as both seed orchards and sources of material for vegetative regeneration. Offspring planted out on the landscape will be free to pollinate with other wild trees, spreading their disease tolerant genes across the Forest's landscape.

**Contact:** Gary Swanson, Forest Silviculturist, Chippewa National Forest. 218-335-8652



Chippewa NF American elm seedlings growing at NRS.



American elm stored for the winter in the Blackduck RD cooler.

## 2. Goblin Fern (*Botrychium Mormo*)

Goblin fern, *Botrychium Mormo*, is a small species of moonwort found in rich hardwood forests in the northern portions of Minnesota. It is a Regional Forester Sensitive Species for Region 9. The “Conservation Approach for Goblin fern, *Botrychium Mormo* W.H. Wagoner” was completed December 2001.

One of the information needs identified for the Goblin Fern was to investigate the response of this species to changes in overstory vegetation and winter logging as would occur in some typical forest management practices. One of the known colonies of goblin fern on the Forest was chosen. The site selected for this study is south of Lower Sucker Lake (Township 144 North, Range 30 West, Section 3), where goblin fern colonies occur on either side of Forest Road 2135. The colony on the west side of the road (14 acres) was chosen as a control and the east side (17 acres) was chosen for treatment of a typical hardwood management practice.

Data collection began in 1995 when both the control and treatment stands were extensively searched for goblin ferns and each plant location was marked. Plots were established to include five or more individual goblin ferns representing sub-samples of the population. Plot data collection has continued annually through 2008. Soil moisture measurements were added to the data collection in 1999 and these measurements have continued annually in conjunction with monitoring of the goblin fern population.

A timber harvest contract was awarded to implement the treatment. About 1/3 of the treatment stand was harvested early in 2006, but operations were suspended due to excessive soil disturbance. The remainder of the treatment was completed by the end February 2007 under adequate conditions for soil frost (>4” in depth) but less than the prescribed 12” of snow depth. A total of 377 trees were removed during the harvest including paper birch, yellow birch, balsam fir, black ash, basswood, and sugar maple species. This was thought to result in approximately 70% crown closure throughout the managed stand.

Post-treatment plot data collection began during the 2007 growing season. It will conclude following the 2009 season.

### **Monitoring Results**

Table 34 displays the mean annual goblin fern population within the monitoring plots by year for the treatment and control stands. There was a total count of 27 individuals in the treatment stand in 2008. This is the same as 2007, the year immediately following harvest, and it is within the range observed since 2000.

Table 35 displays the mean annual soil moisture for the treatment and control stands. Drought conditions existed during the summers of 2006 and 2007. This is reflected in the lower soil moisture readings taken during those years relative to years prior to 2006.

The soil moisture in the treatment site has exceeded the control site in all years since 2002. The goblin fern population in the treatment and control sites has been variable in these same years.

For 2008, soil moisture on both the control and treatment site were near the high end of the range observed since 2002. This reflects more normal rainfall amounts in 2008.

Canopy closure was recorded at each of the monitoring plots in the control and treatment stands in July 2008, one growing season following the treatment. A tube densitometer was used to determine canopy closure. Five measurements were taken at each plot for a total of 50 measurements in the treatment stand and 55 measurements in the control stand. Canopy closure averaged 82% (range: 20% to 100%) in the treatment stand. The control stand had 100% canopy closure and showed no variability among plots.

**Additional Work Planned or Needed**

For 2009, goblin fern counts and soil moisture readings will be taken and a final report will be completed following the conclusion of this post-treatment monitoring.

**Table 34.** Goblin Fern Administrative Study annual count of individual plants within sampling plots summed by year.

	YEAR													
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Control (n=11)	104	273	117	39	36	27	34	37	30	44	22	22	19	23
Treatment (n=10)	97	239	101	53	58	36	33	25	15	28	15	29	27	27

**Table 35.** Goblin Fern Administrative Study yearly Average Volumetric Soil Moisture within sample plots.

	YEAR									
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Control site average (n=11)	32.5	37.5	(no data)	27.0	23.9	27.5	26.8	21.3	21.0	27.8
Treatment site average (n=10)	31.9	33.4	(no data)	29.9	28.0	27.8	27.5	23.0	23.3	29.4

**3. Stand and cohort structures of old-growth red pine forests of northern Minnesota**

The objective of this study is to determine the natural range of variability in stand and cohort structure for red-pine dominated forests in Minnesota, using current old-growth remnants as a guide.

