Ottawa National Forest
FY 2002-2003
Monitoring and Evaluation Report

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FY 2002-2003 MONITORING AND EVALUATION REPORT

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ABSTRACT

The Ottawa National Forest Land and Resource Management Plan (Forest Plan) was approved in October 1986, with implementation beginning that same year. This report documents many of the results of monitoring the implementation the Forest Plan through Fiscal Years 2002 and 2003. The report also includes Decade 1, Decade 2 (to date), and life of the Plan average statistics for many elements of plan implementation, for comparing to "planning" average annual projections. This report is organized and presented in terms of Forest-wide resource programs and management area activities.

Based on a decision from the US 6th Circuit Court of Appeals relative to a timber sale project on the Ottawa National Forest we have been directed to view projected management practices from the Forest Plan as limitations. Prior to the March 2003 ruling the Ottawa did not view these number as limitations, however, following the ruling they have been and will be considered as such through the life of the Forest Plan. This report provides summary information relative to the above referenced limitations and the effects of the Ottawa's rate of implementation on potentially affected resource areas.

Forest Plan revision is underway, with the Notice of Intent published in the Federal Register on September 18, 2003. Revision is anticipated to be complete (FEIS/ROD issued) in March of 2006. Therefore we expect to complete 20 years of implementing the current Plan. Based on the March 2003 ruling from the 6th Circuit Court of Appeals the Ottawa National Forest will ensure that the projections contained in the Plan for two decades of implementation are not exceeded.

Resource program sections are presented in terms of Forest Plan goals and objectives, accomplishments and trends, followed by effects and values generated. These discussions provide an overview of the results of implementing Forest Plan direction dealing with vegetation management, wildlife habitat, transportation, botany and soils resources. Also included are interpretations and conclusions relative to the results displayed.

Forest Plan direction is implemented on the ground in segments of the Forest known as management areas. A section is provided within this report summarizing work done toward achieving desired conditions and goals for those management areas on the forest where active timber management occurs.

I. INTRODUCTION AND FOREST PLAN OVERVIEW

Introduction

The Record of Decision for the Ottawa National Forest Land and Resource Management Plan (Forest Plan), was signed by the Regional Forester (Region 9, Milwaukee) on October 14, 1986. Implementation of the Forest Plan began during fiscal year 1987. Monitoring began that year as well and has continued through fiscal year 2003, the seventeenth year of Forest Plan implementation.

The purpose of monitoring is to measure our efforts in achieving the goals and objectives of the Forest Plan for the many resource area programs under management. The process enables us to determine if specific Forest Plan direction is being implemented as written, if the direction is reasonable, and if this leads to attainment of the goals and objectives defined. If, after reviewing and evaluating these results, there is a significant difference between expected versus actual conditions, we may recommend one of several actions. Change could occur in our performance to better align with plan direction, adjustments in funding within our discretion to meet objectives, amend the Forest Plan as appropriate, or provide for further study of the situation. Forest Plan revision is currently underway.

The initial section of this report presents a review of key direction, accomplishments and effects for Forest resource program areas. This provides an overview through selected discussions of work accomplishments, outputs and outcomes of management. The second section of this report presents information on Forest management areas where active timber management occurs.

Making Changes to the Forest Plan

The National Forest System Land and Resource Management Planning Regulations permit amendments to the Forest Plan that may result in either significant or non-significant changes (36 CFR 219.10 (e)(f)). The Forest Supervisor develops amendments to the Forest Plan, determines and documents whether they will result in a significant or non-significant change, and completes all appropriate public notification. The Forest Supervisor may approve and implement amendments that are determined not to result in significant changes to the Plan. Amendments that do result in significant changes to the Plan will follow the procedure required for development and approval of the Forest Plan.

The Forest Plan amendments listed below were developed over the past several years.

Amendment No. 1, issued on April 20, 1992, provides specific management direction for the McCormick, Sturgeon River Gorge, and Sylvania Wildernesses under Management Area Prescription 5.1, 5.2, and 5.3. This amendment does not include management direction for motorized use of Big Bateau, Devil's Head and Crooked Lakes within the Sylvania Wilderness. Management direction on motorized use is covered under Amendment No. 5.

Amendment No. 2, issued on August 3, 1992, updates and expands standards and guidelines for gray wolf monitoring requirements, management indicator species habitat projections,

Endangered, Threatened and Special Concern Plants, cultural resource program, and many routine administrative changes to the Forest Plan text. This amendment was also developed in response to and incorporated in the July 10, 1990, decision of the reviewing officer for the Chief of the USDA-Forest Service on the appeal of the Ottawa Forest Plan by the Sierra Club, Wilderness Society, and Detroit Audubon Society.

Amendment No. 3, initially issued on October 27, 1992, provides specific management direction for the Sylvania Perimeter and McCormick Entrance areas under Management Area Prescription 8.2. An "Errata Sheet" that identified correction needed to the amendment, was issued December 8, 1992.

Amendment No. 4, issued on May 27, 1994, provides specific management direction for those rivers having been designated wild, scenic, or recreational. This updated direction was provided under Management Areas 8.1 (Wild and Scenic Rivers) and 9.2 (Wild and Scenic Study Rivers) standards and guideline sections.

Development of this amendment is based on the Michigan Scenic Rivers Act of 1991 signed into law on March 3, 1992, by President Bush. Under this Act, 14 rivers or segments thereof were designated federal wild, scenic, or recreational rivers and added to the National Wild and Scenic River System. These rivers include the Black, Presque Isle, West Branch of the Presque Isle, South Branch of the Presque Isle, East Branch of the Presque Isle, Cisco Branch of the Ontonagon, West Branch of the Ontonagon, Middle Branch of the Ontonagon, East Branch of the Ontonagon, Paint, North Branch of the Paint, South Branch of the Paint, Sturgeon and Yellow Dog rivers, totaling more than 300 miles.

In addition, five rivers or segments thereof were designated federal study rivers. These include the Brule, Ontonagon, Paint, Presque Isle, and Sturgeon rivers totaling more than 175 miles.

Amendment No. 5, issued May 31, 1995, provides specific management direction for motorized use on Big Bateau, Crooked, and Devil's Head lakes within the Sylvania Wilderness. This amendment limits boat motors to electric motors with a maximum of 24 volts, 48 pounds of thrust, and no-wake speeds.

Amendment No. 6, issued December 1, 1999, incorporates the following administrative reference documents into the recreation management section: the National Meaningful Measures Standards, the Interpretive Services Master Program Guide, and using Universal Design Concepts consistent with Recreation Opportunity Class and Setting of the area. The amendment also updates MA 5.3 standards and guidelines for dogs and other domestic pets within Sylvania Wilderness, to allow dogs that are engaged in State of Michigan permitted hunting activities to be excluded from leash requirements.

II. MONITORING AND EVALUATION REPORT

Chapter 1 Forestwide Resources

TRANSPORTATION

Forest Plan Goals:

Goals relative to Transportation can be found in the Forest Planon p. IV-2 to IV-4.

Accomplishments:

Forest Plan standards and guidelines such as road densities, standards, season of use, soil types, and closure devices are routinely taken into account during the transportation planning process and followed during project implementation.

The transportation program has evolved from one of construction and reconstruction of system roads to the primary maintenance of the existing road system. Integrated transportation planning and road location have led the way in providing an economically efficient transportation system which:

1. Minimizes the total amount of roads needed.
2. Provides for the lowest standard of road needed to meet the intended use.
3. Reduces the cost to operate and maintain the road system.
4. Limits the need for new roads and places more attention on maintenance and use of existing roads.
5. Identifies unneeded roads for decommissioning and obliteration.

Forest Road Analysis
A Forest-wide assessment of our primary road system was completed in January 2003. This document provides an overview of where and how the primary road system relates to other resources across the Forest and recommended activities to improve management of the primary road system in the future.

Transportation System
The Transportation System on the Ottawa provides access to the Forest for a diverse mix of uses. Because the Forest is managed for multiple uses, fish and wildlife habitats, recreational opportunities and timber products, most resources benefit from the variety in road densities and standards. Overall, the Ottawa's transportation system is considered to be a low standard/low density road system, which contributes to the remote character of the Forest.
Only about 2% or 70 miles of the transportation system is maintained at its highest level (maintenance level 5-paved/aggregate surface). Over half of the system (maintenance level 1 road totaling approximately 2,430 miles) is closed to passenger vehicles after use (two-track, native surface). This system is supporting the established ROS settings on the Forest.

Chapter 2 – Management Areas displays current road densities by Management Area for those Management Areas with road density standards in the Forest Plan.

Interpretation:

The Ottawa continues to construct/reconstruct fewer local roads than was originally projected in the Forest Plan. Two major reasons have contributed to this. First, the vast majority of the transportation system has been put in place and there is no longer a need to construct/reconstruct as many miles of local road. Second, an administrative decision was made in FY94 to minimize local road costs associated with the use of specified roads in the timber sale program by incorporating alternative methods (pre-haul maintenance, reopening existing roads and temporary road construction) to meet resource needs at lower costs. This administrative decision reduced overall costs to the program and placed an emphasis on transportation planning, road location and cost estimating. The trend to minimize local road costs and their associated impacts on the remote character of the Ottawa is expected to continue in the future.

The transportation system provides important access for the various needs of Forest users. Because the Ottawa is managed for multiple uses, the transportation system provides economic, social and other values to local, state and regional communities and businesses. Timber production, recreational opportunities, and fisheries and wildlife habitats all benefit from the variety in road densities and standards developed to serve the diverse mix of Forest recreational settings.

During project planning on the Ottawa, roads are inventoried and road management objectives assigned. Determinations are made regarding the management status of system roads, that is, whether they are to be maintained open or closed, or whether to be decommissioned. These determinations take into consideration MA objectives for road density and site specific resource concerns and use patterns.

Wildlife Habitat Value: Some wildlife habitat has also improved through proper planning and management of the transportation system. Lower road densities and restricted access may also have contributed to the quality of habitat for some wildlife species sensitive to interaction with people especially in the Remote Habitat Area (RHA). In addition, while much of the Ottawa is accessible from nearby roads, lower open road densities in some areas provide a more remote setting favored by many hunters and anglers. Through project decisions road densities within the RHA are being reduced to me the goal of 1 mile per square mile or less of open system roads.

WILDLIFE RESOURCES

Forest Plan Goals

Goals and objectives relative to Wildlife can be found in the Forest Plan on p. IV-2 to IV-5.

Accomplishments/Interpretation

The Ottawa strives to maintain vegetative diversity by designing long-term vegetative patterns to match ecological suitability for tree species while responding to wildlife, fish, and plant concerns.

Table 1. Forest Types in Management Area 1.1
Acres

Forest Type	Acres
Jack Pine	375
Red Pine	1,890
White Pine	2,475
White Pine – Hemlock	351
Hemlock	2,301
Balsam Fir-Spruce-Aspen-Birch	4,593
Wetland Black Spruce	756
Wetland Northern White Cedar	424
Tamarack	89
White Spruce	868
Upland Black Spruce	215
Mixed Swamp Conifer	1,973
Upland Northern White Cedar	864
Northern Red Oak	51
Black Ash-Elm-Red Maple	1,317
Red Maple (wet site)	322
Mixed Lowland Hardwoods	224
Hardwoods – Northern Red Oak	243
Hardwoods – Yellow Birch	2,999
Hardwoods – Basswood	400
Red Maple (dry site)	189
Sugar Maple	552
Hardwoods – Hemlock	1,365
Mixed Hardwoods	7,021
Quaking Aspen	32,130
Paper Birch	1,279
Bigtooth Aspen	517
Aspen-Birch-White Spruce-Balsam Fir	11,473
Lowland Brush (Alder-Dogwood-Willow)	3,926
Upland Brush	121
Open (water, grass, forbs)	1811

All the management areas on the Ottawa contain different mixtures and age classes of the forest types. Table 1 provides an example of the vegetative diversity on the Ottawa by displaying the acreages of the various Forest Types contained in MA 1.1. The Ecological Classification and Inventory (EC&I) system is used to aid in making better choices on species/habitat prescriptions. We continue to integrate wildlife needs into silvicultural prescriptions. Biological evaluations are written to evaluate the effects of alternative actions on threatened, endangered and sensitive species. Effects to Management Indicator Species are also considered and disclosed with each project.

Implementation of vegetative management activities is moving the Ottawa toward the desired future condition for MAs 1.1 – 6.2 described in the Forest Plan. Prescribed activities have maintained or enhanced wildlife habitat and desired visual condition while providing commodities.

Early successional types (e.g. jack pine, aspen) are being managed to provide habitat for some wildlife species and to provide fiber for forest products. Additional effort is needed in maintaining the early successional stages of aspen. The Ottawa has a general habitat goal of retaining approximately 138,000 acres of aspen forest types. At the current pace of treatment the amount of regeneration is behind what is needed to maintain the goal. While every effort is being made to maintain the early successional stages of aspen in the design of all vegetation management projects, it is not possible to maintain the quantity of acres identified in the current Forest Plan. Increased emphasis towards the restoration of aquatic systems and protection of riparian areas are two reasons for the decline in aspen management opportunities. Some MA forest type goals are not currently being met currently since many aspen stands are old and deteriorating and naturally converting to longer-lived species. For example in MA 1.1 goals are being met, but in MA 2.1 the objectives are not being met as well. The Ottawa continues to supply an important and valued opportunity for quality deer and grouse hunting on public lands with a remote recreational opportunity character.

Since implementation of the Forest Plan began portions of the northern hardwood ecosystem on the Forest have had treatment prescriptions implemented that have and will create within-stand structural diversity. These harvest prescriptions are creating a variety of size classes and habitat conditions for a variety of wildlife.

Management objective classification in hardwoods on the Ottawa have resulted in 83% of those stands that are classified having an uneven-aged management objective with only 17% being classified for even-aged management. This could result in some areas gradually becoming dominated by sugar maple communities. Regeneration of such species as yellow birch, basswood, and ash could be falling behind as a result. The Ottawa is using several techniques to provide for regeneration of these mid-tolerant species under uneven-aged management (such as the creation of larger canopy gaps and using summer logging, where possible, to obtain needed seedbed scarification). Considerable attention is being given to the red oak and hemlock component within hardwood stands to maintain an oak component and regenerate where ecologically feasible.

Progress has been made in old growth classification and managing stands for old growth characteristics. Other means of providing a mix of conditions include: protecting riparian

corridors; using Wild and Scenic River Corridors and areas of closed-canopy northern hardwood forest to provide landscape linkages connectivity to large habitat patches; and maintaining a relatively continuous forest canopy.

The Ottawa maintains approximately 292,000 acres of coniferous forest types (Table 2), distributed across all MAs. Thermal cover has been more than adequate to achieve the Forest Plan goal to maintain habitat adequate to support 20 deer per square mile. However, estimates of over 30 deer per square mile over most of the Ottawa during the last 17 years are raising concerns over long-term regeneration abilities of hemlock, cedar, and white pine due to browsing by deer on seedlings. Deer population levels result from a variety of climatic, habitat, and other ecological factors, not vegetation type alone. Progress is being made in restoring white pine to ecosystems in which it was once much more prevalent.

Table 2. Acres of Conifer Forest Types
Forestwide

Forest Type	Acres
Jack Pine	16,852
Red Pine	42,635
White Pine	14,303
White Pine – Hemlock	1,043
Hemlock	19,182
Balsam Fir-Spruce-Aspen-Birch	49,483
Wetland Black Spruce	13,022
Wetland Northern White Cedar	6,414
White Spruce	10,662
Upland Black Spruce	1,629
Mixed Swamp Conifer	67,495
Upland Northern White Cedar	1,692
Aspen-Birch-White Spruce-Balsam Fir	47,388
Total	291,800

Location and timing of vegetative management projects are coordinated to benefit wildlife-based recreation. Many winter sales are timed to provide browse for wintering deer herds which contribute to the high densities of deer present across most of the forest. Both deer hunting and deer watching opportunities are increased by these efforts. Some aspen sales are designed to improve woodcock and grouse habitat and to develop/maintain hunter walking trails. Large white pine is managed for old growth and possible future eagle nesting sites. During project planning ROS objectives are taken into consideration as well as RHA requirements, where applicable. As mentioned previously, progress is being made in managing road densities within the RHA to achieve a long-term goal of 1.0 miles or less of open road per square mile of land area. Desired road densities within other MAs are generally on target.

During project planning, the amount, size and spatial arrangement of temporary openings are taken into consideration when determining effects to wildlife species.

ENDANGERED, THREATENED AND SPECIAL CONCERN SPECIES

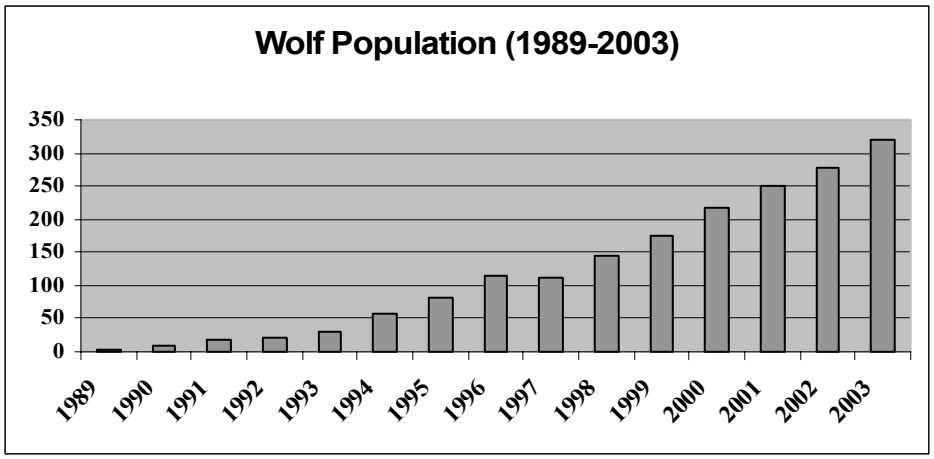
Endangered and threatened animal species on the Ottawa are listed below. (There are no known federally listed plant species endemic to this area – Forest Plan p. IV-40. The Botany section contains a summary of the rare plant program (see p. 38).

Gray Wolf

Background: The gray wolf was federally listed as endangered when the Plan was approved in 1986, with only unconfirmed reports of wolf occurrence in Michigan. The 1992 federal recovery plan for the wolf includes a de-listing goal of 100 or more wolves for at least five consecutive years outside of Minnesota.

Status of the Population: In 2003, Wisconsin and Michigan had exceeded that goal for nine years. On April 1, 2003, the U.S. Fish and Wildlife Service reclassified the wolf from "endangered" to "threatened" in the Eastern District Population Segment which includes Michigan. Michigan had already reclassified wolves from endangered to threatened on June 17, 2002. The MDNR wolf population estimate for winter 2003 was 321 animals in the Upper Peninsula; with over 100 estimated on or near the Ottawa. This is well over the Forest Plan goal of 24 wolves for the Ottawa. In Michigan, wolves will be de-listed and considered recovered when the population has maintained 200 animals or more for 5 consecutive years (Michigan Department of Natural Resources 1997). If 2004 wolf population estimates are over 200 then Michigan will meet its recovery criteria. The continued upward trend in wolf numbers in the Upper Peninsula as reported by the MDNR is apparent from Figure 1.

Figure 1. Wolf Population Trends
Upper Peninsula Estimates (1989-2003)



Habitat: A habitat objective for the gray wolf involves managing a large portion of the Ottawa (256,000 acres) for lower road densities (one mile or less of open road per square mile). Additional discussion relative to the RHA is contained in the Transportation and above. This habitat is also used by white-tailed deer, the main prey species of wolves, and is maintained

within the area through vegetative management practices. Deer habitat is also maintained elsewhere on the forest through practices such as aspen regeneration, maintenance of conifer types for thermal cover, and maintenance of permanent upland openings. The Forest will continue to reduce road densities in areas that do not meet Forest Plan Guidelines through vegetation management projects while also increasing the quality of habitat for potential prey species

Wolves will utilize a variety of different habitats as long as their basic needs (protection from human disturbance and existence of an adequate prey base), are met.

Key Changes in the Environment - (physical, social, and economic):

Public education efforts were identified in a study conducted in Michigan (Kellert, 1990) and implemented by a number of organizations, including the Ottawa in the early to mid 1990's. This educational effort appears to have helped, as evidenced by the growing wolf population in Michigan, and reduced numbers of human-caused wolf mortality in recent years. However, increasing wolf numbers will also likely result in higher numbers of wolf/human conflicts; thus, there will continue to be a need for education in the future.

In addition to the continuing need for education, land use management is the other important factor for long-term survival of wolves in this region. With positive human attitudes toward wolves, land use management becomes the remaining concern for long-term survival of wolves in this region. The Forest will continue to reduce road densities in areas that do not meet Forest Plan Guidelines through vegetation management projects while also increasing the quality of habitat for potential prey species.

Since Forest Plan implementation began we have:

- Promoted public information and education programs regarding wolves, through working with groups such as the Timber Wolf Alliance and MDNR. As wolves approach Federal de-listing, the emphasis for such efforts would begin to shift from wolf recovery to wolf management.
- Worked with the MDNR on wolf monitoring programs, in order to gain information that will help guide future management practices.
- Managed portions of the Ottawa for remote habitat conditions (especially low open road densities), in order to provide refuge areas for wolves and other species sensitive to human disturbance.

Bald Eagle

See the combined write-up on Osprey and the Bald Eagle under the Management Indicator Species (MIS) narrative of this Report. (pg. 24)

Canada Lynx

Background: On July 8, 1998 the U.S. Fish and Wildlife Service published a proposed rule to list the lynx under the Endangered Species Act of 1973, as amended (Federal Register Volume 63, No. 130). The final rule listing the contiguous United States Distinct Population Segment was published on March 24, 2000 (Federal Register Volume 65, No. 58).

The Lynx Conservation Assessment and Strategy (LCAS) was developed to provide a consistent and effective approach to conserve Canada lynx on federal lands in the contiguous United States. The USDA Forest Service, USDI Bureau of Land Management, and USDI Fish and Wildlife Service initiated the Lynx Conservation Strategy Action Plan in the spring of 1998. The overall goals were to develop recommended lynx conservation measures, provide a basis for reviewing the adequacy of Forest Service and BLM land and resource management plans with regard to lynx conservation, and facilitate Section 7 conferencing and consultation at the programmatic and project levels.

There have been no documented occurrences of lynx on the Ottawa in at least two decades. However, it is possible that dispersing lynx could re-occur here at some point. Recent evidence, including a verified animal in the eastern U.P. and discovery of significant numbers of lynx in NE Minnesota could result in dispersing animals showing-up on the Ottawa. The Ottawa continues to search for lynx by conducting site-specific winter track surveys for mammals, including lynx, prior to management activities in the areas containing habitat for Lynx. In addition, the Ottawa has been an active participant in the national effort to detect lynx using the National Lynx Detection Protocol or "hair snare". The Ottawa has completed "hair snare" detection surveys yearly since 1999 with no positive detections to date.

The animal caught in a trap in the eastern U.P. in November 2003, and the number of lynx being discovered in NE Minnesota, correspond with the hare cycle in Canada and Minnesota at this time. Prior to this documentation, the winter of 1972-73 was the last year with a relatively large number of documented occurrences in the Great Lakes Region (Ruggiero et al 2000). During that winter, several specimens were collected in Minnesota and Wisconsin: however, none were recorded in Michigan (Ruggiero et al 2000). On March 23, 2004 the USFWS sent a letter to the Forest stating, based on the animal trapped in the eastern U.P. in 2003, that they believe that Canada lynx "may be present" in potential lynx habitat throughout the U.P.

Habitat: Historically, Lynx occurred primarily in the boreal forest, sub-boreal and western montane forests of North America, and mixed coniferous/deciduous forests of southern Canada, the Lake States and New England. Lynx habitat or territory can be characterized as having areas of mature forests with downed logs and windfalls to provide cover for denning sites, and escape and protection from severe weather. Early successional forest stages provide habitat for the lynx's primary prey, the snowshoe hare. Lynx and snowshoe hare populations increase and decline dramatically in approximately 10-year cycles.

