MENOMINEE TRIBAL ENTERPRISES
BOARD OF DIRECTORS
November 29, 2012

REAFFIRMATION OF APPROVED FOREST MANAGEMENT PLAN FOR 2012 – 2027

CERTIFICATION

I, Michelle L. Dickenson, do hereby certify that I am the Secretary of Menominee Tribal Enterprises, the principal business arm of the Menominee Indian Tribe authorized to manage and operate the subject property as described in the Management Plan of Menominee Enterprises, a Tribal Enterprise of the Menominee Indian Tribe of Wisconsin of April 22, 1975, and approved by the Secretary of the Interior of the United States.

MOTION: **Lawrence Waukau moved to reaffirm the Forest Management Plan for 2012 – 2027, as approved by the United States Department of Interior on July 30, 2012 (and August 15, 2012) pursuant to authority delegated to Midwest Regional Office Director.**

Second to the Motion: Jerilyn Grignon

Motion Carried.

I hereby certify that the foregoing motion was passed at a regular meeting of the M.T.E. Board of Directors held on November 29, 2012, with a quorum being present by a vote of 7 in favor; 0 opposed; 0 abstentions; 3 absent (Bernard Kaquatosh, Laurie Reiter, Susan Waukau).

Date: November 29, 2012

Michelle L. Dickenson

Michelle L. Dickenson, Secretary
MENOMINEE TRIBAL ENTERPRISES

MENOMINEE TRIBAL ENTERPRISES
BOARD OF DIRECTORS
NOV. 29, 2012 AT 5:00 PM AT MTE BOARD ROOM
IN NEOPIT, WI. 54150

MOTION

LAWRENCE WAUKAU: I move to reaffirm the Forest Management Plan for 2012-2027, as approved by the United States Department of Interior on July 30, 2012 (and August 15, 2012) pursuant to authority delegated to Midwest Regional Office Director.

JERILYN GRIGNON: I second the motion.

CHAIRMAN: All those in favor of the Motion signify by saying Aye, Opposed. The Motion is carried: 7 for, 0 opposed, 0 abstentions, 3 absent (Kaquatosh, Reiter, S. Waukau).

Michelle L. Dickenson, Corporate Secretary
MTE Board of Directors

MENOMINEE TRIBAL ENTERPRISES

Forest Management Plan (Revised 1973)

2012 - 2027

MENOMINEE TRIBAL ENTERPRISES

FOREST MANAGEMENT PLAN
(1973 Revision)

2012 – 2027

FOR THE MENOMINEE RESERVATION

Submitted By: Marshall Pecore **Date** 6/12/12
Marshall Pecore
Forest Manager

Concur: _____ **Date** June 12, 2012
Lawrence Waukau, President
Menominee Tribal Enterprises

Approved By: MTE BOARD OF DIRECTORS **June 12, 2012**

_____ **Date** 06-12-12
Norman Shawanokasic, Chairman
Menominee Tribal Enterprises – Board of Directors

Approved By: _____ **Date** _____
(United States Secretary of Interior)

MENOMINEE TRIBAL ENTERPRISES

FOREST MANAGEMENT PLAN
(1973 Revision)

2010 – 2025

FOR THE MENOMINEE RESERVATION

Submitted By: Marshall Pecore Date 6/12/12
Marshall Pecore
Forest Manager

Concur: Lawrence Waukau Date 6-12-12
Lawrence Waukau, President
Menominee Tribal Enterprises

Approved By: ~~MTE~~ BOARD OF DIRECTORS June 12, 2012

Norman Shawanokasic Date 6/12/12
Norman Shawanokasic, Chairman
Menominee Tribal Enterprises – Board of Directors

Approved By: Date 7/30/12
(United States Secretary of Interior)

Acting Regional Director

PREFACE

The 2012[1] Menominee Forest Management Plan (1973 Revision), is prepared in accordance with the requirements of the Constitution and Bylaws of the Menominee Indian Tribe of Wisconsin, the Trust and Management Agreement Between the Menominee Indian Tribe of Wisconsin and Secretary of the Interior of the United States of America, and the Management Plan of Menominee Tribal Enterprises – the principle business arm of the Menominee Indian Tribe of Wisconsin.

In doing this, the FMP workgroup developed a plan that includes four main areas of change:

- First, it considered non-timber resources in the planning process. Representatives of non-timber resource concerns were members of the FMP workgroup throughout the entire revision process. The intent was to increase the level of collaboration during planning to reduce possible problems during plan implementation regarding silvicultural prescriptions.

- Second, increased involvement of tribal members through comment periods has helped shape the FMP. This was done through pre-planning comment periods by the MTL FMP Ad Hoc Committee in 2005 and followed up with a public comment period on the draft FMP in 2010. Self-determination can be found at all levels of forest management on Menominee, whether it is governmental, business, or individual.

- Third, the biggest change or inclusion of technical elements in this plan are; the use of the 1999 CFI analysis to develop revised cover type targets; discussion on the increased use of fire as a management tool; and discussion of management options for swamp conifer & hardwoods.

- Fourth, due to the increase amount of tribal lands that have been designated as "non-sustained yield" as in the Wolf River Corridor and Compartment 223). The forest and MTE is exposed to threats from these unmanaged acres adjacent to managed acreage. The Tribe must develop a plan to identify, inventory, and address the management and protection needs of these lands. Assistance from MTE and all of the partners involved in the Forest Management Plan will be vital.

While some of these changes are new for the Menominee FMP, it is important to remember the overarching goal is the management and protection of the Menominee Forest. It is in recognition of the high regard that the Menominee people have had for their forest resources and the land base that has sustained them for thousands of years.

1 In 2005, the United States Department of Interior ("U.S.D.O.I.") granted a request by the Menominee Indian Tribe to extend the then existing revised 1996-2005 Forest Management Plan by five years. Accordingly, the expiration date for the revised 1996-2005 Forest Management Plan was amended to reflect 1996-2010. However, in December 2010, on behalf of the Menominee Indian Tribe, the Menominee Tribal Enterprises and the Menominee Tribal Legislature each submitted to U.S.D.O.I. a proposed revised 2010-2025 Forest Management Plan for approval. On January 14, 2011, acting pursuant to delegated authority, the U.S.D.O.I.'s Bureau of Indian Affairs' Midwest Regional Director ("Director") rejected both proposed revised 2010-2025 Forest Management Plans ("Decision"). Additionally, in the Decision, the Director extended the revised 1996-2010 Forest Management Plan to June 30, 2011. Both Menominee Tribal Enterprises and the Menominee Tribal Legislature appealed the Director's decision to the Interior Board of Indian Appeals ("IBIA"). On June 1, 2011, as a part of that appeal, Menominee Tribal Enterprises filed a motion to extend the revised 1996-2010 Forest Management Plan until 90 days after the matter has been decided and all appeals exhausted. On June 23, 2011, the IBIA issued an Order granting MTE's motion, joined, in part, by the Menominee Tribal Legislature and the Director. Thereafter, Menominee Tribal Enterprises and the Menominee Tribal Legislature resolved the issues that prompted their separate appeal of the Director's Decision and, on May 8, 2012, IBIA dismissed the separate appeals. See 55 IBIA 14 (May 8, 2012). In accordance with the June 23, 2011 IBIA Order, the 1996-2010 Forest Management Plan expired on August 6, 2012. On June 11, 2012, Menominee Tribal Enterprises submitted for approval a revised 2012-2027 Forest Management Plan on behalf of the Menominee Indian Tribe to U.S.D.O.I. On July 30, 2012, the Director, acting upon delegated authority, approved the revised 2012-2027 Forest Management Plan.

CHAPTER 1 - UNDERSTANDING THE MENOMINEE FMP

1.0 INTRODUCTION

Management of natural resources has been an important part of Menominee for thousands of years. The Menominee people have a rich cultural heritage that has been transferred from generation to generation. The Menominee forest has always been managed by the tribal members through Menominee Indian Mills, Menominee Enterprises, Inc., Menominee Tribal Enterprises, with the assistance from several entities including, US Department of Interior-Bureau of Indian Affairs, the Wisconsin Department of Natural Resources and the USDA Forest Service.

Figure 1.1 Satellite imagery of the Menominee reservation after June 2007 tornado. Image from UW-Madison Environmental Remote Sensing Center. Accessed online 8/20/2008

A forest management plan is a written document designed to 1) document goals and strategies, 2) describe the resource and the current condition, and 3) identifies processes and procedures necessary to develop prescriptions as well as a timetable for completion.

For the Menominee Tribal Enterprises, the management goals have been maximizing the quality and quantity of saw timber grown under sustained yield management principles, while maintaining the diversity of native species. These goals are grounded by the principles contained within the words of Chief Oshkosh, when he was asked how the Tribe should harvest timber:

> "**Start with the rising sun and work toward the setting sun, but take only the mature trees, the sick trees, and the trees that have fallen. When you reach the end of reservation, turn and cut from the setting sun to the rising sun and the trees will last forever**"

This Forest Management Plan was written in coordination with Menominee Tribal Enterprises (MTE) staff and Menominee Indian Tribe of Wisconsin (MITW) Natural Resources staff. The technical development of this Forest Management Plan was also assisted with participation of the Bureau of Indian Affairs (BIA), the Wisconsin Department of Natural Resources (WWDNR) and other cooperating partners. Menominee Tribal

Enterprises is responsible for the implementation of this plan, with all four agencies, MTE, MITW, BIA and WDNR working together to sustain a healthy forest for future generations.

1.1 MENOMINEE - 1854 TO PRESENT

The Treaty of May 12, 1854, established the Menominee Reservation. Initially, the small Keshena Falls sawmill manufactured lumber, shingles and other products primarily to supply the needs of the Tribal community. In 1871, the sawmill began manufacturing pine lumber for sale outside the Reservation. This operation continued for 15 years, and between 1871 and 1890, approximately 100 million board feet of logs were cut for sale from dead and downed timber.

The Congressional Act (26 Stat. 146) of June 12, 1890, allowed the cutting of standing green timber and established the annual allowable cut on Menominee at 20 million board feet. This Act was a legislative landmark, as it recognized the need to limit indiscriminate cutting that would deplete the forest resource and eventually deprive the Menominee of their economic livelihood. The Act marked one of Congress' first attempts to prescribe sustained-yield management on federally controlled lands, recognizing the nation's shift toward a conservation land ethic. Harvest of Menominee timber continued under this legislation and from 1890 to 1907, approximately 290 million board feet of timber were cut and sold. On July 16, 1905, a windstorm in the western part of the Reservation blew down an estimated 40 million board feet of hardwood and Hemlock. The need to salvage this large timber volume was limited by the 20 million board feet allowable cut limitation established in the 1890 Act Congress.

The Congressional Act (Pub. L. 74-60) (35 State. 51) of March 28, 1908 authorized the salvage of the downed timber and construction of the Neopit sawmill to maximize economic benefit to the Tribal members. More important, it further strengthened the sustained-yield concepts contained in the Act of 1890, by adding language such as "the protection, preservation, and harvest of the forest upon the Reservation."

The Indian Reorganization Act of June 18, 1934, established Secretarial trust responsibility on the Menominee Forest accordingly: "The Secretary of the Interior is directed to make rules and regulations for the operation and management of Indian forestry units on the principle of sustained-yield management..." The Secretary defined sustained-yield under 25 CFR, Part 163, Section 163.1 as "... the yield of forest products that a forest can produce continuously at a given intensity of management." While under Section 163.4, sustained-yield management requires "... practical methods of harvest, based on sound economic, silvicultural and other forest management principles... Harvest schedules shall be directed toward achieving an approximate balance at the earliest practical time, between maximum net growth and harvest..."

The Menominee Termination Act of June 17, 1954 "terminated federal supervision over the property and members of the Menominee Indian Tribe of Wisconsin". Although the Menominee Termination Act of 1954, removed the Reservation from federal trust protection status. Section 896 of this Act required "The plan shall contain provision for protection of the forest on a sustained-yield basis and for the protection of the water, soil, fish and wildlife." Historically, the sustained-yield requirement was intended to ensure that the only significant source of jobs, economic development and tax revenue on Menominee, i.e., the forest and Tribal sawmill, are preserved. This provision of federal law led to State of Wisconsin Chapter 258, Laws of 1959, creating 70.335 of Wisconsin Statutes, Valuation and Assessment of Sustained-Yield Forest Lands.

Wisconsin Statute 70.335 This statute defined sustained-yield management and sound forestry practices to comply with federal law. Under 70.335(1)(a), "Sustained-yield management

means that the lands taxed under this section shall be operated in a manner which will provide for a continuous annual harvest of high quality forest products on a permanent basis." Further, 70.335(1)(b) established "Sound forestry practices mean those timber cutting, transporting, and forest cultural methods which will best propagate and improve the various forest types. Such practices shall be those which are recommended by the WDNR for various timber types common to Wisconsin and which are used by the WDNR on lands under its jurisdiction." Wisconsin Statute 70.335 codified sustained-yield forest management during the termination period to ensure that the Menominee Forest was protected from exploitation and would continue to provide forest products to the Neopit sawmill.

The Menominee Restoration Act (Pub. L. 93-197, of December 22, 1973, repealed the Termination Act and reinstated The Menominee Indians of Wisconsin as a federally recognized sovereign Indian Tribe. The Act also preserved the rights and privileges articulated under the provisions of the Indian Reorganization Act of June 18, 1934.

Restoration Plan
This Plan allowed for provisions "that the forest will continue to be operated on a sustained yield basis. The Trust and Management Agreement specifically states this requirement in Section 6, and the Forest will be operated according to the existing Forest Management Plan, which sets forth detailed procedures for operating the tribal forest on a sustained yield basis."

The Trust and Management Agreement of April 22, 1975,
The Trust and Management Agreement defines the unique trust relationship established in the Restoration Act between the Menominee Indian Tribe of Wisconsin and the federal government. The agreement "is intended to provide maximum self-determination to the Tribe…the parties wish to provide for federal protection, but not federal domination."

The Agreement also included "all Tribal land which is forest land shall be operated on a sustained-yield basis. All such forest land shall be managed pursuant to the Forest Management Plan: Menominee Enterprises, Inc., 1968-1982 (1973 Revision). The Tribe guaranteed that the forest would continue to operate on a sustained-yield basis, by incorporating the sustained-yield provision of the Trust and Management Agreement into Article XII of the Constitution. Menominee Tribal Enterprises has been charged with the responsibility of managing the forest, which is held in trust by the Secretary of the Interior for the benefit of the Menominee people.

Management Plan of April 22, 1975
The Management Plan included a section that the "tribal enterprise shall operate all forest lands on a sustained yield basis according to the provisions of the Forest Management Plan (1968-1982, revised 1973).

Constitution and Bylaws of Menominee Indian Tribe of Wisconsin adopted Nov. 12, 1976,
The Tribe guaranteed that the forest would continue to operate on a sustained-yield basis, by incorporating the sustained-yield provision of the Trust and Management Agreement in to Article XII of the Constitution and Bylaws. Article XII, Section 2 (a) "All tribal forest lands shall be managed on a sustained-yield basis according to the provisions of the Forest Management Plan: Menominee Enterprises, Inc., 1968-1982 (1973 Revision), including any revisions which may in the future be made in that document."

Sustained yield has been an inherent practice for the Menominee since their existence. The Menominee have ensured that the sustained yield concept has been incorporated in all the

federal and tribal legal documents in order to preserve the Menominee Forest for the next generations.

1.2 FMP CLOSURE/COMPLIANCE/MONITORING

To truly measure whether or not the Forest Management Plan has met the intended goals an individual would have to live 150 years to compare the beginning inventory to the ending inventory. Therefore, to prevent overcutting, undercutting and neglect, monitoring on an "annual basis" is essential. The Menominee Tribal Enterprises records and maintains data on a regular basis with certain information retrieved for monthly committee and Board reports. The primary document MTE utilizes for monitoring is the approved prescription. This document contains all information necessary to monitor all forest activities for compliance with the FMP. MTE must adhere to the prescription process as indicated in Section 5.4 of the FMP.

Upon completion of each forestry activity, MTE Forestry staff reviews the prescription and determines whether or not it has been properly implemented. This includes but is not limited to; was the prescription approval process followed; was the prescribed method utilized; was the prescription completed in the correct time frame; were there deviations from the prescription and documentation as to why; etc. Summaries of these reviews are submitted to the MTE Forest Resources Administrator who provides a final report to the Board of Directors for acceptance. At the end of each harvest season a report containing the following information will be provided to the MTE Board of Directors.

- A list of approved prescriptions that were scheduled for implementation for the past logging year
- A progress report of prescriptions that were scheduled for implementation for the past logging season
- An explanation of deviations from the prescriptions (i.e. archeological find, etc.,)
- The projected harvest by species for sawlogs and pulp for the past logging year
- A final harvest by species for sawlogs and pulp for the past logging year
- An explanation of the variations from the projections for sawlogs and pulp for the past logging year

The Menominee Indian Tribe of Wisconsin, through the, Menominee Tribal Enterprise, submits a report to the Secretary of Interior-BIA. The report serves as the tribe's formal documentation to be used in the Annual Determination as described in the Trust and Management Agreement, Section 6.

The Secretary of Interior reviews and approves the Annual Determination. The BIA has opportunity to monitor, review and provides guidance as indicated in this FMP, ensuring that the Secretary's fiduciary and trust responsibilities to the tribe are being fulfilled.

1.2.1 Plan Approval

The FMP is developed and implemented by MTE, as the entity entrusted with responsibility under the authority of the Constitution and Bylaws of MITW. Specifically, Article XII, Section 2 (b) "shall be to log, manage, and reforest the tribal forest land, and to manufacture, market, sell and distribute timber, forest products, and related products. The Successor Business shall be granted with all powers necessary to manage and operate the subject property in order to properly perform its duties as set forth herein." After approval by the MTE Board of Directors, the plan is submitted to MTL and the DOI.

1.2.2 Plan Period

The FMP shall be in effect for the year it was approved and shall be valid 15 years along with the provision that it may be extended for a period not to exceed 5 years from the initial expiration date.

1.2.3 Amendments

FMP amendments will be guided by the following process; 1) MTE staff will meet to discuss any potential amendment(s), and develop draft amended language. 2) MTE will solicit public comment on any draft amended language and if necessary incorporates the public comment into the proposed amendment and forwards it on for approval from the MTE Board of Directors; 3) the MTE Board of Directors will send a document describing the amendments and a final draft of the amended language to MTL and DOI. This process may be expedited in cases of an emergency nature (i.e. insect or disease outbreak, large fire incidents, etc.).

1.3 EDUCATION AND PUBLIC AWARENESS

The Menominee Forestry Center staff supports and promotes community awareness of the forestry program. This includes such things as tours, field activities, urban forestry projects and other special events such as Earth Week and Arbor Day.

The Menominee Forestry Center also provides tours to diverse interest groups, ranging from concerned local people to various resource management agencies. Menominee Tribal Enterprises also regularly attends important technical forestry/natural resources symposia, presenting papers on the Menominee Forestry Program, sustained-yield management, ecosystem management and forest management planning. The continued exchange of technical information serves to make the Menominee Forestry Program stronger. Education and Public Awareness will be based on available funding.

1.4 SPECIAL RESEARCH CONSIDERATIONS

MTE may conduct several ecological restoration projects. These projects, with MTE Board of Director's approval, as with all other silvicultural prescriptions are developed as part of a larger landscape management objective.

CHAPTER 2 - FORESTWIDE GOALS

2.0 FOREST MANAGEMENT GOAL

Menominee Tribal Enterprises and their cooperating partners are able to work together to ensure that the highest standards are met when managing and protecting the Menominee natural resources. The overall forest management goal of the Menominee Tribal Enterprises is:

> **Maintain the diversity of native species and habitats, continue to improve environmental and cultural protection, improve planning efforts, further develop economic opportunities, promote communication and increase environmental education for the Menominee people, while maximizing the quantity and quality of forest products grown under sustained yield principles.**

The strategies that achieve these goals include:

- Incorporation of the interests of tribal members as expressed through elected officials and public commentary into the forest management goals
- Establishment of near- and long-term cover type targets (measured in acres) that maximize forest diversity
- Development of harvest schedules that ensure diversity in species composition, stand structure, and age distribution across the forest
- Development of management prescriptions that direct forest stands toward specific objectives within stands and across landscapes
- Incorporation of sustainable management tools, including harvesting, fire, and pre-commercial treatments
- Incorporation of water quality as a management objective on all treatments
- Incorporation of historic preservation as a management objective on all timber harvest treatments
- Incorporation of wildlife habitat goals on all treatments
- Incorporation of soil preservation on all treatments

2.1 CONCEPT OF SUSTAINABLE FORESTRY

The 160-year history of forest resource use and management on the Menominee Forest stands as a practical example of sustainable forestry Sustained-yield management, as traditionally and currently practiced on Menominee, predates the concepts currently evolving in discussions among resource managers. It is a history of management that is ecologically viable, economically feasible, and socially desirable. This refers not only to forest products and social benefits, but also to wildlife, site productivity, and other ecosystem functions. The varied composition of the forest at Menominee offers a much broader range of choices than would have existed had a long-term policy of sustained-yield not been in place.

<u>TYPICAL FOREST PRACTICES AND MANAGEMENT</u>

In typical forest management, success is measured in board feet and market price. If market prices are expected to be high, more trees are harvested. If the market price is low, the harvest is reduced. To prevent over harvesting, an annual allowable cut is determined. The projected harvest is measured against the actual harvest to determine whether or not the intended result has been accomplished, both in board feet and dollars. The Annual Allowable Cut (AAC) is often a theoretical maximum volume limit such as 20MMBF per year. This is purely volume control and with no regard for future conditions of stands and other non-timber resources. Typical forest management is focused primarily on the production of quality and quantity of sawtimber that can

be sold for the highest market price and therefore, the forest management plan is developed with the primary goal of financial gains. Managing a forest under the sustained-yield concept is significantly different from typical forest management.

SUSTAINED-YIELD PRACTICES AND MANAGEMENT

For the Menominee, quality and quantity are of great importance while at the same time, developing the plan to; maximize diversity in forest composition; sustain wildlife, vegetation, aquatic life, culture, and to leave the land with acceptable aesthetics. Therefore, the Menominee manages its total forest resources rather than simply managing the trees within the forest.

Since sustained-yield management is a long-term method of forest management, it cannot be measured annually using the same method of typical forestry. Instead, Menominee measures its success in increments of 10 – 15 years utilizing the Continuous Forest Inventory (CFI) data. In addition, the MTE determines the Operating Inventory (OPINV) for the entire 15 years. This OPINV is then used to identify what needs to be done to reach the desired growth, yield, and cover types necessary to achieve the projected 150-year goals. The Menominee approach to the calculation of the AAC predicts cut volume per year given the application of the approved silvicultural prescriptions. Since the prescriptions are written to ensure that the forest is managed on a sustainable basis within each forest stand, they serve as a volume control that prevents the detrimental treatment of the forest. As prescriptions are adjusted, the AAC is recalculated to provide an updated predicted cut volume.

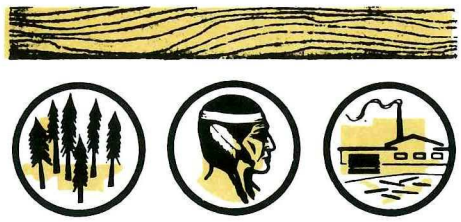


Figure 2.1
The original logo for MTE represents, environment, social and economic sectors of forest management.

2.2 BIODIVERSITY

On the Menominee forest, there is approximately 220,000 acres of forestland delineated into more than 9,000 distinct timber stands. These stands are defined by attributes such as tree species composition, tree size, volume, or number of trees per acre. Forest stands occur on a variety of soils and topographical or geologic features interspersed with streams and lakes. This combination of physical and biological elements has evolved into diverse plant and animal communities (or ecosystems). The retention of old growth forests that support a wealth of species and natural communities is unique in northeastern Wisconsin. For example, the white pine forests within the Menominee Reservation are unlike any other stands within the Great Lakes States with documented specific ecological niches. Mixed hardwood stands that are under sustained yield management have resulted in excellent habitat for large mammals like white-tailed deer, bear and wolves. In addition, there are thousands of species of nonvascular plants and invertebrates.

The southeastern portion of the reservation has stands of mixed jack pine, white pine and red pine that potentially can be restored to pine barrens habitat. Barrens once occupied a significant ecological niche on the forest, but over the years have succeeded toward a pin oak component in the absence of fire. Integration of fire onto the landscape may assist in assuring that biodiversity

remains a priority and a management goal. With the emergence of the biomass markets, these types of restoration projects (ecological and cultural landscapes) will become more economically feasible. Forest products that were once viewed as waste or non-merchantable are now being sought after as a source of renewable energy.

2.3 UNITED STATES TRUST RESPONSIBILITY

The trust relationship between the United States of America and the Menominee Indian Tribe of Wisconsin is reflected in the Menominee Restoration Act, 25 U.S.C. § 903 *et seq.* (including, without limitation the provisions of 25 U.S.C. § 903a and the statutes referenced therein), the Plan for Transfer of All of the Assets of Menominee Enterprises, Inc., a Wisconsin Corporation, Pursuant to Sections 6(a) and 6(b) of the Menominee Restoration Act, the Management Plan of Menominee Tribal Enterprises, a Tribal Enterprise of the Menominee Indian Tribe of Wisconsin, dated April 22, 1975, and the Trust and Management Agreement attached as Exhibit D thereto, together with the controlling precedents of the United States Supreme Court.

2.3 MULTI-AGENCY COOPERATION

Forestry operations at the Menominee Forestry Center represent the combined efforts of four agencies, MTE, MITW, WDNR, and BIA.

Menominee Tribal Enterprises: Performs forestry services as required by the Forest Management Plan.

- Forest Management – This carries out the majority of timber harvest preparation, monitoring and post harvest monitoring activities.
- Forest Development – This is charged with carrying out required reforestation and restoration efforts.
- Fire Management – This is charged with providing forest fire protection as well as implementing prescribed fire projects for reducing wildland fire hazards and/ or managing timber cover types.

Menominee Indian Tribe of Wisconsin: Responsible for the protection of non-timber resources through monitoring and regulation of forestry activities.

- Conservation/ Fish & Wildlife – Responsible for implementing and enforcing conservation laws of the Tribe.
- Environmental Services – Responsible for programs and services aimed at implementing, monitoring, and enforcing the various health, safety, and environmental laws of the Tribe.
- Historic Preservation – Responsible for identifying and registering properties of historic, archeological, or anthropological importance to the Tribe.
- Trust Resources – Provides program support to MITW programs as necessary, and serves as a liaison.

Bureau of Indian Affairs: The BIA, as D.O.I. delegated trustee, monitors the forest's yield and provides technical forest management assistance, when requested, under the defined terms of the Trust and Management Agreement.

Wisconsin Department of Natural Resources: Operates on the Menominee Forest within the framework of two distinct facets:

- Tribal Liaison – This position serves at the local level in providing effective and efficient services for the Tribal and WDNR programs located on Menominee. Position is not

currently stationed on the reservation.

- Forest Fire Protection Agreement, between the BIA and the WDNR, provides WDNR forest fire protection assistance on federal trust lands on the Menominee Reservation for which the BIA reimburses the WDNR.

Each agency has distinct responsibilities, yet work together to achieve the same goal— the best management and protection possible for the Menominee Forest.

Figure 2.1 The Hilary J. Waukau Environmental Services Center in Keshena WI houses the MTE Forestry Dept., MITW Trust Resources, MITW Conservation/ Fish & Wildlife and MITW Environmental Services

2.4 ADAPTABILITY TO CHANGES IN RESEARCH AND TECHNOLOGY

As breakthroughs occur and opportunities arise in research and development of technology in ecological and traditional forest management, Menominee Forest will continue to be a model of using these new ideas to accomplish various management objectives on the forest. Tools, equipment, research and techniques used in forest management have drastically evolved over the last 150 years and will continue to advance. Invasive species and a changing climate also prompt new technology. MTE plans to continue to evaluate and adapt accordingly.

Other possible technologies that may prove to be useful in the future:

- Use of biological controls that have been shown effective against invasive species
- New equipment for timber harvesting and forest product utilization
- Renewable biomass harvesting and marketing
- New research produced for improved techniques in forest management
- Research for new management methods in Menominee timber types
- Improvements in technology for equipment
- Improvements in computer technology for data management
- Expanded and emerging markets for forest products

CHAPTER 3 - MULTIPLE USE RESOURCE MANAGEMENT

3.0 INTRODUCTION

In the 1995 Menominee FMP, the discussion of the management goal and concept of sustainable forestry touched on Menominee version of multiple-use management; an example of ecologically viable, economically feasible, and socially desirable forestry. The purpose of this chapter is to reaffirm that discussion by describing current multiple use activities which impact the forest ecosystem and in turn are impacted by forest management activities.

3.1 GOALS AND STRATEGIES

The goal of multiple-use management is to manage the forest for multiple attributes by recognizing the interdependent relationships between timber- and non-timber related objectives.

The strategies that achieve this goal include:

- Tribal activities that have historically taken place in the forest
- Identification of current uses of the forest
- Identification of potential impacts of forest management on other uses of the forest
- Minimize impacts on non-timber uses of the forest while meeting timber production objectives
- Consider non-timber uses of the forest when planning harvest and other treatment operation
- Consider cultural attributes of the forest when planning treatment options

3.2 PAST TRIBAL ACTIVITIES

Ancestral Tribal lands encompassed more than 10 million acres of forest, lakes, lakeshores, and prairies. These lands served the Menominee people in a myriad of ways, providing them with shelter, sustenance, utensils, ceremonial necessities, and protection. The ability to obtain these services was the primary means of existence for the Tribe. However, with the advance of time and European populations, a transition began from this primary dependence on the Menominee forest to a more supplemental and/or recreational dependence that the majority of tribal members experience today. This transition occurred as several treaties and land successions were carried out, which reduced Menominee lands to the present day 235,000 acres.

3.3 CURRENT MULTIPLE USE ACTIVITIES

Access to tribal forest lands is specifically reserved for Menominee tribal members. The Menominee governing body has extended very limited hunting and fishing privileges to Menominee descendants. While not every Menominee lives within or near enough to the reservation to access tribal forest lands, or exercises their rights to camp, hunt, fish and gather, the population has increased while the land base remained finite. This means an increased pressure on the natural resources of the Tribe.

The introduction of Tribal Ordinances to regulate some of the multi-use activities mentioned has been seen as a necessary method for monitoring and controlling increased use of the tribal natural resources. The Tribe has undertaken measures in the management and protection of its lands and granted limited access to non-tribal members for Tribal work related activity, educational research and public tours. Should non-tribal members be granted access to tribal lands for specific benefit of the Tribe, gathering is both forbidden and controlled. The specific process for providing non-tribal members access to tribal lands is governed by the Menominee Tribal Legislature.

3.4 FOREST MANAGEMENT CONSIDERATIONS OF MULTI-USE ACTIVITY

When managing the forest, considerations for multi-use activities will be given during the silvicultural prescription development phase. A short discussion on these efforts is included below. In addition, there is a need for more staffing in the areas of entomology and forest ecology issues due to diversity and the ever increasing impact of invasives.

3.4.1 Wildlife

When designing the prescription for a harvest, and deciding the boundaries of a harvest area, environmental factors which effect wildlife populations will be considered. Some of the factors that will be considered are travel corridors, forest edges, and grassy openings. Food sources can be maintained in areas of the harvest unit to meet the requirements of wildlife species. For example, 1-2 acre Aspen clones can be left within an Aspen harvest to provide ruffed grouse with the Aspen buds they use as winter food. The edges of harvest units and buffer areas between harvest units can be designed to favor either those wildlife species that prefer edges or those that do not. Grassy openings can be maintained throughout the forest to enhance the habitat for species, such as white tail deer, woodcock, black bear and various songbirds, which use these areas. Without management, these openings will eventually convert back to trees. Baseline data on wildlife species populations is necessary and is being compiled. Future management decisions, with respect to wildlife, can be improved with this additional information. Menominee Tribal Enterprises, along with the WDNR, and the Menominee Conservation Department, actively gather the data required to provide for the needs of wildlife populations on Menominee. The MTE forest management ethic, practiced for more than 140 years, has provided suitable habitat for large populations of threatened and endangered species, such as bald eagles and red shouldered hawks. The concern for the whole forest ecosystem will continue[2].

3.4.2 Endangered Resources

Forest management treatments may affect certain threatened or endangered species, such as bald eagles or Karner blue butterflies. Potential effects, both adverse and beneficial, on these species may require the alteration of management techniques. Example are, harvest operations near eagle nests can be conducted when the birds are not present, so they will not be disturbed, and areas of Karner blue habitat can be excluded from of the harvest unit, or harvest can be timed to have minimal impact on the butterflies.

Using the environmental checklist, proposed treatments are evaluated to determine if a given forestry treatment might affect any threatened or endangered species. In most cases, a treatment can be modified, or timed, to minimize or eliminate adverse effects on these species. If a proposed forestry treatment cannot be modified to minimize an adverse effect on threatened/endangered species, an environmental assessment may be required.

All possible steps will be taken to avoid adverse impact on threatened and endangered species. It is MTE's desire to manage the forest on a sound ecological basis, and wildlife populations are an integral part of the ecosystem.

There is a need for more baseline information on the populations of endangered or threatened species in the forest. The Menominee Conservation Department is responsible for conducting surveys to determine the locations and distributions of threatened and endangered species.

2 A more detailed description of how wildlife concerns are integrated into forest management planning can be found in Chapter 9, “Wildlife Habitat”.

3.4.3 Soils[3]

The soils of the forest have been classified and mapped by the U.S. Natural Resources Conservation Service. This effort, completed in 1998, greatly expanded the knowledge of the soils, their properties, and management implications. Soils classification combined with forest habitat classification (discussed in Chapter 7), allows a more detailed analysis of habitat type, soils, and tree growth. The additional information acquired with the classification allows for better assessment on the impacts of the silviculture practices. This information helps to reduce any identified undesirable effects, such as erosion and compaction due to road design, road construction, skidding, and time of harvest. See the Forest Operations section for more information on soils and Harvest Administration.

3.4.4 Water Resources[4]

Menominee Tribal Enterprises is responsible for the management of the Tribe's timber lands, but has no direct management authority in Waters/Fisheries. These resources are under the direction of the MITW. However, MTE realizes that forest management activities can affect these resources and takes all precautions to minimize this impact. As a result of forest management which limits erosion through harvest unit boundary designs, road layouts, and skidding, MTE minimizes the potential for negative impacts on Waters/Fisheries. Additionally, MTE cooperates with Tribal Environmental Services Department in the identification of discharge sites of potentially hazardous materials occurring on the forest.

3.4.5 Cultural Resources[5]

The Menominee Forest, located within the traditional territory of the Menominee Tribe, has been used to gather natural resources, and as a home. Thus, there are numerous cultural resources to be found in various parts of the forest. Burial sites and settlements are common in many areas of the forest. It is MTE's intent that the disturbances to significant cultural resources are minimized or avoided. Staff paraprofessional archaeologists review cultural resource sites as they are discovered. In addition, all treatments are evaluated using the environmental checklist which reviews potential cultural resource impact. When a cultural resource site is discovered, MTE takes steps to ensure that any disturbance is minimized or the site is avoided. If the area must be treated, MTE evaluates the effectiveness of treating the site during frozen ground conditions. MTE also makes every effort to coordinate with the Tribal Historic Preservation Officer when these areas are encountered.

3.5 IMPACTS OF FOREST MANAGEMENT ON MULTIPLE USE ACTIVITIES

The historic and current use of sustained yield management has created a mosaic of forest cover types that cater to a wide variety of multi-use activities. The following gives a breakdown of the perceived positive impacts derived from management of the forest:

- Hunting: The diversity of cover types and a discussion of the influence they have on wildlife populations can be found in Chapter 9. Fishing: While timber harvesting may not directly improve fishing activities, MTE considers Wisconsin’s BMP’s to assure that riparian zones are not adversely affected. For more information on how timber harvesting is conducted near water sources see chapter 10.

3 A more detailed description of soils and their implications for forest management on Menominee can be found in Chapter 11 “Sustainable Soil Productivity”

4 A more detailed description of water resources and their protection during forest management activities can be fond in Chapter 10 “Riparian Areas”

5 A more detailed description of the cultural and historical heritage of the Menominee can be found in Chapter 8 “Cultural Resource Management”

- Gathering: The gathering activities that are available to tribal members are many, and the effects that forest management activities have on their survival have not been well documented. However, management efforts by MTE Forestry & Fire work to promote protection & regeneration of the more well-known plant species. The MTE Forest Development & Fire Management programs both include consideration of gathering activities as objectives in their work plans.
- Sugar Maple Camps: Planned timber harvests that occur near current sugar maple camps usually consider the non-timber use. At times the area surrounding a sugar maple camp has been avoided out of consideration to the camp, but also because the timber from the trees in the area may have stains due to the taps.
- Camping: For the Menominee, there are several well used camping sites that exist around the reservation. These are areas that families use for fishing, hunting, or gathering and recreational activities.

The association of forest management activities with the multi-use activities listed above is only a glimpse of positive impacts that management activities have on the forest. There are many other positive impacts considered when monitoring sustained yield forestry practices. These efforts are supported by Tribal entities involved in the management and protection of the Menominee natural resources.

CHAPTER 4: FOREST MANAGEMENT OPERATIONS

4.0 INTRODUCTION

This chapter describes the sequence of activities and flow of information that are carried out by MTE Forestry while accomplishing the goals set forth in the Management Plan. This includes long-term planning, prescription development, timber harvest administration and forest development activities.

4.1 GOALS AND STRATEGIES

The goal of the organizational structure described in this chapter is to develop and implement management activities in the forest in a professional, sustainable, and efficient manner.

The strategies that achieve this goal include:

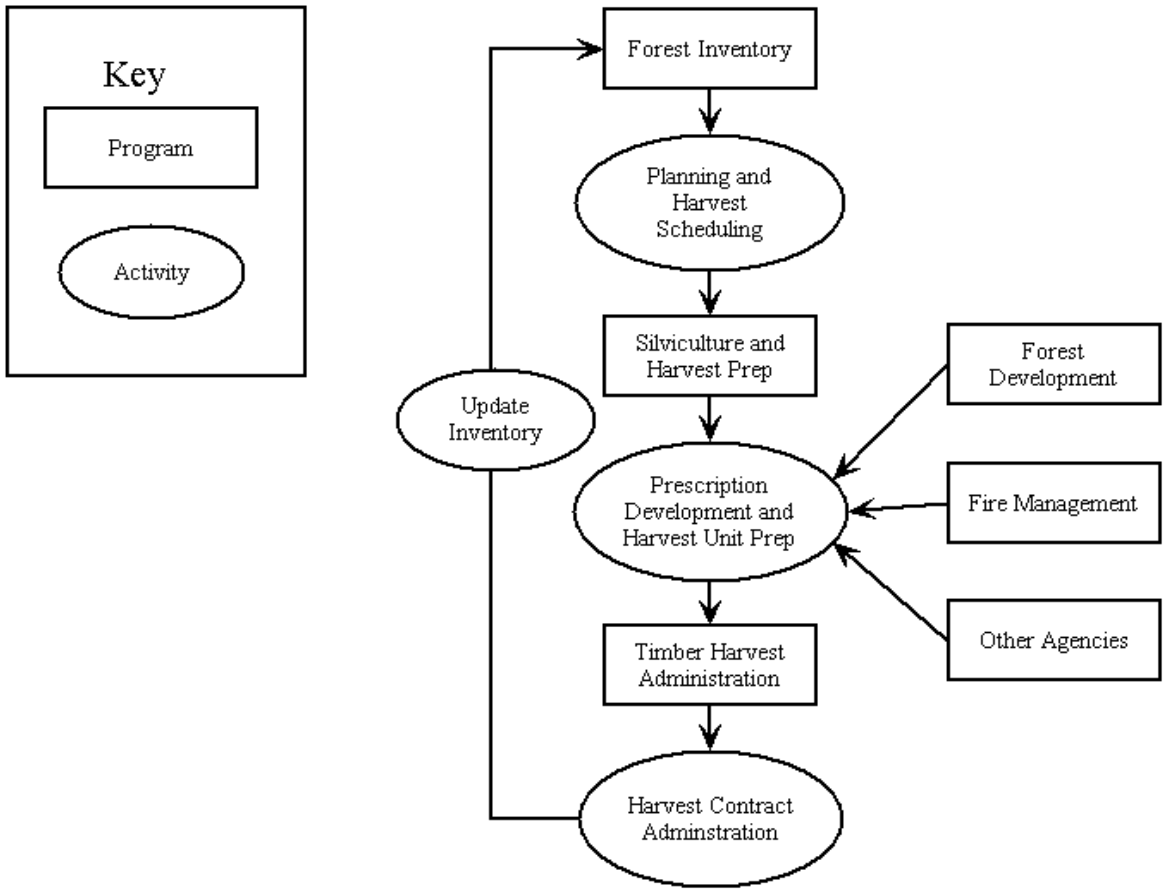
- Establishment of programs that carry out essential forest management activities
- Continually refine processes in an effort to address inefficiencies, implement advances in technology (e.g. information technology), and manpower constraints
- Provide a concrete framework to describe the role of everyone working in Menominee forest management and the relationship between the different programs

4.2 BASIC OVERVIEW

Figure 4-1 illustrates the basic organization between the programs that comprise the overall MTE Forestry department. These consist of Forest Inventory, Silviculture, Timber Harvest Administration, Forest Development, and Fire Management. Timber harvests and other activities are developed by following an established sequence of decisions, input, and discussion.

Typically, **Forest Inventory** conducts long- and near term planning and harvest scheduling based on targets, goals, and current knowledge of the forest composition. **Silviculture** follows the guidelines of the harvest schedule to develop harvest prescriptions. These documents describe the manner in which a forest stand is to be prepared for harvest, how the harvest is to be conducted, and the management objective of the harvest. **Harvest Prep** delineates the harvest unit, marks the timber, and estimates the volume of timber to be removed from the unit. **Timber Harvest Administration** (THA) works with the logging contractors to ensure the units are harvested according to the prescription, and evaluate the performance of the logging contractors to protect the soil, water, and forest resources. **Forest Development** (FD) works with the other programs to develop and implement prescriptions of a pre-commercial nature (e.g. pre-commercial thinning, planting, site prep, etc). **Fire Management** (FM) conducts fire suppression activities across the forest, and develops and implements burn and fuels reduction prescriptions and activities that complement the goals of Forest Development and Silviculture. The results of all operations are recorded in the Forest Inventory databases to update the system and inform future decision making processes. **Other Agencies** (e.g. MITW Environmental Services, Historic Preservation, etc.) provide input and signature authority to prescription development and implementation.

Figure 4.1 Summary of the sequence of activities performed developing, setting up, and executing management activities.



4.3 DETAILED OVERVIEW

As shown in the process flow diagram in Appendix E, forest management, especially those activities that involve timber harvesting, can be broken down into five core areas of responsibility (also known as *Programs*): Forest Inventory, Silviculture, Timber Harvest Administration, Forest Development, and Fire Management. The responsibility of each program is described in the next section.

In general terms, the process can be summarized as follows (each bullet corresponds with a box on the diagram, as indicated by the bullet number):

1. Continuous Forest Inventory (CFI) – CFI provides the strategic-level information necessary for long-term planning.

2. Operations Inventory (OPINV) – OPINV provides a stand level inventory of the entire reservation for tactical (near-term) planning.

3. Harvest Scheduling – Trends and goals from CFI are combined with more precise information on stand-level inventory in OPINV to develop an operational harvest schedule.

4. Silviculture uses the harvest schedule to develop harvest prescriptions; input from Tribal Historic Preservation, Fire and applicable MITW departments. MTE adjusts

prescriptions as necessary.

5. Once approved, stands are marked, cruised, and checked according to prescription.

6. Bid Packages are prepared by the Harvest Prep forester and handed off to THA.

7. THA administers the bid.

8. Harvest contracts are prepared by THA.

9. Harvesting occurs and sawlogs are delivered to the mill in Neopit, and is tracked using (pulp) scale delivery tickets.

10. Pulpwood is delivered to mills off the reservation, tracked using (pulp) trip tickets.

11. Harvest contracts are continually monitored by THA foresters and technicians.

12. Jobs are completed. Any remaining fines and assessments are paid prior to closeout.

13. Post-harvest surveys are conducted by THA and Forest Inventory. THA checks to ensure that all work is completed and then the contract is closed. Inventory updates all databases to reflect changes in contract status and to the composition of the forest (e.g. changes to OPINV).

Forest Development (FD) enters the process by administering non-harvest prescriptions (i.e. treatments) that are necessary for accomplishing the goals set forth in the harvest prescriptions and long-term forest goals. These include site preparation, planting, and pre-commercial thinning. FD also performs surveys to track the needs of recent (within the last 15 years) activities; this allows them to plan ahead to address stand-specific needs throughout the forest.

4.4 PROGRAM DESCRIPTIONS

This section describes the responsibilities of each program in Forestry. They are presented in the order in which they appear in the process flow diagram.

4.4.1 Forest Inventory

Forest inventory is responsible for developing and maintaining databases on the status of the forest. This includes all harvest activities, stand mapping, and various forest surveys. This is accomplished by applying forest inventory techniques for monitoring the condition of the forest, growth and mortality trends, and the calculation of the Annual Allowable Cut (See section 5.4.2). Forest Inventory also develops the long-term (i.e. strategic) and near-term (i.e. tactical) harvest schedules that guide timber harvesting activities from year-to-year.

Several sub-systems within Forest Inventory monitor the forest. It is the integration of all of these parts that provides the complete information necessary to ensure proper management of the forest.

4.4.1.1 Planning and Analysis Module

The inventory design allows for two levels of planning and analysis: strategic and tactical. Strategic level planning is the *long-term* multiple cutting cycles forest-level planning that determines the allowable cut level and reconciles this with the overall goals and acreage

targets set forth in the Management Plan. The tactical level planning takes the strategic level results and determines where the cut occurs, such as compartment harvest volumes and stand-level scheduling in the *near-term* single cutting cycle. These planning levels are elaborated on below. Furthermore, the Geographical Information System (GIS) is a mapping system that allows Forestry to analyze and graphically represent the information in most Forestry databases on a map. It is used extensively in Planning and Analysis at both the strategic and tactical levels of planning, so it is included in this module.

4.4.1.2 Strategic Planning – Continuous Forest Inventory (CFI)

This level of planning is designed to give forest-wide information on the condition of the forest, and calculate allowable cut levels for the next planning period. The backbone of this level of inventory and planning is the Continuous Forest Inventory. Other programs are attached to this inventory that help monitor the calculations that are derived from the CFI.

The CFI is an inventory system that involves the measurement and analysis of permanent inventory plots, 881 of which were measured during the last analysis in 1999. In this system, a set of parameters is measured for every tree within a permanent $1/5^{th}$ acre plot, including diameter (DBH), merchantable height, volume, grade, and tree condition. The same trees are measured from one inventory to the next, with dead trees and new trees being noted within the plot as the measurements take place. The plots are measured every 10-15 years in order to monitor changes on forest and identify trends that are occurring within cover types. These include mortality rates, regeneration statistics, and changes in acreage of the different cover types that comprise the entire Menominee forest. This information is also used to calculate the Annual Allowable Cut.

4.4.1.2 Tactical Planning – Operations Inventory (OPINV)

The tactical level of planning determines where on the land base the strategic planning levels will be met. After forest-wide levels are set, tactical planning determines exactly where on the forest the treatments will occur. This includes developing a compartment entry schedule for the next planning period, and stands within each compartment that must be treated. The inventory system for this is the Operations Inventory, also known as Stand Exam.

This system provides the stand-level operational data needed to plan and implement the operational harvest schedule. Information is collected for each stand describing the timber type, condition of the trees, operability of the stand and proposed silvicultural prescriptions. The data is used to schedule the stands for treatment at the optimal time. A more in-depth discussion and detailed data collection procedures can be found in the official manuals describing the Stand Exam procedures.

It is important to remember that the CFI measures a ‘snapshot in time’ because all CFI plots were measured during a single growing season. In contrast, Stand Exam as a whole is continuously updated as stands are harvested, regenerated, or periodically re-measured, however individual stands might not be measured for up to 20 years. Therefore, Stand Exam does not provide the same ‘snapshot in time’ as CFI. The strengths and weaknesses of Stand Exam and CFI complement one another, and both databases are used in conjunction to give an overall picture of the status of the forest. Previous Management Plans had to rely more heavily on CFI because the Stand Exam database either did not exist or was only partially completed. Consequently, comparing the acreage figures in this Management Plan (taken from Stand Exam) with those from older Management Plans (taken from CFI samples) is not advised. This apples-to-oranges comparison will certainly result in many misleading conclusions.

The strengths and weaknesses of various characteristics CFI and Stand Exam are summarized in tables 4.1 and 4.2 to better illustrate how they complement each other.

Table 4.1 Continuous Forest Inventory (CFI)			
Characteristic	**Strength**	**Weakness**	**Key Point**
Continuity of Measurement	Periodically measures same trees over many decades on approx. 881 plots	Measurements take place every 10-15 years, so changes on the forest are not immediately detected	Snapshot in time, useful for capturing long-term trends, but misses small events that happen between measurements
Extent of Measurement	The systematic grid of plots is small enough that it can be measured in a single growing season	Only measures a sample of the forest (approx. 880 plots); smaller cover types are under-represented	The system ensures that trees are measured during the same year; essential for reliable long-term trend analysis
Detail Level of Measurement	Tree-level measurements (e.g. DBH, height, volume, condition, etc.)	Only samples individual trees so estimates derived from CFI are less reliable for under-sampled cover types	Recurring tree-level measurements of decades are the only way to pick up on many forest trends such as mortality, grade changes, and growth/yield
Cost	Occurs periodically, so can be planned for several years in advance	Expensive, and occurs above and beyond the regular budget cycle for Forest Management	CFI is very expensive (labor intensive), but proper planning can alleviate some of the burden

Table 4.2 Stand Exam/Operations Inventory			
Characteristic	**Strength**	**Weakness**	**Key Point**
Continuity of Measurement	Measures every stand in the forest as management occurs	Some stands may go years without being measured, some data may be out of date; also it is not possible to track trends using Stand Exam because updates are on-going (i.e. no snapshot in time is available)	Provides a relatively accurate stand-level picture of the forest, although the records on some stands may be outdated
Extent of Measurement	Every stand on the forest is measured and mapped at some point in time	There are over 10,000 stand in the database, so it is not practical to measure every stand on a short timetable	Provides a fairly accurate forest-wide map and record of each stand
Detail Level of Measurement	Stand-level measurements (e.g. cover type, average DBH, species and basal area composition, operability, etc).	Because stand-level values are averages, trends within a stand (at the tree level) cannot be tracked	Provides information at the stand level that is vital for harvest scheduling, especially at the tactical level
Cost	Can be partially covered under other on-going management activities (e.g. marking check plots, periodic stand updates, closeouts)	Current funding levels do not permit frequent large-scale updates, so it becomes necessary to obtain project funding from the BIA to contract stand exam in blocks	Stand Exam is constantly being updated through routine activities, but special projects are necessary to augment this for areas of the forest that are not frequently managed

4.4.1.3 Geographic Information System (GIS)

The Geographic Information System is an integral part of Forest Planning, especially at the tactical level. GIS is a computer mapping system capable of storing, displaying, and analyzing data describing places on the earth's surface. Tied directly to the OPINV system and several other databases, it provides the mapping and analytical capabilities needed for advanced planning in addition to providing forestry with the capability to make customized maps serving every aspect of forestry from planning to operations. This allows for the quick analysis of

where the operations will occur, and the impact it will have on surrounding areas. The GIS is also used to track the status of the harvest (sale) units throughout the year, and maintains records on all previously harvested units. This provides Forestry with the ability to quickly report harvest trends and statistics for past logging years.

It should be emphasized that the GIS is used for far more than simply making maps. The analytical tools in GIS are essential for determining stand adjacencies, identifying patterns in the forest, and for tracking harvest carryover, harvest progress, survey planning, and harvest scheduling. The analytical tools in the GIS give managers the ability to create spatial queries to answer questions that cannot be resolved using other methods. For example, the GIS can instantly show all stands that meet a set of criteria (e.g. *show* all aspen stands on a map that are at least 50 years of age on a certain range of habitat types).

4.4.2 Silviculture, Harvest Prep and Forest Development

Silvicultural prescriptions must be developed to apply state-of-the-art, site specific forest management techniques to individual forest stands to meet the goal of producing the maximum quantity and quality of sawtimber while maintaining species diversity.

Menominee Tribal Enterprises will continually evaluate the current accepted management practices in the forestry profession, and integrate suitable practices into regular forest management operations. New information must be sought out, as it is developed.

Generally, treatments which result in commercial harvest of timber are the responsibility of the Harvest Preparation forester. Noncommercial or pre-commercial treatments are the responsibility of the Forest Development forester. Both Harvest Preparation and Forest development foresters are supervised by the Silvicultural Forester.

The following subsections detail the procedures in generating prescriptions and applying treatments in all activities.

