FISCAL YEAR 2004
MONITORING AND EVALUATION REPORT

LAND and RESOURCE MANAGEMENT PLAN

May 2005

APPROVAL AND DECLARATION OF INTENT

I have reviewed the FY 2004 Monitoring and Evaluation Report for the Chippewa National Forest that was prepared by an interdisciplinary team during the winter 2004. The Monitoring and Evaluation Report meets the intent of both the Forest Plan (Chapter V) as well as the regulations contained in 36 CFR 219.

This report is approved:

_____ _____

NORMAN L. WAGONER Date
Forest Supervisor

EXECUTIVE SUMMARY

FISCAL YEAR 2004
MONITORING & EVALUATION REPORT

Chippewa National Forest

We have been monitoring and evaluating the 1986 Land and Resource Management Plan (Forest Plan) implementation since its approval. Our Monitoring and Evaluation plan is described in Chapter V of the Forest Plan. We've monitored actual outputs against predicted outputs, how well we implemented standards and guidelines, how well those standards and guidelines protect forest resources, and whether or not our actions are moving the Forest toward the long-term desired future conditions described in chapter IV of the Forest Plan. Monitoring plays a crucial role in surfacing irregularities or areas that may require change.

This will be the last Monitoring and Evaluation report that addresses the 1986 Forest Plan. Future reports will monitor and evaluate the 2004 Forest Plan.

Key Events in 2004

Woodtick Wetland Restoration
In 2003 and 2004, Forest fisheries and hydrology staff teamed up with Forest engineers on at least 15 different hydrology-related projects, from shoreline stabilization to bridge and culvert replacements. One of the larger projects involved the Woodtick Trail reroute and wetland restoration near Walker, MN.

The Woodtick Trail relocation project is the first project of its kind on the Chippewa. The "Trail" is actually a 15-mile long gravel road that paralleled a major highway on the Forest. Built along an 1890's railroad grade, the original entrance to the trail went through a wetland.

Forest policy regarding wetlands is to protect wetland resources and functions from adverse impacts and to restore resources and functions (FSM 2527 Supp 96-1). The Forest Plan specifies that National Forest management activities will be conducted so as not to cause a reduction in present water quality or to impair designated uses (IV-44) and those wetlands will be managed so as not to significantly impair their water quality, wildlife habitat, and aesthetic values (IV-54).

In 2002, a decision was made by Walker District Ranger, Tom Somrak, to relocate the road entrance to an upland area 1000 feet north of the original entrance site. Work began in 2003 and continued through 2004.

Woodtick Trail passes through a wetland.

Road has been removed from the wetland.

Relocating the road reduced long-term maintenance costs, improved safety for visitors, and restored water flow by reconnecting wetlands near the old road bed. In addition to wetland restoration, natural contours in uplands were restored and Blandings turtle habitat was created in three locations.

Healthy Forest Initiative

President Bush's Healthy Forests Initiative (HFI) of 2002 improved administrative procedures necessary to expedite hazardous fuels reduction activities and forest health projects. Of utmost importance was protecting communities from the risk of wildland fires.

In 2004, the forest had two projects implemented under this initiative. Blackduck District Ranger, Tracy Beck, made the decision to implement the "Healthy Forest Fuels Treatment Project" the Forest's first project under this initiative. This project covered 865 acres of fuels treatment including: 624 acres of large-scale prescribed burning; 217 acres of mechanical treatment; and burning slash piles created from timber activities on 24 acres.

A second project, also on the Blackduck District, thins and reduces fuels on about 70 acres of dense red pine.

Annual Activity Review

In 2004, members of the Forest Leadership Team and several forest employees spent a day reviewing several projects on the Blackduck district. Emphasis was to look at treatments designed to increase within stand diversity, to assess management of riparian areas, and to review attainment of prescribed burning objectives. Projects were reviewed to determine if what was implemented matched what was planned in the environmental and decision documents. On the ground, projects were examined to determine if treatments incorporated the necessary standards and guidelines, mitigation measures, and design features identified during planning. A summary follows.

Clearcut unit in the Silver Lake Sale

- Stand was harvested in the spring/summer 2004.
- Forest Plan Standards and Guidelines for timber harvest and roads were examined in detail. Of those that were applicable, all were met except for an effective closure of a temporary road. Decommissioning of the road is planned after reforestation activities are completed.
- The temporary road was closed using a berm but there is evidence that ATV users are accessing the area. Effective closures may be achieved by distributing slash at the access points. If berms are used, incorporation of large woody debris and boulders may result in berms staying intact and deterring use.
- Although a clearcut was prescribed, numerous conifer and hardwood species of varying ages and sizes were left to meet structural and species diversity objectives. Regeneration objectives may be difficult to achieve because so many residual trees were left.
- There was a good distribution of snags and coarse woody debris was adequate.

Clearcut with residual trees in the background.

Diversity in a red pine sapling sized stand

- This site was probably among the first units harvested under the 1986 plan. It was most likely heavily site prepped and then planted with red pine.
- Conifer diversity is limited. Numerous brush and hardwood species occur inspite of several release treatments. Structural and vertical diversity is lacking especially snags, overstory trees, coarse woody debris, and legacy patches. The retention of legacy patches and reserve trees evolved and was incorporated later. At the time the stand was harvested, it met the 1986 Forest Plan goals and objectives. As demonstrated in the previous unit, more recent projects would retain a variety of conifer and hardwood species resulting in more structural and species diversity.

Diversity in young stand

- This stand was clearcut in 1998, site prepped and planted with a several conifer species.

Residual overstory trees were left and provide good species and structural diversity. Coarse woody debris is low but snags are in adequate numbers.
- Overall, project diversity objectives were met as were 1986 Forest Plan goals and objectives. To meet the diversity objectives, planting and stand tending is most often required which is extremely expensive. Obtaining adequate funding for planting and stand tending is a concern.

Riparian Management
- Riparian management next to a lake and wetland in a regeneration harvest unit logged in the summer of 2004 was examined.
- Next to the lake, the 1986 Forest Plan standards and guidelines were met. Removal of about 6 trees, impacting roughly 1/10 acre was in conflict with a mitigation measure that required no cutting within 100 feet of the ordinary high water mark. There was no harvest or activity in the rest of the riparian area in the unit.
- Around the wetland, recommendations were made to improve skid trail placement and to minimize ground disturbance.

Prescribed Burning for Site Preparation in Tank Sale
- The site is a regeneration harvest logged in the winter of 2004. Numerous overstory and residual trees were left on site. It was burned in August 2004. Burn objective was for less than 10% mortality in the overstory; currently there is 12-15% mortality. Additional trees may die in the next year due to stress and beetles.
- Mortality obtained was acceptable and will provide snags and coarse woody debris in the future.
- Diversity will be obtained from the reserve trees, reserve patches, and sprouting of hardwoods and shrubs.
- The burning met project and 1986 Forest Plan goals and objectives.

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; regeneration surveys. Often times the monitoring may be informal consisting of general field observations, or site specific reviews. The following is a brief summary of some the monitoring that has occurred.

Some findings from projects reviewed….
- ✓ It is important to describe the objectives and desired conditions in environmental documents in sufficient detail so that results desired on the ground are well defined. Examples include specifying size of gaps, burning objectives, acceptable mechanical fuels treatments and timing of those treatments, and specifying the creation, retention, and distribution of slash piles for wildlife objectives.
- ✓ Where *soils* are a concern, timing of harvest as well as timing of mechanical fuels treatments should be addressed.
- ✓ Where some *prescribed burning* has occurred, fuel loadings and mortality has been monitored. Continue to clarify objectives and if or how machine piling fits in as an alternate approach.
- ✓ *Funding* from the timber sale may not cover all the post harvest activities planned, especially planting for species diversity or wildlife objectives. Tracking of these activities is critical so that

requests for dollars appropriated by Congress can be made to insure objectives and desired conditions are met.

- ✓ In several instances, *wetland/stream protection* exceeded the MFRC guidelines. There was one site where slash piles occurred within the riparian zone. Continued attention needs to be paid to wetland and stream filter strips and riparian management zones to ensure activities and ground disturbance do not occur within them. One effective approach in regeneration units is to incorporate seasonal wetlands into legacy patches.
- ✓ *Skid trails* leading out of units were properly obliterated, stabilized and vehicle use discouraged.
- ✓ Protection of *structural features*, such as leaning trees for owl fledglings, occurred during layout. To follow through, specify protection during harvest, where feasible.
- ✓ In one project, harvest activities were conducted in such a manner that *temporary roads*, although planned, were not constructed. This is the best of situations as the impacting activity did not occur. In another project, a couple of short-term road closures were ineffective and roads were being used by vehicles. These roads have since been proposed for decommissioning. In other instances, large slash piles effectively closed temporary roads and deterred garbage dumping.
- ✓ In one instance, to protect a recently discovered *rare plant*, a buffer around the population was put in place. The buffer was effective in that no treatment activity occurred within the buffer.
- ✓ Where specified, 10% *legacy patches* were retained. *Snags* were protected.
- ✓ In a cutting unit in a *goshawk* territory, 50% canopy closure was retained, aspen greater than 12" dbh were reserved and well distributed, and slash was piled.
- ✓ Planted *white pine seedlings* concentrated in a portion of the stand are more economical and successful to tend than scattered plantings.
- ✓ Birch trees left in several units provide birch bark *gathering opportunities* for Native Americans.
- ✓ Jesse Lake fish structures installed in 2003 were checked and found to be in place and effective.

Blueberry Monitoring

Plots to monitor the effects of treatments on blueberry production were set up in the Sand plain area. The objective is to determine if the management practices effectively increase the amount of blueberries.

Red Pine Retention Study

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 Wade Spang. 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. Some ecosystem burning was also done in fall 2003. Data collection occurred in 2003 and 2004 and is planned for a number of years. 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 North Central Research Station, University of Minnesota, 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.

In Summary
Our monitoring results and evaluations indicate that we are implementing the Forest Plan adequately and, in some cases, better than adequately. Through timber harvesting, we are close to meeting the Age Class Distribution as planned for year 2000 (p. IV-208). Threatened, Endangered, and Sensitive and Management Indicator Species have not been adversely impacted. Management strategies have resulted in the increase in the wolf and eagle populations in the area. Soil and water quality were not adversely impacted. All of our programs are managed within Forest Plan direction and within the limits of funding received from the United States Congress.

Evaluations at the end of most resource sections provide more details and information on trends and implications.

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 and our projects can be found on the Internet at www.fs.fed.us/r9/chippewa.

FOREST PLAN REVISION

The record of decision for the revised Forest Plan was signed by Regional Forester Randy Moore on July 30, 2004. Implementation of projects covered under the Forest Plan began 30 days after the publication of the decision.

Nineteen appeals were received. The major appeal issues include the prohibition of cross country travel by snowmobiles and ATVs, expansion of the semi-primitive non-motorized management areas, establishing an ASQ level that was either too high or too low, violation of trust responsibilities, flawed economic analysis, and inadequate public notification.

The Forest worked with the Superior NF to address all of the appeal issues. This information was sent to the Washington Office. The Chief of the Forest Service will make a decision to support or remand (send back) the decision, to remand parts of the decision or to direct the Forest to work with the appellants to resolve issues.

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MONITORING & EVALUATION REPORT

INTRODUCTION

The Chippewa National Forest Land and Resource Management Plan (Forest Plan) was approved in June 1986, and implementation began that same year. The National Forest Management Act Planning regulations specify that, "at intervals established in the Forest 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 on this evaluation, the interdisciplinary team shall recommend to the Forest Supervisor such changes in management direction, revisions, or amendments to the Forest Plan as are deemed necessary." This report summarizes and evaluates the results of monitoring Forest Plan implementation in fiscal year 2004.

Where feasible, data in tables was incorporated from 1987-2004 to show the results and trends through the implementation period of the 1986 Forest Plan. In particular, numbers on Management Indicator Species, Timber volumes, and acres adequately stocked are displayed for 1987-2004. Other resource areas—recreation visitor days to forest and interpretive sites, recreation activities and outputs, wildlife habitat improvement and structures-- were also reviewed. Because of inconsistencies in presentation of data, shifts in reporting formats or indicators, or missing information, it was not possible to compile and display that information.

This will be the last report that addresses the 1986 Forest Plan. The year 2004 marks the beginning of a transition from the 1986 Forest Plan to the 2004 Revised Forest Plan. The Record of Decision for the Revised Forest Plan was signed late July 2004. In the last years of operation under the 1986 Forest Plan many additional issues were considered compared to the early years of the Plan. In order to address these issues and at the same time adhere to the standards and guidelines, varying approaches to analysis and management were used under the general guidance of the 1986 Forest Plan.

I. PROGRAM FUNDING

A. Congressional Allocations

Budgets are allocated annually (our fiscal year runs from October 1 through September 30) by the US Congress, in amounts and mixes that reflect Congressional priorities and desires. White House Administration objectives and Forest Service national and regional priorities further influence Forest budgets.

Budget numbers for the last five fiscal years (FY) are presented to reflect the budget trend for recent years. Budget numbers are expressed in 2004 dollars by using the implicit price deflator. Numbers reflect dollars allocated by Congress and do not include partnership dollars from other organizations.

Table 1: Budget allocation by FY

FY	*Total Budget (Millions)*
2000	10.980
2001	12.216
2002	13.042
2003	13.055
2004	13.588

B. Partnerships, Grants & Agreements

We continue to seek partnerships with other public and private organizations and volunteers to assist us in meeting the Forest goals. Partners and volunteers benefit us in two ways; they leverage the funding we receive from Congress and they promote public involvement in National Forest management.

The forest has a wide variety of partners and volunteers that have assisted us for many years. They include: Lake Associations, snowmobile and recreation clubs, the Leech Lake Band of Objibwe, Minnesota DNR, Itasca, Cass and Beltrami Counties, MCC and YCC, and individuals too numerous to mention. They contribute to the success of our Naturalist Programs, the Discovery Center, Passport in Time program, Marcell Family Center, prescribed fire program, campgrounds and Visitor Centers, and some of the ongoing studies (deer and soils) on the Forest.

In 2004, the Forest had 31 new active partnerships that provided over $200,000 in support to our recreation, wildlife habitat, heritage resources, wildland fire program, forest roads, and watershed program.