Table 3. Status of Habitat
Forest Lynx Analysis Units (LAU's)

LAU	Suitable Habitat %[1]	Denning Habitat %[2]
9	88	46
10	87	>10
14	86	>10
15	86	43
17	88	36
20	87	>10
23	80	55
24	85	49
28	94	>10
31	100	>10
33	90	>18
38	91	>10

[1] The LCAS recommends that at least 70% of the suitable habitat in an LAU meet the definition of suitable foraging habitat.
[2] The LCAS recommends that at least 10% of the suitable habitat in an LAU meet the definition of suitable denning habitat.

Key Changes in the Environment - (physical, social, and economic): Lynx populations in portions of Canada, north of the Great Lakes Region, have experienced declines in recent decades due to habitat alteration, fragmentation, and other human development, and possibly from over-harvest during periods of high pelt prices. This has changed in recent years as lynx numbers in Ontario have begun a rebound. Environmental and social changes may have altered the ability of lynx to invade the Upper Peninsula of Michigan during periods of cyclic fluctuation in Canada.

It is probably unlikely that a viable population of lynx will ever be established on the Ottawa. In the meantime, as part of the listing process, an agreement has been initiated to promote the conservation of the Canada lynx and its habitat on federal lands. The Lynx Conservation Agreement between USFWS and other federal agencies identifies actions the signatories agree to take to reduce or eliminate adverse effects or risks to the species and its habitat, and to maintain the ecosystems on which this species depends.

As part of this, the Ottawa has identified and mapped potential lynx habitat and 12 Lynx Analysis Units (LAUs) (see Table 3) within its administrative boundaries. The LAU is a project analysis scale at which direct, indirect, and cumulative effects analyses are conducted. LAU boundaries remain constant to facilitate planning and allow effective monitoring of habitat changes over time. We continue to follow the LCAS during project planning and implementation.

Analysis of lynx habitat centers on some key habitat components that constitute potential habitat, or could affect suitability of potential habitat in a proposed project area, especially as those effects could influence colonization by lynx. These factors are foraging habitat (prey habitat),

denning habitat, acreage and connectivity of suitable habitats, and human disturbance. Because there is no direct evidence of a resident viable population of lynx in the Upper Peninsula, productivity, mortality, competition and regional landscape factors are not relevant at this time.

ADDITIONAL WILDLIFE SPECIES AND STATE ET&SC SPECIES

Peregrine Falcon

Background: Peregrine falcons were formerly listed under the Federal Endangered Species Act, but were de-listed in 1999. The falcon is still listed under Michigan's Endangered Species Act as endangered. One aerie has been documented within the Ottawa, in the Trap Hills area, and the Forest cooperated in a multi-agency recovery effort that released a total of 18 young falcons during 1988 and 1989. However, the long-term goal of one active pair (Forest Plan Amendment #2, page IV-41.1) has not yet been met.

A documented nesting effort took place in 1990, but was unsuccessful. In 1991, the Trap Hills site produced the first peregrine falcon fledglings in the Upper Peninsula since 1957. The Trap Hills site is maintained in an undisturbed condition. Another successful nesting effort occurred in 1993. The years 1994 through 1996 witnessed peregrine falcon presence but no successful nesting. For most years since 1996, there has been no documented presence of peregrines in the area.

Habitat: Peregrine falcons select inaccessible cliff sites with numerous ledges and overhangs for nesting sites. These cliffs are typically near large lakes, coastlines, or large wetland complexes where waterfowl and passerines, the peregrine's main prey, are concentrated and offer open-air hunting. Feeding sites include large meadows, fields, wetlands, marshes and lakes.

Key Changes in the Environment - (physical, social, and economic): The lack of successful reproduction at the Trap Hills site (and also a site at Porcupine Mountains Wilderness State Park) during the 1994-1996 breeding seasons can be attributed to climatic factors, such as severe drought, high cliff nest site temperatures (lethal to young fledglings), and intense thunderstorms and rainfall, which can flush nests and young from cliffs.

Prey availability may be a factor in limiting production of young in some years.

The viability of the peregrine falcon on the Ottawa site is related to peregrine falcon recovery occurring in a larger regional area. A strong recovery in the Midwest may supply breeding pairs to re-colonize the Trap Hills site at some time in the future. Current management activities on the Ottawa do not impact the potential for re-colonization of the Trap Hills site.

Neotropical Migrant Birds (NTMB)
(Monitoring Frequency - Annually)

Background: In 1991, the Ottawa initiated its first annual "Breeding Bird Census". The census weekend is based out of Camp Nesbit on the Kenton Ranger District in early June, and utilizes volunteers to gather breeding bird data. A total of 104 permanent plots have been established

and all of the major habitats found on the forest have been sampled. Volunteers record all birds heard or seen from a plot center for a 10-minute period.

Bird populations on the Ottawa are generally stable. Some declines in species that use early seral stage forest, sometimes called "edge" species have been noted. The two most abundant species of birds on the Ottawa, the ovenbird, and the red-eyed vireo, are generally associated with maturing forests, as are seven of the top ten most abundant species on the Forest. The top ten are ovenbird, red-eyed vireo, Nashville warbler, hermit thrush, white-throated sparrow, American robin, black-throated green warbler, yellow-rumped warbler, chipping sparrow, and black-capped chickadee.

Value of Implementation: Birds are an excellent, though not comprehensive indicators of biological diversity and can be sampled easily and cost-effectively. Long-term trend data is valuable in monitoring the health of ecosystems at all levels from local settings (National Forest), to regional (Lake States), national, and even global settings (western hemisphere). Animal populations show a considerable degree of annual fluctuation from year to year, and therefore require a commitment to annual monitoring over a long-term period.

Data collected on the Ottawa is shared with researchers coordinating the 2nd edition of the Michigan Breeding Bird Atlas, as well as others who request the data.

Red-Shouldered Hawk

Background: The Red-shouldered Hawk is on the Ottawa National Forest list of Regional Forester's Sensitive Species (RFSS). It is also listed by the MDNR as threatened.

Red-shouldered hawk populations have declined in Michigan since the early 1900's. Most breeding pairs are now concentrated in the northern Lower Peninsula, with limited populations in the Upper Peninsula. Factors thought to be limiting Red-shouldered Hawk populations include loss of habitat, contaminants, competition with Red-tailed Hawks (among others), and human disturbance, including falconry. In the northern part of its range, including Michigan, this hawk is migratory, arriving in northern Michigan in March and staying until late fall. Many thousands of acres were surveyed for Red-shouldered Hawks since the summer of 2000 by Ottawa biological staff. To date, the Forest has located three territories. This low occurrence validates most range maps which show the UP of Michigan to be on the periphery of the species summer range and therefore uncommon.

Habitat: This raptor is found in moist or mixed hardwoods, wooded swamps, mature bottomland hardwoods, and wooded margins of marshes. Postuplasky (1980) reported three Upper Peninsula Red-shouldered Hawk nests. Nests were found in habitats such as northern hardwoods with closed canopies and generally open understories. Nest trees included yellow birch, aspen, and sugar maple; but in each case were found in main limb crotches 35-45 feet off the ground in trees about 18 inches in diameter. Small ponds or streams were found 0.3 to one mile away from the nests. In the recent past, a Red-shouldered Hawk nest was found in the Sylvania Wilderness in an old growth hardwood stand that contains several woodland kettle ponds. Surveys of Red-shouldered Hawk habitat in Minnesota have shown nearly all nests are in

northern hardwood stands containing small woodland ponds. This preference for deciduous forest with small woodland ponds is probably related to the diet of red-shouldered hawks consisting of amphibians, reptiles, crayfish, and small mammals.

Red-shouldered Hawks are susceptible to disturbances in their forest habitat and to habitat changes that encourage Red-tailed Hawks, an aggressive competitor (Evers 1992). Interspersed wet meadows and ponds should comprise about 20% of the suitable habitat. Nesting pair home ranges have been reported to vary from 250-600 acres. Retaining mature, closed canopy forests near small wetlands and minimizing disturbances within 300 feet of a nest are good management practices for Red-shouldered Hawks. Design criteria to protect any known nests are incorporated as necessary into projects, this includes design criteria for protection of wetland habitats which makes direct disturbance unlikely to occur. Habitat for the Red-shouldered Hawk appears to be limited to an extent on the Ottawa, as we are north of the primary historic range of the species. The Ottawa in general does not have extensive flood plain forests adjacent to major rivers and active vegetation management near such areas are not common and those that are near would have protective design criteria included. The Ottawa does have some areas of mature hardwood forest with small lakes and ponds. The Sylvania Wilderness is probably the best example of this kind of habitat on the Forest.

Key Changes in the Environment – (physical, social and economic): The decline in the Red-shouldered Hawk population and habitat loss in other parts of the species range has led to concerns about this species on the Ottawa.

The Ottawa appears to be at the northern extreme of this species range. With very little documentation of Red-shouldered Hawk presence on the Ottawa, observations of population trends cannot be made. Some of the best (and potential) habitat on the Ottawa is protected either in existing Wilderness, in the Wild/Scenic/Recreation River corridors, or through design criteria in project level decisions.

Conclusions: The increased pace of Plan implementation of selection harvest on northern hardwoods during the 1st decade of Plan implementation did not reduce habitat suitability for this species, as this type of harvest will result in larger more mature forests not a reduced suitability for this species. The rate of harvest has been reduced during the 2nd decade of Plan implementation, ensuring that the effects of Plan implementation remain within those anticipated in the Forest Plan FEIS. Design criteria referenced above, which include timing restrictions and no-cut buffers to protect nesting birds from disturbance during harvest activities and retain suitability around known nests, are incorporated into projects to ensure that the rate of implementation does not have negative impacts on the Red-shouldered Hawk.

Wood Turtles

Background: The wood turtle was added to the Ottawa RFSS list in 2003 after completion of a Risk Evaluation indicating our uncertainty of the species long-term outlook. Adults are readily seen in suitable habitat across the Forest, but evidence of successful reproduction is lacking. The wood turtle is protected by the MDNR under a Director's Order. The Forest is planning to search for key nesting areas and initiate a monitoring program in 2004.

Habitat: The wood turtle lives in sandy-bottomed rivers and streams. They use steep eroding sand or gravel banks, or large gravel and sand bars for nesting habitat. Wood turtles are omnivorous and feed within mixed sedge meadows, stands of alder and willows along rivers and creeks, the edges of grassy openings, floodplain forests and upland forest stands. Wood turtles can sometimes be located in forested stands from ¼ to ½ mile from the nearest river or stream habitat.

Preferred habitat for wood turtles is in or near third order or larger streams passing through very sandy regions such as those found in glacial outwash plains geomorphic regions. Historically, wood turtles mainly used the sandy cutbanks and points created by streams to nest in. These days, with the prevalence of roads crossing and paralleling streams it is not uncommon to see wood turtles using the shoulders, fill-slopes, and cutbanks of sand and gravel roads to lay their eggs in. Suitable nesting habitat appears to be a critical habitat determinant, and wood turtles may inhabit smaller streams if nesting areas are available. Wood turtle nesting sites are always within a few hundred yards from rivers. Some individuals may travel further while foraging, either moving along smaller tributary streams or across upland areas.

Key Changes in the Environment - (physical, social and economic): The wood turtle is a relatively long-lived reptile, with a low reproductive rate, which means populations would recover slowly in the face of a large reduction in the population. Factors that influence or limit wood turtle populations are lack of available nesting habitat, nest predation, shooting, and illegal collection. In other parts of the turtle's range, illegal collection is a serious problem.

The wood turtle appears to be widely distributed across all the major watersheds on the Ottawa.

MANAGEMENT INDICATOR SPECIES

Monitoring Results

The Forest Service monitors population trends of selected wildlife species, called Management Indicator Species (MIS), to help determine the effects of our management activities. These activities are required under the National Forest Management Act, and by the Forest Service Handbook, section 2600. The regulations require the Forest Service to monitor MIS population trends at the scale of the "Planning Area" which in this case is the entire Ottawa National Forest. Further, the regulations state that MIS populations must be monitored at prescribed intervals. The August 1992 amendment to the Forest Plan (Pages IV-37 – IV-40) describes these species (there are 13 MIS species on the Ottawa), the habitat types they represent, the periodicity of population surveys, and long-term management objectives for each. In addition to monitoring MIS species at a Forest-level, the Ottawa, as part of on-going Forest Plan implementation, analyzes the expected effects of project-level impacts upon each of the 13 MIS during project planning (in the Environmental Analysis or Environmental Impact Statement). Also, since several of the Ottawa's MIS are also TES species, the Biological Evaluations completed for all projects contain an analysis of expected project-level effects upon the listed or sensitive MIS.

The following species are MIS on the Ottawa: black bear, white-tailed deer, common loon, ruffed grouse, American bittern, osprey, bald eagle, northern goshawk, barred owl, blackburnian

warbler, brook trout, smallmouth bass and northern pike. These 13 species each represent a guild of species that utilize similar habitats, as listed in Appendix I of the Forest Plan Final EIS Appendix Volume. The following is a narrative describing the monitoring results to date for each species.

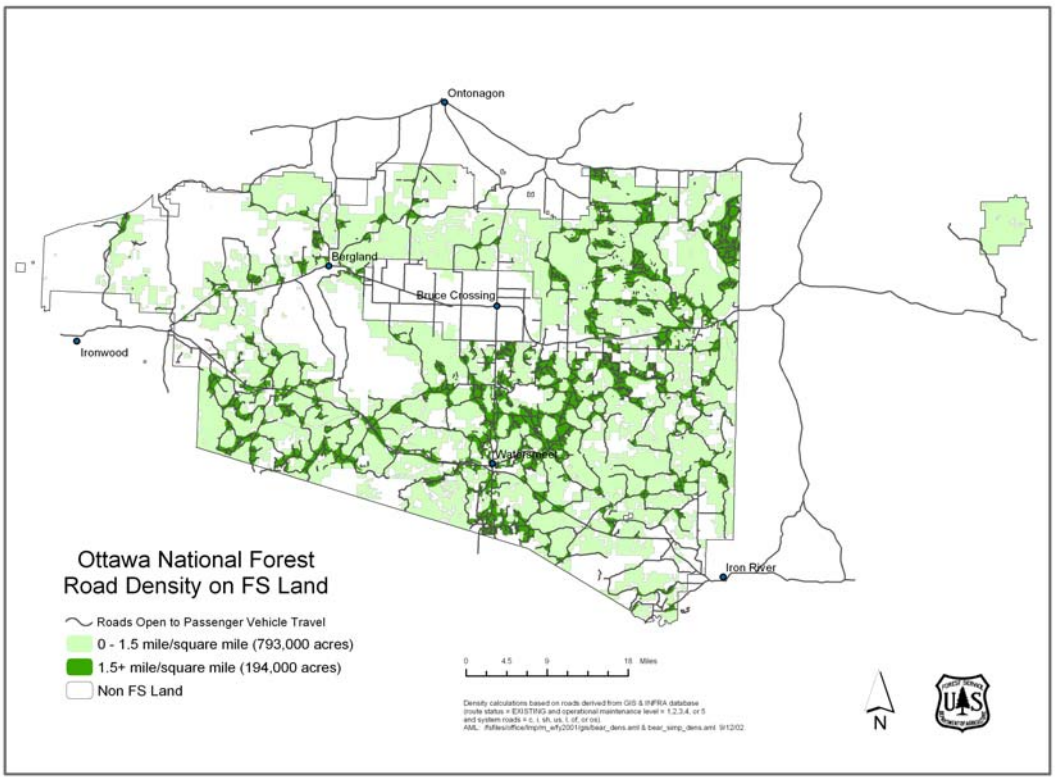
Black Bear

Background: Black bears use a wide variety of habitats, ranging from openings and sedge meadows through conifer swamps to mature forest of most types. The black bear's diet includes berries, insects, small mammals, carrion and vegetation. Minimal human interaction is important, particularly during the cub-rearing period of mid-summer. For this reason, black bear was selected as a management indicator species of remoteness. As an indicator, the black bear represents 18 different species of wildlife (Appendix I, Forest Plan FEIS Appendix Volume). Habitat of black bear is closely tied to mature hardwood, mature and young coniferous swamp, shrub swamp, sedge meadow and upland openings.

Forest Plan Objectives: The Forest's long-term objective (as stated on Page IV-37 of the Forest Plan) is to provide greater than 448,000 acres with less than 1.5 miles of open road per square mile of land. This objective is further refined to include only those roads that are open to passenger vehicles during July and August, the most critical months for black bears and their cubs, in most years.

Status of Habitat: Based upon the population increase in black bears over the last 15 years (discussed below), overall habitat appears to not be limiting for this species at this time. Relative to the habitat objectives described in the Forest Plan, the acreage meeting the open road density objective is almost double the 448,000 acres prescribed in the Forest Plan (See Figure 2 below for a spatial representation of this).

Figure 2. Map of areas with less than 1.5 mi/mi^2 of open road.



Status of Population: The MDNR continues to estimate bear populations across the entire Upper Peninsula with the use of tetracycline-marked bait and bear harvest data. The Ottawa biological staff cooperates with MDNR on the deployment and retrieval of these baits. MDNR data indicates that for the three Bear Management Units that comprise the Ottawa (Bergland, Baraga and Amasa), the bear population has slowly and steadily increased since the late 1980's. The population model used by MDNR suggests a population that grew from about 3,200 bears in 1989 to almost 8,000 bears in 2003 in the three Bear Management Units. In that same time period, legal bear harvest has increased in the western Upper Peninsula. In 2003, hunters in the three Bear Management Units legally registered 1,054 bears. The number of hunting permits available for black bears has been increased by MDNR recently to prevent the population from becoming too large.

Conclusions and Actions: There are likely a number of other factors, in addition to the availability of relatively remote habitat, that have been responsible for the increase in bear populations over the last 15 years. These factors include: 1) increased tolerance of bears by the public; 2) decreased illegal harvest of bears; 3) higher deer numbers, which provides a high-quality food source for bears through both carrion and predation on fawns, etc.; 4) continued emphasis on maintaining forest openings and early-successional vegetation in general, which provides additional food sources (fruits, berries, succulent vegetation, ants); and 5) a trend toward less severe winters, which may have increased overwinter survival. Other factors probably contribute as well. The Forest should continue to monitor open road density to insure

that Plan objectives for habitat with relatively low road densities continue to be met. Other aspects of Forest Plan implementation should continue as well. Based on the information summarized above the level and type of timber harvest on the Ottawa has not negatively affected bears or their habitat, nor is it anticipated to in the future.

White-Tailed Deer

Background: A popular game species, the white-tailed deer is a habitat generalist. Deer use almost every terrestrial habitat available on the Forest to some degree, especially edge and disturbed habitats. They require an abundance of palatable vegetation and, in winter, large areas of thermal cover scattered across the landscape. Specifically, it represents 69 species (Appendix I, Forest Plan FEIS Appendix Volume) that are habitat generalists (use a variety of habitats), are "edge specialists", or are adapted to using disturbed habitats.

Forest Plan Objectives: The long-term goals for deer are to maintain about 138,000 acres of aspen/birch habitat, 150,000 acres of coniferous thermal cover, and between 8,700-24,000 acres of upland openings (Forest Plan, p. IV-37).

Status of Habitat: At this time, the Forest has about 190,000 acres of aspen and birch forest types, and about 172,000 acres of coniferous thermal cover (forest types include hemlock, lowland conifer, spruce/fir, and white spruce). The Forest also currently has about 8,800 acres of upland openings. The acreage in upland openings has declined slightly recently from a maximum of about 10,200 acres, (attained in the mid-1990's) but is higher than the approximately 8,700 acres of upland openings when the Forest Plan was signed in 1986. (See Upland Openings, p. 50 for more details)

Status of Population: The MDNR monitors deer populations annually through harvest records and other methods. In 1986, when the Plan was signed, deer populations were approximately 15 deer/mi^2 or less across the whole Forest. In the early 1990's, deer numbers on the Upper Peninsula were quite high. Severe winters in 1995-97 substantially reduced the population. Recently, milder winters and the structure of the hunting regulations have allowed deer populations to soar to high levels throughout most of the western Upper Peninsula. At present, MDNR estimates deer densities to be about 12 deer/mi^2 in the "high" snowfall zone, which includes the northern-most part of the Ottawa, about 30 deer/mi^2 throughout the "moderate" snowfall zone, which includes most of the Ottawa, and about 55 deer/mi^2 in the "low" snowfall zone, which includes the southeast corner of the Ottawa, near Iron River, MI. Population control has become a concern of the Ottawa staff, MDNR and many members of the public.

Conclusions and Actions: Based on the data provided to the Ottawa by MDNR, and our own observations of increasing deer density, we conclude that plan implementation is not detrimentally affecting the viability of the Forest's deer population. As with bears, there are a number of other factors, that resulted in an increase of the deer population in the last 15 years, including hunting regulations that limit antlerless deer harvest, supplemental feeding and baiting, and, especially, milder winters. Other factors probably contribute as well. Deer browsing is inhibiting the regeneration of hemlock, cedar, and white pine in some portions of the Ottawa,

changing the nature of the understory and shrub layers in some stands, and thus affecting habitat quality for a variety of species.

In response to relatively persistent high deer numbers over the last decade or so, the Ottawa has scaled back certain practices that had been previously used to enhance deer habitat, such as creation of "browse strips" adjacent to winter thermal cover (small strip clearcuts in hardwood stands to regenerate large quantities of winter browse). In some portions of the Forest, deer-proof fences have been constructed around hemlock, cedar, and white pine regeneration to protect it from browsing by deer. If the current trend of mild winters continues across the Upper Midwest, it is likely that deer populations will remain higher than desired, regardless of changes in habitat conditions.

Common Loon

Background: The loon was selected as an indicator of lake habitat condition on the Ottawa, in particular, mid to large-sized lakes with a forage base of small fish, and relatively free of human use. Regionally, loons are common in good habitat, but declining. They are listed as threatened in Michigan, but not federally listed.

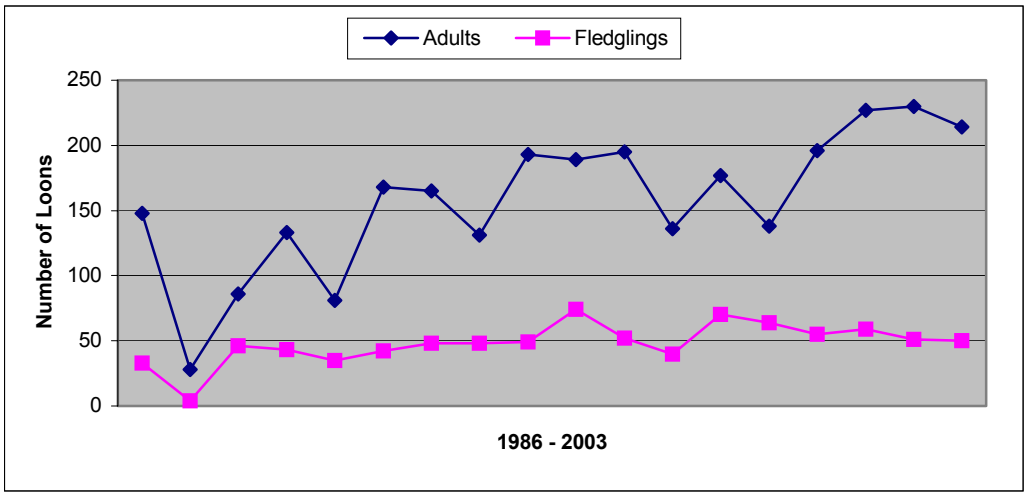
Forest Plan Objectives: The Forest Plan calls for identification, protection and maintenance of loon breeding areas.

Status of Habitat: Generally, habitat quality has not been directly influenced by Plan implementation. Most of the boat launches and other recreation facilities on the Forest have been in place since before Plan adoption. Vegetation management on the Ottawa does not affect habitat quality for loons. A couple of influences have been detrimentally changing loon habitat, including the increase in lakefront development on privately-owned land, higher boating use, the use of jet skis, and aquatic invasive species.

