2012

Forest Management Plan

STOCKBRIDGE-MUNSEE COMMUNITY

Revisions to the 2009

Forest Management Plan

Approved October 23rd, 2012

2012
FOREST MANAGEMENT PLAN

Revised by: _____ _____
Paul Koll Date
Tribal Forester

Reviewed by: _____ _____
Forestry Committee Date
FC Chairperson - Beau Miller

Approved by: _____ _____
Stockbridge-Munsee Tribal Council Date
President– Bob Chicks

Concurrence: _____ _____
Date

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PREFACE

This 2012 revision to the Stockbridge-Munsee Community Forest Management Plan (FMP) provides the most up-to-date information available on the forest resources of the Stockbridge-Munsee Community. The FMP also provides the means for the Bureau of Indian Affairs to incorporate its approval of the Tribe's Forest Management Plan, and begins to implement their strategy to achieve the objectives outlined in it.

The 2012 revision is focused on updating various figures and values, which are used to describe the forest resource. Values used are taken directly from the 2008 Stockbridge-Munsee Continuous Forest Inventory Analysis. The FMP provides the most current forest information related to volume, growth, mortality, health, and harvesting.

I. DESCRIPTION OF THE FOREST

As of July 2012, the Stockbridge-Munsee Community's ("Tribe") land base is 23,741.0 acres; of this 17,217.5 acres are held in trust status for the Tribe by the federal government and 6,523.4 acres are owned in fee simple by the Tribe. Fee lands are further divided by tax structure into Managed Forest Law lands, Forest Crop lands and other fee lands (815.5 acres, 2,685.5 acres and 3,022.4 acres respectively). Excluding acres associated with tribal infrastructure (housing, utilities, industrial, commercial, government, agricultural, parks and recreation and multi-purpose), the Tribe has 20,817.9 acres that are considered commercial forest and managed under this forest management plan. Trust lands contain 14,678 acres designated as commercial forest while fee lands contain 6,139.9 acres. However, only portions of the commercial forest are considered harvestable. Trust lands contain 10,161 harvestable acres while fee lands contain 5,486.9 harvestable acres, for a total of 15,647.9 harvestable acres. These acreages are continually changing as new land is purchased, zoned and parcels are enrolled in trust status. Minor discrepancies from these acreages have been noticed and can be attributed to variances in when and how parcels were digitized. For this management plan, all values associated with trust lands will be consistent with the Bureau of Indian Affairs' ("BIA" or "Bureau") Continuous Forest Inventory Analysis ("CFI"), while all values associated with fee lands will be calculated by the Tribe and consistent with the values above. As newer and better data are gathered and analyzed, these numbers will be updated.

A. GENERAL OVERVIEW

Glaciers left a diverse terrain with complex ecosystems across the Stockbridge-Munsee Reservation. The uplands range from hilly, rocky ground moraines with rich mixed hardwoods to nutrient poor hemlock and red pine stands. The lowlands vary from open beaver marshes to dense conifer swamps. Clear streams meander through the lowlands and cascade over rocky outcrops in the uplands.

The Tribe's forest is rich and varied with a wide variety of tree species occupying both the uplands and lowlands. Although the forest is located in the northern hardwood forest region of Wisconsin, there is a pronounced influence of southern plant species in its forest composition, most notably bitternut hickory and American beech. Today's forest is a direct result of timber harvesting practices and forest fires that occurred around the turn of the 20th century. The current high quality, even-age forest that developed since is generally younger than 100 years. Although the forest is predominantly even-age, approximately 55% of the forest has the capability to be managed all-age. Current forest management prescriptions are designed to convert stands with all-age potential to an all-age condition.

The Tribe's forest provides habitat for a wide variety of native wildlife species that are typical of northern Wisconsin. Rare species also exist within the reservation because of the heavily forested nature of the land compared to the surrounding private lands. For

example, the red-shouldered hawk is listed as threatened on Wisconsin's Natural Heritage Inventory, yet flourishes throughout the forest during the spring, summer, and fall. There is also a resident wolf pack that dens, rendezvous and utilizes the forest. The Tribe will continue to review the endangered species list to reduce the potential of detrimental effects to these endangered resources in future management activities.