4.4.2.1 Pre-harvest Stand Examination

Before any silvicultural treatment is proposed, the stand to be treated is field surveyed. Data collected will include species composition, timber stocking, operability, regeneration status, and habitat type. This examination will determine if the stand is ready for treatment and, if so, the treatments necessary to meet the management goals.

4.4.2.2 Prescription development

The silvicultural prescription is tailored to match the existing stand conditions and effect the changes necessary to achieve a desired future stand condition. The prescription includes a statement of goals, a stand description, stand history, objectives, the silvicultural prescription, harvesting guidelines, non-timber resource management, and the expected results of the treatment. Decisions are based on habitat type and current stand conditions as well as long range planning on a landscape level.

4.4.2.3 Silvicultural Approval Process

To initiate the review process, proposed areas of treatment are provided to the Tribal Historic Preservation Officer (THPO) in advance of the silviculture review meeting. MTE reserves the option to utilize other appropriate archeological professionals upon the available recommendation of the MITW. However this will be only in the event the THPO is unavailable

due to emergency situations. The THPO and the MITW Environmental Services review an environmental checklist that includes a variety of environmental and cultural effects pertaining the desired treatment. This checklist is designed to verify that all environmental or cultural resources are fully reviewed in light of the proposed treatment. The checklist is attached to the prescription along with a Prescription Notice Review Sheet.

Written prescriptions are posted on a secure MTE website available for review and comment. If there are concerns, they are discussed at a silvicultural review meeting. Adjustments to the proposed prescriptions can be incorporated at this time.
The proposed prescription with any incorporated changes is submitted for final approval and then the treatment area is prepared. After treatment preparation, a Compliance and Treatment Notice Review Sheet is attached. The review sheet is signed by the MTE Silvicultural Forester certifying that the treatment area was prepared to the requirements of the prescription.

The MTE Forest Manager signs certifying that the treatment is in compliance with approved management practices and processes. The Forest Manager recommends approval to the MTE Board of Directors.

The MTE Board of Directors concurs by motion with the recommendation of the Forest Manager and authorizes signatory approval to the Board Chairman.

The BIA Forester, ensures that MTE, the business arm of the Menominee Tribe, is in compliance with the processes described in the Forest Management Plan, consistent with the intent of self-determination and fulfills the trust responsibility.

4.4.2.4 Compliance Reports and Trust Monitoring

The progress and adherence to a prescription during treatment preparation (e.g., timber marking, boundary marking, etc.) are systematically checked by MTE personnel. The BIA Forester has the option of performing a final check of the area and its treatment prescription.
This process also verifies that the treatment preparation complies with the sustained-yield management principles mandated in the Constitution and Bylaws of the Menominee Indian Tribe of Wisconsin.

4.4.2.5 Demonstration Areas

Demonstration areas are extremely valuable tools in improving the management of the Forest. Without implementing demonstration areas and designing prescriptions to match the stand conditions found on Menominee, the future condition and sustainability of the Forest could be at risk. Only through the continued use of demonstration areas will MTE be able to provide the best possible long-term forest management on Menominee.

The appropriateness of a new technology, or investigations of the effectiveness of different techniques, are determined on demonstration areas. These are areas where the new treatment is implemented and its effects can be monitored by objective means through data collection and analysis. The demonstration areas also provide an opportunity for Tribal members to determine the effects of treatments through on-site evaluation.
Regeneration of White Pine through the shelterwood system is an excellent example of the demonstration area process. Both information from areas outside the forest, modified to fit Menominee, and information collected from demonstration areas on Menominee were used to develop the current prescription. Through this work, the large sawtimber stands on Menominee are being regenerated.

Menominee Tribal Enterprises has management questions which are not and will not be addressed by current research. Outside agencies often do not place high priority on problems of concern to the Menominee Forest due to limited funding. In these cases, MTE must utilize current research only as a starting point and further investigate the problem by making reasonable appraisals about the effects of a different management technique. New management concepts and prescription modifications are usually implemented on a limited basis to allow evaluation of data and effects prior to full-scale implementation.

4.4.2.6 Prescribed Fires

Prescribed fire is used on the Menominee Tribal Forest as a forest management tool. Many of the Menominee Forest cover types regenerated following large-scale disturbance. In the Lake States region, windstorms, insect and disease outbreaks, and forest fires were the most significant forms of natural disturbance. For example, many stands on the forest show evidence of windthrow in the form of small soil mounds. Charcoal and charred stumps give clues to past fire and stand origins. Presumably, windstorms blew over large tracks of timber and significantly increased fuel loading in the blowdown blocks. The fuels dried and subsequent intense forest fires created extensive forest disturbance. These fires burned unchecked for months and likely smoldered until the winter snows extinguished them.

Foresters can mimic these natural events with prescribed fire, chemicals, and machines to create favorable seedbed conditions for natural regeneration and to control competing vegetation. While fire represents a natural disturbance in forest ecosystems, its role and effects are not entirely understood. It is known that large-scale conflagrations are not an option because the risks to people and property are great.

Fire science now suggests that prescribed fire can play a bigger role than originally believed in the management of certain forest ecosystems. To date, the use of prescribed fire on the Tribal Forest has been limited and results have been mixed. Fire does appear to produce a different vegetational response than machines or chemicals. Specific uses will depend on a thorough review of all alternatives on a stand-by-stand basis. In some situations, fire may actually be more suitable than other forestry practices and is currently being evaluated as an alternative to the use of chemicals and machinery.

Prescribed fire on the Menominee Tribal Forest is done strictly according to a Prescribed Burn Plan. The Plan describes the burn objectives, desired weather conditions, forest fuels, expected fire behavior, personnel and equipment assignments, and safety considerations. The plan is routed and reviewed by MTE and BIA personnel prior to the actual burning. Due to the possible negative public perception of fire, the MTE Board of Directors shall be kept informed about fire management activities. To inform the board and other interested leadership, fire managers will present proposed burn projects and give program updates prior to the spring fire season.

4.4.3 Timber Harvest Administration

Timber Harvest Administration is charged with the responsibility of protecting the forest resource from logging damage, insuring that the silvicultural objectives are achieved, that quality forest products are produced in the safest, most efficient and cost effective manner.

The (THA), in conjunction with the silviculture department, is responsible for delineating and identifying harvest units from areas that are established for harvest. The harvest units are delineated for efficient and economical harvest. The principle activities of THA are:

- Awarding harvest units.
- Inspecting unit prior to harvest
- Contract compliance
- Monitoring forest product deliveries
- Processing delivery tickets for payment
- Contract closure
- Investigating and developing better techniques of harvesting and manufacturing forest products

In addition to the principal activities listed above, THA monitors logging activity for possible theft and timber trespass. THA works closely with the Menominee Conservation Department regarding trespass incidents with non-contractual trespass and is referred to the BIA through appropriate channels. Contractual trespass incidents are handled through procedures outlined in the contracts

THA coordinates with the MTE Safety Coordinator on the training of the logging work force. Logging crews are required to take saw training, equipment training, first aid and CPR. The purpose of the training is to develop professional, conscientious loggers that will produce quality forest products, reduce harvest damage, and have fewer logging injuries.

4.4.5 Fire Management

The primary responsibility of the Fire Management program is to protect forest from wildfire and use fire to meet land management objectives. The program consists of four separate fire management activities (or four separate areas of responsibility):

- Preparedness
- Fire Suppression
- Prevention
- Fuels/Prescribed Fire

Preparedness: Activities that lead to a safe, efficient, and cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination. This includes training, base wages for preparedness personnel, maintenance and replacement of equipment, and general operating expenses. The preparedness program is the foundation of the Fire Management program.

Suppression: All activities connected with the control or management of wildfire incidents.

Prevention: All activities that communicate fire prevention related information to the public. Prevention activities include Smokey Bear, school presentations, and other public events. Fire investigation is also a function of prevention.

Fuels/Prescribed Fire: The program intent is to utilize fire and other mechanical means to meet land management objectives.

MTE chooses to operate the Fire Management program to meet or exceed the same standards as other federal fire management programs, meeting the same NWCG qualification standards, and all the elements of the Federal Wildland Fire Policy.

Chapter 5 – SILVICULTURE AND FOREST MANAGEMENT GOALS

5.0 INTRODUCTION

The Menominee Forest is managed using sustained-yield techniques across a wide range of different forest cover types, habitat niches, and age classes. As indicated throughout this plan, the objectives of management include both timber- and non-timber resources. The variety of forest communities, species, and habitats on the forest directly impact the types of treatments that are performed to improve, maintain, and in some cases, change the structure and composition of the forest. Consequently, MTE utilizes different management techniques in the pursuit of these goals and strategies.

Unlike most chapters in this plan, this chapter goes beyond a basic overview of the management goals and strategies and describes the underlying forest characteristics that guide management. This includes basic forestry concepts such as sustainability, the different *shade tolerances* of tree species, habitat typing, and silvicultural treatments. A discussion on the fundamentals of forestry and silvics was included in this chapter to assist non-professionals with understanding how the Menominee forest is managed.

Finally, the forest cover groups, current forest statistics, and long-term management targets are discussed. Some of this information was adapted from the *Wisconsin Forest Management Guide*.

5.1 GOALS AND STRATEGIES

The goal of forest management is to provide for maximum diversity in the forest (species composition, age class distribution, structural diversity both within and between stands), habitat diversity, and to optimize growth and sawlog quality of the forest timber resource.

The strategies that achieve these goals include:

- Developing and refining sustained-yield silvicultural prescriptions that achieve the stand objectives that meet these goals
- Following the guidelines established by the Kotar Habitat Typing system to match tree species to the site-specific plant association habitat types
- Managing the forest to achieve the long-term forest cover type targets (see Table 5.3)
- Managing the forest to accomplish landscape-scale objectives that maximize diversity across larger scales
- Managing the forest within the constraints of the Annual Allowable Cut (AAC)
- Establishment and maintenance short- and long-term inventory systems to ensure that forest growth, yield, and coverage reflect the intended results of sustained-yield forestry
- Continue working with the researchers and other agencies to continue developing and refining prescriptions to achieve management goals

5.2 SILVICULTURE

Silviculture is the art and science of controlling the establishment, growth, composition, health, and quality of forests to meet the goals and strategies. A *silvicultural prescription* is a written document that describes the objectives of the harvest treatment and the manner in which it will be carried out. All prescriptions follow the standards and guidelines presented in this plan and supporting documents. A *silvicultural system* is the specific technique, based on practical experience and scientific research, used to modify the stand to meet the objectives of the prescription.

Some of the key considerations in the selection of a silvicultural system are described below. These include **Shade Tolerance, Age Distribution, Stand Structure, and Stand Condition.** The two broad categories of management that apply to silviculture include **even-aged** and **uneven-aged** management.

Shade Tolerance: The ability of a given tree species to survive and grow in low light conditions under a forest canopy is referred to as its shade tolerance (see Table 5.1). This silvicultural characteristic is one of the most important considerations in the selection of a silvicultural system. Once established, most trees will maximize vigor and growth in near full sunlight. However, the amount of sunlight required for regeneration, early survival and different growth rates varies between tree species. Some species require full sunlight for their entire life cycle while others benefit from some protection in the regeneration and early establishment phases, only requiring full sunlight later to maintain growth and vigor. Still other species are able to regenerate and develop under very shady conditions, and use that ability to effectively compete with more sun-loving species.

Age Distribution and Stand Structure: The age difference between individual trees within a particular stand varies. Some cover types typically regenerate all at once following a major disturbance (e.g., fire, wind events, insect and disease activity, past cutting, etc.). Others regenerate as groups following smaller disturbances, while still others regenerate almost continuously as individual trees die and create openings. As a result, the trees in some stands are essentially all the same age, while in others age varies widely. These age differences within a stand are often reflected by differences in tree heights and diameters. Trees in an ***even-aged*** stand tend to mature at the same time, while trees in an ***uneven-aged*** stand tend to mature as groups at distinct intervals or as individual trees on a relatively continuous basis.

Stand Condition: A species composition, age, structure, quality, health and vigor, and spatial distribution of the trees (and other plants) within a stand must be carefully considered. Silvicultural guidelines and standard management systems generally are developed for typical or average conditions.

In some cases, however, stands may exhibit a combination of low vigor, poor health, excessive logging damage, low stocking, inappropriate age or stand structure, low tree quality, compacted or eroded soils and/or other abnormal characteristics. Although rare on the reservation, these stand conditions typically result from abuse, neglect or improper management practices such as high grading or diameter limit cutting. Typically, land acquisitions placed into sustained yield fall into this category (e.g. just north of Middle Village in the area of the forest that falls in Shawano County). Stands that burned over in the 1920s and 1930s (e.g. stands near County Highway M that were originally clear for farming and have been abandoned years ago) are also often found in a degraded state. Degraded stands may require modification of a standard silvicultural system to address specific stand and site conditions. Sometimes, intermediate treatments such as a series of improvement cuttings can restore degraded stands to acceptable and productive conditions. Other times, naturally regenerating or planting after a clearcut will be necessary to reestablish the stand to a state of increased productivity.

Table 5.1 Shade Tolerance of Menominee Tree Species	
Characteristic[6]	**Species**
SHADE TOLERANT: Able to reproduce and grow under a dense tree canopy.	Sugar Maple, Beech, Basswood, Red maple, Hemlock, Balsam Fir, Ironwood, Black Spruce, White Spruce, White Cedar, Boxelder.
INTERMEDIATE: Reproduces best under a partial tree canopy which admits limited sunlight. Species requires moderate sunlight to remain established.	Red Oak, White Oak, Swamp White Oak, Bur Oak, Hickory, Yellow Birch, White Pine, Elm, Black Ash, White Ash.
SHADE INTOLERANT: Light demanding species that reproduces best in full sunlight. Species requires full sunlight to remain established.	Aspen, Jack Pine, Red Pine, White Birch, Butternut, Northern Pin Oak, Tamarack, Balsam Poplar, Black Cherry.

5.3 SILVICULTURAL SYSTEMS

This section summarizes the basic silvicultural systems that are used to achieve the objectives of the prescription, and in turn, the overall goals of forest management on the entire forest. This information is presented as a general overview of silviculture for a non-technical audience.[6]

Figure 5.1 As shown in this photo of the 2007 blowdown around Hazel and Crowell lakes, integrated guidelines recognize the forest as a community of related resources, rather than a collection of separate resources.

The following discussion covers a number of silvicultural systems and harvest methods separately to facilitate the discussion of sound silviculture. These systems, however, are often

6 Shade Tolerance for a given species may vary during its life cycle.

most effective when used in combination to best accommodate differences between and even within stands. The ability to adapt silvicultural systems to address multiple objectives is limited only by one's imagination and creativity, making the practice of sustainable forestry both an art and a science. Table 5-2 summarizes the array of regeneration harvest methods generally considered acceptable for the forest cover types in Wisconsin.

5.3.1 Site Evaluation and Stand Delineation

Site capability determines what types of forestry practices are sustainable. A *site* is defined by the sum total of environmental conditions surrounding and available to the plants. A site is also a portion of land characterized by specific physical properties that affect ecosystem functions and differ from other portions of the land (Kotar, 1997).

Forestry practices are carried out on a stand-level basis that determines where practices will occur. A **stand** may loosely be defined as a contiguous group of trees sufficiently uniform in species composition, arrangement of age classes, and general condition to be considered a homogeneous and distinguishable unit. The minimum stand size is usually 10 acres, but smaller stands are occasionally delineated if they are unique and affect the management of adjacent stands (e.g. islands of large white pine surrounded by aspen, or grassy openings surrounded by mature forest).

A stand is usually treated as a basic silvicultural unit. Stands are normally identified by the forest cover type involved, which is typically dominated by a few major species (e.g., an aspen stand, a northern hardwood stand, or a jack pine stand). Cover types are discussed in more detail later in this chapter.

Forest stands are delineated through the use of aerial photographs, forest reconnaissance, inventory, and cruising. Sites are generally delineated based on soils, topography, landforms, geology, vegetation associations, and site index. It is important to note that forest stands and sites often overlap each other. As illustrated in Section 5.3.3 (Site Productivity and Habitat Types), a single stand may occupy more than one site and a single site may support more than one stand.

Since a stand is the basic unit of silvicultural planning, care should be taken to ensure that it represents a uniform ecological opportunity unit. In other words, each specific site and stand combination has a unique set of silvicultural opportunities and constraints, which can be used to increase the number of outcomes available.

Figure 5.2 A representation of forest cover types, red pine (left) and swamp conifers (right). Each cover type has unique composition and is defined by a specific combination of overstory and understory species. Each stand also can be considered as a unique ecological or silvicultural opportunity unit.

5.3.2 Forest Cover Types and Natural Succession

In a forested situation, tree species tend to occur in associations known as forest cover types. They range from a single tree species to several different species that commonly grow together on a specific site. MTE recognizes 13 forest cover types. It is important to understand that only a subset of these cover types will naturally occur on any given site, and as a result, the range of sustainable management alternatives available are usually limited.

Forest Cover Type	Structure	Regeneration Method
Red Pine	Even-age	Plant or Shelterwood
White Pine	Even-age	Shelterwood
Jack Pine	Even-age	Clearcut with fire or plant
Swamp Conifer	Even-age or Uneven-age	Not currently regenerated on Menominee (requires some form of clearcut or shelterwood)
Hemlock	Even-age or Uneven-age	Group openings or shelterwood
Hemlock-Sugar Maple	Uneven-age	Single-tree Selection with canopy gaps
Hemlock-Yellow Birch	Even-age or Uneven-age	Single-tree Selection with group openings
Sugar Maple (Northern Hardwoods)	Uneven-age	Single-tree Selection with canopy gaps
Mid-tolerant Hardwoods	Even-age or Uneven-age	Shelterwood or large group openings
Red Oak	Even-age	Shelterwood
Swamp Hardwoods	Even-age	Not currently regenerated on Menominee (requires some form of clearcut or shelterwood)
Aspen	Even-age	Clearcut coppice
Pin Oak	Even-age	Clearcut

Table 5.2 Common forest cover types found in Menominee, the common stand structure of those types and the methods required to regenerate them.

In the absence of any disturbance, the forest cover type of most stands will tend to change over time through the natural process of forest succession. Following a major disturbance such as large scale fire or windstorm or a silvicultural treatment designed to create similar conditions, a pioneer community normally becomes established on a site. These communities (or forest cover types) are made up of shade intolerant species able to rapidly establish themselves on an open, relatively competition-free, highly-disturbed site. Over time, the canopy begins to close and limit available sunlight, which results in other more shade-tolerant species becoming established.

Once trees dominate a site, the original pioneer species are no longer able to compete due to the increased shade, and other successional communities (cover types) that are better adapted to the changing microenvironment gradually replace them. A gradual transition to a number of different communities may occur in succession as each one gains a reproductive edge on the continually changing site conditions. At some point, after a long period free of disturbance, sites will transition to a climax community of shade tolerant species that are self-regenerating. This climax community will occupy the site until another disturbance creates conditions favoring re-establishment of a pioneer community (a major disturbance) or one of the earlier successional communities (a lesser disturbance).

Since a climax association is normally self-sustaining, maintaining existing shade tolerant species on a site would minimize regeneration costs. Based on the successional paths identified for a habitat type, the changes resulting from various levels of disturbance can be predicted. A partial removal of red pine overstory trees to release competing white pine, for example, would hasten the conversion from a red pine to a white pine timber type. On the other hand, a severe

windstorm in a red oak-red maple stand might re-establish an aspen-white birch association for a period of time.

Maintaining a forest at the pioneer or mid-successional stage would require a disturbance, such as timber harvest and/or fire, to overcome the natural tendency to convert to the next stage. Increasing light levels by maintaining a lower canopy density is needed to allow reseeding of the more light-demanding, earlier successional stages. Marking criteria would have to focus on releasing preferred species from more shade-tolerant species to ensure survival.

Reversing the trend and going back to a previous successional stage would generally require a significant disturbance. Even-aged regeneration management would normally be needed to create conditions favorable for re-invasion by pioneer successional stages like aspen and white birch. Prescribed fire or mechanical scarification may be required to favor jack pine. Site preparation and planting would probably be needed to re-establish red pine. In general, the further succession is set back, the more disturbance and effort will be required. MTE utilizes even-age management to perpetuate shade intolerant species, including aspen, oak, and pine, on the reservation. In the absence of even-age management, the proportion of shade intolerant species would decline as they are gradually replaced by more shade tolerant species.

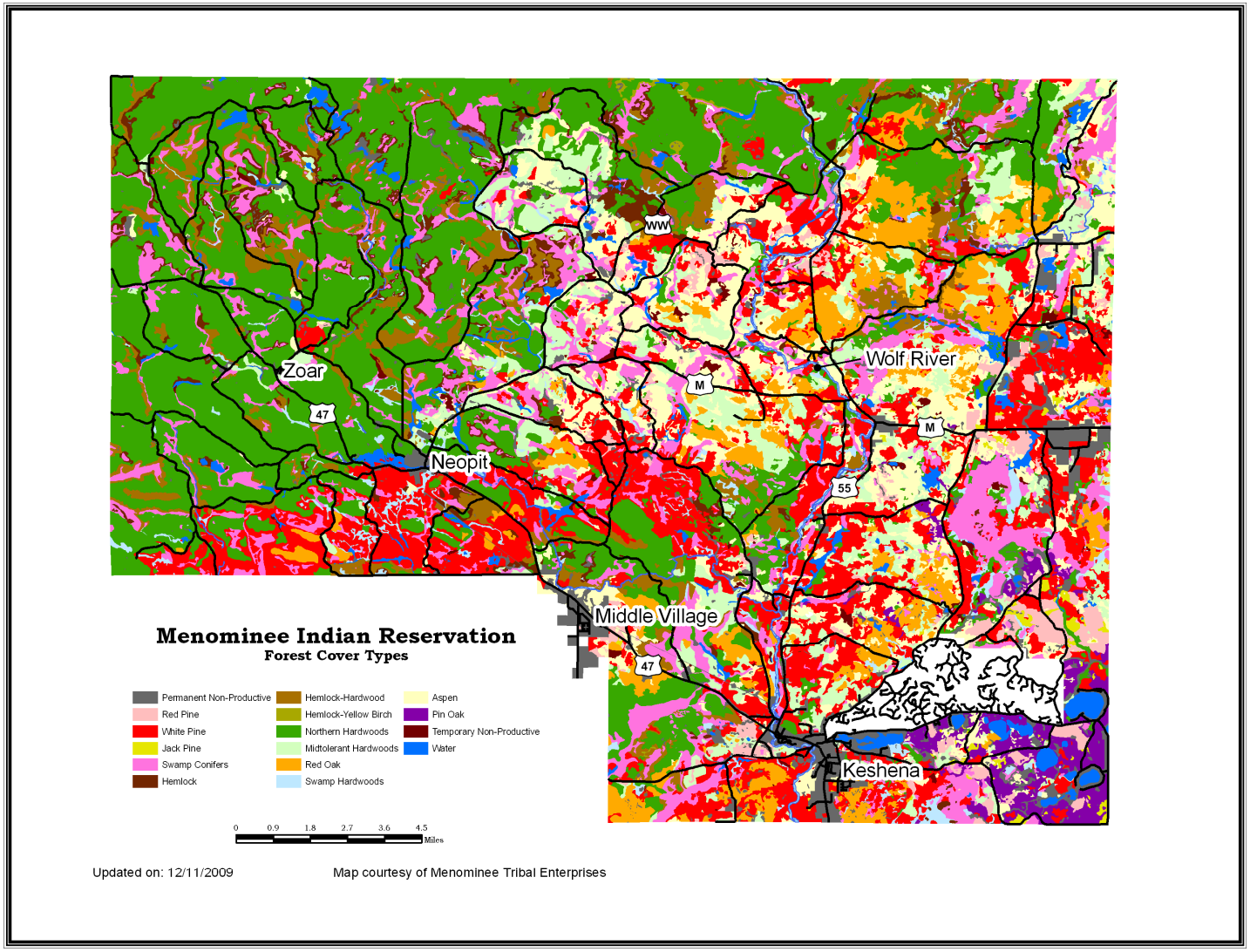


Figure 5.3 Cover Type Map of the Menominee forest.

5.3.3 Habitat Types and Site Productivity

There are approximately 220,000 acres of forest on Menominee, delineated into more than 9,000 distinct timber stands. As described in the previous section, stands are defined by attributes such as tree species composition, tree size, volume, or number of trees per acre. Forest stands occur on a variety of soils and topographical or geologic features interspersed with streams and lakes. This combination of physical and biological elements has evolved into diverse plant and animal communities (or ecosystems). The management and protection of Menominee forest ecosystems require forest management practices that maintain the environmental conditions necessary to ensure diverse plant and animal populations.

Traditionally, foresters made management decisions according to the current condition or appearance of forest stands. Stands were often harvested and regenerated with the objective of maintaining their existing species composition. This approach based decision-making on the current appearance or condition of the forest stand with little consideration of past historical events such as cutting practices, fire, wind-throw, or land use (e.g. grazing). These impacts could make highly productive forest stands appear to be low in timber productivity, thereby affecting the forest management practices applied to that site. This would result in a stand not growing at its optimal potential. For example, Aspen growing on a site suitable for high value White Pine might be regenerated to Aspen without ever realizing a different cutting prescription could have regenerated White Pine and associated quality hardwoods.

The *Forest Habitat Classification System* avoids this trap by providing a method to accurately assess forest site productivity. It provides guidelines that indicate which forest cover type is best suited to that site, regardless of the tree species or tree quality currently growing there. Habitat types are used to evaluate forest productivity based on associations of understory plants, rather than on the trees currently occupying the site. Barring severe site disturbance (e.g. plowing), understory plants establish themselves on sites in recognizable combinations (associations) according to site productivity. Site productivity directly reflects the total combination of available soil moisture and nutrients. On Menominee, eleven understory plant associations have been identified across the spectrum of forest sites, ranging from the dry, nutrient poor sites (Pin Oak/Jack Pine) to the moist, nutrient rich sites (Sugar Maple/Basswood). These habitat types are described in detail in Table 5-3.

While understory plant associations are closely identified with each habitat type, tree species are less specific in their ecological range. For this reason, a single tree species will often grow on a number of different sites (habitat types), but may achieve its best form and quality on only one or two of these habitat types. Therefore, just because a tree species is found growing in a stand does not mean that it will be most productive (reach large size and quality) on that site. The desired species could become established on the site over time. However, this requires a seed source and a favorable combination of chance events.

The Forest Habitat Classification System provides guidelines for which tree species are best suited to a given habitat type. Foresters can now improve and increase forest productivity by identifying the forest habitat type, evaluating the existing forest stand, and developing a silvicultural prescription that either promotes the most productive tree species on the site. The matching of tree species or cover types to a particular habitat type is based upon the specie's potential (quality and quantity), its biological/ecological suitability to the site, and its relative competitiveness with other tree species commonly associated with it. The tree species that are the focus of management efforts are termed *objective* species. *Associate* species are those species that are likely to exist as a result of the efforts or silvicultural systems designed to promote the objective species. When there is no objective species present, the site must be restored

through special efforts such as planting or seeding.

As stated above, individual tree species will associate together as a community. A community of trees with a specific combination or abundance of species is termed a *cover type* and is managed as a unit called a *stand*. When this combination or abundance of species changes, the cover type designation changes (as does the stand designation). To encourage specific species to grow on a habitat type, the practice is to manage the site for a cover type that contains those species. Those forest cover types which satisfy the silvicultural criteria for a given habitat type are referred to as a *featured forest cover type*. Cover types that do not meet these criteria are termed *non-featured cover types*. Table 5-4 presents the different cover types and individual species that will be managed (featured) for on each habitat type. Some species are generalists and can occur on a wide range of habitat types (e.g. aspen). Therefore, in some instances it is actually desirable to maintain non-featured cover types on some sites where it is already present in order to keep a certain acreage of those cover types on the reservation.

Application of the habitat type system will include a silvicultural review of each forest stand. The three steps for determining the best alternative for managing the stand are:

1. If the stand primary type is currently a featured forest cover type, the objective will be to maintain the present cover type through harvesting practices.

2. If the current stand includes a minor component of one or more featured species that could become the major component of the stand through management. The management prescription for this stand will be tailored to increase the presence of the featured species.

3. If no featured forest cover type or species is present, establish a featured cover type through a seeding or planting effort.

Recently, John Kotar has developed a preliminary wetland Forest Classification System. This project has provided valuable insight into the unique stand dynamics present in wetland forest systems. Formerly, it was assumed that forest succession operated in wetland forests much as it does in upland forests. The research indicates that this is not necessarily the case, however, due to the nutrient poor soils present in most wetland forests. Few tree species are able to tolerate both the wet soil conditions and the nutrient conditions (e.g. sphagnum bogs). Therefore the limited number of tree species that can potentially grow on these sites usually results in limited succession. The range of soil conditions is the driving factor in determining which wetland tree species will grow in any particular wetland. While most upland stands have been type using the Habitat Type Classification system, none of the forested wetlands have yet been typed. It is expected that this will be implemented in the near future on those sites.

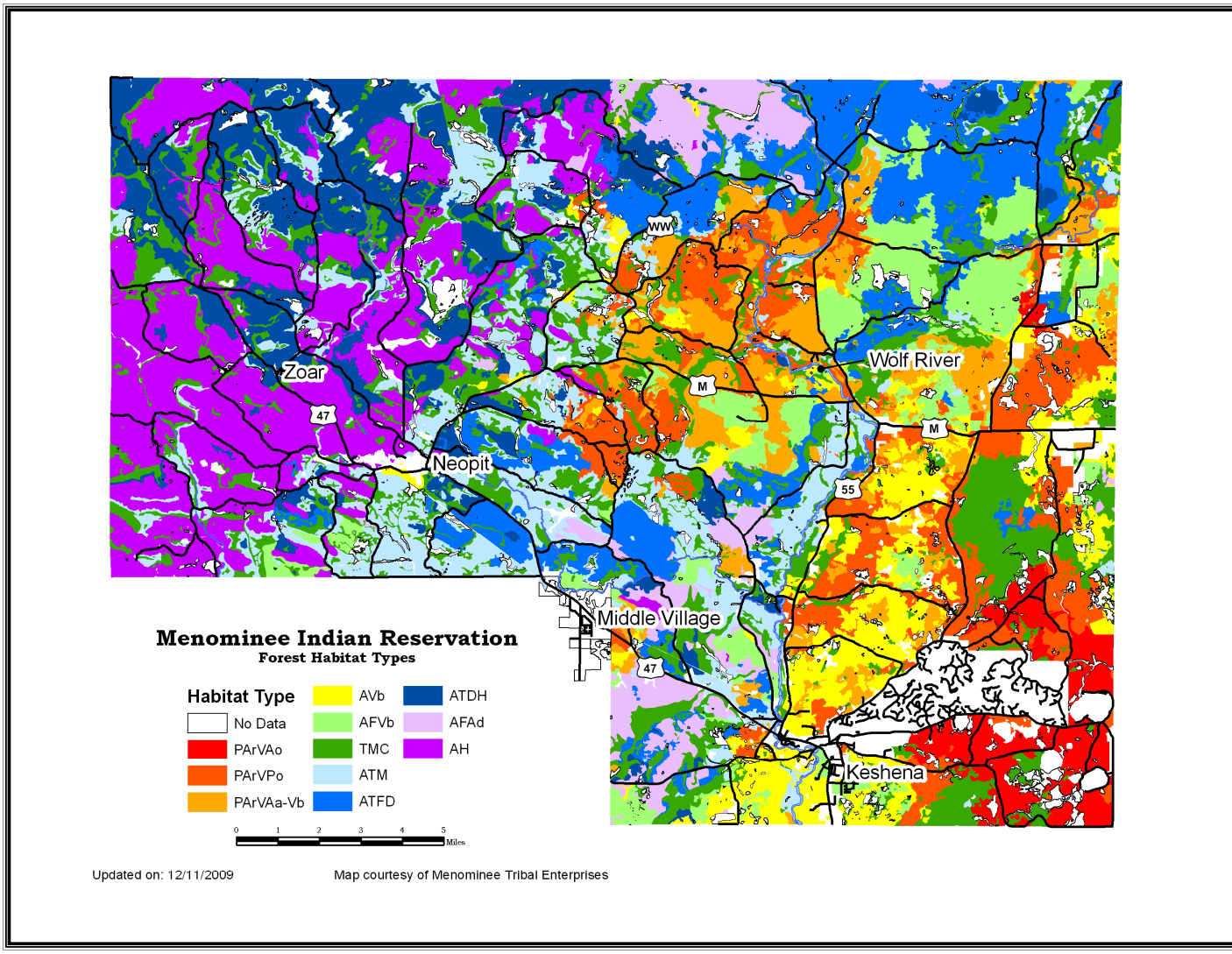


Figure 5.4 Habitat Type Map of Menominee.

Table 5.3. Menominee Upland Forest Habitat Type Descriptions

Habitat Type	Common Names	Location on Reservation	Soil Characteristics
PArVAo Quercus/Vaccinium	Pin Oak/ Blueberry	Identified only in southeastern corner.	Soil: Deep, droughty outwash sands, Nutrients: poor Moisture: very low
PArVPo Pinus/Maianthemum/ Vaccinium (Quercus)	White Pine/Wild Lily-of-the-Valley/Blueberry	Found almost exclusively in the eastern half.	Soil: Mostly loamy sands, Nutrients: medium Moisture: low (not as dry as QV).
ParVAa-Vb Acer/Quercus/ Viburnum	Sugar Maple/Red Oak, Maple Leaf	Found in the eastern half.	Soil: Sandy loams and loams. Nutrients: medium Moisture: medium
Avb Acer/Quercus/ Viburnum (Hammemelis)	Sugar Maple/Red Oak/Maple Leaf (Witch Hazel phase)	Found in the eastern half, with close proximity to AQVib.	Soil: Mostly loams and fine sandy loams of outwash over till. Nutrients: medium Moisture: medium (More moisture than AQVib.)
AFVb Acer/Fagus/ Viburnum	Sugar Maple/ American Beech/ Maple-Leaf Viburnum	Found in the eastern half, with close proximity to AQVib and AQVib(Ha).	Soil: Most common soils are loams and fine sandy loams over red till. Nutrients: rich Moisture: medium (More moist than AQVib (Ha).
TMC Tsuga/Mianthemum/ Coptis	Hemlock/Wild Lily-of-the-Valley/ Goldthread	Found in low lying areas, within many other habitat types.	Soil: No specific soil type dominates this habitat type. Nutrients: medium Moisture: high
ATM Acer/Tsuga/ Mianthemum	Sugar Maple/ Hemlock/Wild Lily-of-the-Valley	Found scattered throughout.	Soil: fine sands Nutrients: medium Moisture: medium
ATFD Acer/Tsuga/Fagus/ Dryopteris	Sugar Maple/ Hemlock/Beech/Shield Fern	Found in the northeastern part, and scattered between Neopit and Keshena.	Soil: fine sandy loams Nutrients: medium to rich Moisture: medium
ATDH Acer/Tsuga/Dryopteris/ Hydrophyllum	Sugar Maple/ Hemlock/Shield Fern/ Virginia Waterleaf	Western half.	Soils: fine sandy loams Nutrients: medium to rich Moisture: medium
AFAd Acer/Fagus/Adiantum	Sugar Maple/Beech Maidenhair Fern	Central portion.	Soil: loams Nutrients: rich to very rich in nutrients Moisture: rich in moisture.
AH Acer/Hydrophyllum	Sugar Maple/ Virginia Waterleaf	Western half, intermixed with ATDH.	Soils: silt loams and loams Nutrients: rich to very rich Moisture: rich to very rich

Table 5.4. Featured Forest Cover Type Identification for Upland Forest Habitat Types

Habitat Type	Featured Forest Cover Types	Objective Species	Associate Species
PArVAo	Red Pine White Pine	Red Pine White Pine	Jack Pine Red Maple Quaking Aspen Pin Oak
PArVPo	Red Pine White Pine	Red Pine White Pine	Red Maple White Birch Quaking Aspen Pin Oak
ParVAa-Vb	White Pine Mid-tolerant Hardwoods Red Oak	White Pine Red Oak White Ash Basswood	Red Maple White Birch Quaking Aspen Pin Oak White Oak
Avb	White Pine Mid-tolerant Hardwoods Red Oak	White Pine Red Oak White Ash Basswood	Red Maple Sugar Maple White Birch Bigtooth Aspen Quaking Aspen Pin Oak White Oak
AFVb	White Pine Mid-tolerant Hardwoods Red Oak	White Pine Red Oak White Ash Basswood	Red Maple Sugar Maple White Birch Bigtooth Aspen Quaking Aspen
TMC	Hemlock Hemlock - Yellow Birch Swamp Conifers Swamp Hardwoods	Hemlock Yellow Birch Cedar	Spruce/Fir Red Maple Black Ash
ATM	White Pine Hemlock Hemlock - Sugar Maple Hemlock - Yellow Birch Sugar Maple Mid-tolerant Hardwoods Red Oak	White Pine Hemlock Sugar Maple Yellow Birch White Ash Red Oak Basswood	Cedar Red Maple White Birch Quaking Aspen
ATFD	Hemlock Hemlock - Sugar Maple Hemlock - Yellow Birch Sugar Maple	Hemlock Sugar Maple Yellow Birch Beech	White Pine Red Maple Basswood Hard & Soft Elm
ATDH	Hemlock Hemlock - Sugar Maple Hemlock - Yellow Birch Sugar Maple	Hemlock Sugar Maple Yellow Birch Hard & Soft Elm	Basswood
AFAd	Sugar Maple Mid-tolerant Hardwoods Red Oak	Sugar Maple Beech Red Oak White Ash Basswood Hard & Soft Elm	Hemlock Yellow Birch Hickory Quaking Aspen
AH	Sugar Maple	Sugar Maple	Yellow Birch Hickory White Ash Red Oak Basswood

Table 5.5. Featured Forest Cover Type Identification for Wetland Forest Habitat Types

Habitat Type	Featured Forest Cover Types	Objective Species	Associate Species
PmLNe	Tamarack Black Spruce	Tamarack Black Spruce	Jack Pine White Pine
PmLLe	Tamarack Black Spruce	Tamarack Black Spruce	Jack Pine White Pine
ThAbFnC	White Cedar Balsam Fir	White Cedar Balsam Fir	Red Maple Paper Birch
AbThArAsp	White Cedar Balsam Fir	White Cedar Balsam Fir	Red Maple Paper Birch
FnThAbAt	Black Ash Green Ash White Cedar Balsam Fir	Black Ash Green Ash White Cedar Balsam Fir	Red Elm
FnUB	Black Ash Green Ash	Black Ash Green Ash	Red Elm

5.3.4 Even-Aged Silvicultural Systems

Even-aged management systems are normally used to harvest, regenerate and tend sun-loving forest cover types that grow poorly when not exposed to direct sunlight or will not regenerate in their own shade. The cover types adapted to these systems are generally those accustomed to regeneration and rapid domination of a site following a large-scale disturbance, such as a fire or major windstorm. Because pioneer species rapidly colonize a recently-disturbed site, these stands normally consist of trees at or near the same age. Even-aged systems are also applied to cover types dominated by shade-tolerant species when the intent is to focus on the less-tolerant component of the stand. Portions of even-aged management systems, specifically the intermediate thinning regimes, may also be used in the early stages of young northern hardwood stands to facilitate a long-term promotion of shade intolerant species such as pine or oak.

Light requirements, growth rates and reproductive characteristics of the species to be regenerated govern the degree of overstory removal at the time of harvest. Competing vegetation and site characteristics are additional factors. Even-aged regeneration methods partially simulate the degree of stand mortality that would normally follow a major natural disturbance such as a fire or major windstorm. These methods are primarily used with intolerant species such as aspen, red pine or jack pine that require full sunlight to ensure complete regeneration and optimum development.

In most cases, the goal of an even-aged silvicultural system is to naturally regenerate a species already present in the stand. Depending on the species involved, additional activities may be required to ensure that its germination and growth requirements are met. These may involve the use of prescribed fire, disking and other forms of scarification to expose a mineral soil seedbed to enhance seed germination and survival. Where natural regeneration is insufficient or in cases where the desired species was not present in the harvested stand, tree planting or direct seeding may be required.

Variations on even-aged management include the clearcut, shelterwood, and intermediate (basal area) thinning. A brief summary of these methods of cutting follows:

Clearcut: A method used to regenerate a stand of shade intolerant species by the removal of most or all woody vegetation during the harvest. This creates a completely open area leading to the establishment of a new even-aged stand. Depending on the species being regenerated, the regeneration can be from natural seed produced by adjacent stands, trees cut in the harvesting

operation, direct seeding, or replanting. This method of harvest simulates the large-scale major disturbance that naturally occurs to stands, often wind or fire. Clearcutting can be combined in some instances with prescribed fire to prepare the site for the replacement stand. Some species, such as aspen require a full clearcut to occur in order to enable the root network to sprout and regenerate the stand (often referred to as coppice sprouting). Figures 5-5 to 5-7 illustrate the different stage of an even-age aspen stand. In the absence of a clearcut, the shade tolerant species would fail to regenerate in the understory and gradually be replaced by more shade tolerant species.

In typical forest management clearcutting is a method used primarily to maximize short term financial gains. In sustained yield forest management clearcutting is used for the purpose of creating a major disturbance necessary to regenerate or recreate a new forest cover type. This creates conditions for a more diverse forest. This method of treatment impacts a variety of concerns but in a relatively short period of time (less than 10 years) this clearcut disturbance has disappeared and new growth appears. Today, the sustained yield forestlands totals 220,000 acres with approximately 500 acres per year managed utilizing the clearcut method (less than ½ percent per year) MTE monitors clearcutting through the prescription process.

Figure 5.5 A mature aspen stand near Evergreen Falls.

Figure 5.6 An aspen stand two years after a clearcut/coppice regeneration harvest. The stand is fully stocked with aspen regeneration (several thousand trees per acre). Photo taken near Evergreen Falls.

Figure 5.7 Two aspen stands near Evergreen Falls. The 2-year old stand in Figure 5-6 is on the right side of the road, and a 20-year old stand is on the left side of the road.

Shelterwood: A method similar to a clearcut used to regenerate a stand by manipulating the overstory and understory to create conditions favorable for the establishment and survival of desirable shade-intolerant tree species. This method normally involves gradual removal, often in two or three cuts, of the overstory. The overstory serves to modify understory conditions to create a favorable environment for reproduction and provide a seed source. Once established, the regeneration is released by cutting most of the remaining mature trees. In order to preserve the structural diversity and planning for future aesthetics one mature tree per acre is retained.

A successful shelterwood harvest requires the removal of intermediate or suppressed saplings and poles of less desirable species such as elm, ironwood or red maple because the smaller understory trees will suppress development of vigorous seedlings of the preferred species. Site preparation using vegetation controls such as fire or herbicide are used to further reduce competition from woody shrubs, saplings, and stump sprouts from non-objective species. Figures 5.8 to 5.11 illustrate the stages of shelterwood regeneration harvesting.

Figure 5.8 A dense stand of mature white pine and associated hardwoods before harvest. Notice the uniformity in size and age in the overstory, and the complete lack of pine regeneration in the understory.

Figure 5.9 A white pine stand after the first stage of a shelterwood harvest. The overstory has been opened up to allow sufficient light penetration for seed germination. Enough shade has been retained to prevent excessive drying of the seedbed and enhance early survival and establishment of the new seedlings. (Note:In some situations, post-harvest treatment of the understory with herbicides or mechanical scarification may be needed to control competition from hardwood seedlings and to prepare the seedbed.)

Figure 5.10 A White Pine stand after the final harvest has taken place. The stand was harvested during the winter after the seedbed was prepped during the fall. In the spring, the seed will germinate and young pine will begin the cycle of stand development anew.

Figure 5.11 Examples of young white pine stands, approximately 10-years (left) and 20-years (right) after regeneration. Stands are along Highway 55.

Tending: Most operations implemented in young stands are usually non-commercial in nature. Timber stand improvement (TSI) generally includes **intermediate treatments** such as pruning and release. **Pruning** is usually applied to improve timber quality and value, although it can also be utilized to control disease, improve aesthetics, or improve stand accessibility. **Release** treatments are designed to free young trees from undesirable competing vegetation to improve stand composition, growth and quality. The stand shown in Figure 5-11 has been treated with a pre-commercial thin to release it from hardwood competition from maple and aspen saplings that threatened to out-compete some of the pine.

Thinning and improvement: These treatments are a form of select-cut intermediate treatments implemented in older stands with larger trees that often offer commercial opportunities. This treatment entails the removal of trees to temporarily reduce stocking and concentrate growth on the more desirable trees. Thinnings are applied primarily to improve diameter growth, manipulate structure, enhance forest health, recover potential mortality, and increase economic yields. It also involves the removal of less desirable trees (e.g. low vigor and suppressed) of any species primarily to improve composition and quality.

5.3.5 Uneven-Aged Silvicultural Systems

Uneven-aged management systems are normally used to harvest, regenerate and tend forest cover types that will regenerate and grow under their own shade. Stands managed under uneven-aged systems are normally comprised of three or more age classes. These cover types are adapted to regenerate under partial canopies following minor disturbances like individual tree mortality, or a moderate disturbance such as a wind storm that would damage up to one third of the stand. Uneven-aged systems are designed to mimic such disturbances.

Despite being shade-tolerant, these species grow most vigorously in relatively free-to-grow conditions with full sunlight, assuming other growth requirements like soil moisture, are met. As a result, regeneration and most vigorous growth typically occur in small- to medium-sized canopy gaps (small openings). The number and size of gaps created through uneven-aged management are dependent upon species composition, acreage regulation, and tree rotation age or size. Normally, these systems are used to manage stands containing mixed trees of all ages, from seedlings to mature trees. They are also used to convert even-aged stands into an uneven-aged structure.

Stand regeneration is achieved by periodically manipulating the overstory and understory to create conditions favorable for the establishment and survival of desirable tree species. Thinning, regeneration and harvesting usually occurs simultaneously. The harvested trees are

essentially replaced by growth on the younger trees left in the stand. These silvicultural systems are designed to maintain an uneven-aged stand condition, while manipulating the multi-age and multi-size structure of the overstory to facilitate continual recruitment and development of quality growing stock. With the uneven-aged silvicultural system, the tree selection decision (to cut or leave) considers a number of factors as illustrated in Figures 5-12 through 5-14.

Figure 5.12 Species Desirability (WDNR Photo)

Figure 5.13 Tree Quality (WDNR Photo)

Figure 5.14 Desired Age and Size Class Distribution (WDNR Photo)

The generally accepted uneven-aged natural regeneration system used throughout Wisconsin and on Menominee is Single-tree Selection. Individual trees of various size and age classes are periodically removed to provide space for regeneration, and promote the growth of remaining trees. Each regeneration opening (gap) covers an area equivalent to the crown spread of a single large tree that has been removed. Individual trees are selected for removal from all size classes

(to achieve desired residual density levels) following a recognized order of removal criteria based on tree risk, vigor, quality, and spacing. Trees under this management option are marked to a specified basal area (70 square feet per acre of sawlog size trees plus up to 20 square feet per acre of poles). Order of removal is:

1. High Risk of Mortality (prior to the next 15-year reentry)
2. Cull
3. Low Vigor
4. Poor Form and Quality
5. Species (some species are favored over others as determined by objectives)
6. Spacing/Provide Additional Crown Release
7. Size (trees greater than 20-24 inches DBH)

Essentially, the stand is thinned to the target basal area (70 square feet per acre) for optimal growth by marking the high risk, low quality trees first. Over several entries, the stand should increase in overall quality and growth and yield will be optimized. CFI data indicates that this is occurring on the Menominee forest. The inclusion of canopy gaps, started less than 20 years ago, will further improve overall stand quality over time.

The goal, particularly in the northern hardwood cover type, is to achieve an optimum distribution of size and age classes so each contains a sufficient number of quality trees to replace those harvested in the next larger size class. Specific selection criteria vary slightly with the particular species makeup of the stand.

5.3.6 Passive (Non-Management) Options

In some stands, particularly those in ecological or culturally sensitive areas, foresters choose to "let nature take its course". In such cases, they make a conscious management decision to not actively manipulate the vegetation through harvesting or other management techniques. This passive management is not considered a silvicultural system since it does not involve manipulation of vegetation. However, this does not mean that the stand is not subject to the same silvicultural principles that guide active management. Forest succession, shade tolerance, and natural disturbance still direct the stand composition in a fairly predictable manner, albeit caused by nature on an unplanned time interval. A White Pine stand, for example, will gradually convert to a shade tolerant hardwood stand on most sites in the absence of active management or moderate-to-major natural disturbance.

Managers have many reasons for choosing to not actively manipulate vegetation. They may wish to protect and preserve fragile or special sites or communities (e.g., wetland communities, springs, groves of large old trees, and cultural sites). These areas are catalogued and documented in Forest Inventory.

The concepts of *preservation* and *natural dynamics free of human impacts* are relative. Forests are dynamic communities that are continuously changing and adapting to external inputs and internal disturbances. Natural processes like forest succession, plant competition, wildlife and insect activity, tree aging and decay, windstorms, fires, and climate change will cause changes in forest composition, structure, and function over time. Forests cannot be maintained in a static, unchanging condition. Also, there are no forest ecosystems undisturbed by human activities. Disturbance has occurred through impacts on climate, atmospheric composition and inputs, fire control, management of wildlife populations (intentional and unintentional), introduction of invasive species, recreational use, other human uses, etc. Passively managed forests will

continue to change and will be subjected to human impacts, however, these changes and impacts often will be different than in actively managed forests. Managers have less control on the direction of change in unmanaged forests.

Passive management still requires monitoring, and certain events may necessitate the implementation of some short-term active practices. Examples include control of invasive species, fire management, disease and insect management, wildlife management, recreation management, removal of diseased or weakened trees that pose safety hazards, and loss of attributes desired by the landowner. Passive management requires an understanding of the effects of natural processes and the impacts of other human activities (internal and external to the forest) on the development of the forest. This knowledge will facilitate the achievement of the FMP objectives, and minimize the chances of counterproductive results or unintended consequences. In some situations, a blend of passive management and active silvicultural treatment may most effectively achieve management goals for that area.

5.3.7 Salvage Harvests

In addition to planned harvests employed as part of a silvicultural system, salvage harvests are carried out as part of an overall forest management program. Unlike regularly scheduled harvests, which are designed to achieve a specific silvicultural objective, salvage harvests are geared only to the economic recovery and use of dead or dying trees that would otherwise go un-harvested. Wind events, fire, flooding, insect and disease activity, and weather extremes can all wreak havoc on the best of forest management plans. High quality trees can have significant economic value and often justify a salvage effort. In the case of forest pests and diseases, the removal of infected trees is often necessary to prevent additional mortality and further spread of the disease to neighboring trees.

It should also be remembered, however, that dead and dying trees are part of the overall forest system, and provide a number of benefits to wildlife and other ecological processes. Decisions to conduct or not conduct a particular salvage operation are often a balance between potential economic return, impact on stand silviculture, risk of wildfire, cost of salvage, and the ecological value of leaving the trees in place. When mortality is significant, a regeneration strategy should be developed to facilitate regeneration, based on current conditions and Forest Management Plan.

Figure 5.15 Forest management plans are often modified by natural disturbances, such as the tornado that flattened over 2,000 acres of forest in 2007. After salvaging the timber in the blowdown, the site was reevaluated to determine the quantity and quality of the regeneration present.

5.3.8 Unsustainable Cutting Methods

A silvicultural system is a planned program of treatments over the life of a stand. Other cutting methods exist primarily to maximize short-term economic gain, and are not part of a long-term plan to ensure regeneration of a healthy, vigorous stand on a sustainable basis. **These methods are not allowed on the Menominee Forest, as they are unsustainable and run counter to the goals of this plan and the Menominee people.**

The examples of unsustainable cutting methods presented here are not an all-inclusive list. These methods may result in a new stand of trees, but due to the lack of consideration of specific species requirements, they often lead to stand degradation and are not considered to be generally accepted silvicultural practices that result in sustainable forestry:

Diameter limit cutting is cutting all trees above a set diameter regardless of the impact on stand structure, stand quality, tree quality, species composition, or regeneration needs. At times referred to as a *selective cut*, the only consideration is diameter. This is clearly opposed to specific criteria employed in a true single-tree selection harvest under the uneven-aged silvicultural system.

Economic clearcutting, where any tree of economic value is cut with no consideration for site, silvics of the species involved or regeneration needs. This practice differs from a clearcut in the even-aged silvicultural system where all trees are harvested, regardless of value, in order to ensure residual shade and competition does not hamper the regeneration and development of a new stand. Unlike well-planned clearcutting, with economic clearcutting there is no consideration of the resulting site condition or regeneration.

High grading is also sometimes referred to as *selective logging*, is the practice of cutting only the largest, most valuable trees in a stand and leaving low value and poor quality trees to

dominate. This practice is not the same as a single-tree selection regeneration harvest described in the silvicultural systems section. High grading is not designed to enhance the quality and reproductive potential of the residual stand, but maximize immediate revenue. The term *selective logging* is sometimes used intentionally by unscrupulous loggers to create false expectations on the part of landowners off of the reservation. High grading is the opposite of the selection method employed on Menominee, where the lowest quality trees are selected first.