Status of Population: At the time of this writing, about 80 Ottawa lakes have been documented as having loons nesting on them in the last 10 years, or about 30 more lakes than were in use for nesting at the time the Plan was adopted in 1986. This trend is relatively consistent across years.

The following figure displays the population trend of loons on the Ottawa since Plan adoption. The upper line is the number of adults seen, and the lower number is the number of young fledged. These numbers can be viewed as minimum population figures, since they likely underestimated the actual population for a couple of reasons. First, the Ottawa does not check every lake every year, due to time and logistics constraints. Second, many of the lakes are large with many bays, and it is possible for observers to miss loons.

Figure 3. Adult Loon Population Trends and Number Of Loon Chicks Fledged
From 1986-2003



As shown in Figure 3 above, 2002 had the highest number of adult loons ever documented on the Ottawa (230 adults, with 51 chicks fledged). The number of fledglings has remained relatively stable with no large fluctuations. In 1987, which is the second data point in the above figure, only 28 adults were seen, with only 4 fledglings documented. These low numbers are an artifact of limited survey effort that year, most waterbodies were not checked. Survey effort is not consistent from year-to-year, which explains much of the annual variation in loon numbers observed.

The western Upper Peninsula is one of the only places in the region where loon populations appear to be stable (Sauer, et al., 2001[1]). Loon declines have been noted in Wisconsin, Central Minnesota, the eastern Upper Peninsula, and the Lower Peninsula of Michigan.

Conclusions and Actions: Overall, it appears the population of adult loons has increased slightly, with the number of fledglings produced being remarkably stable from year-to-year. At this time, all optimal nesting lakes are consistently being used, with reproduction being consistent from the best loon lakes. As the number of returning adults increases, they are starting to utilize marginal nesting lakes, with few additional fledglings being reared. As our level of survey effort increases, we find more adults (utilizing the marginal habitats) but we do not observe significantly more fledglings.

[1] Sauer, J.R., J.E. Hines, and J. Fallon. 2001 The North American Breeding Bird Survey, Results and Analysis 1966-2000. Version 2001.2, www.mbr-pwrc.usgs.gov/bbs/bbs.html USGS Patuxent Wildlife Research Center, Laurel, MD.

The Forest is not developing additional lake-associated recreation sites to try to maintain the remote character of its undeveloped lakes. More actions may have to be taken in the future to protect loons from disturbance. In recent years, we have been:

- Monitoring impacts of recreation use, both motorized and non-motorized, on loon reproductive success.
- Working with loon researchers investigating the impacts of environmental contaminants (mercury and lead being most notable) on loons, and monitoring loon reproductive success.
- Working with partners, most notably the Michigan Loon Preservation Association and Lake Loon Rangers, to monitor breeding success and identify impediments to successful fledging of young loons.

American Bittern

Background: American bittern is a secretive wetland bird and little is known about this bird's life history. It is a summer breeder on the Ottawa that migrates south for the winter, and is a solitary nester (non-colonial). Bittern construct nests out of vegetation that sit either on the ground in a wetland, or float on a dense mat of vegetation. Nests are typically well hidden in very dense emergent vegetation within shallow wetlands of large acreage. The American bittern was selected as a (MIS) for wetland obligate species, including several waterfowl, passerine birds, small mammals, and amphibians. Thirty vertebrate wildlife species that rely on wetland communities are represented by bittern (Appendix I, Forest Plan FEIS Appendix Volume). It is not on the Federal or Michigan threatened and endangered species lists.

Forest Plan Objectives: Habitat management objectives, contained in the Forest Plan (page IV-38), include monitoring of bitterns at least once every 5 years, including an inventory of existing breeding territories. The Plan also recommends maintenance or improvement of 4,700 acres of sedge meadows with emergent vegetation, 7,600 acres of shallow marsh with open water, and 27,900 acres of other wetlands with potential for improvement.

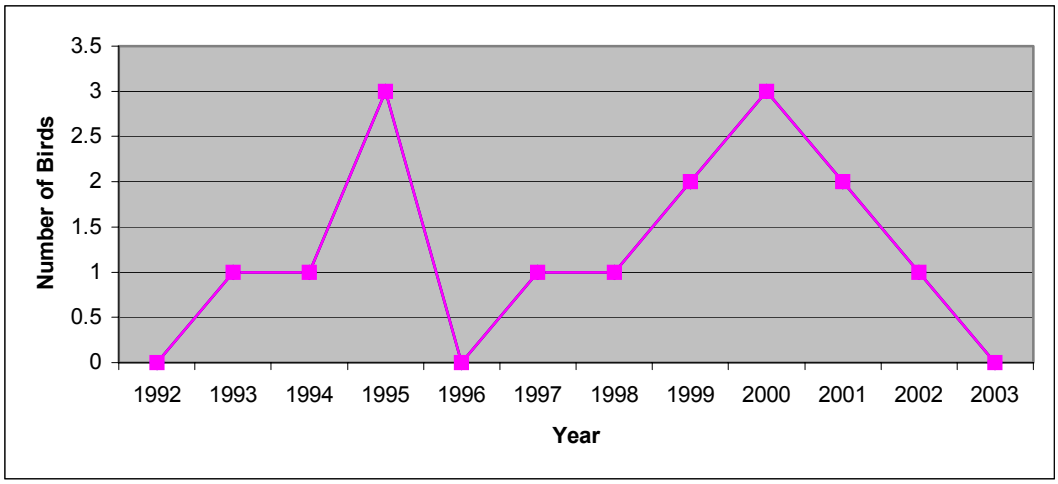
Status of Habitat: At this time, the Ottawa is accomplishing or exceeding the habitat management objectives contained in the Forest Plan. Currently the Ottawa has about 5,550 acres of sedge meadows and 7,400 acres of shallow marsh. In addition, the Ottawa has about 1,570 acres of deep marsh. Currently, about 44,200 acres have been classified as: open water wetlands (~5,100 acres), shrub wetlands (~28,000 acres), or wetland bogs (~11,100 acres). Also, the database contains about 7,450 acres of "undifferentiated" wetlands, which means they have not been categorized into any of the above classes.

In recent years, the Forest has provided riparian areas with even greater protection than was previously in place. Management in or near riparian habitat is designed to maintain or enhance the structure, function, and composition of the riparian ecosystem. In the sedge meadows that bitterns prefer, this usually means no new disturbance (i.e. no timber harvest operations), which results in no human impact to bittern habitat. As a result, habitat for wetland obligate species, such as the bittern, is being protected on the Ottawa.

Status of Population: Most population data for American bittern has been collected through the U.S. Fish and Wildlife Service's Breeding Bird Survey (BBS), which has been conducted across the country since 1966, including the Ottawa. The BBS data indicates that this species is declining in numbers across its range, especially in the north-central United States (Sauer, et al., 2001). These population declines have been attributed to wetland habitat losses resulting from agriculture and urbanization in areas to the south of the Ottawa.

Bittern population data from the Forest is limited. Review of on-Forest Breeding Bird Census plots since 1991, indicate that we detect between 1-3 birds each year, with no discernable trends apparent. The Ottawa has 104 BBC plots, established in 1991, which are re-surveyed every year. Note, that in 1996, most BBC plots were not surveyed due to heavy rainfall on the survey dates, hence, no detections of bitterns that year. Even though the periodicity of monitoring required by the Plan is every 5 years (pg. V-13), annual data are needed to detect trends in population in a timely manner.

Figure 4. Detections of American Bitterns
During Annual Breeding Bird Census, 1992-2003



Note: In 1996 most plots were not surveyed due to weather. 2003 appears to be an anomaly.

The Ottawa has established three MIS survey transects specifically for American bitterns, and birds have been detected on the routes annually since 2000. It is too early (3 years of data) to draw any conclusions from these bittern survey results. The intent is to continue to survey these routes annually.

The Forest's bittern population appears to be holding steady, with bitterns being consistently found in suitable habitats across the Forest.

Conclusions and Actions: Though the population data are not as robust for this species as we would like, all indications are that we have good quality habitats across the forest occupied by a stable population of American bitterns. The Ottawa will continue to gather data on this species, with the objective of creating a long-term dataset that can be better used for detecting population

trends. Continuing to monitor the bittern routes annually, coupled with annual BBC data, should provide such a dataset in a couple more years.

The Forest's protection of wetland habitats through project design criteria, coupled with an abundance of suitable habitat, ensures that viability for this species has not and will not be compromised by the levels of timber harvest and other activities implemented on the Forest.

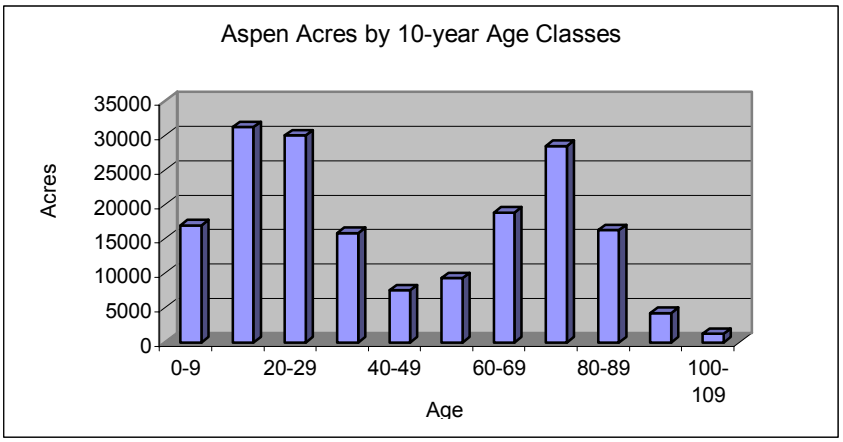
Ruffed Grouse

Background: Ruffed grouse is a highly-prized gamebird in the area that relies largely on aspen habitats in a variety of age classes. Dense, young sapling stands are used for brood rearing, pole stands are needed for cover, and mature aspen provides food, even through the winter, and additional cover. Ruffed grouse represents 12 species of vertebrate wildlife on the Ottawa (Appendix I, Forest Plan FEIS Appendix Volume). Grouse are inherently cyclical in their populations, following a 7-10 year cycle.

Forest Plan Objectives: In the Forest Plan, page IV-39, the long-term objective for this species is to maintain at least 16,000 acres of 0-10 year old aspen/paper birch distributed over managed aspen areas. Over time, this will ensure provision of all age classes of aspen.

Status of Habitat: At this time, the Forest has about 17,000 acres of 0-9 year-old aspen/paper birch types, which exceeds the Plan's objective for ruffed grouse. Due to the advanced age, lack of vigor of the remaining aspen stands, and other reasons such as poor access, location on sensitive or unstable soils, or location in riparian areas where long-lived species are desired for watershed restoration purposes, it is unlikely that a high percentage of these stands can be regenerated to aspen. As part of project planning, the Forest is reviewing these old aspen stands on an individual basis to determine whether the stand can be regenerated to aspen, or whether the stand should succeed to a later-seral forest type. Most of our "third-growth" aspen stands have been regenerated within the last 20-30 years or so, and are not yet of merchantable age or size for another harvest. Figure 5 below displays the amount of aspen in each age group. It is important to note that not all of the acreage displayed in Figure 5 is on sites and within management areas where active timber harvesting may occur. The remaining acreage will continue to succeed naturally to late successional types. An additional effort underway related to Ruffed Grouse is the Cost Share Agreement between the Ruffed Grouse Society and the Ottawa that is discussed on p. 48 under Aspen Management.

Figure 5. Current Acres Of Aspen And Aspen/Birch Forest Types
Ottawa National Forest, By 10-Year Age Classes



Status of Population: Ruffed grouse populations are monitored regularly using standard drumming survey routes. The Ottawa cooperates annually with MDNR to do these routes. Numerous routes occur across the Forest. As a whole, ruffed grouse numbers are highly variable between years, and seem to follow about a 7-10 year cycle. Grouse populations have been declining, having peaked in 1999. Populations appear to be at or near the bottom of the decline and at this time it is unclear when they will rebound.

Conclusions and Actions: Implementation of the Forest Plan has aided this species through regenerating the over-mature aspen stands. Without active forest management, aspen as a forest type would decline significantly on the Forest, and grouse populations would decline correspondingly. The Forest should continue to seek opportunities to regenerate aspen in appropriate locations, and monitor population trends through cooperation with MDNR. Refer also to Aspen Management and discussion on p. 48.

Osprey And Bald Eagle

Background: Since the national ban on DDT (dichloro diphenyl trichlorethane) in 1972, eagles and ospreys have made remarkable strides toward recovery. The banning of DDT and the reduced use of pesticides in the environment has resulted in improved reproductive success across North America. On the Ottawa, the population of eagles has also been rising. The eagle is Federally-listed as "threatened", in addition to being an MIS, while the osprey is a MIS for lakes and open water wetlands. Much effort has been put into improving habitat quality and monitoring these species on the Forest over the past ten years.

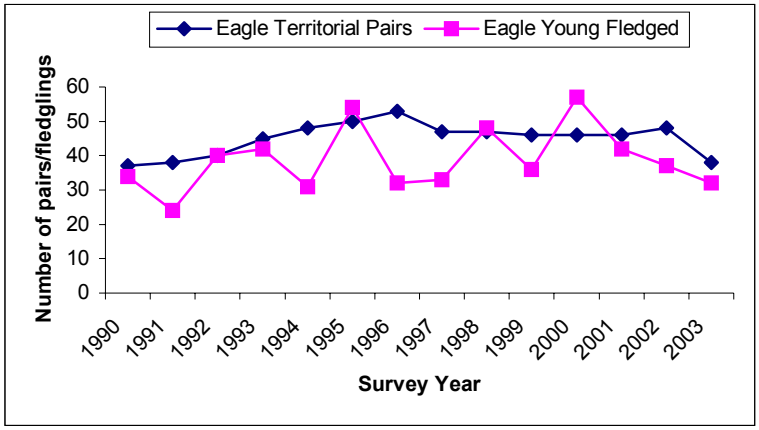
Forest Plan Objectives: The Forest Plan calls for retaining 31 existing (1986) bald eagle breeding areas, and locating and designating 34 additional potential breeding areas that meet the following criteria: free from human disturbance, within 1/2 mile of a lake of at least 200 acres, with supercanopy white pine or yellow birch, and with potential for creation of a deep marsh (Forest Plan, pages IV-38 and IV-39). The Forest Plan goal for total number of eagle territories, thus, is 65 (31 existing plus 34 additional). The Forest Plan goal for osprey nesting pairs on the

Forest is 10 (page IV-38).

Status of Habitat: The additional 34 territories have been delineated across the Forest. Generally, the habitat conditions for eagles and ospreys are continuing to improve across the Forest as supercanopy white pine and other species develop near fish-bearing waters. Active management of fish populations in Ottawa lakes by the Forest and MDNR are ensuring a food supply for these species. The Ottawa develops eagle protection plans around nests that preclude activities that might disturb eagles or alter eagle habitat (Forest Plan, pages IV-41.1 to IV-42).

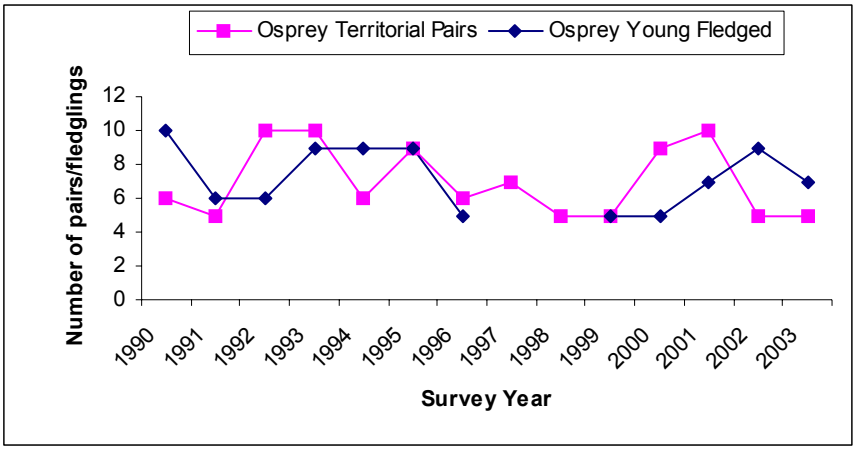
Status of Population: Across North America, both these species are expanding their ranges and increasing in number. This trend is especially evident in the upper Great Lakes region. In fact, the USFWS has proposed de-listing bald eagle in the region since recovery plan goals have been exceeded for many consecutive years. On the Ottawa, some eagles have become year-round residents in the last several years, relying on road-killed deer to survive the winter when lakes are frozen and fish inaccessible. The number of territorial eagle pairs has steadily risen since adoption of the Forest Plan until recently, with a peak of 53 known pairs in 1996; Figure 6, below, contains data from 1990 through 2003. The number of eagle territories remained fairly constant from 1997-2002. Although numbers appear to drop off in 2003 this is not actually the case, it is instead a reflection of survey effort. The Ottawa depends on the MDNR for eagle survey information and during 2003, fewer territories were surveyed than usual. The MDNR does not believe the numbers from 2003 are indicative of an actual decline in numbers.

Figure 6. Eagle Productivity
1990-2003



Another important viability factor is the number of fledglings produced, also addressed by Figure 6. This number varies more dramatically than number of territories, understandably. For example, in 1996, the lower fledgling production was probably the result of a late and cold spring. The lakes were iced over until mid-May, which might have impacted the eagles ability to obtain fish.

Figure 7. Osprey Productivity
1990-2003



NOTE: The data on the number of Osprey young fledged in 1997 and 1998 has been lost, this is reflected above by a break in the line. Additionally, from 1999-2002 the final nest checks were done prior to fledging of young. Therefore, the number of young depicted represents the number of chicks seen during the final nest checks that were conducted.

Five to ten osprey territories have been found and monitored for over a decade (see Figure 7). It appears that the breeding population on the Forest is somewhat stable, with little change seen from year-to-year. The number of fledglings was not monitored from 1999-2002, with the last nest check being conducted prior to fledging. We believe it is likely that most of these chicks fledged successfully, since late-term mortality is typically low in osprey chicks. In 2003 the final checks were completed at fledging, this is planned to be continued in future years.

Colonization of new lakes by ospreys in the western Upper Peninsula has been much slower than eagle colonization. This is due, in part, to the tendency of ospreys to not stray far from their natal territory. If a suitable lake and nest site is not located within several miles of the natal site, it seems the young adult birds will simply not nest. Wisconsin DNR has been constructing artificial nesting platforms for ospreys across the state line in Wisconsin, and has thereby facilitated rapid colonization by ospreys in that area.

Conclusions and Recommendations: The social factors affecting eagles and osprey and loons, which are previously discussed above, are very important when considering their productivity. As human populations increase and as interest increases among people visiting the National Forests, more disturbance occurs to these species. Management activities are designed specifically to protect known eagle and osprey nests (e.g. all activities remain a certain distance from sites, or occur during the non-fledging/nesting seasons). These birds are susceptible to disturbance and will often flush from the nests when people are around. Excessive flushing from the nests can decrease fledgling production.

Another social and physical factor is private development along lakeshores. Both flushing of the eagles and ospreys off the nest or complete removal of potential nesting trees is occurring.

Along many lakes on the Ottawa, private land ownership exists along the lakeshores. This is especially true on many of the larger lakes (>200 acres) that are favored by these species. As more of this land is developed and subdivided, habitat for these species is converted to residential home use.

High deer populations are producing changes in eagle over-wintering strategies as the number of deer/vehicle accidents increase. Deer carcasses have become a food source for eagles, especially in the winter. While feeding on roadside deer carcasses several eagles in recent years have been hit by vehicles. This trend is expected to continue. On the other hand, the high number of deer/vehicle collisions, as well as high deer mortality in harsh winters, can benefit the eagles by providing a food source during the winter and early spring, when other food sources are not readily available.

In conclusion, the Ottawa should continue to monitor territorial pairs of eagles and ospreys annually and continue to include protective design criteria for projects where osprey and eagle nests are in close proximity.

Northern Goshawk

Background: Representing eight other animals (Appendix I, Forest Plan FEIS Appendix Volume), the northern goshawk was selected as a MIS of pole-timber to mature-sized northern hardwood forest habitat.

This large raptor nests in expansive stands of northern hardwood and other mature forests having a closed canopy and open understory. They forage in a variety of habitats where snowshoe hare and ruffed grouse, the primary prey species, occur abundantly. Goshawks also forage in open forests where they can capture other prey such as jays, woodpeckers and small arboreal mammals. Snags, downed logs, openings, large trees, and the interspersion of vegetative structural stages (from grassy areas to old forests) are all important for the prey species utilized by goshawks, from hairy woodpeckers to snowshoe hares.

Goshawk populations tend to fluctuate in relation to the population cycle of its main prey species, particularly ruffed grouse and snowshoe hares. In addition to prey availability, goshawk populations and productivity are influenced from year-to-year by many other factors, such as seasonal weather patterns, nest predation (by great horned owls and fisher, in particular), nest disturbance, and habitat alteration.

In Michigan, the goshawk is a well-dispersed, if uncommon, breeder in the northern two-thirds of the State, and nests occur most often in deciduous trees (aspen, birch, beech, maple) and less so in conifers (white, jack, and red pine). A breeding area may contain several nests, usually no more than a few hundred meters apart. Goshawks have a reputation for fierceness and aggressive behavior toward intruders near the nest.

Forest Plan Objectives: The Forest Plan has identified an objective of maintaining 240,000 acres of pole-sized to mature northern hardwood habitat over the long term to maintain Goshawk population viability. The monitoring frequency for goshawks is once every five years. In

addition to monitoring the amount of suitable habitat, populations are to be monitored for population trends.

Status of Habitat: Currently, approximately 427,000 acres of pole-sized to mature northern hardwood habitat occur on the Ottawa. Some of the 427,000 acres of hardwood stands, however, are lacking certain attributes needed to attract nesting goshawks (such as dense canopy and open understory conditions). This number of hardwood acres should remain relatively stable in the coming decade, and habitat quality should increase gradually as average stand diameters increase, as most pole-sized stands on the forest mature into an uneven-aged structure over time. Selection harvest activities during the first decade of Plan implementation were higher than projected in the plan, the second decade activities have been at a reduced rate and are still within the acres anticipated for harvest during 20 years of Plan implementation. Additionally, the Forest has made great strides towards meeting Forest Plan objectives for classifying old growth during project level decisionmaking. This will serve to improve habitat for goshawks into the future.

In addition to this nesting habitat, the Ottawa is actively managing several other habitat components important for goshawk prey species, including aspen/birch type (for key prey species), old growth, and retention of key habitat elements within managed hardwood stands.

Status of Population: Generally, this species is more abundant in boreal environments, and is at the southern fringe of its range on the Ottawa. As such, this species is uncommon here, and probably always will be.

Much of the Ottawa's suitable goshawk habitat appears to be vacant, though habitat structure and prey abundances seem favorable. For example, in a study conducted in 1996-1999, only 36 confirmed goshawk nests were found across the entire Upper Peninsula (Lapinsky and Bowerman, 2000 Report), with a maximum number of 12 nests confirmed in any one year (1999). This study by no means located all the nesting goshawks in the Upper Peninsula, but the intent was to find and monitor as many as possible. Therefore, it appears that this species remains at a low population level in this area. Lapinsky and Bowerman's study provides the best data on reproductive rates in the area. Total productivity for the 4 years, across the Upper Peninsula, was 1.14 young fledged per monitored nest (n=36), which is less than the 1.7 young per occupied breeding area necessary to maintain a stable population. This rather low rate of reproduction seems to be due, in part, to a high rate of predation, especially by fishers (*Martes pennanti*). Fishers have recovered to the point of abundance in recent years, and appear to be preying on goshawks, and other forest raptors.