Some examples are: working with the Cass Lake Partnership on the Scenic Highway Corridor Management Plan; partnering with the Leech Lake Band of Ojibwe (LLBO) and the Minnesota Department of Natural Resources (MN DNR) on the Boy River Prescribed Burn; working with the LLBO on improvements to the Brush Lake Impoundment; collection of water quality data for lakes within Itasca County with the Itasca County Soil & Water Conservation District and the MN DNR. We continued our partnership with the LLBO in regards to heritage sites; partnered with Cass County on the Woodtick Trail reroute which benefited wetland rehabilitation and provided students from Itasca Community College with internships within our fire program.

Other agreements include: the Chippewa entering into a five-year Interagency Agreement with the USDA Animal Plant Health Inspection Service (APHIS) for animal damage control; a long-term soil productivity survey with the University of Minnesota – Duluth; and partnering with the North Itasca Joint Powers Board on an “Edge of the Wilderness Birding Guide”.

We also renewed our partnership with the Minnesota Conservation Corps (MCC). This partnership

allows us to utilize the talents of the young adults in the MCC program to further benefit our natural resources.

The Forest Service and the U.S. Army Corps of Engineers are embarking upon a jointly sponsored, long-range reservoir operating plan evaluation (ROPE) for the Mississippi River Headwaters reservoirs. The Forest Service is providing funding as well as in-kind services in support of the ROPE study.

The Forest Service has an Intergovernmental Personnel Act (IPA) agreement until 2005 with Itasca Community College to provide an employee as Program Leader/Instructor for the wildland firefighting program.

Cooperative Fire Protection agreements have been established with nine local Volunteer Fire Departments (VFD's) within the boundaries of the Chippewa National Forest. These agreements take the place of Emergency Equipment Rental Agreements (EERA's) that had been established in previous years. The FS expects to establish more Cooperative Fire Protection agreements with local VFD's in the next few years.

II. MONITORING RESULTS AND EVALUATION

Monitoring and evaluation are separate, sequential activities. Their purpose is to provide information that will help determine whether Forest Service programs are meeting the Forest Plan direction from both the quality and quantity standpoint. This direction includes goals and objectives, management prescriptions, and standards and guidelines. The end result of these activities is a decision regarding the need for change in the Forest Plan.

Monitoring - The purpose of monitoring is to observe and record the results of actions. The information collected through this process is used to determine:

- If Forest Plan goals and objectives are being achieved,
- If management prescriptions are applied as directed by the standards and guidelines,
- If the results of applying the prescriptions address the management problems, issues, concerns and opportunities, and
- If significant effects are occurring as predicted.

There are two criteria that determine monitoring requirements. They are (1) monitoring needs required by federal regulations such as the 1982 Planning Rule (36CFR 219) and the National Forest Management Act (NFMA) and (2) considerations found to be significant and linked to the resolution of public issues, management concerns, resource development opportunities and corresponding environmental effects.

Monitoring consists of the collection of information from selected sources on a sample basis. The frequency, precision, and reliability of the sample are based on the relative importance and associated risk of the parameter being monitored, the natural variation of the parameter, and the technology and resources available. A full spectrum of data collection techniques are used including:

- Site-specific observations by specialists,
- Field assistance trips,
- General field observations,
- Management attainment reporting system,
- Formal management reviews on a scheduled basis, and

- Discussions with other agencies and general public users.

Evaluation determines how well actual results are meeting Forest Plan direction and consequently, whether the Plan needs to be changed.

Forest Plan Monitoring Direction --- Direction for the Chippewa National Forest's monitoring and evaluation effort is contained in Chapter IV of the Forest Plan. The specific monitoring plan is included in Chapter V of the Forest Plan.

The following sections display monitoring results and evaluation of outputs and accomplishments, compliance with standards and guidelines, NFMA requirements, measured effects of implementation, management indicator species, and candidate sensitive species. Rationale for proposed changes to the Forest Plan and research needs may also be discussed within this section.

A. VEGETATION COMPOSITION

1. Composition and Age Class

Vegetative composition can be depicted as age classes by forest timber type groups as shown in the 1986 Forest Plan on page IV-208. In Table 2 below, the Forest Plan planned age class distribution for the year 2000 (taken from page IV-208). The existing age class distribution by forest type groups for the years 2000 and 2004 are displayed. Numbers for the existing acres for 2000 and 2004 were obtained by querying the corporate database.

The Chippewa National Forest has implemented the Forest Plan through active management, working *towards* a desired age class distribution for each forest type group. The forest is close to meeting the 2000 planned age class distribution, particularly for the younger age classes in the short and long rotation conifer. Some differences in percentages can be explained in part by:

- Acquisitions or land exchanges where the timber types differ.
- Retyping during field inventory as a result of changing standards and forest succession resulting from mortality of old jack pine, balsam fir, and paper birch.
- Shift from aspen and short rotation conifer to long rotation conifer, from short rotation conifer to aspen, from hardwoods to conifer or aspen, and from aspen to upland opening.

The Chippewa Forest Plan, unlike some other forest plans in the Region, does not identify forest type group age class goals by management area. Consequently, when doing analysis for project areas, it is not possible to compare the existing timber type composition by management area and the age class within each type.

Table 2: Age class distribution planned and existing for 2000 and 2004.

Timber Type/Age Class	Planned (00)	%	Existing (00) all acres	%	Existing (04) all acres *	%
Short Rotation Conifer						
0-20	9,725	26	8,560	28	8,439	30
21-40	541	1	819	3	1,187	4
41-60	1,860	5	2,950	10	1,355	5
61-80	23,946	64	13,521	43	11,136	40
81+	1,338	4	4,950	16	5,975	21
	37,410		30,800		28,092	
Long Rotation Conifer						
0-20	7,805	10	13,765	15	8,683	9
21-40	16,023	20	31,755	36	31,268	34
41-60	40,816	52	6,609	7	11,160	12
61-80	553	1	12,271	13	11,896	13
81-100	223	0	13,968	15	13,148	14
101-120	13,110	17	9,186	10	11,659	13
121-140	0	0	2,303	3	3,269	4
141-160	77	0	178	0	480	<1
161-200+	0	0	1,314	1	1,025	1
	78,607		91,349		92,588	
Lowland Conifer						
0-20	6,298	11	2,624	3	1,758	2
21-40	719	1	1,742	2	2,434	3
41-60	175	0	3,590	5	2,886	4
61-80	18,494	31	10,957	14	8,958	12
81-100	333	1	19,922	26	18,626	24
101-120	32,875	55	24,111	32	23,867	31
121+	415	1	12,999	17	17,833	23
	59,309		75,945		76,362	
Hardwoods						
0-20	6,310	5	3,211	2	5,492	4
21-40	610	1	987	1	1,122	<1
41-60	0	0	5,804	4	3,066	2
61-80	89,900	68	63,462	48	47,502	36
81-100	218	0	35,406	27	45,536	35
101-120	34,748	26	15,317	12	18,033	14
121+	404	0	8,243	6	10,283	8
	132,190		132,490		131,034	
Aspen						
0-10	51,701	22	45,413	20	22,670	10
11 20	55,828	24	47,273	22	59,752	26
21-30	39,101	17	40,050	18	41,031	18
31-40	30,294	12	18,226	8	30,335	13
41-50	780	0	6,899	4	10,627	5
51-60	0	0	9,399	4	5,316	2
61-70	41,644	18	29,137	10	14,245	6
71+	16,602	7	32,520	14	42,428	19
	235,950		228,917		226,404	

2. Results:
When looking more closely at **Table 2, Age Class Distribution, Planned and Existing, for 2000 – 2004,** the numbers suggest the following.

a. Short Rotation Conifer Type Group– consists of jack pine and balsam fir types.
One of the notable differences is the change in acres from the planned 2000 to the existing 2004. Acres for 2004 decreased by approximately 9300 acres from the 2000 planned acres. Notice there has been a corresponding increase in the long rotation conifer acres. Many of the short rotation stands were mixed species stands consisting of jack and red pine that were typed as jack pine. When jack pine was removed either through mortality or harvest, red pine frequently dominated the site and the forest type was changed to red pine. If stands were regenerated, sites were often reforested with red pine. In either scenario, these acres would be reflected in increased acreage of long rotation conifer.

When looking at the percentages in each age class, Table 2 shows the differences between what was planned for 2000 and what currently exists. The 2004 figures show about 30% of the short rotation conifer in the 0-20 age class, slightly higher than the planned 26% for 2000. The 21-40 age class currently has over two times the acres planned for 2000 and the 41-60 age classes are roughly comparable. There is a seemingly greater discrepancy in the mature age classes, especially in the 81+category with 21% of the 2004 acres in this class compared to a planned 4% for 2000. When the mature age classes (60+ years) are combined, however, the gap narrows. The planned acres for 2000 totals 68% whereas the existing 2004 acres show 61%. This can be explained in part by the amount of mature and over-mature jack pine on the forest. Within the last few years, the forest has harvested a significant portion (almost 50%) of jack pine type. Establishment of jack pine occurred in the wake of logging shortly after the turn of the century and during the CCC era in the 1930s. Due to the rapid decline and mortality occurring within old stands of this forest type, there has been an emphasis on harvesting and reforesting these stands to maintain their productivity. Recently many of these sites are being successfully regenerated with jack pine using historical vegetative patterns as a guide.

Similarly, balsam fir types tend to be found in mixed species stands that often shifted to other types when the balsam fir died or the stand was regenerated.

b. Long Rotation Conifer Type Group – consists of red pine, white pine, and white spruce types.
According to the figures, the forest has exceeded both the total acreage planned for 2000, and the acreage in both the 0-20 and 21-40 year age classes. For the 0-20 year age class, there are about 1000 acres more in 2004 than planned in 2000. In the 21-40 year age class there are almost twice as many acres in 2004 than acres planned in 2000. As explained in the previous section, this in part is a function of shifts in forest type rather than entirely a function of regenerating the long rotation conifers. With regard to older age classes at 2000, approximately 13,187 acres were planned to be older than 101 years, compared to 16,433 actual acres. In recent years, partial harvests (rather than regeneration harvests) occurred in some of these stands in order to retain cover and/or habitat for species requiring older forests.

Since 1986, extensive acres of immature stands of red pine planted by the CCC in the 1930s and early 1940s have been commercially thinned, some for the second or third time. Most stands planted in the 1960s have been thinned once. There are also considerable acres of young red pine stands planted in the 1970s and 1980s that would benefit from thinning in the near future as they move into a merchantable size class.

c. Lowland Conifer Type Group – consists of black spruce, cedar, tamarack, and mixed swamp conifer types.

In 2004, only 1,758 acres were in the 0-20 years age class, compared to a planned total of 6,298. Regeneration of lowland conifers since 1986 has proceeded at a rate less than planned for a number of reasons. Old aspen, jack pine, and balsam fir stands in adjacent uplands were considered higher priority for regeneration than long-lived lowland conifers. Lowland conifer stands examined for harvest often contained trees less than merchantable size. Cedar types or mixed conifer types with more than 20% cedar were deferred from harvest due to uncertainty of obtaining cedar regeneration. In addition, lowland conifer types often contain Regional Forester Sensitive plants. In the last few years, concerns about obtaining adequate regeneration and questions on the timber suitability of these stands have been raised. Suitability was re-analyzed during the Forest Plan revision.

Actual acreage of lowland conifer type group increased 17,053 acres from 1986 to 2004. There has been no active management of lowland conifers to account for such a large increase. It appears that some acres formerly typed as non-forest lowland brush are now typed as lowland conifer. Some areas have flooded due to road construction and beaver dams.

d. Hardwood Type Group – consists of oaks, lowland hardwoods, northern hardwoods and paper birch types.

As of 2004, approximately 5500 acres of hardwood type group were less than 20 years of age, compared to 6,310 acres planned. There were approximately 6600 acres in 2004 of this type 40 years or younger compared to 6900 planned; the amounts between planned and existing are fairly close. The older age classes show a much wider disparity between planned and existing acres.

There has been limited harvesting in the hardwood timber type. Since 1986, higher regeneration priority has been on short rotation conifer and aspen types, due to: limited demand and market for hardwood; and the expectation that hardwoods would survive longer than adjacent, early successional, aspen, balsam fir, and jack pine stands. Hardwood types on the Chippewa, in contrast to most of the region, generally produce poor quality products and are most often used for pulpwood or firewood.

Type changes and loss of standing volume due to Dutch elm disease in the 1980s, drought and insect related mortality of oak and paper birch in the late 1980s, and continuing age related mortality of paper birch have not been assessed.

Hardwood stands provide important habitat for several sensitive species such as the goshawk, black-throated blue warbler, and older forest dependent species. Given the Forest Plan direction to maintain early successional forest types, and a pattern of intermingled private ownerships, these stands provide important habitat across the fragmented landscape for sensitive species. Management systems described in the Forest Plan focus are mainly even-aged systems, but given the disturbance ecology of many sites, and current wildlife issues, uneven-aged management may be more appropriate. This change is reflected in the Revised Forest Plan.

e. Aspen Type Group–consists of aspen and balsam poplar types.

Since 1986, there has been considerable emphasis on aspen harvest and management on the Forest. The 2004 age class distribution for the aspen type group is fairly close to what the Forest Plan had projected.

- Within MAs 1.1, 1.2 and 1.3, emphasis has been on harvesting and regenerating the aspen type group.
  - As of 2004, the acres in the 0-10 age class are less than 50% of what was projected for

2000. The decrease can be attributed to several factors: a decrease in acres harvested on the Forest during the last few years; ingrowth into older age classes, and prescriptions for intermediate treatments in order to meet wildlife and older forest objectives; and some conversion to other forest types.
  - The percentages in 2004 are slightly higher than those projected for 2000 in the 11-20, and 21-30, and 31-40 age classes.
  - The unbalanced age class distribution in aspen type group is evident in the small percentages of aspen in the 40-60 year classes.
  - Differences occur in the 61-70 and 71+ age classes, but when combined the forest currently has 25% of the aspen over 61 years while the plan projected 25%. The existing species composition of mature (60+ yrs) aspen stands is variable and diverse.
- Stand typing is based on type and size class that dominates the site and will be managed to rotation age or until regenerated. Consequently, many mixed species stands are typed as aspen even though aspen may comprise 50% or less of the stand basal area. The composition of aspen stands varies across the forest. Given their existing composition, with time, natural succession would eventually convert most of these stands to balsam fir or more shade tolerant hardwood species such as red or sugar maple.