It is emphasized that economic gain and sustainability are compatible. Using creativity and imagination in the application of sound silviculture will best achieve both goals in the long run.

5.4 SILVICULTURAL PRESCRIPTIONS

The FMP identifies through prescriptions, stand management objectives, and the series of management prescriptions describing specific actions needed for all stands for an entire operational period. The MTE *Silvicultural Handbook* describes the specific details of the prescriptions used by MTE.

As illustrated in this section, forest management requires detailed planning to achieve a silvicultural objective. A *silvicultural prescription* is a detailed description of a specific treatment designed to implement a specific stand management objective. Prescriptions describe the individual activities necessary to implement the overall silvicultural system in a given stand. The goal of the prescription is to clearly communicate all steps that need to be taken to meet the stand objectives, including both timber and non-timber resources.

The development of a detailed management prescription for a given stand is a complex process. It requires a thorough understanding of the objectives in the FMP, silviculture, silvics, capabilities and limitations of the resource, and collection and evaluation of considerable vegetative and site data.

Considerations when developing a prescription include:

- Strategic objectives
  - Are the treatments sustainable?
  - Were all alternatives considered?
  - How does this prescription fit into the long term objectives, goals, and targets for the entire forest
  - Harvest scheduling based on inventory data
- Assessment of biological characteristics of the stand
  - Site capabilities
  - Past disturbances
  - Current vegetative condition and potential options
  - Growth and forest succession
  - Forest health and protection
- Consideration of other relevant environmental, cultural, social, and economic factors (in no particular order)
  - Aesthetics
  - Recreation
  - Wildlife
  - Endangered species
  - Invasive species
  - Landscape scale issues (critical habitat, percentage of land in a particular cover type, etc)
  - Regulations (statutes, rules, or local ordinances)

- Traditions (cultural values)
- Markets
- Community support
- Watershed protection

5.4.1 Calculation of Featured Forest Acreage

The Forest Habitat Classification System and both forest inventory systems (CFI and OPINV) allow MTE to view the current forest condition (all sizes and combination of tree species occurring in a stand) and predict the possible future forest composition based on long term goals and strategies of the FMP. To determine these future forest acres, the first step is to identify and summarize the acres that currently have featured or non-featured forest cover types present.

Acreage in the featured forest cover type is made up of two components. The first component is called the *current* acreage, or acreage where the primary cover type of the stand is a featured forest cover type. An example would be the Sugar Maple cover type on the AH habitat type. This cover type will be maintained with as many of the objective and associated species as possible. The second component is called the *potential* acreage. These are acres that have a minor stocking of some of the featured species for that habitat type. An example would be an Aspen stand on a PMV(Q) habitat type which has a limited stocking of White Pine in comparison to the Aspen. Since White Pine is a featured species and Aspen is not, this stand is considered to have a White Pine cover type potential. These acres could be managed in such a way to allow the featured forest cover type to become dominant. The acreage of each cover type where the cover type is featured or potential is summarized in Table 11.5, column 2**.** In some instances it is desirable to maintain the non-featured species on the site in order to retain a certain amount of those species on the reservation. Also, some areas are not suitable for conversion to the featured species due to terrain or jurisdictional constraints eliminate or limit management options (e.g. wetlands, Wolf River Corridor).

Stands that have non-featured forest cover types, and could be converted, are classified as *restoration* acreage. Converting these stands require special management on part of the forestry staff, but will restore the forest to a higher level of productivity. Examples include some Aspen, White Birch, Red Maple or Pin Oak growing on sites (habitat types) more suitable for pine or quality hardwoods. In many cases, the past management practices on these acres included cutting during the railroad logging era, and uncontrolled slash fires resulting from limited fire suppression capabilities (poor road access and machinery) following logging. Some of these acres, which once supported stands of quality pine and hardwood, now need an extensive restoration effort if they are going to return to their former value and productivity. Other areas with non-featured species will be retained to maintain habitat, forest diversity and other non-timber resources.

For planning purposes, the restoration acreage is allocated among the featured cover types on each of the habitat types. While there are an infinite number of possibilities for dividing these acres, there are only a few that will enhance diversity on the forest. The *recommended forest cover type* acreage is the future cover type distribution recommended by the management plan. It represents the forest species best suited for these acres and is the forest cover type mix which will maintain plant and animal species diversity, quality timber and overall forest health and vigor.

While a specific target acreage has been given, it is more important to realize that the actual acreage for each cover type will be somewhere in a given range approximating the target

acreage. The target acreage gives the MTE forestry a number to strive for. Non-featured cover type targets were chosen with the assistance of Tribal resource professionals, such as the wildlife biologist. They represent a compromise between retaining certain non-featured species on the reservation and restoration of forest acreage to the most productive cover type for each site.

5.4.2 Annual Allowable Cut

The Annual Allowable Cut (ACC) is a concept that is often misunderstood, in large part because the term has different definitions depending on the organization. In other forestry organizations, the AAC is often a theoretical maximum volume limit such as 20MMBF per year. This is purely volume control. The Menominee approach to the calculation of the AAC has historically differed from this definition in that it refers to the predicted cut volume per year given the application of the approved silvicultural prescriptions. Since the prescriptions are written to ensure that the forest is managed on a sustainable basis within each forest stand, they serve as a control that prevents the detrimental treatment of the forest.

The heart of the Menominee concept of the AAC is that the prescription regulates the amount of volume harvested *per acre*, ensuring sustainable management of that tract of forest. The prescription dictates *how* the forest is treated, whereas the operational harvest schedule (see Section 5.4.3) indicates *where* and *when* the harvest takes place. The AAC is an expression of how much volume can be expected from the application of the prescriptions according to the operational harvest schedule. The harvest schedule adds an area control by calculating the number of acres to be treated each year based on rotation lengths for each cover type.

CFI provides not only a snapshot of the current forest inventory, it also predicts the results of harvesting by simulating the application of the prescriptions. The CFI does not tell you how much to cut, or how to cut it. Rather, it tells you how much to expect from the application of the approved prescriptions. Over time, inventory helps to adjust prescriptions by monitoring the forest. Prescriptions are modified if the objectives of the prescriptions are not being met. An example of this is the adoption of canopy gaps in hardwood stands to increase stand quality through the promotion of seedlings and saplings that remain free to grow. As prescriptions are adjusted, the AAC is recalculated to provide an updated predicted cut volume.

The CFI analysis calculates the annual net growth of the forest, stratified by cover type, where:

Net Growth = Growth (of individual trees) + Ingrowth (new trees) – Mortality

In some situations, it is possible to experience temporary fluctuations in volume in particular cover types, such as when a large percentage of aspen or white pine is regenerated (i.e. A lot of old trees are replaced by young trees). As shown in the five CFI measurements (Table 5.7 and Table 5.8), overall volume has been steadily increasing on the Menominee forest.

5.4.3 Operational Harvest Schedule

The Operational Harvest Schedule determines where forest management activities will occur in any given year. One important point about harvesting scheduling is that it is meant to serve as a *guide*, and not a precise, itemized list of stands to be harvested. It is based on information provided by Operations Inventory (OPINV), the Continuous Forest Inventory (CFI), and guided by the Annual Allowable Cut (AAC) figures.

The objective of a schedule is two-fold: First, it ensures that stands are entered on a timeline that optimizes growth and yield and captures a reasonable amount of the mortality within each stand.

Second, it serves as a preliminary planning tool for management because it strives to present a fairly even flow of timber each year. Extreme fluctuations in flow can cause severe planning problems with regard to staffing, harvesting, and other issues. Elements of area control and volume control are used to ensure both even flow and optimized growth and yield.

Relatively small variations to the schedule are expected due to unforeseen events (e.g. insect outbreaks or blowdowns), changes to inventory information (e.g. updated stand exam data), or other causes. Changes to the schedule are acceptable if they are logical and do not introduce unreasonable disruptions to either even flow or optimized growth and yield. The harvest schedule is evaluated and updated by the Forest Manager, Silviculturist and Forest Inventory on a continuing basis. This enables new information to be incorporated into the planning process.

5.4.4 Landscape Management Philosophy

Landscape ecology is a relatively new formal concept in forest management, but it is one that dovetails nicely with long-established management practices on Menominee. Landscape ecology is the study and implementation of management techniques that look at the overall composition, structure, and function of the landscape components. It is defined by the interaction of the forest mosaic composed of stands, riparian zones, travel corridors, and habitats. By focusing on the underlying pattern of the landscape at different scales, managers and foresters make better decisions that best retain the functioning components of the entire landscape.

As part of the planning process and prescription development, MTE Forestry considers not only the stands scheduled for treatment, but also the surrounding landscape components. This includes things like consideration for protected and endangered species, invasive species control, riparian functionality, fire management, and other ecological considerations in addition to the species/timber objectives of the harvested stand.

Table 5.6 Potential Cover Type Acres (Long-term Target Acres)

Cover Type	Current OPINV Acreage			Planning Goals
	Total[1]	Featured[2]	Non-Featured[3]	Target[4]
Red Pine	5,074	3,387	1,687	6,000
White Pine	35,032	30,734	4,298	36,500
Jack Pine	702	0	769	1,000
Swamp Conifer	23,307	22,736	571	23,400
Hemlock	6,139	5,396	743	5,500
Hemlock – Sugar Maple	13,881	10,018	3,863	13,500
Hemlock – Yellow Birch	474	229	245	2,000
Sugar Maple	68,644	63,678	4,966	61,000
Mid-tolerant Hardwoods	15,618	9,694	5,924	20,000
Red Oak	13,461	12,610	851	15,000
Swamp Hardwoods	3,830	3,481	349	3,700
Aspen	20,626	0	20,626	21,000
Pin Oak	3,892	0	3,892	2,500
Temp. Non-productive	1,108	0	1,108	1,000
Perm. Non-productive	11,225	0	11,225	12,500

[1] Total cover type based on OPINV data, as of 12/30/09.

[2] Acres where the current cover type is a featured forest cover type.

[3] Acreage where the current cover type is not featured on habitat type.

[4] Target acreage based on the management for featured cover types in conjunction with the goals set forth in the Management Plan.

Note: Variations on these cover types, such as oak savanna or pine barrens, are not specified, as they fall under cover types listed above (e.g. pine barrens is considered a lightly stocked pine stand).

5.5 FOREST-WIDE SUMMARY

The CFI analysis is the best source for forest-wide volume trends over time. Table 5.6 illustrates forest volume by species across all five measurement periods.

Table 5.7 Forest-wide sawlog volume, by species, for all five CFI measurements.

Sawlog Volume Summary (all trees over 11" DBH)
Volumes in MBF (Scribner)

	Measurement Year				
Species	**1963**	**1970**	**1979**	**1988**	**1999**
Balsam Fir	890	897	1,792	2,116	1,562
Tamarack	839	1,527	2,378	2,965	3,650
White Spruce	4,150	3,253	4,413	5,765	6,305
Black Spruce	665	1,084	1,279	714	815
Jack Pine	3,603	3,417	5,255	3,661	1,741
Red Pine	24,324	28,339	33,436	36,678	35,549
White Pine	381,345	382,944	398,666	418,642	423,206
White Cedar	41,516	47,518	59,242	80,651	85,124
Hemlock	280,898	276,355	275,711	262,787	232,159
Red Maple	17,682	24,326	36,286	53,940	78,202
Sugar Maple	262,790	260,919	299,096	360,963	435,229
Yellow Birch	111,733	105,692	92,117	89,854	89,644
Paper Birch	5,250	7,740	12,547	14,587	9,145
Hickory	2,001	1,670	2,833	3,731	5,135
American Beech	23,539	23,111	28,892	37,065	40,937
White Ash	5,504	5,708	8,913	11,628	22,989
Black Ash	10,469	10,418	9,831	10,912	11,384
Butternut	650	920	1,145	951	968
Balsam Poplar	1,715	1,973	2,892	3,438	3,720
Bigtooth Aspen	3,120	6,257	14,384	26,619	41,503
Quaking Aspen	34,855	39,074	40,735	59,249	44,917
Black Cherry	611	1,532	2,520	3,415	4,341
White Oak	1,212	1,619	3,164	4,412	6,089
Pin Oak	13,615	14,972	18,033	24,925	27,790
Bur Oak	208	210	357	481	925
Red Oak	60,804	72,619	93,623	118,413	174,889
Basswood	95,570	97,363	105,504	107,758	117,412
American Elm	70,308	66,486	9,200	844	914
Rock Elm	35,663	34,717	7,967	495	661
Misc. Commercial	-	-	-	98	-
Misc. Non-commercial	-	-	-	67	118
Total	1,495,530	1,522,659	1,572,211	1,747,826	1,907,022

As shown above, the volume of the forest has increased since CFI measurements began in 1963. This is a strong indicator that harvest operations do not exceed the net growth of the forest and is therefore sustainable over the long term.

Table 5.8 Forest-wide cordwood volume, by species, for all five CFI measurements.

Pulpwood Volume Summary (all trees under 11" DBH)

	Measurement Year				
Species	**1963**	**1970**	**1979**	**1988**	**1999**
Balsam Fir	34,855	37,898	37,388	38,607	36,715
Tamarack	17,021	21,139	25,507	27,193	30,793
White Spruce	6,104	4,362	4,638	20,327	23,514
Black Spruce	18,645	19,361	17,576	17,230	15,475
Jack Pine	34,189	39,955	42,274	25,381	11,265
Red Pine	13,792	21,147	35,069	123,596	152,242
White Pine	113,967	107,359	129,395	1,021,011	1,110,581
White Cedar	247,748	270,721	295,370	465,011	498,124
Hemlock	868,695	852,851	832,935	824,904	812,663
Red Maple	125,286	158,387	223,529	398,896	467,615
Sugar Maple	253,295	282,697	352,093	1,287,198	1,491,345
Yellow Birch	119,425	138,303	145,695	390,218	380,993
Paper Birch	72,579	88,531	107,472	145,306	76,260
Hickory	15,724	16,516	17,016	26,267	24,030
American Beech	53,138	52,549	61,302	160,979	176,873
White Ash	19,641	22,843	27,771	58,955	78,680
Black Ash	41,460	44,392	47,532	68,414	77,508
Green Ash			35	84	190
Butternut	1,975	1,565	1,070	2,769	2,436
Balsam Poplar	4,510	3,330	3,561	13,523	12,545
Cottonwood	12	30	57	110	
Bigtooth Aspen	35,287	51,142	68,332	159,356	184,477
Quaking Aspen	410,227	403,839	347,042	364,693	223,737
Black Cherry	13,263	17,937	22,631	25,470	23,111
White Oak	5,362	7,002	7,862	20,400	23,589
Pin Oak	50,525	53,891	68,053	124,696	111,881
Bur Oak	664	900	1,147	3,100	4,396
Red Oak	78,724	88,994	104,524	394,938	505,147
Basswood	114,983	118,189	132,698	398,646	393,428
American Elm	39,132	47,159	17,471	7,359	10,012
Rock Elm	16,785	17,198	7,600	2,849	
Misc. Commercial	6,551	5,880	5,146	5,179	
Misc. Non-commercial	1,627	1,936	2,761	3,696	
Total	2,835,191	2,998,004	3,192,556	6,626,361	6,959,624

A full summary of the CFI analysis is beyond the scope of the Management Plan, but some general trends can be noted:

- Increasing stocking trees per acre in 10 year increments
- Red, White, and Jack Pine (24%), Sugar Maple (23%), Hemlock (12%), and Red Oak (11%) comprise the majority of sawlog volume
- White Pine, Sugar Maple, and Red Oak sawlog volume continues to increase
- Elm volume significantly decreased during the 1970s and 80s as the result of Dutch Elm disease (currently about 1% of the volume remains that was present 40 years ago)
- Bigtooth Aspen volume is increasing, whereas Quaking Aspen volume is decreasing; the bulk of the Quaking Aspen has reached maturity and is either being regenerated or converted to pine
- Most other species are either slightly increasing in volume, or have remained relatively constant since the 1988 measurement

5.6 SUMMARY OF FEATURED FOREST COVER TYPES

This section will identify and describe the forest cover types that have been defined as featured forest cover types. For most of the featured forest cover types, there will be a diverse mixture of species growing in combination within each. It should be noted that the goal is not to manage for one individual species, but to manage it as the primary component of the stand. The 1999 CFI volume estimates are listed at the end of each cover type description.

5.6.1 Red Pine Cover Type

Red Pine is intolerant of shade and does not grow well in an understory position. It requires large-scale disturbance to create favorable light and seed-bed conditions in order to regenerate itself. Due to the infrequent nature of suitable disturbance, mature Red Pine does not often regenerate naturally without management. Shelterwood, seed-tree, or planting is used to regenerate Red Pine.

The Red Pine type currently exists as plantations and natural sawtimber stands, often mixed with White Pine. Red Pine regeneration can occasionally be found under Pin Oak in the southeastern part of the Forest and needs release for best pine growth. While Red Pine self-prunes relatively well, mechanical pruning can greatly improve lumber quality.

The Red Pine cover type will be featured on PArVAo and PArVPo habitat types. The Red Pine acreage on the reservation has remained fairly constant since the previous Forest Management Plan. Treatments in this cover type include first-entry row thins and intermediate basal-area thinning operations. Certain forest diseases, especially Red Pine Pocket Decline and Annosum Root Rot require that special precautions be taken when managing Red Pine, especially when found in plantations. In extreme cases, it may be necessary to consider rotating and converting some stands to other cover types earlier than originally anticipated.

Figure 5.16 A 44-year old Red Pine plantation on County Highway AA.

Table 5.9 Volume summary for the Red Pine Cover Type

Species	Volume (BF)
Jack Pine	183,898
Red Pine	13,301,226
White Pine	2,251,191
Paper Birch	144,925
Bigtooth Aspen	209,193
Quaking Aspen	304,889
Basswood	61,731
Total	**16,457,052**

Species	Volume (Cords)
Balsam Fir	172
White Spruce	142
Jack Pine	1,243
Red Pine	86,781
White Pine	9,181
Red Maple	958
Paper Birch	722
Beech	215
Balsam Poplar	105
Bigtooth Aspen	994
Quaking Aspen	2,198
Black Cherry	1,152
White Oak	124
Northern Red Oak	392
Basswood	324
American Elm	33
Total	**104,737**

5.6.2 White Pine Cover Type

White Pine prefers a slightly more nutrient rich site than Red Pine, but is still capable of producing quality sawtimber on some PArVAo sites.

It is moderately tolerant of shade and is a light-seeded species requiring disturbance conditions to regenerate itself. Much of the White Pine sawtimber on the forest is at, or near maturity, and is not regenerating itself naturally under current conditions. White Pine is regenerated through shelterwood, seed tree, or planting.

Natural White Pine regeneration can be found across the forest under Aspen, Pin Oak and Jack Pine. Releasing this pine of overhead competition is mandatory to ensure acceptable growth. Pre-commercial crop tree pruning is also necessary to improve the tree grade of White Pine on the forest.

The White Pine cover type is featured on habitat types ranging from PArVAo to ATM. The White Pine acreage on the reservation has increased since the previous Forest Management Plan, largely due to pine release treatments and forced conversion from other cover types. A fairly significant acreage (approximately 15,000 acres) of White Pine are nearing rotation age, and will require shelterwood regeneration treatments some time in the next 30 years if these stands are to be maintained in this cover type. The remaining acreage (approximately 19,000 acres) will require intermediate basal area thinning treatments, or in the case of the youngest stands, pre-commercial thinning and pruning treatments to improve the quality of the stand.

As with Red Pine, White Pine and all other conifers is are susceptible to certain forest diseases, especially Annosum Root Rot. One way to reduce the risk of spread of Annosum and other diseases is to diversify the species composition on the stand. By increasing the proportion and distribution of oak, hemlock and other species in a white pine stand, the rate of spread of some diseases can be reduced.

Figure 5.17 A 20-year old White Pine stand on Highway 55.

Table 5.10 Volume summary for the White Pine Cover Type

Species	Volume (BF)
Balsam Fir	494,697
White Spruce	126,070
Jack Pine	236,597
Red Pine	13,797,158
White Pine	300,005,242
Northern White Cedar	1,094,223
Hemlock	1,744,528
Red Maple	8,766,580
Sugar Maple	4,905,763
Yellow Birch	387,474
Paper Birch	1,228,576
Beech	888,315
White Ash	98,803
Bigtooth Aspen	1,564,076
Quaking Aspen	3,661,077
Black Cherry	86,308
White Oak	234,031
Northern Red Oak	7,906,979
Basswood	2,881,895
Total	**350,108,392**

Species	Volume (Cords)
Balsam Fir	5,773
White Spruce	892
Black Spruce	1,091
Jack Pine	1,376
Red Pine	35,694
White Pine	764,858
Northern White Cedar	4,327
Hemlock	12,362
Red Maple	58,177
Sugar Maple	21,479
Yellow Birch	2,887
Paper Birch	7,714
Beech	5,354
White Ash	483
Black Ash	735
Bigtooth Aspen	5,467
Quaking Aspen	17,338
Black Cherry	1,358
White Oak	1,438
Northern Red Oak	25,967
Basswood	9,213
American Elm	363
Rock Elm	60
Misc. Non-commercial	243
Total	**984,654**

5.6.3 Hemlock Cover Type

Hemlock is a shade tolerant species that favors moist, medium to rich sites. It commonly regenerates as an understory component with Aspen and birch in old blowdowns and burns. However, its best germination and development occur in shelterwood or group selection treatments with soil disturbance. It can withstand substantial suppression and still respond to release. However, suppression can cause tree quality and vigor to decline.

If allowed to remain under vigorous growing conditions it can produce quality sawtimber. Young stands of understory Hemlock should be released from less desirable overstory trees and over-mature stands should be regenerated. There is also a potential to prune Hemlock to improve lumber grade as future vigorous stands become available.

Hemlock in this timber type is found in nearly pure stands and is featured on habitat types from TMC to ATDH. The Hemlock acreage on the reservation has been slowly decreasing since the previous Management Plan, largely due to natural mortality. Few stands of hemlock have been regenerated because it has proven difficult to regenerate hemlock under current practices, although in some cases hemlock has been successfully regenerated along with white pine in shelterwoods. Hemlock will continue to be managed using Group Selection harvest prescriptions.

Figure 5.18 Mature Hemlock stand.

Table 5.11 Volume summary for the Hemlock Cover Type

Species	Volume (BF)
White Pine	1,027,454
Northern White Cedar	225,945
Hemlock	52,102,121
Sugar Maple	1,644,040
Yellow Birch	2,443,142
Paper Birch	110,141
Beech	2,283,057
Basswood	259,731
Total	**60,095,632**

Species	Volume (Cords)
Balsam Fir	118
White Spruce	54
Black Spruce	456
White Pine	2,967
Northern White Cedar	1,224
Hemlock	165,261
Red Maple	1,622
Sugar Maple	7,667
Yellow Birch	11,780
Paper Birch	753
Beech	9,494
Black Ash	113
Northern Red Oak	352
Basswood	885
American Elm	301
Misc. Commercial	128
Misc. Non-commercial	47
Total	**203,223**

5.6.4 Hemlock – Sugar Maple Cover Type

The Hemlock – Northern Sugar Maple timber-type contains Hemlock and associated species such as Sugar Maple and beech. These are all shade-tolerant species which can produce quality sawtimber under the higher shade levels.

As such, this type will be managed under an uneven-aged system on ATM, ATFD, and ATDH habitat types. AFAd or AH habitat types, which are more favorable for pure mesic hardwood development (i.e. Northern Hardwoods), will likely continue to show a decline in Hemlock composition over time due to the single-tree selection method of regenerating these stands. Hemlock does not reliably regenerate in stands under the single-tree selection method. Hemlock is currently harvested using group selection with the single tree selection treatments. Further research is needed to determine if this regeneration method is successful.

Figure 5.19 Hemlock-Sugar Maple stand.

Table 5.12 Volume summary for the Hemlock-Sugar Maple Cover Type

Species	Volume (BF)
White Pine	8,133,703
Northern White Cedar	321,376
Hemlock	65,838,568
Red Maple	4,193,119
Sugar Maple	22,902,279
Yellow Birch	8,416,596
Paper Birch	548,178
Beech	3,348,643
White Ash	238,741
Black Ash	86,994
Balsam Poplar	118,315
Quaking Aspen	165,296
Northern Red Oak	1,943,284
Basswood	4,595,380
Total	**120,850,470**

Species	Volume (Cords)
White Pine	16,858
Northern White Cedar	1,898
Hemlock	213,555
Red Maple	17,307
Sugar Maple	81,816
Yellow Birch	34,583
Paper Birch	3,467
Hickory	110
Beech	15,148
White Ash	1,336
Black Ash	389
Balsam Poplar	386
Quaking Aspen	406
Northern Red Oak	4,784
Basswood	13,096
American Elm	289
Misc. Commercial	87
Misc. Non-commercial	126
Total	**405,641**

5.6.5 Hemlock - Yellow Birch Cover Type

This timber-type contains predominately Hemlock and Yellow Birch, but also associated hardwood species such as Red Oak, Basswood, and Red Maple. These species tend to favor higher levels of sunlight and regenerate and develop best under even-aged or group selection management systems.

These stands currently consist of either multi-aged groups of large-diameter sawtimber and poletimber, originating at different times due to mortality or blowdown, or as relatively even-aged assemblages originating at the same time.

Hemlock and mid-tolerant hardwood timber types are regenerated through shelterwood or group selection.

This timber-type is featured on habitat types from TMC to ATDH. This cover type is presently recognized on a small percentage of the forest, although it is likely that some stands typed as Hemlock or Hemlock – Sugar Maple may be Hemlock – Yellow Birch stands in reality. Stand Exam updates will assist in correcting any errors in cover type in the OPINV database.

Figure 5.20 Hemlock-Yellow Birch stand

Table 5.13 Volume summary for the Hemlock-Yellow Birch Cover Type

Species	Volume (BF)
White Pine	7,545,223
Northern White Cedar	360,208
Hemlock	20,678,574
Red Maple	463,046
Sugar Maple	1,667,046
Yellow Birch	13,386,556
Beech	134,585
Black Ash	183,423
Basswood	612,984
Total	**45,031,646**

Species	Volume (Cords)
Balsam Fir	244
White Pine	16,811
Northern White Cedar	1,786
Hemlock	75,156
Red Maple	3,071
Sugar Maple	6,701
Yellow Birch	42,675
Beech	694
Black Ash	710
Basswood	1,896
American Elm	20
Total	**149,764**

5.6.5 Sugar Maple Cover Type

The Sugar Maple (also called Northern Hardwoods) cover type is comprised predominately of Sugar Maple and on certain sites, Beech. Other more mid-tolerant hardwoods also occur, but usually are a minor component. Much of the Sugar Maple sawtimber overstory tends to be the same age over large areas of the forest, likely due to large-scale blowdown in the past. The shade tolerant species in this type can regenerate themselves without much disturbance. However, growth and quality can suffer under this regime. The presence of mid-tolerant species tends to be minimal barring any major disturbance.

Single-tree selection is the common method of thinning and regenerating northern hardwood stands on the better habitat types. Canopy gaps are established to ensure the development of quality replacement stock. This improves the vigor and growth of regeneration and attempts to retain the presence of some mid-tolerant species.

Where the quality and condition of the northern hardwood overstory are poor, or where suitable regeneration is lacking, shelterwood or group selection can be used to regenerate the stand.

Poletimber stands are thinned by releasing the crowns of crop trees from those of competitors. Those stands which have noncommercial removal volumes are treated through timber stand improvement activities.

This cover type is found on medium to rich, mesic sites and habitat types ranging from ATFD to AH. This cover type has been steadily increasing in acreage on the reservation as the result of natural succession in Hemlock-Sugar maple, Mid-tolerant Hardwoods, Aspen, and some White Pine stands. Single-tree selection on most cover types also accelerates the conversion to shade tolerant species such as sugar maple and beech.

Figure 5.21 Sugar Maple-Beech stand (also known as Northern Hardwoods).

Table 5.14 Volume summary for the Sugar Maple Cover Type

Species	Volume (BF)
Balsam Fir	382,249
White Spruce	1,450,327
Red Pine	2,105,711
White Pine	20,583,062
Northern White Cedar	98,436
Hemlock	36,642,681
Red Maple	10,009,401
Sugar Maple	356,797,371
Yellow Birch	20,310,682
Paper Birch	1,327,186
Hickory	3,135,347
Beech	26,801,818
White Ash	7,605,941
Black Ash	375,994
Balsam Poplar	345,468
Bigtooth Aspen	10,977,665
Quaking Aspen	16,179,109
Black Cherry	3,119,678
White Oak	214,127
Northern Red Oak	25,368,665
Basswood	45,029,916
American Elm	767,070
Rock Elm	358,154
Misc. Non-commercial	118,153
Total	**590,104,213**

Species	Volume (Cords)
Balsam Fir	6,236
White Spruce	5,923
Black Spruce	207
Red Pine	5,401
White Pine	56,799
Northern White Cedar	762
Hemlock	123,900
Red Maple	60,283
Sugar Maple	1,135,031
Yellow Birch	93,848
Paper Birch	12,711
Hickory	9,582
Beech	110,654
White Ash	24,486
Black Ash	1,959
Balsam Poplar	1,394
Bigtooth Aspen	38,137
Quaking Aspen	60,396
Black Cherry	9,458
White Oak	1,109
Northern Red Oak	66,559
Basswood	152,552
American Elm	6,095
Rock Elm	2,428
Misc. Commercial	1,886
Misc. Non-commercial	3,004
Total	**1,990,801**

5.6.6 Mid-Tolerant Hardwoods Cover Type

Mid-tolerant hardwoods consist of stands of species such as White Ash, Basswood, Yellow Birch, and Red Oak. Species in this group exist occasionally in nearly pure stands but most often are found as in mixed stands. Where Red Oak comprises over 50% of the primary size class, stands are type as Red Oak (see below). The Mid-Tolerant Hardwoods group has in common moderate shade tolerance and disturbance-related regeneration regimes. The shelterwood and seed-tree silvicultural treatments are used to regenerate mature stands which, in the absence of disturbance, will not regenerate to featured species. Conversion to off-site mesic hardwood (i.e. Northern Hardwoods cover type) occurs under selection management (see Sugar Maple cover type).

Release is necessary when these species are found in understory conditions or in young sapling and poletimber stands. Early release is very important in this cover type to avoid vigor loss and mortality. Pruning will improve tree grade in this species group.

Habitat types which feature the mid-tolerant hardwoods range from ParVAa-Vb to AFAd. This cover type was created since the original Stand Exam project and was first listed in the 1995 Forest Management Plan. Stands that were examined prior to this time were often typed as Northern Hardwoods (Sugar Maple) or Hardwood-Aspen, so OPINV still tends to underestimate the acreage present in this cover type. However, on-going stand exam updates will continue to correct the cover type for these stands in the OPINV database which will lead to a better estimate of the stands present in this cover type.

Figure 5.22 Mid-tolerant Hardwood stand.

Table 5.15 Volume summary for the Mid-tolerant Hardwood Cover Type

Species	Volume (BF)
Balsam Fir	132,802
White Spruce	512,891
Jack Pine	123,792
Red Pine	3,727,475
White Pine	46,292,061
Northern White Cedar	329,049
Hemlock	36,124,501
Red Maple	41,805,566
Sugar Maple	45,147,492
Yellow Birch	33,809,587
Paper Birch	3,814,133
Hickory	1,708,322
Beech	7,480,688
White Ash	11,080,395
Black Ash	498,596
Butternut	968,011
Balsam Poplar	283,127
Bigtooth Aspen	5,884,503
Quaking Aspen	8,555,155
Black Cherry	946,732
White Oak	3,383,779
Northern Red Oak	57,784,912
Basswood	61,277,740
American Elm	60,066
Rock Elm	302,657
Total	**372,034,032**

Species	Volume (Cords)
Balsam Fir	4,430
White Spruce	1,905
Black Spruce	48
Jack Pine	698
Red Pine	12,489
White Pine	129,450
Northern White Cedar	2,182
Hemlock	134,485
Red Maple	221,431
Sugar Maple	216,213
Yellow Birch	136,544
Paper Birch	28,342
Hickory	12,567
Beech	33,579
White Ash	38,863
Black Ash	4,264
Butternut	2,436
Balsam Poplar	1,148
Bigtooth Aspen	21,214
Quaking Aspen	37,508
Black Cherry	7,642
White Oak	12,861
Northern Red Oak	165,899
Basswood	201,378
American Elm	1,463
Rock Elm	1,554
Misc. Commercial	713
Misc. Non-commercial	768
Total	**1,432,073**

5.6.7 Red Oak Cover Type

Red Oak has a moderate shade tolerance and prefers medium rich sites and mesic soil moisture. It is commonly found in association with White Pine, mid-tolerant hardwoods, and mesic hardwoods.

Mature Red Oak does not reliably regenerate itself naturally in the absence of disturbance, nor does it develop best under selection management. Since Red Oak needs ample light to reach its best development, it is regenerated by shelterwood and potentially by seed tree or group selection. On favorable habitat types with non-featured forest cover types, Red Oak may be planted or seeded to improve the productivity of the site.

When Red Oak is found under Aspen and poor quality hardwoods, on suitable habitat types, it should be released. Pruning Red Oak crop trees will improve tree quality.

Red Oak is featured on habitat types ranging from ParVAa-Vb to AFAd. The acreage in Red Oak has been slowly increasing since the previous Forest Management Plan as the result of thinning in Mid-tolerant Hardwood stands (removing red maple, basswood, aspen and other species in favor of Red Oak) and by converting Northern Hardwood stands that have a Red Oak component through a shelterwood regeneration treatment.

The increasing incidence of Oak Wilt on the forest, especially in high quality Northern Red Oak stands, may steer management away from stands heavily stocked with Red Oak. During intermediate thinning treatments in Red Oak stands, the spacing between red oak can be improved by selecting in favor of other associated species. This will reduce the relative stocking of red oak and increase the species diversity which will in turn reduce the potential spread of oak wilt through root grafting.

Figure 5-23 Red Oak stand in South Branch.

Table 5.16 Volume summary for the Red Oak Cover Type

Species	Volume (BF)
White Pine	2,764,948
Hemlock	107,853
Red Maple	3,026,745
Sugar Maple	1,501,746
Yellow Birch	37,482
Paper Birch	316,976
Hickory	291,771
White Ash	3,506,221
Black Ash	306,572
Bigtooth Aspen	293,373
Quaking Aspen	1,172,349
White Oak	1,886,344
Northern Red Oak	78,816,629
Basswood	2,582,737
Total	**96,611,747**

Species	Volume (Cords)
White Pine	7,803
Hemlock	797
Red Maple	24,566
Sugar Maple	14,322
Yellow Birch	602
Paper Birch	2,241
Hickory	1,589
Beech	924
White Ash	10,828
Black Ash	1,192
Bigtooth Aspen	1,591
Quaking Aspen	4,481
Black Cherry	378
White Oak	6,575
Northern Red Oak	227,922
Basswood	11,733
American Elm	53
Misc. Commercial	195
Misc. Non-commercial	24
Total	**317,816**

5.6.8 Swamp Conifers Cover Type

The Swamp Conifers cover type includes species such as Northern White Cedar, Spruce, Fir, Hemlock, and associated swamp hardwoods. The Forest Habitat Classification System has recently been expanded to include forest wetlands for northeast Wisconsin.[8] This further details the capacity of certain wetland cover types to be actively managed, although there are no current treatments being applied on Menominee. In the future, shelterwood, seed tree, or strip cuts may be used to regenerate these stands.

Swamp Conifers are found on most of the wetland Forest Habitat Types, including PmLNe, PmLLe, ThAbFnC, and AbThArAsp. The least nutrient rich of these (PmLNe and PmLLe), the bog types, support black spruce and tamarack on sphagnum covered muck. Occasionally, one can find scattered white pine or jack pine in association with tamarack, but little else will grow on the bog types. Growth rates are marginal, as is the economic viability of actively managing bogs. Therefore, MTE does not have plans to manage bogs with timber harvests.

The relatively nutrient rich sites (ThAbFnC and AbThArAsp) support varying proportions of Northern White Cedar, Balsam Fir, and occasionally some hardwood species that can tolerate very poorly drained muck soils (e.g. Paper Birch, Red Maple, and Ash). While these sites can be managed economically, there is often no need to manage them for silvicultural reasons; as John Kotar's research has shown, forest succession to more shade tolerant species does not occur at the stand level in these stands because the site is already dominated by shade tolerant species. Change occurs locally within stands as a normal part of gap dynamics, but the overall stand composition remains relatively unchanged. The primary difference between Swamp Conifer stands is the distribution of individual swamp conifer species and size classes within a stand. Therefore, MTE has no current plans to manage Swamp Conifer stands. Changes in hydrology due to beaver flooding or construction is typically the major threat to the continuation of these stands.

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Figure 5-24 Swamp Conifer stand near County Highway WW.

Table 5.17 Volume summary for the Swamp Conifer Cover Type

Species	Volume (BF)
Balsam Fir	343,221
White Spruce	3,543,073
Black Spruce	574,977
Red Pine	133,544
White Pine	23,226,350
Northern White Cedar	79,474,181
Hemlock	17,397,329
Red Maple	4,296,905
Sugar Maple	249,997
Yellow Birch	7,804,858
Paper Birch	1,062,904
Black Ash	4,413,505
Balsam Poplar	1,849,106
Bigtooth Aspen	663,571
Quaking Aspen	2,425,591
Northern Red Oak	1,109,392
Total	**148,568,504**

Species	Volume (Cords)
Balsam Fir	14,399
White Spruce	11,511
Black Spruce	12,791
Jack Pine	80
Red Pine	332
White Pine	62,423
Northern White Cedar	465,822
Hemlock	77,883
Red Maple	27,087
Sugar Maple	2,643
Yellow Birch	39,822
Paper Birch	10,609
Beech	248
White Ash	117
Black Ash	33,894
Balsam Poplar	6,055
Bigtooth Aspen	2,558
Quaking Aspen	12,283
Black Cherry	191
Northern Red Oak	3,948
Basswood	534
American Elm	642
Rock Elm	47
Total	**785,917**

5.6.9 Swamp Hardwoods Cover Type

Swamp Hardwoods occupy the most nutrient rich wetland Forest Habitat Types (FnThAbAt and FnUB). This cover type includes species such as Black Ash, Green Ash, Elm and Red Maple. Under most circumstances, Black and Green Ash are the only dominant tree species found on these habitat types. Ash is shade intolerant, and does not regenerate well under heavy shade. Regeneration can be

abundant in areas with overstory mortality where light conditions are better. According to John Kotar's research, the species in these stands are self perpetuating through periodic flooding and windstorms. The major threat to these stands comes from long-term flooding (i.e. Longer than seasonal) due to beaver or changes in hydrology due to construction. The emergence of Emerald Ash Borer (EAB), an invasive insect in the Lake States, is certainly the greatest threat to this cover type over the next several decades. The ultimate effects of EAB on the cover type is not fully known, but it is possible that Elm and Red Maple may fill the ecological niche currently filled by ash in these stands. MTE is monitoring the experiences of other Forest Programs in areas already affected by EAB in order to improve planning for the eventuality that EAB reaches the reservation. Because this cover type is self-perpetuating (in the absence of EAB), MTE has no current plans to manage these stands.

Figure 5-25 Swamp Hardwood stand near Camp 21 road.

Table 5.18 Volume summary for the Swamp Hardwood Cover Type

Species	Volume (BF)
Balsam Fir	95,943
White Spruce	90,282
Black Spruce	239,765
White Pine	9,103,122
Northern White Cedar	3,184,219
Hemlock	1,522,610
Red Maple	5,022,141
Sugar Maple	246,879
Yellow Birch	3,047,242
Paper Birch	160,059
White Ash	251,841
Black Ash	5,519,348
Balsam Poplar	548,550
Quaking Aspen	882,133
Northern Red Oak	108,336
Basswood	109,577
American Elm	86,655
Total	**30,218,700**

Species	Volume (Cords)
Balsam Fir	1,882
White Spruce	497
Black Spruce	882
White Pine	23,986
Northern White Cedar	19,707
Hemlock	8,749
Red Maple	30,748
Sugar Maple	1,791
Yellow Birch	18,139
Paper Birch	1,138
Beech	62
White Ash	1,032
Black Ash	34,058
Balsam Poplar	1,681
Quaking Aspen	2,119
Northern Red Oak	462
Basswood	320
American Elm	536
Rock Elm	26
Total	**147,817**

5.7 SUMMARY OF NON-FEATURED COVER TYPES

Certain cover types on the Reservation provide important non-timber values such as wildlife, aesthetics, and water quality, but do not meet the goal of maximizing the site potential due to their lower sawtimber quantity and quality value. Since these species cover a large portion of the land acreage (11%) and they help maintain a diversified forest, some mention on their management should be made. These species will remain on the forest to maintain cover type diversity and to accommodate wildlife needs.

Menominee Tribal Enterprises will continue to manage a certain acreage of these cover types. . Since the 1970's, a substantial portion of the acreage in non-featured cover types was converted to a featured forest cover type when the stand reached maturity. In some areas, the non-featured species (e.g. aspen and scrub oak) was clearcut and regenerated naturally to the same cover type. Given that most of the cover type acreage targets are close to being met, the plans to convert stands with non-featured cover types are minimal (less than a few hundred acres per year). From this point forward, most stands with non-featured cover types will be maintained in the current cover type so as to maintain the target goals as agreed upon in this plan.

5.7.1 Jack Pine Cover Type

Jack Pine is a shade intolerant species adapted to nutrient-poor, dry sites (PArVAo habitat type) and is located primarily in the eastern part of the forest. It is found in both plantations and natural stands, and is managed primarily for pulpwood and boltwood. On the PArVAo habitat type, Jack Pine will be regenerated by planting or natural regeneration. Better habitat types will be converted to higher-value species more suitable to the habitat type through release of featured forest cover type or by planting. Less than 1,000 acres of forest are typed as Jack Pine, although scattered Jack Pine are found in mixed stands of Pin Oak, Red and White Pine in the southeast corner of the Reservation.

Figure 5-26 Jack Pine stand on South Line road.

Table 5.19 Volume summary for the Jack Pine Cover Type

Species	Volume (BF)
Jack Pine	196,904
White Pine	64,149
Total	**261,053**

Species	Volume (Cords)
Jack Pine	1,629
White Pine	596
Red Maple	316
Total	**2,541**

5.7.2 Aspen Cover Type

Aspen is a pioneer species that vigorously invades disturbed areas. As a result, it can be found on sites in the entire range of habitat types. Much of the Aspen acreage is found on sites where White Pine was cut over, and wildfires burned in the early 1900's. Due to its widespread occurrence, Aspen can often be found on habitat types more suitable for other featured forest cover types.

Aspen acreage has declined in recent decades as acreage suitable for other species converted naturally to those species, or was converted through clearcutting and planting. The current acreage is near the target goal for this cover type. Therefore, emphasis is changing from conversion to natural regeneration of Aspen.

Figure 5.27 A 20-year old Aspen stand near Evergreen Falls road.

Table 5.20. Volume summary for the Aspen Cover Type

Species	Volume (BF)
Balsam Fir	112,683
White Spruce	582,563
Jack Pine	85,171
Red Pine	1,309,981
White Pine	2,161,134
Northern White Cedar	36,377
Red Maple	481,132
Sugar Maple	166,522
Paper Birch	240,344
White Ash	207,329
Balsam Poplar	575,641
Bigtooth Aspen	21,667,231
Quaking Aspen	10,372,875
Black Cherry	187,971
Northern Red Oak	1,851,215
Total	**40,038,169**

Species	Volume (Cords)
Balsam Fir	3,460
White Spruce	2,590
Jack Pine	602
Red Pine	6,640
White Pine	15,755
Northern White Cedar	416
Hemlock	514
Red Maple	20,533
Sugar Maple	3,682
Yellow Birch	113
Paper Birch	7,801
Hickory	182
Beech	501
White Ash	1,534
Black Ash	194
Balsam Poplar	1,776
Bigtooth Aspen	113,418
Quaking Aspen	82,565
Black Cherry	2,688
White Oak	60
Northern Red Oak	8,862
Basswood	1,497
American Elm	199
Rock Elm	76
Total	**275,659**

5.7.3 Pin Oak Cover Type (Northern Pin Oak or Scrub Oak)

The Pin Oak cover type usually has low timber productivity and quality. As such, its value lies chiefly in wildlife concerns and aesthetics. Where featured forest cover types are regenerating under, or with Pin Oak, the stand will be converted to the featured forest cover type through release. Some acreage will also be converted through planting. Large tracts of pure-to-dominant stands of Pin Oak are difficult to maintain because of the pressure from Oak Wilt, a forest fungal disease that quickly creates large areas of mortality when it infects a stand. Consequently, Pin Oak is more likely to be a component in mixed stands of aspen, pine, and oak over the long term.

The Pin Oak cover type is found primarily on PArVAo and PArVPo habitat types in the southeastern portion of the forest.

Figure 5.28 Pin (Scrub) Oak stand near South Line road.

Table 5.21. Volume summary for the Scrub Oak Cover Type

Species	Volume (BF)
Jack Pine	914,142
Red Pine	1,173,468
Red Maple	137,556
Paper Birch	191,156
Bigtooth Aspen	243,380
Quaking Aspen	1,199,019
White Oak	370,500
Total	**4,229,220**

Species	Volume (Cords)
Jack Pine	5,638
Red Pine	4,905
White Pine	2,812
Red Maple	1,515
Paper Birch	762
Bigtooth Aspen	1,097
Quaking Aspen	4,402
Black Cherry	244
White Oak	1,421
American Elm	17
Total	**22,812**

Figure 6.1 Eight-year-old white pine regenerated using shelterwood harvest methods (see Chapter 11 for details).

CHAPTER 6 – FOREST DEVELOPMENT

6.0 INTRODUCTION

Forest Development (FD) is the improvement of commercial forest resources. It involves reforestation and commercial forest stand improvement (CFSI) activities, principally, and consists of silvicultural treatments applied to establish, promote, enhance, and maintain optimum growth on selected trees to produce future yields of desired forest products under the principles of sustained yield forest management. Forest Development funds will be used to establish, maintain, and improve growth and stocking of desirable commercial species.

6.1 GOALS AND STRATEGIES

The goal of Forest Development is to establish, maintain, and improve growth and stocking of desirable species on the forest consistent with the goals of the Forest Management Plan.

The strategies that achieve this goal include:

- Site preparation through mechanical, chemical, and fire treatments
- Reforestation using natural and artificial regeneration
- Improve stand development through commercial and non-commercial treatments
- Evaluation and monitoring of regeneration treatments
- Periodic non-commercial stand improvement treatments
- Pursuit of additional funding sources for the program
- Reporting of results and planning efforts
- Development of short- and long-term plans
- Promotion of species of significant cultural importance to the Menominee people

6.2 SITE PREPARATION

Site preparation is the practice of altering site conditions to favor the establishment, survival and growth of a desired tree species, browse or other vegetation. Site preparation is a necessary step in active forest management, and is critical in the establishment of both artificial and natural regeneration. It is used to create conditions favorable for tree seedling establishment and growth. By altering slash accumulations or vegetative cover through the use of mechanical methods, prescribed fire or herbicide applications, an environment conducive to seedling establishment is created.

6.2.1 Herbicide application

The establishment of tree seedlings requires the control of the existing vegetation. Herbicide applications are timed to correspond with the period of maximum susceptibility of the targeted species. Generally, susceptibility is lowest during the dormancy period (winter), increasing with bud break (spring), and highest during actively growing periods (mid summer).

Herbicides can be a valuable tool used to control unwanted vegetation competing with tree seedlings. Herbicides are used prior to planting as a site preparation method. This competing vegetation can include grasses, forbs, sedges, vines, many woody shrub (brush) species, and undesirable tree species. Invasive plant species can also be detrimental to reforestation projects. If invasive plant species are allowed to grow unchecked, they can become extremely difficult to control. The methods used to apply herbicides include spot and broadcast applications. Broadcast applications are used in site preparation. Herbicide use must adhere to tribal laws and ordinances. Herbicides must be applied under the supervision of a licensed applicator. Herbicides will only be applied in accordance with Environmental Protection Agency standards, and herbicide applicators are to follow manufacturer instructions during application. In addition, all applicable labels and material safety data sheets must be on hand when applying herbicides. There are two primary chemical site preparation application techniques: spot or backpack and broadcast applications.

Spot application with backpack sprayers provides the most controlled method of applying herbicides while using less chemical than other application methods. Broadcast equipment includes the use of either a spray trailer or booms (spray system) mounted on a Forwarder.

Forest Development is committed to finding ways of limiting the amount of herbicide applied on Reservation land. Alternative methods may include prescribed fire or a combination of mechanical methods for site preparation.

Figure 6.2 Disc Trenching equipment used to prepare sites for planting.

6.2.2 Mechanical Methods

Mechanical site preparation is generally thought of as being accomplished with mechanized equipment of some sort. The three types of equipment used on the Menominee Reservation include:

- **Anchor Chains**: Used in the preparation of seedbeds for natural regeneration. This seedbed scarification is timed to coincide with natural seed fall.
- **Disc Trench**: Removes soil only from the areas where seedlings will be planted.
- **Roller Chopper:** Effectively flattens brush occupying sites planned for planting or natural seed

fall.

Goals of mechanical site preparation include:

- Improve access for tree planters and increase the number of suitable sites for planting by removal or rearrangement of slash and/or vegetative competition
- Reduce competition caused by shrubs and grasses or non-featured tree species
- Prepare a suitable seedbed for natural regeneration
- Manually alleviate compacted soils
- Favor practices that allow for dispersed slash or slash in small piles on the site for the benefit of animal habitat
- No additional establishment of non-native invasive species
- Design practices to avoid direct runoff of sediment into water and wetlands

In order for the FD program to perform site preparation methods on all stands in need of treatment, resource objectives must be balanced and prioritized with cost effectiveness. *It is critical when planning and executing mechanical site preparation projects, that the requirements of the National Historic Preservation Act (NHPA), as well as all other federal, state, and tribal regulations regarding the protection of archeological sites and areas are strictly followed.*

6.2.3 Prescribed Fire

Fire is a natural part of many of the ecosystems on tribal lands. In addition to preparing the seed bed, fire releases nutrients. Fire is an excellent tool for fuel abatement and site preparation. Fire treatments should be timed, if possible, to coincide with natural seed fall or with planting schedules. Assessed to determine the impact on vegetative response, cone production, and insect resistance are taken into consideration when Burn prescriptions are written. Fire is covered in more detail in Chapter 7 of this plan.

6.3 REFORESTATION

Reforestation is the practice of regenerating and growing healthy trees on previously forested sites. Reforestation can include both natural and hand planting methods. Reforestation activities usually take place in the spring of each year.

Figure 6.3 Three-year old white pine seedling.

6.3.1 Natural Regeneration

Natural regeneration has many advantages over planted regeneration, including:

- the newly established stands are adapted to the site
- natural seedlings frequently develop superior initial root systems
- natural seedlings tend to be more disease resistant

Natural regeneration is also the most economical reforestation method. However, obtaining adequate natural regeneration relative to desired species and numbers can be elusive within the preferred time constraints furthermore. A good seed crop does not guarantee natural regeneration.

6.3.2 Artificial Regeneration

There are a variety of situations where artificial regeneration should be the selected method of reforestation. Some examples of these situations are the absence of a natural seed crop, management objectives that call for a conversion from a natural stand to a plantation or a natural event such as a windstorm.

Seed Collection is accomplished during heavy seed crop years. Seed types include white and red pine, red and white oak, hemlock, black cherry, and white spruce. The seed is delivered to the nurseries that process the seed to grow the seedlings that are returned to the Reservation during future planting seasons.

Planting Stock **is** the seedlings grown in the nursery from collected seed are known as planting stock. Planting stock can be grown as *bare-root* seedlings or as *containerized* seedlings. Bare-root seedlings are grown in open conditions. Containerized trees are grown in closed greenhouses and shelter houses.. Containerized seedlings give the flexibility to extend planting season throughout the summer months. Stock of both types can differ in size, root length and age.

Figure 6.4 White pine seedlings are available as both plugs (left) and bare root (right) stock.

6.4 REGENERATION EVALUATION AND MONITORING

Regeneration sites are evaluated and monitored over time with regeneration surveys (also known as stocking surveys). Stocking surveys are performed to assess the quality and quantity of regeneration. A 1-percent minimum sample is surveyed on each site using 1/100th-acre plots. Each site is surveyed in the fall of the year planted and 1, 3, 5, 10 and 15 years after planting.

6.5 FOREST STAND IMPROVEMENT

Forest Stand Improvement (FSI) projects enhance growth and yield of existing forest stands. FSI, also known as Timber Stand Improvement (TSI), is an important part of managing timber stands. FSI helps to achieve management goals and strategies for forest vegetation by ensuring the establishment of the objective species. Each FSI project has a stand examination, silvicultural prescription, benefit/cost analysis, and environmental/cultural clearance.