Since adoption of the Ottawa Forest Plan, the number of known, active goshawk territories has fluctuated from a minimum of two nesting pairs to a maximum of 14 nesting pairs. These counts are to be viewed as a minimum count on the Forest, (i.e. the population is being underestimated) since surveys of all suitable habitat have never been done. Nests are located either as part of the pre-project surveys (about 11,000 to 13,000 acres surveyed in most years) or during other field work. Therefore, there are undoubtedly additional territories that have not been discovered on the Forest.

On the Ottawa, Forest-wide goshawk populations are monitored on an annual basis. In the past this has been accomplished using standard road survey routes with many routes across the Forest. Not every route wass run every year (the protocol is standardized and on file at each District office on the Ottawa). The number of detections per year has been low, with a high degree of variation from year-to-year. However, the number of detections corresponds somewhat with the number of MIS routes surveyed, thus it appears that the number of goshawk responses per route has been fairly constant from year-to-year.

However, getting an accurate population estimate for a rare species is difficult using this type of call-back survey. Therefore, suitable habitat proposed for timber harvest is surveyed prior to harvesting to ensure active nest areas are not adversely impacted, as mentioned above. Based on all these surveys, collectively, populations appear to be fairly stable, though low, across the Forest. A decision has been made to concentrate survey efforts on these pre-project surveys and monitoring active nests for fledgling success. In 2003, 4 young were fledged from 8 active nests.

The Ottawa has incorporates nest site protection design criteria for projects where goshawks are found or have a potential to be found (i.e. nesting habitat). These criteria are designed to protect known nesting areas and any that are found during project implementation from human disturbance and to maintain optimum habitat conditions in the vicinity of the nest. Monitoring of active nests where these measures have been implemented will continue. To date, there is no evidence of nest abandonment resulting from logging or human disturbance in areas where these criteria are in effect.

Conclusions and Actions: Based on the above, it appears that factors outside the Ottawa National Forest may be having more of an influence on goshawk populations than our management direction. Ample suitable habitat for goshawk nesting appears to be present, but much of it is not being utilized, despite abundant prey numbers (grouse, hares) in some years. Reported low numbers of active goshawk nests in areas surrounding the Ottawa (Eastern U.P., northern Wisconsin) seem to indicate that larger regional factors are probably at work (e.g. fisher predation), rather than local factors affecting only the Ottawa. Finally, because the Ottawa is close to the southern edge of goshawk range, the species may never be abundant here.

It is recommended that the Ottawa continue completing pre-project inventories in suitable habitat and monitoring known, active goshawk territories. These efforts provide more meaningful and accurate productivity data, an important facet of species viability. The nest protection design criteria employed on the Ottawa should continue to be included in projects and refined as needed to ensure they are providing adequate nest protection for active nests where timber management activities are occurring.

As stated above, the increased 1st decade rate of selection harvest of northern hardwoods did not have negative impacts, and had some positive impacts, on goshawk habitat. These effects were within those anticipated during Forest Plan development, and disclosed in the FEIS for the Forest Plan, as the harvest completed was to move the areas towards the desired vegetative conditions for the MAs. The harvest, though an increase in planned acres, was not such an increase as to result in a need to reduce the 20 year harvest reentry cycle stated in the Forest Plan (refer to the

Harvest Cutting Methods and Hardwood Management sections, p. 43-48 for additional discussion).

In addition, the rate of harvest has been reduced during the 2nd decade and is currently only slightly ahead of Forest Plan total projections for 2 decades, but will not exceed the 20 year limitations determined by the 6th Circuit Court of Appeals. Finally, given that the forest currently exceeds that acre objective for goshawk viability, and that nest protections are implemented to prevent disturbance of nesting birds, effects to the northern goshawk are determined to be within those anticipated in the Forest Plan.

Barred Owl

Background: The barred owl uses mature and old growth forest habitats, including hardwoods, pines, hemlock, upland spruce, and swamp conifers. The primary habitat requirement is large cavities for nesting in trees of 20 inches diameter or larger. The barred owl represents 18 different vertebrate species known to occur on the Ottawa (Appendix I, Forest Plan FEIS Appendix Volume).

Forest Plan Objectives: The Forest Plan long-term objective (page IV-39) for the barred owl is to increase available habitat from 147,000 acres to 170,000 acres of mature and old growth hardwoods, red pine, upland spruce, hemlock and swamp conifers.

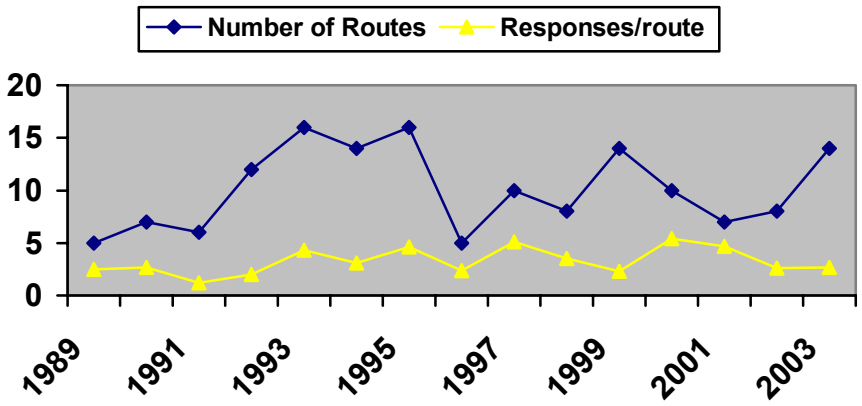
Status of Habitat: According to our CDS data, approximately 243,000 acres of the following forest types are considered suitable barred owl habitat; upland hardwoods (191,000 ac.), lowland conifers (19,100 ac.), hemlock (18,300 ac.), white pine (13,100 ac.), and upland spruce (1,400 ac.).

As described in the Old Growth section of this report (p. 53), about 57,600 acres of forested land have been classified as old growth across the Forest. At this time, however, a high percentage of this classified old growth is lacking one or more characteristics that are desired for old growth (as defined in Table 4.9 p. IV-90 of the Plan, although with time, more of these stands will attain such characteristics). In addition, about 50,000 acres of the Forest are administratively withdrawn from timber production in the Ottawa's three wilderness areas, which currently contribute toward the goal of 170,000 acres. Portions of Wild and Scenic River corridors will eventually contribute toward this objective too, as will on-going classification of old growth during project planning.

Status of Population: Owl survey routes occur across the Forest and many of these routes have been run recently with barred owls, and other owls, responding multiple times on most survey routes.

Based on route results, the species seems to be common, with numerous detections every year. Generally, the number of detections increases with increased survey effort. The most meaningful measure displayed in Figure 9 is the number of owl detections per route surveyed; this measure has varied between 1.2 owls per route and 5.4 owls per route, which should correlate with numbers of breeding pairs of owls along our routes.

Figure 8. Number of Barred Owl Responses and Barred Owl Survey Routes
From 1989-2003



Conclusions and Actions: The Forest Plan's primary habitat objective for barred owls has been exceeded, with about 243,000 acres of suitable forest types in mature (sawlog-sized trees) or old-growth conditions. Across the Forest, barred owls appear to be faring well, with a viable population present. An estimate of total population size across the Forest is not possible at this time.

The Forest should continue to monitor development of old growth and late successional forest structure, as well as monitor populations of this MIS via the annual routes. Even though the periodicity of monitoring required by the Plan is every 5 years, annual data are preferred to detect trends in population in a timely manner.

Evident from the amount of suitable habitat for the barred owl on the Forest and the progress made in classification of old growth the increased 1st decade rate of selection harvest of northern hardwoods did not have negative impacts, and had some positive impacts, on habitat for this species. These effects were within those anticipated during Forest Plan development, and disclosed in the FEIS for the Forest Plan, as the harvest completed was to move the areas towards the desired vegetative conditions for the MAs (refer to the Harvest Cutting Methods and Hardwood Management sections, p. 43-48 for additional discussion). In addition, the rate of harvest has reduced during the 2nd decade and is currently only slightly ahead of Forest Plan total projections for 2 decades, but will not exceed the 20 year limitations determined by the 6th Circuit Court of Appeals. Therefore current timber harvest levels are not reducing the amount of suitable habitat for this species nor, as can be seen from a relatively steady number of responses received per survey route, are they negatively impacting its numbers.

Blackburnian Warbler

Background: Blackburnian warblers nest in the upper canopy of mature coniferous forests and mixed forests with a heavy conifer component. They are neotropical migrant songbirds that spend half their time off the Ottawa, in Central America. While here on the Ottawa, they are

rather specific in their habitat requirements, are relatively easy to survey for, and thus lend themselves well to being indicators for a number of vertebrates that use dense, mature, conifer stands. They represent 39 other species, primarily other birds (Appendix I, Forest Plan FEIS Appendix Volume).

Forest Plan Objectives: The long-term Forest Plan objective, on page IV-39, is to maintain at least 40,000 acres of pole-sized to mature hemlock and swamp conifer forest.

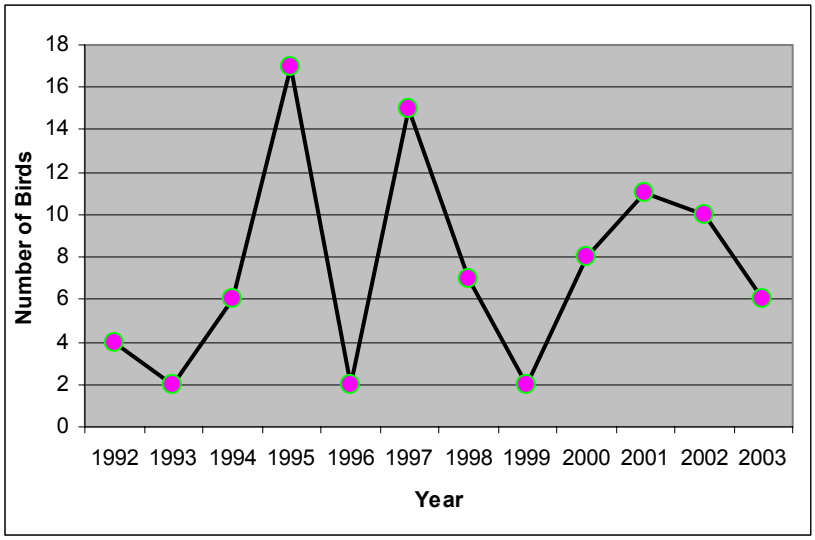
Status of Habitat: Current information indicates that the Forest exceeds this objective, with about 93,540 acres of these habitats. The Forest generally does not actively manage hemlock stands or lowland conifer stands for timber production. These forest types are left to natural succession processes, and therefore, they are becoming denser, and later successional in their character.

As a consequence of high deer densities over the Ottawa, there has been little or no recruitment of hemlock or cedar into these stands' understories for a decade or more. Therefore, the long-term viability of these forest types is a concern, due to the number of species dependent on these forest types. Cedar and hemlock, the tree species in question, are very long-lived, so their loss is not imminent, but it may become more of an issue in the future.

Status of Population: Blackburnian warblers are among the species monitored annually using the Ottawa Breeding Bird Census (BBC). Each year in early June, the same 104 BBC plots are surveyed during this census. Even though the periodicity of monitoring required by the Plan is every 5 years (pg. V-13), annual data are preferred to detect trends in population in a timely manner.

Census sightings of this species from 1992-2003 indicate populations are present on the Forest every year (Figure 10), with a wide latitude in the number detected from year to year. Note that in 1996, when only 2 birds were detected, most BBC plots were not monitored due to heavy rain.

Figure 9. Survey Detections of Blackburnian Warblers
Detected During the Annual Breeding Bird Census Plots
Ottawa National Forest, 1992-2003



In 2000, the Forest established standardized survey routes for this species, one each on the Bessemer, Kenton and Watersmeet Districts. Blackburnians have been detected each year on each of these routes. These 3 routes are monitored on an annual basis. It is unlikely that the Forest's management actions are having any direct effects on this species, since hemlock and lowland conifer forest types are seldom managed for timber production.

Conclusions and Actions: It appears that the Ottawa has a healthy population of blackburnian warblers, and the species can be heard and seen in suitable conifer stands across the Forest. An increase in the mid-90's is suggested by the figure above with the exception of 1996, with a decline and slow recovery suggested in the late 1990's into 2003. As with all neotropical songbirds, problems encountered during migration or on the wintering grounds can cause reductions in populations unrelated to Forest activities. This is especially true since (as noted previously) the Ottawa generally does not actively manage this species' habitat for timber and protection measures for riparian areas and wetlands are incorporated into all projects.

The Ottawa should continue to survey the BBC plots on an annual basis. Finally, the Forest should continue to seek opportunities to recruit new age classes of suitable conifer forest types, especially hemlock and lowland conifer forest types.

Brook Trout

Background: Brook trout prefer rivers and streams with clear, cold water, a silt-free rocky substrate in riffle areas, a pool-to-riffle ratio of about 1:1 with areas of slow, deep water, well-vegetated stream banks, plenty of in-stream cover, and relatively stable water flow, temperature regimes, and stream banks. In terms of habitat, brook trout represent 33 other species of aquatic vertebrates on the Ottawa (Appendix I, Forest Plan FEIS Appendix Volume).

Forest Plan Objective: The Forest Plan objective, on page IV-39, is to maintain 1,200 miles of cool-water streams.

Status of Habitat: Efforts have been made to restore streams that were degraded primarily by the logging era at the turn of the 20th century. Brook trout habitat has been improved by each of the following measures: removal of beaver dams, construction of spawning riffles, construction of sediment basins which remove sand, placement of Hoff logs, stream-bank stabilization with logs and stone, placement of brush bundles and channel restoration using sky boom structures. In all, 171.5 miles of stream improvement and 76 structures have been accomplished. These efforts were supported by 234 miles of stream inventory which includes both habitat mapping (basin-wide inventory) and direct sampling of fish populations. In addition, design criteria to protect riparian areas are incorporated into all vegetation management projects to protect and enhance riparian structure and function.

Status of Population: Brook trout populations vary between stream systems. In some stream systems they are stable or declining, while in systems where restoration efforts have been implemented, they are increasing. Table 4 shows the before (2000) and after (2001 - 2003) results of stream improvements on Cooks Run, a stream that had been greatly modified by an old splash dam and log drives over a century ago. There have also been changes in bag limits and minimum size requirements recently that have potential to impact the brook trout fishery.

Table 4. Brook Trout and Brown Trout Parameters at Cooks Run
Before and After Stream Improvements

Species	Station*	Date	Average Length	No./Acre	Lb./Acre
Brook	Skyboom (2)	2000	3.6	358	17.4
	Skyboom (2)	2001	3.4	533	17.7
	Skyboom (2)	2002	4.1	684	35.3
	Skyboom (1)	2003	3.58	401	17.6
Brown	Skyboom (2)	2000	5.5	824	76.5
	Skyboom (2)	2001	6.1	709	104.3
	Skyboom (2)	2002	6.4	736	279
	Skyboom (2)	2003	4.74	560	216

*The number in the parentheses represents the number of survey points data was gathered at and averaged to provide information.

In general we have demonstrated an increase in the population and size of the fish through this habitat restoration work. The 2003 data for brook trout only contains data from one survey point which explains why the numbers are a bit lower. The other data points are all averages of population and size of fish from two data points. This is a result of improved habitat for large fish in general, with the more aggressive brown trout (also less susceptible to the greatly increased fishing pressure here) benefiting more than the brook trout. Using these same techniques in colder water (although Cooks Run is about as cold as we find on the Ottawa) might

permit targeting brook trout for habitat and fish size improvements. Nevertheless, more brook trout are being caught and enjoyed by fishermen at Cooks Run since the restoration effort, and the opportunities for quality brown trout fishing are outstanding, again, even under heavy fishing pressure.

Conclusions and Recommendations: Riparian design criteria for projects ensure that timber harvest activities do no negatively impact trout habitat. We should continue to implement these design criteria during project implementation and monitor their effectiveness to protect, enhance and restore riparian habitats' structures and functions. Establish "reference reaches" from selected streams that are independent of stream restoration projects, i.e., reaches that are solely responding to riparian management actions and which are not related to direct stream habitat improvement actions. Continue to monitor all stream habitat restoration projects and their apparent impact on brook trout.

Smallmouth Bass

Background: Smallmouth bass are indicators for lakes that have clear water and sediment-free rocky bottoms. In a riverine system, smallmouth bass have requirements very similar to brook trout (described above), except that they tolerate warmer water temperatures. They represent 15 other fish species on the Ottawa. (Forest Plan FEIS App I)

Forest Plan Objectives: The Forest Plan objective for smallmouth bass, relative to riverine habitat, is to maintain about 355 miles of rivers greater than 35 feet wide that are cool and clear, with abundant shade and cover, deep pools, moderate current, and gravel or rubble substrate. In lakes, the Forest Plan objective is to maintain suitable smallmouth bass spawning and feeding habitat in 38,000 acres of mesotrophic lakes that are deep and clear, of moderate productivity with extensive gravel or rubble shoals, sunken logs in near-shore areas, and pH of 5.7+ for reproduction.

Status of Habitat and Population: On the Ottawa, it appears that smallmouth bass populations are stable, or perhaps increasing, due largely to changes in the minimum size anglers are permitted to keep under State of Michigan fishing regulations. This may lead to reduced harvest, but greater age and size in the population. Six lakes, totaling 1,373 acres, have received large woody debris to improve spawning habitat for smallmouth bass. Habitat has been improved by adding large woody debris as both traditional "cribs" which are log-cabin like structures, and as Hoff logs which are specifically designed to provide nesting cover for smallmouth bass on appropriate bottoms (gravel, 5-15 feet deep). Liming of James Lake improved the chemical environment enough to result in increased natural reproduction of smallmouth bass. Of the over 500 lakes on the Ottawa, we have survey data indicating only 19 lakes totaling 22,151 acres currently contain smallmouth bass.

The Forest Plan goal of 38,000 acres is about 1.7 times greater, and 15,000 acres more than what can be considered good smallmouth bass waters. Smallmouth, rarely do well in small lakes, and even more rarely in small lakes with an organic or sand bottom. Vegetation management on the Ottawa does not occur in a manner to directly, indirectly or cumulatively impact this species or its habitat, as a result of the riparian design criteria included in all projects.

Table 5. Summary of Smallmouth Bass Surveys
Ottawa National Forest 1992-2003

Lake	Date	Acreage	Electroshock (Fish/hr)	Fyke Netting (Fish/# nets)	Gill Netting (Fish/# nets)	Average Length (in)
Beatons	5/19 – 5/24/99	323		0.42		5.22
	5/30 - 6/2/ 00	323		1.19		5.46
	4/30 - 5/4/01	323		0.16		12.07
	5/17 2001	323	10.33			8.95
Bob	6/26 – 6/29/00	133		1.13		6.24
	6/18 – 6/21/01	133		0.96		8.74
Bond Falls	6/17 – 6/20/95	2118		0.08		9.50
	6/14 –6/17/99	2118		0.33		6.67
	9/7/99	2118	1.50			8.60
Cisco	9/28/98	506	3.33			15.80
	10/16/00	506	9.00			12.30
Clark	6/7/94	820		0.50		13.13
	5/22 – 5/27/00	820		1.30		12.56
	10/4 – 10/6/00	820		0.70	1.56	15.87
Langford	5/9 – 5/12/95	470		0.17		17.30
	6/26 – 6/30/00	470		0.46		6.45
Marion	5/12 – 5/14/92	317		4.25		10.40
	4/22 – 4/24/98	317		3.44		12.10
	7/9 – 7/12/01	317		3.53		5.65
Ottawa	9/24/99	550	2.50			4.17
	6/25 – 6/28/01	550		3.57		8.42
	7/15/03	550	1.5			6.75
Taylor	5/27 – 5/28/92	110		0.75		8.80
	6/24 – 6/28/96	110		0.16		12.10
	7/16 – 7/19/01	110		0.17		9.00

Table 5 shows a sample of summary results of sampling smallmouth bass in nine lakes over the last decade. Much of the variation displayed can be explained by the dates of sampling, with spring generally being the best time to sample using fyke nets. Average length of smallmouth bass in these lakes, appears relatively stable and varies more between lakes than between dates in any one lake. Stability is the key trait here with all of these lake samples remaining similar within a single lake and across the years.

One of the most interesting aspects of smallmouth bass management on the Ottawa is their interaction with walleye. Walleye have been a major focus of management by both the Ottawa improving habitat and the MDNR stocking fingerlings for the last two decades. Both walleye and smallmouth bass share a common habitat element, rocky shorelines. Walleye utilize

shallow, rock-rubble shoreline for spawning, while smallmouth bass utilize these shorelines more for feeding, particularly on crayfish.

Studies by the University of Notre Dame have shown that walleye consume very few crayfish, while smallmouth bass, and some other species like yellow perch eat crayfish, including young of the invasive rusty crayfish. It appears that in some lakes smallmouth may be competing poorly with walleye, whereas in others, such as Whitefish Lake where smallmouth bass are protected from fishermen harvest, the two species are quite compatible. Where rusty crayfish occur with smallmouth bass, habitat in general has declined because of the devastating effects rusty crayfish have had on aquatic vegetation, particularly Lake Ottawa and to a lesser degree (because it is a reservoir with generally poor weed beds to begin with) Bond Falls Flowage. The apparent increase in average size of smallmouth bass at Lake Ottawa is an encouraging sign.

Finally, monitoring of the Sylvania Wilderness fisheries gives an idea of what regulation of harvest can have on smallmouth bass populations. The report by Miller (1992) shows that fishing pressure is high in the Sylvania Lakes despite the no-kill bass regulations. Total visitors to the lakes in Sylvania, a very high percentage of which are fishermen, ranged from 45,000-52,000 visitors during the period of creel census 1989-1991. Clark, Loon, Crooked, and Deer Island Lakes sustain most of the fishing pressure.

Catch rates for smallmouth bass in these four lakes ranged from .22 to .71 bass per hour. Length distribution for smallmouth bass in Crooked, Clark, and Deer Island showed a very high number of large bass relative to non-wilderness waters. Forty-four %, of 626 smallmouth bass over 15" were reported caught (and released) from these three lakes in 1989 and 1991. Twenty-two of these bass (3.5%) were over 20" long, and two were over 22" long. (Note, special no-kill regulations were implemented on these lakes in 1975.)

Results of Sylvania Wilderness lakes smallmouth sampling, when compared to smallmouth populations in lakes outside the wilderness show that in general, the protected smallmouth of Sylvania Lakes grow to much larger sizes and are more numerous as well. Aside from the attractive wilderness camping setting, the excellent bass fishing opportunities in Sylvania are very much a part of what brings visitors to these lakes.

Conclusions and Recommendations: Habitat improvements, particularly woody debris, have been effective to support naturally reproducing populations of smallmouth bass and should be continued. Lakes with both smallmouth bass and walleye should be monitored regarding the interaction between these two species. It appears that large lakes, especially large productive lakes like Lake Gogebic, Whitefish (Sylvania), and Bond-Falls Flowage can sustain mixed populations of both walleye and smallmouth bass, whereas, smaller less productive lakes may be forage-limited resulting in walleye quickly out-competing and replacing the smallmouth (personal communication, Vern Nurenberg, MDNR). In lakes that have smallmouth bass, walleye, and rusty crayfish, the results from Whitefish Lake (no kill regulation for bass, high minimum size for walleye) should be considered. That is, by protecting smallmouth bass from fishing mortality, and suppressing the number of small walleye (which are the biggest factor in suppressing smallmouth bass) it may be possible to keep mortality for rusty crayfish (from large smallmouth bass) high, and thus lower the number of rusty crayfish.

Northern Pike

Background: Northern pike were selected as the indicator species for those lakes that have marshy edges and relatively warmer waters than those for smallmouth bass. A crucial feature for self-sustaining pike populations is to maintain shoreline marshes or access to inlet and outlet streams with suitable marshy spawning and rearing habitat. They represent 24 other vertebrate species on the Ottawa, including many amphibians. Northern pike are widely distributed on the Ottawa, and are often found in small marshy lakes. Along with white suckers, yellow perch, and mud-minnows, pike are among the "original" fish fauna of these lakes. They are a circum boreal species and are characteristic of the Great Lakes and Hudson Bay basins lakes, and to a lesser degree, their streams.