Harvest methods for aspen specified in the Forest Plan:
- "…the harvest methods to be used…apply to steady state stands in which the timber type to be regenerated is the same as that being harvested and in which the designated type constitutes a predominant percent of the trees in the stand." (IV-26)
- "…the matrix shows the timber types and the harvest methods appropriate for them. The circumstances that are listed encompass the vast majority of the stands to be harvested. It is recognized that there are a number of other possible circumstances (generally of a very specialized nature and requiring specialized methods)." (IV-26)
- Aspen – Clearcutting is the normal method with small clearcuts also being used in retention and partial retention… (IV-27)
- Intermediate cutting in aspen, resulting in intensive management through the use of both commercial and precommercial thinning is specified. (IV-39).
- "An important objective in harvesting timber is to regenerate a stand to meet a number of resource management objectives. These include desired conditions for visual management, species composition, wildlife habitat, timber quality and integrated pest management. *Achieving the management objectives is foremost in selecting the harvest method* (emphasis added)." (Forest Plan, B-3)

3. Evaluation:

Emphasis in managing forest vegetation has been on harvesting and regenerating aspen, and treatments in the short and long rotation conifer types. There is a shortfall in the 0-10 aspen age class due in part to a decline in harvesting the last few years and the changes in treatments in aspen. There is an age class imbalance in the aspen in the 40-60 year old age classes which the 1986 Forest Plan projected.

Overall the acreage of short rotation conifer acres has decreased due to a change to long rotation conifer, aspen, or hardwoods from natural processes and active management. There is a shortage in the 60-80 year age class for short rotation conifer.

Long rotation conifer type group has increased due to a shift from aspen and short rotation conifer both from active management and natural processes. With the exception of the 21-40 year age class, today's

age class distribution is more uniform than projected for 2000.

Limited harvesting has occurred in the lowland and hardwood forest types for reasons explained in previous sections.

B. OLD GROWTH

1. Results

The 1986 Forest Plan requires that a determination be made every 5 years that old growth objectives are being maintained. Through the life of the 1986 plan, several efforts were made. Initially, there were approximately 27,000 acres, comprised of stands that were managed for an extended rotation. These stands were eligible for regeneration when they reached 1.5 times the Forest Plan rotation age or earlier if they deteriorated. In the early 1990s, a total of about 72,500 acres of old growth complexes were identified. No management activities would occur within the complexes. This was followed by an effort in 1993 to field inventory old growth stands using MN DNR protocols which identified about 5,000 acres. As with the earlier effort, it was assumed that the Revised Forest Plan would designate them as old growth or return these stands to active management. Further analysis and allocation were deferred until revision of the Forest Plan occurred.

As the forest geared up for plan revision spatial aspects of proposed future vegetation management along with the age class distribution, species diversity, and concentrated rare resources and communities were analyzed. Patches of old forest, patches of potential old forest, patches classified as old forest of poor to fair quality, and old forest on the verge of not continuing to maintain the values of old forest were all analyzed. Several options were considered for providing old growth forest conditions at the site and landscape levels. With the alternative selected, there will be an increase in vegetation expected to provide old growth forest conditions. These increases will be realized through vegetation age class objects, rather than through a network of designated allocations.

C. TIMBER

1. Results:

In FY 2004, 24.5 million board feet (MMBF) of timber were offered for sale and there were no “no-bid” sales. The reason for the difference between the “sold” and the “offer” is that some of the offerings did not sell during 2004 and likewise, some of the “sold” was not offered during 2004. During 2004, 26.9 MMBF of timber was harvested.

The Forest Plan predicted a total of 127,836 acres to be sold with regeneration harvest during 1986-2004. The Chippewa actually sold 82,590 acres or 65% of the predicted acreage. The Forest scheduled 24,680 acres to be sold with intermediate harvest prescriptions during the period 1986-2004. The Forest actually sold 31,359 acres or 127%. Combined overall accomplishment of acres sold for regeneration and intermediate harvests was 75% of planned.

The Forest Plan predicted that volume sold from conifer stands for the 1986 -2004 period would be 412.1MMBF. Actual sold volume from conifer types through 2004 was 308.2 MMBF or 75% of the predicted amount. The Forest Plan predicted that volume from hardwood types (including aspen) from 1986 – 2004 would be 1151.3 MMBF. Sold volume from these stands through 2004 was 789 MMBF or 69% of the predicted amount. Overall volume sold was 70.2% of the predicted amount.

Each National forest provides payments to the counties in which they are located. National Forest lands are not on the county tax roles so counties must provide services while receiving taxes from fewer

parcels of land than if National Forest lands were in private ownership and therefore part of the tax base. Therefore National Forests are required to make payments to counties in lieu of taxes and counties also receive a percentage of the receipts from the sale of natural resources. During FY 2004 total payments to the three counties (Beltrami, Cass and Itasca) were $123,143, $826,660 and $779,994 respectively. The total of these payments was the highest payment ever distributed to the counties with ownership inside the boundaries of the Chippewa.

2. Evaluation:

Fiscal year 2004 is the 19th year of management under the 1986 Forest Plan. Tables 3 and 4 provide a summary of the accomplishments since 1986. The year 2004 marks the beginning of a transition from the 1986 Forest Plan to the 2004 Revised Forest Plan. The Record of Decision for the Revised Forest Plan was signed late July 2004. In the last years of operation under the 1986 Forest Plan many additional issues were considered compared to the early years of the Plan. In order to address these issues and at the same time adhere to the standards and guidelines, varying approaches to analysis and management were used under the general guidance of the 1986 Forest Plan. This caused not only reduced accomplishment, but changes in the mix of harvest treatments as well. For example, during 2000 and 2004 intermediate harvest acres sold accounted for 60% of the total acreage harvested, compared with an intermediate harvest percentage of 13% for the years 1986-1991 and 29% for the years 1992-1999.

Another result of adjusting timber harvest treatments to meet existing requirements and other emerging issues has been a reduced amount of regeneration harvest. The Forest Plan predicted that the 0-10 age class of aspen would represent approximately 22% of the aspen type in 2000. Data from 2000 shows 20% of the aspen type in the 0-10 age class; in 2004 this dropped to 10%. There has been a reduction in aspen acres sold, which began as a general trend in 1994 and continued through 2004.

At the end of FY 2004 the Forest had 39.7 MMBF remaining under existing contracts. These were planned using guidance from the 1986 Forest Plan. As these sales are harvested in the next one to two years, the monitoring results may show results similar to the last several years. However, as these sales are completed and replaced with sales planned under the 2004 Forest Plan Revision, monitoring will gradually show the changes in forest management incorporated with the 2004 Revision.

The demand for Chippewa National Forest timber, especially pulpwood-sized material (both conifer and hardwoods) remained strong. Bid rates increased somewhat for pulpwood in all major species product groups except pine, however, overall pulpwood rates decreased by 1% over 2003. The trend of a decrease in the average bid rate for conifer sawtimber continued, leading to an overall decrease for sawtimber of 5%. Hardwood sawtimber bid rates increased by 2%.

Table 3a: Sold, Harvest, Reforestation, and TSI Accomplishments from 1986-2000. Volume in million cubic feet (MMCF)

Activity, Effect, Practice or Output	Forest Plan Output*	FY 1986 Actual	FY 1987 Actual	FY 1988 Actual	FY 1989 Actual	FY 1990 Actual	FY 1991 Actual	FY 1992 Actual	FY 1993 Actual	FY 1994 Actual	FY 1995 Actual	FY 1996 Actual	FY 1997 Actual	FY 1998 Actual	FY 1999 Actual	FY 2000 Actual
Timber Offered																
Total	12.3	10.7	10.7	12.0	13.4	12.6	12.9	11.7	10.8	9.5	9.1	10.0	9.4	9.9	8.8	6.7
Aspen	8.2	7.9	7.9	8.3	8.9	7.7	7.6	6.9	7.3	5.2	4.7	5.3	5.0	5.9	4.4	2.3
Conifers	2.9	1.8	2.2	3.1	3.3	3.6	3.3	3.1	1.8	2.6	2.9	3.4	3.1	2.5	2.8	3.6
Hardwoods	1.2	0.9	0.6	0.6	1.2	1.3	2.0	1.7	1.7	1.7	1.5	1.3	1.3	1.5	1.6	.8
Timber Sold																
Total	12.3	10.7	10.9	12.0	13.4	12.6	12.9	11.7	10.8	9.5	8.5	8.8	8.2	9.6	7.5	6.1
Aspen	8.2	7.9	8.0	8.3	8.9	7.7	7.6	6.9	7.3	5.2	4.5	5.0	4.5	5.7	3.8	2.2
Conifers	2.9	1.8	2.3	3.1	3.3	3.6	3.3	3.1	1.8	2.6	2.6	3.0	3.0	2.6	2.5	3.2
Hardwoods	1.2	0.9	0.6	0.6	1.2	1.3	2.0	1.7	1.7	1.7	1.4	0.8	0.7	1.3	1.2	.7
Timber Cut																
Total	**	12.1	14.6	11.3	11.1	14.4	13.0	14.5	15.8	13.8	11.0	9.8	8.2	9.7	9.2	9.1
Aspen		6.7	8.5	7.5	7.3	9.5	9.2	9.9	10.6	8.3	6.3	6.0	4.4	5.1	4.9	4.9
Conifers		3.6	4.2	2.7	2.9	3.5	2.6	3.3	3.5	3.8	3.0	2.2	2.8	3.3	3.1	2.9
Hardwoods		1.8	1.9	1.1	0.9	1.4	1.2	1.3	1.7	1.7	1.7	1.6	1.0	1.3	1.2	1.3
Regen. Harvest (acres)	6,756	5,943	5,810	6,250	8,248	7,180	6,354	5,5225	5,272	5,391	4,215	4,338	3,344	3,811	3,080	1,670
Intermed. Harvest (acres)	1,272	1,170	2,090	416	738	1,204	1,555	1,611	1,271	1,462	1,319	2,174	2,330	1,716	2,193	3,334
Reforestation (acres)	6,508	6,470	5,977	5,870	6,863	7,496	7,888	7,069	7,276	7,558	6,323	4,618	3,787	4,692	3,773	3,022
Timber Stand Imp (acres)	1,475	3,424	2,960	2,590	1,751	1,871	2,140	2,142	1,971	1,822	2,100	1,932	1,751	1,671	3,507	5,118

** Annual average Forest Plan outputs projected for the period 1986-2000. ** No objective for timber volume or acres cut. MMCF= 1 million cubic feet. MMCF = 6.33 * million board feet.*

Table 3b: Sold, Harvest, Reforestation, and TSI Accomplishments from second decade: 2001-2004.
Volume in million cubic feet (MMCF).

Activity, Effect, Practice or Output	Forest Plan Output *	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual
Timber Offered					
Total	15.5	3.9	3.6	4.0	4.0
Aspen	8.1	.7	1.7	1.5	1.7
Conifers	5.4	2.7	1.5	1.9	1.6
Hardwoods	2.0	.5	.4	.6	.7
Timber Sold					
Total	15.5	3.7	2.3	3.9	3.9
Aspen	8.1	.7	.8	2.0	1.2
Conifers	5.4	2.4	1.2	1.5	2.1
Hardwoods	2.0	.6	.3	.4	.6
Timber Cut					
Total	***	6.2	5.2	6.0	4.4
Aspen		3.2	2.0	2.3	1.7
Conifers		2.0	2.4	3.0	2.2
Hardwoods		1.0	.8	.7	.5
Regen. Harvest (acres)	6736	1,575	1,249	1,491	1516
Intermed. Harvest (acres)	1400	2,657	835	2,444	2039
Reforestation (acres)	6736	4,172	2,430	1,887	2313
Timber Stand Imp (acres)	1645	4,352	2,889	2,474	2900

Annual average Forest Plan outputs projected for the period 1986-2000.
**** No objective for timber volume or acres cut.*
MMCF= 1 million cubic feet.
*MMCF = 6.33 * million board feet*

Table 4a: Sold, Harvest, Accomplishments for first decade: 1986-2000. Volume in million board feet (MMBF).

Activity, Effect, Practice or Output	Forest Plan Output*	FY 1986 Actual	FY 1987 Actual	FY 1988 Actual	FY 1989 Actual	FY 1990 Actual	FY 1991 Actual	FY 1992 Actual	FY 1993 Actual	FY 1994 Actual	FY 1995 Actual	FY 1996 Actual	FY 1997 Actual	FY 1998 Actual	FY 1999 Actual	FY 2000 Actual
Timber Offered																
Total	77.9	67.4	67.7	76.2	84.8	79.6	81.4	73.7	68.1	60.0	57.8	63.4	59.2	61.7	55.5	42.3
Aspen	51.9	50.2	50.0	52.5	56.3	48.9	47.9	43.8	46.1	32.8	29.7	33.6	31.3	36.6	27.6	14.5
Conifers	18.4	11.7	13.9	19.6	20.9	22.6	20.9	19.4	11.3	16.3	18.2	21.5	19.5	15.9	17.5	22.6
Hardwoods	7.6	5.3	3.8	4.1	7.6	8.0	12.6	10.5	10.7	10.9	9.9	8.3	8.4	9.2	10.4	5.2
Timber Sold																
Total	77.9	67.4	69.1	75.9	84.8	79.6	81.4	73.7	68.1	60.0	54.1	55.9	52.0	60.0	47.2	38.3
Aspen	51.9	50.2	50.3	52.5	56.3	48.9	47.9	43.8	46.1	32.8	28.7	31.5	29.0	35.2	24.2	14.2
Conifers	18.4	11.7	14.8	19.6	20.9	22.6	20.9	19.4	11.3	16.3	16.4	19.0	18.7	16.5	15.6	19.9
Hardwoods	7.6	5.3	3.9	3.8	7.6	8.0	12.6	10.5		10.9	9.0	5.4	4.3	8.3	7.4	4.2
Timber Cut																
Total	**	76.4	92.4	71.5	70.3	91.0	82.4	91.6	100.0	87.3	69.3	62.3	52.1	60.4	58.0	57.7
Aspen		42.4	53.8	47.5	46.2	60.5	57.9	62.6	67.1	52.5	39.5	38.4	27.8	31.4	31.0	31.2
Conifers		22.6	26.6	17.1	18.4	21.9	16.6	20.9	22.1	24.1	19.1	14.1	17.6	20.8	19.6	18.3
Hardwoods		11.4	12.0	7.0	5.7	8.6	7.8	8.1	10.8	10.7	10.7	9.8	6.7	8.2	7.4	8.2

Table 4b: Sold, Harvest, Accomplishments for second decade: 2001-2004.