Included here is an overview of methods and a few preliminary results. Final results will not be available until all sites are complete and all increment cores have been processed. The project currently includes four study sites, one of which is the Pine Point RNA, Chippewa National Forest. We intend to add two more sites in the 2009 season to complete the study (locations still undecided).



Field work was conducted at the Pine Point RNA on multiple visits between June and August, 2008. As proposed, we established one 70.7-by-70.7 m plot (0.5 ha) on the main north-south ridge bisecting the RNA. The plot was aligned north-south; the GPS point for the plot's southwest corner is E 0381961, N 5222258 (UTM 15). Within this plot, we measured dbh and recorded X and Y coordinates for all living and dead pine trees (stems  $\geq 10$  cm dbh). We also conducted a complete inventory of all down woody debris (DWD). We collected increment cores from 42 living red pines and 23 living white pines; in addition, we collected cores from 22 dead pines (both snags and DWD, mostly red pine) on or near the plot.

We are currently processing the increment cores in our newly-established tree-ring laboratory in Grand Rapids. This lab was equipped using approximately \$5000 contributed by the Chippewa National Forest. The lab includes an Olympus sliding-stage stereomicroscope, a digital encoder (to record measurements), and associated tree-ring software. This equipment is essential for this study (and other tree-ring studies), and it is truly a state-of-the-art laboratory.

Preliminary results for stand structure at Pine Point show a basal area of 36.1 m<sup>2</sup> per ha, typical of old-growth pine stands. The volume of DWD is 75.5 m<sup>3</sup> per ha, also typical of such stands. Interestingly, preliminary results suggest two cohorts of red pine, one established *ca.* 1690, the other *ca.* 1900.

The final report will include more structural data, as well as more detailed age structures and growth patterns from all sites. Once the study is complete, we intend to present an informal seminar to Chippewa NF staff, discussing our findings and the possible management implications. All Pine Point plot data and increment cores will be available to FS staff if needed.

Contact: Shawn Fraver, Northern Research Station, Grand Rapids

## **4. Relationship between stand age and carbon storage in the Chippewa National Forest**

Understanding the relationship between forest age and carbon storage is important for two reasons. First, knowing how well carbon storage is related to forest age is essential for developing and applying techniques to estimate total ecosystem carbon storage and cycling over large areas, (i.e. entire national forests). Because stand age is a commonly monitored characteristic of forests, the ability to accurately predict carbon storage from age would be a very valuable addition to carbon assessment efforts. Second, understanding how carbon storage relates to age is necessary because forest managers are increasingly being asked to manage forests for both fiber production and carbon storage and sequestration. Although general patterns of age-related carbon trends have been identified by previous studies, very little attention has been focused on understanding the relationship between stand age and total ecosystem carbon storage (i.e. including carbon stored in branches, foliage, dead wood, forest floor, etc.).

We are examining ecosystem carbon storage in managed stands of red pine and aspen across the Chippewa National forest. In 2007, we measured carbon storage on managed, but unthinned red pine stands that spanned stand ages from 10 to 160 years old. These results identified some clear



relationships between stand age and carbon storage that we are incorporating into our analysis of carbon dynamics over much larger areas. In the summer of 2008, this analysis was expanded to examine carbon storage in aspen-birch stands, and if funding is available, to lowland conifer stands as well. These chronosequence results will strengthen our understanding of how carbon storage depends on both age and forest type. In addition, these chronosequence results are highly complimentary to our long-term studies on the experimental forests because they provide insight into processes occurring in the younger stands that are more typical of managed forests in the lake states region.

During the summer of 2008, field measurements necessary to quantify carbon storage were conducted. These measurements consist of 3, 10 meter radius plots per stand. Within each plot all diameters and heights of all trees are measured. Shrubs and herbaceous material are measured in smaller plots nested within the full plot. Forest floor and mineral soil are sampled and analyzed to assess carbon content. We planned to measure at least 15 aspen-birch stands, selected to integrate with existing data to create an aspen-birch chronosequence.

For 2009, it was decided to integrate this study with the stand and cohort structure of old-growth red pine study to answer two important forest management questions that are both related to climate change:

- How does carbon storage and cycling differ between managed and unmanaged (old-growth) stands?
- Does the greater forest complexity in the old-growth stand make it less vulnerable to weather fluctuations (which are expected to increase with climate change)?