Forest Plan Objectives: Forest Plan Objectives (page IV-40 of Forest Plan) are to maintain at least 41,000 acres of mesotrophic and eutrophic lakes, and about 108 miles of warm-water streams, access to spawning marshes, and large populations of white suckers (preferred prey). Pike are a highly favored species for bald eagles and osprey. These two birds of prey also favor an associated fish, the white sucker, which is the principal diet of northern pike.

Status of Habitat and Population: Northern pike populations are stable or increasing on the Ottawa, mainly because the MDNR and the Ottawa have managed the fishery to balance predator and prey populations in lakes, and because MDNR increased the minimum size limit on pike in 1993 (to ≥24", with a maximum daily limit of 2 fish). The management goal is to increase the number of large fish in suitable habitat. No habitat improvement has been done on the Ottawa directed at northern pike for many reasons. Pike are not as desired a species. Recent regulation changes have resulted in more protection of pike, and somewhat bigger fish, but really attractive sizes to most anglers are rare. However, pike, and the associated fish species, white suckers, are preferred prey of osprey and eagles. Table 6 shows the results of surveys on four very typical Ottawa pike lakes. These shallow, weedy lakes, not unexpectedly are also the home to four nesting eagle pairs that have been very successful in producing young eagles over the last twenty-plus years.

Table 6. Results of Northern Pike Sampling
Four Lakes Between 1981-2001

Lake	Year	Catch per Net Night	Mean length in
Presque Isle Flowage	2000	1.2	18.2
	1996	4.3	21.5
	1986	1.2	21
	1984	1.1	17.8
	1981	2.5	18
Pomeroy	2001	0.1	20.1
	1991	0.5	18
	1988	0.6	26.6
	1985	0.1	25.5
Langford	2000	0.5	22.6
	1995	8.7	23.1

Lake	Year	Catch per Net Night	Mean length in
	1990	0.7	21.4
	1989	3.2	21.8
	1986	0.7	20.2
Perch	2001	0.6	19
	1998	2.7	16.2
	1996	1.8	17.6
	1983	2	17.9

These results illustrate the substantial stability of pike populations in these lakes. Average size is around 20" despite the increase in minimum size from 20" to 24" in 1993. However, growth rate for pike varies greatly depending on a waterbody's productivity, and recent changes in pike regulations adjusting for this difference in growth rates has been incorporated into the 2002 and future Michigan pike regulations (personal communication, Vern Nurenberg).

Maintenance of viable beaver populations in lakes that have pike may be one of the most effective management practices. This has been attempted by maintaining aspen where aspen exists, particularly near the outlet of lakes. A surprisingly high percentage of the lakes on the Ottawa have their lake level determined by the activity of beavers in or just downstream from where the outlet stream leaves the lake. When a beaver dam regulates the water level, there is a cycle of high spring water that floods ideal pike spawning habitat (grassy marshes). In late summer the water recedes rejuvenating the marsh. Also, occasionally the dam is not maintained by the beaver, and/or goes out completely. This event, complete dewatering of the marsh and shoreline in general, is good for the entire lake ecology through oxidation of accumulated organic substrates in shallow water areas and re-growth of marsh grass. In addition, where productivity and pike growth rates are appropriate, we should support increases in the size limit for pike, and reductions in creel limits (1 fish over the maximum length for a protected slot, etc.). Michigan DNR is open to these adjustments as evidence by recent pike regulation changes.

As with the smallmouth bass and brook trout, vegetation management on the Ottawa does not occur within the northern pike's habitat or in such a way as to negatively impact the species or its habitat.

Conclusions and Actions: The importance of Northern pike, white suckers, and bullheads to eagles and ospreys as food should be considered when making fisheries management prescriptions. This should not preclude population reductions in these species where appropriate, but the impact on fish eating birds should be considered.

Literature Cited:

Hoff, M.H.1991. Effects of increased nesting cover on nesting reproduction of smallmouth in Northern Wisconsin lakes. First International Smallmouth Bass Symposium, 1991, pp. 39-43.

Miller, B.R. 1992. Results of voluntary catch surveys on Sylvania Lakes in 1989 and 1991. Michigan DNR Technical Report No. 92-7.

BOTANY

Rare Plants

Forest Plan Objectives: The Forest Plan lists a Forest-wide management goal for wildlife resources (p. IV-11) as "Protect and enhance habitat for endangered and threatened, and sensitive plant and wildlife species." Further direction is provided in Amendment 2 (p. IV-44), which lists the following items as key components for the rare plant program:

- Identification of sites;
- Protection of individuals;
- Providing habitat for expansion;
- Documentation of effects in biological evaluations;
- Preparation of a TES plant field guide;
- Consideration of rare plants in land adjustments;
- Discussions with MDNR regarding deer population levels and associated effects on understory plants;
- Field inventories based on ECS and project type;
- Managing sites;
- Monitoring known sites and
- Updating TES lists.

Accomplishments: Sites are identified during project surveys (i.e. timber sales, road construction, culvert replacement, fisheries habitat enhancement, and special uses) and focused searches (i.e. lake inventories), and occasionally from information provided by botanists, not on the Ottawa staff, visiting the Forest. Most Forest projects are surveyed for rare plants by Forest staff or qualified contractors, with survey intensity and need determined by project types and habitats (see Table 7 for a summary of rare plant survey accomplishments for 2002 and 2003). Protection of individual populations, and provision for expansion, is addressed during project environmental analysis; populations occurring in areas where no management activities are proposed are generally considered protected. A biological evaluation (BE) is prepared for nearly all projects occurring on the Forest, assessing the risks of the project alternatives on federally listed plant and animal species. Thirty or more BEs are completed annually, with shorter formats used for lower risk projects.

A draft rare plant field guide was produced in the mid-1990's and some updates have subsequently been made to correspond with additions to the list. A few sites (5-10) are revisited for monitoring purposes annually but the Ottawa does not have an organized element occurrence-monitoring program for already identified and protected sites. The RFSS List is revised periodically, with the last major revision occurring in February 2000.

Table 7. Rare Plant Survey Accomplishments

	2002	2003
Rare plant sites located*	30	13
Approx. acres surveyed at least once	23,348	19,845

*Includes state listed and Regional Forester's Sensitive Species list in place at the time of discovery; see table below for details.

Interpretation: Most objectives of the Forest Plan are met with our on-going botany program. We are locating populations and designing ways to protect them while providing for multiple uses on the Forest. Site information is shared with other land managers to enhance our collective knowledge of species needs and distribution. New information results in plant species moving on and off the RFSS List. More information is needed for some rare plants regarding their habitat needs and specific ecology, and ways to best ensure their viability. Nonvascular plants (mosses, liverworts, lichens), in particular, need further attention on the Forest.

Pre-project surveys and resulting protection measures for rare plants during project implementation continue to ensure that negative impacts are prevented or kept to a minimum.

Non-Native Invasive Plants

Forest Plan Direction: This topic is not addressed in the Plan except indirectly, where the Plan speaks to maintaining biological variety and habitat for wildlife, protecting rare plant sites and wetlands, providing a natural appearance of the landscape, using native grasses to reseed landings, and limiting use of chemicals for vegetation management purposes. Region 9 began a new program addressing exotic weeds in FY 97. Since 1999, the Forest has been assigned an annual target for weed control.

Accomplishments:

Surveys for NNIP were conducted during the same rare plant surveys noted above, and also at several lake access areas on the Forest. Treatment information from 1997-2003 are displayed in Table 8.

Table 8. Non-Native Invasive Plants Accomplishments

Year	Target (acres)	Accomplished (acres)	Species Controlled
1997	0	0	--
1998	0	1	Japanese knotweed, purple loosestrife
1999	10	10	Spotted knapweed, Japanese knotweed, giant knotweed, exotic bush honeysuckles, purple loosestrife
2000	40	40	Giant knotweed, spotted knapweed, burdock, Canada and bull thistles, purple loosestrife

Year	Target (acres)	Accomplished (acres)	Species Controlled
2001	30	30	Japanese knotweed, giant knotweed, purple loosestrife, sweet clover, reed canary grass, tansy, alfalfa (Also, Eurasian watermilfoil was treated by a lake association on a lake within the Forest boundary)
2002	68	68	Burdock, garlic mustard, giant knotweed, exotic bush honeysuckles, Japanese knotweed, leafy spurge, purple loosestrife, spotted knapweed, Japanese barberry, glossy and common buckthorns. All manual/mechanical treatments.
2003	68	68 also 44 acres toward wildlife habitat enhancement target	Garlic mustard, spotted knapweed, crown vetch, dames' rocket, purple loosestrife, burdock, Eurasian watermilfoil, Japanese barberry, glossy and common buckthorns, exotic bush honeysuckles, leafy spurge, giant knotweed. Mostly manual/mechanical. Glyphosate used against glossy buckthorn at one infestation.

We also provide education and consultation on weed identification and management to Forest employees and the public. In addition, we received a grant to produce an education public service announcement in 2002 from MDNR. The public service announcement, about Eurasian watermilfoil was played on local television stations during the summer of 2003. Work towards a forestwide NNIP control project was also begun in 2003. Finally as NNIP are identified during project planning we incorporate feasible control measures.

Interpretation: The invasive species issue is receiving increasing attention at national, regional, and local scales. Invasive species cross boundaries and have huge economic and social effects, which are only recently being understood and considered. A number of groups and federal, state, and tribal governments in Michigan and the Michigan-Wisconsin north woods area have recently chartered interagency invasive plant councils. While the Ottawa is meeting the annual weed control target, we do not yet have detailed information on distribution of invasive plants (or animals) across the Forest or a comprehensive strategy to address the problem. Weed control methods are limited to mainly manual control. Limited preventative steps are implemented to control weeds.

VEGETATION - TIMBER RESOURCE

Vegetation Management Accomplishment Summary: The Ottawa has a total National Forest acreage of approximately 989,000 acres.

Since 1950, the acreage of hardwoods and spruce-fir has increased and the acreage of aspen-birch forest has decreased.

The Ottawa National Forest lands represent about 19 % of the forested lands in the Western Upper Peninsula, and accounts for about 15 % of the removals. In other words about 15 % of the volume harvested in the Western Upper Peninsula comes from the Ottawa.

The Ottawa is predominantly a young, second growth forest that continues to grow and mature. The average age is 60-70 years, however the older age classes are increasing and the intermediate age classes are decreasing in acreage. Currently, the Ottawa is harvesting approximately 50 % of the net growth, mortality is about equal to harvest, and the long-term sustained yield capacity is approximately 2.4 times the current level of harvest.

Commercial timber sales are an important tool designed to not only provide raw material for wood products, but to meet a variety of resource objectives as identified in the Forest Plan. Most obvious is management of the vegetation to improve the diversity of wildlife habitat conditions and maintain healthy, sustainable forest ecosystems.

Many timber sales on the Ottawa are investments in improving young stands for future timber and non-timber benefits. Those sales produce lower value pulpwood products now in the initial thinning or improvement cuts, but will yield high quality and high value products in the future (10-20 years and beyond).

The Ottawa treats about 1.2% of the forest annually (about 11,000 –13,000 acres) through the commercial timber sale activity. Less than 20% of harvested acres (about 0.2% of the Forest annually) are clearcut. The balance is partial cuts such as thinning, selection and improvement cuts. Over the seventeen-year period the total acres of harvest has been at about 85% of Plan level, but based on project-level site assessments, more emphasis has been on selection/improvement cuts and less on clearcutting and shelterwood harvest methods.

The acres that are clearcut are primarily in short lived, early successional species such as jack pine and aspen forests. All harvest, including clearcut, are carefully designed and administered following the Forest Plan standards and guidelines, and the site-specific environmental analysis for the individual project. These site-specific analyses are developed by an Interdisciplinary Team (IDT) to consider the potential impact on all resources.

The silvicultural objectives for northern hardwoods have placed an increased emphasis on uneven-aged management. Although the Forest Plan directs 60% of the hardwood to be managed uneven-aged and 40% even-aged, the actual implementation has favored uneven-aged management much more heavily. The actual mix is approximately 83% uneven-aged based upon the objectives for stands being treated. This shift in emphasis also has occurred in many of the MAs across the Forest (See Hardwood Management section).

The timber sale program also helps build and maintain our forest road system and manages access to National Forest System lands consistent with other resource objectives. An analysis of roads is completed at the project level to determine what roads are needed, and to what standard they will be maintained. To the extent possible, these objectives are carried out through the timber sale contract.

The Ottawa is dealing with a large acreage of overmature aspen that is being impacted by a disease that causes heart rot, loss of merchantability, loss in value, and eventually leads to tree mortality. (See Aspen Management section).

The Ottawa has an ongoing salvage sale program that represents 15-20% of the total timber sale program on the Forest. The current emphasis of the salvage sale program is to treat and salvage dead and dying stands of overmature jack pine that also present an increased fuel hazard and fire risk. Salvage sales allow the treatment of these stands to salvage the timber, regenerate the stands, and reduce fuel hazard and fire risk.

A number of goals were developed in the Forest Plan dealing with the vegetation management problem important to both timber and wildlife concerns these are found in the Forest Plan p. IV-2 through IV-4.

Harvest Cutting Methods

Forest Plan Goals: One of the intents of the Forest Plan is to utilize a mix of appropriate harvest cutting methods, including clearcutting where it has been determined to be the optimum method.

The Forest Plan also provides direction on the size and dispersion of temporary openings. On the Ottawa, the maximum size of temporary openings created through even-aged regeneration harvest is not to exceed 40 acres, as required in 36 CFR 219 (1982 version). Exceptions can be made when appropriate rationale has been developed and the regional forester reviews the project.

Accomplishments: The acres of timber sold, by method of cut accomplished in prior years of Forest Plan implementation are shown in Table 9, compared to levels projected in the Forest Plan.

Table 9. Timber Sold By Methods of Cut
FY 1987-2003

Method of Harvest	*Forest Plan Level Decade 1	*Forest Plan Level Decade 2	Decade 1 Average (FY 1987-1996)	FY 2002	FY 2003	Decade 2 Average (1997-2003)	17-year Average (1987-2003)
Clearcut	4860	4300	2687	187	1753	1015	2005
Shelterwood seed cut	1210	1050	383	0	0	162	292
Shelterwood removal cut	260	1210	40	0	0	203	107
Other removal	80	280	237	53	0	133	194
Selection Improvement	3800	7000	7068	3325	3149	4461	5919
Thinning	2900	3300	3173	1083	927	1314	2565
TOTALS	**13,110**	**17,140**	**13,588**	**4648**	**5829**	**7289**	**11,082**

*Forest Plan levels are in terms of annual average acreage of harvest by method, by decade. Decade 1 is for the period FY 1987-1996, and Decade 2 represents 1997-2006.

Interpretation: The annual average of total acres of timber sold is below levels projected in the Forest Plan for the first and second decade. An emphasis on hardwood selection/improvement

type timber sales and reduced emphasis on clearcutting and regeneration of aspen and jack pine compared to Forest Plan levels is evident.

The hardwood sales involve primarily selection cuts, improvement cuts, and thinning. At this stage of development of our young second growth hardwood stands, the volume per acre is relatively low in comparison to other harvest methods. Approximately 2,000 acres of jack pine were also thinned rather than clearcut, to address site specific concerns such as visual quality, wildlife habitat and fuels reduction. This resulted in fewer acres of clearcutting, and more acres of thinning in some management areas. Most of this occurred in Management Areas 4.1 and 4.2.

The average acres of clearcutting, shelterwood seed cutting, and shelterwood removal cutting sold during the seventeen-year period are all substantially lower than the estimated levels in the Forest Plan. These are the harvest methods that yield the highest timber volumes per acre while still managing other resource objectives and social needs.

However, some increases are expected to deal with concerns of high risk and overmature aspen and jack pine stands due to increasing insect and disease problems. The acreage of selection cutting has continued at higher levels than estimated due to greater emphasis on uneven-aged management of hardwoods. This emphasis has been based on on-the-ground assessments of stand conditions during project planning activities. We anticipate shelterwood harvest will continue, but at levels well below the level projected in the Forest Plan. With the higher volume per acre yields in future years, we also expect a reduction in the total acres sold per unit of volume in comparison to the levels over the past seventeen years.

The acreage of clearcut harvest has been reduced on the Ottawa throughout Plan implementation, particularly over the past four to five years. The acres of clearcutting were only about 19% of Forest Plan level over the past 2 years (FY02-03). Clearcutting was projected to decline in the second decade, but not to the extent it has.

The Forest Plan included clearcut harvest for 36% of the total projected harvest acreage. Actual acres of clearcutting has been 18% of the total acres harvested.

The Forest has emphasized uneven-aged management of northern hardwood since implementation of the Plan began 17 years ago. Of the acres of hardwood sales sold in the last 5 years, 88% were reported as uneven-aged harvest methods and 12% even-aged harvest methods.

Due to the emphasis on uneven-aged management, the total acreage of selection harvest was higher than projected for the first decade of Forest Plan implementation, but has been slightly under second decade projections. During Forest Plan implementation, the acreage of selection harvest has been nearly 5,920 acres annually, compared to the Forest Plan levels of 3,800 acres in the first decade and 7,000 acres in the second decade (Ref. Forest Plan Table 4.7).

Acres of selection harvest are currently slightly ahead of Forest Plan estimated level, the overall acres sold are approximately 92% of Forest Plan estimates. The higher rate of selection harvest in the first decade reflected a more rapid trend toward management of the hardwood type to

reach the Desired Future Condition (DFC) in the Forest Plan. Since the rate has slowed during the second decade we have somewhat offset the higher rate during the first decade.

The average of approximately 5,920 acres per year of selection harvest that has occurred on the Forest, which is between the first and second decade projections, is consistent with the Forest Plan direction for maintaining 165,000 acres of uneven aged hardwoods on about a 20-year cutting cycle.

Plan projections for the third decade for selection harvest are 8,000 acres. These projections reflect the plan to manage 165,000 acres of uneven-aged hardwoods on about a 20-year cutting cycle.

Conclusion: Based on seventeen years of implementation, there has been some deviation from the Forest Plan estimated harvest in terms of the mix of harvest cutting methods.

The trends include less clearcutting and shelterwood harvest than in the Forest Plan and more selection/improvement cutting.

With the high risk situation of natural succession in our old aspen stands, the use of clearcutting and shelterwood harvest may increase somewhat, but will not approach Forest Plan levels. Aspen management is discussed in more detail later in this report (p. 49). The emphasis on selection and improvement cutting is expected to continue although we will stay within the levels projected in the Forest Plan for this type of harvest.

We will continue to monitor our choice of harvest cutting methods implementation against the Forest Plan direction and ensure that Forest Plan harvest projections through two decades are followed.

Within clearcut stands residual trees are often retained to provide wildlife or visual benefits. Tree species, such as northern red oak, black cherry, or conifer species, such as white pine, white spruce or balsam fir may be restored in aspen or jack pine clearcuts. The amount of residual is limited to assure that adequate sunlight reaches the ground to accommodate the regeneration objectives.

Hardwood Management

Forest Plan Goals: The intent of the Plan is to manage the northern hardwood type under a mixture of uneven-aged and even-aged management. The option to manage hardwood stands even-aged or uneven-aged, allows the silvicultural system to be matched to the ecological unit, vegetative condition, wildlife, or visual objective.

Forest-wide, the mix planned is 60% uneven-aged and 40% even-aged. This mix varies widely by MA, some emphasizing uneven-aged management and others emphasizing even-aged management. Uneven-aged management is to be featured Forest-wide with a particular emphasis in areas of high visual resource sensitivity, areas managed for semi-primitive recreation opportunities, and for production of high quality hardwood sawtimber and veneer. On

the other hand, even-aged management of northern hardwoods will be used to increase the composition of mid-tolerant species and to provide age class diversity in the hardwood type.

Accomplishments: Stand Data Bases are being used to monitor the mix of long-term silvicultural system objectives within the northern hardwood type. The long-term silvicultural objective (even-aged or uneven-aged management), is indicated for each hardwood stand with cut or sell accomplishments. The decision of what prescription would be implemented is made during site-specific project analysis incorporating Forest Plan direction.

To date, about 68% of the suitable and tentatively suitable hardwood stands have been classified in terms of what silvicultural system they will be managed under. Table 10 below, shows a breakdown of the acres and % of hardwood stands planned for even-aged and uneven-aged management, the total (suited or tentatively suited) hardwood acres in the MA, and the percentage of those hardwood acres that have been classified and updated in the databases.

Table 10. Hardwood Silvicultural Objectives for Those Stands Classified
By Management Area (MA) (1999-2003)

Management Area	Acres Classified Even-aged	% Hardwood Classified Even-aged[1]	Acres Classified Uneven-aged	% Hardwood Classified Uneven-aged[1]	Total Hardwood (LSC 500-699) Acres	Percent of MA Classified[2]
1.1	852	18	3754	82	12109	38
2.1	17325	12	122540	88	185278	75
3.1	2847	18	12992	82	22916	69
3.2	17304	39	27552	61	65541	68
4.1	1358	19	5643	81	9624	73
4.2			333	100	836	40
6.1	780	5	14806	95	39441	40
6.2	729	4	16796	96	23268	75
TOTAL	**41,195**	**17**	**204,416**	**83**	**359,013**	**68**

[1] This percentage is based on the number of acres that have been classified either even-aged or uneven-aged; NOT the total number of hardwood acres. (See note 2 below)
[2] Only a portion of each MA is classified with a long-term objective. This number shows what portion of each MA and the Forest has been classified formally with a long-term objective of even-aged or uneven-aged.

Conclusions: Based on our accomplishments and experience with Forest Plan implementation during the past seventeen years, there has been a strong tendency to favor uneven-aged management more heavily than projected in the Forest Plan. The increased emphasis on uneven-aged management compared to the Forest Plan appears to be at both the Forest-wide level and by individual MAs. This is also consistent with the method of cut for hardwood stands sold in fiscal year 99-03, where 88% were uneven-aged treatments (selection and improvement cuts). Because of the increased emphasis on uneven-aged management, the acres of selection and improvement cuts are also higher than projected in the plan. (See discussion under Harvest Cutting Methods).

The management of the hardwood type on the Ottawa continues to be of high importance. The issues and concerns related to hardwood management remain essentially the same. Concerns over visual effects of even-aged management have increased somewhat, and sensitivity to this concern is one reason for the emphasis on uneven-aged management.

In addition, there have been fewer opportunities at the project level to regenerate mid-tolerant species through even-aged management compared to what was anticipated in the Forest Plan. The regeneration of mid-tolerant species in large numbers not only requires even-aged management, but also requires intensive site preparation activities combined with ideal site and existing stand conditions. The combination of these factors has not presented itself in sufficient amount to fully accomplish the level projected in the Forest Plan. Many of the existing hardwood stands are on sugar maple dominated sites, and often lack seed sources for mid-tolerant species, or are strong sites with sugar maple as the climax species (based upon ecological landtype phase (ELTP) information).

Markets for hardwood sawtimber remain strong, and markets for hardwood pulpwood have improved. Our current trend is that we are moving toward uneven-aged management of northern hardwoods and we anticipate that the trend will continue.

The trend towards more emphasis on uneven-aged management of hardwoods needs to be validated during the Forest Plan revision process. The level of even-aged management to perpetuate mid-tolerant species needs to be based upon more site-specific, site-potential data than was used in the current Forest Plan to assure a more realistic projection is made.

To further research the retention of mid-tolerant species as a component of hardwood forests, the Ottawa is working with the North Central Forest Experiment Station. This research began some years ago and anticipate interim results of this study and interpretations in the near future.