Activity, Effect, Practice or Output	Forest Plan Output*	FY 2001 Actual	FY 2002 Actual	FY 2003 Actual	FY 2004 Actual
Timber Offered					
Total	98.1	24.5	23.0	24.8	24.5
Aspen	51.2	4.4	10.7	9.4	10.5
Conifers	34.2	16.7	9.5	11.4	9.5
Hardwoods	12.7	3.4	2.8	4.0	4.5
Timber Sold					
Total	98.1	23.2	14.7	24.1	24.1
Aspen	51.2	4.1	5.2	12.8	7.7
Conifers	34.2	15.4	7.5	9.0	12.7
Hardwoods	12.7	3.7	2.0	2.3	3.7
Timber Cut					
Total	**	39.2	32.8	36.8	26.9
Aspen		20.3	12.6	14.5	10.9
Conifers		12.9	15.2	18.0	13.5
Hardwoods		6.0	5.0	4.3	2.5

** Annual average allowable sale quantity. ** No objective for cut.*

D. UNSUITABLE LANDS, REGENERATION, INSECTS & DISEASE

1. Unsuitable lands

Land suitability for timber production and maximum size limits for harvest areas were not monitored during 2004. Those activities were conducted as part of the forest plan revision process.

2. Regeneration

National Forest Management Act (NFMA) regulations require that cutover lands be adequately restocked within five years. Lands are certified as regenerated based upon the results of surveys one, three, or five years after artificial regeneration, or one or three years following natural regeneration activity.

a. Results:

Table 5a. Acres reported as adequately stocked or certified by fiscal year.

Restocking	FY 1987	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
Acres certified or Adequately stocked	**5,372**	**7,838**	**6,303**	**5,844**	**5,869**	**7,069**	**7,870**	**6,431**	**6,386**
Planted/Seeded	**1,540**	**1,434**	**1,178**	**1,097**	**704**	**951**	--	--	--
Natural	**3,832**	**6,404**	**5,125**	**4,747**	**5,165**	**6,348**	--	--	--

Table 5b. Acres reported as adequately stocked or certified by fiscal year.

Restocking	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Acres certified or Adequately stocked	**5,548**	**5,898**	**5,408**	**1,793**	**4,390**	**5,736**	**2,850**	**2,526**	**4,393**
Planted/Seeded	--	--	--	--	**787**	**781**	**388**	**649**	**980**
Natural	--	--	--	--	**3,603**	**4,955**	**2,462**	**1,877**	**3,416**

b. Evaluation:

The acres certified dropped significantly in 1999 and since then have fluctuated. These fluctuations reflect a decline in harvested acres and in the number of acres regenerated. Since reforestation generally follows as a need created by regeneration harvests, these numbers indicate a growing timber sale program on the Chippewa. Certifications lag behind stocking surveys because stands need time to become established. For naturally regenerated stands certification may occur three years after site preparation. For plantations, certification usually occurs 5 years later. First year survival for all species averaged 89% in 2004 surveys. Third year survival averaged 77% for all species.

3. Insects & Disease

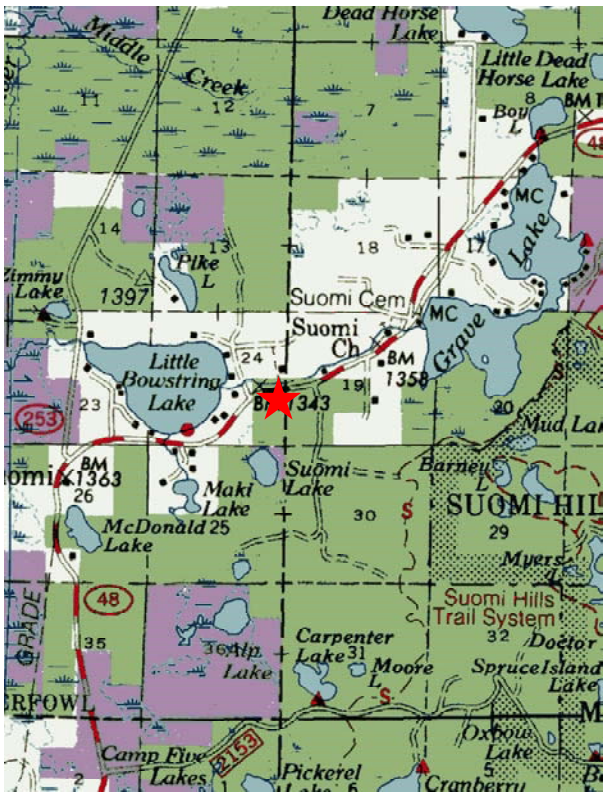
a. Jack Pine Budworm

Jack pine budworm has been moving through the range of jack pine in Minnesota for the past few years. The upswing in populations is a natural cycle of this native insect. Over the past three years defoliation of jack pine by this budworm has moved through Hubbard and Beltrami Counties.

In 2004, it reached the western edge of the Chippewa National Forest with approximately 274 acres being affected. These stands were all located around the Pike Bay area. Defoliation was moderate

with less than 50% of the stands being affected. Beyond 2004, the population is expected to continue to collapse.

b. Gypsy Moth:



Star indicates location where a male Gypsy Moth was trapped.

In 2003, our cooperators, USDA-APHIS set 519 Gypsy Moth traps within the Chippewa National Forest and one single male moth was recovered. In 2004, the Minnesota Department of Agriculture delimit trapped (high density trapping) around this single find from the previous year. Traps were set at a density of 16 traps per square mile for the first mile out from the location, with the second surrounding mile having a density of 9 traps per square mile

The intent of delimit trapping is not necessarily to "trap out" the insect. Rather, it's to determine the extent of a POSSIBLE infestation. Male moth recoveries alone do not necessarily indicate an infestation. It takes several years of trapping and egg mass surveys to determine if indeed a population has become established. It is not uncommon to find a single male moth in a detection trap. More often than not these traps will come up negative the following year. This was the result of this trapping in 2004, with no moths being recovered. No other Gypsy Moth traps were set on the Forest in 2004 as we are on a rotating grid schedule.

E. WILDLIFE AND FISH

1. Habitat Improvement Accomplishments

Wildlife habitat improvement, including improvements for threatened and endangered species, consists of structural and non-structural habitat enhancement or restoration. Structural improvements include nesting islands, platforms, and boxes, and are expressed as the number of structures placed in suitable habitat that is currently lacking these particular features. Non-structural improvements include seeding, planting, deer habitat improvement, permanent opening construction, impoundment draw down, and prescribed burning, and are expressed as acres treated to enhance or restore current habitat conditions for a particular group of species. Lake and stream restoration and enhancements include structural and non-structural habitat improvements that address environmental features limiting the productive capability of lake and stream fish populations (spawning riffles, additions of large woody debris, riparian planting, restoration of aquatic vegetation, etc.). Table 6 displays annual accomplishments for wildlife and fish habitat restored or enhanced since 1986.

a. Results*:*
The 1986 Forest Plan for the Chippewa National Forest projected an annual accomplishment for the time period of 1991-2000 of 889 acres of non-structural wildlife habitat improvement. For the same time period, the Forest Plan also projected an annual accomplishment of 417 structural wildlife habitat improvements, as well as 69 fish habitat improvement structures.

Table 6: Wildlife and Fish Habitat Improvements

Year	WILDLIFE Non-Structural Improvements (Acres)	Structural Improvements (Structures)	FISH Lake Improvements (Acres)	Stream Improvements (Miles)
1986-1991	9495	3203	486 ac; 1174 structures	not reported
1992	2245	462	2 ac; 26 structures	not reported
1993	2963	623	0 ac; 6 structures	not reported
1994	2404	181	2 ac; 100 structures	not reported
1995	942	582	129	3
1996	3716	671	95	2
1997	100	108	103	3
1998	190	0	13	5
1999	285	0	12	5
2000	1176	619	14	2
2001	2661	6	209	2
2002	1465	not reported	57	2
2003	397	not reported	14	13
2004	800	not reported	27	3

For 2004, the Chippewa produced about what was projected for wildlife habitat acre improvements and less than was projected for fish habitat acre improvements in the 1986 Forest Plan (Table 6). In non-structural wildlife improvements, 800 acres were accomplished. In non-structural lake and stream improvements, 27 acres and 3 miles were accomplished respectively. Beginning in 1995, the Forest's Management Attainment Report asked for fish habitat restored or enhanced to be expressed as acres and miles of improvement and not structures, and more recently, the wildlife program has stopped tracking structures. In response to this change in direction, an acreage figure for habitat restored or enhanced is now assigned to the placement of a habitat structure; for example, a loon nesting structure is now reported in acres of wildlife habitat enhanced.

2. Wildlife Population Monitoring - MIS
This category monitors and evaluates population trends of designated management indicator species to analyze the potential effects of management practices on wildlife habitats and populations. Management indicator species (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 has identified fourteen MIS, each representing different wildlife or fish communities within the Forest. National Forest Management Act Regulations (CFR 36, part 219.19, paragraph a-6) state "Population trends of management indicator species will be monitored and relationships to habitat changes determined."

MIS were designated in the Chippewa National Forest Land and Resource Management Plan (1986, page IV-65). Lowell H. Suring and John E. Mathisen (1983) selected the MIS for monitoring on the Chippewa National Forest. They included five categories for representation:

(1) Endangered, threatened, or sensitive species;
(2) Species with special habitat needs that may be influenced significantly by planned management programs;
(3) Species commonly hunted, fished or trapped;
(4) Non-game species of special interest
(5) Species whose population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality.

Table 7: Management Indicator Species on the Chippewa National Forest, with reasons selected (according to Suring and Mathisen, 1983) and the preferred habitat for each species.

Common name	Reason for selection	Preferred habitat
Gray wolf	Federally threatened	Broad spectrum of habitats with abundant ungulate prey
White-tailed deer	Represents shrub-sapling communities and is an important game species	Forests, swamps and open brushy areas
Bald eagle	Federally threatened	Large trees adjacent to fish bearing lakes and streams
American woodcock	Represents permanent opening community	Young aspen and hardwood stands, alder, and openings containing brush on moist soils
Barred owl	Represents lowland deciduous communities	Mature interior, hardwood and mixed deciduous-coniferous forests bordering lakes and wetlands
Black-backed woodpecker	Represents mixed upland communities and also is a Sensitive species.	Mature coniferous forests which include dead and dying tamarack / spruce bogs, white cedar infested with wood boring beetle larvae
Blackburnian warbler	Represents coniferous upland communities.	Mature lowland and upland coniferous forests, especially jack pine
Common loon	Represents aquatic communities	Clear lakes with undisturbed shorelines and islands for nesting
Northern parula	Represents lowland conifer communities	Mature interior, contiguous coniferous or mixed forests near water
Pileated woodpecker	Represents old growth deciduous upland communities and secondary cavity nesters	Mature, upland deciduous, mixed and coniferous forests which are dense canopied and contiguous
Pine warbler	Represents coniferous upland communities.	Mature white, red and jack pine forests, particularly white pine
Ring-necked duck	Represents wetland communities	Marshes, wooded ponds, bottomland lakes and open areas in swamps
Ruffed grouse	Represent deciduous upland communities and is an important game species	Early successional mixed and deciduous forests, particularly aspen and birch
Walleye	Represents aquatic communities and is an important game species	Large, clean and cold or moderately warm lakes and rivers

Two species are listed as both threatened and MIS. One species is listed as sensitive and MIS. The great gray owl, originally designated a MIS in the Chippewa National Forest Land Management Plan, was replaced by the northern parula in Amendment #6 in 1989. Walleye was designated as a MIS by the Forest Plan, but was not discussed by Suring and Mathisen (1983). Table 7 lists the reason for selection for each Management Indicator Species. Since 1983, more has been learned

Table 8: Management Indicator Species (MIS)Monitoring

MIS	Unit of Measure	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY96	FY97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04
American woodcock[1]	Singing males per route	4	4	3	5.1	5.4	5.7	4.0	2.8	4.2	N/S	2.6	3.8	3.9	5.7	5.1	3.6	3.0	3.4
Bald eagle[1]	Active breeding pairs	125	135	144	154	160	175	186	88	174	189	161	163	138	139	132	153	160	134
	Successful breeding pairs	89	91	98	101	99	101	108	119	97	97	104	ND	ND	93	107	87	86	66
	Young per active nest	1.21	1.08	1.13	1.03	1.00	0.80	0.92	0.99	0.93	0.76	.96	ND	ND	0.94	1.02	0.85	1.3	1.39
Barred owl[2]	Owls per stop	.63	0.21	0.40	0.50	0.40	0.30	0.40	0.30	0.50	N/S	0.26	N/S	0.36	N/S	0.48	N/S	.64	N/S
Common loon[2]	Active breeding pairs per lake	2..10	.83	0.94	0.78	0.74	1.15	0.67	0.83	0.80	N/S	ND	N/S	*b*	N/A	N/A	N/A	N/S	N/S
	Adults/100 acres lake surface								3.6	3.6	3.8	3.5	3.4	3.2	N/S	3.4	N/S	N/S	N/S
	Average brood size at fledging	.91	0.66	0.41	0.61	0.38	0.49	0.33	0.30	0.31	N/S	ND	N/S	0.43	N/S	0.48	N/S	N/S	N/S
Northern parula[3]	No. of pairs		--		30182	*a* 6332	3048	4815	4500	ND	ND	3800	N/S	N/S	*c*	*c*	*c*	N/S	c
Pileated woodpecker[2]	Calls per stop	N/S	0.32	0.46	0.42	0.37	0.24	0.22	0.41	0.32	N/S	0.63	N/S	.23	N/S	0.8	N/S	.88	N/S
Ring-necked duck[2]	Ducklings/acre of wetland	.21	0.23	0.19	0.20	0.16	0.15	0.12	0.16	ND	N/S	ND	N/S	N/D	N/S	N/D	N/S	N/S	N/S
	Pairs per acre	.07	0.08	0.06	0.07	0.05	0.05	0.04	0.05		N/S	ND	N/S	N/D	N/S	N/D	N/S	N/S	N/S
Ruffed grouse[1]	Drums/stops	1.25	1.6	2.2	1.6	1.5	0.8	0.6	0.7	0.7	N/S	2.0	1.4	1.3	1.1	0.7	0.8	.54	.56
Blackburnian warbler[3]	No. of pairs	N/S	N/S	20,311	25,407	*a* 7,693	5,758	4,381	3,639	ND	ND	9,400	N/S	N/S	*c*	*c*	*c*	N/S	c
Pine warbler[3]	No. of pairs	N/S	N/S	34,751	42,616	*a* 3,139	3,699	5,193	4,207	ND	ND	2,830	N/S	N/S	*c*	*c*	*c*	N/S	c
Gray wolf[2]	No. of wolves	41-52	N/S	N/S		80 to 90	100	N/S	N/S	N/S	N/S	N/S	N/S	100+	N/S	N/S	N/S	N/S	N/S
White-tailed deer[1]	Deer per sq.mi.	13.7	12.4	12.2	14.7	16.3	18.1	17.8	18.6	18.0	ND	11.0	10.2	11.9	15.6	15.2	15.8	15.5	15
Walleye[5]	Pounds/acre	N/S	N/S	ND	ND	ND	ND	ND	ND	ND	ND	ND	*c*	*c*	N/S	N/S	N/S	N/S	N/S

a In 1991, the method used for monitoring changed, so were unable to compare with previous years.

b. The 1999 Minnesota Loon Monitoring Program began displaying Loon Abundance in Adult Looons per 100 acres. Previous year data was converted in order to make compariosn.

c. Ppopulation trends presented in graph form rather than breeding pairs or pounds/acre.

d. N/S = Not Scheduled. ND = No Data. Monitoring Frequency: [1]Monitored Annually [2]Monitored every 2 years [3]Monitored every 3 years [5]Monitored every 5 years

about the preferred habitat for some of the species. In particular, the black-backed woodpecker and northern parula are now known to prefer habitats somewhat different than the habitats they were proposed to indicate. The preferred habitat for all species is also listed in Table 7.