6.5.1 Pre- Harvest Thinning (PHT)

PHT is also known as "pre-commercial" and is method of timber stand improvement to improve the quality of featured growing stock. PHT is the reduction of stand density (thinning) to prescribed specifications in the pre-commercial size class. The tools of PCT are hand tools (brush cutters), mechanical, and fire. The PCT work is accomplished by forestry staff or contractors.

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6.5.2 Prescribed Burning

Prescribed burning is a powerful tool that can be used for the protection and improvement of harvest and stands of timber. These benefits include the removal of undesirable brush, ground fuels, lower limbs of remaining trees and release of nutrients tied up in dead organic material.

6.5.3 Pruning

Pruning is an early- to mid-rotation investment that is vital to maximize grade and growth potential by refocusing growth on the upper portion of the tree. Trees are pruned for a variety of reasons, the most common being:

- minimize knot size in the bottom log(s)
- to reduce disease intensity
- to redirect the growth to the upper portion of the tree
- to control overall tree size
- to influence flowering and fruiting
- to maintain vigor, and appearance
- reduce the amount of time to reach rotation age

Live branches, as they grow into the stem of the tree, may form knots. Knots are one of the main lumber grade defects that reduce the value of the finished product. Branches are removed by pruning, which in turn, over many years produces higher-grade, knot-free wood. Dead branches are removed from live trees to prevent the entry point of disease.

Two types of Pruning include:

- **Corrective pruning**: Applied to White Pine, this technique corrects the terminal leader damage at the top of the tree caused by White Pine Weevil thus decreasing rotation age. Red Oak is another species to benefit from this technique.
- **Crop tree pruning**: Mainly applied to White Pine, this technique removes the lower branches from 6 feet up to 17 feet of clear log but maintains at a minimum 2/3 tree height in live branches.

Before pruning an adequate number of potential crop trees per acre is necessary to improve the timber quality of the stand. These trees are marked for future reference.

6.6 PROGRAM FINANCIAL SUPPORT

The program support component of FD is made up of the following activities:

- development of a FD Plan
- related environmental compliance work
- planning of annual projects and activities
- benefit/cost analyses
- project ranking and funding priorities
- record keeping
- monitoring and evaluation
- reporting
- technical training

An accurate inventory is necessary support for planning the development and maintenance of forest development projects and activities. This FD inventory lists the acres on the reservation that have need for forest development work. This inventory is updated annually and submitted with the annual reporting requirements.

6.7 FOREST DEVELOPMENT PLANS AND REPORTING

FD Plan: A FD is prepared in conjunction with the Forest Management Plan. The FD activities are guided by the Environmental Assessment as identified within the approved prescription.

Benefit/Cost Analyses: A benefit/cost (B/C) analysis must be prepared for each FD projects. Groupings of similar projects is reviewed to maximize efficiency. This process aids the FD Staff in setting the project priorities.

Technical Training: Technical training and assistance will be provided to forest development staff as necessary. A minimum level of training and experience is required of all staff performing field work.

As new technology and techniques are developed additional staff training will be implemented.

Reporting: Two primary FD program reports must be completed and submitted to the appropriate departments. The first report describes the *Forest Development Program Projects/Activities* for the coming fiscal year. The second report summarizes the *Forest Development Program Accomplished Project and Activities* of the previous fiscal year.

CHAPTER 7 - FIRE MANAGEMENT PROGRAM

Figure 7.1 A prescribed fire near of Jackson Creek conducted for silvicultural purposes. The Menominee Tribe, going back to the pre-European times, has used fire as a powerful land management tool.

7.0 INTRODUCTION

Fire Management is composed of activities required for the protection of burnable wildland values from fire and the use of prescribed fire to meet land management objectives.

7.1 GOALS AND STRATEGIES

The goal of Fire Management is the protection of human life, property and forest resources from wildfire and the incorporation of fire as an integral land management tool.

The strategies that achieve these goals include:

- Promotion of firefighter, aviation, and public safety as the principal concerns of every decision in fire management operations
- Incorporation of fire management into forest management planning goals, objectives, and alternatives
- Administration of fire using a full range of wildland fire and prescribed fire options to defend, develop, and restore resources and developments
- Balancing fire management program actions to support fire dependent ecosystem resource management
- Collaboration of fire managers with tribal, federal, state, and county land management agencies, air regulators, and the public to coordinate fire management operations that may affect other landowners

Specific fire management objectives are established to better guide forest management activities related to fire and fuels projects. The Menominee Fire Management Plan outlines these objectives in detail.

Figure 7.2 Berry Gatherers camp in the late 19th century.

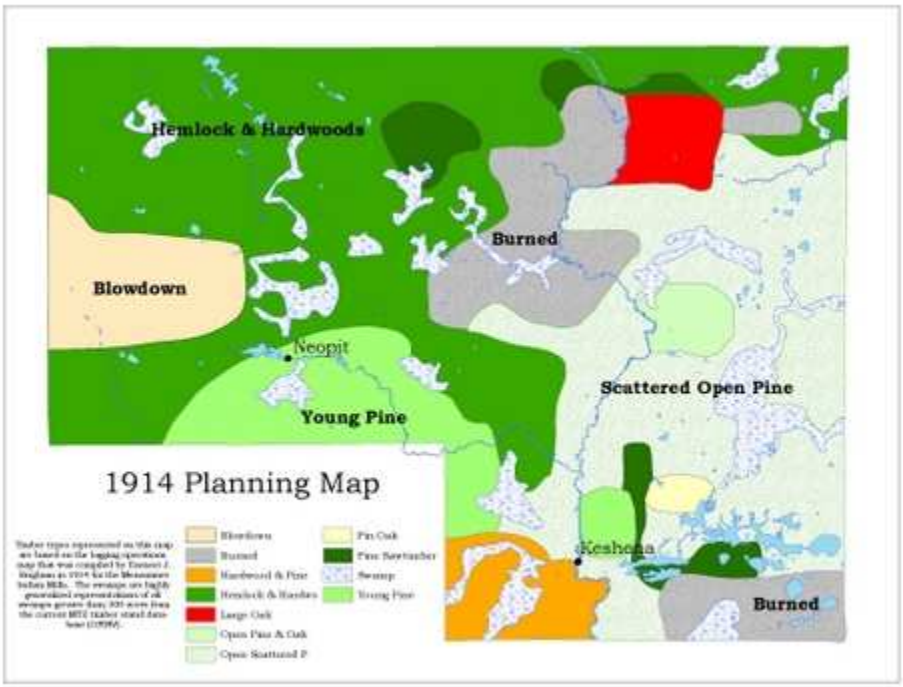


Figure 7.3 Map shows the pre-settlement conditions based on notes and observations from GLO surveys. Large areas of open barren and brush occupied much of the eastern side of the Reservation.

7.3 TRADITIONAL USES OF FIRE

The reasons for the use of fires throughout tribal history include:

- To maintain open stands to facilitate travel and clear routes through dense timber;
- To improve hunting by stimulating the growth of desirable grasses and shrubs, to facilitate stalking, and to drive or surround game;
- To enhance the production of certain foods and medicine plants (Blue Berries, Black berries, raspberries, others);
- To clear campsite areas thereby reducing fire hazard and camouflage for enemies, cleaning up refuse, maintaining open areas around villages or settlement, and pest control;

7.4 MENOMINEE FIRE HISTORY

Fire has been a significant part of the Menominee forest and has influenced the landscape for thousands of years. Pre-settlement fire (either from lightning or anthropogenic (human caused)) had a significant impact on the composition and structure of the forest managed today. More recent fire management activities (primarily fire suppression for almost 70 years) have changed the ecological role fire played creating a need to re- introduce fire as a forest management tool.

The Menominee forest of today is very much a fire-influenced ecosystem. Fire is a culturally connected ecological process, thus to learn about fire in pre-European times we need to understand how people were living, what foods were eaten, where people were living, hunting, and gathering, how did people survive. There weren't boundaries for whose property ended here or there, no one was putting fires out. Large fires could have and likely started in the Prairie/Grasslands and burned clear across entire "States" or regions. Some fires may have started in late Spring or Early summer and burned for weeks and months until fall snows came. Certain areas such as the pine barrens/oak savannas were likely burned almost annually as a way to stimulate good berry production for the following years. Knowledge that was passed from one generation to the next created landscapes that had been intensively managed through the use of fire.

- Early 1800's- Large fire (probably associated with a large scale blow-down) burned the southern areas of the Reservation (South of Neopit, West/Northwest of Middle Village). The evidence of these fires can be seen in a few of the remaining trees (fire scarred) but also in the age of the current pine stands. Some of the historic references to this area describe it as brush (1830's), young pine (1914), "old aspen skeletons" (1930), giving us snap-shots of how the current stand developed.

- Late 1800- Early 1900's- Logging era. Large fuel load from slash, increased fire occurrence and damage. Late 1800's (Peshtigo Fire, Chicago fire, large fires in MN, MI, and WI), large fires leads to a national policy to suppress wildland fires.

- Blow-down event. Puts in motion the creation of Forestry program and in turn fire control capability on the Reservation. Aggressive fire control policies established at a National level.

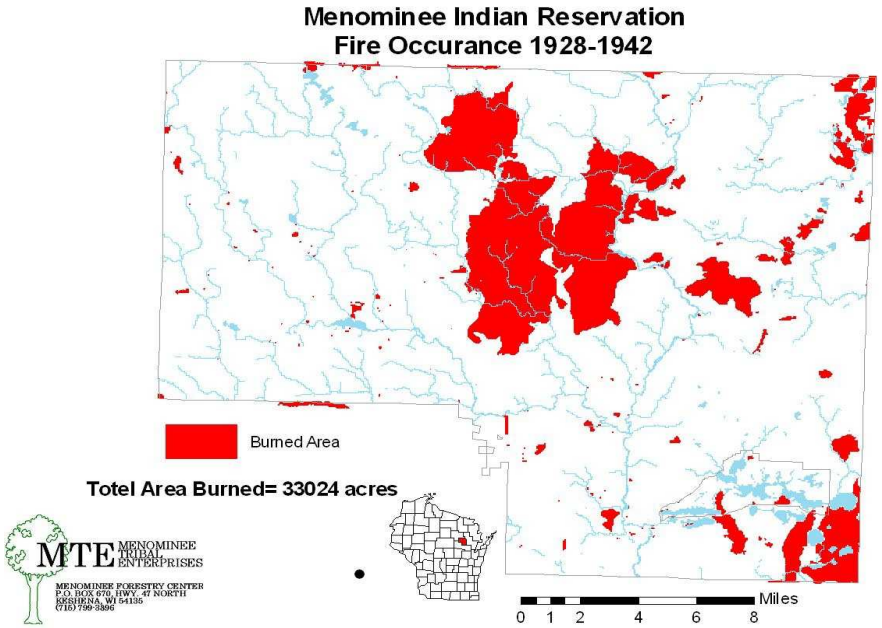


Figure 7.4 Map showing fires which occurred from 1928-1942. Much of the large fires were prior to 1940 and during period of a significant drought.

- 1928 to 1936- Very active period of large wildfires. Primarily fires associated with logging operations (slash and railroads). The fires of this period likely burned hotter and were more destructive then fires in the pre-logging era. In a 1932 review of the Menominee Forest Protection program by the Indian Office, there was great concern about protecting the Southeast borders of the Reservation. The areas outside the Reservations Southeast corner were called "no-mans" land because of the absence of the States Conservation Commission and fire protection. Roads and fire breaks were constructed as a priority for forest management. (Figure 14.3 Fire History Map 1928-1942)

- 1940's- Suppression capability on Reservation shows a dramatic decrease in fire occurrence and size of wild fires. Fire management activities are limited to aggressive fire suppression. Fire fighting equipment becomes mechanized and very effective. Effective fire control was in part a result of the roads and fire breaks which were constructed in the late 1930's, the mechanized equipment, and less severe drought conditions.

- 1961- Following termination fire control responsibility fell to the State Forest Protection Division (Wisconsin Conservation Department- Present day Department of Natural Resources). Approximately 1500 acres burned during the termination era of 1961 to 1973, with the most significant fire occurring in 1962 north of Skice Lake (Skice Lake Fire burned approximately 600 acres on April 12, 1962).

- 1973- Upon restoration, responsibility for fire management on the Menominee Reservation passed from the WI WDNR to the Secretary of Interior and the BIA. The BIA did not have the resources to provide adequate forest protection so this function remained with the WDNR through an agreement.

- 1988- Congress passed the Indian Self-Determination Act allowing tribes to contract their own fire protection services. Menominee Tribal Enterprises begins building its Fire Management capabilities and establishes a cooperative agreement for fire protection between the BIA and WWDNR.

- 1990's- Resource Managers begin to use fire as a management tool on a small scale.

- Present day- Effective fire suppression for about 70 years has reduced the number and size of wildfires. The use of fire as a management tool for forest management and restoration is increasing.

7.5 UNDERSTANDING DISTURBANCE AND FOREST SUCCESSION

Landscapes are always changing. An open field/meadow will eventually become a forest if disturbances (such as from wind, fire, flood, or insect/disease) are removed or limited. An old mature forest (climax/old growth) will eventually be affected by a disturbance, which, depending on the type and scale of the disturbance will revert to an earlier developmental stage. Through succession and disturbances every landscape is constantly changing, filled with natural variation and diversity.

Figure 7.5 Photos both taken from Sand Lake fire tower. Photo on left was taken in 1936 during a fire that burned over 500 acres. The current view (right) clearly shows the effect of fire exclusion for 70 plus years. Note the large open areas (present prior to the fire) in the 1936 photo have been replaced by dense stands of scrub oak and pine.

Fire Regimes are how scientist and fire managers attempt to define fire as a disturbance. Fire regimes describe how often (the fire frequency/fire interval) and the type of fire that occurred over a certain time frame on any given landscape. Fire Regimes are influenced by human land use activities. The term fire regime refers to the kind of fire that typically occurs in an area and the effects that that particular type of burning has on the vegetation. Fire regimes are described by fire frequency (how often fires occur), fire intensity (whether the fire that burn are mostly surface fires that burn ground vegetation or crown fires that burn ground vegetation as well as in the canopy), and the pattern of vegetation that the fires create.

Historic fire regimes within the Menominee Reservation and throughout the Lake States coincide very closely with habitat types (being that soil types, geological activity, and human activities are the primary drivers of fire regimes in this area).

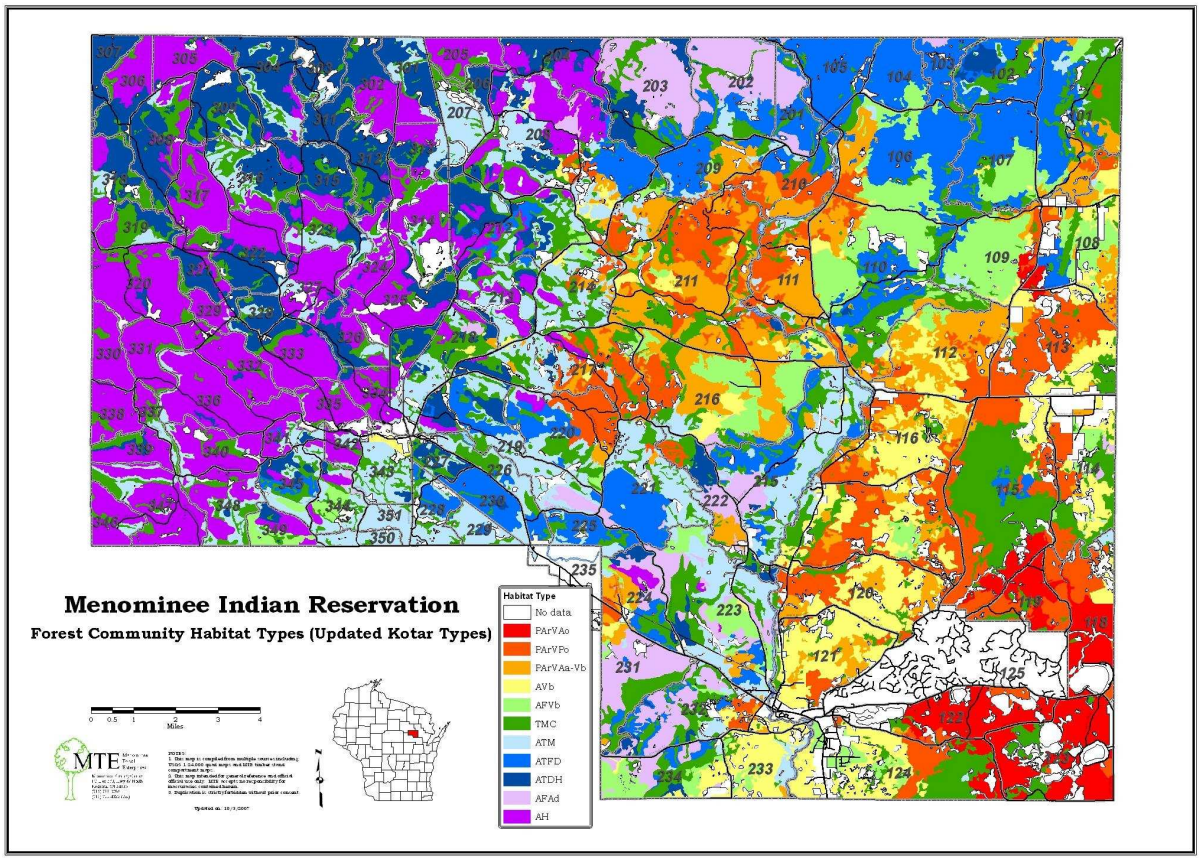


Figure 7.6 Habitat type is directly related to the fire regime. The driest soil types/lowest habitat types had the most frequent fire occurrence and has ecosystem elements that have adapted to fire (See Chapter 11 for more details on Habitat Types and their role in Silviculture).

7.6 FIRE MANAGEMENT TODAY

Today we are faced with the task of "relearning" how to apply fire onto the landscape. Due to almost 70 years of fire suppression (removal of just about all natural and historically applied fires), fire management today is a very complex issue.

The Fire Management (FM) program started back in 1992. The program currently operates in coordination with the Wisconsin Department of Natural Resources for protection on the Menominee Reservation and surrounding areas. A cooperative agreement exists which provides for mutual aid responses to wildland fires, shared equipment and facilities, coordination, and access to each agencies resources. Strong interagency cooperation and coordination is important for a successful fire management program. Menominee fire management maintains a commitment to collaborate and maintain a good working relationship with the WIWDNR and other fire protection agencies in the area (includes Menominee Fire Departments, Federal partners, Forest Service, US Fish and Wildlife Service, BIA and other Indian Tribes in the State.

To be eligible for long-term fire program funds, federal wildland fire policy requires a fire management plan for all areas with burnable vegetation. The Fire Management (FM) identifies and integrates all wildland fire management and related activities within the context of the Forest Management Plan (FMP). All tribes are required to have Fire Management that are compliant with environmental and cultural resource management laws to receive project funding for fuels treatment projects involving prescribed fire or mechanical treatments and rehabilitation treatments.

Suppression actions will occur on all unplanned ignitions. Suppression response will be tempered to meet management objectives in the Fire Management and a) protection of values at risk relative to personal and public safety, b) developed properties, cultural and historical resource values, c) natural resources benefits, and d) cost benefit based on values at risk.

Figure 7.7 County S Fire. Summer of 2008. Menominee Fire Resources responded as part of our cooperative agreement with the WWDNR.

7.7 FIRE MANAGEMENT ZONES (FMZ)

Fire Management Zones are established to identify objectives, standards, guidelines, and future desired conditions within the Fire Management Area. A FMZ[9] is a land management area definable by objectives, management constraints, topographic features, access, values to be protected, political boundaries, fuel types, major fire regime groups, and so on. Representative Locations (RL's) further specify objectives or strategies within a FMZ

9 Refer to Fire Management for detailed fire management strategies for each FMZ and RL.

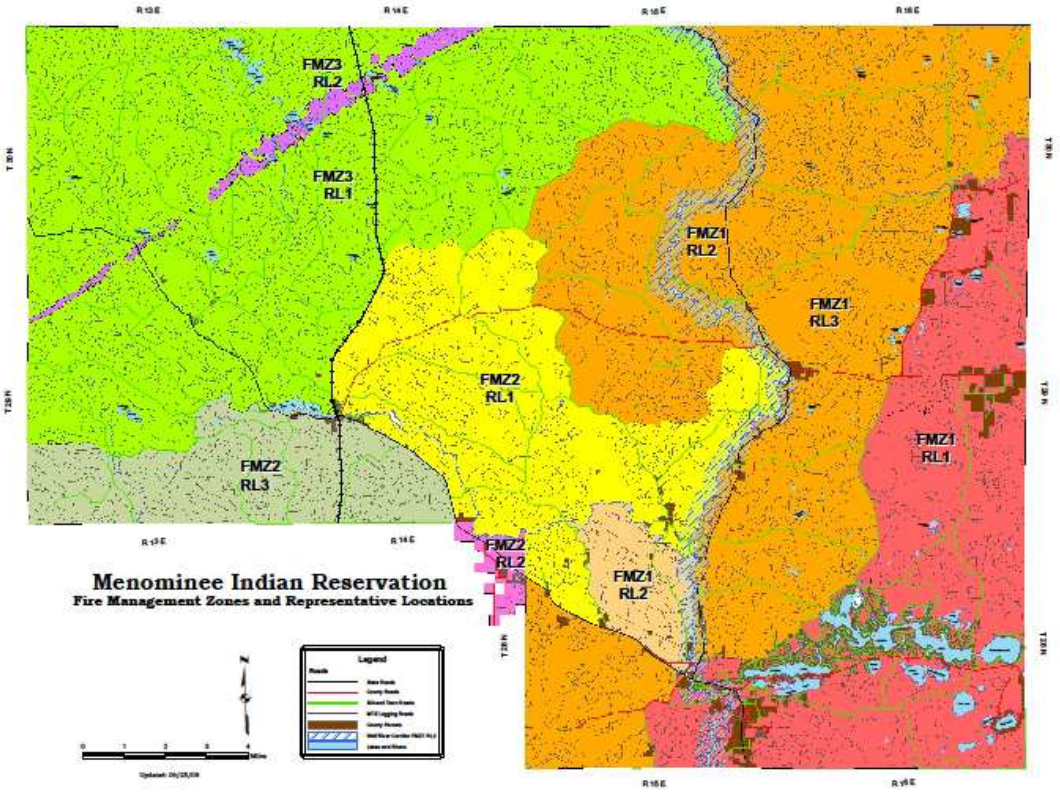


Figure 7.8 Fire Management Units and Representative Locations for Menominee are established to differentiate fire management objectives based on different fire regimes, fuel types, current vegetation, and desired land management objectives.

7.7.1 FMZ 1- Sand Plains/Dry Habitat Types

This Fire Management Unit consists of primarily the driest/nutrient deficient habitat types. Historically much of this area was burned often and maintained as open pine/oak barren/scattered open pine/oak cover types, intermixed with swamps and marshes. Geologically the area is comprised of sandy out washed plains with minimal topography. Some Wildland Urban Interface (WUI) occurs within this FMZ, primarily around the Legend Lakes, along the Wolf River, in South Branch, and in and around Keshena. Significant cultural resources can be found throughout the FMZ, especially around or near lakes and along the wolf river corridor. Fire will be utilized for various forest management objectives, including management of white pine, Pine Barrens restoration, oak, aspen, grasslands, and other forest/non-forest cover types.

- RL1- Jackson Creek and Legend Lakes/Keshena/South Branch WUI
- RL2- Wolf River Corridor and Compartment 223 (Fire suppression guidelines have been developed to minimize impacts on culturally sensitive areas. Confinement and Limited action suppression strategies will be utilized as much as safely possible.)
- RL3- Sand Plain/ Non-WUI

7.7.2 FMZ 2- West Branch of the Wolf-Middle Habitat/ White Pine/Oak

This FMZ consists of the middle to high habitat types. Historic fire occurrence was less frequent then FMZ1 and wildfire risk is moderate. Significant cultural resources can be found throughout this FMZ. Fire will be utilized for various forest management activities such as white pine and oak natural

regeneration, conversion, site preparation. Savanna and barrens restoration, and hazard fuels reduction.

- RL 1- West Branch/Crow Settlement
- RL 2- Middle Village and Vollands
- RL 3- Camp 1

7.7.3 FMZ 3- Northern Hardwoods/High Habitat Types

This FMZ consists of the highest/nutrient rich habitat types. Historic fire occurrence was much less then FMZ1 and FMZ2. Fires were associated with other natural disturbances such as wind events and large scale insect and disease outbreaks. Fire can be utilized for forest management related to oak and pine regeneration, hemlock, and natural disturbance immolation (fire following a large scale wind event). Much of the fire applied to this FMZ would be considered demonstration in nature due to the lack of understanding about this particular long return fire environment.

- RL 1- Northern Hardwoods
- RL 2- 2007 Blow down

7.8 APPROPRIATE MANAGEMENT RESPONSE (AMR)

The response to a wildfire based on an evaluation of risks to firefighter and public safety, the circumstances under which a fire occurs, including weather and fuel conditions, natural and cultural resource management objectives, protection priorities, and values to be protected. General Fire Suppression Strategies are identified for each Representative Location. These strategies outline options for suppression activities that best meet the overall fire management goals and utilize AMR. A combination of suppression strategies is often the most realistic approach, taking into account: public and fire fighter safety, AMR and resource management objectives, risk, and cost accountability.

7.8.1 Full Suppression/Aggressive Control Strategy

This strategy is to be used when values at risk need to be protected and the only option for controlling the fire is to control the fire through aggressive means. This strategy incorporates using whatever means possible to contain and control a fire.

7.8.2 Confinement Strategy

Confinement strategy may include utilization of natural and man-made barriers (existing roads) to contain and control a fire. A less aggressive approach may be utilized when values at risk are minimal and where the fire may actually help meet resource management objectives.

7.8.3 Limited Action/Fire Use

This is a rare option that could be considered as long as the fire fighter, public safety, and developed properties are not put at risk. Actions include monitoring and allowing fire to mimic its natural, free-burning nature.

7.9 FIRE MANAGEMENT / ACTIVITIES

The following distinctions are made for the administrative and operational activities that make up a fire management program in Indian Country today.

7.9.1 Preparedness/Pre-suppression

Pre-suppression (or Preparedness) program covers all activities in advance of fire occurrence to ensure effective suppression action. This includes planning for the organization, recruiting and training, procuring equipment and supplies, maintaining fire equipment and fire control improvements, and negotiating cooperative and/or mutual aid agreements.

7.9.2 Suppression

Suppression includes all the activities associated with the extinguishing or confining a fire beginning with its discovery. Resources involved in fire suppression utilize an Incident Management System (ICS-Incident Command System) that models those used in the military. This command system helps to organize and provides structure for safe and efficient management of a very complex and dangerous work environment).

Figure 7.9 Menominee Fire Crews participate in fire suppression both on the Menominee Reservation as well as on National incidents around the country.

7.9.2 Fuels/Prescribed Fire

Fuels program primary goal is to ensure that land management objectives are being met through the use of fire and other mechanical means. Activities include: fuels and fire effects monitoring, implementation of prescribed burns, ecosystem maintenance, wildlife habitat enhancement, hazard reduction, and public education.

7.9.2.1 Prescribed Fire

The projects associated with prescribed fire include:

- WUI Burns- Hazardous Fuels Reduction in Middle Village, Keshena, South Branch, and Neopit. Fields burned in early spring and fall. Burning these fields reduces the threat of damaging fires and nuisance fires throughout the fire season.

- Wildlife Burns- Create and maintain bio-diversity through maintaining cover types as open, barren, and/or savanna types.

- Pine and Oak Regeneration Burns (Site Preparation Burns and Understory Burns)- Burns designed to remove competing vegetation, reduce litter and duff, and help facilitate natural regeneration or prepare sites for planting.

Figure 7.10 Prescribed fire has potential for achieving silvicultural goals, including site preparation for shelterwood regeneration harvests.

- Pine Barrens Restoration Burns- Projects designed to restore landscapes that existed prior to fire suppression era. Frequent burns would help maintain a landscape with objectives of enhancing blue berry production and re-establishment of barren/savanna habitat.
- Other Demonstration Burns- MTE Approved Projects designed to expand knowledge, application of fire and other forest management activities.

7.9.2.2 Mechanical Fuels Projects

The projects associated with mechanical fuels include:

- HFR (Hazard Fuels Reduction): Any project located in high fire risk areas that reduces the potential or severity of a wildfire or allows for more effective fire suppression. Specific projects include plantation thin hazard fuel reduction, fuel breaks, and development of defensible space around homes and other developments.

Figure 7.11 Red Pine stands pose a relatively significant hazard if fuel levels are not properly dealt with, especially after harvest operations.

- Biomass projects- Residual slash remaining after harvests can create an elevated fire risk and may limit the use of fire as a land management tool. As this biomass becomes more marketable (bio-fuel, chips, and pellets) many opportunities exist to incorporate fire management objectives, restoration, and harvesting for economic benefits and the overall health of the forest.

Figure 7.12 Chipping equipment used in a South Branch biomass pilot project.

7.9.2.3 Prevention

Prevention activities include public education, fire investigation, fire permits, Smokey Bear activities, and public awareness events that reduce the occurrences of wildland fire. MITW Conservation Department has become more involved with the Fire Management program in recent years, participating in training and western wildfire incidents. It makes sense to coordinate with this department with regards to Fire Investigations, fire wood permits, and other resource protection operations. MITW Conservation wardens have completed Wildland Fire Investigation training and will continue to pursue experience and qualifications to perform these tasks on a local level and national level.

7.10 PUBLIC OUTREACH STRATEGY

Public support and acceptance of the fire management program activities will determine the extent fire can be applied as a resource management tool. Prescribed fire and fire suppression are very complex aspects of Fire Management that require planning, profession program leadership, organization, cooperation, and collaboration with multiple stakeholders. Fire Management recognizes the importance of public outreach and education. Presentation, public meetings, news releases, and other events will be utilized to communicate Fire Management projects and messages.

7.11 PROJECT MONITORING (FIRE EFFECTS MONITORING)

Project monitoring is important to ensure that objectives are being met, to improve treatment successes, to learn from failures and successes, pass on knowledge to future land managers, and communicate fire messages effectively to the public. Monitoring also can improve project efficiency and improve planning for the future. The fire management program will monitor projects. Monitoring will include fuel loading, fire behavior and fire effects, weather, and cost. Monitoring standards have been developed and are identified in the Fire Monitoring as part of the Fire Management Plan.

MTE will consider the use of FIREMON (or its equivalent) method which is a standardized fuels monitoring protocol which has been adopted by the BIA and other federal fire management organizations. FIREMON plots will be established in most projects to monitor fuel loads, fire behavior, and treatment effects. At least 6 plots will be established per project area with an additional plot for every 5 acres over 50 acres. For a 100 acre project as many as 16 plots may be establish. The detail necessary will depend on the type of project area and how variant the landscape is.

Cost is monitored on a project by project basis. A cost/acre will be determined and used to better estimate project cost, to create fiscal accountability, and for acquiring future project funds.

CHAPTER 8 - CULTURAL RESOURCES

8.0 INTRODUCTION: MENOMINEE CREATION AND THE EVOLUTION OF THE CLAN SYSTEM

The Menominee are an Algonquin speaking Tribe, who once referred to themselves as "Kiash Matchitiwuk" or "The Ancient Ones." Surrounding tribes knew the Menominee Tribe as "Omaeqnomenewak," meaning "Wild Rice People", due to the reliance of wild rice as their main subsistence source. It was widely believed that when the Menominee people entered a region, wild rice would soon follow. Menominee history and its connection to wild rice are important to the Tribe's identity. The Menominee are indigenous to what is now Wisconsin and their Creation story took place at the mouth of the Menominee River some sixty miles east of the their present reservation in their ancestral territory.

Menominee history began with the Menominee creation story more than 10,000 years ago. While variations of the creation story exist today, each version tells how the Menominee are indigenous to the area now known as Wisconsin. The following map, created by the Menominee County and the Tribe's Historic Preservation Department, depicts this historical range of the Menominee territory. The Menominee creation story took place near the mouth of the Menominee River, where the creator transformed the five main clans from animal into human form. Each Menominee descends from the following five main clans:

- **Bear (Awaehsaeh) Clan:** speakers and keeper of the law;
- **Eagle/Thunderer (Kenew/Enahmahkiw) Clan**: freedom and justice;
- **Moose (Mos) Clan:** community or individual security;
- **Crane (Otaehciah) Clan:** architecture, construction and art
- **Wolf (Mahwaeh) Clan:** hunting and gathering

The clan system was a mechanism for future planning. It helped the Menominee remain in balance as the Tribe carried out goals and objectives to ensure the survival of the Menominee throughout its early history.

After the arrival of the Europeans in 1634, Menominee life changed with the introduction of the fur trade. The Menominee occupied over ten million acres of land and with migration of people from the east, the Menominee reluctantly entered into treaty negotiations with the federal government. During this time missionaries tried to Christianize the Menominee and were partially successful in their effort, however many Menominee clung to their traditional ways of life.

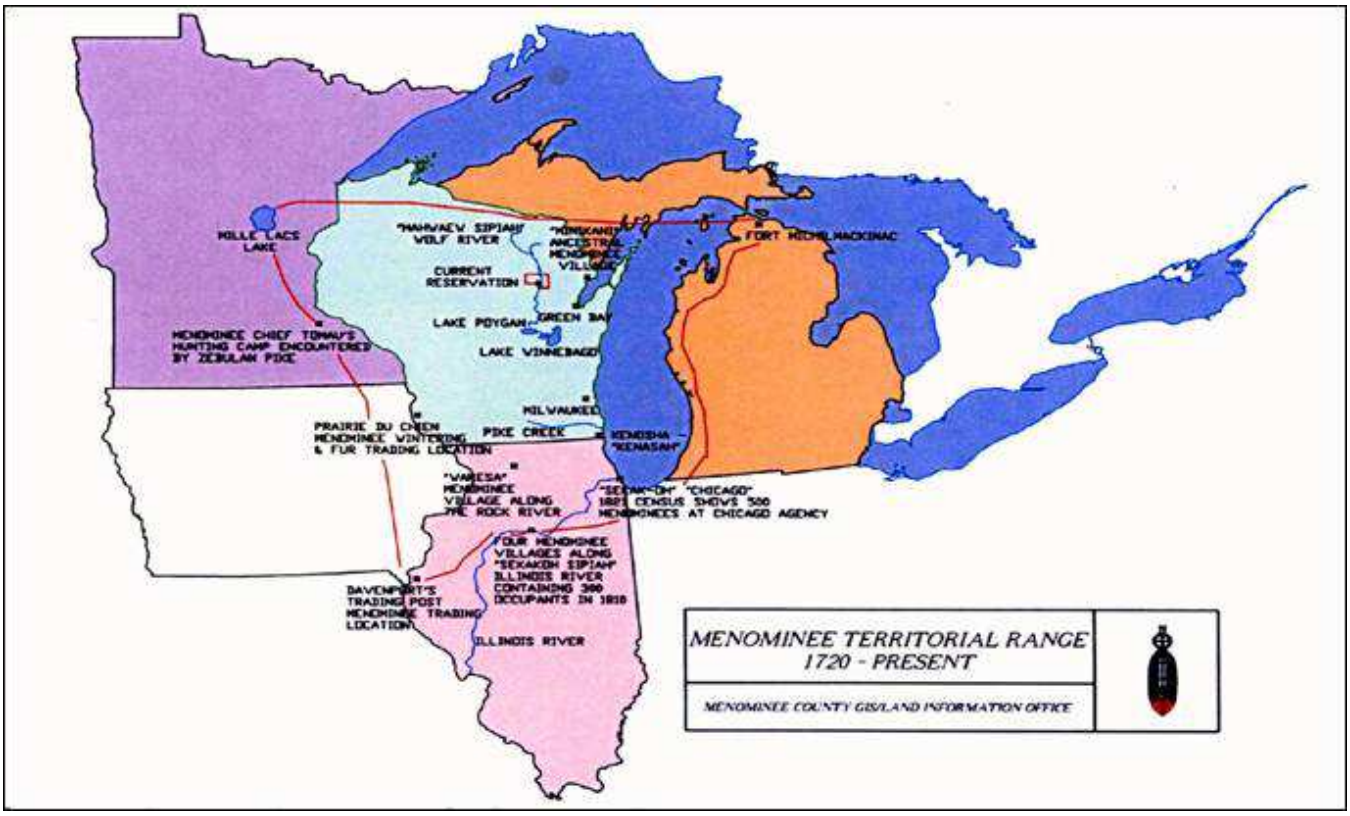


Figure 8.1 Menominee territorial range, 1729 – present (provided by Menominee Tribal Historic Preservation Officer)

8.2 GOALS AND STRATEGIES

The goal is to enhance the protection of cultural resources of the Menominee people that exist in the forest.

The strategies that achieve this goal include:

- Identification of traditional cultural properties
- Statement of potential impacts on cultural resources as the result of forest management activities
- Application of the appropriate regulatory authority over cultural resource management
- Establishment of resource inventories by the Tribal Historic Preservation Officer
- Field identification of cultural resources
- Establishment of management alternatives
- Inadvertent discovery guidelines
- Establishment of restricted management areas

8.3 TREATY ERA HISTORY

The Menominee treaty era resulted in seven ratified treaties and two contested treaties that were never ratified. The contested Treaties of 1821 and 1822 called for the sale of 7,850,000 acres of Menominee land to New York Indians; these treaties were signed by unauthorized chief and warriors, and were never ratified by the federal government. The following ratified treaties shaped the relationships between the Tribe and federal government and established the present day boundaries of the Menominee Reservation:

- 1817 Treaty of Peace and Friendship – This treaty, ratified on March 10, 1817 and established the government to government relationship with the federal government
- 1827 Treaty of Butte Des Morts – Called for the Menominee, Winnebago, and Chippewa

to establish boundaries for future land cessions. It was also intended to settle the land issues between the Menominee and the New York Indians.

- 1831, 1832 Stanbough's Treaty - This Treaty, negotiated in 1831 and 1832, was intended to settle land disputes with the New York Tribes. In this Treaty, the Menominee reluctantly ceded 2.5 million acres to the federal government, 500,000 of this acreage was given to the New York tribes.
- 1836 Treaty of the Cedars – This treaty, signed on September 3, 1836, ceded approximately four million acres to the federal government.
- 1848 Treaty of Lake Pow-aw-hay-kon-nay-Poygan – This treaty, signed on October 18, 1848, ceded all remaining Menominee lands to the federal government in exchange for 600,000 acres in Minnesota. Subsequent to its passage, Menominee leaders visited Minnesota and determined the land didn't offer the resources necessary for the Menominee to survive. So the Menominee refused to relocate.
- 1854 Treaty of the Wolf River – This treaty, signed on May 12, 1854, established the present day Menominee Reservation and reversed the terms of the 1848 treaty. The reservation was now reduced to 12 townships, or just 267,480 acres of land
- 1856 Treaty of the Stockbridge-Munsee – This was the final treaty, signed February 11, 1856, that the Tribe entered into with the federal government. In this treaty, the Tribe ceded a tract of land in the western part of the reservation for the Stockbridge-Munsee to have as a home. The reservation was reduced to 10 townships.

For generations the Menominee lived and survived in the forest and treated the forest with reverence and respect, now they would soon find the forest could be used as an economic resource. The Menominee realized that they could harvest trees for lumber to make homes and to sell trees to mills outside of the reservation. However, Chief Oshkosh ("the claw") from the Bear clan said we can harvest trees in a way that the trees will always be here and not clear cut trees like what was happening throughout Wisconsin. Chief Oshkosh said: (with Menominee translation)

"**Start with the rising sun and work toward the setting sun, but take only the mature**
Kiskahakituaq enes yoh skimohkahah anokiwen yom skinik enakah, tapehnen kesekew
trees, the sick trees, and the trees that have fallen. When you reach
Metekok, wehsekesewak metekok, mesek kayes-papeciwak metekok. Kaniw ehpeh,s
The end of reservation, turn and cut from the setting sun to the rising sun
Piyahtaeyaek enes, Kiskahakituaq enes yoh skinik enakah yom skimohkahah enahkah
And the trees will last forever"
Mesek metekok yom kakekaehkamet".

Figure 8.2 Chief Oshkosh "the Claw"

The concept of sustainability or sustained yield management of the forest continues to guide the Tribe's forest management practices and resources protection activities. As a result, the reservation features some of the best managed lands in the Great Lakes Basin.

8.4 MENOMINEE TRIBAL HISTORIC PRESERVATION OFFICER

The Menominee Tribal Historic Preservation Officer has the responsibility and authority under Section 101 d 2 and Section 106 of the National Historic Preservation Act (NHPA) to protect cultural resources on Menominee trust lands. The Menominee Indian Tribe of Wisconsin also has a Tribal Ordinance titled the Menominee Cultural Resources Management Plan that provides protection to cultural resources within the exterior boundaries of the Menominee Indian Reservation.

Cultural Resources within the Menominee Indian Reservation possess spiritual as well as ceremonial components that the Menominee people continue to recognize as a part of their identity. Many of the archaeological sites, burial sites, and mound groups contain ancestors and funerary objects of the ancient Menominee now departed to the spirit land and some of these sites have now been identified, documented and have been afforded protection under the Native American Graves Protection and Repatriation Act (NAGPRA) and are protected with the cooperation of Menominee Tribal Forestry Staff. Traditional Cultural Properties also play an important part of Menominee life ways of the past and are defined in National Park Service Bulletin 38.

Figure 8.3 Historic Maple Sugar Camp

8.5 WHAT ARE CULTURAL RESOURCES?

Cultural resources include archaeological sites, traditional burial grounds, cemeteries, burial mounds, historic structures, and traditional cultural properties. Together, they represent the way the Menominee people lived in the past from their Creation to the historic and proto historic period roughly 12,000 years or more.

Table 8.1 Examples of cultural resource types found on Menominee	
Types of cultural resources	
Historic Structures	• Homesteads, logging camps • Bridges & historic railroad grades • Schools & churches • Office buildings • Sawmill
Cemeteries	• Traditional burial grounds • Burial mounds • Family cemeteries & individual graves • Platted cemeteries
Archeological Sites	• Camp & village sites • Caves & rock shelters • Quarries & flint knapping work areas • Prehistoric and historic garden beds • Historic sturgeon spearing sites • Rock art sites • Enclosures & earthworks • Prehistoric storage pits • Historic logging camps • Abandoned homesteads & settlements
Traditional-use Areas	• Sugar bushes (camps) • Traditional medicine gathering sites • Sacred springs • Ceremonial sites • Fasting areas • Sturgeon rearing areas

8.6 TRADITIONAL CULTURAL PROPERTIES

According to Bulletin 38 published by the National Park Service a traditional cultural property is defined as a property that is eligible for the National or Tribal Register of Historic Places because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community. Examples of properties possessing such significance include:

- a location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world
- a location where Native American religious practitioners have historically gone, or are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice
- a location where a community has traditionally carried out economic, artistic, or other cultural practices important in maintaining its historic identity

Many of these areas exist in on the Menominee reservation and Menominee forest and will be protected from forestry related activities under Section 106 of the National Historic Preservation and NEPA.

8.7 POTENTIAL IMPACTS TO CULTURAL RESOURCES

The threat to cultural resources generally comes from "ground disturbing" activity that is associated with managing the earth and its resources. Archaeological sites are very sensitive and in most cases lie within inches of the earth's surface, therefore the least ground disturbance can potentially destroy the context of artifacts or features such as dirt floors of ancient homesteads and historic logging camps. The potential threat to cultural resources comes from natural forces such as erosion, flooding, weathering, insects, and fire. The human threat comes from logging activity, land development and vandalism. Potentially damaging effects to cultural resources resulting from forestland management activities include the following:

- Ground disturbance to soil and/or compaction
- A change in the vegetation that is part of a traditional-use area
- Damage to above-ground features
- Rutting caused by logging equipment

Figure 8.4 1880's Menominee Logging Camp #23

8.8 CULTURAL RESOURCE MANAGEMENT (CRM) AND THE LAW

The legal basis for CRM is rooted in federal and tribal laws concerned with natural resource conservation and environmental protection going back to the early 1900's. The National Historic Preservation Act (NHPA) of 1966, as amended, is the centerpiece of the national historic preservation program. It established the National and Tribal Register of Historic Places and provides the Menominee Tribal Historic Preservation Officer with the authority to implement the national historic preservation program on the Menominee Indian Reservation. Section 106 of the NHPA requires that federal agencies consider the effects of their activities on cultural resources and to assess cultural resources of present. Federal law applies whenever activity takes place on federal land or trust land, will use federal funds, or will require a federal permit.

Certain requirements of the National Environmental Policy Act (NEPA) must be fulfilled before any and all types of forest management can begin. The Tribal Historic Preservation Officer is a signatory to all forestry prescriptions in accordance with NEPA and Section 106 of the National Historic Preservation Act. The THPO must sign forestry prescriptions that meet all the requirements of the NHPA and NEPA.

The Menominee Cultural Resource Management Plan (MCRMP) is a tribal ordinance that also affords protection to cultural resources on the Menominee reservation and establishes guidelines for establishing the Tribal Register of Historic Places.

The Menominee Tribal Ordinance #05-22 Tribal Logging Limitations contains the necessary buffer areas that need to be placed around historic properties in consultation with the Tribal Historic Preservation Officer

The Native American Graves Protection and Repatriation Act (NAGPRA) affords protection to burial sites on the Menominee Reservation and is the vehicle used to repatriate Menominee unassociated funerary objects, sacred objects and objects of cultural patrimony and human remains.

Chief Neopit Oshkosh said "*We want to sell our timber for a fair price … But we will not consent to the sale of any more land … We want it for our children and grandchildren. We accepted our present reservation when it was considered of no value… and all we ask is to be permitted to keep it as a home…*"

Figure 8.5 Chief Neopit Oshkosh "Four in the Den"

The American Antiquities Act of 1906 was enacted by the US Senate and House of Representatives of the United States of America in Congress assembled, that any person who shall appropriate, excavate injure, or destroy any historic or prehistoric ruin or monument or any object of antiquity, situated on lands owned or controlled by the Government of the United States, without the permission of the Secretary of the Department of the Government having jurisdiction over the lands, including Indian trust land, on which said antiquities are situated, shall, upon conviction, be fined a sum of not more than five hundred dollars or be imprisoned for a period of not more than ninety days, or shall suffer both fine and imprisonment, in the discretion of the court (federal or tribal).

8.9 CULTURAL RESOURCE INVENTORIES

All inventories of cultural resources shall remain in the office of the Tribal Historic Preservation Officer and will not be given out to the public. The Tribal Historic Preservation Office maintains all of the inventories or archaeological surveys that have been conducted on the Menominee Reservation. Most of the Menominee Reservation has not been surveyed by a qualified archaeologist and frequently more archaeological sites are being found. The Tribal Historic Preservation Office will insure that the inventories and archaeological surveys be protected so that no looting or desecration will take place from these sites from the public.

8.10 FIELD IDENTIFICATION OF CULTURAL RESOURCES

On many occasions walk-over inspection of a proposed forest management unit or compartment area is needed to assess cultural resources by the Tribal Historic Preservation Officer. The walk over or reconnaissance is necessary and is a component of the Section 106 of the National Historic Preservation Act's consultation process to properly assess historic properties that may be contained in the proposed "federal undertaking" and associated forestry management activity. Walk-over's have proven to be successful in the past to detect unrecorded cultural resources. Some of the identification traits we look for during walk-over's are:

- High spots offering a panoramic view
- Unusual natural features
- Surface artifacts (check clearings in forest, tree tip-ups and cut banks)
- Surface features
    - Cellar and well holes near historic homesteads and historic logging camps
    - Fieldstone foundations and fence lines
    - Miscellaneous building materials (bricks and cement, wood foundations, middens)
    - Metal well pipes
    - Earthen berms and trenches
    - Shallow depressions (such as graves, ricing pits, prehistoric storage pits)
    - Dance Rings, historic ceremonial areas (medicine lodge and big drum sites)
    - Milled lumber (such as boards suitable for burial crosses, spirit houses or building construction.)
    - Domestic or exotic plants (including lilac bushes, fruit trees (apple), and daylilies
    - Old roads, wagon trails, historic rail roads (spurs), grades, watering areas, old ruts Trash dumps containing antique items or jumbo-sized tin cans, old cars and trucks, old bottles with imprinted labels, abandoned logging equipment
    - Standing structures and buildings (old logging camps, intact historic sugar camps, historic homesteads)

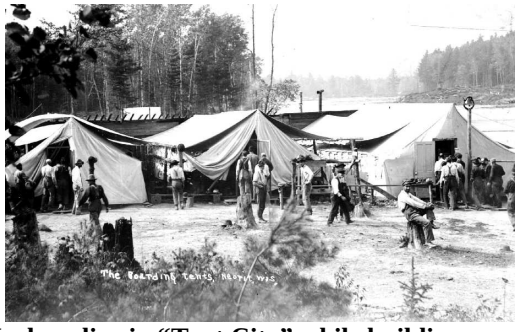


Figure 8.6 Workers live in "Tent City" while building sawmill in Neopit

8.11 ASSESSING MANAGEMENT ALTERNATIVES

Protection by law. If the pre-field review indicates the project area contains a site protected by law (such as a burial site, archaeological site, and historic site) further actions will be taken by the Tribal Historic Preservation Officer. Federal and Tribal laws protect historic properties under the National Historic Preservation Act, Native American Graves Protection and Repatriation Act, American Indian Religious Freedom Act, Archaeological Resource Protection Act and the Menominee Tribal Ordinance 05-22 Tribal Logging Limitations and the Menominee Cultural Resources Management Plan.

- **Protection by law.** If the pre-field review indicates the project area contains a site protected by law (such as a burial site, archaeological site, and historic site) further actions will be taken by the Tribal Historic Preservation Officer. Federal and Tribal laws protect historic properties under the National Historic Preservation Act, Native American Graves Protection and Repatriation Act, American Indian Religious Freedom Act, Archaeological Resource Protection Act and the Menominee Tribal Ordinance 05-22 Tribal Logging Limitations and the Menominee Cultural Resources Management Plan.

- **Identification as a low-sensitivity site.** If no cultural resources have been recorded and walk-over inspection yielded no indications of important cultural resources, the site would have low sensitivity. The Tribal Historic Officer will approve the proposed forest management activity for the unit or compartment.

- **Identification as a high-sensitivity site.** If cultural resources are known to exist or if the walk over or reconnaissance of the site indicate their presence (oral history can also be used to determine the authenticity of an historic property), then the site has high sensitivity and must be assessed in "consultation" with the Tribal Historic Preservation Officer as mandated in Section 106 of the National Historic Preservation Act and Tribal Ordinance #05-22, Tribal Logging Limitations.

8.12 WHEN ACCIDENTAL DISCOVERY OCCURS

Inadvertent discoveries of cultural resources or human remains during forest management activities shall be reported to the Tribal Historic Preservation Officer. All forest management activities shall cease until the Tribal Historic Preservation Officer can assess the situation.

8.13 CULTURALLY RESTRICTED AREAS

Currently there are culturally restricted areas within the Menominee reservation and Menominee forest that are protected by federal and tribal laws. Most notably are Compartment 223 and an area known as the Wolf River Corridor. The Menominee Tribal Legislature passed a resolution to take these two areas out of sustained yield and no forestry management activities can be carried out in these two areas and other such areas on the Menominee Reservation, or other areas that may be identified in the future.

The Menominee Tribal Legislature shall develop a plan to address wind, insect, and disease threats that may occur within the Wolf River Corridor and Compartment 223. The plan shall be completed within one year of the date of approval of the Forest Management Plan.