Ottawa hardwood stands provide a great deal of management flexibility in their present even-aged, immature pole stand condition. Whether they are maintained as even-aged stands or converted to uneven-aged over time, near term treatments are similar. Commercial thinning, selection cuts, or improvement cuts in young even-aged stands, leave a very similar appearance in typical hardwood stands on the Forest and have similar short term effects. These result from the fact that stocking following treatment, in terms of basal area and crown cover, is reduced to approximately the same level and the logging methods that are used are also similar. While the canopy is opened up somewhat, habitat conditions for wildlife are not negatively impacted in the short term and are beneficially impacted in the long term. The vegetative response, including increased growth in the residual trees and in the understory vegetation, is also very similar with these types of treatments. Therefore, the increased emphasis of uneven-aged management instead of even-aged management at this stage of stand development does not result in effects different than those anticipated during the development of the Forest Plan. After each successive treatment, scheduled about every 20 years, the desired condition should begin to take shape and more differences in effects could become evident. This would occur as the stands reach maturity and regeneration though two-cut shelterwood system is undertaken for those stands classified for even-aged management.

Aspen Management

Forest Plan Goal: One of the intents of the Forest Plan is to maintain a moderate to high amount of aspen type and thermal cover in areas of the Forest with the greatest potential for improving habitat for deer and grouse, and increasing wildlife based recreation. Aspen stands are being regenerated in sizes and locations on the Forest to sustain habitat conditions for ruffed grouse.

The Forest Plan sets a goal of maintaining this component type with the objective of 138,000 acres of aspen type to be maintained over the long-term, with an average annual harvest and regeneration projection of about 3,280 acres per year during Decade 1 and 3,090 during Decade 2.

Considerable attention has been given to the impacts and benefits of aspen management for white-tailed deer and ruffed grouse. Aspen regeneration is an important early seral vegetative condition in the forest landscape. It provides the bulk of the temporary openings and early successional habitat on the Ottawa.

Aspen regeneration provides niches for over 20 species of mammals, from the white-tailed deer to the deer mouse. Aspen regeneration is used by over 30 species of birds from the ruffed grouse to the chestnut-sided warbler. There are a few species of reptiles and amphibians that can be found in regenerating aspen. Approximately 60 species represented by this ecosystem are an important component of the total number of species on the forest. It is an important vegetative component to be maintained on the Ottawa.

Retention of an aspen component, including young age classes, is important in a forest dominated by northern hardwoods. Uneven-aged management of the northern hardwood ecosystem does not provide opportunities where dense aspen regeneration can exist. A northern hardwood forest ecosystem, once established, is managed with the uneven-aged silvicultural system, using improvement and selection harvest cuts. This system of management does not create the large 10+ acres of dense aspen regeneration habitat needed by the approximately 60 species mentioned above.

Accomplishments: During FY02-03, Ottawa aspen management, through timber sales, included an average of 227 acres per year of aspen regeneration harvest. Table 11 summarizes aspen management since Plan implementation began.

Table 11. Acres of Aspen Type Sold, Harvested and Regenerated
And Volume of Aspen Products Sold By Fiscal Year

	*Forest Plan Level Decade 1	*Forest Plan Level Decade 2	10-Year Average FY 1987-1996	FY 2002	FY 2003	Decade 2 Average (1997-2003)	17-year Average (1987-2003)
Acres Sold (regeneration)	3,280	3.090	2,100	89	364	411	1,405
Harvest acres	3,280	3,090	2,424	724	384	1013	1843
Site prep. for natural regeneration	2,300	2,100	2,436	522	830	1379	2000
Volume of aspen products sold (MCF)	4,100	4,590	3,224	596	1835	1578	2549

* Forest Plan levels are in terms of annual average acreage of harvest by method, by decade. Decade 1 is for the period FY 1987-1996, and Decade 2 represents FY 1997-2006.

Interpretation: During the second Decade, the acreage of aspen sold has only been about 13 % of Forest Plan level. Over seventeen years of Plan implementation, the Forest is behind planned levels in acres and volume sold, including less than 43 % of the planned acres sold and about 62% of the planned aspen volume. This trend raises a great deal of concern with regard to meeting the Forest Plan goal of maintaining 138,000 acres of suitable aspen type, and maintaining 16,000 acres of young growth habitat.

Although there is a relatively large acreage of mature and overmature aspen stands, we have had difficulty identifying opportunities to regenerate the planned level of acres to work toward the Forest Plan goals.

Local groups, such as Whitetails Unlimited and the Ruffed Grouse Society, have become more directly involved with special aspen regeneration projects and other habitat improvements such as opening maintenance and tag alder management. The Ottawa and the Ruffed Grouse Society entered into a Challenge Cost Share agreement in 2000 to identify and update stand data (and prescriptions) for mature and overmature aspen stands and assess the potential for regeneration of aspen into the future. This effort has helped both parties have a better understanding of the current status of the older aspen stands on the Forest, and what factors have contributed to a recent decline in harvest and regeneration of aspen and the implication this may have on meeting Forest Plan objectives.

Conclusions: There is continued concern about the health of some of the mature and over-mature aspen forest on the Ottawa. The major concern is the loss of aspen trees and volume of aspen products due to a disease known as white trunk rot, caused by a fungal disease *Phellinus tremulae*, which is the most destructive disease of aspen in the Lake States. This disease causes heart rot, loss in merchantability, loss in economic value, and eventually leads to tree mortality.

The Ottawa is concerned about the increased impact this disease will have on the management of our aging aspen stands in future years. The long-term impact is the continued decline in the acreage of aspen forest ecosystem that would be maintained on the Ottawa.

Harvest in aspen stands over the next ten years should concentrate on higher risk level stands in the 50-year and older age class. Harvesting stands before white trunk rot becomes severe is the best means of controlling this disease.

There appears to be several reasons for the decline in aspen acres harvested in recent years. Most likely, it is a combination of the reasons listed below:

1. The overall timber program (acres and volume) is down from 10 years ago.
2. Data was not current and many stands that had been classified aspen, have naturally converted to more shade tolerant species such as northern hardwoods or balsam fir.
3. Silvicultural options considered at the project level that better met site potentials and addressed Forest Plan goals, such as managing for hardwoods through natural conversion, or converting to white pine or other conifers.
4. Other priorities the Forest has placed an increased emphasis on jack pine salvage sales over the past four to five years, and this has resulted in some reduction in aspen harvest.
5. Scattered or isolated stands don't lend themselves to efficient management via commercial timber sales.

The cost-share agreement mentioned above is helping both parties have a better understanding of the current status of the older aspen stands on the Forest, and what factors have contributed to a recent decline in harvest and regeneration of aspen and the implication this may have on meeting Forest Plan objectives.

Upland Openings

Forest Plan Goal: Maintain 8,700 acres of permanent upland openings with a long-term objective of 24,000 acres of permanent upland openings to benefit white-tailed deer (page IV-37; Amendment 2). On page IV-99, the Forest Plan urges maintenance of all existing old fields, grassland ecosystems, logging camps, etc. greater than 1/2 acre. On page IV-100, the Forest Plan recommends that 30-60% of upland openings within deeryards be kept in a shrub condition for browse production. Further, within each MA narrative the Forest Plan describes a desired percentage range for upland openings.

Table 12 contains the following information: current acres within each MA, the desired range, expressed as percentage of each MA, and the current percentage of upland openings in each MA.

Table 12. Permanent Upland Openings by Management Area

Management Area	Management Area Acres	Desired Range, per Forest Plan	Current Acres In Openings	Current % In Openings
1.1	82,500	1% -5%	800	1%
2.1	375,990	1% -5%	2840	0.8%
3.1	61,430	1% -5%	770	1.3%
3.2	141,610	1% -5%	1140	0.8%
4.1	62,380	1% -5%	860	1.4%
4.2	14,950	1% -10%	120	0.8%
6.1	64,600	1% -5%	170	0.3%
6.2	52,860	1% -5%	940	1.8%

Table 13 contains acreages of upland openings, by opening type, currently on the Ottawa. Current conditions are compared to conditions in 1986, when the Forest Plan was adopted. Acreages include openings in all MAs on the Forest.

Table 13. Permanent Upland Openings Forestwide by Opening Type

Type of Opening	1986[1] (acres)	2004[1] (acres)	Change from 1986
Upland opening (undifferentiated)	3,320	2,820	-500
Grassy opening	2,700	2,620	-80
Forb opening	1,030	1,170	+140
Shrub opening	1,050	1,960	+910
Savannah	590	180	-410
Orchard	10	20	+10
TOTAL	~8,700	~8,770	~+70

[1] Acreages have been rounded to the nearest 10 for this table.

Overall, there are some trends worth noting:

- Since Forest Plan adoption, the number of acres of openings has increased overall, so progress has been made toward attaining the desired condition described in the Forest Plan.
- Most MAs are not within the range prescribed in the Forest Plan; the few that are within range are at the low end of the range.
- The Forest is maintaining most existing openings, unless they are located in inappropriate areas, near aquatic features, or adjacent to old growth.
- The need for maintaining the existing level or increasing the number of acres is being considered as part of Forest Plan revision since white-tailed deer densities throughout the Ottawa are high and the purpose of the upland openings is to benefit deer.

Old Growth Habitats

Forest Plan Goal: The Forest Plan describes a desired future arrangement of old growth habitats across the Ottawa that will provide for the needs of species that require old growth conditions.

The desired spatial arrangement is a mosaic that relies heavily on the designated Wilderness Areas, which total about 50,000 acres, with connectivity provided by managing other forest types, mainly northern hardwood communities, toward late successional conditions. The long-term objective is to develop an old growth mosaic that is connected across the landscape, and includes characteristics of all vegetative communities present on the Ottawa, intermingled with early-seral and mid-seral vegetation types and treatments.

The Forest Plan prescribes a desired percentage of old growth for most MAs, ranging from 1-3% in MA 1.1 to >10% in MA 6.1 and MA 6.2. Table 14 displays the Forest's progress toward implementing the Forest Plan desired conditions, relative to old growth, by MA. All data are based on queries of the CDS database as of March 2004.

Table 14. Old Growth Classification

Management Area [1]	Mgmt. Area Acres	Old Growth % Range (Plan)	Managed Old Growth [1] (acres)	Unmanaged Old Growth [2] (acres)	Total (acres)	Percent of MA
1.1	82,500	1%-3%	390	2230	2,620	3.2
2.1	375,990	8%-10%	14850	11420	26,270	7.0
3.1	61,430	4%-7%	1530	1240	2,770	4.5
3.2	141,610	4%-7%	3030	5550	8,580	6.1
4.1	62,380	4%-7%	920	2530	3,450	5.5
4.2	14,950	1%-3%	0	0	0	0
6.1	64,600	10%+	1310	3210	4,520	7.0
6.2	52,860	10%+	1150	3030	4,180	7.9

[1] Forested land managed for timber production, according to the Forest Plan, and is classified as having an objective to be managed to promote old growth characteristics.
[2] Forested land not managed for timber production, according to the Forest Plan, and is classified as having an old growth objective.

Our records indicate about 57,570 total acres currently classified as old growth, or about 7% of the Forest. Of the 57,570 acres, about 10% currently exhibits old growth characteristics, as defined on p. IV-90 (Table 4.9) of the Forest Plan.

Much of the Congressionally-designated wilderness on the Ottawa currently exhibits old growth characteristics, though these areas are not administratively "classified" as old growth at this time. The 3 Wilderness Areas, 15,000-20,000 acres each, are the largest blocks of old growth and late successional forest communities on the Ottawa. Though many of these acres have had timber products removed from them in the past, it has been decades since these activities took place, and successional processes have continued unabated since.

As part of on-going Forest Plan implementation, the Forest has been classifying additional stands through project planning using an interdisciplinary process. This approach recognizes the opportunity to allow small stands of old growth to develop and to connect areas of old growth across the landscape, and to protect unique vegetation communities and existing old growth. The

Forest Plan recommends consideration of certain site factors when classifying old growth. These are listed on page IV-91 of the Forest Plan as amended.

Comparison of the desired percentages of old growth for each MA to the existing acreage of old growth for each MA shows that the Ottawa continues to make progress toward the Forest Plan old growth objectives. For example, Table 14 shows that the Forest is within the desired range of old growth for MAs 1.1, 3.1, 3.2, and 4.1. However, the existing percentages are still low for MA 2.1, 6.1 and 6.2. The percentage for MA 4.2 is much less than the Forest Plan's desired range, with no acres classified within this relatively small MA.

Further analysis of the old growth data indicates that the Forest is classifying a variety of forest vegetation types as old growth. Specific observations by management area include:

- Classified old growth within MA 1.1 is comprised primarily of aspen types (32%), fir/spruce/aspen/paper birch (22%), lowland conifers (16%), pine and white spruce (12%).
- MA 2.1 old growth is mostly northern hardwood types (53%), followed by lowland conifers (16%), and a relatively small acreage of most other forest types.
- MA 3.1 old growth is comprised of northern hardwood types (27%), lowland conifers (22%), fir/spruce/aspen (18%), red/white pine and white spruce (16%), and a smattering of other forest types.
- MA 3.2 old growth is comprised of mostly northern hardwood types (54%), with lowland conifers and aspen comprising about 17% each, and a little of most other forest types.
- MA 4.1 old growth is comprised of northern hardwood types (26%), lowland conifers (21%), jack pine (17%), red/white pine and white spruce (12%), followed by 18% of aspen and aspen/conifer mixes, combined.
- MA 6.1 old growth is dominated by northern hardwood types (53%), followed by lowland conifers (22%), aspen (11%), and a small amount of several other forest types.
- MA 6.2 old growth is also dominated by hardwood types (67%), followed next by hemlock (15%) lowland hardwoods (9%), and a few acres of 4 other forest types.
- Classified Old growth within MA 8.1, the Wild and Scenic River corridors, is comprised of aspen (32%), fir/spruce/aspen/birch (29%), northern hardwoods (17%), lowland conifers (11%), and a few acres of other forest types.
- MA 9.2 old growth is comprised of lowland conifers (47%), fir/spruce/aspen/birch (20%), northern hardwoods (19%), and aspen (11%), and a few acres of 3 other forest types.

Overall, it appears that the Forest has been classifying forest types in roughly the proportion that these forest types exist across the landscape. For example, the Ottawa is dominated by northern hardwood forest, and northern hardwood types comprise the majority of the classified old growth on the Ottawa.

SOIL AND WATER

Forest Plan Goals:

1. Minimize detrimental soil disturbance and erosion.
2. Design management activities to minimize impacts on water quality and other riparian values.
3. Maintain soil productivity
4. Manage riparian areas to give preferential consideration to riparian dependent resources. Cumulative effects of management practices will not adversely impact water quality.
5. Continue to cooperate with other government resource management agencies in a unified protection effort.

The above objectives can be found in the Forest Plan on page IV-11.

Accomplishments: The Ottawa continues to meet the above stated goals of minimizing detrimental soil disturbance and erosion and designing management activities to minimize impacts on water quality and other riparian values. All projects planned or designed on the Ottawa have an appropriate level of involvement from soil, hydrology and/or watershed staff. These experts assist in planning projects so as to minimize soil disturbance, erosion, or impacts to water quality or other riparian values. Project impacts that are analyzed fall into the broad categories of direct and indirect project effects and cumulative effects to the soil and water resources. When needed, project specific design criteria are developed to protect the soil, water and riparian values. Soils, hydrology and watershed experts are available and often work with silviculture, engineering, recreation and sale administrators in an integrated manner during the implementation phase of projects.

There are numerous examples of implementation in FY03 of Forest Plan standards and guidelines designed to minimize detrimental soil disturbance. These include the use of the Ecological Classification System to identify resource capability, specify management limitations, and identify appropriate design criteria for all management prescriptions and practices (Forest Plan, page IV-35).

The Forest Plan also states, “Use filter or buffer strips to prevent soil, nutrient, or pesticide movement into lakes and stream. Filter strip width will vary according to the soil, slope, vegetation, and type of practice.” (Forest Plan, page IV-35). The Forest has been working with design criteria in vegetation management projects that provide varying width strips depending on soil type, slope, vegetation, and type of practice. Various resource specialists, including soils scientists, hydrologists, aquatic ecologists, fisheries biologists, and wildlife biologists have been working with timber sale marking crews and sale administrators to assist with understanding how to implement these filter strips. Formal timber sale activity reviews, conducted annually, are one way the Forest ensures the design criteria specific for projects are effective when implemented.

Where soil and or watershed problems are recognized but not a part of a Forest Service project on federal lands, the Ottawa works with partners such as Michigan Department of

Transportation, the MDNR, the road commissions of local counties and private owners to correct or improve these situations.

Soil productivity is maintained through the involvement of resource professionals in project planning as described above. Another important aspect of maintaining soil productivity is the continued involvement of resource professionals' with the Long Term Site Productivity (LTSP) study. This international study focuses on the joint role of soil porosity and site organic matter and their effect on the site processes that control productivity.

One interagency effort is the ongoing lake monitoring being done on selected lakes by the MDEQ. The MDEQ monitors various lakes throughout the Upper Peninsula of Michigan for water quality, including trophic state indicators and nutrients and a suite of metals, including mercury, as well as other contaminants. Lake mercury monitoring has resulted in fish consumption advisories for all lakes throughout the state. Lakes are also scheduled for Total Maximum Daily Load (TMDL) development for mercury with the Environmental Protection Agency as the lead agency.

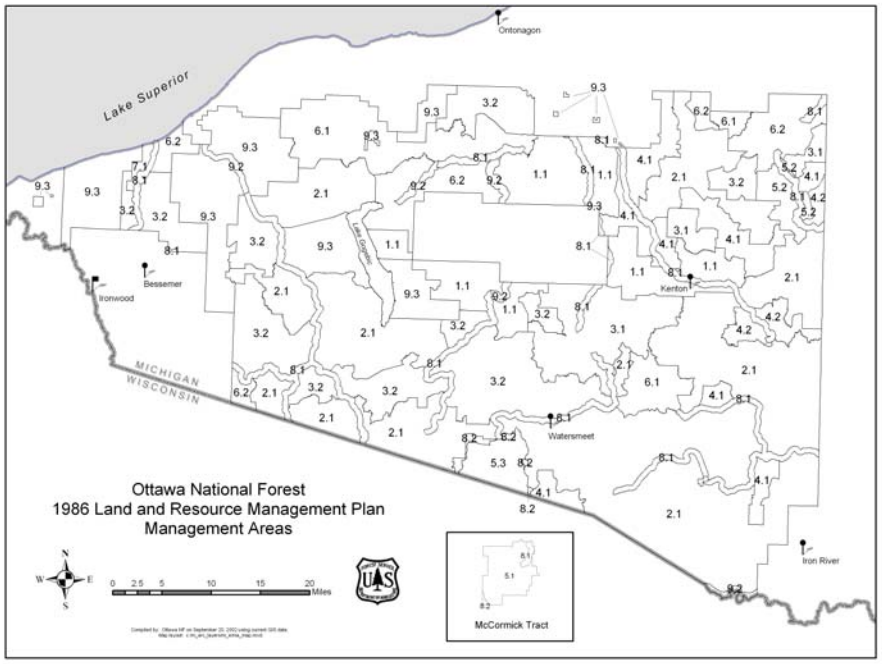
In 2003 the Ottawa implemented new regional handbook direction for soil quality monitoring. Active timber sale information was consolidated and stratified by major landform. A random sample of the dominant landform was selected. Following handbook guidance a monitoring method was developed involving ocular estimates over the entire payment unit to determine the amount of disturbed soils in the payment unit. Only one unit of the 11 units selected was found to be above a low level of disturbance, transects were then set up in this unit to determine the actual amount of disturbance. The results of the transect monitoring was that approximately 90% of that unit was undisturbed, with less than 2 percent of the area in a potentially detrimentally disturbed condition. The remaining ten units had no detrimentally disturbed soil conditions. In order to ensure that ocular estimates were accurate, an additional payment unit also had transects set up, this confirmed that the ocular estimate was within 5% of actual disturbance. Ninety percent of all the units monitored were considered to be "undisturbed" with small percentages having low to moderate soil disturbance. This monitoring confirms the effectiveness of project design criteria in protecting soil quality. This type of monitoring will be continued in the future on the Ottawa.

Chapter 2 - Management Areas

This chapter features a review and summary of the status of each Management Area (MA) on the Ottawa. It gives an indication of the general condition of each MA and the progress being made in movement toward the desired future condition and the goals and direction set in the Forest Plan.

Most MAs on the Ottawa are comprised of multiple small units across the Forest. Each management prescription defines the desired future condition including goals for the desired vegetation, recreation, wildlife habitat needs, Transportation systems, if any, and support facilities (e.g. trails, campgrounds, etc.) and activities.

Figure 10. Management Area Map



Forest Plan management prescriptions provide long-range goals for the land and resources. Some goals may take a very long time to achieve. These prescriptions describe what the desired condition should be in the future and type of project activities needed to move toward the condition. The resource management challenge is to spatially arrange the components: vegetation composition, transportation networks, placement of support facilities, and landownership in a pattern which best achieves the Plan's goals through a Forest Plan implementation analysis process called Integrated Resource Management (IRM). In this process, forest plan direction and local conditions and opportunities are brought together.

A summary of vegetative accomplishments are displayed. This display, similar to the one presented in the Forest Plan, shows vegetative composition in the MA as a whole as well as the acreages of vegetative practices in each area for seventeen years of Forest Plan implementation.

Management Area 1.1
Emphasis on Aspen in a Motorized Recreation Ecosystem

Management Area Goal and Direction: Emphasizes early successional ecosystem community types (plant and animal) in a motorized recreation environment. Provides habitat for deer, ruffed grouse, and other wildlife requiring young forests.

Desired Future Condition: Management Area 1.1 encompasses approximately 82,500 NFS acres in total. This area features a forest that is a mosaic of stands of aspen, paper birch, and balsam fir with temporary forest openings. Stands of even-aged or uneven-aged northern hardwoods are interspersed throughout the area. Table 15 describes the desired vegetative composition.

The combination of openings and forest cover provides habitat for plant and animal species dependent upon early-seral habitats and disturbance. Game species such as deer, ruffed grouse, snowshoe hare, and non-game species such as chestnut-sided warbler and white-footed deer mouse, are at moderate to high population levels. Deer populations could climb to very high densities if severe winters do not hold populations in check.

Considerable human activity is evident, but any structures or alterations are visually compatible with the surrounding forest environment. This moderately roaded environment provides ORV, snowmobiling, and other motorized recreational opportunities. Roads are seldom closed to public motorized vehicle use.

Management activities are planned to move the area toward this condition and then to maintain it. These activities include even-aged management (clearcut) of aspen and softwoods with even-aged and uneven-aged management of northern hardwoods.

The even-aged silvicultural system used for aspen and softwoods results in clearcuts accessed by many temporary roads that are obliterated after the timber is removed. In addition, the system of long-term local and collector roads averages 2.5 to 3.5 miles per square mile. The location and design of these roads minimizes their visual and physical impact.

Vegetative Management

Table 15. Management Area 1.1 Summary

Vegetative Composition - Forested Lands			
Vegetation Type	**Final Harvest Product**	**Desired Future Condition % Forest Land**	**Current % Management Area**
Aspen	Sawtimber & Pulpwood	40-60	58.4
Softwood	Sawtimber	5-10	10.3
	Pulpwood	10-20	12.5
Hardwood	Sawtimber & Pulpwood	5-20	18.8
TOTAL			**100.0**

Permanent Upland Openings	
Forest Plan Projected percentage	**Current % Management Area**
1 - 5	1.0

Road Density	
Forest Plan Objective	**Current miles/sq. mi. Management Area**
2.5 - 3.5	2.1

Interpretation: Management Area-wide, the vegetative composition is consistent with the desired future condition for the vegetation composition described in the Forest Plan. The softwood sawtimber component just exceeds the desired range. This is acceptable and no change in overall species composition is recommended.

Approximately 39% of the aspen suitable for timber production is over 40 years old, and the majority of that is over 60 years of age. So, approximately 15% of the suitable acres in this MA is aspen over 60 years of age.

To move toward the desired future condition for the MA, continued effort is needed over the next 10-15 years to regenerate aspen forest and improve the age class distribution of this type.