Gray wolf and bald eagle were selected because of their status as federally threatened. Species federally listed since 1983 (piping plover and Canada lynx) have not been designated as MIS.

Monitoring of management indicator species is conducted by the Chippewa National Forest, the Minnesota Department of Natural Resources (MN DNR), and the Natural Resources Research Institute (NRRI). The NRRI data is available from Lind et al. (2004) and the NRRI web page. Many of the MIS birds are also regionally and nationally monitored by the National Breeding Bird Survey (BBS).

Results*:*

American woodcock: The numbers of singing males per route in 2004 falls within the range observed from 1988-2003 and are similar to numbers observed since 1997. When compared to the number of singing males per route in the Central Region of the American woodcock range in 2001 (Dexter, 2002), the 3.4 singing males per route on the Chippewa still exceeds the number for the Central Region (approximately 1.9-2.0 singing males per route). Thus, woodcock population levels on the Chippewa appear to be higher than those found throughout the Central Region. The more than ten years of monitoring data collected on this species does not indicate a downward population trend on the Chippewa National Forest.

Bald eagle: Population targets or base line populations were established in the Forest Plan for breeding bald eagles are 150 pair. Considering 2004 data and over the course of implementing the 1986 Forest Plan, bald eagle populations have remained relatively constant across the Chippewa National Forest. The number of successful breeding pairs recorded in 2004 is the lowest ever recorded. This is likely due to changes in aerial surveyors and an under-detection of active nests in otherwise active territories (those with adults present). Numbers of active breeding pairs (134) remain within the range observed in past years and productivity for this year (1.39 young per active nests) is the highest recorded during the period of 1988 through 2004. Previously, the 2003 breeding season had the highest recorded productivity on the Chippewa. Increasing competition among breeding pairs at higher nesting densities is thought to be the primary factor in breeding success declines. Nest productivity in 2003 and 2004 appear to run counter to trends since 1994.

Barred owls: Surveys for this species were not completed in 2004. Based upon the number of barred owls recorded per stop along established survey routes in 2003 (0.64 owls per stop), owl population numbers appear to be above the range of those recorded over the past 10-15 years. According to the data collected over that time period, barred owl numbers appear to fluctuate up and down from year to year without drastic variations. No definite trend in barred owl populations can be established at this time.

Common loon: No data were collected on loons in 2004. The Minnesota Department of Natural Resources' Loon Monitoring Program provides breeding information for loons in three areas of northern Minnesota. In 2001, the adults/100 acres of lake surface and the average brood size at fledging, for Itasca County (near Marcell, MN), were not significantly different from that collected for that area in previous years.

Pileated woodpecker: Surveys for this species were not completed in 2004. Based upon the number of calls per stop, the pileated woodpecker numbers appear to continue to increase on the Chippewa National Forest. The calls per stop recorded in 2003 are the highest recorded during the past 10-15 years.

Ruffed grouse: The mean number of drumming grouse on the Chippewa in 2004 (0.56 drums per stop) is among the lowest recorded on the Chippewa during the period of 1988-2004. Other recent surveys (2001, 2002) are similar to those of approximately 10 years ago. The ruffed grouse population on the Chippewa National Forest appears to have remained relatively stable over the past 10-15 years, and continues to fluctuate in the cyclic manner characteristic of their population dynamics.

Gray wolf: Population targets or base line populations were established in the Forest Plan for gray wolves are 40-50 individuals. In recent years, there has been a gradual, long-term increase in wolves in Minnesota. The Minnesota Department of Natural Resources conducted a formal statewide wolf survey during the winter of 2003-2004. The Chippewa National Forest contributed observation information to this effort. As with similar surveys conducted in 1979, 1988, and 1998, this survey provides the best estimate of wolf distribution and abundance in Minnesota. Results from this survey estimate total wolf numbers to be 3,020 wolves (range 2301 to 3708) over 34,100 square miles of the state. This represents a 23% increase in population over the 1997-1998 estimate. Mean territory size was 39 square miles and the total number of wolf packs statewide was estimated to be 485 with a mean winter pack size of 5.3. Approximately 15% of the population is thought to be single wolves.

White-tailed deer: Population targets or base line populations were established in the Forest Plan for white-tailed deer are 25-30 per square mile. The Chippewa NF contains portions of at least 6 permit areas modeled by MN DNR for white-tailed deer populations. Population densities range from 11 per square mile in area 197 to 31 per square mile in area 172. Deer numbers declined slightly in 4 of 6 areas from 2003, increased slightly in another, and remained unchanged in the last. Overall on the Chippewa, deer densities remain about 15 deer per square mile – similar to the previous 4 years.

Forest Songbirds: The Natural Resources Research Institute, through the Breeding Bird Monitoring in Great Lakes National Forests project, has been monitoring breeding birds on the Chippewa National Forest since 1991. The Blackburnian warbler, northern parula, and pine warbler population levels on the Chippewa are monitored through this project. For past years, none of these three warbler species show a statistically significant decrease in population trend. Although the northern parula and pine warbler show fairly stable population numbers over this monitoring period, the Blackburnian warbler shows a slight but relatively steady decline over this same time period. Graphs of population trends for each species are shown below.

Figure 1: Population trend for Pine Warbler on the Chippewa National Forest

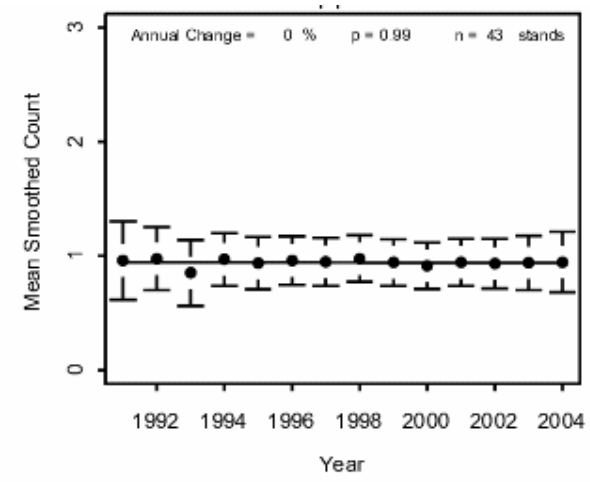


Figure 2: Population Trend for Blackburnian Warbler on the Chippewa National Forest

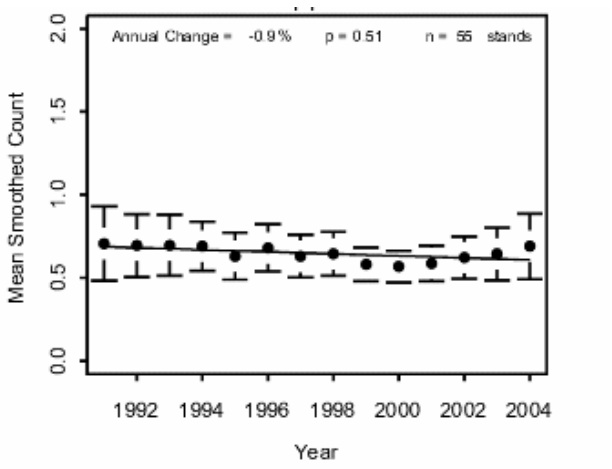
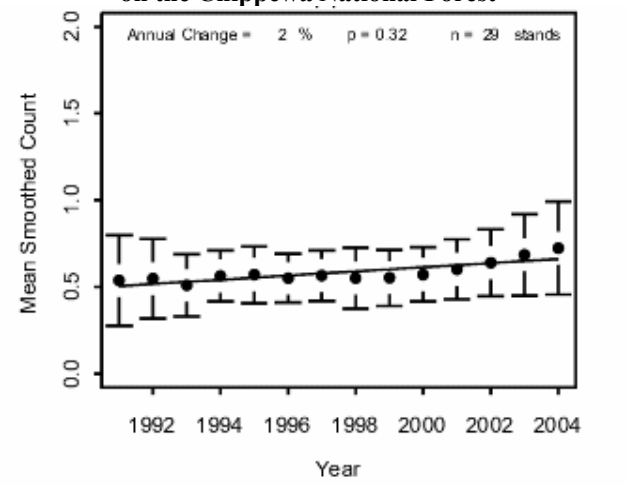


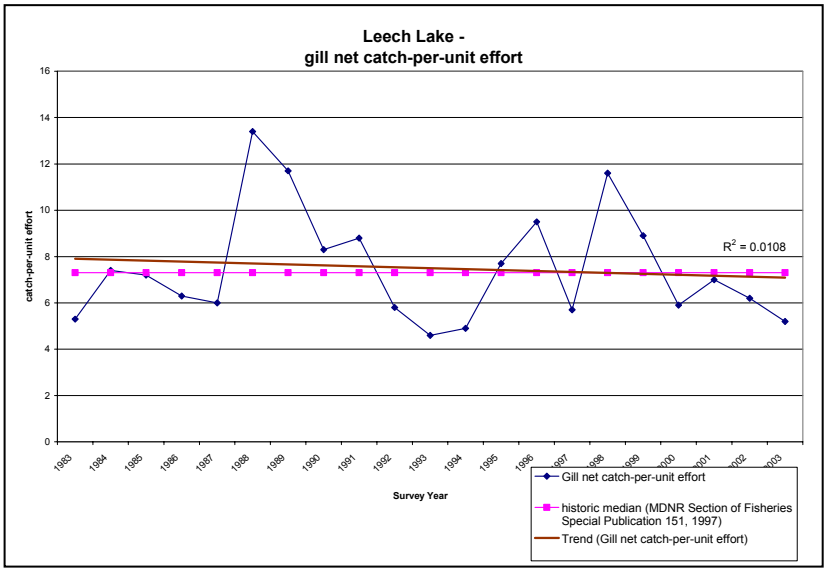
Figure 3: Population trend for Northern Parula on the Chippewa National Forest



Walleye: Minnesota Department of Natural Resources (MN DNR) walleye abundance data from Lake Winnibigoshish, Cass, and Leech Lakes was used to monitor walleye population trends within the Chippewa National Forest between 1983 and 2003. Although data were available for additional lakes, only these 3 lakes could be used because either they were not stocked, or the proportion of the walleye population due to stocking was insignificant compared to that contributed by natural reproduction as determined by MNDR biologists. The average walleye catch per gill net was calculated for all lakes for each year surveyed. Walleye populations in Cass and Leech Lakes have decreased slightly since 2000 and are below the historic median, while the Lake Winnibigoshish population increased and is now slightly above the historic median (Figures 4-6).

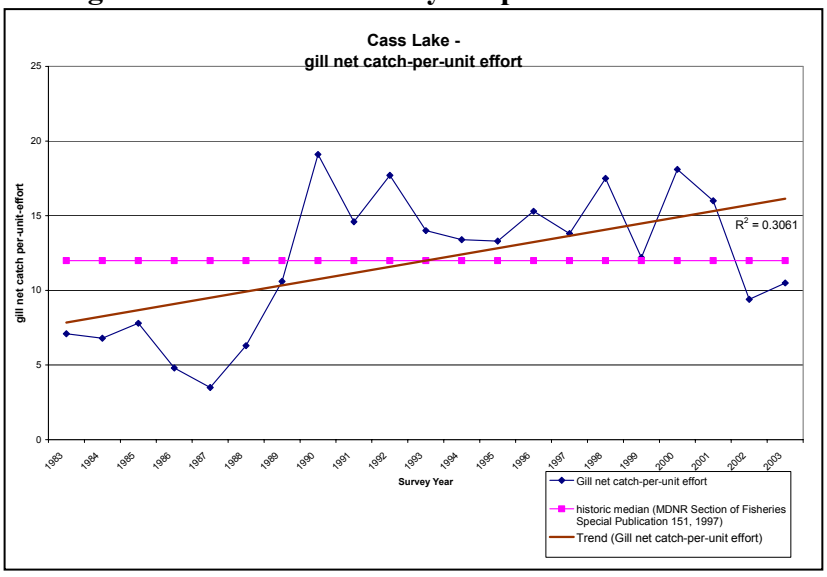
Annual variability of walleye populations in all lakes is high, potentially due to many factors including, but not limited to, angler and subsistence harvest, variations in year-class strength and weather conditions.