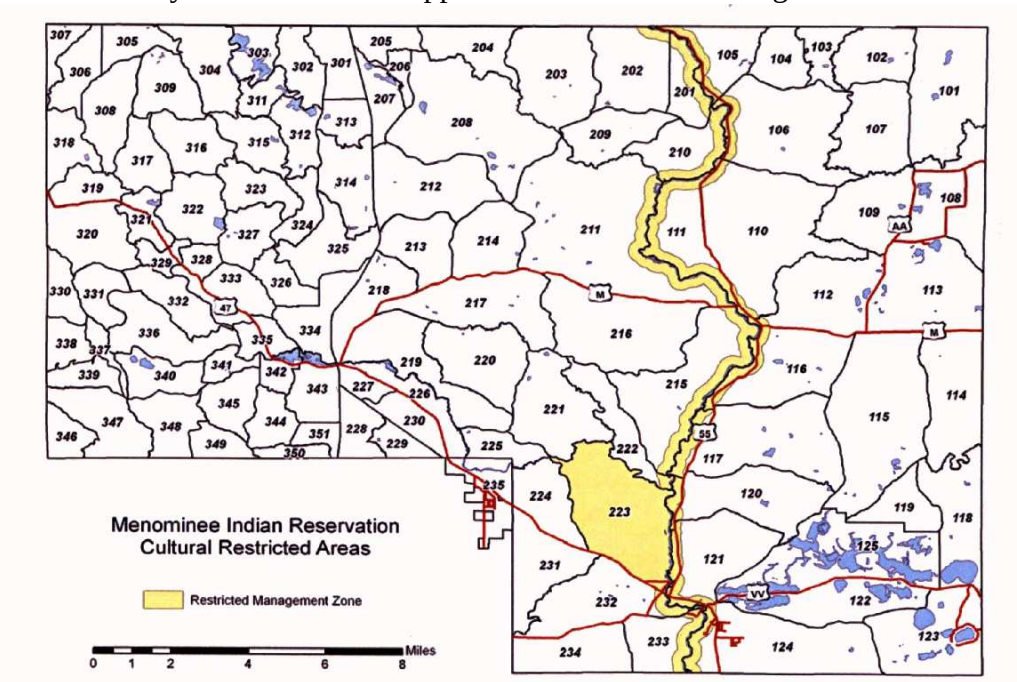


Figure 8.7 culturally restricted areas within the Menominee Reservation Compartment 223 and Wolf River Corridor

CHAPTER 9 - WILDLIFE HABITAT

9.0 INTRODUCTION

Certainly, much more can be done to enhance wildlife habitat or individual species than the steps recommended in these guidelines. It should be remembered that it is difficult to separate site-level and landscape-level issues. For wildlife, more than for other forest resources, what occurs on a site influences the surrounding landscape and vice versa. While the guidelines focus on the site level as much as possible, some of the more important "landscape implications" will also be discussed. Landscape-level wildlife needs can best be addressed through professional planning within Menominee Tribal Enterprises Silviculture Management Prescription Plan for an area.

The primary focus of this chapter is on forest-dependent terrestrial and amphibious forms of wildlife. The intent is to provide practical, science-based guidelines to address a number of specific issues and projected impacts relating to forestry and wildlife.

Figure 9.1 Young Red Shouldered Hawk in nest.

HABITAT MANAGEMENT IS COMPLEX:

Wildlife management is the art and science of manipulating habitat and wildlife resources, with a goal of achieving dynamic equilibrium between the needs of the ecosystem and human populations. Forests provide many wildlife species with major habitat requirements—food, cover, water, and space. When you harvest timber, the quantity, quality, and distribution of these habitat features change. As a result, managing habitats will positively affect some species and negatively affect others. Land managers have long wrestled with how best to balance the needs of multiple species and habitats for a variety of conservation and economic uses. For example, managing for older growth forests at a location may benefit some species, but may conflict with the needs of other species that require forests at earlier succession stages. Decisions about how to manage must consider the spatial and temporal scale of the action as well as the ecological, cultural, socio-economic and institutional context within which the action will be taken. In forest succession, a grassy field or harvested stand will eventually become a mature forest.

Wildlife may be associated with forests at a particular successional stage because of the types and amounts of habitat that are provided by that stage. See Figure 1 below. For example, early-successional forests have more fruit, seeds, and woody browse but less nuts, acorns, and cavity trees. Older forests have more nuts, acorns, and cavities but fewer fruits, seeds, and woody browse.

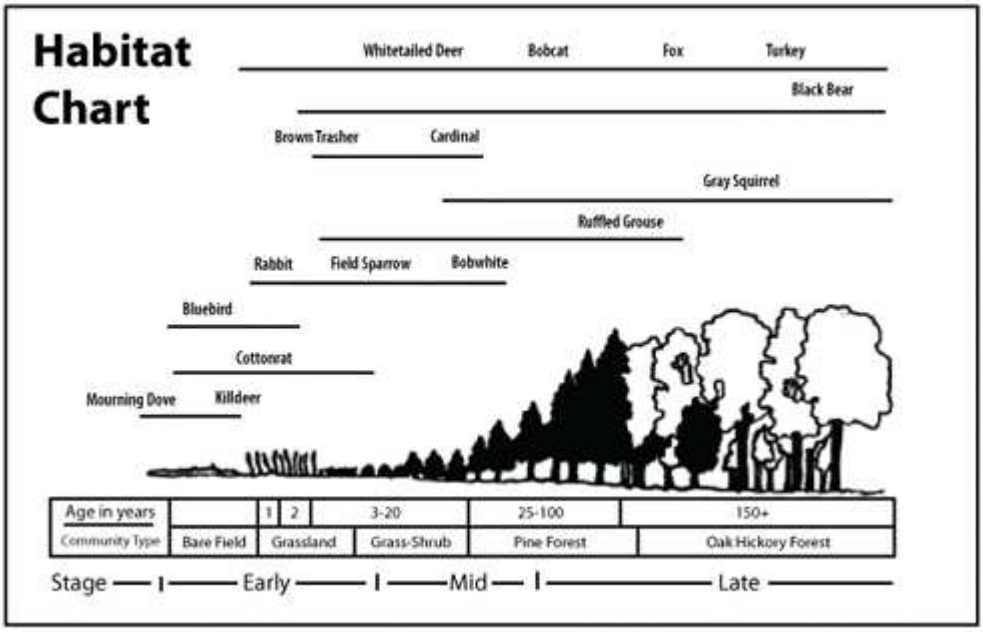


Figure 9.2 Forest Succession

The following Chapter is a review of some important forest management prescriptions that have implications for fish and wildlife, how these forest management prescriptions may shape wildlife management in our forest in the future – followed by some specific wildlife management guidelines, opportunities and issues considered as developed specific strategies and objectives for this plan – and will need to continually consider as we implement fish and wildlife programs with forest management. The intent is to provide practical, science-based guidelines to address a number of specific issues and projected impacts relating to forestry and wildlife.

Finally, many wildlife habitat guidelines can be applied simultaneously. For example, leave tree clumps in clearcuts might also serve as rare species buffers, provide mast production, and enhance vertical structure. These overlapping benefits may extend to other forest resources as well, such as for cultural resource protection and visual quality. In other cases, retention of various structural habitat components may create safety issues like the reduction of visual quality or increase the potential for pest damage. Other chapters of the guide will address some of the trade-offs that need to be considered relative to other resources.

9.1 GOALS AND STRATEGIES

The goal of forest management activities with regard to wildlife management is to maintain the diversity of wildlife habitat in the Menominee forest.

The strategies that achieve this goal include:

- Promotion of leave-tree and snag retention
- Course woody debris and slash retention
- Promotion of species that contribute to mast production
- Incorporation of cutting patterns (harvesting) that are compatible with wildlife habitat retention
- Protection and promotion of endangered species and their site-specific habitats
- Protection of wetlands, seasonal ponds, and other riparian areas
- Adherence to all guidelines provided by other Tribal references and plans

9.2 LEAVE TREES AND SNAGS

The purpose of this habitat aspect is to provide for wildlife requiring perches, tree cavities, and bark-foraging sites through retention of suitable leave trees and snags on a site during forest harvesting and timber stand improvement. This guideline will also contribute to the continued presence of coarse woody debris on a site.

Figure 9.3 Den Tree in Hardwoods Stand

What is a Live Tree?

Many live trees may also be classed as snags or "wildlife trees". These include trees with large broken tops and ensuing decay and rot/or a significant number of large dead branches, hollow trees created by advanced heart rot fungal growth, as well as those severely infected with mistletoe and covered with brooms. Some may live for long periods with the defect created by storms, disease, fire, and insects; yet they are functioning as snags for wildlife.

What Is a Snag?

A snag is any dead or dying standing tree. For wildlife purposes, snags should be at least three inches in diameter at breast height (dbh) and at least six feet tall. Snags may develop cavities which either occur naturally or are excavated by birds and mammals.

Why Snag/Live Tree Management?

Over 85 species of North American birds, 30 of which occur in the Menominee, use cavities in dead or deteriorating trees. Snags also provide essential habitat requirements for nearly cavity-using amphibians, reptiles and mammals. Snags are used for perching, nesting, shelter and feeding sites. The removal of snags can negatively impact wildlife populations that are dependent on them as essential habitat components. Cavity nesters evolved in unmanaged forest stands where snags developed naturally. Snag and den trees are becoming short in supply as forests are being intensively managed, whether through cordwood cutting, timber management or land clearing. These activities tend to accelerate the removal of existing snags and diminish the probability of trees ever becoming large enough to serve as possible snag or den trees.

One Very Important Benefit.

Invasive species are moving closer to the Menominee Reservation. Insectivorous birds such as

woodpeckers and nuthatches depend heavily on snags as a source of food. These birds, in addition to being an integral part of our natural ecosystem, are very beneficial in helping to control unwanted insect pests. The importance and benefits derived from insectivorous birds as biological control agents are receiving more attention.

TABLE 9.1 SNAG/LIVE TREE DEPENDANT WILDLIFE							
	FOOD	NEST	PERCH		FOOD	NEST	PERCH
Cavity Nesting Birds				**Water Birds**			
Hairy Woodpecker	XX	XX	XX	Belted Kingfisher		XX	XX
Downy Woodpecker	XX	XX	XX	Bufflehead		XX	
Pileated Woodpecker	XX	XX	XX	Common Goldeneye		XX	
Red-bellied Woodpecker	XX	XX	XX	Common Merganser		XX	XX
Red-headed Woodpecker	XX	XX	XX	Common Egret		XX	XX
Yellow-bellied Sapsucker	XX	XX		Great Blue Heron		XX	XX
Common Flicker	XX	XX	XX	Hooded Merganser		XX	XX
				Wood Duck		XX	XX
Raptors							
American Kestrel		XX	XX	**Reptiles/Amphibians**			
Bald Eagle		XX	XX	Most Salamanders		XX	
Barn Owl		XX	XX	Tree Frogs		XX	
Barred Owl		XX	XX				
Osprey		XX	XX	**Mammals**			
Red-tailed Hawk		XX	XX	Big Brown Bat		XX	
Saw Whet Owl		XX	XX	Bobcat		XX	XX
Eastern Screech Owl		XX	XX	Deer Mouse	XX	XX	
				Eastern Chipmunk			XX
Woodland Birds				Fox Squirrel		XX	XX
Black-capped Chickadee	XX	XX	XX	Gray Fox		XX	
Brown Creeper		XX		Gray Squirrel		XX	XX
Great Crested Flycatcher		XX	XX	Hoary Bat		XX	
Prothonotary Warbler		XX		Little Brown Bat		XX	
Red-breasted Nuthatch	XX	XX		Mink		XX	
Tufted Titmouse		XX		Opossum		XX	
Turkey Vulture		XX	XX	Raccoon		XX	
White-breasted Nuthatch	XX	XX		Red Squirrel		XX	XX
Winter Wren				Red Bat		XX	
				Silver-haired Bat		XX	
Meadow Birds				Flying Squirrel		XX	
Eastern Bluebird		XX	XX	White-footed Mouse		XX	XX
Tree Swallow		XX		Eastern Timber Wolf		XX	
Bewick's Wren		XX		Black Bear		XX	
Chimney Swift		XX					
House Wren		XX					
Purple Martin		XX	XX				

9.2.1 Forest Management

Although these guidelines address site-level recommendations for snags and leave trees, the contribution of an individual site should be considered in the context of the surrounding landscape. Many of the cavity-dependent species being addressed have home ranges larger than the typical harvest unit, so planning for their needs requires a broader look, both spatially and temporally, at the larger forest community. Many other species have smaller home ranges than the typical harvest unit. If suitable habitat exists surrounding a given harvest site, then leave trees may not be as critical on that site. However, if harvests are likely in the adjacent habitats, then the trees left on the initially harvested sites become more important as the surrounding forest regenerates. Consideration must be given to the time it takes for a regenerating stand (as in a conversion treatment) to produce trees of adequate size and degree of decay to provide suitable structure. Coordination among neighboring landowners may result in varying numbers of leave

trees on a site if adjacent lands exceed or fall short of the recommendations. Forestry staff will continue to implement leave tree snags and dens within the prescription development phase. Close coordination will occur between MTE Forestry and Tribal natural resources staff when it pertains to wildlife considerations.

9.2.2 Management Recommendations

In a ten acre forested area:

- Leave 4-5 Wildlife Trees > 18 inches DBH
- Leave 10-15 Wildlife Trees > 14 inches DBH
- Leave 20-25 Wildlife trees > 6 inches DBH

9.3 COARSE WOODY DEBRIS AND SLASH

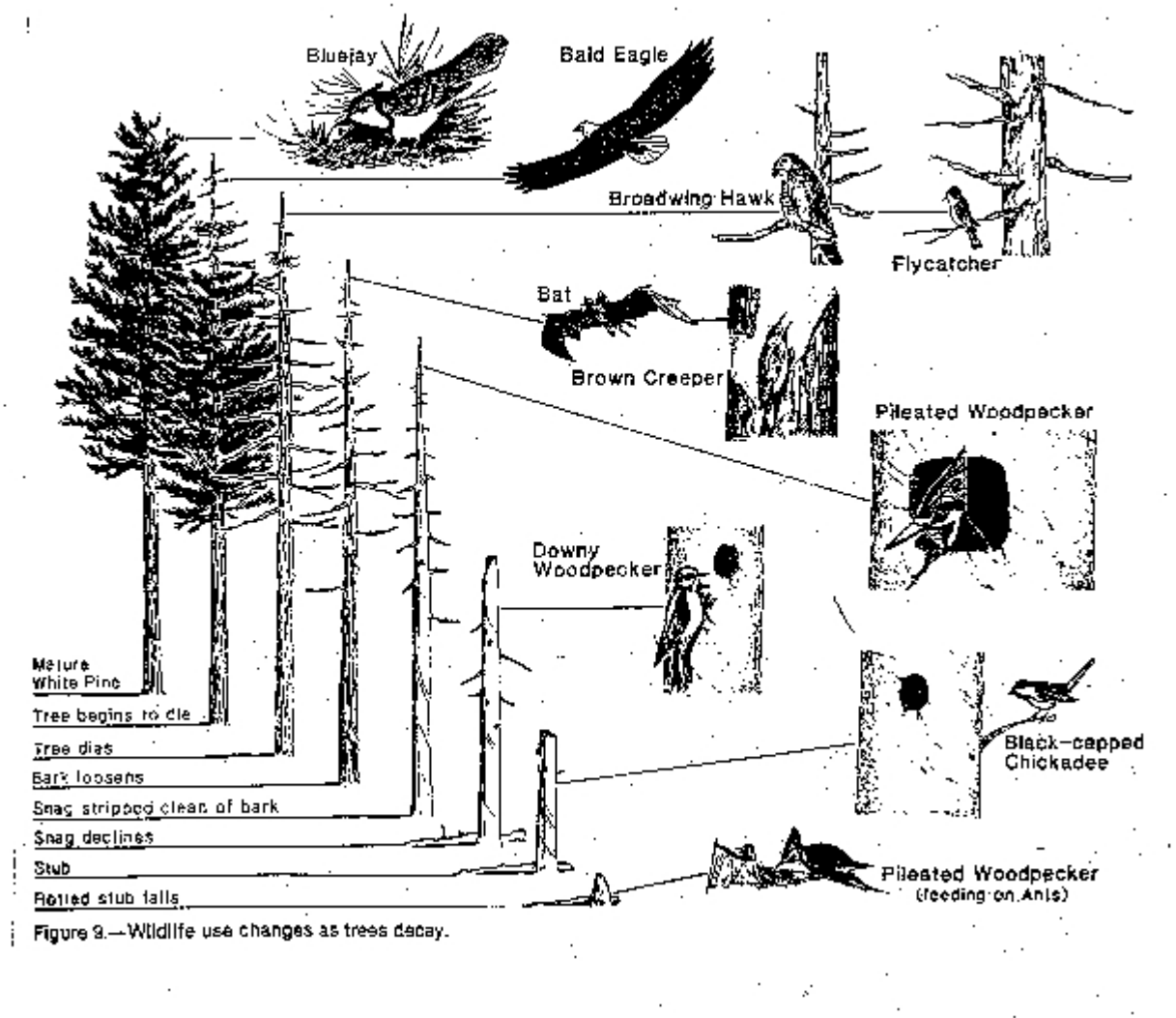


Figure 9.4 Menominee Small Mammal Study - Lake Elma. Coarse Woody Debris as a source of recycled materials not only provides the nutrients for the regeneration of many plant species in the form of carbon constituents necessary for new plant life but it also serves as the microhabitats for many plant and animal species

The purpose of coarse woody debris and slash is to provide cover, food or growing sites for a diverse group of organisms through the retention or creation of coarse woody debris and slash during forest management. Implementation of these guidelines will be vital if MTE moves into

the future of secondary uses of woody bio-mass. Benefits to wildlife and ecosystem must first be considered before reducing the woody debris on the forest.

9.3.1 Forest Management

A wide variety of organisms benefit directly or indirectly from presence of coarse woody debris and slash. Small mammals dependent on slash and coarse woody debris in turn provide food for mammalian carnivores and forest raptors (such as the pine marten and the Broad-winged Hawk). Amphibians such as Wood Frogs, Four-toed Salamanders, and Red-backed Salamanders utilize the cool, moist microsites created by coarse woody debris as resting/feeding areas. Woody detritus reduces erosion and affects soil development, stores nutrients and water, is a major source of energy and nutrients, serves as a seedbed for plants, and is a major habitat for microbes, invertebrates and vertebrates. For example, yellow birch, white cedar and eastern hemlock regeneration is enhanced by coarse woody debris. These tree species are important components of a diverse northern forest, and provide habitat for an untold number of vertebrate and invertebrate species.

9.3.2 Forest Management Recommendations

Although these guidelines address site-level recommendations for snags and leave trees, the contribution of an individual site should be considered in the context of the surrounding landscape. Coarse woody debris left on a specific site may be benefiting reptiles and amphibians living there but breeding elsewhere. Thus, coarse woody debris placement might be influenced by off-site factors. The cheapest and best method for managing these resources is to retain them where they exist, and allow natural processes to continue recruiting new material into each forested stand. Where forestland is being managed or has experienced intensive management in the recent past, this practice often conflicts with management objectives or does little for wildlife species needing these forest components. For example, thinning programs often remove not only existing snags and coarse woody debris, but also those poorer quality and defective trees that would be recruited into these components in the future. **MTE manages with longer rotations, which addresses this concern.**

9.4 CONIFER RETENTION AND REGENERATION

The purpose of this aspect of habitat is to ensure diversity of wildlife habitat through the retention and regeneration of conifers for food, nesting and cover in mixed deciduous/coniferous stands. Conifers should continue to be a significant structural component in appropriate habitats and landscapes.

Figure 9.5 Scattered white pine are retained in shelterwood regeneration harvests to serve as vertical stand structure and potential nesting sites (photo courtesy of Jeff Grignon).

9.4.1 Forest Management

Many wildlife species within the Menominee Reservation benefit from a mixture of conifer and deciduous trees and shrubs. Retaining young conifers, including isolated trees and scattered clumps can provide habitat and food needed for many wildlife species, and can increase the probability that conifers will later regenerate on harvested areas.

Various animal species, including the Great Gray Owl, Bald Eagle, Pine Warbler, white-tailed deer, elk, pine marten, snowshoe hare, and red-backed vole, depend on coniferous stands for structural attributes. Others – including Spruce Grouse, Red-breasted Nuthatch, red squirrel, porcupine, and elk – depend on food that coniferous stands provide. Deer and elk will often winter in conifer forest due to the reduced snow depths and thermal cover that these stands provide. Many species associated with the boreal forests of Canada reach the southern limits of their range in the coniferous and mixed coniferous forests of northern Wisconsin. Examples of these include pine marten, fisher, gray wolf, Cape May Warbler, Boreal Chickadee, Great Gray Owl, Gray Jay and Palm Warbler.

Historically, conifers often existed as scattered trees or clumps within hardwood stands. Many of these conifers have been lost due to poor regeneration following early logging. A number of species are adapted to these scattered overstory conifers or patches of conifer within a hardwood stand. Pine Warblers are often heard singing from scattered overstory white pines that have persisted or regenerated within an oak or maple forest. Bald Eagles or Osprey often use these scattered superstory trees as nesting or roosting sites. Often aspen/birch stands in northern Wisconsin contain patches of regenerating or mature white spruce or balsam fir. Birds such as Cape May Warbler, Magnolia Warbler and Canada Warbler will locate territories in and around these coniferous patches. These dense areas of conifer also provide thermal cover for grouse, deer and other northern species during cold winters and warm summers. When retaining conifers, clumps are preferable to scattered trees. Clumped conifers are more wind firm, are better potential seed sources because of improved pollination, can withstand snow and ice loads more successfully, and can provide better cover. Management goals for conifer retention will be guided through a combination of priority species and use of the habitat typing (see Table 9-1).

9.4.2 Forest Management Recommendations

It is important to match existing site conditions and silvicultural objectives to plans for conifer retention and regeneration. MTE Staff will refer to the silvicultural handbook and habitat typing (Forest Communities and Habitat Types of Northern Wisconsin, second edition, Kotar, Kovach & Burger) information for distributions of different conifer species within different ecological landscapes. Conifer regeneration and retention will work best if done in appropriate conditions and site locations. For example, retention and regeneration of fir and spruce in aspen/birch stands would be most appropriate on the ATM, TMC & AQVib habitat types but there can be other areas of the Menominee Reservation that historically supported a mixed aspen/spruce forest type that will result in decisions to retain a conifer mix. Most decisions for conifer retention will be based on coordination between MTE Forestry staff and Tribal Natural Resource Staff regarding concerns of wildlife.

Table 9.2 Conifer Species and Examples of Use by Wildlife and the associated habitat types on the Menominee Forest

SPECIES	HABITAT TYPES	USES BY WILDLIFE
Red Pine	All Habitat Types	Mature trees may be used by raptors for perches or nest trees. Seeds are important mast for winter songbirds and red squirrels. Larger stands of mature trees provide breeding habitat for Red Crossbills, Pine Warblers, Blackburnian Warblers, and Pine Siskins. Mature stands with dense deciduous or coniferous understories can contain diverse breeding bird assemblages, including some rare species.
White Pine	All Habitat Types	When young, provides good escape and severe winter cover for many species. High calorie, large seeds eaten by many small mammals and winter songbirds. Mature trees are important for cavity-dependent wildlife, preferred Bald Eagle nest trees, and escape trees for bears. Roosting trees for Wild Turkeys where present in central and southern Wisconsin.
Jack Pine	PArVAo, PArVPo, ParVaa-Vb, Avb	Very good cover for a number of species when trees are young and stands are well stocked. Used as browse, most notably by Spruce Grouse. Seeds eaten by red squirrels and Red Crossbills. Persistent cones provide a year-round food source. Mature stands in north-western Wisconsin home to rare Connecticut Warbler.
Balsam Fir	All Habitat Types All Swamp Conifer cover types	Important winter and summer cover for deer, elk and many species of birds. Birds eat seeds and use trees for nesting. When allowed to persist in hardwood understory, is important nesting cover for Black-throated Blue Warblers and other bird species. Thermal cover for grouse and owls.
Black Spruce	TMC; All Swamp Conifer cover types	Important escape and severe winter cover. Birds such as White-winged Crossbills eat seeds and use trees for nesting. Buds and needles are important Spruce Grouse food. Often have diverse and abundant small mammal populations, which are important food sources for owls and other forest raptors. Black spruce wetlands contain many vertebrates and invertebrate species not commonly found in Wisconsin. Dead or dying trees often provides insects and snags for Black backed Woodpeckers.
Tamarack	TMC; All Swamp Conifer cover types	Mature stands provide excellent habitat for owls and other birds. Snags are used as hunting/singing perches. Small mammals, Pine Siskins and Crossbills eat seeds.
White Cedar	TMC; All Swamp Conifer cover types	Mast is important food source for winter songbirds. Very important winter cover for deer. Important for browse during severe winters. Provides cover and cooling effect near water.
White Spruce	All Habitat Types	Important seed source for winter finches. Summer nest cover for rare songbirds such as Cape May Warbler and Evening Grosbeaks. Thermal cover for owls and grouse
Hemlock	Avb, AFVb, TMC, ATM, ATFD, ATDH, AFAd, AH	Hemlock-dominated forests or mixed stands contain distinct breeding bird assemblages not found in hardwood forests. Mature trees provide important owl roosting sites. Mast important to red squirrels and winter finches.

9.4 MAST

The purpose of this habitat aspect is to provide for wildlife that utilizes mast production from trees and shrubs.

Figure 9.6 Acorns from red, white, and black oaks serve as valuable food sources for a wide range of animal species (Northern Red Oak acorns are shown here).

9.5.1 Forest Management

MTE manages for mast producing trees. This indirectly benefits many wildlife species. Many species of trees and shrubs have developed a seed dispersal system that benefits many species of wildlife. Producing mast in the form of nuts or berries encourages mammals such as squirrels or birds to eat or transport the seeds to other areas. Oaks may produce thousands of acorns in the hope that a Blue Jay or Turkey will accidentally scratch one into the forest soil. Dogwoods and juneberries will produce fruit attractive to migrating birds, which will pass the seeds to neighboring areas during migration. This complex reproductive strategy is essential to the inner workings of many ecological systems in Wisconsin.

High levels of fat, protein and carbohydrates in mast contribute to energy stores critical for migration or hibernation, and for survival of newly independent young. Many birds that eat insects on breeding grounds will consume berries during fall migration. Yearly variations in mast production may impact subsequent reproductive success of many species. Often, plentiful mast production will lead to abundant small mammal populations, which in turn benefits forest carnivores that prey on small mammals. During winter, some sources of mast remain available to forest wildlife on trees and shrubs, under snow or stored in caches (see Table 3-2, page 56).

Mast production is generally favored by increased crown exposure to light, crown size, maturity of trees or shrubs, increased soil nutrients, tempered microclimates (especially during flowering), and adequate soil moisture. Production on a site tends to vary considerably from year to year. Other considerations with respect to mast include:

Mast-producing species often depend on animals for their dispersal and reproduction.
Riparian edges often contain a higher concentration and richness of mast-producing species.

Most shrub species will regenerate well and produce mast after cutting, burning or soil disturbance.

Although concerns for oak and other dominant tree species are particularly important, especially in relation to game species (such as deer or gray squirrels), other mast species also provide important benefits.

9.5.2 Forest Management Recommendations

Retention of mast and other key food-producing tree types should be prioritized in accordance with the local abundance of each tree species. In areas of least abundance, greatest attention should be applied to retention. Decisions for treatments to increase mast-producing trees will be based on coordination between MTE Forestry staff and Tribal Natural Resource Staff regarding concerns of wildlife.

Table 9.3 Examples of Mast-producing plants that Will Benefit Wildlife on the Menominee Forest and the Habitat Types

MAST SPECIES	HABITAT TYPES	EXAMPLES OF WILDLIFE USE
Oak, beech and hazel nuts	All Habitat Types	Deer, bear, Wild Turkey, Woodpeckers, Blue Jay, Wood Duck, squirrels
Maple and ash	All Habitat Types	Small mammals, Evening and Pine Grosbeaks
Aspen, Birch and Hazel buds	All Habitat Types	Ruffed Grouse
Birch seeds	All Habitat Types	Common Redpoll, Pine Siskin, American Goldfinch
Conifer cones and seeds (such as white cedar, balsam fir, black spruce, white pine, common juniper, red cedar, Canada yew)		Red squirrels, White-winged and Red Crossbills, Pine Siskins, Red-breasted Nuthatch, Pine Grosbeak
Late summer soft mast (such as juneberries, blueberries, cherries, dogwoods, and elderberries		Important to a number of birds and mammals as they prepare for migration and winter
Soft mast retained in fall and through winter (such as mountain ash, cranberry and nannyberry, winterberry)		Waxwings, Pine Grosbeaks and other bird and mammal species
Vines (such as wild grape)		Numerous bird and mammal species

9.6 CUTTING PATTERNS

The purpose of this habitat aspect is to provide site and landscape-level wildlife habitat requirements by using a variety of sizes and shapes of harvest areas. Understanding the impact from site-level management on the larger forested area will help land managers make better wildlife decisions.

Figure 9.7 Two age classes of Aspen in Menominee Dells Creek Area, younger aspen in front of an older age class. Illustrates edge. Menominee Fish and Wildlife Photo

9.6.1 Forest Management

This management objective will involve making silvicultural decisions on a landscape basis. Ideally, the management regime should range from the very fine-scale management represented by selection cutting to the coarse-scale management affected by sizable clearcuts. The size of clearcuts and other treatments should be determined by considering issues such as size of the management unit, the home range requirements of large animals, aesthetics, and natural disturbance regimes. Once again these decisions will be made based on coordination between MTE Forestry staff and Tribal Natural Resource Staff regarding concerns of wildlife

Size and shape of both cut and uncut areas should mimic natural disturbance regimes that historically impacted the forest type to be managed. This will then benefit the native species of plants and animals adapted to this forest type and disturbance regime. Larger patch sizes historically occurred under natural disturbance regimes on even-aged, fire-dependent types, such as jack pine. Large clearcuts in such types can function for a short time as habitat for some area sensitive openland species such as Sharp-tailed Grouse and Upland Sandpipers.

These managed areas will be of even greater benefit to openland species if they are placed adjacent to more permanent open barrens. Colonization of new openland habitat created by forest management is much more likely to occur if it is adjacent to existing populations of openland species. As the managed area ages, it will become less attractive to openland species, but other early successional species such as Eastern Towhees and Brown Thrashers will colonize the site.

Smaller patches are appropriate in more heterogeneous forest types, such as deciduous forests on moraines. For example, northern mesic forests dominated by sugar maple, hemlock or beeches were much more likely to undergo disturbance from wind than from large fires. Most wind events created smaller patchy canopy gaps within a larger forested matrix. Species like Black-throated Blue Warblers nest within the thick regeneration generated by these disturbance events, and thus could benefit from a silvicultural treatment that mimics this process.

The shape and size of the cutting area determines the total amount of edge habitat created through management. An **edge** is defined as the transition area between two different forest types

or successional stages. This transition zone can be "hard" (between a forested habitat and a field) or "soft" (between two age classes of forest habitat). "Hard" edges tend to be permanent, and may have more impact on wildlife than "soft" edges. "Soft" edges can also form as forest expands into open habitats. These "soft" edges differ from the regeneration found in canopy gaps by virtue of the amount and distribution of the regenerating age class. The amount and type of edge in a landscape will create conditions favorable for some species and detrimental to others. Many game species such as white-tailed deer and Ruffed Grouse, along with Indigo Buntings and Chestnut-sided Warblers, prefer the wide variety of cover and food resources found along forest edges, and tend to be very good competitors for those resources. Landscapes with high amounts of natural or man-made edges tend to favor these edge species. However, many species of birds, some mammals and herptiles (reptiles and amphibians) prefer the interior of larger (greater than 100 acres) blocks of forest. Cerulean Warblers, Acadian Flycatchers, Hooded Warblers, Black-throated Blue Warblers, and many other interior species are listed as federally endangered, threatened or species of special concern by the Wisconsin Bureau of Endangered Resources due to loss of appropriate habitat. A large increase in the amount of edge, through forest management activities or a natural disturbance in large blocks of forest, will increase edge species, which will replace many interior species.

9.6.2 Forest Management Recommendations

When implementing an approved prescription allowing large clearcuts, consider harvesting in segments over several years. This will provide both early successional diversity and, over the long-term, a large mature forest stand. Consider adjacency only when applied to traditional Aspen regeneration treatments. Conversion treatments can typically take too long to regenerate in adjacent stands on adjacency schedules of five to ten years, depending on size and shape.

9.7 ENDANGERED, THREATENED AND SPECIAL CONCERN SPECIES

The purpose of this section is to increase awareness of endangered, threatened and special concern species (ETS species), and the need to maintain or enhance populations of these species. In addition, this section will help to increase awareness to consider endangered and threatened species in the forest management decision-making process[7].

By definition, ETS species are rare. The Menominee Forest is home to a diverse ecological community that hosts a number of threatened and endangered species, both plant and animals. Further MITW resource managers identify and manage for species that may be affected by forest management activities. There are three terrestrial species listed as federally endangered or threatened within the Menominee Reservation. All species found in a natural forest ecosystem contribute to its healthy functioning. Humans tend to place values on the species found in these ecosystems, however, for the plants and animals living in the forest, no value judgment is given. They are there because that's where they live. Only we can make decisions affecting their habitats. Management decisions will occur with the best information available and decisions will be made based on coordination between MTE Forestry staff and Tribal Natural Resource Staff regarding concerns of wildlife. Reasons for considering all species in the decision include the following:

- Conservation of species because of their innate values.
- Conservation of rare species that play a critical role in ecosystem function.
- Conservation of nutrient recycling and soil enhancing animals and fungi.
- Conservation of natural disturbance regimes.

7 See frequently asked questions section for more information.

- Deter invasion by aggressive, non-native invasive species.
- Conservation of genetic strains adapted to local climate and site conditions.
- Conservation of aesthetic and recreational values.
- Conservation of species that may produce economically-valuable products or provide eco-tourism benefits.
- Scientific and educational benefits.

9.7.1 Protection and Management

Most forest management activities will not involve ETS species. Even when they are found, the laws seldom totally prohibit activities. Therefore, Forestry Staff coordinates a discussion with MITW Natural Resource Staff. On public land, endangered and threatened plant species are considered when developing a management plan or conducting a timber sale. Endangered and threatened animal species are protected by law, but many can be incidentally taken, if certain restrictions and permitting processes are followed. Special concern species have no legal protection, but that does not abdicate the responsibility to consider them in planning actions.

When found most ETS species tend to be found in specialized habitats. Seeps, ephemeral ponds, cliffs, extensive bog areas and old-growth forest. Many species are also localized in their distribution, such as Karner Blue Butterfly, that are found mainly within the areas where wild lupine is present.

Many studies on the relationship between timber harvest and vertebrates provide a basis for making decisions regarding those rare species. Relatively little is known about the impacts of timber harvest on rare plants and especially invertebrates. Long-lived and slow-dispersing understory plants and invertebrates, especially those that have their optimum habitat in late-successional or old-growth forest as in Menominee, may be particularly affected by timber harvest.

9.7.2 Legal Protection

Endangered and threatened species are protected in Wisconsin by one or more of the following laws: the Federal Endangered Species Act of 1973 (Public Law 100-478), Lacey Act, Migratory Bird Treaty Act, Bald Eagle Protection Act, Wisconsin Endangered and Threatened Species Law (State Statute 29.604 and Administrative Rule NR27), and the Wisconsin Non-game Species regulations (State Statute 29.039). Other laws, tribal, state and federal, may apply to the protection of plants and animals in the state. Specific information may be obtained from your local WDNR office, or the BER Endangered Resources Program (see the Resource Directory).

9.7.3 Other Sources of Information

The following sources of information can be consulted when taking wildlife issues into considerations during forest management planning (silvicultural prescriptions).

- MITW biologists, MITW conservation wardens, foresters (MTE, County).
- Nature centers, colleges and universities, and University of Wisconsin-Extension offices.
- NHI On-line Database, www.dnrstate.wi.us/org/land/ er/nhi/NHI_ims/onlinedb.htm, USFWS Web- Site, www.fws.gov
- NatureServe Web Site, www.abi.org
- Wisconsin Vascular Plant Web Page, University of Wisconsin Herbarium, wiscinfo.doit.wisc.edu/herbarium/

- Breeding Bird Atlas Maps for Listed Species, www.uwgb.edu/birds/wbba/
- Wisconsin Herpetological Atlas Web Site, www.mpm.edu/collect/vertzo/herp/atlas/atlas.html

9.7 WETLAND INCLUSIONS AND SEASONAL PONDS

The purpose of wetland inclusions and seasonal ponds is to provide site-level wildlife habitat features for terrestrial species associated with wetland inclusions and seasonal ponds within forests.

9.7.1 Forest Management

The Menominee forest has an abundant variety of wetland inclusions and seasonal ponds. The mixture of land and water features across the landscape provides an important dimension to the habitats of many wildlife species.

Wetland inclusions and seasonal ponds are different from puddles. Wetland inclusions and seasonal ponds retain water for longer periods, and support populations of invertebrates that consume forest litter that falls into the depressions. These invertebrates provide food for birds, mammals, amphibians, and other species. Red-shouldered Hawks, a threatened species in Wisconsin, often choose forested areas that contain a number of wetland inclusions to ensure an adequate supply of prey for rearing young. Seasonal ponds are also important spring food sources for breeding waterfowl and migrating birds. Seasonal ponds are best identified in spring when they are full of melt-water from the spring runoff. Frogs calling in spring, vegetation type or topography might provide additional clues to their location.

One important component of many forest ecosystems is amphibians, and many depend on seasonal wetlands for breeding habitat. These temporary or seasonal wetlands are important to amphibians because they do not contain fish populations, which prey on salamander eggs. Blue-spotted and spotted salamanders will enter these ephemeral wetlands as soon as they lose their ice cover in spring. Pay attention to roadsides during the first warm rain of spring, and you will literally see the forest floor crawling with salamanders traveling to breeding sites. Five species of frogs are also heavy users of wetland inclusions. Anyone who has walked along a forest road at night can recall the croaking of wood frogs, the peeping of spring peepers, and the distinctive notes of chorus frogs. Frog songs can be so loud in these wetland inclusions that they block out all other sounds. Later in the spring and early summer, Cope’s and Eastern Gray treefrogs use these wetland inclusions for breeding.

Because of the high biomass of amphibians in forested habitats, they are extremely important both as predators of invertebrates, and as prey for other forest wildlife species.

Applying guidelines for water quality, leave trees and snags, coarse woody debris, and slash during forest management activities can retain and create key habitat features (including woody debris, litter depth and plant cover) in these areas, while preventing siltation, excessive warming, or premature drying-up of wetland inclusions and seasonal ponds. Menominee Tribal Ordinance 04-22 & 05-22 are both in place to add protection to these habitats in forest resource management.

9.7.2 The Need for Research and Monitoring

Even though the ecological importance of wetland inclusions and seasonal ponds is recognized, the total number and location of all such water bodies in the Menominee forest is unknown. Existing inventories are incomplete with regard to wetland inclusions. Furthermore, seasonal ponds are sometimes difficult to recognize in the field. Uncertainty regarding the abundance and

location of wetland inclusions and seasonal ponds indicates the need to document their occurrence and further research their role in forest ecology within the Menominee Reservation. Management decisions will occur with the best information available and decisions will be made based on coordination between MTE Forestry and Tribal natural resources staff when it pertains to wildlife considerations.

9.8 RIPARIAN WILDLIFE HABITAT

The purpose of riparian wildlife habitat is to provide site-level wildlife habitat features for species that utilize riparian ecosystems.

9.8.1 Forest Management

Riparian areas are among the most important parts of forest ecosystems. These areas have high plant diversity, both horizontally and vertically from the water's edge, which contributes to the high diversity of animals that live in these areas. Up to 134 vertebrate species occur in riparian forests in this region, but many of these species will also use non-riparian forest habitat. The species that are of most concern in riparian areas are "obligate" species, which require both the water and surrounding forests as habitat. In the Menominee forest, obligate riparian species include amphibians, reptiles, birds, and mammals. Numerous plant and invertebrate species are also strongly associated with these habitats. Different animals are associated with different stream sizes. In general, larger animals are associated with larger streams and smaller species with smaller streams. A reverse pattern is found in some salamanders.

Although some degree of mature forest cover is desirable along many riparian areas, all habitat conditions are valid, given long-term disturbance regimes. Some wildlife species, such as woodcock, require dense woody cover that can be provided by young forest or shrub cover in riparian areas. The greatest threats to riparian habitats on the Menominee forest is in those areas of the state where roads and stream crossings have been poorly designed, resulting in little additional forest of any kind in the region. This situation occurs in the majority of logging sites, as historically there was little guidance as to proper designs. Currently the MITW Environmental Service Department is managing the permitting of roads and crossings in riparian habitats, which is resulting in a reduction of impacts. This is dictated by MITW Ordinance 04-22 and will continue to be the process that is implemented when setting units for treatment. (See Chapter 5: Riparian Areas and Wetlands, for specific BMP's and harvesting criteria that is considered for riparian zones).

Forest streams come in many sizes, growing from spring-fed trickles to large rivers as they move downhill, and converge with one another to drain larger and larger watersheds. Along this gradient, the ecological characteristics of a riparian area change in a gradual continuum. Because of these characteristics, management guidelines for riparian areas in general should be considered on a landscape level.

It is important to keep in mind the following wildlife-related concerns for riparian habitats:

Leave Trees and Snags: Prothonotary Warblers, Tufted Titmice, Wood Ducks, and a number of other species are dependent on existing cavities in riparian forests. Woodpeckers and chickadees select dying or diseased trees in which to excavate cavities. It is important to leave existing cavity trees and potential snags for use by the many cavity nesters that utilize riparian forests. Some riparian species require large super-canopy trees (trees above the existing canopy) for hunting perches and nesting sites. On larger rivers, Osprey will often perch in a large, dead white pine above a river to look for prey. Shade is essential for maintaining microhabitat conditions for

some riparian animals. Winter Wrens, Northern Waterthrushes and many salamanders like the cool, moist conditions created by a closed canopy riparian forest. Yellow Warblers, Willow Flycatchers and some herps need more open riparian conditions. Providing a range of serial stages where appropriate will benefit a number of riparian species.

Coarse Woody Debris and Slash: Many riparian animal species require downed logs for cover. Downed logs and slash in riparian areas provides additional microsites for insects and the species that prey on these insects. Salamanders, frogs and small mammals utilize these large logs as travel routes to avoid predation.

Mast: Riparian edges often contain a higher concentration and richness of unique mast species, especially shrubs, than adjacent upland areas. It is well documented that riparian areas are critical migratory stopover locations for birds that winter in the Neotropics. These areas often have more insect life in the spring before leafout than associated uplands. In the fall, dogwoods, nannyberry, wahoo, honeysuckle, elderberry, and other mast-producing shrubs and trees provide nourishment to birds migrating south and other species preparing for winter.

ETS Species (see below): Many ETS species are found in riparian areas. Many bigger blocks of forest occur in riparian zones along the larger rivers. These are important areas for forest interior species such as Red-shouldered Hawks, Cerulean Warblers, Acadian Flycatchers, Yellow-throated Warblers, Yellow-crowned Night Heron, and a host of other species found in the southern half of the state. High quality streams and rivers are important habitat for many rare dragonflies, fish, mussels and clams, and other invertebrates. Often the presence of these species is used to evaluate stream health.

Natural Communities and Sensitive Sites: Many natural communities are associated with riparian ecosystems. Some, like floodplain forests, are always associated with riparian areas. Others, such as northern edge meadow, emergent aquatic, and alder thicket are often associated with riparian areas, but can also be found in other situations. For a complete listing and description of natural community types in Wisconsin, see the BER web site.

9.8.2 Eco-Region Applicability

These guidelines are applicable throughout the entire forest and should be mentioned that the state of Wisconsin applies the guidance statewide.

9.8.3 Forest Management Recommendations

Most rare species associated with these forests require high-canopy closure and large blocks of forest. This would require protection of riparian areas to include retention of canopy cover in all shelterwood treatments associated with riparian areas. This is addressed in the prescription process.

Table 9.4: ETS Species associated with riparian ecosystems.		
1. THREATENED	**2. ENDANGERED**	**3. SPECIAL CONCERN**
Red-shouldered Hawk	Yellow-throated Warbler	Prothonotary Warbler
Yellow-crowned Night Heron	Snowy Egret	Louisiana Waterthrush
Cerulean Warbler		
Osprey		
Great Egret		

CHAPTER 10 - RIPARIAN AREAS

10.0 INTRODUCTION

A riparian area is the area of land and water forming a transition from aquatic to terrestrial ecosystems along streams, lakes and open water wetlands. Riparian areas are among the most important and diverse parts of forest ecosystems. They support high soil moisture and a diversity of associated vegetation and wildlife, and they perform important ecological functions that link aquatic and terrestrial ecosystems.

- Riparian areas maintain streambank, channel and shoreline stability as well as stream temperature and water quality.
- Riparian areas provide conservation and water storage, nutrient and food input to the aquatic system, in-stream structure of coarse woody debris, and a moderated microclimate.
- Riparian areas provide important habitat for many species of fish, mammals, birds, reptiles, amphibians, and insects.
- Riparian areas are also important for recreation, forest products, hunting, fishing, biological diversity, and provide many other values to humans.

10.1 GOALS AND STRATEGIES

The goal is to protect the water resources, riparian areas and wetlands of the Menominee forest.

The strategies that achieve this goal include:

- Identifying of wetlands and riparian areas
- Identifying of potential threats to wetlands and riparian areas
- Protecting of the functions of wetlands and riparian areas
- Considering Best Management Practices
- Minimizing or mitigating impact to wetlands and riparian areas

10.2 THE VALUE OF RIPARIAN AREAS

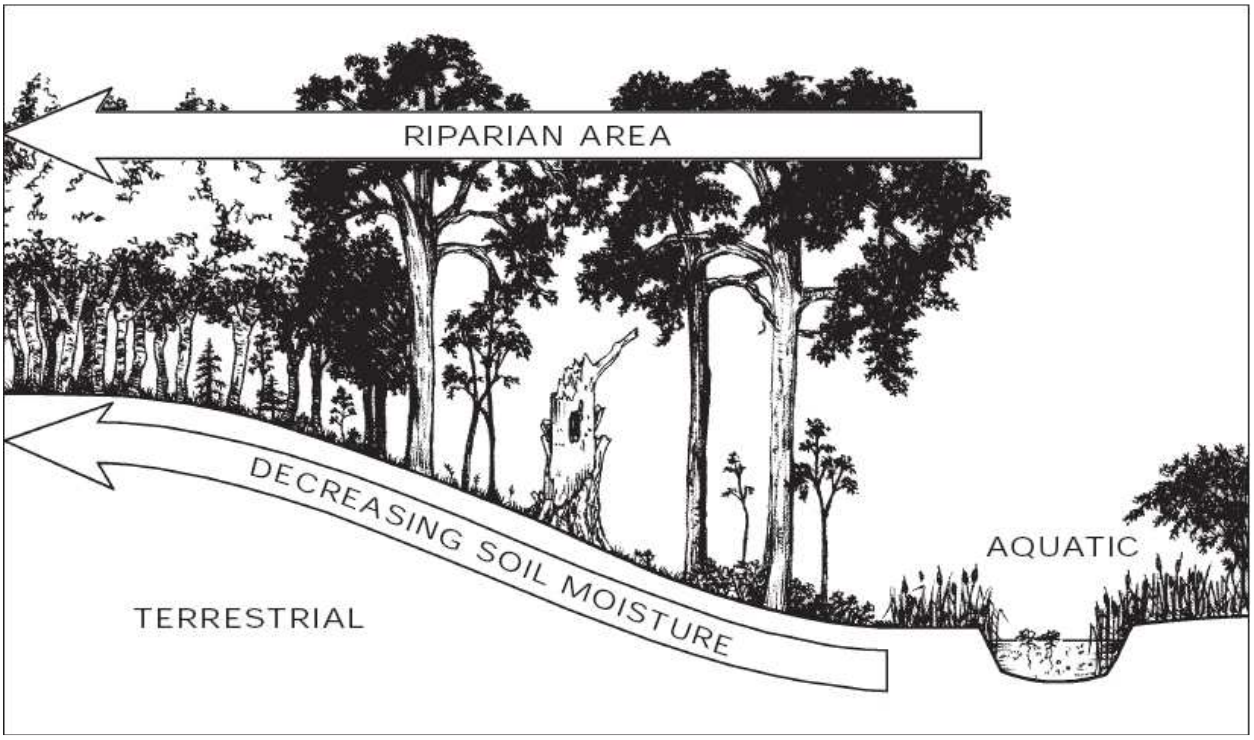


Figure 10.1 Transition from aquatic to terrestrial habitat in a riparian area (courtesy of the WDNR)

To protect the functions and values of riparian areas, management practices are modified within riparian management zones (RMZs) for streams and lakes to protect water quality, fish, and other aquatic and terrestrial resources. These RMZs are applied adjacent to lakes, perennial streams, and intermittent streams.

10.3 POTENTIAL THREATS TO RIPARIAN AREAS

One of the biggest threats to water quality is non-point source pollution. Non-point source pollution occurs when surface water runoff from rainfall or snowmelt moves across or into the ground, picking up or carrying pollutants into streams, lakes, wetlands, or groundwater. Soil becomes a non-point source pollutant when water runoff carries large amounts of soil into a waterbody.

10.3.1 Sediment

Forest floor vegetation and organic debris protect the soil from the erosive actions of falling raindrops and runoff. Forestry management activities such as road building can remove this protection, and lead to erosion of the soil creating sediment. When sediment is carried away in runoff and deposited elsewhere, sedimentation occurs. Without considering appropriate Best Management Practices (BMPs) on exposed and sloping land, the soil will likely erode and may wash into a body of water. Sediment is the primary pollutant associated with forestry activities, especially at stream crossings for forest roads and skid trails.

In the world of nature, sedimentation is a slow, naturally occurring process-however, human activities often speed it up. The result can be large amounts of sediment accumulation in lakes, streams and wetlands that speed up the aging of lakes, and bury fish spawning grounds and aquatic plants. These plants are a source of food and habitat for fish and other aquatic organisms.

Accumulating sediment also constricts naturally flowing channels, leading to increased stream bank erosion and possible flooding. Suspended sediment can cloud the water, reducing the hunting success of sight-feeding fish, and can also damage the bills of some fish species, causing them to suffocate.

10.3.2 Organic Debris

Leaves and large woody debris (usually large fallen logs, at least 12 inches in diameter) that naturally fall into streams can greatly benefit aquatic ecosystems. However, too much organic debris deposited in a short time can harm water quality. This can occur during logging when treetops and branches fall or wash into streams. Too much decomposing matter in streams can decrease dissolved oxygen in the water, which fish need to thrive and reproduce.

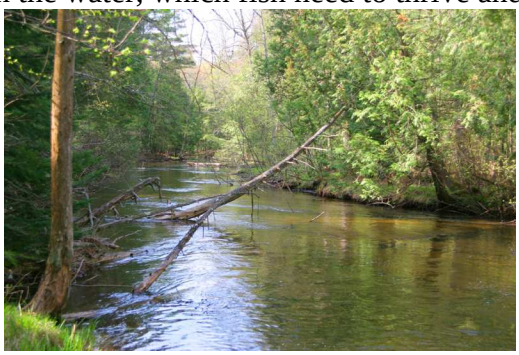


Figure 10.2 Fallen Cedars are large woody debris in the South Branch of the Oconto River (photo by Jeremy Pyatskowit)

10.3.3 Invasive Plants

A number of non-native invasive species are impacting forested riparian areas and wetlands. Reed canary grass can rapidly overtake a site where the forest canopy is opened up by harvesting and wind damage. It is extremely difficult to regenerate bottomland forests once reed canary grass is established. Another non-native invasive species, glossy buckthorn, can form a dense shrub layer that also limits regeneration.

10.3.4 Chemicals

Pesticides help control forest pests and undesirable plant species. But when applied improperly, pesticides can be toxic to aquatic organisms. Fuel, oil and coolants used in harvesting and road building equipment must also be handled carefully to avoid water pollution.

10.3.5 Temperature

Some sunlight filtering through trees is healthy for many streams. It can promote plant growth (food) in the water, and foster healthy ground vegetation along shorelines. However, when trees and the shade they provide are removed along most small streams, peak mid-summer water temperatures climb as a result of increased solar radiation. This can eliminate cold water fish, reduce dissolved oxygen, and affect the metabolism and development of fish.

Figure 10.3 Vernal ponds are susceptible to temperature change from overstory removal (photo by Jeremy Pyatskowit)

10.3.6 Nutrients

Nutrients such as nitrogen and phosphorus exist naturally in forest soil, and can enter waterbodies if the soil erodes into water. Also, if fertilizers are used in forest management, they can wash into waterbodies in runoff. Excessive amounts of nutrients may cause algal blooms in lakes and streams, which can reduce levels of dissolved oxygen in the water to below what fish and other aquatic species need to survive.

10.3.7 Streamflow

Timber harvesting can increase peak streamflow which increases chances for flooding, streambank erosion, and sedimentation. If timber harvesting equipment compacts a large area of the forest soil, water infiltration into the soil is reduced, and surface runoff into streams increases. This also reduces water
percolation through the soil to recharge groundwater which provides cool, clean water to lakes and streams – helping to maintain steady streamflows and lake levels throughout the summer.

Harvesting can also contribute to an increase in peak streamflow. In basins where 60 percent or more of the trees are less than 15 years old, snow can melt several times faster than in older stands.