The spruce-fir type has also had limited management with about two thirds of the type in the 60+ year age, and at increased risk from insect and disease attack.

Table 16. MA 1.1 Vegetation Management Practices

In Acres Sold

Method of Harvest	*Forest Plan Level Decade 1	*Forest Plan Level Decade 2	Decade 1 Average (1987-1996)	FY 2002	FY 2003	Decade 2 Average (1997-2003)	17-year Average (1987-2003)
Clearcut	800	880	794	0	0	68	495
Selection / Improvement	170	280	71	4	0	22	51
Shelterwood Seed	180	60	83	0	0	55	72
Shelterwood Removal	20	60	15	0	0	12	13
Commercial Thinning	140	70	200	0	0	30	130
TOTAL	**1310**	**1350**	**1163**	**4**	**0**	**187**	**761**

*Forest Plan levels are in terms of annual average acreage of harvest by method, by decade. Decade 1 is for the period FY 1987-1996, and Decade 2 represents 1997-2006.

Interpretation: After seventeen years, it appears most planned practices are being implemented somewhat below the 20 year plan projections with the exception of Commercial Thinning. Clearcut acreage is over 40% below 2 decade Forest Plan averages, selection harvest is nearly 80% below planned averages, while total acreage harvested is about 42% below the planned average.

Project decisions issued over the remainder of the Plan period need to emphasize practices of clearcutting and selection harvest. Some increase in shelterwood seed and removal cutting would also be appropriate.

A review conducted in 1998 focused on the Baltimore Opportunity Area (OA) in MA 1.1, north of Bruce Crossing, Michigan. The Baltimore OA contains about 24,500 acres, or approximately 35 % of the Forest acreage of MA 1.1. The NCT crosses this area and receives a growing amount of use by hunters and others. Deer hunter numbers are high, and a snowmobile trail that crosses the area receives substantial use. The road system in the area supports the desired condition including relatively high amounts of hunting, recreational uses, and access for maintenance of short-lived tree species.

Review observations included giving additional attention to out-year plans for vegetation treatments in MA 1.1 to distribute aspen harvest treatments in a way that both regenerates acres of aging aspen type and addresses the imbalance of age classes in some units of the MA. Recognition should be given to reforestation risks associated with efforts to restore aspen in areas where hardwood succession has started. Additionally maintaining a high degree of sensitivity between timber sale layout and operation, and roads and trails to ensure high quality experiences for travelers and hikers should be continued. This should include favoring opportunities to use vegetative treatments to create variety and diversity which complements visual quality and visitor's experiences.

Wildlife

Current Resource Condition: Management Area 1.1 emphasizes early successional forests, particularly aspen. With about 60% of the MA in aspen of various ages, it clearly is the focal area on the Ottawa for early-seral species. About 40% of the acres of aspen in this MA are over 40 years of age, so not all the aspen is serving as young forest habitat for species like grouse, golden-winged warbler and woodcock at this time. As is the case Forest-wide, continuing an aggressive harvest rate of this aspen is necessary, or it will naturally convert to other forest types.

Monitoring: Because this MA provides good habitat for ruffed grouse, a number of established drumming count routes occur here to monitor population trends of this management indicator species. Reference p. 23-24 for discussion of Ruffed Grouse monitoring at the Forest scale.

Management Area 2.1
Emphasis on Northern Hardwood Forests in a Motorized Recreation Ecosystem through Uneven-aged Management

Management Area Goal and Direction: Emphasizes northern hardwoods ecosystem using uneven-aged management to produce quality hardwood timber products and associated wildlife in a motorized recreation environment.

Desired Future Condition: This area features a forest that is a continuous canopy of northern hardwoods, interspersed with some aspen and softwoods. Occasional temporary openings occur where even-aged management is applied, but uneven-aged stands of sugar maple are most common. White ash, yellow birch, red maple, northern red oak, eastern hemlock, eastern white pine, and other mid-tolerant species are also found. Trees within each stand are a mix of sizes and ages from seedlings to very large, old trees. Permanent upland forest openings are small and scattered. Table 17 describes the desired vegetative composition.

Although not always readily evident, considerable human activity occurs. Any structures or alterations are visually compatible with the surrounding forest environment.

This roaded environment provides ORV, snowmobiling, and other motorized recreational opportunities. Roads may be closed to public motorized vehicle use, thereby providing non-motorized recreational opportunities as well.

Management activities are planned to move the area toward the desired future condition and then maintain it. These activities include uneven-aged management of northern hardwoods (especially sugar maple) and even-aged management of small clumps or stands of aspen and softwoods.

Because of the frequent use of roads for timber operations, local and collector roads are generally permanent. Their average density is three to four miles per square mile. The location and design of these roads minimizes their visual and physical impact. The MA encompasses approximately 376,000 net NFS acres in total, which is distributed on the Forest in separate units of 8,960 contiguous acres or larger in size. Some units are part of the RHA (Remote Habitat Area) which has an open road density goal of 1 mile per square mile or less.

Vegetative Management

Table 17. Management Area 2.1 Summary

Vegetative Composition - Forested Lands			
Vegetation Type	**Final Harvest Product**	**Desired Future Condition % Forest Land**	**Current % Management Area**
Aspen	Sawtimber & Pulpwood	15-20	15.2
Softwood	Sawtimber	0-10	8.2
	Pulpwood	10-20	18.1
Hardwood	Sawtimber & Pulpwood	50-70	58.5
TOTAL			**100.0**

Permanent Upland Openings	
Forest Plan Projected percentage	**Current % Management Area**
1%-5% of MA	0.8%

Road Density	
Forest Plan Objective	**Current miles/sq. mi. Management Area**
3.0-4.0 miles/sq. miles	2.9

Table II.38 Interpretation: Vegetative composition MA-wide is consistent with Forest Plan direction. Additional effort is needed to move hardwoods toward an uneven-aged condition, improve age class distribution in aspen type, and increase the acreage of upland openings.

Approximately 88% of the hardwood acres that have had silvicultural objectives established are planned to be managed in an uneven-aged condition. However, of the 185,000 hardwood acres (suitable landbase), only 91,500 (49%) are in an uneven-aged condition. Additional improvement and selection cutting of immature second growth hardwood stands is needed to move this MA toward the DFC in terms of stand structure to meet a variety of resource objectives.

Although the aspen type in MA 2.1 occupies about 15% of the suitable landbase (LSC 500 & 600), there is concern about the number of aspen acres in the 60-year and older age class. Currently, over 22% (10,000 acres) of the aspen is over 60 years of age. Additional effort is needed to regenerate aspen in the MA and move the age class distribution closer to the desired future condition. Progress has been slow over the past three years in this MA in regeneration of aspen type.

Table 18. MA 2.1 Vegetation Management Practices
In Acres Sold

Method of Harvest	*Forest Plan Level Decade 1	*Forest Plan Level Decade 2	Decade 1 Average (1987-1996)	FY 2002	FY 2003	Decade 2 Average (1997-2003)	17-year Average (1987-2003)
Clearcut	1440	1130	617	16	173	140	421
Selection	2800	4750	4814	1424	2580	2557	3885
Shelterwood Seed	500	550	150	0	0	31	101
Shelterwood Removal	130	600	81	0	0	31	60
Commercial Thinning	1300	1,020	1,449	128	0	294	974
Total	**6170**	**8050**	**7111**	**1568**	**2753**	**3053**	**5441**

*Forest Plan levels are in terms of annual average acreage of harvest by method, by decade. Decade 1 is for the period FY 1987-1996, and Decade 2 represents 1997-2006.

Interpretation: As was the case Forest-wide, the acres of harvest appear heaviest in the selection/improvement cutting and light in clearcutting and shelterwood seed cuts. The total amount of acres harvested within the MA is about 77% of average plan projections. Management Area 2.1 is the largest MA on the Forest and is somewhat indicative of the Forest-wide trend to favor uneven-aged management to even a greater extent than planned. As discussed in the section on Harvest Cutting Methods the increased rate of selection/improvement is consistent with the standards and guidelines in the plan and long term desired condition and harvest levels for this MA. The annual rate of clearcutting is about 33% of the level projected in the Forest Plan over the 2 decade period. Selection harvest was emphasized in the first decade, but has declined sharply in the second decade. Overall, the annual rate of selection harvest is only slightly ahead of Forest Plan projections for the 20-year period, at 87% of the 20 year total after 17 years.. Thinning on the other hand is behind the projected rate, at 71% of the 20 year total after 17 years..

Project decisions in this Management Area over the remainder of the Plan period should emphasize clearcutting and regeneration of aspen to the extent possible, and continue to provide a mix of selection and thinning in the hardwood type within Plan projections. Thinning in hardwoods should be given a slightly greater emphasis than in the past 15 years. Thinning in the pine type should also be scheduled, to the extent possible. Opportunities for initiating regeneration through shelterwood harvests should also be identified.

Wildlife

Current Resource Condition: Management Area 2.1 contains the largest portion of the northern hardwoods ecosystem on the Ottawa National Forest and, as a result, vegetative management will have the largest influence on much of the wildlife associated with this ecosystem. This MA provides conditions for a variety of Neotropical Migratory Bird (NTMB) species, including numerous warblers, thrushes, and flycatchers. Providing a variety of vegetative conditions (through uneven-aged and even-aged management) will help maintain the diversity of NTMB species within this MA.

Management Area 2.1 contains most of the Forest's Remote Habitat Area, which is a large block of land along the Wisconsin border where densities of roads open to passenger vehicles are to be kept low (goal is 1.0 mile or less of open roads per square mile of federal lands).

The Red shouldered-Hawk, a Regional Forester Sensitive Species, is normally associated with wetlands and large river lowlands; however, we have noted this species seems partial to mature upland hardwoods containing small woodland ponds. Minnesota researchers have noted this as well. Of concern is the fact that nesting pairs seem particularly sensitive to human disturbances near nests, which may cause abandonment by the adults. Management Area 2.1 would appear to have the highest coincidence of these small ponds in hardwood stands. This MA surrounds many of the large river systems as well. Uneven-aged management in the largest MA is very compatible with Red-shoulder Hawks if nest sites are protected. These same areas are important to black bears, particularly during spring breakup.

Nest protections for any active nests found during pre-project surveys or project implementation ensure no negative impacts for the red-shouldered hawk or northern goshawk (refer to previous discussions for each of these species p. 14-15 and 28-31 respectively). The types and levels of harvest that have been emphasized, even though at an increased rate during the 1st decade of Plan implementation, will serve to improve habitats for many species on the forest, including such MIS as barred owl and goshawks and RFSS like the red-shouldered hawk. Riparian and wetland design criteria protect habitat for such species as the American bittern and the red-shouldered hawk as well.

Monitoring: This MA also provides a large portion of the Forest's habitat for northern goshawks, barred owls, and other woodland raptors. Monitoring routes have been established in this MA to track population trends of management indicator species. Results are reported at the forestwide scale, reference p. 28-32 for results on northern goshawk and barred owl.

Management Area 3.1
Emphasis on Mixed Northern Forests in a Motorized Recreational Ecosystem through Even-aged Management

Management Area Goal and Direction: Emphasizes a mix of northern hardwoods, softwoods, and aspen vegetative types in a motorized recreational ecosystem through even-aged management. Provides habitat for deer, ruffed grouse, and other wildlife by establishing a variety of vegetation cover types and age classes.

Desired Future Condition: This area features a highly mixed mosaic of northern hardwoods, hemlock, pine, white spruce, balsam fir, aspen, and lowland conifer stands, interspersed with permanent upland forest openings and wetlands. Table 19 describes the desired vegetative composition.

Trees within each stand are about the same age and size, giving a uniform appearance; however, stands within the MA are of many different ages.

The combination of temporary and permanent forest upland openings and forest cover provide habitat for diverse plant and animal species. Deer populations could be about 12 per square mile in early spring. Populations of snowshoe hare and ruffed grouse could also be expected to be moderate.

Even-aged management that results in clearcuts (temporary forest openings) predominates the management of all species, but northern hardwoods may occasionally be managed uneven-aged.

Considerable human activity is evident, but any structures and/or alterations are visually compatible with the surrounding environment. This moderately roaded environment provides ORV, snowmobiling, and other motorized recreational opportunities. Roads may be closed to public motorized vehicle use, providing non-motorized recreational opportunities such as hiking.

Management activities are planned to move the area toward the desired future condition and then to maintain it. These activities include even-aged management of all species with occasional uneven-aged management of northern hardwoods.

Because of the frequent use of roads for timber operations, local and collector roads are generally permanent. Road density varies with the mix of species present, but the average density is three to four miles per square mile. The location and design of these roads minimizes their visual and physical impact.

Management Area 3.1 encompasses approximately 61,400 net NFS acres in total which is distributed on the Forest in separate units of generally 7,680 contiguous acres or larger in size.

Vegetative Management

Table 19. Management Area 3.1 Summary

Vegetation Type	Final Harvest Product	Desired Future Condition % Forest Land	Current % Management Area
Aspen	Sawtimber & Pulpwood	25-45	27.9
Softwood	Sawtimber	20-30	14.3
	Pulpwood	10-20	15.6
Hardwood	Sawtimber & Pulpwood	25-45	42.2
TOTAL Forested Land			**100.0**

Permanent Upland Openings	
Forest Plan Projected percentage	**Current % Management Area**
1-5	1.2

Road Density	
Forest Plan Objective	**Current miles/sq. mi. Management Area**
3.0 - 4.0 miles/sq. mile	3.1

Interpretation: Composition of aspen and hardwoods is consistent with Forest Plan desired future condition of MA 3.1. Currently, the softwood component is low on longer rotation sawtimber types. The continued conversion of jack pine and balsam fir to longer rotation red pine, white pine, and white spruce will move the MA more toward the desired future condition. Management of aspen in MA 3.1 over the years has resulted in a good age class distribution, except that about 30 % of the suitable landbase of aspen is over 60 years old. Very little aspen regeneration has been accomplished over the past 7-8 years, and additional effort is needed to regenerate overmature aspen stands to continue moving this MA toward the Desired Future Condition.

As was the case forestwide, this MA has a greater emphasis on uneven-aged of northern hardwoods being applied during implementation than anticipated in the forest plan.

Table 20. MA 3.1 Vegetation Management Practices
In Acres Sold

Method of Harvest	*Forest Plan Level Decade 1	*Forest Plan Level Decade 2	Decade 1 Average (1987-1996)	FY 2002	FY 2003	Decade 2 Average (1997-2003)	17-year Average (1987-2003)
Clearcut	460	380	286	0	135	50	189
Selection	110	125	377	656	313	354	367
Shelterwood Seed	60	40	28	0	0	19	24
Shelterwood Removal	20	40	35	0	0	34	35
Commercial Thinning	280	630	315	220	432	169	255
TOTAL	**930**	**1215**	**1041**	**876**	**880**	**626**	**870**

*Forest Plan levels are in terms of annual average acreage of harvest by method, by decade. Decade 1 is for the period FY 1987-1996, and Decade 2 represents 1997-2006.

Interpretation: Although MA 3.1 has had an even-aged emphasis for hardwood management, approximately 50% of the hardwood acres are currently in an uneven aged condition, with uneven aged objectives identified for approximately 82% of the hardwood that has been classified with a long-term objective.

The total acres of harvest within this MA to date, is about 81 % of Forest Plan projections. The mix of harvest methods has an emphasis on selection and improvement cuts and with much fewer acres of clearcutting as compared to Forest Plan projections. This is consistent with the increased level of uneven aged hardwood management for the MA and forestwide.

Project decisions over the remainder of the Plan period should emphasize clearcutting and regeneration of aspen. Hardwood management should place stronger emphasis on even-aged management and thinning. Opportunities for pine thinning should also be given consideration.

Wildlife

Current Resource Condition: This MA prescription is designed to result in a mix of forest types and age classes to benefit many species to a moderate amount; in other words, it does not differentially emphasize young-forest species at the expense of mature, interior-forest obligates, or vice-versa. The primary silvicultural system is to be even-aged management, via clearcutting of aspen and other early-seral types, and thinnings and shelterwood systems in the hardwood types. Moderate levels of game species are expected to be present as a result of implementing the management prescription. However, as described in Table 20, above, most of the hardwood treatments have been uneven-aged, which tends to favor sugar maple, and wildlife species needing dense canopy and interior-forest conditions. Also, very little aspen clearcutting has been done in this MA recently (an average of 50 acres per year during the second decade of Plan implementation). The decline in young forest conditions will tend to reduce grouse, deer and hare production in this MA, and benefit species that need closed canopy and interior-forest conditions.

From a species diversity perspective, it is important to periodically open up the overstory in young hardwood stands to allow forb and shrub species to proliferate. Many of the Ottawa's hardwood stands are dense, relatively immature pole stands that regenerated 65-75 years ago. These dense, immature stands are in the "stem exclusion stage", where intense competition for light and other resources is resulting in suppression mortality and decreasing plant biomass and species diversity in the lower vegetative layers. Due to the slow-growing nature of these hardwood forest types, this condition typically persists for many decades, absent some disturbance event such as blowdowns. Periodic thinning of these stands allows a dense ground flora and shrub layer to develop, thereby increasing habitat niches for a variety of vertebrate and invertebrate species. Eventually regenerating these hardwood stands via shelterwood treatments favors establishment of mid-tolerant tree species such as red oak, black cherry, ashes, yellow birch, and white pine. Furthermore, even-aged hardwood silviculture can result in conditions that emulate, for a decade or so, the dense thicket conditions found in regenerating aspen clearcuts, and provide for early-seral wildlife species in much the same way that young aspen does.

Future projects to enhance wildlife habitat in this MA, should focus on regenerating mature and over-mature aspen, and regenerating mature northern hardwoods via shelterwood treatments, specifically to favor red oak, white pine, and hemlock, where opportunities exist.

Management Area 3.2
Emphasis Northern Hardwoods Forests in a Motorized Recreation Ecosystem through Even-aged Management

Management Area Goal and Direction: Emphasizes northern hardwoods through even-aged management. Provides habitat for deer, ruffed grouse and other associated wildlife in a motorized recreation environment. Provides a forest scene with occasional temporary openings mixed with stands of larger and older trees.

Desired Future Condition: This area features a forest that is predominantly even-aged northern hardwood stands mixed with aspen interspersed with stands of uneven-aged northern hardwoods and even-aged pine, paper birch and hemlock. Permanent upland forest opening and wetland types may be present. Table 21 describes the desired vegetative composition.

Trees within each stand are about the same age and size, giving a uniform appearance; however, stands within the MA are of many different ages. The combination of forest cover and temporary and permanent upland forest openings is habitat for diverse plant and animal species. Deer populations could be low, about ten per square mile in early spring. Populations of snowshoe hare and ruffed grouse could be low to moderate.

Management activities are planned to move the area toward the desired future condition and then to maintain it. These activities center around even-aged management of most species. Even-aged management that results in clearcuts (temporary forest openings) predominates the management of all species, but northern hardwoods may be managed uneven-aged. Considerable human activity is evident but any structures or alterations are visually compatible with the environment.

This moderately roaded environment provides ORV, snowmobiling, and other motorized recreation opportunities. Roads may be closed to public motorized vehicle use, providing non-motorized recreation opportunities such as hiking.

Because of the frequent use of roads for timber operations, local and collector roads are generally permanent. Road density varies with the mix of species present, but the average density is about three to four miles per square mile. Portions of this MA are associated with the Remote Habitat Area that has an open road density goal of 1.0 mile of road per square mile of land area or less.

Management Area 3.2 encompasses approximately 141, 600 net NFS acres in total which is distributed on the Forest in separate units of generally 2,560 contiguous (net NFS) acres or larger in size.

Vegetative Management

Table 21. Management Area 3.2 Summary

Vegetative Composition - Forested Lands			
Vegetation Type	**Final Harvest Product**	**Desired Future Condition % Forest Land**	**Current % Management Area**
Aspen	Sawtimber & Pulpwood	20-35	17.7
Softwood	Sawtimber	5-15	3.4
	Pulpwood	5-15	21.1
Hardwood	Sawtimber & Pulpwood	45-60	57.8
TOTAL			100.0

Permanent Upland Openings	
Forest Plan Projected percentage	**Current % Management Area**
1-5	0.8

Road Density	
Forest Plan Objective	**Current miles/sq. mi. Management Area**
3.0 – 4.0/sq.mile	2.5

Interpretation: The current aspen and long rotation conifer components of the vegetative composition in this MA are low relative to the desired future condition of the Forest Plan. Additional increases in upland openings are also needed within this MA.

Table 22. MA 3.2 Vegetation Management Practices

In Acres Sold

Method of Harvest	*Forest Plan Level Decade 1	*Forest Plan Level Decade 2	Decade 1 Average (1987-1996)	FY 2002	FY 2003	Decade 2 Average (1997-2003)	17-year Average (1987-2003)
Clearcut	700	570	384	0	0	147	286
Selection	400	1095	978	655	0	658	846
Shelterwood Seed	250	150	49	0	0	22	38
Shelterwood Removal	90	300	57	0	0	88	70
Commercial Thinning	600	430	935	220	0	193	629
TOTAL	**2040**	**2545**	**2403**	**875**	**0**	**1108**	**1869**

*Forest Plan levels are in terms of annual average acreage of harvest by method, by decade. Decade 1 is for the period FY 1987-1996, and Decade 2 represents 1997-2006.

Interpretation: Although MA 3.2 features even-aged management of the hardwood type, of the portion of the MA that has been given a long-term management objective, about 61% has been identified to be managed uneven-aged. The high amount of selection harvest compared to Forest Plan levels also indicated a greater emphasis being placed on uneven-aged management of the hardwoods in this MA. Both selection harvest and thinning are ahead of Forest Plan projections.

Aspen regeneration has lagged behind planned levels and about 28% of the aspen acres suitable for timber production are over 40 years of age, and over 23% are over 60 years of age. Increased emphasis on aspen harvest and regeneration is needed in this MA over the remainder of the Plan period.

To date, the rate of total harvest acreage is about 96% of annual plan projections. However, the harvest methods have emphasized thinning and selection harvest over shelterwood seed cutting and artificial reforestation. The rate of clearcutting is about 45% of planned acres. This should increase somewhat in response to the need to harvest and regenerate the older aspen component in this MA. This situation may change in future years; however, it is very likely that uneven-aged management of hardwoods will continue to have more emphasis than planned in this MA (See Forestwide discussion of Hardwood Management, p. 46). This is quite the opposite in MA 2.1.

Wildlife

Current Resource Condition: The desired future conditions in MA 3.2 are very similar to the desired future condition for MA 3.1. The primary differences between MA 3.1 and MA 3.2 are that MA 3.2's desired future condition includes less conifer forest types, and more hardwood and aspen forest types. At this time, however, MA 3.1 has more aspen, and less pine types than MA 3.2. MA 3.2 is currently dominated by hardwood types of which about 61% are being managed as uneven-aged. The current habitat conditions on the ground in MA 3.2 are probably most similar to MA 2.1, with large tracts of hardwood forest being managed toward uneven-aged stand conditions and the occasional temporary opening created by even-aged management. The species expected to be present here include barred owl, goshawk, red-eyed vireo, and other interior forest species needing complex stand structure. One known active red-shouldered hawk nest on the Ottawa is located in MA 3.2. The types and level of harvest that have been accomplished to date are of types that will improve habitat for these species. Populations of grouse, woodcock, and other young-forest species are probably low to moderate at this time.

Monitoring Needs and Considerations: Management Areas 3.1 and 3.2, which feature even-aged management of hardwoods (and mixed hardwoods containing hemlock), seem to have the greatest potential for increasing hemlock representation on the Forest. Even-aged management and hemlock are quite compatible, especially if care is taken to protect established understory hemlock when removing the overstory. Even those hardwood stands managed uneven-aged could be treated using techniques that would favor hemlock (greater cutting near hemlock "clumps" followed by post-sale scarification). Some parts of MA 3.2 contain deeryards, and these areas would not be suitable for attempting hemlock regeneration, however. Increasing the hemlock component in MAs 3.1 and 3.2 would benefit marten, most raptors and all coniferous warblers.