Figure 4. Leech Lake Walleye Population Trend



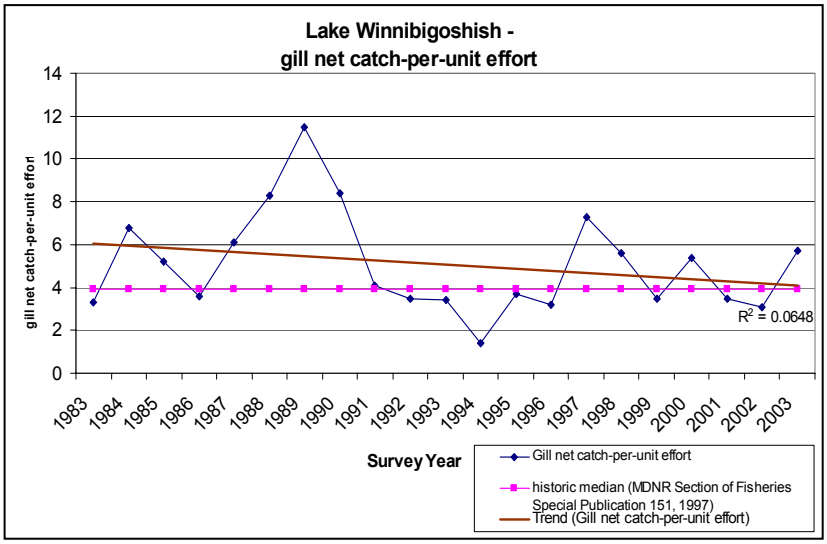
The Leech Lake walleye population is well below the long-term goal with regard to overall abundance and size distribution. In combination with predation by a rapidly expanding double-crested cormorant population since 2000, high angler harvest in the late 1990s likely contributed to a decline in the Leech Lake walleye population. Walleye recruitment has been poor since 1997 (Minnesota Department of Natural Resources, 2005-2010 Leech Lake Action Plan).

Figure 5. Cass Lake Walleye Population Trend



The walleye population of Cass Lake remains healthy and is comprised of good numbers of fish distributed among many different year classes. However, the 2003 gill net catch rate of 10.5 fish/net is currently below the long-term median catch rate of 13.3 fish/net. The historic data also indicate that overall walleye biomass was slightly higher during the 1990's than in 2002 and 2003. It appears that the slight reduction in overall population size may be due to the presence of two weaker-than-average year classes that currently make up the adult segment of the population (Minnesota Department of Natural Resources, Cass Lake Fishery Survey, 2003; available on the web at http://www.dnr.state.mn.us/lakefind/showreport.html?downum=04003000).

Figure 6. Lake Winnibigoshish Walleye Population Trend



The Lake Winnibigoshish walleye population appeared to be healthy with ten age classes sampled between age 1 and age 12. Two weak year classes, three average year classes, and a strong 2001-year class were present. The 1994 and 1995 year classes were relatively abundant, and contributed to the above average catch of 18 to 23 inch walleye. Growth was fast for most age classes, averaging 16.5 inches after four growing seasons. Average weight of 8.2 pounds also exceeded the long-term average (Minnesota Department of Natural Resources, Lake Winnibigoshish Fishery Survey, 2003; available on the web at http://www.dnr.state.mn.us/lakefind/showreport.html?downum=11014700).

Under the revised Forest Plan, we will no longer monitor walleye as a Management Indicator Species, because walleye are one of the most sought-after game-fish species on the Forest and the effects of forest management on their populations are masked by angler harvest and weather conditions during the spawning season.

b. Evaluation:

The implementation of the 1986 Forest Plan has resulted in an existing forested landscape that has considerable implications to wildlife habitats and to wildlife populations native to the Chippewa National Forest (CNF). Because a large majority of the timber harvesting has occurred on upland landforms, the effects to wildlife populations are especially evident in those species that are associated with upland forested habitats. For upland wildlife, the 1986 Forest Plan placed primary emphasis on providing habitat for large populations of game species (white-tailed deer, ruffed grouse, and American woodcock). These habitat conditions were to be provided through the regeneration of upland forest types, especially aspen and jack pine (short rotation conifer), by way of the clearcutting harvest method. Aspen has a rotation age of generally 40 years; jack pine is somewhat longer at 50 years. Many of these stands began to fall apart and were regenerated (refer to section "A. VEGETATION" for more details). These two forest types occupy over 50% of the upland area on the CNF, and a relatively large proportion of these two types are currently less than 20 years old (see Table 2).

Implementation of the 1986 Forest Plan over the past 19 years has resulted in an abundance of habitats favorable to wildlife species associated with early successional upland forest conditions. Wildlife species, such as white-tailed deer, ruffed grouse, chestnut-sided warbler, and others, associated with young forest habitat conditions have maintained relatively high population levels over the past 10-15 years of monitoring.

However, the amount, size, and spatial distribution of early successional forest within the CNF has also resulted in landscape conditions that are not favorable to a wide variety of wildlife species. The intensity of upland forest timber harvests over the past 15 years has caused:

- an increase in forest edge,
- an increase in habitat fragmentation
- a decrease in mature and older forest conditions,
- a decrease in large mature forest patches, and
- a decrease in forest interior conditions.

Additionally, the emphasis on harvesting short rotation conifer and aspen has reduced the acreage of upland forest types in a vegetation growth stage capable of providing large amounts of snags and downed woody material at concentrated levels. The current age class imbalances in the short rotation conifer and aspen create bottlenecks in the habitat turnover rates needed to sustain habitat conditions and wildlife communities associated with these forest types over time. These current landscape conditions increase the concern for many wildlife species which are associated with larger patches of mature and older upland forest habitats, such as the northern goshawk, red-shouldered hawk, black-throated blue warbler, black-backed woodpecker, Blackburnian warbler, and others.

References:

Erb, John and Steve Benson. 2004. Distribution and abundance of wolves in Minnesota, 2003 – 2004. Division of Wildlife, Minnesota Department of Natural Resources, St. Paul, MN. 12 pages.

Lind, Jim, Nick Danz, Malcolm T. Jones, JoAnn M. Hanowksi, and Gerald J. Niemi. 2004. 2004 Annual Update Report: Breeding bird monitoring in Great Lakes National Forests: 1991-2004. Natural Resources Research Institute, Technical Report: NRRI/TR-2002/24. Duluth, Minnesota. (http://www.nrri.umn.edu/mnbirds/spp_trends.htm)

Dexter, M.H., editor. 2004. Status of wildlife populations, fall 2004. Unpub. Rep., Division of Wildlife, Minn. Dept. Nat. Res., St. Paul, Minnesota. 176pp.

Lyons, J. (1992). Using the index of biotic integrity to measure environmental quality in warmwater streams of Wisconsin. St. Paul, Minnesota, General Technical Report NC-149, USDA Forest Service, North Central Forest Experimental Station**:** 51 pages.

Minnesota Department of Natural Resources. 1997. Potential, Target, and Current Yields For Minnesota's 10 Large Walleye Lakes. Minnesota Department of Natural Resources, Section of Fisheries Special Publication 151.

Niemela, S. a. M. D. F. (2002). Index of Biological Integrity (IBI) guidance for coolwater rivers and streams of the Upper Mississippi River basin. St. Paul, MN, Minnesota Pollution Control Agency, Biological Monitoring Program**:** 56.

Sauer, J. R., J. E. Hines, I. Thomas, J. Fallon, and G. Gough. 1999. The North American Breeding Bird Survey, Results and Analysis 1966 - 1998. Version 98.1, USGS Patuxent Wildlife Research Center, Laurel, MD (http://www.mbr.nbs.gov/bbs/bbs.html)

Suring, L.H. and J.E. Mathisen. 1983. Selection of Management Indicator Species on the Chippewa National Forest. Chippewa National Forest. Cass Lake, Minnesota.

F. 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.

During 1995, both sites were extensively searched for goblin ferns and each plant location was marked. Plot data was taken in 1995 and has continued through 2004. A timber harvest contract was awarded to implement the treatment, but the contractor was not able to conduct the work during the winter of 2004-2005. Treatment is now scheduled for winter 2005-2006. Plot data will continue to be collected until the treatment occurs, and post treatment plot data will be collected for a number of years, depending on the extent of the response and confidence in the results.

G. RECREATION

1. Results:

The 1986 Chippewa National Forest Land Resource Management Plan identifies recreation activities and outputs for annual monitoring and evaluation. They are:

1. Hunter Walking Trails – Miles (annually)
2. Trails:
    a. Non-motorized Trails – Miles (annually)
    b. Motorized Trails – Miles (annually)
3. Boat Access:
    a. Drive-In – Number (annually)
    b. Carry-In – Number (annually)
4. Recreation Use – RVDs (annually)
5. Land acquisition – acres (refer to section M. of this document)

During FY04, the miles of hunter walking, and motorized trails have remained constant at 83 and 20 miles respectively. The Forest maintained 167 miles of trail, and improved 9 miles to standard last fiscal year. Currently, there are 248 carry-in boat accesses, and 107 drive-in accesses on the Forest. During the monitoring period, no carry-in or drive-in boat access were constructed or improved.

Since the 1986 Forest Plan was developed, the method for quantifying recreation use has changed. Historically, recreational use was counted in Recreational Visitor Days (RVDs). An RDV is defined as one person recreating for a 12-hour block of time. Currently the standard of measurement is a national forest visit (entry of one person for an unspecified period of time into the National Forest site or area for recreation activities). Nationally, Forest Plans and other agency needs mandate visitor use monitoring. Thus, the National Visitation Use Monitoring Program (NVUM) was developed to provide statistically reliable estimates of visitor use to assist with federal land

management planning decisions. The monitoring survey provides important information for Congress and external customers including states, private industry, and academia.

In addition to estimating the numbers of visitors, the NVUM program obtained descriptive information about National Forest visitors. This information includes visitor age, race, activity participation, outdoor recreation expenditure profiles, and length of stay. Additionally, information about the visitor's satisfaction with Forest Service facilities and services was collected. NVUM data helps to answer monitoring elements in the USDA Forest Service Strategic Plan (2000 Revision) and the international monitoring plan 2003 Nations Report on Sustainable Forest Management. Most elements have a fiscal year 2006 target for improvement.

Table 9: Chippewa NF activity participation and primary activity.

Activity	Percent participation	Percent who said it was their primary activity
Camping in developed sites (family or group)	8.7	1.1
Primitive camping	0.5	0.0
Backpacking, camping in unroaded areas	0.8	0.3
Resorts, cabins and other accommodations on Forest Service managed lands (private or Forest Service run)	23.0	4.8
Picnicking and family day gatherings in developed sites (family or group)	12.2	1.8
Viewing wildlife, birds, fish, etc on national forest system lands	53.6	0.1
Viewing natural features such as scenery, flowers, etc on national forest system lands	45.1	5.4
Visiting historic and prehistoric sites/area	8.5	0.6
Visiting a nature center, nature trail or visitor information services	9.2	0.1
Nature Study	5.1	0.4
General/other- relaxing, hanging out, escaping noise and heat, etc,	74.3	7.0
Fishing- all types	33.4	24.4
Hunting- all types	20.7	19.0
Off-highway vehicle travel (4-wheelers, dirt bikes, etc)	8.4	0.3
Driving for pleasure on roads	27.8	1.5
Snowmobile travel	29.0	27.5
Motorized water travel (boats, ski sleds, etc)	20.9	0.1
Other motorized land/air activities (plane, other)	0.4	0.0
Hiking or walking	30.7	6.5
Horseback riding	1.1	0.7
Bicycling, including mountain bikes	3.6	1.3
Non-motorized water travel (canoe, raft, etc.)	4.9	0.5
Downhill skiing or snowboarding	0.1	0.1
Cross-country skiing, snow shoeing	21.7	0.8
Other non-motorized activities (swimming, games and sports)	10.6	0.8
Gathering mushrooms, berries, firewood, or other natural products	7.0	0.8

Results of the NVUM on the Chippewa National Forest for FY01 were 2.3 million recreation visits which equals 6.1 million RVD's. The top three recreation activities were snowmobiling, hunting, and fishing. Visitor satisfaction met or exceeded expectations. A table summarizing visitor participation and primary activity on the Chippewa National Forest is included below. A further breakdown and activity analysis can be found in the National Visitor Use Monitoring Results (Kocis, et al., May 2002). NVUM will be conducted again in FY06.

2. Evaluation:

Recreational use of the Chippewa National Forest continues to grow as private lands in north central Minnesota become increasingly more developed, the state population expands, and the northern lakes area becomes ever more popular as a year-around destination. Visitors seek out public land in which to pursue a diverse range of outdoor recreational activities. National trends indicate that winter, water based, and developed land activities will in general grow faster than the population (*Cordell's Projection of Outdoor Recreation Participation to 2050*).

Currently, the Chippewa National Forest is providing an adequate range of hunter walking, and other non-motorized trail opportunities to meet current demand. With the completion of the Migizi paved bike trail (phases 1-3), the forest has shifted its emphasis from construction to reconstruction of existing trails. Efforts will now be placed on improving the trail user's experience, while protecting natural resources, mainly water quality and wetlands. The exception to this is the last phase of the Migizi Trail (phase 4) that will connect the Norway Beach Recreation Area with the Great River Road National Scenic Byway. This phase will be implemented as funding opportunities and partners are secured.

Water access is one of the key recreation issues identified during the forest plan revision process. Inventories, assessments and collaboration with state and county recreation managers have occurred over the past three years. The new forest plan provides goals, objectives, standards, and guidelines related to water access opportunities and management. The plan limits future construction of water access developments to five sites over the next decade, and permits maintenance of existing structures at current levels.

Motorized use continues to generate substantial interest, and concern, by both Forest managers and the public. The Chief of the Forest Service has identified unmanaged recreation, specifically OHV use as one of the top four threats to National Forests. OHV's riding opportunities was one of the key recreation issues addressed in the new forest plan. The new Forest Plan has shifted the Chippewa's OHV policy from an "open unless posted close", to a "closed unless posted open" philosophy. Peak use on the Chippewa occurs at fishing season opener, Minnesota Education Association (MEA) Convention weekend, opening of deer hunting season, summer holidays, and snowmobiling during heavy snow years. Given the local and national trends in outdoor recreation the Chippewa National Forest is well positioned to help meet future recreation demands in trails, water access and general developed and dispersed use.

Data for the indicators--miles of hunter walking trails, non-motorized and motorized trails, boat access, and recreation use in RVDs-- was looked at for 1987-2004 for trends. Some of the indicators chosen in 1986 were not effective measures. The indicators reflected miles of maintenance; because of shortfalls in budgets there were consecutive years with no maintenance. Hunter walking trails are low priority on the forest compared to motorized trails which have a higher use and maintenance priority. There were inconsistencies in how boat access was reported. Some years it was the

number constructed, other years the number of accesses on the forest. Measurement of recreation use changed in the 1990s and was eventually replaced by the National Visitation Use Monitoring that was done in 2001 on the Chippewa and scheduled again for 2006. In general, what has occurred over the years is a slow but steady increase in recreational use.