10.4 PROTECTING RIPARIAN FUNCTIONS AND VALUES

Figure 10.4 Lakes are an important resource to the Menominee Indian Tribe (photo by Jeremy Pyatskowit

Lakes and streams provide habitat for wildlife, fish and other aquatic species. Our forests play a vital role in purifying and maintaining clean water for streams, lakes and groundwater. To ensure that forestry operations do not adversely affect water quality on the Reservation MTE and Natural Resources refer to the best management practices (BMPs), such as those developed by the Wisconsin Department of Natural Resources and adhere to Tribal Ordinances. Careful planning for forest management activities, such as road construction, timber harvesting and site preparation will minimize nonpoint source pollution. A well thought-out plan will lead to harvest operations that remove forest products efficiently and profitably, and promote sustainable forest growth and protect water quality. The level of formality and detail incorporates the project size, cost and environmental risk. The process allows for flexibility and adaptability to changing conditions. The prescription process incorporates the following items;

- Avoid operations in wetlands, including building landings, skid trails and roads. When avoidance is not practical, minimize impacts by limiting the extent of wetland activities.
- Protect water quality by considering site conditions. Identify on a map the following site conditions:
    - Harvest unit boundary
    - Property boundaries
    - Existing forest road system (roads, skid trails and landings)
    - Sensitive areas which include streams, lakes, wetlands, flood plains, habitat areas for threatened or endangered aquatic, animal and terrestrial plant species, steep slopes, and erodible soils
    - Riparian management zones
    - Stream crossings
    - Equipment maintenance and fueling areas

Figure 10.5 Marsh Marigolds occupy streamside riparian habitat (photo by Jeremy Pyatskowit)

10.5 WHAT IS A RIPARIAN MANAGEMENT ZONE?

Riparian management zones (RMZs) are land and vegetation areas next to lakes and streams where management practices are modified to protect water quality, fish and other aquatic resources. These areas are complex ecosystems that provide food, habitat and movement corridors for both aquatic (water) and terrestrial (land) communities. Also, because these areas are next to water, RMZs help minimize non-point source pollution impacts to surfacewaters. Riparian management zones help to:

- **Filter sediment and nutrients from runoff.** As runoff water moves through plants and the duff layer (needles, leaves and decaying matter), it slows and drops sediment that has been carried along. This settling process keeps sediment and nutrients from flowing into streams and lakes. It also allows plant roots to take up the nutrients that have dissolved in the runoff and soaked into the soil, further reducing the amount of pollution flowing into lakes and streams.
- **Allow water to soak into the ground.** A tree, plants, leaves, and twigs slow surface runoff, allowing water to soak into the soil. This helps reduce peak flow levels in streams, and replenishes the groundwater that helps maintain lake levels and stream flows.
- **Shade streams.** In most cases, plants and trees along streambanks are necessary for shade, keeping water from becoming too warm for aquatic life in the summer.
- **Stabilize streambanks and lakeshores.** Trees and plants along streambanks and lakeshores reduce soil erosion because they 1) reduce the impact of raindrops on exposed soil, and 2) provide roots that hold the soil together which makes it more difficult for waves, currents and runoff to wash the soil away.
- **Provide food and habitat for aquatic organisms.** Fallen leaves and other organic debris from trees is the base of the food chain for aquatic organisms in small forest streams. Large woody debris creates riffle areas and plunge pools, critical habitat for fish and other aquatic organisms. The pools trap leaves and twigs long enough for microorganisms to decompose them. These microorganisms become food for insects and other invertebrates, which in turn become food for fish.

10.6 WETLANDS

A wetland is defined as “an area where water is at, near or above the land surface long enough to be capable of supporting aquatic or hydrophytic (water-loving) vegetation, and which has soils indicative of wet conditions.” Wetlands include marshes, bogs, floodplain forests, wet meadows, and low prairies. These wetlands provide many functional values in the ecosystem.

- Shoreline protection. Shoreline vegetation absorbs the force of waves and currents, protecting against erosion. Roots of wetland plants hold together lake shores and streambanks.
- Flood protection. By storing runoff from heavy rain and snowmelt, wetlands reduce flood damage.
- Water quality protection. Wetlands store and filter pollutants such as sediment and the nutrients in sediment. Also, wetlands can transform some pollutants into non-polluting forms.
- Groundwater recharge and discharge. Some wetlands recharge groundwater by moving surface water into the groundwater system. Groundwater discharge occurs when groundwater flows to the surface and into streams, lakes and wetlands. This discharge is especially important in summer by providing stream baseflows critical to aquatic life.
- Animal and plant habitat. Many animals spend their lives in wetlands, while others use wetlands for feeding, breeding, resting, nesting, escape cover, or travel corridors. Wetland plants provide food and shelter for many animal species. Many of the rare and endangered

plant species in Wisconsin are found in wetlands. MTE's consideration of BMP's in wetlands protect water quality from erosion, and minimize changes to the surface and below-surface water movement that can occur from rutting and road building. Changing the surface and below-surface water movement can affect the health of the wetland ecosystem and its flood protection function.

Figure 10.6 A wetland filters the water flowing from the wetland (photo by Jeremy Pyatskowit)

CHAPTER 11 - FOREST SOIL PRODUCTIVITY

11.0 INTRODUCTION

The Menominee forest contains a rich array of forest soils, influenced over thousands of years by the action of the glaciers that once covered this region and the natural processes that have taken place since the glaciers receded. Soils on Menominee range from nutrient-poor, dry outwash sands in the southeast corner of the reservation to nutrient-rich, mesic sandy-loams throughout the western half of the reservation. The forest plant species throughout the reservation are heavily influenced by the nature of the soil, and fire behavior is closely related to the soil types. Forest management activities can benefit from recognizing the potential of the soil, and the risk of degrading forest soils can be addressed through proper management.

11.1 GOALS AND STRATEGIES

The goal is to protect the physical, chemical, and biological properties of forest soils.

The strategies that achieve this goal include:

- Identification of the physical, chemical, and biological properties of the soil that are critical to the health of the forest
- Identification of potential impacts to the soil that will affect soil properties
- Considering Best Management Practices that minimize or mitigate impact to the soil

11.2 SUSTAINABLE SOIL PRODUCTIVITY

Soil productivity is defined as the capacity of soil, in its normal environment, to support plant growth. It is reflected in the growth of forest vegetation or the amount of organic material produced by plants and animals. In forest management, soil productivity is often measured in volume of trees produced, but other methods of determining productivity exist.

Soil is the fundamental resource of the forest. Without it, other resources of the forest would vanish over time. Identifying and reducing impacts to the soil is an essential part of a strategy for sustainable forest management. Primary considerations in maintaining soil productivity include the following:

- Soil productivity is a major factor in determining the amount of timber harvesting that can be sustained over time. It also affects other forest attributes, such as wildlife habitat and biodiversity.
- Soil productivity limits the kinds of tree species that will grow on a site as well as their rate of growth.
- Maintaining soil productivity keeps forest soils in a condition that favors regeneration, survival and long-term growth of desired forest vegetation.
- Maintaining forest soil productivity is less costly than correction or mitigation (after the fact).
- Maintaining the productivity and sustainability of forest soils is key to meeting society's need for forest products and other amenities of the forest.

11.3 SOIL CHARACTERISTICS AND POTENTIAL IMPACTS

A certain amount of soil impact is inevitable when conducting some forest management activities. Soils have physical, chemical and biological aspects. All three characteristics are closely interrelated, and impacts on one may influence others.

- The physical properties of soil include such factors as texture, structure, porosity, density, drainage, and hydrology.

- The chemical properties of soil include its nutrient status and rates of cycling, and pH.
- The biological properties of soil include the multitude of organisms that thrive in soil such as mycorrhizae, other fungi, bacteria, and worms.

Because of the nature of forest management activities, the risk or significance of impacts to soil properties appears to be highest for physical properties, followed by chemical properties, and then biological properties. For example, forest sites where nutrient loss has occurred are few, while sites that have suffered due to physical impacts are relatively common. If the physical and chemical properties of the soil are not damaged, then the biological aspects take care of themselves. However, if a soil is severely compacted, plants cannot utilize nutrients because of the poor physical rooting environment, and the soil organisms responsible for nutrient cycling are also limited.

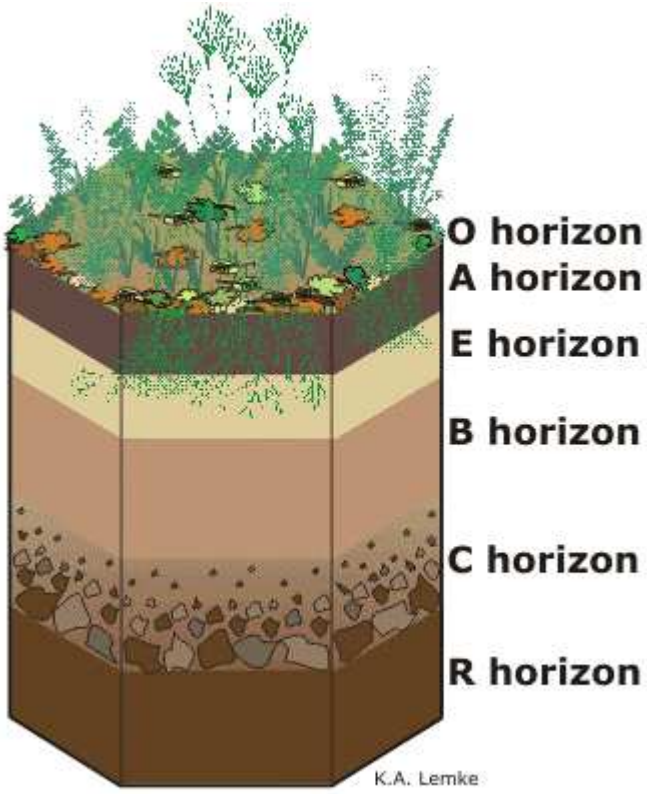


Figure 11.1 Diagram of a soil profile. Note the different horizons (layers) that comprise a healthy soil. Sound management techniques preserve this structure, which in turn ensures that the functions and properties of the soil are preserved. Diagram courtesy of UWSP.

11.3.1 Physical Properties

The physical structure of the soil directly affects the interaction of water with the soil. The drainage of a soil and its susceptibility to erosion are determined by the size of the soil particles and the size of the pores between particles. Sandy soils contain larger soil particles with correspondingly larger pores between particles than loamy or clay soils. Consequently, some soils are more susceptible to damage caused by improper logging techniques. Guidelines have been developed by the Soil Conservation Service (SCS) to enable Harvest Administration in their efforts to monitor the effect of logging operations on the physical properties of forest soils. MTE considers these guidelines when developing a prescription.

11.3.2 Compaction and Rutting

Soils most susceptible to compaction and rutting include fine-textured soils (silty clay, sandy clay and clay) and medium-textured soils (fine sandy loam, very fine sandy loam, loam, silt

loam, silt, silty clay loam, clay loam, and sandy clay loam). Poorly and very poorly drained soils of any texture are susceptible to compaction and rutting during most years when not adequately frozen. The susceptibility of soil to compaction and rutting is primarily dependent on soil texture and moisture content. Soils are most susceptible to compaction, puddling and rutting when they are saturated. Such conditions occur during spring and early summer months, immediately following heavy rains, and in the fall after transpiration has ceased but before freeze-up. Timing of forest management activities, development of infrastructure, and selection of equipment and operating techniques are all critical factors that affect the soil resource. It is important to avoid operating heavy equipment on a site when adverse soil impacts are likely, and to limit direct trafficking of a site to the smallest area possible.

The Soil Conservation Service has produced guidelines applicable for the Reservation that indicate the amount of time necessary to alleviate problems due to compaction and rutting in wet soil conditions. In general, the moisture-rich the soil type, the more time is required for the soil to dry in the wake of a rain event before heavy equipment can safely operate on the site without extensive rutting and compaction. MTE considers these guidelines when developing the prescription.

The preferred operating season for any one site may vary depending on local climatic conditions, equipment being used, and operating techniques. The use of low ground pressure (LGP) equipment and operating techniques such as the use of slash mats can extend operating seasons on low-strength soils. Infrastructure development, including roads, landings and skid trails, almost always results in direct soil compaction and reductions in forest growth. It is critical to minimize the area occupied by infrastructure to reduce the impact to soil productivity.

11.3.3 Soil Displacement

Mechanical site preparation techniques often involve soil displacement. Severe treatments that remove or displace the surface organic and mineral soil layer may result in nutrient removal and other site degradation (i.e., soil erosion or compaction). Site preparation techniques that move surface soil away from seedlings (e.g., dozing soil into windrows) should be avoided, as these practices remove much of the nutrient and moisture supply that a seedling needs. The loss of surface soil is exaggerated with extremes of soil types. Coarse, dry soils and wet, fine soils, or soils shallow to bedrock, are most likely to be severely impacted.

Retaining slash on site provides shelter and organic matter for seedlings. Although it may be difficult to plant a site with slash present, windrowing or piling of slash should be avoided, and scattering of slash should be encouraged. Prescribed fire is sometimes used to reduce slash before planting, control competing vegetation, or expose mineral soil for seeding. Fire "mineralizes" soil nutrients, making them readily available to plants, but leaching can also occur. Fire-adapted ecosystems in Wisconsin are generally restricted to sandy outwash plains, where vegetation is adapted to fire and can take up the nutrients quickly. However, sites without native ground vegetation may be subject to leaching losses. Extremely hot fires may volatilize some nitrogen, but most is retained under conditions prevalent in most prescribed burns. Erosion can be a severe problem on roads and skid trails that lack vegetative cover, resulting in down cutting of the roadbed and sediment delivery to streams.

11.3.4 Chemical Properties

Soil chemical properties include nutrient status of a soil and soil pH. Soil chemical characteristics are influenced by many factors, including soil origin, soil texture and drainage, degree of soil weathering and development, and organic matter content. Forest management

affects the nutrient status of a soil/site through the removal of nutrients in forest products, and the disturbance of surface soils through harvesting and site preparation activities.

11.3.4.1 Nutrient Cycling

Nutrient cycling is the process by which nutrient elements move into, out of and within an ecosystem. Forested ecosystems receive natural inputs of nutrients through atmospheric deposition and mineral weathering. Throughout the life of a stand, these inputs can be very significant. Outputs of nutrients occur through timber harvesting or other practices that remove soil or organic material from a site, and through leaching and surface runoff. In contrast to the annual harvests associated with agriculture, a complete forest harvest typically occurs only once per rotation (40 to 120 years) in an even-age stand such as aspen or pine. Periodic intermediate thinnings or single-tree selection occur about every 10-15 years but only remove approximately 25% of the standing timber. This reduces the rate of nutrient removal as compared with agriculture, and allows sufficient time for replacement by atmospheric deposition and weathering of soil minerals.

In forest ecosystems, timber harvesting and some site preparation practices can remove nutrients and have the potential to create deficiencies. Nutrient depletion could occur if removal is greater than replenishment that occurs between harvests. The likelihood of nutrient depletion is greater with shorter rotations, nutrient-demanding species, whole tree harvesting, and on sites with low inherent nutrient reserves.

11.3.4.2 Nutrient Status and Removals

The initial nutrient capital of a site varies widely by soil type. For example, a loamy soil formed in loess over glacial till may contain several times the amount of calcium in the rooting zone, than a sandy soil formed in outwash deposits. Different nutrients are stored in different parts of a tree, and different tree species store the nutrients in different relative abundance. In general, the greatest portion of mineral nutrients is stored in the leaves, followed by small branches, large branches, and boles. Some species, however, store more calcium and magnesium in the bark than in the leaves. For example, aspen utilizes a relatively high amount of calcium, and stores roughly 50 percent of the calcium in the bole-wood and bark. Harvesting species that store relatively high levels of nutrients in the bole-wood and bark will potentially remove greater amounts of nutrients from a site.

Nutrient removal associated with timber harvest is dependent on 1) the species and portions being harvested, and 2) the season. For example, a whole-tree harvest during the growing season will remove virtually all nutrients stored in the aboveground part of the trees. In the case of bole harvest, with limbing at the stump, nutrients in the crown and other non-merchantable portions are retained on site. If trees are skidded to a landing before limbing, the nutrients in the crown are removed from the immediate vicinity, but could be moved back into the stand. *There is no evidence that nutrient depletion has occurred in Wisconsin due to forest management.* Studies in Michigan on sandy outwash soils found nutrient depletion in conjunction with whole-tree aspen harvest. This could become a concern for sites with similar characteristics.

11.3.4.3 Nutrient Retention Strategies

- • Retain or redistribute slash on the site
- • Avoid whole-tree harvesting
- • Addition of nutrients to the site
- • Avoid shortened rotations

Elsewhere, many modern harvesting systems require full-tree skidding for efficiency of the operation. Prescriptions define and institute safeguards for the resources. Caution is exercised during non-frozen seasons to avoid trafficking additional areas while conducting harvests. Stands are typically harvested from back-to-front to ensure that ground is traversed a minimal number of times.

11.3.4.4 Biological Properties

Biological characteristics of soil include the populations of plants and animals, including microflora (fungi, bacteria, algae) and microfauna (worms, arthropods, protozoa). Forest soils contain a multitude of microorganisms that perform many complex tasks relating to soil formation, slash and litter decomposition, nutrient availability and recycling, and tree metabolism and growth. Generally, the number of organisms are greatest in the forest floor and the area directly associated with plant roots.

The population of soil organisms (both density and composition) and how well that population thrives is dependent on many soil factors including moisture, aeration, temperature, organic matter, acidity, and nutrient supply.

- Mycorrhizae are soil fungi that grow into tree root hairs, forming a symbiotic relationship that is very important in nutrient uptake for most tree species, particularly on nutrient-poor sites. Mycorrhizal tree species include pines, spruces, firs, maples, ashes, birches, beeches, oaks, basswoods, black walnut, black cherry, and willows. Afforestation has proven difficult in areas where mycorrhizae are not present in the soil, and trees planted in such sites are sometimes inoculated with a mycorrhizal fungus to improve establishment. Loss of the forest floor layer, or deforestation that dries and warms a site, can negatively impact populations of mycorrhizal fungi.

- Infiltration of moisture into the soil is aided by dense ground vegetation and thick forest floor, or duff layers, that act to intercept and hold rainfall. Activities that remove or thin the herbaceous plant cover and duff layer will contribute to greater runoff and potential erosion. The use of vehicles in forested sites can damage ground vegetation and remove or displace the forest floor layer. Trampling and grazing by cattle can also have these effects, particularly when combined with soil compaction that also reduces infiltration capacity. Some non-native invasive shrubs contribute to reduced infiltration, by capturing virtually all available sunlight so that no herbaceous plants grow beneath them, leaving the soil bare and unprotected.

- “Pit and mound topography” is a term that refers to the soil surface in a forest where occasional large trees have fallen or been blown down. The tree’s root system pulls up a mound of soil, leaving a pit where the tree formerly stood. These pits are important sites for water infiltration into soils, especially on slopes, and also create puddles and ephemeral pools that benefit amphibians and invertebrate organisms. Harvesting reduces the likelihood of treefalls that create pits and mounds, and equipment travel tends to smooth the surface of forested sites. Maintaining a component of reserve trees that are allowed to fall down can help retain pit and mound topography. This component is readily evident across the reservation, as windstorms have played an important role in shaping the composition of the forest. The area affected by the 2007 tornado is an excellent example of this natural activity on the forest, with large numbers of pits and mounds where trees were uprooted by the storm.

- Physical and chemical soil characteristics can be influenced by forest management as

previously discussed. Impacts to these soil properties may directly impact soil biology, thereby impacting the functions of the organisms – many of which are beneficial to plant growth. Implementation of practices that protect the physical and chemical properties of the soil also protects the habitat of the soil organisms and sustains their populations.

11.4 SOIL MAPPING

The soils have been mapped for the entire reservation by the Natural Resources Conservation Service (NRCS) as part of a national effort. The resulting Menominee County Soil Survey is available to the public and natural resource professionals. It contains maps and soil type descriptions that provide useful information to aid in the planning process.

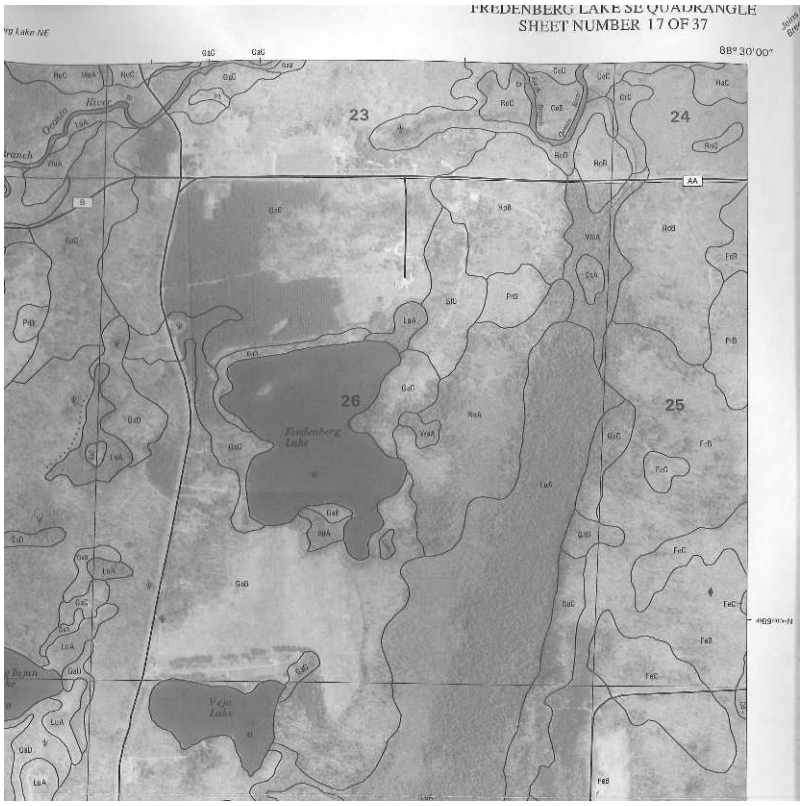


Figure 11.2 Example of a NRCS Soil Survey map (Fredenberg quadrangle)

CHAPTER 12 - VISUAL QUALITY

12.0 INTRODUCTION

Concern about the aesthetic quality of forested lands throughout the Reservation is a great source of pride for Tribal members. Despite over a century of regular active forest management, much of the forest has retained the visual attributes that suggest an untouched, mature forest to the untrained eye. Forests are not static and are constantly undergoing change, whether managed or not, but the effects of those changes can be minimized along heavily traveled corridors.

The Menominee forest is particularly vital to Tribal members for several reasons including spiritual, gathering, recreation, and forest products. Many of the demands on the forest are compatible and even complementary. Recognition of the importance of scenic values to recreational users has led to the development of a set of forest aesthetic management guidelines which have been incorporated in the MTE Silviculture Handbook.

12.1 GOALS AND STRATEGIES

The goal is to protect the aesthetic quality of the forest for the enjoyment of the Tribal membership.

The strategies that achieve this goal include:

- Recognition of the benefits of visual quality management
- Classification of different levels of sensitivity, which provides guidelines for buffer management
- Maintaining aesthetic buffers along travel corridors
- Following management guidelines in sensitive areas

12.2 BENEFITS OF VISUAL QUALITY MANAGEMENT

Visual quality is one important aspect of the broad, multi-faceted concept of integrated forest resource management. Visual quality management can:

- Enhance visual quality of forested lands for recreational users, which results in a healthy tourism economy.
- Enhance public acceptance of forest management and timber harvesting, therefore, helping to sustain a healthy forest products industry.
- Minimize the visual and audible impacts of forest management activities on tourists and other recreational users.
- Minimize visibility of harvest areas by limiting apparent size of harvest.
- Minimize visual impact of slash.
- Minimize the impact of landing operations on recreational viewers and users.
- Minimize visual contrast created by snags and broken or leaning trees.
- Reduce visual impacts associated with the design and use of forest access roads.
- Reduce the visual impact of site preparation practices, and reduce the time that the effects of these practices are visible.
- Promote more natural-appearing stands.
- Enhance the aesthetics of visual management areas by minimizing visual impacts of timber stand improvement activities.
- Reduce visual impacts of treated vegetation.
- Reduce noise and unsightliness related to gravel pits.
- Help in providing a valuable ecological role.

12.3 RECOGNIZING DIFFERENT LEVELS OF VISUAL SENSITIVITY

Some of the factors important in the determination of visual sensitivity include:

- The perceived degree of sensitivity to landscape aesthetics of people traveling that route or recreation area
- The volume and type of use the travel route or recreation area receives
- The speed of travel within the route or area

12.3.1 Most Sensitive

Applies to travel routes and areas where significant public use occurs, and where visual quality is of high concern to typical users. Examples may include paved roads, lakes, wetlands and rivers, and designated recreational trails and areas that provide a high level of scenic quality.

Figure 12.1 The County Highway M Bridge on the Wolf River is an example of a route categorized as *most sensitive*.

12.3.2 Moderately Sensitive

Applies to travel routes or recreation areas, not identified as "most sensitive," where visual quality is of moderate concern to typical users. Examples of these routes and areas may include unpaved roads, recreational lakes and rivers, uncut stands adjacent to existing 10 year-old-and-less clear-cuts and shelter-woods, and designated recreational trails that provide moderate to high scenic quality but less significant public use. Practices where harvesting is adjacent to unpaved roads could include:

Select Cut Thinnings:

- Lopping slash within the Right-of-Way
- Removing all debris from landings
- Conducting harvest operations in winter
- Clear Cuts and Shelterwood Harvests:
- Having a 100 foot slash free zone adjacent to the road
- Conducting harvest operations in winter

Figure 12.2 An example of a *moderately sensitive* area, the mature stand on the right side of the photo lies next to a young pine plantation (center of photo). For aesthetic reasons the mature stand will not be harvested until the young pine have reached a minimum height of 10-feet.

12.3.3 Less Sensitive

Applies to travel routes or recreation areas, not identified as "most sensitive" or "moderately sensitive," where visual quality is of less concern to typical users. Examples of these routes may include low-volume local forest roads, uncut stands adjacent to existing 10 year-old-and-less clear-cuts and shelter-woods, non-designated trails, and non-recreational lakes and rivers.

Figure 12.3 Example of a *less sensitive* area along a logging road that receives very little traffic.

12.4 THE VALUE OF RECOGNIZING LEVELS OF VISUAL SENSITIVITY

Recognizing the level of visual sensitivity helps Forestry to choose the visual quality guidelines that helps fulfill the landowner's expectations. Prescriptions do reflect the differences in visual sensitivity. An area classified, as "most sensitive" would normally have different contract specifications than those used in an area classified as "less sensitive." Landings, for example should be avoided within view of travel routes or recreation areas classified as "most sensitive," while they might be visible in areas classified as "less sensitive," but located outside the travel route right-of-way.

Figure 12.4 A buffer strip of uncut trees has been retained between a clearcut (right) and County Highway M (left) to reduce the visual impact.

Figure 12.5 The selective thinning in this red pine stand was designed to mimic natural changes that occur over time. Trees were removed from all size classes, so that the remaining stand has a mix of sizes, quality, and tree spacing, therefore, providing a more natural look.

12.5 BUFFER ZONES

Buffer zones to protect and preserve the tribal forest and its environs, MTE established limitations on clear-cutting through:

- Creation of buffers around wetlands, streams, and rivers to protect complex ecosystems that provide food habitat and movement corridors for both aquatic and terrestrial communities and to minimize non-point source pollution impacts to surface waters.
- Creation of buffers around archeological sites to protect and preserve archeological, cultural

and historic resources while taking precautions to keep the location of those sites confidential. Archeological sites require the implementation of recommendations from the Tribal Historic Preservation Officer.
- Creation of buffers around paved roadways for aesthetic purposes.

Harvesting any timber via clear-cutting or shelter-wood final cut silvicultural system is prohibited unless such harvesting allows for a 150-foot buffer from a paved road. The 150-foot buffer shall begin at the edge of the pavement.

- A minimum of 50 feet from any wetland.
- A minimum of 100 feet from any river or stream.
- Adjacency: Applies to the time frame to wait before neighboring stands that are regenerated through even-age management (i.e. clear-cut and shelterwood) can be harvested. Stands *adjacent* to existing even-age treatments should not be treated until regeneration in those stands has reached a minimum of 10 feet in height.

12.6 OBJECTIVES

Incorporate visual quality concerns into prescription development through the inclusion of:

- Leave trees in clearcuts; leave trees increase add vertical structure to an otherwise uniform landscape
- Leaving pockets of mature timber in shelterwoods and clearcuts; achieves the objective of leave trees, but to an even greater degree
- Consider designing prescriptions at the landscape level; by planning the overall management of an area in advance, many adjacency issues can be minimized

Most of the forested area of the reservation is accessible by existing roads. However there are a few areas that lack access and the construction of roads may be necessary. The visual impact of construction can be reduced by incorporating the following practices:

- Rather than laying out the road in a straight corridor, allow for a bend in the road near the point of access to a major road
- When possible, lay out the road so that is will intersect various timber types
- Trees that are removed should be merchandized with low stumps and the dirt shaken from the root balls
- Disperse the debris into the adjacent area to avoid a corridor of stumps and slash

CHAPTER 13 - FOREST ROADS CONSTRUCTION AND MAINTENANCE

13.0 INTRODUCTION

Roads, skid trails and landings are all part of a forest transportation system. Roads connect the forestland to existing public roads. They provide forest access for such activities as managing timber, improving fish and wildlife habitat, fighting fires, and recreation.

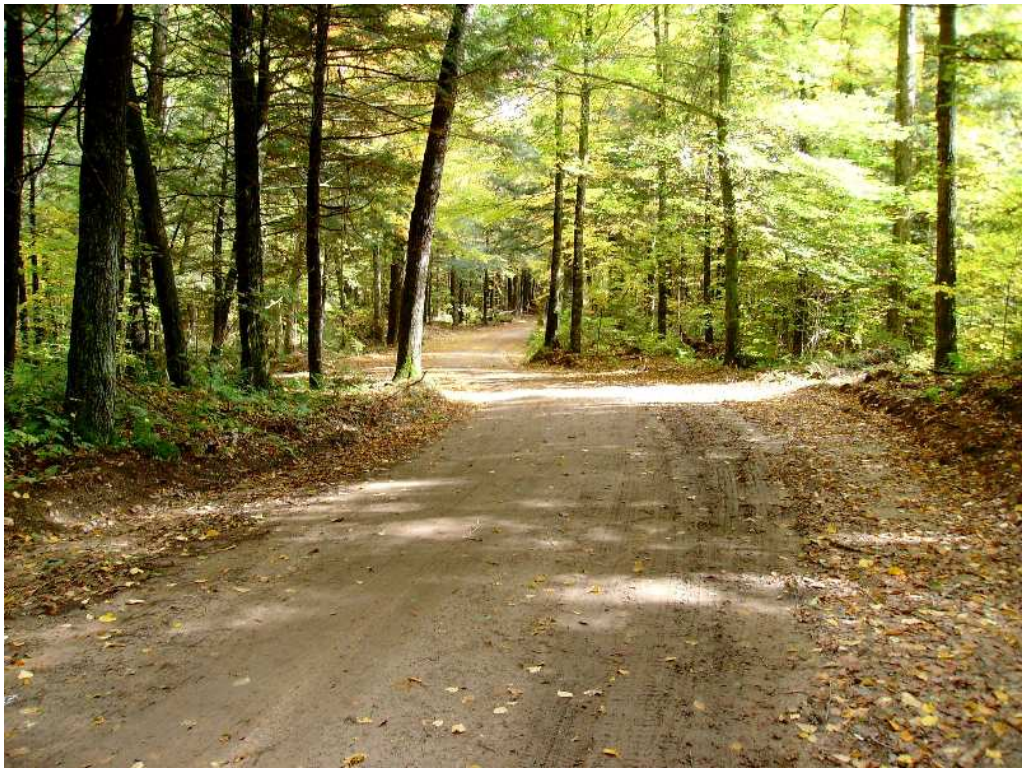


Figure 13.1 Iron Gate Road in the southwestern corner of the reservation.

13.1 GOALS AND STRATEGIES

The goal is to build and maintain forest access roads that optimize the efficiency of operations while simultaneously minimizing the impact of roads on forest resources.

The strategies that achieve these goals include:

- Classifying road types to ensure roads are maintained at an appropriate level commensurate with their intended use
- Planning proper road management
- Considering Best Management Practices
- Minimizing or mitigating impact to wetlands and riparian areas or cultural resources
- Decommissioning of unnecessary roads or road segments to minimize the impact on the forest

13.2 FOREST ROAD TYPES

There are three types of forest roads: temporary roads, permanent seasonal roads, and permanent all-season forest roads.

13.2.1 Temporary Roads

These types of roads are designed and constructed for short-term use during a specific project such as timber harvesting. These roads are used primarily when the ground is frozen or firm.

When the project is complete, the temporary road is closed, all stream crossing structures are removed, and the road is naturally or artificially re-vegetated.

13.2.2 Permanent Seasonal Roads

Permanent Seasonal Roads are part of the permanent road system. Seasonal roads are designed for use primarily when the ground is frozen or firm. These roads are generally narrower than all-season roads, built to lower engineering standards, and have minimal surface gravel.

13.2.3 Permanent All-Season Forest Roads

These roads usually have gravel surfaces and are designed for year-round use. However, there may be some restrictions on use at various times of the year.

Figure 13.2 MTE Roads Department foreman and MTE bulldozer operator discussing a road project on the Camp 30 road.

13.3 FOREST ROAD PLANNING

The silviculture department shall initiate the Unit Road Review. This review is attended by the necessary MTE staff. The review examines the existing road network in a treatment area and determines which roads will be used, if additional roads need to be built and if any roads will be decommissioned. Information concerning new roads that will be used shall be given to the Menominee Tribal Historic Preservation Office for clearance. Road brushing and leveling can commence once clearance is obtained.

Road construction projects shall be initiated by the prescription process. Relevant federal laws and tribal ordinances shall be followed.

13.4 FOREST ROAD MAINTENANCE

- **Temporary Roads:** Approved Temporary Roads that have not been permanently decommissioned should be maintained as needed. Temporary roads that serve a timber harvest operation shall be brushed and leveled two years prior to harvest.
- **Permanent Seasonal Roads:** Approved Permanent Seasonal Roads should be maintained as needed. These roads should be brushed and leveled two years prior to harvest.
- **Permanent All-Season Forest Roads:** Permanent All-Season Roads should be maintained regularly. BIA Routes shall be maintained to the standards outlined in the **MITW / MTE Road Maintenance Contract** to the extent that funding will all**o**w.

- The Wisconsin State Best Management Practices Guidelines shall be considered when maintaining all roads.

13.5 FOREST ROAD CONSTRUCTION

The following are guidelines when planning a road construction project.

- **Maximum Skid Distance:** Roads need to provide access to within specified skidding distance for timber harvesting operations. Road access shall provides skidding distance of no more than one-quarter mile in most situations.
- **Soils and Topography:** Roads shall be located on sites that will provide appropriate drainage, and minimal environmental impact.
- **Road Width:** The width of the road clearing shall be approximately 16 feet. The width shall be wider on corners, landings, turnouts and turnarounds.
- **Visual Aesthetics:** Visual aesthetics shall be taken into consideration when designing a road, when appropriate.
- **Service Area:** The location of a new road shall serve the largest acres possible given the Maximum Skid Distance guideline.
- Wisconsin State Best Management Practices and practices outlined in **Chapter 5, Riparian Areas**, shall be considered when planning and constructing roads.
- All construction projects shall be initiated by the prescription process. In addition, new road construction requires an Environmental Assessment. For specific information regarding road construction procedures and standards, see **"A Landowner's Guide to Building Forest Access Roads".**

13.6 FOREST ROAD DECOMMISSIONING

Road decommissioning renders a road inaccessible to all commercial truck traffic and allows vegetation to reoccupy the site. This action may involve obstructing access at several points along the road. This action may also involve restoration of the natural topography, scarification of the roadbed, utilization of erosion control measures and the removal of all cross drainage structures and other improvements. The use of a combination of closure devices, including but not limited to berms, boulders and down trees may be used to render a road inaccessible.

Roads will be eligible for decommissioning based on the following, but not limited to, criteria.

- Resource protection or restoration.
- Abandoned roadbeds and unneeded access roads associated with road relocation.
- Desired road densities within a given area consistent with maximum skid distance criteria.
- Closure of temporary roads.

MTE uses the guidelines from the Road Decommissioning and Landscape Restoration section of the Transportation Systems chapter of the 2004 Land and Resource Management Plan of the Chequamegon-Nicolet National Forest.

13.7 FOREST ROAD OBJECTIVES

The following objectives are considered when forest roads are utilized on Menominee:

- Construct roads only when other reasonable alternatives are not available.
- Design and construct roads that meet the intended purpose.
- Minimize the number of road entrances to paved roads.
- Incorporate the latest engineering designs that will protect watersheds, aquatic health and create stable roads.
- Decommission roads that are identified as not needed for long term access.

- Reduce the number of wetland and stream crossings when feasible.
- Open seasonal roads that access harvest units at least two years prior to treatment.
- Include aesthetic principles as outlined in the Chapter 6, Visual Quality.
- Incorporate practices in construction and maintenance that reduce that risk of introduction and spread of invasive species as outlined in Chapter 15, Invasive Species.
- Pursue training opportunities for the road maintenance crew that will enable them to implement state of the art techniques in road construction and maintenance that protect the resource and provide for a good road system.

CHAPTER 14 - FOREST INVASIVE SPECIES

14.0 INTRODUCTION

Non-native, invasive species displace native species of plants and animals and can cause major disruptions in local ecosystems. In many instances, invasive plants can out-compete native plants, which in turn may affect animals that depend on the displaced native species for food and/or habitat. These interactions, stemmed from successful colonization of non-native invasive species, can even lead to local extinction of native plants or animals, some of which could already be threatened or endangered such as the federally protected Karner Blue Butterfly.

The Menominee County Land Conservation Committee (LCC) and the Menominee Indian Tribe of Wisconsin and (MITW) Environmental Services Department (ESD), have developed an Invasive Species Management Plan (ISMP) to prevent and control aquatic and terrestrial invasive species within Menominee. An effective management plan in Menominee requires cooperation from local, state and federal government programs, along with Lake Districts, Lake Associations and citizen volunteers.

Figure 14.1 Woodlot invaded by Garlic Mustard (WDNR Website)

The areas that are at greatest risk for the introduction of invasive species within the Menominee Reservation are highly traveled roads and residential areas. These include State Highways 47 and 55, as well as county roads M and VV. These are the main corridors that humans will bring in invasive species and spread them throughout Menominee. The main residential areas that cause spread or threaten natural areas with invasive species are the Legend, Moshawquit, Southeast Bass, Round, Keshena, Neopit, Zoar and LaMotte Lake areas. Additionally parcels that are scattered throughout the forested areas of the Reservation, including Upper Bass Lake are potential avenues for the introduction of invasive species into the forestlands and waterways of the Menominee Reservation. Although human activity can greatly increase the risk of introducing invasive species, some species have the ability to migrate across the reservation boundary on their own accord. Many species of exotic plants and animals are capable of spreading to new areas on their own, but human activity greatly accelerates the spread of these and other species.

14.1 GOALS AND STRATEGIES

The goal is to prevent the introduction and control the spread of invasive species on the forest.

The strategies that achieve this goal include:

- Prevention and early detection of invasive species
- Public awareness and education to raise the prominence of this issue in the public consciousness
- Development of infestation and management controls for species that have either been discovered on the reservation or have the high risk of being introduced
- Continual monitoring of the forest and surrounding areas to provide early warning of the introduction of invasive species
- Development of management options that minimize the impact of invasive species infestations on the composition of the forest at the landscape level
- Collaboration with other agencies and organizations to coordinate assets and efforts in combating invasive species
- Continually seek external funding sources to increase the assets that can be brought to bear in the effort to prevent and mitigate the introduction of invasive species
- Train staff in field identification of a range of invasive species

14.2 PUBLIC AWARENESS AND EDUCATION

MTE will continue to provide workshops, presentations, published materials and planning materials to the public in order to keep them informed and educated on invasive species.

Figure 14.2 Reed Canary Grass (WWDNR Website)

A key part of slowing the spread of invasive species is to ensure that citizens are made aware of the steps they can take to minimize the chance of them bringing invasive species into Menominee Reservation. The Wisconsin Department of Natural Resources (WDNR), University of Wisconsin Extension (UWEX), and other state as well as federal provide programs and informational brochures that will be utilized wherever possible by MTE.

There are five education resource centers on the Menominee Reservation where information on invasive species is available to the public to learn more about invasive species. These are the Menominee Tribal Enterprises (Hilary Waukau) forestry center, Menominee County Land Conservation Department (LCD), UWEX office, Legend Lake Lodge, and the College of Menominee Nation.

Figure 14.3 Emerald Ash Borer (WDNR website)

14.3 PREVENTION AND EARLY DETECTION

Preventing new introductions of invasive species and controlling the spread of invasive species already detected within the county/reservation is critical to management efforts. Preventing the introduction of invasive species saves countless hours of labor, limited financial resources and avoids habitat degradation. The time and money spent to prevent the initial introduction educating the public of invasives is far less than controlling species after they have become established.

Early detection of new infestations of invasives will come from several sources. The LCD, ESD, MTE and Tribal Conservation monitor for outbreaks of invasive species. Many other agencies such as the County Highway Department, as well as the public will be relied upon to report any previously unknown invasive species infestations. Trained personnel and comprehensive monitoring focuses on the species of highest risk of introduction (e.g. Emerald Ash Borer, Annosum Root Rot, Beech Scale). Also, those species that have already been identified on the Reservation are monitored on an annual basis as part of the overall control program developed for those species (e.g. Garlic Mustard, Oak Wilt, Gypsy Moth and Buckthorn).

Preventative activities regarding many terrestrial invasive species includes coordination with local partners to develop firewood bans on all wood coming from high risk and infected states. The MITW firewood ordinance will be amended to address other transportation and cutting issues. MTE has implemented a preventative approach to the Annosum Root Rot disease threat through application of Sporax to all pine stumps that are cut during summer logging operations. Sampling will continue to be carried out by visual monitoring of pine plantations both by ground and by air.

Figure 14.4 Gypsy Moth (WDNR)

14.4 MONITORING

Persistent monitoring is critical in controlling existing invasive species infestations as well as identifying new areas that become infested with an invasive species. The Invasive Species Management Plan describes the monitoring results for each species covered by the Plan. The results of monitoring are stored in the MTE Geographic Information System.

Monitoring for species that are not present, but are nearby and pose serious threats to the Menominee Forest are occurring. One example of this is Emerald Ash Borer (EAB) MTE is working with the Tribe monitoring EAB by establishment of multiple sample points within the Reservation (e.g. 25 sample sites in 2009). EAB sampling will continue to occur into the future through either destructive trap tree points or newly developed pheromone traps.

Additional surveying will be completed through on the job awareness by MTE. Foresters and loggers for MTE will need to be consistently looking for new infestations of garlic mustard. At a minimum, biannual training should be completed to update MTE staff and loggers and identify any new invasive species they need to be looking for.

Figure 14.5 S-shaped galleries made by emerald ash borer larvae feeding under the bark. (WDNR)

14.5 INFESTATION AND MANAGEMENT/ CONTROLS

Rapid response upon the early detection of invasive species provides for the best chance of eradication. The ISMP has specific details of response to invasives not yet identified on Menominee. Response to these threats requires a coordinated effort between all partners in the Plan.

Species that have been either identified on the reservation require complete surveys and annual mapping of their extent. The location and history of observed infestations are tracked in the MTE Forest Inventory Geographic Information System (GIS). This allows managers to create up-to-date maps that facilitate the development and adjustment of mitigation plans for each species that has been identified on the reservation.

A complete, annually updated list of invasive species that have been found on the reservation is found in the ISMP. This list includes, but is not limited to:

- Gypsy moth
- Garlic mustard
- Spotted knapweed
- Wild parsnip
- Leafy spurge
- (Invasive) honeysuckle
- Reed canary grass
- Eurasian water milfoil
- Purple loosestrife
- Phragmites
- Oak Wilt
- Buckthorn

The extent of each species varies from one small patch found in 2004 (leafy spurge) to most of the Wolf River and a few scattered patches on and near Legend Lake (purple loosestrife). The ISMP has specific details of controls being implemented within the Reservation for the species listed therein.

For many of the species listed above, there are biological controls being tested by other, off-reservation agencies (e.g. USDA). If approved bio-control methods are proven safe to humans and the environment, they will be considered as an option for control, generally in lieu of chemical

controls. In cases where chemical control is necessary, it will be completed in accordance with all applicable rules and regulation of the State, Federal and MITW, as well as label and MSDS information.

14.6 PARTNERS AND PERSONNEL INVOLVED

MTE will be the lead agency on most terrestrial invasive species, working alongside MITW ESD, MITW Conservation, and Menominee County LCD. These partners have the responsibility for controlling and monitoring invasive species within the county/reservation. MTE is responsible for the majority of surveying work because about 95% of the reservation is under sustained yield forest management. MTE field personnel are trained to be aware of the current and potential invasive species and to alert other partners when new infestations are located. In some instances, MTE works closely with state and federal agencies in coordinating prevention and mitigation activities (e.g. Emerald Ash Borer and Gypsy Moth). MTE personnel receive periodic training for the identification of all high-risk terrestrial species. On-going training should occur on an annual basis to ensure that staff is capable of identifying invasive species in the field.

Some state and federal partners that will help with the invasive prevention and control effort include the United States Forest Service, WI Department of Natural Resources, University of WI Extension and Natural Resources Conservation Service. Their efforts typically focus more on prevention and education, but there are funding sources listed in the next section by these agencies.

14.7 FUNDING SOURCES

All funding opportunities will be explored and applicable ones will be sought after for education, prevention, and controls.

CHAPTER 15 -FOREST ECONOMICS

15.0 INTRODUCTION

The Menominee hold the forest close and demand that the forest remains healthy and vital for the next generations. MTE takes this responsibility seriously and manages the forest to the best of their ability by carrying out the principles of sustained-yield management. In addition to the constitutional authority to "log, manage, and reforest, MTE can also "manufacture, market, sell and distribute timber, forest products, and related products."

Menominee Tribal Enterprises Forestry and Mill Operations continues to make direct economic benefits on the Menominee Reservation and throughout the region. MTE has a $96 million economic output benefit which has been represented in the Department of Urban and Regional Planning Extension Report.[9] MTE Forestry and Mill Operations are linked but the Sustained-Yield principles drives the mill operations. The Mill Operations and market prices do not dictate what is harvested from the forest. This is a key distinction between the Menominee Forest and Mill Operations and other similar industries.

15.1 INCOME

Sustained-Yield Costs

Unlike the typical forest management industries whereby maximizing financial gain is primary, Sustained-Yield Management will incur forestry costs 2-5 years prior to the actual timber harvest. This will include man-hour costs to study the CFI and determine the OPINV, walk over for archeological sites, marking, and all the other required activities. The major point is that actual costs are incurred yearly until the harvest is complete and the costs are not reflective in the annual statements until the harvest.

Deferred Revenue

All the prep work and planning of Sustained-Yield does not produce revenue in the years the work is conducted. MTE Forestry and Mill Operations will not record any financial gain or revenue for many years, but the expenses will be incurred. This is extremely different than other like enterprises.

Actual costs

The cost for manpower can not be standardized. The incurred rates of pay and benefits ten years ago are not considered at current value in any of the financial sheets. The costs for harvesting are never carried forward or re-evaluated at time of harvest. Financial statements reflect costs for the given period.

Annual Allowable Cut

In typical Forest management, the market price drives the harvest. In sustained-yield, the harvest is not dependent on market price. In sustained-yield, the forest is harvested according to the Forest Management Plan (FMP) not market conditions. The FMP contains long-term goals that will protect all the resources. The FMP calls for the harvesting in order to maintain the goals, and a species can be harvested which can result in a loss for MTE. The MTE Staff is mindful of the needs to assess their decisions based on timing, certain conditions on OPINV and balance the species determination with sustained-yield to achieve a healthy forest not a bottom line.

15.2 INDIAN BENEFITS

- Employment

[9] Department of Urban and Regional Planning Extension Report 08-2, August, 2008.

Unemployment for the Menominee Reservation has remained consistently high for years. MTE has provided a good paying wage throughout its history. The MTE workforce totals 161 and the Forest Contractors employ approximately 100. Gainful employment benefits not just the individual, but also the family and the community.

Median Income of Head of Household for the year 2000 was $28, 906. MTE's average annual wage per worker in 2008, was $30,039

- Health Benefits

Menominee ranks the lowest in the state of Wisconsin for health and risk factors. MTE provides a full health benefit and dental coverage with a small employee co-pay share that provides access to quality health care for themselves and their families both on and off the reservation.

- Skilled and Professional

There are many opportunities for young members to develop their skill in all areas. The employment opportunities can range from the manufacturing skill set or to higher educational professional.

- Training

MTE continues to provide specialized training for all aspect such as safety, invasive species, wildlife, soils, fire, harvesting, and machinery. This specialized training is readily marketable in the region.

- Local industry

MTE has always been recognized as one of the top employers in the public or private sector on the Reservation. MTE is in the heart of the reservation and transportation is not a factor for employment. In addition, an established early work schedules allows parents to meet family obligations.

- Supply products for members

MTE provides a variety of products for members. The products can range from firewood to sustained-yield practices that consider wildlife, aquatic life, berries, maple syrup, forest greens and other forms of gathering. Sustained-yield forestry does not impact the Menominee way of life.

- Opportunities for Entrepreneurs

MTE Forestry provides opportunities for Menominee members to start their own logging businesses. MTE allows Menominee preference on all contracts.

- Maintain culture

Since the Menominee have occupied this land for over 10,000 years, it permeates the Menominee. The Sustained-Yield Forest principles allows the Menominee to maximizes self-determination in choosing to manage the forest, thereby preserve it in a rather pristine state and allow the Menominee to continue their long standing traditions. These principles are inherent and are imbedded in the governing documents.

15.3 NON-INDIAN BENEFITS

- Employment

MTE provides a stable and fair wage as compared to surrounding communities. Employment opportunities are open with preference given to Menominee pursuant to Menominee Tribal Ordinance 82-10.

- Specialized training; chemical, invasive species

MTE provides contracted and skilled employees specialized training thereby allowing them to work in the Menominee Forest. This is marketable training that is applicable to regional industry.

- Access to and for forest management professionals

The Menominee forest prohibits access by non-tribal members. Working for and with MTE, people gain access to the most highly managed forest with Sustained-Yield principles. The Menominee forest appears pristine to the untrained eye but in fact has been logged over almost 3 time completely. Beside employment opportunities, educated professional want to study the Menominee Forest.

- Exposure to Cultural Values

Non-Indians have very little access to the Menominee Culture. By working side by side, outsiders can gain a perspective on the Menominee intrinsic value to the land and the Forest.

15.4 REGIONAL ECONOMIC IMPACTS

- Primary and Stable Economic Engine

MTE has formed a number of business relationships with variety of businesses and entities throughout the region for hundreds of years. MTE has provided raw materials such as logs, pulpwood and other forest products to surrounding mills. In addition, these mills convert the materials into other value-added products, thereby creating other opportunities. This activity will provide additional support to the regional base.
MTE creates high quality lumber products with a sustainability harvest certification. This certification for sustainable forestry practices allows MTE to fill a unique niche and helps to further maintain the forestry and mill operations

- Goods and Services from income

To operate an enterprise as large as MTE, a variety of goods and services must be purchased outside the reservation. Insurance, equipment, studies, legal, supplies and other administrative supplies are just a sample of what is purchased. Most importantly high-end equipment purchases helps sustain other business with the forest industry. The Extension Report[9] indicated a multiplier effect of approximately 1.13; for a total output of $108 million.

15.5 ECONOMIC TRENDS

For over 150 years, MTE has been a stable economic force on the Menominee Reservation, and the State of Wisconsin. Menominee Tribal Enterprises is a corporation that is impacted the same as other like industries. The economy, building construction, foreign trade and any of the other economic indicators affect how MTE plans to survive.

- Sales and the Economy

Menominee has been able to fulfill the principles of Sustained-Yield through ups and downs in the economy by staying focused on the long-term goals. MTE does not focus on profit but ultimately strives to balance the Sustained-Yield principles while sustaining the operations. Profit and bottom line is not the only critical factor taken into consideration.

- Building Construction

[9] Department of Urban and Regional Planning Extension Report 08-2, August 2008

Building Construction is a key indicator of what is taking place with the economy. MTE's products are not exempt from this indicator. This indicator impacts the market price.

- Foreign Trade

Foreign competition, which has allowed lower priced lumber and forest products into the market, impacts the market price. Since MTE's forestry practices are for long-term, the price is a factor at gaining revenue to sustain the operations but it is not the only determinate. MTE remains committed achieving a balance while maintaining both the forestry and mill operations. One of MTE's responses to this factor is to establish a niche within the growing "Green" movement or trend by incorporating Sustained-Yield Certified wood products.

15.6 SOCIAL ASSESSMENT

- Uniqueness of Menominee

The forest provided an opportunity for the Menominee to live independently by providing food, shelter, clothing and heating for their families. Menominee Tribal Enterprises is "respected as a leader in sustainable forestry and is distinct in its rich history and experience in forest management." MTE reflects the "Menominee philosophy of placing great value on forest health and ecosystem; a keystone of sustainable forest management" while providing an economic base to the members, local communities, region and State. In addition, the Menominee have a global recognition of sustained yield principles in practice. The "untrained" eye observes a pristine forest but in reality the forest has been managed almost three times totally.