Management Area 4.1
Emphasis on Long-lived Conifers
in a Motorized Recreation Ecosystem

Management Area Goal and Direction: Emphasizes long-lived conifers and associated wildlife habitat in a motorized recreation environment through even-aged management.

Desired Future Condition: This area features a mosaic of temporary and occasional permanent upland forest openings and stands containing red pine with some white pine and white spruce. Some stands of aspen, paper birch, and northern hardwoods are interspersed with the predominant coniferous cover type. Table 23 describes the desired vegetative composition.

Trees within each stand are about the same age and size, giving a uniform appearance, however, stands within the MA are of many different ages. The combination of forest openings and forest cover is habitat for diverse plant and animal species. Populations of deer, snowshoe hare, and ruffed grouse could be low to moderate.

Considerable human activity is evident but any structures or alterations are visually compatible with the environment. This highly roaded environment provides ORV, snowmobiling, and other motorized recreation opportunities. Roads may be closed to public motorized vehicle use, providing non-motorized recreational opportunities such as hiking.

Management activities are planned to move the area toward the desired future condition and then maintain it. These activities include: intensive site preparation, tree planting, and manual/mechanical release, and clearcuts (temporary forest openings) for northern hardwoods.

Because of the frequent use of roads for timber operations, local and collector roads are generally permanent. Road density varies with the mix of species present, but the average density is about three to four miles per square mile.

Management Area 4.1 encompasses approximately 62,400 net NFS acres in total which is distributed on the Forest in separate units of generally 3,200 contiguous (net NF) acres or larger in size.

Vegetative Management

Table 23. Management Area 4.1 Summary

Vegetative Composition - Forested Lands			
Vegetation Type	**Final Harvest Product**	**Desired Future Condition % Forest Land**	**Current % Management Area**
Aspen	Sawtimber & Pulpwood	10-20	26.2
Softwood	Sawtimber	45-70	29.5
	Pulpwood	10-15	25.3
Hardwood	Sawtimber & Pulpwood	5-20	19.0
TOTAL			**100.0**

Permanent Upland Openings	
Forest Plan Projected percentage	**Current % Management Area**
1-5	1.4

Road Density	
Forest Plan Objective	**Current miles/sq. mi. Management Area**
3.0 – 4.0 miles/sq. mile	3.0

Interpretation: Continued conversion of short rotation conifers and low quality aspen to long rotation conifers at a rate of 200-300 acres per year will move the MA toward the desired future vegetative condition.

Management of the aspen and jack pine cover types in this MA are of particular concern. Presently, over 40% of the aspen type is over 40 years of age, and over 4,200 acres over 60 years of age. Over 65% of the jack pine type is over 40 years of age and over 4,400 acres is over 60 years of age.

Table 24. MA 4.1 Vegetation Management Practices
In Acres Sold

Method of Harvest	*Forest Plan Level Decade 1	*Forest Plan Level Decade 2	Decade 1 Average (1987-1996)	FY 2002	FY 2003	Decade 2 Average (1997-2003)	17-year Average (1987-2003)
Clearcut	640	600	261	171	1445	363	303
Selection	50	80	37	586	256	201	104
Shelterwood Seed	100	90	58	0	0	30	47
Shelterwood Removal	20	120	24	53	0	91	52
Commercial Thinning	230	470	432	515	495	368	406
TOTAL	**1040**	**1360**	**821**	**1325**	**3641**	**1053**	**864**

*Forest Plan levels are in terms of annual average acreage of harvest by method, by decade. Decade 1 is for the period FY 1987-1996, and Decade 2 represents 1997-2006.

Interpretation: Although this MA is to feature even-aged management of the hardwood type, uneven-aged management is the objective on over 80% of the hardwood acres.

Efforts to treat overmature, dead and dying jack pine continues in this MA particularly through continued implementation of the Plantation Lakes VMP. This project covers approximately 11,000 acres of MA 4.1, and will result in 3,000 – 4,000 acres of jack pine and other types being treated.

The emphasis in the MA to date has been on pine thinning, which is ahead of the average rate projected in the plan. Clearcutting and natural regeneration of aspen and jack pine are about half of levels projected for this MA. Although no jack pine acres were projected to be thinned, over the past 15 years the acres of thinning has included nearly 1200 acres of jack pine. These thinning acres were planned in projects as an alternate to clearcutting, to address several concerns including visual quality, wildlife habitat, and size of temporary openings, while still dealing with the salvage and sanitation needs caused by insects and disease.

Over the remainder of the plan period, treatments in this MA should feature clearcutting and other even-aged regeneration harvest. Thinning should be primarily in pine to reduce fuel hazards, and address forest health concerns.

Wildlife

Current Resource Condition: Management Area 4.1 will eventually have a lot of red pine, white pine and other long rotation conifers. At this time most of the conifer vegetation is immature (50 years or less) and is not ideal marten habitat; however, as the stands age and the understories develop (including some dead and downed wood), MA 4.1 will provide high quality marten habitat. The young conifer plantations provide excellent patches of raspberries, pin cherries, choke cherries, and blueberries. These are important summer foods for black bears, and these regenerating conifer plantations provide important foraging areas for bears. This MA, with its sandy, low fertility soils (LTA 14) could easily be maintained as permanent prairie or savannah. At this time, only about 1.4% of this MA is in openings, and an additional 2,000 acres could be managed as upland openings (savannah or prairie) while remaining within the Forest Plan guidelines.

Management Area 4.1 also has great opportunities for expanding red oak and pin oak on the outwash sands (LTA14a). These areas could be managed as oak savannahs if desired, and would offer some rare habitat opportunities for a variety of wildlife species.

Management Area 4.2
Emphasis on Short-lived Conifers
in a Motorized Recreation Ecosystem

Management Area Goal and Direction: Emphasizes short-lived conifers while maintaining habitat for associated wildlife in a motorized recreation ecosystem through even-aged management.

Desired Future Condition: This area features a mosaic of temporary forest openings and stands featuring jack pine, balsam fir, black spruce, tamarack, and lowland conifers. Stands of aspen, red pine, paper birch, lowland hardwoods, and northern hardwoods are interspersed with the predominant coniferous cover type. Table 25 describes the desired vegetative composition.

Trees within each stand are about the same age and size giving a uniform appearance; however, stands within the Management Area are of many different ages. The combination of openings and forest cover is habitat for diverse plant and animal species. Deer populations could be moderate, about 13 per square mile. Populations of snowshoe hare and ruffed grouse could also be low to moderate.

Considerable human activity is evident but any structures or alterations are usually compatible with the environment. This moderately roaded environment provides ORV, snowmobiling, and other motorized vehicle use and provides for non-motorized recreational opportunities such as hiking as well.

Management activities that are planned to move the area toward the desired future condition and then maintain it include even-aged management for all species that results in clearcuts (temporary forest openings) with northern hardwoods occasionally being managed using uneven-aged management.

Because of the frequent use of roads for timber operations, local and collector roads are generally permanent. Road density varies with the mix of species present, but the average density is 2.5 to 3.5 miles per square mile.

Management Area 4.2 encompasses approximately 15,000 net NFS acres in total which is distributed on the forest in separate units of generally 3,200 contiguous (net NFS) acres or larger.

Vegetative Management

Table 25. Management Area 4.2 Summary

Vegetative Composition - Forested Lands			
Vegetation Type	**Final Harvest Product**	**Desired Future Condition % Forest Land**	**Current % Management Area**
Aspen	Sawtimber & Pulpwood	10-25	23.7
Softwood	Sawtimber	10-25	31.0
	Pulpwood	50-60	39.0
Hardwood	Sawtimber & Pulpwood	0-15	6.3
TOTAL			**100.0**

Permanent Upland Openings	
Forest Plan Projected percentage	**Current % Management Area**
1-10	0.8

Road Density	
Forest Plan Objective	**Current miles/sq. mi. Management Area**
2.5 – 3.5 miles/sq. mile	2.4

Interpretation: The MA is almost 6% higher in softwood sawtimber types and short in softwood pulpwood types (about 10%) than the desired future condition listed above. There is no need at this time to change that situation; however, the emphasis in this MA is toward natural regeneration of these short rotation conifers, such as jack pine, and reduced emphasis on artificial reforestation and conversion to longer-rotation conifers.

On the Baraga Plains, and other sandy outwash plains within this MA, current mortality and expected additional mortality in the near future is being caused by a combination of cyclic infestations of jack pine budworm (a defoliating insect), Ips pini (a bark beetle), Armillaria (a root rot fungus), main stem breakage from snow and wind, over maturity, and dry site conditions. Any of the above conditions can cause problems by themselves. Together, they compound and accelerate decline of stand health and increase tree mortality. Risk of wildfire has been high and increasing as additional trees die. However, the forest has had ongoing efforts to address this forest health problem. This effort has included salvage harvest and regeneration of the more heavily impacted areas of jack pine over the past several of years. This has also helped to reduce the fuel hazard and wildfire risk. Additional treatments are needed in this MA over the remainder of the plan period to reduce fuel hazards and wildfire risks.

Table 26. MA 4.2 Vegetation Management Practices

In Acres Sold

Method of Harvest	*Forest Plan Level Decade 1	*Forest Plan Level Decade 2	Decade 1 Average (1987-1996)	FY 2002	FY 2003	Decade 2 Average (1997-2003)	17-year Average (1987-2003)
Clearcut	260	280	33	0	0	165	87
Selection	10	0	15	0	0	6	11
Shelterwood Seed	0	20	10	0	0	0	6
Shelterwood Removal	20	0	0	0	0	0	0
Commercial Thinning	30	230	29	0	0	223	109
TOTAL	**320**	**530**	**87**	**0**	**0**	**394**	**213**

*Forest Plan levels are in terms of annual average acreage of harvest by method, by decade. Decade 1 is for the period FY 1987-1996, and Decade 2 represents 1997-2006.

Interpretation: In the past, these areas were harvested of jack pine and planted to red pine. The trend now is to regenerate more of these jack pine stands naturally back to jack pine. To retain species diversity, red pine is being retained where possible. A substantial portion of the artificial reforestation in the late 1980's was in fact, seeding of jack pine.

To date, total harvest is occurring at a rate of about 50% below planned levels for this MA. This is primarily due to a higher level of sale activity in this MA prior to the final development and implementation of the Forest Plan which resulted in very low level of harvest activity early in the plan period. Harvest acres sold have increased somewhat in the second decade with salvage sales in the Baraga plains. These sales were treating high risk, dead and dying jack pine with a combination of clearcutting and salvage/sanitation thinning.

Although no thinning of jack pine was projected in the plan, about 615 acres of jack pine were thinned for salvage and sanitation purposes. These stands were thinned rather than clearcut in order to respond to project level concerns, including visual quality, wildlife habitat, and size of temporary openings.

Very little harvest activity occurred during the 1st decade of Plan implementation. There appears to be an ongoing need to harvest and regenerate older aged aspen and jack pine in this MA, as about 25-30% of the aspen and jack pine are over 40 years of age. As mentioned above, progress has been made over the past 7 years in treating areas of budworm-damaged jack pine. Additional projects are being planned for the remainder of the plan period to address forest health and fire hazard issues associated with this MA. Treatments for the remainder of the plan period should emphasize additional thinning and clearcutting in pine to reduce fuel hazards, and maintain a healthy forest condition.

Wildlife

Current Resource Condition (Grassland & Jackpine Ecosystem): Management Area 4.2 is the best possibility on the Ottawa for a long-term, fire dependent jack pine/pin oak/sand cherry savannah-type ecosystem because of the high percentage of openings prescribed in the Forest Plan (up to 10% of the acreage) and the droughty, low fertility soils that exist here. Currently, xeric plants such as hair grass, *Cladina* and *Cladonia* lichens, big and little bluestem grasses, bearberry and extensive blueberry barrens exist on LTAs 14 and 15. Upland sandpipers, grasshopper sparrows, savannah sparrows and other rare and declining grassland species already nest here. An additional 1400 acres within this MA could be managed as upland open habitat types while still staying within the Forest Plan guidelines of 1%-10% upland openings. Recent literature indicates that grassland and shrubland ecosystems are among the most reduced habitat types in eastern North America, (Askins, 2001[2]) and a host of wildlife species dependent upon them have also declining precipitously. Specifically, 70% of the 37 grassland associated bird species in eastern North America are declining (Hunter, et al., 2002[3]). The Ottawa has a unique opportunity in MAs 4.1 and 4.2 to restore extensive patches of these rare, but important, habitat types.

On the more productive LTAs in MA 4.1 and MA 4.2, extensive stands of jack pine are present. The areas of mature jack pine provide habitat for spruce grouse, which is rare throughout the Upper Peninsula, and was until recently listed as a Sensitive Species on the Ottawa.

[2] Askins, R.A.. 2001. Sustaining biological diversity in early successional communities: the challenge of managing unpopular habitats. Wildlife Society Bulletin 29; pgs. 407-412.
[3] Hunter, W.C., Buehler, D.A., Canterbury, J.A., Hamel, P.B.. 2001. Conservation of disturbance-dependent birds in eastern North America. Wildlife Society Bulletin 29; pgs. 440-455.

Management Area 6.1
Emphasis on a Semi-primitive Non-motorized Northern Hardwood Forest Ecosystem

Management Area Goal and Direction: Emphasizes semi-primitive, non-motorized recreation in a northern hardwoods ecosystem with moderate harvesting of other vegetative types through uneven-aged management. Provides habitat for wildlife requiring remoteness. Most roads will be closed.

Desired Future Condition: Management Area 6.1 features a continuous canopy of northern hardwoods interspersed with aspen, softwoods, and occasional temporary and permanent upland openings. Uneven-aged stands of sugar maple are common. Upland openings are scattered and small. White ash, yellow birch, red maple, northern red oak, eastern hemlock, eastern white pine, and other shade-tolerant species are also found. Table 27 describes the desired vegetative composition.

The combination of forest cover and openings provides habitat for diverse plant and animal species. Populations of deer, snowshoe hare, and ruffed grouse will be low. Recreational opportunities such as hunting, fishing, camping, backpacking, hiking, and cross-country skiing occur in a semi-primitive, non-motorized forest environment. Although not always readily apparent, human activity occurs. Recreation and special use facilities (trailhead signs, transmission structures, and utility corridors) are permitted provided they are compatible with the character of the area.

The management goal is for roads to be closed to public motorized vehicle use, except as needed for administrative and other uses associated with harvesting of timber products. The system of long-term local and collector roads within the area has an average density from 1.5 to 2.5 miles per square mile. Trails are closed for ATV, ORV, and snowmobile use except on roads and trails specifically designated as open to their use.

Management activities are planned to move MA 6.1 toward the desired future condition and then to maintain it. Activities featured include: protection of heritage resource sites, road closures (except for harvesting and administrative activities), and uneven-aged management of the timber resource.

Management Area 6.1 encompasses approximately 64,600 net National Forest (NF) acres in total which is distributed on the Forest in separate units of generally 3,200 contiguous (net NF) acres or larger.

Vegetative Management

Table 27. Management Area 6.1 Summary

Vegetative Composition - Forested Lands			
Vegetation Type	Final Harvest Product	Desired Future Condition -% Forest Land	Current % Management Area
Aspen	Sawtimber & Pulpwood	10-55	11.4
Softwood	Sawtimber	1-45	4.5
	Pulpwood	1-30	6.9
Hardwood	Sawtimber & Pulpwood	15-95	77.2
TOTAL Forested Land			**100.0**

Permanent Upland Openings	
Forest Plan Projected percentage	Current % Management Area
1-5	0.3

Road Density	
Forest Plan Objective	Current miles/sq. mi. Management Area
1.5 – 2.5 miles/sq. mile	1.6

Interpretation: Vegetative composition for MA 6.1 is largely consistent with the Forest Plan. The domination by the hardwood component is desirable in this MA. Although the objective for hardwoods is to be 95% uneven-aged management, about 60% of the hardwood stands are presently in an even-aged second growth condition, and only about 30% are in an uneven-aged condition, in this MA. Continued effort is needed to move these even-aged hardwood stands toward an uneven-aged condition through periodic improvement and selection harvest. Although aspen is only 10% of this MA, over 30% of this aspen acreage is currently over 60 years of age.

Table 28. MA 6.1 Vegetation Management Practices
In Acres Sold

Method of Harvest	*Forest Plan Level Decade 1	*Forest Plan Level Decade 2	Decade 1 Average (1987-1996)	FY 2002	FY 2003	Decade 2 Average (1997-2003)	17-year Average (1987-2003)
Clearcut	140	120	83	0	0	21	57
Selection	260	410	343	0	0	216	290
Shelterwood Seed	50	90	0	0	0	0	0
Shelterwood Removal	20	70	11	0	0	0	6
Commercial Thinning	40	**230**	**43**	0	0	32	38
TOTAL	**510**	**920**	**480**	**0**	**0**	**269**	**391**

*Forest Plan levels are in terms of annual average acreage of harvest by method, by decade. Decade 1 is for the period FY 1987-1996, and Decade 2 represents 1997-2006.

Interpretation: Vegetative management practices are generally behind planned levels. Harvest activities have generally placed greater emphasis on selection harvest of northern hardwoods, which is in line with plan projections. Even-aged management, including thinning, has occurred much less than estimated, and the level of clearcutting is about 44% of the projected level. Natural regeneration is being emphasized as planned in this MA**.**

To date, only 55% of the planned activities have been accomplished. Over the remainder of the plan period project decisions should include the full range of planned treatments, with emphasis on selection, thinning and clearcutting.

Wildlife

Current Resource Condition: Although MA 6.1 and MA 2.1 are vegetatively similar, MA 6.1 is quite different geologically. The high hills and bedrock outcrops provide panoramic vistas and excellent wildlife viewing opportunities, especially for raptors like broad-winged and red-tailed hawks. Management Area 6.1 also provides habitat for plant species dependent upon rock outcrops, shallow soils, and exposed sites, and for wildlife species requiring remoteness, and for species requiring large tracts of mature forest with unbroken canopy.

As described in the previous table, only a few acres of young forest types have been created in the last several years in this MA. The consequence of this is that certain wildlife species are likely becoming rare within this MA, such as woodcock and golden-winged warbler (both of which are declining range-wide).

In addition, MA 6.1 contains the only peregrine falcon nesting site on the Forest. Though the peregrine nesting site has not been used in several years, it remains protected from disturbance from human activities.

Management Area 6.2
Emphasis on a Semi-primitive Motorized
Northern Hardwood Forest Ecosystem

Management Area Goal and Direction: Emphasizes a semi-primitive, motorized recreation ecosystem providing for some ORV use (including snowmobiling and ATVs), and uneven-aged management of northern hardwoods with moderate harvesting of other vegetative types including even-aged management of aspen. Provides habitat for wildlife requiring remoteness. Most roads will be closed.

Desired Future Condition: Management Area 6.2 features a nearly continuous canopy of northern hardwoods interspersed with aspen, softwood, and some occasional permanent upland and temporary openings. Uneven-aged stands of sugar maple, with scattered permanent upland openings, are common. White ash, yellow birch, red maple, northern red oak, eastern hemlock, eastern white pine, and other shade-tolerant species are also found. Portions of the area may favor early successional plant communities. Table 29 describes the desired vegetative composition.

The combination of forest cover and openings provides habitat for diverse plant and animal species. Populations of deer, snowshoe hare, and ruffed grouse will be low in some portions of the area and high in others.

Recreation opportunities such as hunting, fishing, camping, backpacking, hiking, ATV riding, mountain biking, and cross-country skiing occur in a semi-primitive motorized forest environment. Recreation and special use facilities such as trailhead signs, transmission structures, and utility corridors are permitted, provided they are compatible with the character of the area.

Use of ORVs (such as snowmobiles and ATVs) occurs only on designated trails. Generally, roads and trails are closed to public passenger vehicle use. The system of long-term local and collector roads within the area has an average density from 1.5 to 2.5 miles per square mile.

Management activities are planned to move MA 6.2 toward the desired future condition and then to maintain it. These activities include an emphasis on uneven-aged management of northern hardwoods and even-aged management of aspen.

Management Area 6.2 encompasses approximately 52,900 net NF acres in total which are distributed on the forest in separate units of generally 2,840 contiguous (net NF) acres or larger in size.

Vegetative Management

Table 29. Management Area 6.2 Summary

Vegetative Composition - Forest Lands			
Vegetation Type	**Final Harvest Product**	**Desired Future Condition % Forest Land**	**Current % Management Area**
Aspen	Sawtimber & Pulpwood	10-55	25.7
Softwood	Sawtimber	1-45	4.4
	Pulpwood	1-30	8.6
Hardwood	Sawtimber & Pulpwood	15-95	61.3
TOTAL FORESTED LAND			**100.0**

Permanent Upland Openings	
Forest Plan Projected Percentage	**Current % Management Area**
1-5	1.8

Road Density	
Forest Plan Objective	**Current miles/sq. mi. Management Area**
1.5 – 2.5 miles/sq. mile	2.2

Interpretation: Vegetative composition is consistent with Forest Plan direction. As in the case of MA 6.1, uneven-aged management is the objective for over 95% of the hardwood component; however, about 35% of the hardwood acreage is currently in an even-aged second growth condition, and only about 50 % is currently in an uneven-aged condition. Additional effort is needed to move the hardwood component toward an uneven-aged condition through periodic selection and improvement cutting.

Aspen is a substantial component in the desired future condition of this management area, currently about 25% of the vegetative composition. One concern of the aspen component is that about 40% of the acres are over 60 years of age.

The aspen component is not distributed evenly among different areas of MA 6.2. However, a wide range (10-55%) of aspen component is acceptable with this MA.

Table 30. MA 6.2 Vegetation Management Practices
In Acres Sold

Method of Harvest	*Forest Plan Level Decade 1	*Forest Plan Level Decade 2	Decade 1 Average (1987-1996)	FY 2002	FY 2003	Decade 2 Average (1997-2003)	17-year Average (1987-2003)
Clearcut	420	340	240	0	0	60	166
Selection	100	260	306	0	0	446	364
Shelterwood Seed	70	50	4	0	0	6	5
Shelterwood Removal	20	20	23	0	0	80	47
Commercial Thinning	280	250	39	0	0	6	25
TOTAL	**890**	**920**	**612**	**0**	**0**	**598**	**607**

*Forest Plan levels are in terms of annual average acreage of harvest by method, by decade. Decade 1 is for the period FY 1987-1996, and Decade 2 represents 1997-2006.

Interpretation: Although average total harvest acres is only about 23% behind the Forest Plan averages, these harvests have emphasized selection cutting. The heavy emphasis on selection cutting over thinning was favored in project decisions since uneven-aged management is being emphasized in the hardwood type. Total acreage treated is still well below Forest Plan levels. Additional even-aged harvest is expected in future years. Clearcut acreage varies widely from year to year; over the past 3 years, sales have included a relatively low amount of clearcutting and a relatively high amount of selection cutting and removal cuts.

Over the seventeen-year period, clearcutting is less than 44% of the level projected in the Forest Plan. Clearcut harvest within MA 6.2 is being concentrated in areas with extensive acreage of older, diseased aspen. Project decisions to be implemented during the remainder of the plan period should favor even-aged harvest methods to the extent possible.

Wildlife

Current Resource Condition: Management Area 6.2 contains a considerable amount of vegetative diversity for its relatively small size, and having a semi-primitive motorized prescription presents a number of management challenges. This MA also contains a large upland opening with opportunities for waterfowl habitat enhancement. There is also a portion of a large winter deer yard in this MA. The management challenge is to identify a mix of these opportunities that is compatible with the management area prescription and satisfies public needs and concerns for this area.

Similar to the situation in MA 6.1, acreage of aspen clearcutting is far below target levels for the last several years. Therefore, young stands of aspen are becoming rare in this MA too. However, there have been a relatively large number of hardwood acres that have been regenerated to young, dense stands of seedlings and saplings, which provide habitat for many of the wildlife species that are normally associated with young aspen.

III. Contributors

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