Contact: John Bradford – USFS Northern Research Station, Grand Rapids, MN

## **5. Long-Term Soil Productivity Study**

As part of a national long-term soil productivity study, soil porosity and organic matter are being experimentally manipulated on large plots to determine the impacts of such manipulation on growth and species diversity of aspen stands on the Chippewa National Forest.

Research was done in two areas on the Chippewa National Forest. The first study area is on the Marcell Experimental Forest on the Marcell Moraine Landtype Association and it was started in 1991. The second study area is called the Chippewa site and that is located within the Guthrie Till Plain Landtype Association. That treatment began in 1993. Test plots were prepared to determine the effects of soil compaction and organic matter removal on soil properties and growth of aspen suckers; associated species and herbaceous vegetation on stand development. On the Marcell and Chippewa sites the study involved winter harvest of 70 year-old aspen growing on loamy soils.

The following combinations of treatments were applied to the sites:

- 1) Whole tree harvest (trees lifted off the site with little or no ground disturbance from machinery) or bole only removal.

- 2) No soil compaction, moderate compaction or heavy compaction.
- 3) Forest floor removal or no forest floor removal

The 15<sup>th</sup> year sampling was completed in 2005 and 2006 for the Marcell pilot study site. The vegetation was sampled for the 15<sup>th</sup> year at the Chippewa site in 2007 and the soil was sampled in 2008. The University of Minnesota will record the plant species in 2009 at the Chippewa site.

Northern Research Station located in Grand Rapids, Minnesota hired a post-doctoral researcher, Rick Voldseth, to summarize the 10-year data. In Sept. 2006, Rick presented his preliminary findings during an office presentation and field tour to the Chippewa National Forest and other interested agencies. The final report is not yet available.

## **6. Non-native Invasive Earthworm Research**

Dr. Cindy Hale, earthworm researcher at the University of Minnesota Duluth, conducted research near Ottertail Point on the northeast side of Leech Lake. Dr. Kyungsoo Yoo from the University of Delaware and Dr. Anthony Aufdenkampe from the Stroud Research Center in Pennsylvania were also assisting on the research. The title of the study is "Acceleration of inorganic nutrient release and Mineral-Organic matter Associations by soil bioturbation along an earthworm invasion chronosequence." They are planning to return in the field season of 2009 to collect samples and continue their research.

## **7. Red Pine Retention Study (RPR)**

North Central Research Station is conducting this study in cooperation with the Chippewa National Forest and University of Minnesota. The study area is located in the Tamarack Point area on the Deer River District which is administered by District Ranger, Joseph Alexander. Since its implementation, this project has gained national and international recognition and interest.

In currently managed, naturally regenerated and planted red pine stands, there is minimal variation in structure and composition relative to historic conditions. The study is designed to create red pine stands that more closely represent past ecosystems. This study uses partial harvests to reduce stands to the same basal areas but leaves remaining overstory trees in different spatial patterns on the landscape. The patterns include large gaps, small gaps, and traditional, evenly spaced thinning. Jack, red and eastern white pine were planted in the understory to increase structure and composition. The varying spatial patterns and densities of the overstory will be compared to the effects on growth and survival of regeneration, understory composition, site productivity, avian communities and disease incidence.

Results will be monitored for 5+ years after treatment. Logging began in August 2002 and was completed in April 2003. Planting was done in May 2003. Data collection began in 2003 and is planned for a number of years. Data is being collected on the following: planted seedling survival, seedling layer, herbaceous vegetation, litterfall, newly recruited mature treefall,

resource heterogeneity, resource competition and seedling growth, pathology, carbon isotopes. Avian surveys are also being conducted. Preliminary results are not yet available. Researchers have hosted several field trips to the site to discuss the study objectives, methodology, and data collection.

The Big Lake Management Plan Environmental Assessment covered this study (1999). The establishment report and study Plan is *Restoring Stand Complexity in Managed Red Pine (Pinus resinosa) Ecosystems Using Overstory Retention and Understory Control*, (Palik, Zasada, and Kern, 2003). The design and implementation of the project has involved the expertise and commitment of numerous resource professionals on the Chippewa Forest, especially on the Deer River and Blackduck Districts, and from Northern Research Station, University of Minnesota, Michigan Tech University, Iowa State University, and State and Private Forestry. It continues to draw the attention and interest of researchers and natural resource professionals across the country and even internationally.