CHAPTER 16 - NATURAL DISTURBANCE & EMERGENCY SUPPORT

16.0 INTRODUCTION

The Menominee forest has been affected by both human and natural landscape disturbances over thousands of years. While efforts are made to reduce the impact management decisions will have on the forest, there is no way to predict or control the impact of a natural disturbance event on the forest. However, one thing that is in our control is our preparation for responding to the short and long term effects of natural disturbance events.

This section provides general direction for use in responding to and managing for the impacts of natural disturbance events on the forest. To better organize efforts between all these entities, the Incident Command System (ICS) will serve as a resource guide to optimize organizational structure and efficiency. The ICS provides for a management/organizational structure on incidents that can evolve with complexity and establishes a consistent model for all responding entities. To effectively manage an incident, it is important to understand the roles and responsibilities of all organizations involved. This means the goals, objectives, and decisions made will strive to balance the Ecological, Social and Economic impacts of any response on the forest.

16.1 GOALS AND STRATEGIES

The goal is to create an integrated response to natural disturbance events that affect the forest resources.

The strategies that achieve this goal include:

- Identifying potential natural disturbance events that may impact the forest resources of the Reservation
- Identifying resources for response and assistance with response to natural disturbance events.
- Establishing a proposed framework on which the Incident Command System (ICS) can be applied

16.2 DISTURBANCES

The types of events that this response guide is aimed at are those that as stated before, primarily impact forest resources. These events are typically large-scale incidents that can increase in complexity involving more than just natural resources. Examples of these events are:

- Tornado/Wind Events
- Wildfire
- Snow Storms
- Ice Storms
- Extreme Cold
- Floods

16.3 RESPONDING RESOURCES

The integration effort is aimed at unifying the resources and capabilities of all emergency response entities working together to protect people, property and resources. Type of event will dictate which entity is the lead, however in all cases each entity should consider and be considered for support roles within the ICS framework. This includes the following agencies/ departments that currently work together on the Reservation.

- Menominee Tribal Enterprises (MTE)

    - Forest Management
    - Fire Management
    - Forest Development
    - Roads
- Menominee Indian Tribe of Wisconsin (MITW)
    - Historic Preservation
    - Environmental Services
    - Conservation/Fish &Wildlife
    - Trust Resources
    - Community Development
- Wisconsin Department of Natural Resources

The Bureau of Indian Affairs, as trustee for the Department of Interior, is also considered a part of the response to natural disturbance events that may impact forest.

Disturbances affecting more than just the forest will require the combined effort of agencies that typically operate outside of the forest. These organizations would include Police Departments, Emergency Medical Resources, and other specialized units. More complex incidents will incorporate the Tribal and County Emergency Operations Center (EOC). This type of response is beyond the scope of this forest management plan.

16.4 PREPAREDNESS AND READINESS

An essential part of this chapter is to maintain an understanding of the general protocols, objectives and goals developed here. In order to achieve this, the entities identified above should work together on training opportunities as often as funding and time allow. Specific opportunities include:

- Annually update training for both employed personnel and elected officials.
- The various entities will ensure that their personnel should be familiar with information provided through basic ICS training courses.
- Encourage participation in incidents where ICS is employed (Wildfire operations) for better understanding of the system for those personnel that are not commonly exposed to the use of ICS.

16.5 RESPONSE AND INCIDENT COMAND SYSTEM (ICS) APPLICATION

The potential for any of the above listed natural disasters exists to require large scale response involving multiple complexities on the landscape and in populated areas. The result would be the use of a larger organizational structure. On these larger incidents no single agency or response group can share the entire burden and responsibility. An interdepartmental/interagency response is prudent and necessary.

16.5.1 Incident Priorities

- Protect Life (Life Safety) Responder and public safety is the #1 priority, actions should never compromise this priority.
- Protect Property (Property Conservation)
- Protect Resources (Environmental Protection)

Protecting the forest and other natural resources including cultural sites is the priority for the Forest and Fire Management entities. Appropriate managers and personnel would take the lead role in dealing with this aspect of a response. As the incident becomes more complex and the primary priorities of life and property are involved, Forest and Fire Management units will assume a

secondary support role to the agencies and personnel that are more qualified and trained for this aspect. These entities include, Structural Fire Departments, Police Departments, Emergency Medical Services, Search and Rescue, etc.

16.5.2 Incident Objectives

Incident objectives are predetermined to give Incident Management Teams (IMTs, also referred to as Incident Response Teams) and initial responders' general direction and guidance.

- Provide for the safety of responders and the public while providing for property and environmental protection. Conduct operational risk assessment and ensure controls are in place to protect responders and the public.
- Establish appropriate IMT that can effectively meet the initial and long term challenges in resolving incidents with various levels of complexity.
- Identify and minimize adverse social, political, ecological and economic effects.
- Keep the public, stakeholders and decision-makers informed of the response activities' situation, actions and progress. Be active in the development of an appropriate media plan for carrying out this objective.
- Ensure appropriate financial accounting practices are established and adhered to.
- Restore and maintain critical infrastructure, such as roads, communications, etc.
- Evaluate the response and its decisions to determine ways to achieve levels of improvement.
- Ensure that decisions being carried out during the response follow abbreviated and expedited guidelines laid out under the National Environmental Policy Act (NEPA).

16.5.3 Initial Response

Initial Responder role (first on scene):

- Evaluation of the situation to determine the feasibility of a safe response, and actions needed, assuming safety of life as listed in priorities.
- Make needed notifications by use of the next section; "Contact and Response Protocol"
- As the situation is evaluated, indications of need for additional response resources across multiple agencies should be determined.
- Assign Incident Commander and utilize the ICS to begin coordinated response.

16.5.4 Contact and Response Protocol

- Menominee Forest Management will be notified about any event that potentially has impacted the forest resources and that may require a formal response. Notification will be made to the Keshena Dispatch center, Forest Manager (or acting delegate) and Fire Management Officer (or acting delegate). Request for Menominee Forestry personnel assistance for other Emergency Response will be made in the same manner.
- Initial responders will assess the situation and report this to Keshena Dispatch as soon as possible. (Situation Size-up should include: Name of the Incidents, identify Incident Commander, report nature, size, and extent of the situation, list resources on scene, and the need for additional resources.)
- If incident is beyond the initial responder capability or the event will extend beyond a few hours or multiple operational periods, an Incident Management Team (IMT) will be utilized to implement a more structured ICS.
- Gather Incident Response Team and develop Incident Action Plan, which identifies specific goals, objectives, and response strategy.
- Maintain open communication between decision-makers, responders, and the public. This will be accomplished through planning meetings, daily briefings, and timely press releases.

- IMT manages the incident until the situation is stabilized, response objectives have been met, or if a less formalized structure is deemed appropriate (return to management of a single/smaller organization).
- Review actions and improve future response actions.

16.5.5 General Command Structure

The general command structure will be used as a guide to develop an ICS structure specific to managing the initial and longer term response to various natural disturbance and emergency response events that involve damage to or are connected to the Tribe's natural resources. The most important concept to remember is to utilize a structure that is flexible and adaptable to changes in the incident. One person may function in multiple roles and/or some functions and roles may not be necessary depending on the complexity and the ability to effectively manage a situation. The following sections describe recommended roles and responsibilities. Actual events and availability would dictate specific command structures.

16.5.6 Roles and Responsibilities

16.5.6.1 Agency Representatives and the Executive Group

This group is the key decision maker that gives the Incident Management Team its specific direction for managing the response actions taken. The responsibility for authorizing/delegating authority to the Incident Commander is carried out by this group. The executive group is not part of field operations, but obtains information through designated contacts (most often IC or Liaisons). This group has the ultimate responsibility for developing further strategic goals and strategies for the IC to follow as the situation evolves. This group consists of Menominee Tribal Chairman, MTE Board Chairman, MTE Forest Manager and/or President, Menominee Emergency Management Director, WDNR representative (if necessary) and other key decision-makers depending on the nature of the incident.

16.5.6.2 Incident Commander

The IC is responsible for the overall management of the incident. On most incidents a single IC carries out the command activities and decision making. The IC is selected based on the individuals' qualifications and experience with the agency with primary jurisdiction over the type of incident. A unified command may be necessary in the event that multiple in the event that multiple jurisdictions exist or where the complexity exceeds the single IC's capability. The IC needs to be clearly identified and receive direction from the Agency Representatives in the Executive Group and be held accountable to follow the Objectives expressed in this chapter and specific objectives outlined in a Delegation of Authority and Incident Action Plan.

ICs may include: MTE Forester Manager, Fire Management Officer, WDNR Forester Ranger, Conservation Department Director, Sheriff's Department, Menominee Fire Commissioner or Fire Chiefs, or others as the situation warrants.

16.5.6.3 Command Staff

Command staff positions may be established to assign/delegate responsibility for activities that the IC cannot perform due to the complexity and size of the incident or other situational demands. The command staff reports directly to the Incident Commander and consists of the following roles:

- **Public Information Officer:** Information officers gather and communicate the activities, progress and statues of the incident to the public and other entities not directly involved with the incident. This person may utilize public meetings, news releases, or informational displays to communicate information about the incident in a timely manner. Possible candidates would be the Tribal Chairperson, MTE Chairman or as determined otherwise.

- **Safety Officer:** The Safety Officer is responsible for monitoring and assessing hazardous and unsafe situations and developing measures for assuring personnel safety. The Safety Officer has the authority to immediately stop or prevent unsafe acts when immediate action is required. Candidates could be the MTE Safety Coordinator or MTE Silvicultural Forester.
- **Resource Advisors:** Provides inputs related to environmentally and culturally sensitive concerns related to the management actions of the response. Tasks may include identification of culturally sensitive sites, endangered species or other environmentally sensitive issues, and should provide sound mitigation measures that should be followed. These individuals will be closely involved with the development of incident objectives and strategies to be outlined in the Incident Action Plan (IAP). Resource Advisors will help ensure that tribal, federal and state policies are addressed in the IAP. Resource Advisors should include the Tribe's Historic Preservation Officer (or delegate) and Environmental Services Department representative.
- **Liaison Officer:** The Liaison Officer is the point of contact for the Agency Representatives in the Executive Group and for other outside entities. The Liaison monitors incident operations to identify current or potential inter-organizational problems. Also, this individual responds to requests for information, resolves problems, participates in planning meetings and keeps the Executive Group informed of planning actions. Possible Liaison Officers may include Tribal Trust Compliance Officer, WDNR Liaison, or other qualified persons.

16.5.6.4 General Staff

The General Staff encompasses incident management personnel who represent the major functional elements of the ICS; generally identified as Section Chiefs. Command Staff and General Staff must continually interact and share vital information and estimates of current and future situations and develop recommended courses of action for consideration by the IC.

- **Operations:** The Operations Section is responsible for managing on-scene tactical operations directed towards meeting the incident objectives as established. Because of its functional unit management structure, the ICS is applicable across a spectrum of incidents and events differing in size, scope and complexity. Depending on the situation different functioning or geographic groups may be organized into Branches, Groups, and/or Divisions to better coordinate and organize actions. The Operations Section would typically consist of agencies that deal with fire, law enforcement, public works, public health, medical, EMS, timber harvesting, or roads crew, working together or separately depending on the situation. The Operations Section Chief should be proficient in ICS and could be the MTE Forest Manager, Assistant Forest Manager, MTE Fuels Specialist, and other specified personnel depending on the situation.
- **Planning:** Responsible for collecting, evaluating and disseminating incident situational information. This section maintains information and intelligence on the current and forecasted situation, as well as the status of the resources assigned to the incident. The Planning Section is responsible for developing the Incident Action Plans (IAPs) and incidents maps and disseminates information and intelligence critical to the incident. Possible candidates are the MITW Community Development GIS Staff, MTE Inventory Forester, GIS (Geographical Information Systems) Technician or other qualified personnel.
- **Logistics:** The Logistics Section meets all support needs for incident, including ordering resources and procurement of supplies from off-incident locations. It provides facilities, transportation, supplies, equipment maintenance and fueling, food services, communications, and medical services for incident personnel. The person or persons occupying this position needs to have appropriate purchasing authorization or must coordinate with the Finance Section for procurement needs. Possible Logistics personnel could be the MTE or Menominee Purchasing Department Managers or delegates.

- **Finance/Administration:** When there is a need for financial reimbursement (individual, agency or department), and/or administrative services to support incident management activities, this Section is established. The Finance/Administration Section is responsible for tracking and reporting incident costs to the Incident Commander and also ensuring that cost expenditures meet statutory rules. Candidates could include MTE/MITW Accounting Manager or delegates, Administrative Assistance with understanding of the ICS and purchasing authorization.

16.6 Incident Facilities

Incident Command Post (ICP) will be located at the Menominee Forestry Center or at other pre-identified location and will be the main location that all facets of the ICS structure will operate. The ICP must have the capability to support all the Command and General Staff functions.

Staging Areas/Drop Points are locations where resources or supplies can be gathered or staged for use on the incident.

Helicopter Spots will be identified when necessary that should be approved by helicopter crews for use in the event of a medical emergency, or for another necessary function.

CHAPTER 17 – NATIONAL ENVIRONMENAL POLICY ACT

17.0 INTRODUCTION

MTE proposes within this revised Forest Management Plan, to incorporate sustained-yield techniques across a wide range of different forest cover types, habitat niches, and age classes. As indicated throughout this plan, the objectives of management include both timber- and non-timber resources. The variety of forest communities, species, and habitats on the forest directly impact the types of treatments and activities that are performed to improve, maintain, and in some cases, change the structure and composition of the forest. MTE utilizes different management techniques in the pursuit of these goals and strategies.

17.1 GOALS AND STRATEGIES

The goal of forest management is to provide for maximum diversity in the forest (species composition, age class distribution, structural diversity both within and between stands), habitat diversity, and to optimize growth and sawlog quality of the forest timber resource.

The strategies that achieve these goals include:

- Developing and refining sustained-yield silvicultural prescriptions that achieve the stand objectives that meet these goals
- Following the guidelines established by the Kotar Habitat Typing system to match tree species to the site-specific plant association habitat types
- Managing the forest to achieve the long-term forest cover type targets (see Chapter 5, Table 5.3)
- Managing the forest to accomplish landscape-scale objectives that maximize diversity across larger scales
- Managing the forest within the constraints of the Annual Allowable Cut (AAC)
- Establishment and maintenance short- and long-term inventory systems to ensure that forest growth, yield, and coverage reflect the intended results of sustained-yield forestry
- Continue working with the researchers and other agencies to continue developing and refining prescriptions to achieve management goals

17.2 ENVIRONMENTAL ASSESSMENT (EA)

MTE requests technical assistance in connection with the preparation of any environmental assessment required under N.E.P.A. should the Department of Interior determine that the 1996, Findings of No Significant Impact need to be addressed. If action is required, MTE will continue to operate under the July 22, 1996 Environmental Assessment Decision.

MTE's submittal of this revised Forest Management Plan 2010, proposes forest management activities to effect sustained yield management on the Menominee Reservation. MTE remains cognizant of NEPA and the unknown stance or decision by DOI if an Environmental Assessment or full-blown Environmental Impact Statement may be necessary with this revised FMP. However, based on previous Environmental Assessment actions (EA, July 22, 1996) taken by the U.S. Department Of Interior and the Bureau of Indian Affairs, on Revised Forest Management Plans, MTE recognizes the compliance with NEPA. The subsequent DOI-BIA decision on the level of environmental assessment to be completed with this revised FMP shall be funded by the Department of Interior-Bureau of Indian Affairs.

APPENDIX A - GLOSSARY OF TERMS

ANNUAL ALLOWABLE CUT: The calculated amount of volume that can be harvested in a single year. Menominee annual allowable cut (AAC) is calculated based on amount of volume that can be removed by silvicultural prescriptions, plus one-half of the projected growth on the removal volume.

BARRENS: Areas where pine and stunted oaks grow. Found in prairie-like areas with sandy infertile soils.

BIA: Bureau of Indian Affairs, Department of Interior.

CANOPY GAP: An opening made in the overstory during single-tree selection where all trees within the opening are removed. This is usually done in conjunction with the removal of a large sawtimber tree. This is done to promote the vigorous growth and good form of regeneration.

CFI: Continuous Forest Inventory. Permanent plot inventory system that is re-measured on a periodic basis. Designed to monitor the forest and calculate the allowable cut.

CLEARCUT: Regeneration method where all mature trees are cut at once. Can be used to regenerate species which sprout from their stumps or to convert the site to other species.

COMPETITION: All plants compete for limited amounts of light, nutrients, and water. Under management, undesirable trees competing with desirable trees are controlled to promote the growth of favored trees.

CROP TREE: A vigorous, well-formed tree which will be managed through to maturity. Other trees will be treated to favor the crop tree.

DESIRABLE: A seedling, sapling, or tree that is capable of growing well on the given habitat type. It should be a well-formed, vigorous tree.

WDNR: Wisconsin Department of Natural Resources.

ESTABLISHMENT: The stage at which a seedling is safe from normal adverse influences and no longer in need of special protection. The seedling is capable of surviving short periods of drought, frost, etc.

FOREST COVER TYPE: An assemblage of trees categorized by its species composition (e.g., northern hardwoods, swamp conifers, etc.).

GROUP SELECTION: Regeneration method where well-distributed, small groups of trees are removed to create areas of young, vigorous regeneration from the seed of the surrounding trees.

MEI: Menominee Enterprises, Inc. Predecessor company to Menominee Tribal Enterprises. This company was the holder of all forest lands during the termination period and transferred the land to Menominee Tribal Enterprises upon restoration.

MESIC HARDWOODS: Hardwoods growing on sites that are not overly wet or dry (e.g., sugar maple).

MITW: Menominee Indian Tribe of Wisconsin.

MTE: Menominee Tribal Enterprises. MTE is the business arm of the Tribe. MTE is responsible for the management of the forest acres.

MTL: Menominee Tribal Legislature. The tribal officials elected, pursuant to the Constitution and Bylaws of MITW, to represent the Tribe in a governmental capacity.

OPERATIONS INVENTORY (OPINV): Forest inventory system designed to map and classify all acres on the reservation. Provides information on where the resources are, where the CFI provides how much can be cut.

OVERSTORY: The highest layer of tree crowns.

PERMANENT NON PRODUCTIVE: Land that will never be capable of producing timber. Examples are lakes, rivers, and towns.

PULPWOOD (CORDWOOD): Wood produced that does not meet sawlog size of 10" diameter outside bark for hardwood or 9" diameter outside bark for softwood at the large end. Minimum diameter is 4" outside bark.

ROADS and SKID TRAILS: permanently build road systems designed to allow truck entry to timber sales. Skid trails are designed for movement of logs from severed tree to landings on the roads.

RELEASE: Freeing a desirable seedling, sapling, or tree from other trees that are overtopping or closely surrounding it. This can be done either mechanically or chemically depending on conditions.

SAWLOG: Merchantable timber that meets minimum specifications. On Menominee, the minimum diameter inside the bark is 9 inches for softwoods and 10 inches for hardwoods.

SEEDTREE: Regeneration method whereby a small number of seed-producing trees are left singly or in small groups to provide seed for the future stand. This method varies from shelterwood in that seed trees are fewer and more widely spaced.

SHADE TOLERANCE: The ability of a tree species to grow satisfactorily in the shade of other trees. Shade-tolerant species can survive under lower light levels than shade-intolerant species.

SHELTERWOOD: Regeneration method that establishes regeneration by seed from the mature trees. From one half to three-quarters of the ground is shaded by the tree crowns. The understory regeneration, once established, is released in one or more cuts of the mature trees.

SILVICULTURE: The science and art of growing and managing trees.

SILVICULTURAL SYSTEM: A process, following accepted silvicultural principles, whereby trees are released, thinned, harvested, or regenerated.

SINGLE-TREE SELECTION: A silvicultural system where trees are removed individually based on risk of loss or vigor. All ages of trees are found throughout the stand.

SUPPRESSION: The process whereby a tree becomes weakened through competition from other trees. Suppressed trees have their crowns below the crowns of other trees and usually exhibit poor growth rates and quality.

TEMPORARILY NON-PRODUCTIVE: Land that is capable of producing timber, but is temporarily non-stocked.

UNDERSTORY: Seedlings, saplings, and trees found below the overstory.

XERIC HARDWOODS: Hardwoods growing on dry sites (e.g., pin oak).

APPENDIX B - APPLICABLE FEDERAL AND TRIBAL LAWS AND POLICIES

The following federal and tribal laws and policies were used to guide the development of this management plan. Adherence to these documents is legislative mandates that pertain to all areas of forest management activities on the Menominee forest.

1. Menominee Restoration Act
2. Menominee Restoration Plan
3. Menominee Constitution and Bylaws of the Menominee Indian Tribe of Wisconsin
4. Menominee Tribal Enterprises Management Plan
5. Trust and Management Agreement Between the Menominee Indian Tribe of Wisconsin and Secretary of Interior of the United States
6. Tribal Ordinance 05-22 Tribal Logging Practices Limitations
7. Tribal Ordinance 04-22 Tribal Surface Water Regulations
8. Tribal Ordinance 81-9 Menominee Forest Fire Prevention Ordinance
9. Tribal Ordinance 81-08 Firewood
10. Tribal Ordinance 99-12 Cultural Resource Management Plan

APPENDIX C – FREQUENTLY ASKED QUESTIONS (FAQ)

Obtaining community input was a high priority in the development of this forest management plan. The effort first started with the Menominee Tribal Legislature convening a Forest Management Plan Ad Hoc committee in 2005. Several community meetings were held to hear community member's issues, concerns and ideas on the development of revisions. In turn, the FMP workgroup made up of MTE Forestry, MITW Natural Resources staff and their partners used the comments to guide them during development of revisions. A second effort to obtain community input was completed in the fall of 2010 during a public comment period, with a draft of the FMP being provided to all interested tribal members.

These comments were used by the FMP workgroup to guide revisions prior to the final document being submitted for acceptance by the MTE Board and MTL.

In addition, the following is a summary of some of the most frequently asked questions during the 2005 FMP Ad Hoc Committee meetings , the2010 FMP Public Comment Period. The purpose is to provide a representation of the questions and show how the FMP workgroup addressed the questions and integrated their comments into the revision process.

Why do we have clear-cuts? The use of clear-cutting as a treatment in the Menominee forest is often contentious and misunderstood because of the immediate and visual impact that results from clear-cutting. Furthermore, there is a misconception that clear-cutting is done purely for economic gain. The reason MTE clear-cuts a small amount of forest stands (a few hundred acres per year out of an annual harvest of approximately 9,000 acres) is for ecological and silvicultural reasons. Aspen, pine (especially red and jack pine), black cherry, white birch, and scrub oak will not successfully germinate and thrive in full or partial shade. Clear-cutting is a necessary tool for regenerating certain species of trees that require a major disturbance to set back competition from more shade tolerant species. Historically, fire and other disturbances played a much larger role in directing forest succession. During the past 70 years, however, fire suppression and a much smaller land base (lower probability of wind disturbances occurring on Tribal lands) has resulted in less forest disturbance on the Menominee Reservation. Various even-age management techniques, such as clearcutting, are required to mimic conditions that were more widespread in earlier times. In the absence of clearcutting, forest in terms of species composition, age class distribution, and landscape structure diversity will decrease substantially over time. *See Chapter 5 (Silviculture and Forest Management Goals) for more details.*

Can anything be done to make clear-cuts less ugly? Starting in 2005, MTE began instituting the use of aesthetic buffer strips in clear-cuts along paved roads. The area within 150-feet of the road may be selectively thinned, but not clear-cut. Furthermore, additional buffers are often placed around cuts along heavily trafficked unpaved roads and near homes. Other strategies, such as limiting the size, fluting (narrow openings near the road, widening further away from the road) and the inclusion of islands of timber inside clearcuts can be included to break up the line of sight through clearcuts. Several clearcuts were created without these buffers prior to 2005, but over time, the visual impact of these stands will decrease as the regenerated stands become established. *See Chapter 12 (Visual Quality) for details.*

Are spiritual aspects considered in forest management? The spiritual aspects of the forest are taken into account through the comprehensive planning process. First, the Tribal Historic Preservation Officer has input into every management activity with respect to its impact on areas

of cultural significance. Certain areas are completely off limits to active management to avoid any impact (e.g. the Wolf River Corridor and all positively-identified historic or cultural sites). Also, forest management has diversity of species and structure as one of its core objectives. The Menominee people have lived in the forest and left their mark there for millennia, and the perpetuation of the diversity of the forest is one way in which forest management actively preserves that heritage. *See Chapter 8 (Cultural Resources) for details.*

What is the difference between a sawlog and cordwood? A sawlog is a segment cut from a larger tree that will yield quality boards when it is taken to a sawmill. The volume of wood in a sawlog is measured in board feet; a board feet measures 12-inches square by 1-inch thick. Sawlogs are manufactured into boards in a sawmill for use in a variety of wood products, and are sold as green (i.e. not kiln-dried) lumber, or further processed by kiln-drying, dimensioning, milling, etc. and sold as higher-value products. Cordwood, also called pulpwood, comes from smaller trees or limbs from larger trees or from very low quality sawlog-size wood. A cord of wood is a pile measuring 4-feet by 4-feet by 8-feet with air space between the pieces, typically the equivalent of approximately 79 cubic feet of solid wood. Cordwood is usually sold to one of several pulp mills in the area, and is manufactured into various paper products. Certain species have limited markets available for sawlogs (e.g. hemlock or quaking aspen), and larger trees of those species are also often sold as pulpwood.

What pesticides are used on the forest? Pesticides for use against animal or insect pests are not used in Menominee forest management. However, there is a limited amount of herbicide use under certain, tightly controlled, circumstances. Glyphosate, available to general consumers in products such as *Roundup*, is used by Forest Development to control competing vegetation when regenerating white pine and oak. Glyphosate is also used to control garlic mustard, an invasive plant, along roadsides. Other products in use include Sprorax (nearly identical in chemical composition to Borax laundry soap) for use in stump application for the prevention of *Annosum* root rot. In all cases, MITW Environmental Services approves the application protocols of chemicals for forestry use. *See Chapter 6 (Forest Development) for details*

What effect do herbicides used in forest management have on plants, animals, and the environment? Glyphosate, the most commonly used herbicide in forest management, is a broad-spectrum, non-selective herbicide that works on most species of green plants. It is absorbed through the leaves and kills plants by disrupting a plant enzyme essential to plant growth, resulting in death of the plant within a matter of days. Glyphosate binds to most soil particles, preventing it from spreading to other areas. It has low toxicity to animals or humans when used according to label directions, and regulatory agencies throughout the country and around the world have determined that it presents no unreasonable risk to health or the environment if used properly. It has a half-life of 32-days, which means that after a few months, very little herbicide is present in the environment. *See Chapter 6 (Forest Development) for details*.

What effect does herbicide use have on berry gathering? Although glyphosate is a short-lived herbicide with minimal risk to people, areas that have been recently treated with herbicide should be avoided if gathering berries. Each summer, Forest Development publishes a map of the treated areas and alternative gathering areas in the Menominee Nation News prior to spraying. In addition, treated sites are marked with signs to alert the public as a precautionary measure.

What impact does timber harvesting have on the animals and their habitat? Many aspects of the harvest prescription are related to non-timber resources, including wildlife habitat and water quality. Forest species composition, structural diversity, and diversity of habitats is a primary goal of forest management. The different types of forest management pursued on Menominee ensure that the Menominee forest will remain one of the most diverse forests in the country. The Tribal wildlife biologist is actively involved in the forest management decisions. Many management decisions are made that actually improve wildlife habitat, including coarse woody debris and snag retention. *See Chapter 9 (Wildlife Habitat) for details.*

What avenues are there for public input to management? The Menominee people can interact with MTE in various ways to have their voice heard, to ask questions of the resource management professionals, and to understand the motivation and reasoning behind different management decisions. The most comprehensive source is this Management Plan. It contains a wealth of information, developed over many years of work, by the people responsible for managing the forest. The various Committees of the MTE Board of Directors welcome public participation at their monthly meetings (see the MTE Website for scheduling details). The elected officials are responsible for ensuring that the wills of the Tribal members' goals are being met. MTE also works with the College of Menominee Nation and other institutions to assist with public education and interaction, including the promotion of tours to the Tribal public. Finally, the Forestry staff will be happy to answer any questions or address concerns to members of the public.

Does MTE listen to the concerns of the Tribal public with regard to forest management? MTE certainly attempts to balance the wishes of the public with the sustainable management goals of the Management Plan. In most cases, it is possible to find agreement on issues, but some proposals are incompatible. In cases where proposals by the public conflict with management goals, it is MTE's responsibility to ensure that the advocates of these proposals understand the results that will occur if they are enacted. For example, a complete ban on aspen clearcuts would eventually result in very little aspen on the forest because aspen will not regenerate in large quantities without the disturbance of a clearcut or blowdown. The same would apply to white pine shelterwoods. If a full ban on clearcuts or shelterwoods were implemented, it would be necessary to change the target acreage in the Plan for those cover types, as it would be impossible to maintain a large acreage of those species in the absence of even-age management. Ultimately, it is up to the elected officials to authorize significant changes to management policy, especially when those changes impact the goals set forth in this Plan.

Is forest management sustainable? The Menominee Forest is a world-recognized leader in sustainable forest management. It is certified by the Forest Stewardship Council (FSC) as meeting their high standards of excellence in meeting the three measures of sustainability: ecological, economic, and social. In terms of forest volume, there is currently more volume on the forest than at any time during the previous 100 years, which means the forest is growing more than MTE is harvesting. Through the preservation of as many diverse habitats, adherence to water quality standards, and steps taken to preserve cultural resources, MTE strives to manage the forest in a sustainable manner. It is a common misconception that the limited number of clear cuts on Menominee are unsustainable. This is a false assumption, because in every case, there are considerations in place to ensure that the stand is replaced with sufficient regeneration (seedlings, whether planted or naturally introduced) to stock the replacement stand. Clearcuts are an essential tool for regenerating certain tree species on the forest. *See Chapter 2 (Forest*

Wide Goals) for details on sustainability and Chapter 5 for details on Even-age management, Annual Allowable Cut, and Operational Harvest Schedules.

How does MTE determine where to cut? MTE continuously collects a lot of information on the status of the forest. This information, called the Forest Inventory, is used to determine the Annual Allowable Cut (AAC) and develop an Operational Harvest Schedule. Forest stands are scheduled for treatment to ensure optimal growth at an interval that captures as much mortality (naturally-dying trees) as is reasonably possible. Most hardwood stands are treated on a 15-year reentry cycle. Intermediate thinning is performed at 10-15 year intervals in pine and oak. The timing of clearcuts and shelterwood regeneration cuts, meant to reestablish shade intolerant species (e.g. aspen and pine) on those sites, is dependent on the average lifespan of those species. Aspen is regenerated every 50-80 years, while white pine and red oak are regenerated when the stand has reached 130-150 years of age. Some areas, such as culturally sensitive areas or wetlands, receive little-to-no active management. As of 2010, MTE is operating under an approved harvest schedule with no backlog. *See Chapter 4 (Forest Management Operations) and See Chapter 5 (Silviculture and Forest Management Goals) for more details*.

How does MTE determine which trees to cut? A document called a Harvest Prescription is developed by the MTE Silviculturist, in consultation with other forestry staff and resource professionals from relevant Tribal agencies (e.g. Environmental Services and Historic Preservation). The prescription describes the current stand condition and the desired condition of the stand after harvesting. Once the prescription has been reviewed and approved, the stand is marked in such a way as to meet the objectives of the harvest prescription. Harvest Prep and the Marking Crew mark individual trees, or lay out clearcut boundaries, in accordance with the prescription. In single-tree selection harvests, for example, the high-risk and low quality trees are marked first; marked trees can be mature sawlogs or younger suppressed pulpwood sized trees. The purpose is to reduce the number of trees growing on a site to create optimum growing conditions for quality trees. *See Chapter 5 (Silviculture and Forest Management Goals) for more details*

Have the prescriptions changed over the last 100 years? As the scientific community discovers new ideas – or in many cases, rediscovers indigenous knowledge - MTE incorporates those advances into the prescription process. For example, it has been demonstrated since the 1970's that single-tree selection in white pine stands will rarely result in the establishment of white pine seedlings. Shelterwood harvesting techniques arose as a result of an improved understanding of white pine regeneration. As part of the evolution of white pine regeneration, MTE is investigating the use of fire as a tool in site preparation. Other areas under investigation include guidelines for the control of invasive species and forest diseases. MTE works closely with state and federal agencies to ensure that state-of-the-art techniques are incorporated into forest management.

How long does it take to prepare prescriptions? It takes a minimum of 2 years to complete the entire process from initial scheduling, to writing and approving a prescription, to unit preparation (marking and boundary identification) to contract award. Maps are initially given to Historic Preservation 2 years prior to harvest in order to give them adequate time to walk through the stands to be harvested and to identify any areas of cultural significance. This also provides adequate time for Forestry staff and other resource professionals (e.g. wildlife biologist and Environmental Services) to develop a proper, comprehensive prescription with an eye towards both timber and non-timber resources. See Chapter 4 (Forest Management Operations) for more details.

When is MTE going to replant the area flattened by the 2007 tornado? Based on the high quality of the soils in that part of the forest, the objective for most of the area affected by the 2007 tornado is to reestablish hardwoods in those stands. A natural seed source is already present in and around the tornado strip, so there will likely be little need to hand-plant trees to replace those toppled by the tornado. Fifty permanently located monitoring plots were established in the blowdown in July 2009, and results indicate that the stands there are regenerating through a combination of new seedlings and stump sprouts. In 2010, additional regeneration surveys (several hundred plots) were conducted in the tornado area, and indicate that seedlings at a density of several hundred to over 2,000 trees per acre are present in most parts of the blowdown. In addition to the natural hardwood regeneration already occurring, the Forest Development program is investigating the possibility of establishing smaller areas of pine and oak within the blow down strip. Previous large-scale blow downs took place in the 1800s (established the pine between Camp 1 and Highway 47), 1905 (around Zoar), 1984 (South Branch), and 1997 (western half of the reservation), and in each case, the forest has naturally recovered with minimal need for planting trees.

There are places that have been cut (or burned) where there aren't any trees growing. What is going on in these areas? The answer to this question is really site specific. In general, however, areas that have been recently harvested with a clearcut or shelterwood treatment are usually in the process of being regenerated. In the case of a clearcut conversion to pine, it takes a year or two to prepare and plant the site. Even then, it can take a few years before the pine seedlings are large enough to be seen from a road. If it is a shelterwood cut, the stand is harvested to remove most of the overstory and any competing understory; then MTE waits, often up to 3 years, for a good cone or acorn crop to naturally regenerate the stand to pine or oak. Usually, when someone sees a stand where 'nothing is going on', it is a recent conversion harvest or shelterwood harvest awaiting regeneration. The MTE Forestry staff can easily answer questions about specific areas as detailed records are maintained on each stand.

If the area has been burned, it is possible that one objective of the fire is to reduce or eliminate competition from trees and woody plants in favor of open savannah-like conditions. Most of the reservation east of the Wolf River was historically open grasslands with scattered pine and oak, called pine barrens. Barrens were maintained through the regular use of fire by the Menominee people. With the introduction of fire suppression and elimination of fire as a dominant tool on the landscape, the barrens naturally returned to a forested condition. One goal of forest management is to restore a relatively small percentage of the reservation to pine barrens in an effort to include this important ecological niche into the diverse collection of habitats present on the reservation. It should be emphasized that MTE never clearcuts a stand and walks away; there is always a planned future objective for any given stand. *See Chapter 5 (Silviculture and Forest Management Goals) and Chapter 7 (Fire Management) for details.*

How much ash (or maple, hemlock, pine, etc) is there on the forest? Detailed statistics on the composition of the forest, including maps, are available in the second half of *Chapter 5 (Silviculture and Forest Management Goals).*

In the management targets, why are swamp conifers (or other cover types) listed bunched together instead of as individual species? Most tree species grow in association with other species. By managing as a cover type, as opposed to as individual species, we can apply the best management tools that benefit all species that make up the targeted cover type. *See Chapter 5 (Silviculture and Forest Management Goals) for more details*

What is the specific relationship between MTE, MTL, and the BIA? The details of this relationship are described in *Chapter 1 (Understanding the Menominee FMP).*

Under what authority does MTE manage the forest and sell products from the mill? Under the Tribal Restoration Act, the Tribe guaranteed that the forest would continue to operate on a sustained-yield basis, by incorporating the sustained-yield provision of the Trust and Management Agreement into Article XII of the Constitution. Menominee Tribal Enterprises has been charged with the responsibility of managing the forest, which is held in trust by the Secretary of the Interior for the benefit of the Menominee people. The Menominee Indian Tribe of Wisconsin has been charged with all proper sovereign and governmental functions over the tribal forest. The Secretary of the Interior and the Menominee Tribe have a legal responsibility to manage the forest under sustained-yield principles. Any departure from this agreement requires the approval of the Tribe and the Secretary. See *Chapter 1 (Understanding the Menominee FMP)* for details.

What does it mean when rare species are found on Menominee land?
It means the tribe has land that is quite different than most properties in the state. Native species that have been eliminated elsewhere still find a home on reservation land. This has some legal obligations, but it may also yield some benefits.

What is the difference between endangered and threatened species?
Endangered means the species is in danger of becoming extinct. Threatened means the species is less vulnerable, but a chance exists that they will soon be endangered.

What if the species are plants?
The plants that are found on the reservation must be protected. What becomes of them is the decision of the tribe and resource managers. Of course, the MTE wants to encourage and help the tribe protect and manage these valuable plants.

What if a rare species is discovered on the reservation?
Laws determine what anyone can do with these species. For example, it is illegal to shoot a timber wolf in Wisconsin, although it is not illegal to shoot a white-tailed deer in season. Laws also protect nesting birds or turtles from being disturbed during the nesting season. For example, it is illegal to disturb an active Bald Eagle nest. Sometimes habitats are protected. A good example are State Natural Areas which protect large pieces of rare habitats such as beach dunes, sedge meadows, or old growth forest. These rare habitats often host a number of rare plants and animals. Within the Menominee Reservation we protect habitat for Karner Blue Butterfly, a federally threatened and endangered specie.

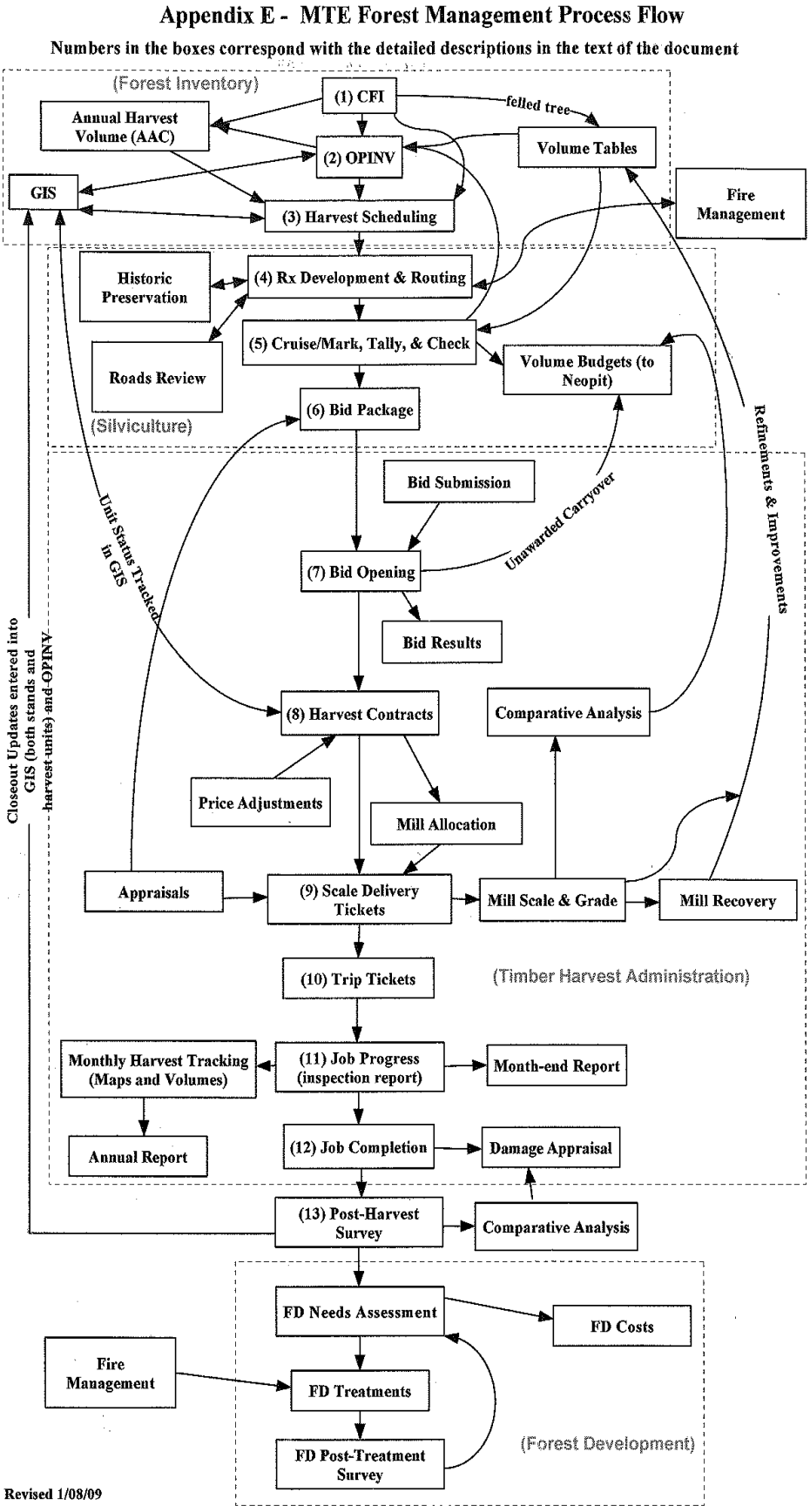
If an endangered species is found, who will get this information?
The information is shared with the land and resource managers, of course. Otherwise, it is confidential. It is not dispensed to the public, and is exempt from the open records law.

How does the Tribe benefit from the knowledge that an ETS species occurs within the reservation?
You learn from the resource managers what makes the lands here special. You will get help with managing the natural resources on your land. Several departments are in place that can provide information and technical assistance for management. Knowledge of the occurrence of rare plants and animals is increasing every year. The best information on occurrences of rare species is the Endangered Resources Program's Natural Heritage Inventory. Information on tribal land is

relatively good, however, tribal land is protected and information and access can only occur with permission of the MITW.

APPENDIX D - LIST OF PHOTOS, MAPS AND TABLES

APPENDIX E – Forest Management Process Flow, Detailed Version



ENVIRONMENTAL ASSESSMENT (EA)

FOR THE

MENOMINEE FOREST MANAGEMENT PLAN

MENOMINEE INDIAN TRIBE OF WISCONSIN

JULY, 1996

USDI, BUREAU OF INDIAN AFFAIRS

NOTICE OF AVAILABILITY

AGENCY: Bureau of Indian Affairs, Minneapolis Area Office

ACTION: Notice

SUMMARY: This notice advises the public that an Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) have been prepared for the sustained yield forest management practices contained in the Menominee Forest Management Plan submitted to the Secretary of the Interior for approval by Menominee Tribal Enterprises. These forestry practices will be reviewed and approved by the Bureau of Indian Affairs prior to implementation on the Menominee forest. This EA and FONSI are available for public review.

FOR FURTHER INFORMATION CONTACT:

David Congos
Bureau of Indian Affairs
Menominee Forestry Center
P.O. Box 670
Keshena, Wi. 54135
(715) 799-3896

SUPPLEMENTAL INFORMATION:

This EA and FONSI were prepared to meet the requirements of the National Environmental Policy Act. The purpose of the proposed action is to protect the sustained yield capacity of the Menominee forest.

The EA process indicates that the proposed action will not significantly affect the quality of the human environment. This determination was based on the following factors: The project would not result in any significant impacts to water or land resources, to any properties listed on or eligible for inclusion on the National Register of Historic Places, to any threatened or endangered species, or to any resource, and will benefit the forest resources of the Menominee Tribe by ensuring the application of sustained yield forestry principles by Menominee Tribal Enterprises during their forest management operations.

Date July 22, 1996

Area Director
Minneapolis Area Office

Decision Notice
and
Finding of No Significant Impact
for the
Menominee Forest Management Plan

The Menominee Forest Management Plan, submitted to the Secretary of the Interior for approval by Menominee Tribal Enterprises, proposes certain forest management treatments to effect sustained yield management on the Reservation. The attached Environmental Assessment (EA) documents the analysis of the environmental impacts which may result from the implementation of the Menominee Forest Management Plan.

Two alternatives were considered: Alternative 1 was the "no action" scenario and Alternative 2 was the proposed actions submitted by Menominee Tribal Enterprises. After careful review, it is my decision to adopt Alternative 2 (the proposed actions) developed by the MTE Forest Manager and his staff.

Based upon the analysis within the Environmental Assessment, I have determined that this action would not significantly affect the quality of the human environment on the Menominee Reservation. Therefore, in accordance with National Environmental Policy Act of 1969, an environmental impact statement will not be required.

This determination is supported by the following findings:

1. Tribal and Agency involvement was conducted and environmental issues related to the proposed Plan were identified. Mitigation measures were developed within the chosen alternative in response to environmental concerns and issues.

2. The proposed action does not jeopardize important or sensitive resources on the Reservation, including vegetation, soils, wildlife, water quality and cultural resources nor does it negatively impact the community economy.

3. No impacts to public health or safety were identified.

4. There are no irreversible resource commitments or irretrievable loss of forest resources from the proposed action.

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U.S. Department of the Interior

July 22 1996
Date

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CHAPTER 1: PURPOSE AND NEED FOR ACTION

PROPOSED ACTION

Menominee Tribal Enterprises (MTE) proposes, within it's amended Forest Management Plan, to incorporate ecosystem based forestry principles with traditional Tribal sustained yield management practices. Using the Wisconsin Forest Habitat Type Classification System, MTE has identified eleven (11) habitat types on the Menominee Reservation to quantify relative forest site capability and improve forest cover type productivity. MTE has identified those forest cover types, and associated tree species, which they believe are most competitive on each forest site and have the best potential for producing high quality sawtimber under long rotational periods (120+ years). These long lived forest cover types best suited to a particular habitat type is called the featured forest cover type. The forest habitat type and the featured forest cover type will together determine the long term management objective for each stand on the forest and the appropriate silvicultural prescription needed to achieve that objective.

MTE also believes that if they manage for those tree species which are best suited to each habitat type, total species diversity (plants and animals) on the forest will increase through two distinct mechanisms. First, short lived tree species will be replaced by long lived forest cover types which typically contain well developed, complex stand structure (herbaceous, shrub and tree canopy layers). Second, timber harvesting, based upon MTE's silvicultural prescriptions which generate the annual allowable cut calculation, will create a mosaic of forest stands varying in tree size, density, and composition across the Reservation. This approach will maximize vegetational diversity and, therefore, promote the greatest ecological (floral and faunal) diversity consistent with commodity production. This represents MTE's ecosystem management approach on the Reservation.

The proposed action is to:

A. Install the Forest Habitat Type Classification System as the primary decision making tool at all levels of planning on the forest. Habitat type will be the key forest management criteria for forest inventory functions (allowable cut and future forest volume, structure and cover type acreage predictions), stand level silvicultural prescriptions, forest development prescriptions and fire management planning.

B. Harvest the calculated annual allowable cut of 27.6 MMBF of sawtimber and 97.3 thousand cords of pulpwood. Cutting systems will include single tree selection (all-aged management), shelterwood, seed tree and clearcutting (even-aged management). Additionally, salvage harvesting will be

applied in areas of mortality containing operable timber volumes or high quality/value species.

C. Begin restoring approximately 47,427 acres of forest land from its current cover type to a more productive or valuable cover type. This decision will be based upon the habitat type on which the stand is growing and the featured forest cover type most suitable for that particular habitat type. The restoration process will normally include mechanical, chemical or prescribed burn treatment to prepare the site for artificial regeneration of the objective species.

D. Perform non-commercial cultural treatments necessary to improve the quality, species composition or productivity within featured forest cover types. Treatments include pruning, crop tree release, overstory release and thinnings by mechanical, chemical or prescribed fire means.

NEED FOR THE PROPOSAL

The proposed action described above would implement those forestry practices necessary to meet the sustained yield mandate contained in the Menominee Trust and Management Agreement. This proposal will keep the current forest condition intact and begin moving the forest structure toward the desired future condition. Both results ensure the Secretary of the Interior meets the federal trust protection responsibility promised in the Menominee Restoration Act and achieves the stated Tribal objective of producing the maximum quality and quantity of sawtimber while maintaining species diversity.

The future forest condition described in the Forest Management Plan includes maintenance of the all-aged hardwood component currently found and managed on the most productive habitat types on the forest. This is almost exclusively the northern hardwood cover type comprised primarily of sugar maple. It also provides for regenerating those stands which are not naturally replacing themselves through periodic entries. This includes cover types such as white pine, hemlock, yellow birch, red oak and other mixed hardwoods found on habitat types midway between the richest and poorest in site productivity. Additionally, the proposal will restore stands, through special regeneration efforts, to a higher level of productivity and value on sites currently occupied by short lived or low quality cover types. Usually this includes the aspen, scrub oak and low quality mixed hardwood stands occurring on the lower habitat types.

The proposed action also recognizes the need to retain certain amounts of both high and low value tree species and cover type acreage to support specific wildlife, recreation, aesthetic and spiritual requirements of the Tribal membership. While MTE's silvicultural treatments cannot fully satisfy all tribal member

interests on each acre under its management, it can ensure that all the forest benefits demanded by the Tribe exists somewhere on the forest. The proposal will not eliminate any benefit currently enjoyed by the Tribe from the existing forest structure.

DECISION TO BE MADE

The decision to be made is whether or not to proceed with the proposed action as described here, and if so, under what conditions; or whether the purpose and needs described above can be met by taking alternative actions.

CHAPTER II: ISSUES

The Menominee Forest Management Plan was mailed to three agencies (one state and two federal) and the Menominee Tribal Legislature requesting their review and soliciting specific questions and concerns they may have.

The following issues and concerns were raised by the people who commented on the proposal.

CONCERNS BY PEOPLE REGARDING THE PROPOSED ACTION

1. The proposed action was supported in the belief that the procedures described in the Plan will avoid major adverse impacts to the environment in general.

2. Concern was expressed regarding federally-listed threatened and endangered species, which on the Menominee Reservation include the bald eagle (threatened) and the karner blue butterfly (endangered). Specifically, a commenter recommended that no timber harvest activity occur within 660 feet of an eagle nest during the critical nesting period and that no timber harvest occur within 330 feet of a nest at any time. Also, no timber harvest should occur in areas within areas occupied by karner blue butterfly.

   MTE policy restricts any disruptive forest management activity away from main roads within one quarter mile of an active eagle nest during the period between March 1 - August 31 (critical period). After the critical period is over, treatments adjacent to eagle nests are evaluated on a stand specific basis. In 1993, a modified shelterwood was conducted up to an eagle nest during the winter months to regenerate a white pine stand for future timber production and eagle nesting habitat. The prescription was submitted to the U.S. Fish and Wildlife Service for their review and comment. The nest has been active the two nesting seasons immediately following the harvest. Future harvest activities adjacent to eagle nest sites will also develop stand specific

prescriptions to ensure that both timber production and eagle nesting considerations are met.

MTE conducts karner blue butterfly surveys each year in areas where lupine is found. No karner blue butterflies have been observed on sustained yield forest land subject to the proposed action of the Plan. If karner blue butterflies were observed in or adjacent to an area proposed for treatment, a stand specific prescription would be developed to protect both the karner blue and meet the timber objective. Experience has shown on lands which contain lupine and karner blue butterflies that overstory removals during the winter months increase both species the following growing season. Numbers of both species decline as tree crown closure or density increases over time. Properly designed and conducted, timber harvesting should have no adverse affect on karner blue butterfly populations.

3. Concern was expressed that the procedures described in the Plan did not meet the requirements of the National Historic Preservation Act regarding identification and evaluation of historic, archeological and traditional cultural properties prior to treatment.

Menominee Tribal Enterprises has provided paraprofessional archeological training through the U.S. Forest Service and has patterned its cultural protection practices and procedures with those applied on the National Forests in this region. Whenever a potential cultural site is identified within a treatment area (either by an MTE paraprofessional or advance consultation with Tribal elders or the Tribal Historic Preservation Director), the site is excluded from the treatment area pending further on-site review by the Tribal Historic Preservation Director. If the Tribal Historic Preservation Director concurs with this decision, MTE simply removes the acreage containing the potential cultural site from treatment. Under this procedure, forestry "practices" do not pose a threat to a potential cultural site and therefore do not require the evaluation of a professional archeologist. The Tribal Historic Preservation Director may, under the Tribe's sovereign powers, choose to communicate his findings with the State Historic Preservation Officer (SHIPO).