This area is in the Wolf River Basin which drains into Lake Michigan through Green Bay. The Tribe's forest joins the forests of Menominee Reservation and the Nicolet National Forest to the North. Since the adjoining forests make up a major component of Northern Wisconsin forests, the Tribe and surrounding entities plan to meet on a yearly basis to discuss activities that could affect one another. Approximately 50 miles of rivers and streams drain this forest. Cold water from springs and seeps keep these waters cool providing excellent trout habitat. Most of these rivers and streams are classified as class 1 and 2 trout streams.

The forest provides many benefits to the Stockbridge-Munsee Tribe. Tribal members harvest fish, game, raw materials and wild crops from the forest. The traditional fall deer hunt, in particular, provides an important source of food for tribal members and collecting and making maple syrup is a prominent custom repeated every spring. Raw materials for home construction and fuel wood for home heating are important forest resources often utilized by tribal members. Wild berries, ginseng, mushrooms, and greenery are also often gathered and provide numerous benefits to tribal people.

B. FOREST HISTORY

The Bureau of Indian Affairs, in Ashland, developed a book in 1996, now available to the Tribe, which is a documented history of timber and forest management activities on the forest. Although this document deals primarily with forest use, it also includes a narrative chronology of events and peoples (both prior to and during the period of BIA responsibility) that impacted the character of the forest resource. The book is titled ***A Forestry History of Ten Wisconsin Indian Reservations Under the Great Lakes Agency***, and was written by Anthony Godfrey of the US West Research Inc.

The early history of the forest resource of the Stockbridge-Munsee Forest is similar to the surrounding Lakes States region. Prior to European settlement of the 1800's, the forest occupying the reservation area was comprised of a mix of maple, hemlock, and yellow birch growing under a canopy of large pines. This forest was dynamic due to periodic windstorms, fires, and insect and disease out breaks, which made the forest an ever changing environment. These disturbances created gaps in the forest canopy which provide sunlight to seedlings on the forest floor.

By 1910, European settlement had completely harvested all accessible trees of commercial value. First, the white pine was cut to build cities and towns. Later the hardwood was cut to supply the furniture industry. The resulting slash coupled with the

creation of open spaces for farmland, fueled great fires. Today's varied timber resource is a result of this interruption in forest succession.

Very little timber was harvested between 1910 and 1950 as the forest was very young. Logging operations started to increase during the 1950's and 1960's with hardwood saw timber selectively cut from the forest. Then three significant events occurred in the early 1970's that rapidly altered the progression of the forest.

- Dutch elm disease virtually eliminated American elm from the forest. Prior to this disease, elm comprised a substantial component of the forest.
- The Tribe began to intensify its forest management program. The BIA supplied a forester in 1978 to work full time on the forest. The forestry program concentrated on salvaging elm, harvesting mature aspen through the clear-cut system, and select cutting northern hardwood stands.
- Hardwood pulpwood markets developed around the area. These markets, non-existent before, allowed for the sale of this previously un-merchantable forest product.

Since the 1970's, there has been a decline of early successional species as they reach biological maturity and make way for later successional species. Common early successional species include: white birch, aspen, black cherry, yellow birch, butternut, basswood, and balsam fir. A combination of other factors may be aiding this decline like stress from the 1988 drought, insects and diseases.

Timber sales were negotiated with Tribal loggers until 1989. That year, the Tribe elected to sell their timber on the open market to the highest bidder. This method of competitive bidding has increased the stumpage revenues generated by sales of timber.

Current markets for forest products are good depending on species and quality. Stumpage rates for pulpwood range from $6.00 to $41.00 per cord. Stumpage rates for saw timber range from $135.00 to $465.00 per thousand board feet. Prices for delivered pulpwood range from $40.00 to $80.00 per cord. Prices for delivered sawlogs range from $50.00 to $1500.00 per thousand board feet.

The current estimated standing volume of timber is approximately 324,000 cords of pulpwood and 69,000,000 board feet of saw timber. The volume per acre is approximately 32 cords and 6780 board feet. Annual growth is approximately 0.7 of a cord of 134 board feet per acre. These estimates are for trust lands only. Data for fee lands are currently being evaluated and subsequent volume estimates will be added to this plan when available.

There was a substantial increase in the annual harvest starting in 2002 when the intensity of forest management increased as a result of emergency salvage operation in connection to thousands of acres of blowdown. This figure shows that the AAC was exceeded eight times over this 30 year period.