H. HERITAGE RESOURCES

1. Identification and Protection:

Compliance with various laws and regulations requires that the Chippewa National Forest identify and manage heritage resources (usually archeological and historic sites) which may potentially be eligible for the National Register of Historic Places. This must be accomplished prior to any activity which may damage or destroy the site. The Forest conducts reconnaissance field surveys to search for heritage resources in all proposed project areas which might involve earth disturbance. Projects which typically require surveys include timber sales, wildlife openings, utilities installations, gravel pit development and expansions, land exchanges, special use permit activities, prescribed burns, and recreation facility development and maintenance. Surveys for the heritage program are driven by project work across the forest. Funding is not available to do surveys outside of project areas.

A total of 10,010 acres were surveyed in FY 2004 for proposed undertakings. Thirty-seven new archeological sites were identified. There were no adverse effects to historic properties.

Working with Leech Lake Reservation, the Forest has initiated a program to identify and record traditional resource areas. The information gathered will be used in project planning, assessment, and implementation as it becomes available.

Numerous public interpretation and education activities were conducted by heritage staff. These included presentations to local schools, tourists, and community groups, as well as formal training sessions in partnership with other agencies. Thirty-five volunteers contributed 1466 hours in evaluation of the Sucker Lakes archeological site during Passport in Time in FY 2004. At the standard GS-5 archeological technician pay rate of $12.79 per hour, the value of that time is $18,750.

2. Evaluation*:*

The three recreation residence communities of Star Island, the first area developed in Minnesota under the summer home (later recreation residence) program of the Forest Service, were found eligible to be listed on the National Register of Historic Places as Historic Districts. The three summer home groups of Star Island were among the first summer homes to be established in the Chippewa National Forest and in Minnesota. The three communities contain 49 lots with 92 buildings, two campgrounds, and a tennis court.

Overall, the Heritage Resource program is meeting the intent of the Forest Plan.

I. INTERPRETATION OF NATURAL AND HISTORIC AREAS

Natural and Historic Areas are management areas that are set up to preserve and interpret areas on the Forest which possess unique historic, biotic, aquatic, or geologic values.

All of the unique areas on the Chippewa national forest are monitored and/or interpreted to some degree, though it is difficult to monitor visitor use in some of the lesser-known sites. In some cases,

numbers are rough estimates. As indicated in the Monitoring plan, the precision and reliability of the numbers are expected to be low. The public affairs office has researched Unique Area uses via districts and local organizations to get a clearer picture of use at these sites.

In 2004, work was completed on the Chippewa National Forest Plan which notes a number of changes regarding Unique Areas, including number of sites listed. This and other reporting changes will be noted in the 2005 report. Differences in 2004 Unique Area monitoring were noticeable mainly in areas where increased education efforts were put forth.

Elmwood Island—Located 3 miles south of Northhome, Elmwood Island is almost entirely surrounded by private land, with the exception of two small state parcels of shoreline. The boat landing is located on the Northwest corner of the lake. There is one resort on the lake, so use may be highest among the resort guests and private cabin owners. It is rare that Forest visitors request information for the Island. The Island Lake Resort owners said quite a few people do visit the site in the summer, but they did not have numbers. Most recreation use seems to be hiking and picnicking.

Forest Supervisor's Office---Located in the city of Cass Lake, the Forest Supervisor's Office is visited most often by people obtaining various land use permits (fire, fuelwood, Christmas Trees) and by other agencies/community leaders coming in for meetings. In 2004, we did have a noticeable increase in visitors to the site for general information and camping information, perhaps connected with an increased interest in the Norway Beach Recreation Area. We led a number of groups on tours inside (Elderhostel, scouts, community and school groups) during the 2004 school year, and received 1 group of Kindergartners each year from Cass Lake (approximately 150 students).

Gilfillan Area---This site, approximately 10 miles south of Blackduck, is little known and rarely visited. As an orchid bog, it may be the more enthused botanist who ventures out into this remote area. To our knowledge, there was one visitor inquiry in 2004.

Lost 40---The Lost 40 does attract the attention of both the casual Forest sight-seer as well as those who are very interested in old growth forest and forest management. Road construction during the 2004 summer season may have impacted use at Lost 40, though there still seems to be a steady stream of visitors and groups who travel to the site. Forest Service crews from Blackduck noted that they were refilling the Lost 40 brochure rack at the site on every visit. They also noted people on site during many of their visits as well. In 2005, interpretive signs will be posted along the trail to replace the interpretive trail guide. Existing Forest panels remain, interpreting the history of the site and basic tree identification. The Blackduck and Deer River districts, both Visitor Centers and the Supervisor's Office receive many requests for information on Lost 40, including directions on how to get to the site.

Rabideau CCC camp—Visitation at the Camp increased in the past two summers with the help of volunteers working at the site. In 2004, a constant presence at Camp Rabideau encouraged both new and returning visitors. Hosts counted 490 people taking in the building tour, and over 500 "drive-thrus" at the site as well. In 2004, new displays inside the remodeled Education building told the story of the CCC nationwide and life at Rabideau. Each July, the Norway Beach naturalist schedules a car caravan to the site. Approximately 5 people each year join the caravan. The Blackduck Ranger District invites the area school to Rabideau every spring for a day of natural resource and historic presentations. (Approximately 100 students) Most efforts focus on bringing the public to Rabideau and increasing their awareness of CCC history on the Forest.

Ten Section Area—Interpretation efforts focused on the 100 year Anniversary of the Minnesota Forest Reserve have brought renewed attention to the Ten Section area. Visitors tend to come to the Norway Beach Visitor Center, which is in the Ten Section Area, with information requests and sight-seeing suggestions. In 2004, new interpretive signs were put up along the trail describing the history, big pines and area resources. Visitation statistics from the Norway Beach Visitor Center showed approximately 4500 in 2004, a decrease, perhaps due to the colder summer. Program participation was up, however, with added emphasis on Forest Service and Ten Section history in the displays. Campground numbers in 2004 were slightly lower from 2003. Under the Revised Forest Plan, the Norway Beach Recreation Area is no longer included in the Ten Section Area Management Area; rather, it is included in the Recreation Use in a Scenic Landscape Management Area.

Pennington Bog---In 2004, the DNR Non-Game offices in St. Paul and Bemidji issued permits to 27 individuals for access into Pennington Bog, a decrease from 35 the previous year. The state tracks the permits, and allows just 5 permits per week to be issued, with 5 people allowed per permit. This year, there was just one week where the maximum number of permits were issued. The dry spring and cool summer made for poor orchid viewing, and therefore, may have led to a slight decrease in numbers at the bog.

Cut Foot Sioux Ranger Station---The Cut Foot Sioux Visitor Center naturalist lead two tours to the site during the summer, with approximately 10 people per tour. Visitors are also directed to the site. Interpretation occurs at the Visitor Center and through signs at the site. The Heritage Garden with its theme on Forest History is tended by the campground hosts.

Miller Lake---Other than the Unique Area flyer, there is very little interpretation on Miller Lake. Some information can be found in the "Sharing our Secrets" brochure, but this does not seem to draw any great numbers. There may be some local traffic to the area, but minimal requests are reported by the Marcell office.

J. ROADS

Table 10a: Road Construction and Existing Miles

Activity, Effect, Practice or Output	Unit of Measure (Annual)	Forest Plan	FY 1987	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
Construction	Miles	19.25	38.0	42.6	25.6	14.4	12.2	6.6	2.2	4.7	0.8
Collector	Miles	0.25	0.0	0.0	2.0	0.0	0.0	0	0.0	0.0	0.0
Local	Miles	19.0	38.0	42.6	23.6	14.4	12.2	6.6	2.2	4.7	0.8
Open - Local Roads	Miles	* 1,562.0	1337.0	1366.7	1,421.0	1,427.6	1,411.0	1,438.1	1,440.0	1,441.0	1,441.8
Closed - Local Roads	Miles	* 162.0	188.0	200.9	206.0	214.3	248.0	240.9	241.2	244.9	244.9

** This value is the total that would exist in the year 2000.*

Table 10b: Road Construction and Existing Miles

Activity, Effect, Practice or Output	Unit of Measure (Annual)	Forest Plan	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Construction	Miles	19.25	2.4	0.0	7.7	3.3	0.0	2.0	0.8	0.0	0.0
Collector	Miles	0.25	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Local	Miles	19.0	2.4	0.0	7.7	3.2	0.0	2.0	0.8	0.0	0.0
Open - Local Roads	Miles	* 1,562.0	1,443.6	1,372.0	1,379.9	1,380	1,678	1,752	1,753	1,581	1,628
Closed - Local Roads	Miles	* 162.0	245.5	429.0	429.0	429.0	333	323	324	277	299

** This value is the total that would exist in the year 2000.*

1. Results

In 2004, no new collector or local roads were constructed. Any timber roads constructed were temporary roads that were to be obliterated or decommissioned after use.

2. Evaluation

Open Local Road mileage was determined using the Operational Maintenance Level (OML) 2 road mileage total as reported in the FY2004 Annual Roads Accomplishment Report. OML 2 roads are local roads, managed as open to high clearance motor vehicles.

Closed Local Road mileage was determined using Operational Maintenance Level (OML) 1 road mileage total as reported in the FY2004 Annual Roads Accomplishment Report. OML 1 roads are local roads, managed as closed to motor vehicles.

Temporary Roads are roads that are authorized by contract, permit, lease or other written authorization, or emergency operation, not intended to be a part of the forest transportation system and not necessary for long-term resource management. Temporary road totals are not included in the above mileage totals.

The mileage changes in 2004 are due to continued database inventory updates that reflect current conditions as determined from field observations.

In the last few years there has been a focus on identifying and inventorying all the roads and inputting them in the corporate database called INFRA. There is an ongoing effort to verify, update or correct this information. In 2002, a forest-wide Roads Analysis was completed for level 3, 4 and 5 roads—these are the main or collector Forest Service roads. The report provides line officers with critical information to develop road systems that are safe and responsive to public needs and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land, and are a balance with available funding for needed management actions. Smaller scale roads analysis to study the local roads tier off the Forest wide report. These analysis areas are identified for timber projects. During the analysis process, close scrutiny is given all roads within the project area and recommendations are made to retain, add them to the road system or remove them through decommissioning or obliteration. With management for lynx and wolf habitat, there is a concerted effort to reduce road densities.

K. SOIL

1. Long-term Soil Productivity Study (LTSP)

Forest harvest operations, through the use of heavy equipment and slash management practices, have the potential to damage soil structure and remove organic matter from the forest floor. A clear understanding is lacking of which soil types are most susceptible, and what degree of impact can be sustained before the potential productivity and diversity are reduced. The national long-term soil productivity study was designed to answer some of these questions. In this study, soil porosity and organic matter are being experimentally manipulated on large plots to determine the impacts on growth and species diversity of aspen stands on the Chippewa National Forest. Research is being done in two areas on the Chippewa National Forest. The first is on the Marcell Experimental Forest in the Marcell Moraine Land Type Association (LTA) and it was started in 1991. The second study area is on the Pike Bay Experimental Forest in the Guthrie Till Plain LTA. That treatment began in 1993. Treatments have also occurred on the Ottawa National Forest in upper Michigan and on the Huron-Manistee, lower Michigan.

a. Results*:*

Four 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. The study involved winter harvest of 70-year-old aspen growing on loamy sand with site index of 65. The following treatments were applied to the sites:

1. whole tree harvest (trees lifted off the site with little or no ground disturbance from machinery)
2. soil compaction
3. forest floor removal and
4. soil compaction and forest floor removal.

Preliminary findings on test plots indicate that disturbance treatments decreased 5-year growth of potential crop trees and delayed early stand development. After five growing seasons, numbers of suckers was extremely limited on the soil compaction areas. Mean diameter and height of regeneration was greatest on the whole tree harvest area. The treatment areas of soil compaction, forest floor removal, or both, all resulted in reduced biomass of foliage, stems, and total suckers to about one half of that produced on the whole tree harvest treatment. And, after five years, there was an abundance of saplings (>1 inch dbh) on the whole tree harvest area but few on the other treatment areas.

Data collection (soil bulk density, soil strength, plant nutrient analysis and regeneration by species) continued in years seven and ten.

Rick Voldseth, a post- doctoral research scientist, was hired by the Forest Service North Central Research Station in Grand Rapids, Minnesota to summarize the LTSP data collected the first 10 years. He began work in spring 2004. Results of his work are forthcoming.

In August, George Host from the Natural Resource Research Institute and a field crew of students from the University of Minnesota – Duluth collected data on LTSP plots in the Pike Bay Experimental Forest on plant species and their abundance. The objective of this portion of the study is to see how compaction and organic matter removal affect species richness, diversity and community composition of plant species. Data was collected before harvest in 1992 and in 1994, 1995 and 1998. The 2004 data collection occurred 10 years after the harvest. Preliminary results

show a shift away from species that colonize mesic, nutrient-rich closed forest habitat toward those characteristic of open and more xeric environments. While this shift is a natural community transition following disturbance, it appears to be intensified under moderate and heavy soil compaction levels.

Obtaining funding for the research has been difficult the last few years. Representatives from the Lake States forests and from the Regional Office met during 2004 and committed to continue the study for one rotation of aspen as was originally planned. This study has the potential to become one of the more significant research efforts for assessing the long term effects of forest harvest practices on the productivity and diversity of aspen forest ecosystems.

b. Evaluation:
The data suggests that managers should plan activities to minimize the area covered by machine traffic and to avoid traffic in the spring after suckers have begun to emerge. During project planning, sensitive soils and mitigation measures (such as winter harvesting) are identified to minimize soils impacts.

2. Timber Harvest
In addition to the LTSP study, the Big Bud Timber Sale in the Pike Bay Experimental Forest on the Guthrie Till Plain was selected to further study the effects of timber harvesting on soil productivity. The study is conducted by the North Central Research Station in Grand Rapids. Soil strength, soil bulk density, site disturbance and the regeneration of vegetation was sampled in 1998 and 1999. Data collections were planned for 2003 but did not occur due to shortfalls in funding. However, there may be an opportunity for funding from the research station in FY2005.

Aaron Steber, a graduate student from the University of Minnesota - St. Paul, conducted a study to observe the degree of soil compaction from recently harvested timber on selected sites within the Chippewa National Forest. Half of the sites were on loamy, fine-textured soils and half were on sandy, coarse-textured sites. Preliminary results suggest that heavier textured soils are more susceptible to compaction and using only visual criteria for determining soil compaction may not relate to the actual degree of compaction on the site. Aaron may return in 2005 to study how the landscape affects the amount of soil compaction.