4. Concern was expressed for non-timber values, including a scenic corridor along the Wolf River.

Menominee Tribal Enterprises incorporates the Wisconsin Best Management Practices (BMP's) guidelines for forestry into their forestry prescriptions and treatments. The Wisconsin BMP's provide for a buffer strip adjacent to certain riparian areas to protect water quality and sensitive aquatic habitat.

Further, these buffers strips serve as aesthetic barriers along major waterways, including the Wolf River. Additionally, MTE incorporates wildlife considerations into their forest management practices as a matter of practice through consultation with Tribal, State and federal fish and wildlife experts. MTE is also gathering baseline data on non-timber resources, including wildlife snag/den trees, neotropical songbirds, frogs, sandhill cranes and some game species.

5. Concern was expressed over the Plan's emphasis on forestry practices without consideration of other non-forestry concerns.

The Menominee Forest Management Plan was written primarily to describe the forest management practices, procedures and policies MTE intends to apply on the forest during the coming decade. It did not attempt to integrate other non-timber resource management practices with forestry in a detailed, comprehensive manner. MTE's resource management authority is limited to the sawmill and sustained yield forest land; non-timber management authorities rest with other Tribal programs. However, MTE has a Forest Ecologist on staff to consider non-timber values, to consult with other Tribal and governmental resource specialists about non-timber concerns and to mitigate the impact of timber management upon non-timber resources. To further achieve the integration of non-timber resource management into the forestry operation, MTE has developed and applied the Forest Habitat Type Classification System (FHTCS) on the Menominee Forest. The FHTCS will provide, on a sustainable basis, both the timber and non-timber resource values demanded by the Tribe through an ecosystem management approach.

CHAPTER III: ALTERNATIVES

ALTERNATIVES STUDIED IN DETAIL

The following describes those alternatives that were developed in response to the issues and concerns raised as well as the legal responsibilities prescribed in specific Menominee legislation.

ALTERNATIVE 1

The "no action" alternative, as required by the National Environmental Policy Act (NEPA) provides that the proposed action would not be implemented at this time.

ALTERNATIVE 2

This alternative would implement the proposed action.

FOREST HABITAT TYPE CLASSIFICATION SYSTEM

The Forest Habitat Type Classification System (FHTCS) will be the key criteria used to plan current forest treatments and predict future forest cover type acreage, volume, growth and value. The FHTCS will replace the current forest cover type management practices with site potential criteria whereby the existing forest cover type will be evaluated according to its suitability for that specific habitat type. The existing forest cover type may not, upon evaluation by habitat type, be regenerated as the future forest cover. Instead the existing forest cover type may be managed for a featured cover type(s) appropriate for the habitat type, e.g., aspen may be restored to white pine or red oak.

Approximately 47,427 acres of existing forest cover type have been identified for change to a different forest cover type during the next 100+ years of management. These acres are currently occupied by species which are either short lived or poor quality (no potential for high quality sawlogs) which, in combination, fail to meet MTE's stated goal of growing the maximum quantity and quality of sawtimber suitable to the site.

Basing future forest condition on the featured forest cover types which will be managed or restored on the appropriate habitat types, it is possible to project future forest cover type acreage, volume, growth and value. If the appropriate non-featured cover type acreage is properly restored to a higher level of value and productivity, it can be estimated that the future forest's sawtimber annual allowable cut (volume manufactured in the Tribal sawmill) will increase by over 30%. Additionally, this increased volume, coupled with tree grade improvement within the stand, will increase the value of timber receipts generated through annual harvests. It is expected value added manufacturing opportunities and Tribal profit potential will increase dramatically without increasing harvest intensity above its current level.

TIMBER HARVEST SYSTEMS

The current calculated annual allowable cut is 27 MMBF of sawtimber and 97 thousand cords of pulpwood annually. As forest management practices are applied, this available harvest volume will increase over time. The timber harvest systems which will be used to achieve the desired stand conditions include:

ALL-AGED

The northern hardwood cover type occurring on the better forest habitat types will be selectively harvested according to strict silvicultural prescription and tree marking guidelines. Within existing sawtimber stands, each harvest entry will remove excess stocking, leaving the best quality timber to develop quality and

size in anticipation of the next harvest entry. Reproduction will be established during each entry by cutting canopy gaps which favor new seedling development. While this system encourages the development of sugar maple, occasionally other high value species such as white ash, red oak, yellow birch and basswood become established in the larger gaps. These species will be encouraged to promote diversity and avoid forest health problems common within forest stands dominated by a single tree species. A well managed (regulated) sawtimber stand will contain vigorous trees ranging in diameter from saplings to 24+ inches in diameter at breast height.

Northern hardwood small sawtimber and poletimber stands lack the size and age distribution found in large sawtimber stands. An all-aged structure will be developed by selectively removing the poorest trees and favoring those stems containing potential quality sawlogs. Canopy gaps will also be created when several poor quality poles can be selectively removed to create the proper size openings. Periodic entries coupled with canopy gap installation will eventually created a regulated large sawtimber stand.

Hemlock-hardwood, hemlock-yellow birch and intermediate hardwood stands will also be managed under the all-aged system. Vigorous reproduction will be established by group selection when an opportunity is identified, usually a dead or dying large sawtimber tree. Small sawtimber or poletimber stands will be thinned according to recommended stocking guides until large diameter is reached; group selection will then be applied.

There are approximately 122,106 acres of the all-aged cover types currently being managed as described above. The long term planning goals establishes a future target of 98,613 acres for these same cover types.

EVEN-AGED

The pine (red, white and jack), red oak, hemlock, intermediate hardwoods, swamp conifer, swamp hardwood, aspen and pin oak cover types will be managed according to even-aged harvest systems. This system employs periodic intermediate thinnings (selectively harvesting stems in the intermediate crown class and below) as soon as the stands become merchantable. At rotation age (maturity), the stand is regenerated by clearcutting or shelterwood. Generally, all trees within these cover types are within 20 years of age, although a few large, high quality individuals (<20% crown closure so understory seedling development will not be inhibited) may be carried well into the next rotation to produce high quality sawlogs, wildlife values, aesthetic values and genetic diversity.

Stocking levels applied during the intermediate stand thinnings for all cover types will vary according to the stand stocking guides specific for that cover type/species. Regardless of specific stocking level, however, harvest entries will occur periodically

(approximately at 10 year intervals) and harvest trees will be selected either from below (the poorest crown development) or according to their risk factor (likelihood to survive until the next thinning). Under this system, the trees remaining at rotation age will be the largest diameter, most vigorous and contain the highest log grade (value).

The regeneration cut or shelterwood cut will occur at rotation age. Cover types regenerated under this system include red and white pine, red oak, scrub oak and hemlock. The stand overstory for the particular cover type will be reduced to its optimum seed producing crown closure and the understory seedbed will be treated prior to seedfall. Generally, understory treatments will focus on controlling competing understory vegetation (hardwood shrubs and non-featured tree species) through herbicide application or prescribed burning. Following control of the undesirable understory vegetation, the ground surface will be mechanically scarified (the leaf litter disturbed to expose mineral soil) to promote seed germination and improve seedling survival of the target species. Normally, the shelterwood prescriptions developed for each cover type produces abundant regeneration within three to five years. After this establishment period, the overstory will be reduced to <20% crown closure to fully release the understory seedlings. Typically, a properly regenerated shelterwood stand will contain the most tree species diversity of all the regeneration systems used on the forest. The existing featured forest cover types requiring the shelterwood regeneration system currently totals 31,374 acres. Restoring the short lived, low quality cover types to featured forest cover types will increase this acreage in the future. Long term management goals has established that these cover types will contain approximately 85,946 acres if all goals are met.

The even-aged cover types not suitable to a shelterwood regeneration system includes jack pine and aspen. Jack pine stands (which normally contain a minor component of low quality hardwoods) are regenerated through clearcutting, i.e., cutting all stems >2 inches or larger during the harvesting operation. Jack pine regenerates either from the seed always present in the crown (serotinous cones) or by tree planting (hand or machine). Aspen stands are likewise harvested by clearcutting, however, regeneration is quickly achieved through root suckering rather than seed. Rarely is additional follow up treatment required to adequately stock an aspen harvest area. The jack pine cover type currently occupies over 700 acres while the aspen cover type occupies an estimated 25,315 acres on the forest. Future planning goals targets 1000 acres for the jack pine and 10,000 acres for the aspen cover types, respectively.

The swamp conifer and swamp hardwood cover types currently are not scheduled for any regeneration treatments pending additional silvicultural information and research. Because these cover types

occur in close proximity to water and have seasonal limitations, neither the current shelterwood nor clearcutting regeneration systems have been determined to be completely reliable for regenerating these cover types. The swamp conifer and swamp hardwood currently occupy 21,344 and 1,985 acres, respectively, and future planning goals do not project any significant change in these acres.

Salvage harvest will occur across all cover types whenever necessary or appropriate. Circumstances which necessitate salvage operations include dead or dying timber resulting from insect, disease, lightning, flooding (adjacent to beaver dams), fire or windthrow. In situations where damage is light and residual stand stocking is sufficient to maintain stand productivity, dead or dying trees will be selectively marked and removed. In cases where stand mortality is high and residual stand stocking is insufficient for continued productive growth or to adequately regenerate the stand, all high risk trees will be harvested and the salvage area will be planted with the appropriate species for the site.

COVER TYPE RESTORATION

There are approximately 47,427 acres of forest which lacks either a featured forest cover type (a cover type suitable to a particular habitat type) or a potential featured cover type, i.e., stands which have a featured cover type component mixed with non-featured species which, through silvicultural prescription, can become the featured cover type. Forest cover type acreage which is neither featured nor potential can only achieve a featured cover type through a conversion, or restoration, treatment.

Restoring stands to a featured forest cover type will be accomplished by tree planting (forced conversion) methods. Stands scheduled for conversion currently contain low value timber which cannot meet the maximum quality and quantity requirement. Examples include aspen and other mixed hardwoods (white birch, soft maple, scrub oak) growing on sites suitable for white pine, northern red oak, hemlock or yellow birch, depending on habitat type. Normally, the forced conversion prescription requires a clearcut which is three to five years old (to allow decomposition of stumps and slash), a herbicide application to control the non-featured tree vegetation and then hand or machine planting one or more featured species seedlings suitable to the site. The total planned restoration acres are summarized:

Forest Cover Type Restoration

Featured Forest Cover Types

Cover Type	Current	Target	Acres to be Planted
Red Pine	6,700	13,029	6,329
White Pine	28,790	41,779	12,989
Hemlock	4,995	6,340	1,345
Hemlock-Sugar Maple	3,970	9,637	5,667
Hemlock-Yellow Birch	9,678	15,346	5,668
Sugar Maple	49,886	51,168	1,282
Mid-tolerant Hardwoods	15,389	22,462	7,073
Red Oak	14,147	21,221	7,074
Total (All Cover Types)	133,555	180,982	47,427

CULTURAL IMPROVEMENTS

Cultural improvements will be non-commercially applied to approximately 2000 acres annually. These include pruning, mechanical release, herbicide release and prescribed fire.

Pruning will be applied primarily to white and red pine stands to improve log grade quality and increase total stand value. Limbs will be removed by hand crews to approximately nine feet while a mechanical pruner will be used at later stages to produce clear boles to a height of 32-64 feet, depending on tree form.

Mechanical release, herbicide release and prescribed fire essentially are directed at releasing featured species crop trees from competing vegetation. Each release treatment will be chosen based on the particular vegetation control problem surrounding established featured species. Mechanical release (chain/brush saw) may be used in a mixed stand of conifer and hardwood (such as white pine and red oak) where maximum individual tree specificity is required.

Herbicide release will generally be used where conifers are the featured species and the competing vegetation is non-featured hardwood trees and shrubs. Typically, herbicide release is a broadcast treatment applied by aerial or ground equipment. Occasionally, mixed conifers and hardwoods can be chemically released by selective basal treatments of individual competing stems using an oil/chemical mix.

Prescribed fire will generally be applied when the featured species to be released are sprouting hardwoods such as red oak or white ash. A light fire will top kill both featured and nonfeatured hardwoods. However, oak and ash are prolific sprouters and, on the appropriate habitat types, will quickly overtop less vigorous sprouting hardwoods such as sugar maple. Prescribed fire is

usually limited to stems under 2 inches at the root collar; trees larger than 2 inches are better treated simply by cutting or with a chemical basal/stump treatment.

CHAPTER IV: ENVIRONMENTAL EFFECTS

This chapter presents the environmental effects of the two alternatives. It considers indirect, direct and cumulative effects as they relate to ecological, social and economic factors. Irreversible and irretrievable commitments of resources are also evaluated.

ISSUE: SOILS

The forest soils on the Menominee Reservation are currently being identified and mapped. While a complete forest soil map is not yet available, preliminary data shows that more than one forest habitat type may occur on a single soil type or, conversely, more than one soil type may occur on a particular habitat type. There is, however, a link between a group of soil types and habitat types. MTE believes that, pending completion of the soil maps and analysis of the Reservation soils, the Forest Habitat Classification System for the Menominee Indian Reservation (Kotar and Burger, 1989) is the primary criteria upon which it will base its ecosystem and sustained yield management decisions. This document is referenced in and appended to the Forest Management Plan.

EXISTING CONDITION

Soils across the Reservation range from mesic, nutrient rich drumlinized loams to xeric, nutrient poor outwash sands. Generally, the western portion of the Reservation contains the most productive, nutrient rich sites, which includes the AH, ATDH, ATFD, and AFAd habitat types. The central part of the Reservation contains a mixture of soils and land forms which are moderate in forest productivity and include the AFVib, AQVib(Ha), and AQVib habitat types. Included in the western two thirds of the Reservation is the AMT habitat type, which is moderate in site productivity and contains the broadest spectrum of forest cover types. Also widely spread through this same area is the TMC habitat type, which is somewhat nutrient poor with impeded soil drainage. The eastern and southeastern sections of the Reservation are comprised primarily of sandy soils and includes the PMV(Q) and the QV habitat types. These are the least productive habitat types with respect to available soil moisture and nutrients.

DIRECT AND INDIRECT EFFECTS ON SOILS

Alternative 1: No soil would be disturbed.

Alternative 2: Harvesting the annual calculated cut across all

habitat types could cause some potential soil disturbance, including soil compaction and rutting, resulting from logging and heavy road equipment. Implementation of the following measures will mitigate potential adverse effects of the proposed action. As a result, no detrimental soil disturbance will occur as a result of the harvesting operations and other forest management treatments.

Measures taken to mitigate potential adverse effects of all proposed actions are:

1) New road construction would be initiated only when existing road access made commercial timber harvesting economically unfeasible. Whenever possible, unnecessary old spur roads would be closed and reforested.

2) Main haul roads would be reopened or maintained according to Wisconsin Department of Natural Resources recommended Best Management Practices (BMP) to protect water quality and reduce soil erosion.

3) Exposed mineral soil associated with new road construction or significant old road reconstruction will be seeded where slope or grade presents an erosion possibility.

4) Skid trail locations will be designated to reduce the percent of forest acreage impacted by heavy logging equipment.

5) Log landing locations will be designated to reduce forest acreage impacted by log piling and haul truck loading.

6) While most of the Menominee Forest's topography is flat to gently rolling, occasional activities occurring on steeper slopes will be mitigated by soil stabilizing practices such as seeding, water bars, riprap, etc. to reduce water runoff and protect water quality.

CUMULATIVE EFFECTS ON SOILS

Adherence to the logging standards and Wisconsin BMP's contained in the Forest Management Plan will mitigate logging related impacts and will result in no appreciable changes in the inherent long-term productivity and sustainability of the forest soil.

ISSUE: VEGETATION

The Menominee forest contains 13 major forest cover types and over 28 tree species common to the Lake States Region. Forest ecosystem relationships, hence silvicultural prescriptions, are complex due to the many potential succession pathways which can occur over time. Vegetation, for this analysis, is considered to be tree species, singularly or in mixture to form a forest cover type. Unlike shrub and herbaceous vegetation, tree species (forest cover

type) are not predictable to a particular habitat type, being more sensitive to past land use history or events. Shrub and herbaceous vegetation, by contrast, occurs in distinct species combinations and abundance by habitat type without regard to forest cover type. These understory species are predictable and relatively constant, appearing as distinct plant associations/communities regardless of land use or management practices, even following severe disturbance. Understory vegetation regenerates and occupies a forest site (habitat type) unless the land use is radically altered from forest to non-forest uses, e.g., agriculture or industrial.

EXISTING CONDITION

The existing condition of the hardwood forest includes well developed northern hardwood and hemlock-hardwood stands containing large diameter sugar maple and associated hardwood species. These stands have been managed under all-aged prescriptions but remain unregulated from a diameter distribution standpoint. Additionally, some large diameter even-aged stands of red oak are reaching maturity and will need a regeneration treatment. A smaller percentage of the hardwood forest is pole sized; this limited acreage will be thinned and developed into large sawtimber subject to either all-aged or even-aged regeneration systems. The pine forest is primarily mature, large diameter white and red pine approaching rotation age. A small percentage of the pine forest is pole sized (natural or planted) or consists of other species such as jack pine. The aspen-white birch forest is generally mature and being regenerated or converted to other higher value species appropriate to the habitat type.

DIRECT AND INDIRECT EFFECTS ON VEGETATION

Alternative 1: No forest acreage would be harvested. The existing forest cover types would continue to grow and, based on the high percentage of mature timber, suffer increased mortality over time. Forest cover type composition would continue to shift to sugar maple (shade tolerant) with continually decreasing percentages of red oak, pine and other intermediate hardwoods (shade intolerant) species.

Alternative 2: The forest cover types will, under the proposed action, move toward the desired vegetational composition through silvicultural prescription with the exception of the lower quality mixed hardwoods (red maple, white birch, and off-site hardwoods), aspen and pin oak.

The following table shows the desired vegetative condition for the Reservation under the Forest Management Plan (FMP) and how the alternatives mover toward that goal:

Vegetative Condition by Management Alternative

Forest Cover Type	No Action	Alternative 2
Red Pine	decrease	increase
White Pine	decrease	increase
Jack Pine	decrease	increase
Hemlock-Hardwood	same/decrease	increase
Northern Hardwood	increase	increase
Red Oak	decrease	increase
Other Hardwood	same/increase	decrease
Aspen	decrease	decrease
Pin Oak	same/decrease	decrease

CUMULATIVE EFFECTS ON VEGETATION

Human settlement and past forest management practices have begun to alter the vegetational composition of the forest. The most significant ecological force in changing or maintaining the Reservation forest vegetation has been fire. Eliminating wildfire from the Menominee forest has allowed widespread establishment of shade tolerant hardwoods across most habitat types. This hardwood understory invasion, coupled with selective harvesting practices, has created a multi-aged understory of hardwood reproduction beneath the old, mature sawtimber. This is desirable on the northern hardwood cover type appropriate to the habitat type but quite undesirable on sites more suitable to pine or intolerant hardwoods.

Under the no action alternative, the successional process which was begun by the elimination of wildfire will continue unabated. As the mature sawtimber overstory is lost through mortality over time, the shade tolerant hardwood understory will continue to grow and develop. On the drier, nutrient poor habitat types, forest cover types such as white pine and red oak will be replaced by low quality hardwoods. Since wildfire can no longer function within the ecosystem, natural seedbed preparation will not occur and these seral forest stages will decline in frequency and abundance.

Alternative 2 addresses the successional problem created by the lack of wildfire. The existing forest cover types and their functioning ecosystems would be maintained through stand specific silvicultural prescription and its corresponding harvesting system. On habitat types suitable for shade tolerant hardwoods, the single tree or group selection system would be applied to encourage multi-aged groups of hardwood reproduction while regulating the overstory sawtimber diameter distributions. Likewise, on habitat types unsuitable for shade tolerant hardwoods, the successional trend toward shade tolerant reproduction would be broken by applying treatments emulating wildfire which eliminate understory hardwood and create a seedbed to regenerate species requiring site

disturbance. This ecosystem management approach will encourage a variety of forest tree species and continue the size, age and vigor distributions representative of the existing forest composition.

Settlement of Menominee ancestral lands following treaty cessions altered traditional land use practices and eliminated wildfire from the forest ecosystem. This fundamental change permitted a shift in forest vegetation toward shade tolerant hardwoods previously excluded by frequent burning. Alternative 1 would do nothing to change this successional trend, since uncontrolled wildfire would not be permitted on the forest either at a Reservation wide scale nor at the intensity needed to regenerate the fire dependent, mid-successional forest cover types.

Alternative 2 would also alter the forest ecosystem by harvesting specific tree species based upon size, age, risk and vigor. Road construction or reconstruction, logging equipment and openings created by logging operations would affect both the forest floor and periodically open the forest canopy. This alternative would also recognize the successional trend occurring within the mid-successional cover types and, on the appropriate habitat types, apply silvicultural treatments designed to regenerate certain fire dependent species through non-fire effects. This approach will maintain all existing forest cover types and their respective functioning ecosystems, thereby preserving the current forest diversity and sustaining them for at least one more harvest rotation.

ISSUE: WILDLIFE HABITAT

The Menominee Tribal membership derives both sustenance and spiritual values from the indigenous wildlife populations found on the forest. These values are different yet substantial for each tribal member, creating a diverse public demand on MTE, in total, to protect this resource and provide opportunities to utilize it.

EXISTING CONDITION - EARLY SUCCESSIONAL/EDGE HABITAT

Aspen is considered critical wildlife habitat for some animal species, particularly whitetail deer and ruffed grouse. Aspen has not been identified as a featured forest cover type on Menominee, despite its wide environmental amplitude (it occupies every habitat type on the Reservation). This forest cover type is early successional, rapidly invading severely disturbed sites. On Menominee, aspen is most common in areas heavily logged and burned during the railroad logging era which ended during the mid 1930's. Aspen is easily regenerated from root suckers, provided the stand canopy is reduced below 20% crown closure.

The aspen cover type has been steadily declining since 1963. The Continuous Forest Inventory (CFI) data reveals the following trend:

Cover Type	Acres by Measurement Year			
	1963	1970	1979	1988
Aspen/White Birch	47,901	39,957	34,003	25,315

The aspen acreage decline has occurred primarily on sites where aspen was mixed with other hardwoods. As the aspen component of the stand was lost to natural mortality, the longer lived hardwoods immediately occupied the site, shaded the understory and effectively replaced aspen as the dominant tree species in the stand. This successional process has been occurring since CFI measurements began in 1963. Part of the remaining aspen acreage includes aspen stands clearcut within the past 20-25 years (when aspen clearcutting was first done by MTE). Aspen which is currently mature will likewise be replaced by other hardwoods unless the overstory is removed before the root system dies or large areas of the forest are subjected to severe disturbance (such as a catastrophic fire).

DIRECT AND INDIRECT EFFECTS ON EARLY SUCCESSIONAL/EDGE HABITAT

Alternative 1: No action would allow natural succession to continue, with the aspen cover type replaced by tolerant hardwoods and occasionally conifers. Absence of uncontrolled wildfire would further reduce the opportunity for aspen to regenerate from seed. Over time, the aspen forest cover type will essentially be lost from the Menominee forest under the no action alternative. Likewise, the longer lived intermediate species, such as red oak and white pine, would also slowly be replaced with more shade tolerant tree species.

Alternative 2: This option proposes reducing the aspen cover type from the 1988 level of 25,000 acres to a minimum level of 10,000 acres through aspen clearcutting. Existing aspen acreage would be identified and selected for regeneration according to current geographical distribution and adjacency to other critical wildlife habitat. In compartments heavily represented with aspen cover type, some acreage would be restored to its original forest cover type based on existing habitat type. In other parts of the forest where aspen is less common, a greater effort will be made to regenerate these sites in order not to lose aspen representation and associated forest ecosystem diversity at those locations. Under this alternative, aspen, and its ecological values, will always be represented on the Menominee forest.

Other long lived intermediate hardwood and pine would be maintained through regeneration cuts. Tolerant hardwood and hemlock would also be maintained in its current all-aged condition. Wildlife species currently associated with these stand conditions will be maintained through timber management prescriptions.

CUMULATIVE EFFECTS ON WILDLIFE HABITAT

Valuable early successional forest cover types will be maintained at a certain level through forest management practices, providing certain wildlife benefits which would otherwise be lost through the natural successional process. Management of the other long lived forest cover types will continue to provide the wildlife benefits currently enjoyed on the forest.

ISSUE: THREATENED AND ENDANGERED SPECIES

The potential effects of forest management on threatened and endangered species (TE) are a concern whenever a proposed activity may pose a risk or conflict. Under no circumstances will any forestry project be initiated when a known TE species is believed to be in or immediately adjacent to a project area until a full and complete evaluation is performed.

EXISTING CONDITION

There are a number of active bald eagle nesting sites across the Reservation. The karner blue butterfly has been found in the southeast corner of the Reservation adjacent to Legend Lake, although large acreage of quality habitat have not been found (large, unforested openings with abundant lupine).

Other species of concern which are found within the Reservation include osprey, goshawk and red shouldered hawk. No eastern grey wolves are known to reside within the Reservation boundaries.

DIRECT AND INDIRECT EFFECTS ON TE

Alternative 1: There would be no immediate effects on TE species. Over time, natural forest succession would replace large white pine nest trees with other species and have some impact on eagle nesting sites. No forest harvesting on sites containing lupine will, over time, reduce lupine numbers due to increased tree canopy density and directly influence karner blue populations.

Alternative 2: Current management practices include identifying TE species or habitat prior to initiation of any proposed practice or treatment. Active bald eagle nesting sites are identified prior to timber harvesting and, when a nest site occurs within or adjacent to a proposed treatment area, appropriate mitigation measures are taken. These measures include restricting all activities within one quarter mile of the nest site during the active nesting season, protecting nest trees from disturbance at any time and applying silvicultural prescriptions designed to protect and maintain nesting site production. The karner blue butterfly has been identified with habitat found on the Legend Lake dam and roadsides located in this general area. No karner blues have been found within the forest away from roadside openings. If karner blues

were found within a treatment area, the project would delayed until the winter season. Generally, harvest operations create light conditions favorable to lupine growth which would improve karner blue habitat (and karner blue populations if they are present) for a period following the harvest. Under this alternative, management actions will mitigate disturbance and prevent any negative effects to a TE species.

CUMULATIVE EFFECTS ON THREATENED AND ENDANGERED SPECIES

Timber management practices contained in alternative 2 will protect and enhance habitat favorable to threatened and endangered species. The TE populations should be maintained by habitat protection and, in some cases, improve as forest management treatments expand the existing critical habitat for species such as the bald eagle and karner blue butterfly.

ISSUE: SURFACE WATER QUALITY

Protecting vernal ponds, streams and lakes from harvesting and road construction impacts is a water quality concern. Soil siltation can damage aquatic plants and animals by altering stream bed or lake bottom characteristics necessary to support these organisms. Heavy equipment such as skidders can directly impact stream bed structure or shoreline vegetation when driven through riparian zones during forest harvest operations. MTE will mitigate these impacts on water quality by following the Wisconsin Best Management Practices (BMP's) whenever forestry activities occur adjacent to wetlands or streams.

EXISTING CONDITION

There are currently over 2,558 miles of road surface on the Reservation, with over 84% of these miles being low grade, gravel or dirt surface woods roads. Additionally, the Reservation contains over 3,700 acres of lakes, 300 miles of perennial streams and numerous intermittent streams and ponds. Virtually all forest management treatment areas, and supporting road systems, cross or are adjacent to wetlands or streams.

DIRECT AND INDIRECT EFFECTS ON WATER QUALITY

Alternative 1: There would be no effect on water quality.

Alternative 2: Current management practices would follow the Wisconsin Best Management Practices (BMP's) to minimize forestry impacts on water quality. These include road design and layout which either avoids riparian areas or crosses them with the least impact possible. New road design would apply BMP's such as silt barriers, riprap, culverts (size and configuration) and cut/fill slope seeding. Existing road maintenance would apply appropriate BMP measures described above where they are absent and protect

those that are in place. As a matter of policy, MTE keeps new road construction to an absolute minimum and, at the start of every new forestry project, closes and restores every old road to its original vegetative cover whenever it is considered unnecessary for forestry operations.

The BMP's also restrict harvest operations within a certain distance from riparian areas. This prevents logging equipment from directly impacting sensitive aquatic habitat or placing logging slash directly into a wetland or stream. Also, harvest adjacent to a lake or stream is restricted to selective cutting within the recommended BMP buffer zone to leave a protective vegetative cover against the riparian area and to effectively mitigate visual or aesthetic impacts along lakes and streams.

CUMULATIVE EFFECTS ON WATER QUALITY

Alternative 2, by carefully applying the Wisconsin Best Management Practices, would reduce short term impacts to wetlands or streams resulting from forest management treatments and eliminate any long term impacts to water quality. Following any new road construction or old road reconstruction, application of the BMP's would stabilize soil adjacent to riparian areas and careful harvest operations would prevent movement of soil or logging slash into lakes or streams. No detrimental impact to aquatic plants or animals would be expected from any forestry practices.

ISSUE: CULTURAL RESOURCES

The Menominee Reservation is part of the Tribe's ancestral homeland. It contains certain historically important locations and artifacts which are culturally and spiritually sensitive to the Menominee people. These cultural resources are located throughout the Menominee forest and potentially at risk from certain forest management practices. To prevent damage to these cultural resources, sensitive areas and artifacts must be located and avoided before forest management activities occur.

EXISTING CONDITION

The Menominee Tribe currently has a Historic Preservation Director responsible for monitoring all cultural resource sites identified on the Menominee Reservation while MTE has trained archeological paraprofessionals on staff to review planned treatment areas for culturally significant locations or artifacts prior to stand entry. If a potential cultural site location is identified, it is referred to the Tribal Historic Preservation Director for inspection.

DIRECT AND INDIRECT EFFECTS ON CULTURAL RESOURCES

Alternative 1: There would be no effect on cultural resources.

Alternative 2: Current management practices include identifying possible significant cultural resource locations by MTE paraprofessionals and providing this information to the Tribal Historic Preservation Director. Unless advised otherwise, MTE excludes the potential site from treatment to avoid any detrimental impacts. Under Tribal policy, the Tribal Historic Preservation Director does not publish or otherwise publicly document his findings nor does he provide them to MTE or any other government agency. This alternative will protect sensitive cultural resources from physical disturbance by excluding the land from treatment and provide confidentiality to significant locations by limiting public knowledge of the finding.

CUMULATIVE EFFECTS ON CULTURAL RESOURCES

Both alternatives 1 (no action) and 2 (proposed actions) will protect cultural resources. Current forest management practices are not expected to damage or alter the integrity of Menominee's cultural resources. Under current management practices, the number of known cultural resource sites will actually increase due to MTE paraprofessional identification of cultural site locations over large parts of the Menominee forest and Tribal documentation by the Historic Preservation Director.

ISSUE: ECONOMICS

Timber harvesting and manufacturing have been a significant (and sometimes the only) part of the Reservation economy, generating the capital for tribal employment and supporting other community services such as health care, education, welfare and protection (police and fire). The Menominee Tribe has operated its sawmill and woods operations on a large scale commercial basis for over 90 years, and has formally practiced sustainable forestry under legislation passed in 1890.

EXISTING CONDITION

The total calculated annual allowable cut is 27.6 MMBF of sawtimber and 97.3 thousand cords. This available forest volume supports the MTE sawmill and woods work force, generating over $10 million in gross revenues, of which a large percentage stays within the Reservation community in the form of wages and contracted services. MTE's total employment for manufacturing and forest management exceeds 160 people while the woods workers (loggers and truckers) is over 150 people. Also, periodic MTE mill maintenance, renovation and modernization done through independent contractors provides additional employment within the community.

DIRECT AND INDIRECT EFFECTS ON ECONOMICS

Alternative 1: The no action alternative would eliminate all jobs associated with the sawmill and woods operations and retain only a

few forest protection personnel to guard against forest fires and timber trespass. The Tribe would directly lose most of the current revenues generated from harvesting and manufacturing and indirectly impact the community businesses serving those workers. Expansion and modernization of the Tribal sawmill would be halted, quashing job creation and incentives for education and training in all facets of business, resource management and technology. Additionally, sustained yield forest management practices would halt, raising a legal conflict with federal statute and jeopardizing Secretarial support for forest management and protection. Forest road maintenance would be greatly reduced, with interior forest road access limited to seasonal use.

Alternative 2: This alternative would continue harvesting the annual allowable cut, maintaining existing jobs and providing the resource base for modernization and expansion of both manufacturing and harvesting. Community services would continue to expand as demand increased through creation of more and better paying jobs based on the perpetually renewable tribal forest resource. Federal support for management and protection of the forest would remain intact, further ensuring forest sustainability and improvement. Forest road maintenance would continue to occur, ensuring both primary and secondary road access to most parts of the Reservation to the tribal membership for recreational and cultural use in all seasons.

CUMULATIVE EFFECTS ON ECONOMICS

The no action alternative would dampen economic growth across all segments of the Reservation, leaving no clear long term, stable economic alternative to the tribal membership on the Reservation.

Alternative 2 would promote economic growth both within MTE and other segments of the Reservation. Economic growth would create future demand for goods and services on the Reservation, providing incentive for both education and entrepreneurship within the community. The quality of life on Menominee would continue to improve, consistent with the cultural values of the Tribe.

CHAPTER V: IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

An irreversible commitment is considered as a loss of future options, primarily as applied to nonrenewable resources, such as minerals or cultural resources. It also includes those factors such as soil productivity which are renewable only over long periods of time or a change in land status when forest land is lost to non-forest commitments such as housing or industrial use.

An irretrievable commitment refers to the loss of production, harvest, or other use of a renewable resource when it is decided to

use the resource for some other purpose. One example is the loss of timber harvesting opportunities when Reservation forest land is removed from sustained yield status to create wilderness or natural areas. Unlike an irreversible commitment, the opportunity lost could be regained in a short time frame if land use priorities changed.

Of the activities proposed in the alternatives analyzed here, none represents an irreversible commitment. There are some irretrievable commitments, however. These include:

1) Construction or reconstruction of forest roads as part of the transportation system necessary to haul logs to the sawmill. The wider main road (those designated as BIA roads) system creates forest corridors which are unavailable for timber or wildlife production. The narrower, lower standard interior forest roads, however, reduce forest production very little due to tree canopy expansion over the road surface. Also, roads, particularly low grade roads, are easily closed to vehicle traffic and can be quickly planted or regenerated to a forest cover type.

2) Some forestry silvicultural prescriptions remove forest vegetation to create a seedbed essential for the regeneration of certain tree species. While the loss of vegetation is brief (less than one growing season), some wildlife values, such as food or cover, may be lost in this transition period.

3) Some people object to the appearance of the forest immediately following a harvest. While the harvest itself may actually increase net forest productivity on the site, the loss of an aesthetically pleasing view or experience may not be possible at that location for some time period.

4) Sustained yield forest management often requires that the poorest trees be harvested and the best trees left for the future. Additionally, the trees left must be of sufficient number that site productivity, i.e. sawlog or cubic foot growth, does not fall below a certain level. These restrictions prevent maximizing the short term economic gain (i.e. highgrading) which could be realized by the Tribe if more trees and better trees were cut sooner.

CHAPTER VI: LIST OF PREPARERS

David Congos, Menominee Forester, BIA
Tom Magnuson, Timber Sale Forester, BIA
Tim Hepola, Inventory Forester, BIA
Jay West, Acting Area Forester, BIA

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS

MINNEAPOLIS AREA OFFICE
331 SOUTH 2ND AVENUE
MINNEAPOLIS, MINNESOTA 55401-2241

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Forestry

COPY FOR YOUR INFORMATION

MAY 10 1996

John Teller, Chairman
Menominee Indian Tribe
P.O. Box 910
Keshena, Wisconsin 54135-0910

Subject: Preparation of an Environmental Assessment (EA) for the Menominee Forest Management Plan, 1996-2005

Dear Mr. Teller:

Enclosed with this letter is a copy of the proposed Menominee Forest Management Plan for the period 1996-2005. The Deputy Commissioner of Indian Affairs and Deputy Assistant Secretary - Indian Affairs (BIA) have directed the Minneapolis Area Office to prepare an EA for the subject Plan. The plan was written by Menominee Tribal Enterprises to show policies, guidelines, and procedures used to manage the reservation forest (219,055 acres) according to sustained-yield forestry principles (Enclosure). Sustained-yield is defined as the yield of forest products that a forest can produce continuously at a given intensity of management (25 USC § 3103.14).

The development of the plan included participation of the BIA Menominee Forestry Center staff and the Wisconsin Department of Natural Resources (DNR). Menominee Tribal Enterprises (MTE) is responsible for the implementation of the plan. This plan is intended to provide long range forest management guidelines for the Menominee Reservation.

For purposes of this undertaking, the Area of Potential Effect would be all lands within the boundary of the Menominee Reservation. I am seeking your views on this project under 36 CFR 800.4(a). Please send your comments regarding pertinent issues, concerns, and opportunities to:

Mr. Dave Congos, Menominee Forester
Menominee Agency, BIA
Branch of Forestry
P.O. Box 670
Keshena, WI 54135

Please send your comments to Mr. Congos within 30 days after receipt of this correspondence.

Sincerely,

Jay R Wilcox

Acting Area Director

Enclosure

cc: w/o encl Menominee Forestry
Environmental Services

6/21/96 Louis Dixon 11:50A

Reviewing FMP - too much to cover - legal references - wants 30 additional days for comment.

I said BIA needs to finish the EA within the 90 day window - if he or MTL want to have questions beyond major concerns, they should take in depth concerns/issues through the Forestry Committee/MTE Board of dir.

I recommended he come see me & we discuss his concerns & I'll document them in the EA. He wanted to set up a temporary office at the MFC for appox. 1 month to review all supporting information in the FMP.

Louis felt MTE was too specific to their needs & did not consider other non-forestry concerns; I said that was their intent & that consensus on forestry was not likely. MTE would cut timber w/o 100% public agreement w/ FMP. Any concerns about other values could be integrated through appropriate committees by persons responsible for those

resources. Essentially, MTE did not write an IRMP, but an integrated plan could be developed later if all parties care to cooperate.

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS

MINNEAPOLIS AREA OFFICE
331 SOUTH 2ND AVENUE
MINNEAPOLIS, MINNESOTA 55401-2241

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IN REPLY REFER TO:

FORESTRY

COPY FOR YOUR INFORMATION

MAY 10 1996

National Park Service
310 West Wisconsin Ave.
Room 500
Milwaukee, WI 53203
Attn: Angie Torness

Subject: Preparation of an Environmental Assessment (EA) for the Menominee Forest Management Plan, 1996-2005

Dear Ms. Torness:

Enclosed with this letter is a copy of the proposed Menominee Forest Management Plan for the period 1996-2005. The Deputy Commissioner of Indian Affairs and Deputy Assistant Secretary - Indian Affairs (BIA) have directed the Minneapolis Area Office to prepare an EA for the subject Plan. The plan was written by Menominee Tribal Enterprises to show policies, guidelines, and procedures used to manage the reservation forest (219,055 acres) according to sustained-yield forestry principles (Enclosure). Sustained-yield is defined as the yield of forest products that a forest can produce continuously at a given intensity of management (25 USC § 3103.14).

The development of the plan included participation of the BIA Menominee Forestry Center staff and the Wisconsin Department of Natural Resources (DNR). Menominee Tribal Enterprises (MTE) is responsible for the implementation of the plan. This plan is intended to provide long range forest management guidelines for the Menominee Reservation.

For purposes of this undertaking, the Area of Potential Effect would be all lands within the boundary of the Menominee Reservation. I am seeking your views on this project under 36 CFR 800.4(a). Please send your comments regarding pertinent issues, concerns, and opportunities to:

Mr. Dave Congos, Menominee Forester
Menominee Agency, BIA
Branch of Forestry
P.O. Box 670
Keshena, WI 54135

Please send your comments to Mr. Congos within 30 days after receipt of this correspondence.

Sincerely,

Acting Area Director

Enclosure

cc: w/o encl Menominee Forestry
Environmental Services

State Historical Society of Wisconsin
Division of Historic Preservation
816 State Street • Madison, Wisconsin 53706-1488
(608) 264-6500 • FAX (608) 264-6404

June 4, 1996

Larry Marrin
Acting Area Director
Bureau of Indian Affairs
331 S 2nd Avenue
Minneapolis, Minnesota 55401-2241

SHSW 96-0606
Re: Menominee Forest Management Plan

Dear Mr. Marrin,

Thank you of the opportunity to review and comment on the report entitled "Menominee Tribal Enterprises Forest Management Plan 1996-2005".

Section 2.1.4 (pages 19 and 20) of this document addresses cultural resources. The proposal set forth in this document does not meet the requirements of the National Historic Preservation Act. There is no provision in this document to identify and evaluate historic and archeological resources and traditional cultural properties prior to undertaking forestry "practices". The proposal, merely to have "Staff paraprofessional archeologists review cultural resources sites as they are discovered" and to "coordinate with the Tribal Historians when these areas are encountered" does not meet the requirements of Federal law, nor the regulations established in 36 CFR Part 800 to implement the law.

If we can be of assistance to your agency or the Menominee Tribe in developing procedures that meet the requirements of the National Historic Preservation Act, please let me know. I can be reached at (608) 264-6509.

Sincerely,

Richard W. Dexter
Chief, Compliance Section

CC David Grignon

Post-it® Fax Note 7671	Date 6-13-96	# of pages ▶ 1
To MARSHALL FLORES	From DAVE GRIGNON
Co./Dept. FORESTRY	Co. Historic Pres.
Phone # 799-4323	Phone # 264-5258
Fax # 799-4323	Fax # 799-4525

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS

MINNEAPOLIS AREA OFFICE
331 SOUTH 2ND AVENUE
MINNEAPOLIS, MINNESOTA 55401-2241

TAKE PRIDE IN AMERICA

IN REPLY REFER TO
Environmental Services

COPY FOR YOUR INFORMATION

MAY 10 1996

Rick Dexter, Compliance Officer
State Historical Society of Wisconsin
816 State Street
Madison, Wisconsin 53706

Subject: Preparation of an Environmental Assessment (EA) for the Menominee Forest Management Plan, 1996-2005

Dear Mr. Dexter:

The Deputy Commissioner of Indian Affairs and Deputy Assistant Secretary - Indian Affairs (BIA) have directed the Minneapolis Area Office to prepare an EA for the subject Plan. The plan was written by Menominee Tribal Enterprises to show policies, guidelines, and procedures used to manage the reservation forest (219,055 acres) according to sustained-yield forestry principles (Enclosure). Sustained-yield is defined as the yield of forest products that a forest can produce continuously at a given intensity of management (25 USC § 3103.14).

The development of the plan included participation of the BIA Menominee Forestry Center staff, Wisconsin Department of Natural Resources (DNR). Menominee Tribal Enterprises (MTE) is responsible for the implementation of the plan. The plan also addresses cultural resources. It states,

> "For generations, the Menominee Forest, located within the traditional territory of the Menominee Tribe, has been used to gather natural resources, and as a residence. Thus, there are numerous cultural resources to be found in various parts of the forest. Burial sites and settlements are common in many areas of the forest.
>
> It is MTE's intent that the disturbances to significant cultural resources are minimized or avoided. Staff paraprofessional archaeologists review cultural resource sites as they are discovered. In addition, all treatments must be evaluated using the environmental checklist which reviews potential

cultural resources impacts.

When a cultural resource site is discovered, MTE will take steps to ensure that any disturbance is minimized or the site is avoided. This is most commonly accomplished by excluding the resource site from treatment. These areas are delineated on the ground and no mechanical disturbance is allowed on the site. If the area must be treated, MTE will evaluate the effectiveness of treating the site during frozen ground conditions. MTE will make every effort to coordinate with the Tribal Historians when these areas are encountered."

For purposes of this undertaking, the Area of Potential Effect would be all lands within the boundary of the Menominee Reservation. I am seeking your views on this project under 36 CFR 800.4(a). Please send your comments to this office within 30 days after receipt of this correspondence. Any questions you have may be directed to Richard Berg, Area Archaeologist, at 612/373-1145.

Sincerely,

Acting Area Director

Enclosure

cc w/o encl Menominee Forestry

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS

MINNEAPOLIS AREA OFFICE
331 SOUTH 2ND AVENUE
MINNEAPOLIS, MINNESOTA 55401-2241

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IN REPLY REFER TO:

FORESTRY

COPY FOR YOUR INFORMATION

MAY 10 1996

U.S. Fish & Wildlife Service
1015 Challenger Court
Green Bay, WI 54311
Attn: Janet Smith

Subject: Preparation of an Environmental Assessment (EA) for the Menominee Forest Management Plan, 1996-2005

Dear Ms. Smith:

Enclosed with this letter is a copy of the proposed Menominee Forest Management Plan for the period 1996-2005. The Deputy Commissioner of Indian Affairs and Deputy Assistant Secretary - Indian Affairs (BIA) have directed the Minneapolis Area Office to prepare an EA for the subject Plan. The plan was written by Menominee Tribal Enterprises to show policies, guidelines, and procedures used to manage the reservation forest (219,055 acres) according to sustained-yield forestry principles (Enclosure). Sustained-yield is defined as the yield of forest products that a forest can produce continuously at a given intensity of management (25 USC § 3103.14).

The development of the plan included participation of the BIA Menominee Forestry Center staff and the Wisconsin Department of Natural Resources (DNR). Menominee Tribal Enterprises (MTE) is responsible for the implementation of the plan. This plan is intended to provide long range forest management guidelines for the Menominee Reservation.

For purposes of this undertaking, the Area of Potential Effect would be all lands within the boundary of the Menominee Reservation. I am seeking your views on this project under 36 CFR 800.4(a). Please send your comments regarding pertinent issues, concerns, and opportunities to:

Mr. Dave Congos, Menominee Forester
Menominee Agency, BIA
Branch of Forestry
P.O. Box 670
Keshena, WI 54135

Please send your comments to Mr. Congos within 30 days after receipt of this correspondence.

Sincerely,

Acting Area Director

Enclosure

cc: w/o encl Menominee Forestry
Environmental Services

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Green Bay ES Field Office
1015 Challenger Court
Green Bay, Wisconsin 54311-8331
June 7, 1996

Memorandum

To: Menominee Forester, Menominee Agency, Bureau of Indian Affairs
Attention: Dave Congos

From: Field Supervisor, ES Field Office, Fish and Wildlife Service, Green Bay, WI

Subject: Review of Menominee Forest Management Plan, 1996-2005, Menominee Indian Reservation, Menominee County, Wisconsin

The U.S. Fish and Wildlife Service (Service) has reviewed the Menominee Forest Management Plan (Plan) for the subject project. We offer the following comments relative to potential impacts of the project on endangered species.

ENDANGERED SPECIES ACT COMMENTS

A review of our files indicates that the following federally-listed species are present in Menominee County:

Classification	Common Name	Scientific Name	Habitat
threatened	bald eagle	Haliaeetus leucocephalus	breeding
endangered	Karner blue butterfly	Lycaeides melissa samuelis	prairie, oak and jack pine areas w/wild lupine

The Karner blue butterfly is known to occur in the southeast portion of the project area. In addition, a number of bald eagle nests occur within the project area. According to information contained within the Plan, Menominee Tribal Enterprises (MTE) will take all possible steps to avoid adverse impacts on threatened and endangered species. The Plan also states that in the event that a proposed forestry treatment can not be modified to avoid adverse affects on listed species, an environmental assessment (EA) will be completed.

The Service believes that procedures described in the Plan will avoid major adverse impacts to the environment in general. However, the bald eagle and Karner blue butterfly are both subject to adverse impacts due to timber harvest practices under certain conditions. The Service asks that information be included in the Plan which will set guidelines for avoiding adverse impacts to these species. The Service considers activities which conform to the following guidelines as avoiding effects to the bald eagle and the Karner blue butterfly:

1. To avoid affecting the bald eagle, no timber harvest should occur within 660 feet of any bald eagle nest during the critical period from March 1 to July 31. In addition, no timber harvest should occur within 330 feet of the nest at any time.

2. To avoid affecting the Karner blue butterfly, no timber harvest should occur in any areas occupied by the butterfly. For purposes of this guideline, "occupied" refers to areas of wild lupine (*Lupinus perennis*) which support populations of the butterfly. Wild lupine is the sole food plant of the larvae of the Karner blue butterfly. We recommend that if the presence of the butterfly is suspected, a vegetational survey be conducted during late May to early June, a period during which wild lupine is easily detected. This time period will coincide with the early flight of the butterfly, and may or may not determine its presence or absence. If the butterfly is suspected to be present, but not observed during the early flight period, the area should be surveyed again during its second flight period, from late July through early August.

In summary, the Service considers that any timber harvest activities conforming to these guidelines will avoid adversely affecting listed species. Should a timber harvest be proposed which will not meet these guidelines, the Service should be contacted for further guidance on measures which can be taken to avoid adverse affects.

This precludes the need for further action on this project as required by the 1973 Endangered Species Act, as amended. Should the project be modified or new information become available that indicates listed or proposed species may be affected, consultation should be initiated.

Janet M. Smith

cc: BIA, Minneapolis Area Office, Minneapolis, MN Attention: Herb Nelson

C:\WP51\ENDSPP\MENOMINE.E/JAT/jat

5/20/96

Angie Torness
Park Service, Milwaukee

Question on buffer/riparian zones
Hasn't checked to see if a "plan"
has been written under Wild & Scenic
River Act - a study was done -
will check on this + she realizes
NPS hasn't done much over the years -
NPS policy - unsure if exactly ~~the~~ policy
on this; probably all in joint consultation

Regie Torres / Park Service 6/14/96

- Corridor along river
- Wildlife + Aesthetics

Q? Provision for aesthetic - mention non-timber consideration

Educate visitors re: Menominee non-timber practices

Wanted to know if plan would be revised if EA would address concerns. Said it was uncertain, but BIA would probably answer through the EA + have field guide + procedures on file at MFC as attachments to the FMP. Sounded OK. to her.

MENOMINEE INDIAN TRIBE OF WISCONSIN

P.O. Box 910
Keshena, WI 54135-0910

November 18, 1999

Marshal Pecore, Forest Manager
Menominee Forestry Center
P.O. Box 680
Keshena, Wisconsin 54135

RE: Environmental Assessments?

This memo is for your information. On Tuesday, October 12, 1999 I was part of a three way conference call with Mr. Herb Nelson, Environmental Specialist, Bureau of Indian Affairs, Fort Snelling Minnesota, Mr. Gary Schuettpelz, Director and Mr. Doug Cox, Environmental Specialist, Environmental Services, and Mr. Steve Pertinizer, Director, Natural Resource Conservation Service, and myself. The issue discussed was Environmental Assessments (EA's). To my understanding, Mr. Nelson stated that any federal, Bureau funded program for any type of construction must have an environmental assessment completed before the project starts. This in turn will affect the MTE Forestry Program. By allowing Environmental Services to make an issue for the Camp 19/Old Railroad Grade Waterfowl Management Project, this has opened a can of worms in the Bureau of Indian Affairs Office in Fort Snelling, Minnesota. Mr. Cox asked Mr. Nelson, BIA that my program was receiving federal dollars for wild rice restoration and the planting of wild rice and Mr. Nelson stated that if this was Bureau monies that in order to comply with federal law, an environmental assessment will have to be completed.

Correct me if I am wrong, MTE Forestry monies are BIA dollars. If the fish and wildlife program needs to complete EA's for fish and wildlife projects, I think forestry would need to do the same for the following:

1.) Any type of road construction (widening, plowing, etc).
2.) Burning wildlife openings.
3.) Any forest management prescription (shelterwoods, clearcuts, etc.)
4.) Planting of trees.
5.) Spray projects.

Anything on this list is defined as construction because you are altering the habitat in some way shape or form. This may be a short list, but according to Mr. Nelson, BIA, he has contacted Mr. Robert Jackson, Wildlife BIA and informed him of these situations in fish and wildlife. Forestry is not exempt from this. If I can be regulated for planting wild rice, Forestry may be next. My question is are we setting ourselves up for over regulation and not managing, which we should be doing? Or did we create a position for Environmental Services? If they want to complete EA's for every project, I am all for that. I have a full slate of goals and activities to accomplish and assisting in EA's is near the bottom.

I am not happy with the decision to complete an EA for the Camp 19/Old Railroad Grade Project because this area has been inhabited by beaver and under water every year since the building of the railroad grade, but I will comply and assist Environmental Services with this. For this project, what we wanted to do was create control over this area. With beaver, we cannot. The area has several active beaver dams present.

Again, this is for your information. If you should want an update of the previous waterfowl management areas, please request. I have completed waterfowl indices, reviewed animals present, and planted wild rice for two years (some three years). Each project has been working well. Maintenance has become a problem, but for the most part, minimal. There is a misconception that things are way out of order, this is false. I am not amused at certain things taken place over the last few months, but communication is the key. If you have questions, please contact me, that is why I am here.

Thank you for your time,

Donald J. Reiter, Fish and Wildlife Manager
Menominee Indian Tribe of Wisconsin

c. Dave Congos, BIA Forester
Myron "Sonny Pat" Grignon, MTE Board
Larry Waukau, MTE President