Contact: Brian Palik, Northern Research Station, 218-326-7116

## **8. Monitoring by the Minnesota Dept. of Natural Resources and the Minnesota Forest Resources Council**

There was no site-level forest management guideline monitoring done by the Minnesota DNR on the Chippewa National Forest in 2008. However, three sites have been selected for monitoring in 2009.

## IV. ADJUSTMENTS OR CORRECTIONS, AND AMENDMENTS TO THE FOREST PLAN

Since the Chippewa National Forest Land and Resource Management Plan (Forest Plan) was revised, Congress has enacted the 2008 Planning Rule which allows us to make non-substantive corrections or adjustments to the revised Forest Plan using a process called “administrative corrections”. Administrative corrections (36 CFR 219.7(b)) may be made at any time and are not plan amendments or revisions. Administrative corrections include the following:

- (1) Corrections and updates of data and maps,
- (2) Corrections of typographical errors or other non-substantive changes;
- (3) Changes in the monitoring program and monitoring information
- (4) Changes in timber management projections; and
- (5) Other changes in the Plan Document or Set of Documents, except for substantive changes in the plan components.

In FY 2008 there were no amendments, corrections or updates.

Table 36. Listing of Forest Plan amendments, corrections, or updates.

Type of Change	Date	Content
Amendment 1	11/15/2007	Change to Guideline on prohibited OHV use (G-ORV-1)
Amendment 2*	06/04/2009	Change to North Winnie SPNM Boundary
Administrative Correction 1	08/17/2006	Change to Glossary definitions
Administrative Correction 2	08/30/2006	Change to Monitoring Plan
Administrative Correction 3	08/18/2006	Change to Timber Management Guideline (G-TM-7)
Administrative Correction 4	08/18/2006	Change to Heritage, Recreation, and Access Guideline (G-WSR-7)
Administrative Correction 5	08/18/2006	Correction to Executive Summary Table
Administrative Correction 6	08/18/2006	Change to Watershed Health, Riparian Areas and Soil Resources Table (Table G-WS-8a)
Administrative Correction 7	08/18/2006	Change to SIO Map
Administrative Correction 8	09/18/2006	Change to National ORV Definitions
Administrative Correction 9	09/14/2007	Change to Proposed and Probable Practices
Administrative Correction 10*	08/10/2009	Change to Boundary of Candidate Research Natural Area, Sunken Lake
Errata 1	08/18/2006	Change to Record of Decision (ROD)

\* These changes occurred in FY 2009. They are included here to provide a complete and up to date listing of changes.

The amendment, full corrections, as well as the corrected pages from the set of Plan documents can be found at: [http://www.fs.fed.us/r9/forests/chippewa/projects/forest\\_plan/index.php](http://www.fs.fed.us/r9/forests/chippewa/projects/forest_plan/index.php)  
We encourage people to use this resource for accessing the most up to date information on amendments and administrative corrections. Future corrections or amendments will also be listed in the Chippewa NF *Schedule of Proposed Actions* which is distributed quarterly. We will continue to provide opportunity for public involvement at the project level and during any substantive changes to the Forest Plan.

## V. LIST OF PREPARERS

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The following people collected, evaluated, or contributed time and/or data for the FY 2008 Monitoring and Evaluation Report.

<b>Name</b>	<b>Discipline</b>
Sharon Klinkhammer	Forest NEPA Coordinator/ Planner
Gary Swanson	Forest Silviculturist
Cindy Miller	Timber Specialist
Millie Baird	Engineer
Lori Larson	Timber Resource Specialist
Neil Peterson	Tribal Liaison
Jim Barott	Soils Scientist
Joyce Rairdon	Executive Assistant
Ann Long-Voelkner	Recreation Planner
Leo Johnson	Blackduck District NEPA Coordinator
Lisa Arbucci	Natural Resources Operations Team Leader
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Jim Gallagher	Walker District Wildlife Biologist
Kim Rawnsley	Wildlife Technician; Monitoring, Inventory, & Survey Team
Michael Hayes	Acting Lands Program Manager
Todd Tisler	Fish & Wildlife Program Manager
Jeremy Cable	Monitoring, Inventory, & Survey Team Supervisor
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Brian Jenkins	Fire and Fuels Specialist
Shawn Fraver	Northern Research Scientist
John Bradford	Northern Research Scientist
John Greenlee	Botanist, Superior National Forest