The MN DNR, in conjunction with the Minnesota Forest Resources Council, conducts monitoring of timber harvests on a statewide basis on a variety of land ownerships. Sites are selected on a random basis. None of the sites selected for monitoring were on the Chippewa National Forest. Two sites were selected on the Superior National Forest. Monitoring results are expected to be published by the DNR in 2005.

3. Exotic Earthworms
For the past several years, the Chippewa National Forest has been monitoring the effects of exotic earthworm (European in origin) invasion on the soil resource. Drastic changes in the distribution of soil organic matter (litter and humus layers) caused by the invasion of earthworms has been documented along with shifts in the animal and plant community species composition. Three sites on Ottertail Point (Leech Lake) and one site on Blackduck Point (Leech Lake) are being studied. Cindy Hale, a graduate student from the University of Minnesota, has been responsible for much of the research on earthworm impacts. Hale's Ph.D dissertation has been published and several research papers are in the process of being published. There continues to be nationwide and even international publicity from this study and others in the newspapers, journals and television.

Deer exclosures were built on Ottertail Point to study the combined effect of deer and earthworm impacts. That study is being conducted by Andy Holdsworth from the University of Minnesota.

As a result of the research done, there is an emphasis on educating the public on the effects non-native worms have on the forest environment. Locally, there is a continued effort to educate those who purchase earthworms for fishing in and near the Chippewa National Forest to deposit leftover worms in the trash rather than throw them into the forest. During the last couple of years, as sites are inventoried on the Forest for sensitive plants, the presence or absence of worming is being noted. More work needs to be done before any analysis and conclusions can be drawn on a Forest-wide basis.

4. Ecological Classification and Inventory Project (Terrestrial EC&I)

Initiated in 1992, the Chippewa National Forest Demonstration Project is a cooperative project between the Chippewa National Forest and the Minnesota Department of Natural Resources. The purpose of the project is to demonstrate the methodology used in Ecological Classification and Inventory and to demonstrate how ecological land units may be used to address land management issues. Landtype associations, landtypes, and landtype phases are three ecological units being delineated and inventoried. In 2004, 7700 acres were inventoried in the Bemidji sand plain landtype.

In total, approximately 60% of the Chippewa National Forest has been surveyed. Up to this time, the surveys have provided valuable information on the location of sensitive soils and have been accompanied by mitigation measures for our projects, such as season of activity, to minimize impacts to the soils and water resource. Efforts are now underway to input data collected into a national database so that analysis can more efficiently be done, and interpretations and conclusions drawn.

5. Fire

A pre-fire walk through to examine the available organic matter and firelines was made on the Lake 34 prescribed burn on the Walker Ranger District. Recommendations were made to install waterbars on steeper portions of the fireline to minimize erosion. A post-fire walk through showed that the waterbars were effective in minimizing erosion. Ocular estimates of the burned area indicate that less than 5% was severely burned which is well within the soil standard of 15% or less of the soil detrimentally impacted (Soils handbook).

L. WATER - LAKES AND STREAMS

1. Lakes

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 Forest Plan states that a significant reduction in water quality occurs when the Carlson Trophic State Index (TSI) increases by more than 15 percent from pre-1980 index values (LRMP p.IV-44). The Carlson TSI is a measure of the productivity of a lake. An increase in TSI represents a decrease in water quality. Trophic states of lakes are usually broken down into four broad categories (Carlson, 1977):

- **Oligotrophic:** TSI less than 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, Round and Lower Sucker Lakes were added to the program. Lakes are sampled three times during the open water season on an alternating schedule so that each lake is actively monitored every two to three years. Adele, Beaver, Caribou, Dixon (a new addition), Little Cutfoot Sioux, and Round Lakes were sampled in 2004. All are exhibiting normal year-to-year water quality variability (See Table 11).

Table 11. TSI Trends for Lakes Sampled in 2004

	TSI Score					
Lake Name	**Pre-1980**	**2002**	**2003**	**2004**	**2002/2003 Trophic State**	**2004 Trophic State**
Adele	45.0	42.3	*	47.4	Mesotrophic	No Change
Beaver	39.2	42.2	*	44.4	Mesotrophic	No Change
Caribou	36.8	27.2	*	32.6	Oligotrophic	No Change
Dixon	*	*	*	52.5	*	Eutrophic
Little Cutfoot Sioux	59.9	54.6	*	52.0	Eutrophic	No Change
Round	*	*	61.7	46.5	Eutrophic	Mesotrophic

2. Streams

a. Water Quality

Compliance with NFMA and the Forest Plan standards for stream water quality require long-term monitoring of a sub-sample of Forest streams. Six streams are currently enrolled in the long-term trend monitoring program. Simpson Creek, Fletcher Creek, and the Rice River have been monitored since the mid-1970s. In 1990, the Mississippi, Big Fork, and Turtle Rivers were added to the monitoring program.

Water quality data is used to determine a stream water quality index value for each stream. The index represents an arbitrary scale based on weighted parameters. Values range from 0 to 100, with an index score of 100 representing the highest water quality streams for fisheries and recreational uses. A score of 0 represents very poor water quality for these same resources. The water quality index scores are useful for comparing water quality between streams and in the same stream over time (trends). Monitoring consists of collecting water quality samples and flow data three times per site during the open water season. Streams are monitored on a rotating basis so not all streams are sampled each year. Simpson Creek, Fletcher Creek, and the Rice River were sampled in 2004. All are exhibiting normal year-to-year water quality variability (See Table 12).

Table 12. Water Quality Index Trends for Streams Sampled in 2004

Stream Name	WQI Score			Average Over Sampling Record	Sampling Years of Record
	Pre-1980	2002	2004		
Fletcher Creek	64.0	75.1	77.8	72.5	11
Rice River	74.0	74.3	67.4	75.2	17
Simpson Creek	64.0	74.3	67.9	71.1	14

b. Water Quantity

Water quantity is measured and estimated during the open water season on the Mississippi River below Knutson dam and lake and river levels at Knutson Dam are measured continuously. These estimates and measurements help to regulate Knutson Dam.

3. Groundwater

Broadcast application of pesticides has not been used on the Forest since 1990. The only pesticide use currently approved on the Forest is selective application of glyphosate (Round Up) on poison ivy in developed recreation sites and along trails. No pesticide monitoring occurred in 2004.

4. Wetlands

In June 2004, approximately 3,500 feet of the Woodtick Trail was removed from wetlands and uplands and the adjacent landscape was recontoured. 1.9 acres of wetlands were reclaimed directly from the removal of the road's footprint and 18.9 acres of wetland hydrology restored. The next phase of restoration will occur in 2005 and will include removal of an additional 500 feet of road prism along with follow-up seeding and planting of native vegetation.

5. Designated Water Uses

Twelve designated swimming areas were sampled in 2004. Fecal coliform levels were in compliance with the standard at all sites. No swimming areas were posted or closed.

6. Drinking Water Supplies

Monitoring of drinking water supplies consists of collecting and analyzing well water samples from all designated drinking water sources operated by the National Forest. Monitoring plans for individual wells, calls for monitoring on an annual, or monthly basis depending on requirements. Forty-seven of the fifty wells that were tested for total coliform, E. Coli bacteria, and nitrates in 2003 were sampled in 2004 (two wells have been abandoned and one remains inactive). When corrective action is taken, the wells are closed and are not re-opened until sampling shows that they are in compliance with EPA regulations. For a current list of Chippewa drinking water supplies and compliance with safe drinking water standards visit: www.epa.gov/enviro/html/sdwis/sdwis_query.html. Click on the Minnesota map and scroll down to Water System ID and type in MN and the PWSID# from the table (See Table 13).

The Minnesota Department of Health also requires that sanitary surveys be conducted every 3 years on Noncommunity Transient wells and Noncommunity Nontransient/Forest Service wells and every 5 years on Non Public wells for all scheduled water systems. In 2004 all of these surveys were completed. The Department of Health also requires that we have an Operation and Maintenance

Plan for our water supplies. Operation and Maintenance Plans have been developed for supplies that have hand pumps and a pressure system at Norway Beach Other Well Pressure Systems--Cass lake, Chippewa, Wanaki , Onegume, and Stony Point, and the solar pump at the Horse Camp--need to be done. All wells in 2004 were below the Forest and State drinking water standard of 10mg/L Nitrate-nitrogen. The Forest Service also met the Clean Water Act requirements for fecal coliform (< 200 colonies/100mls).

Table 13. Wells Monitored in 2004

Classification	Well Name/PSWID Number/Dist ID#
Noncommunity- Transient	South Pike Bay West/5110523/C-W3
Noncommunity- Transient	South Pike Bay East/5110523/C-W2
Noncommunity- Transient	Wanaki Campground/5110519/c-W9
Noncommunity- Transient	Norway Beach Campground/5110702/C-W26 well#2 -new well unique # 653985
Noncommunity- Transient	Cass Lake Campground/5110701/C-W12
Noncommunity- Transient	Cass Lake CG Handpump/5110701/C-w25
Noncommunity- Transient	Chippewa CG Handpump/5111080/C-w23
Noncommunity- Transient	Chippewa Campground/5111080/C-w22
Noncommunity- Transient	Mosomo Point Camp/5310387/D-W7
Noncommunity- Transient	Cutfoot Sioux VIC/5310600/D-AW2
Noncommunity- Transient	Williams Narrows North/5310453/D-W18
Noncommunity- Transient	Williams Narrows South/5310453/D-W10
Noncommunity- Transient	O-NE-GUM-E Camp/5310389/D-W8
Noncommunity- Transient	Plughat Camp/5310390/D-W12
Noncommunity- Transient	Tamarack Point Camp/5110525/D-W13
Noncommunity- Transient	Deer Lake South/5310383/D-W2
Noncommunity- Transient	Deer Lake North/5310383/D-W3
Noncommunity- Transient	West Seelye Camp/5310392/D-W4
Noncommunity- Transient	East Seelye Pt./5310385/d-w20
Noncommunity- Transient	West Winnie Campground/5110703/c-w7
Noncommunity- Transient	Stony Point Campground/5110524/w-w5
Noncommunity- Transient	Benjamin picnic/5040266/b-w1
Noncommunity- Transient	Noma Lake Campground/5310835/b-w2
Noncommunity- Transient	Clubhouse North Campground/5310381/m-w1
Noncommunity- Transient	Clubhouse South Campground/5310381/m-w13 -new well-Unique#661156
Noncommunity- Transient	Marcell Ranger Station/5310605/m-w8
Noncommunity- Transient	Northstar Campground North/5310388/m-w10
Noncommunity- Transient	Northstar Campground South/5310388/m-w11
Noncommunity- Transient	Mabel lake campground/5110546/w-w3
Noncommunity- Transient	Mabel lake Picnic/5110546/w-w4
Noncommunity- Nontransient	Walker Ranger Station/564968/w-w1
Nonpublic	Nushka Group Camp/5040724/c-w21
Nonpublic	Knutson Dam/5040267/C-W8
Nonpublic	Birches Picnic/5310840/D-W14
Nonpublic	Cutfoot Warehouse/5310601/D-AW4
Nonpublic	Cut foot Residence/5310382/D-AW3
Nonpublic	Cut Foot Horse Camp/5310847/d-w19
Nonpublic	Lake Erin Wayside/511079/w-w8
Nonpublic	Central shop/5111077/c-w17
Nonpublic	Webster Lake Campground/5040281/b-w6
Nonpublic	Webster Lake Picnic/5040281/b-w7
Nonpublic	Rabideau CCC Camp/5040723/b-w9

Nonpublic	Marcell Residence/5310837/m-w9
Nonpublic	Marcell Benahouse/5310838/m-w12
Nonpublic	Woodtick Trailhead/5111078/w-w7
Nonpublic	Watershed Lab/5111081/c-w18
Inactive and Needs Abandonment	Shogren Dam/5310835/b-w4
Abandoned	Marcell Field Lab//5310839/NC-w1
Abandoned	Marcell Research Center/MRC-w1/unique#688215

References:
Carlson, R. E. 1977. A Trophic State Index for Lakes. Limnol. Oceanogr. 22: 361-369.

USDA Forest Service. 1986. Chippewa National Forest Land and Resource Management Plan. Eastern Region. Cass Lake, MN.

M. LANDS

1. Results*:*

In 2004 the Chippewa National Forest acquired one tract of 20.46 acres of land using funds appropriated from the Land and Water Conservation Fund. The tract, which is primarily a shallow lake valuable for waterfowl, is bordered on all sides by other National Forest System land. The Forest also sold a 0.31-acre tract of land under the Small Tracts Act authority along the south side of Island Lake, east of Bergville, MN.

2. Evaluation*:*

At the end of 2004 the National Forest land ownership within the Chippewa National Forest was 666,542 acres, which is 51.4 percent of the land area within the boundaries of the Forest (does not include 303,129* acres of water bodies within the Forest). At the start of 1986, when the outgoing Forest Plan was approved, the National Forest land ownership was 661,441 acres, or 51.0 percent of the land area within the Forest boundaries.

The net acreage gain during the tenure of the 1986 Forest Plan was 5,101 acres, for an average of 268 acres per year. The average acreage gain over the past five years is 43 acres per year, which reflects both decreased funding along with an emphasis on acquiring key lakeshore tracts that have risen dramatically in market value. The outlook is for limited funding that is focused on a select few high priority tracts.

Land exchanges continue to become more complex, costly and closely scrutinized at the Regional and National levels. Funding in recent years has been inadequate to complete any exchanges. The best opportunities for cost-effective exchanges are with Cass, Itasca and Beltrami Counties, for purposes of consolidating mixed ownerships. Several thousand acres are potentially available for logical exchanges with the counties. Exchanges are also likely to be used on a very limited basis to acquire key tracts when purchase funding is not available.

*This number is different from previous reports which used 285,300 acres for meandered water bodies. The 303,129 is a recent estimate using GIS tools that includes more water bodies than those included in the original surveyor calculations as meandered waters. The 303,129 acres of water bodies better reflects the actual amount of public waters.

I. AMENDMENTS TO THE FOREST PLAN

There have been no amendments approved since 1996. The Chippewa National Forest decided that initiating or processing minor amendments concurrently with the revision process might confuse our constituents and require us to divert funding and staffing for Forest Plan changes that could be incorporated into the revised Plan.

IV. LIST OF PREPARERS

The following people collected, evaluated, or compiled data for the fiscal year 2004 Monitoring and Evaluation Report:

Name	Discipline
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