Figure 1 also shows that adjustment in the calculated AAC on trust lands during this period. This is due to recalculations of the forest inventory every ten years. The first four allowable cut calculations where based on harvesting all high risk trees with no regard for even flow. As the forest matured, there would be more high risk trees. In 1990 the allowable cut was recalculated using different assumptions. The new calculations assumed that a more continuous even flow of acres managed, volume harvested and stumpage income earned was desired though the entire rotation and future rotations. The current AAC is based on targeting a certain level of volume. With the measured growth of the forest in the last inventory, data has shown more volume can be harvested from fewer acres when compared to previous measurements.

Figure 1 shows the annual allowable cut ("AAC") and the annual harvest volume on trust lands since 1980.

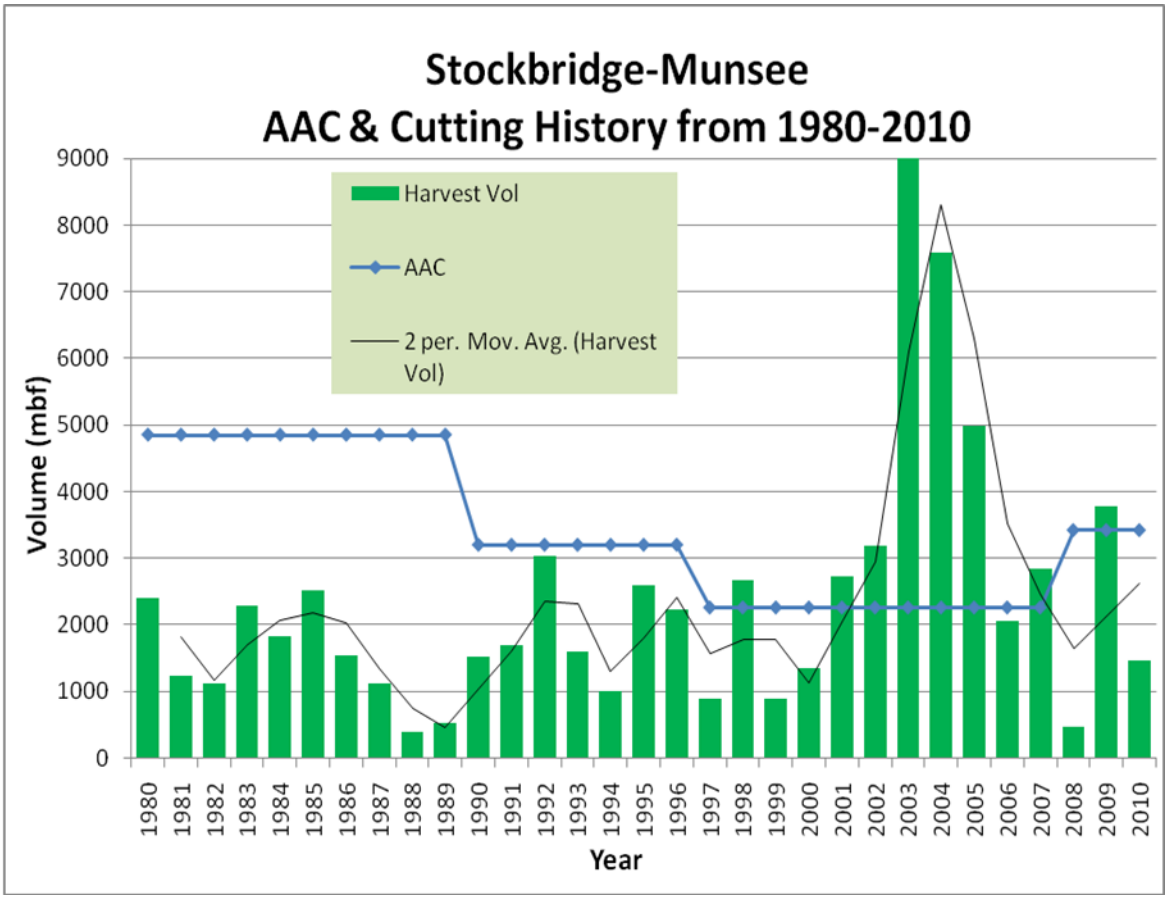
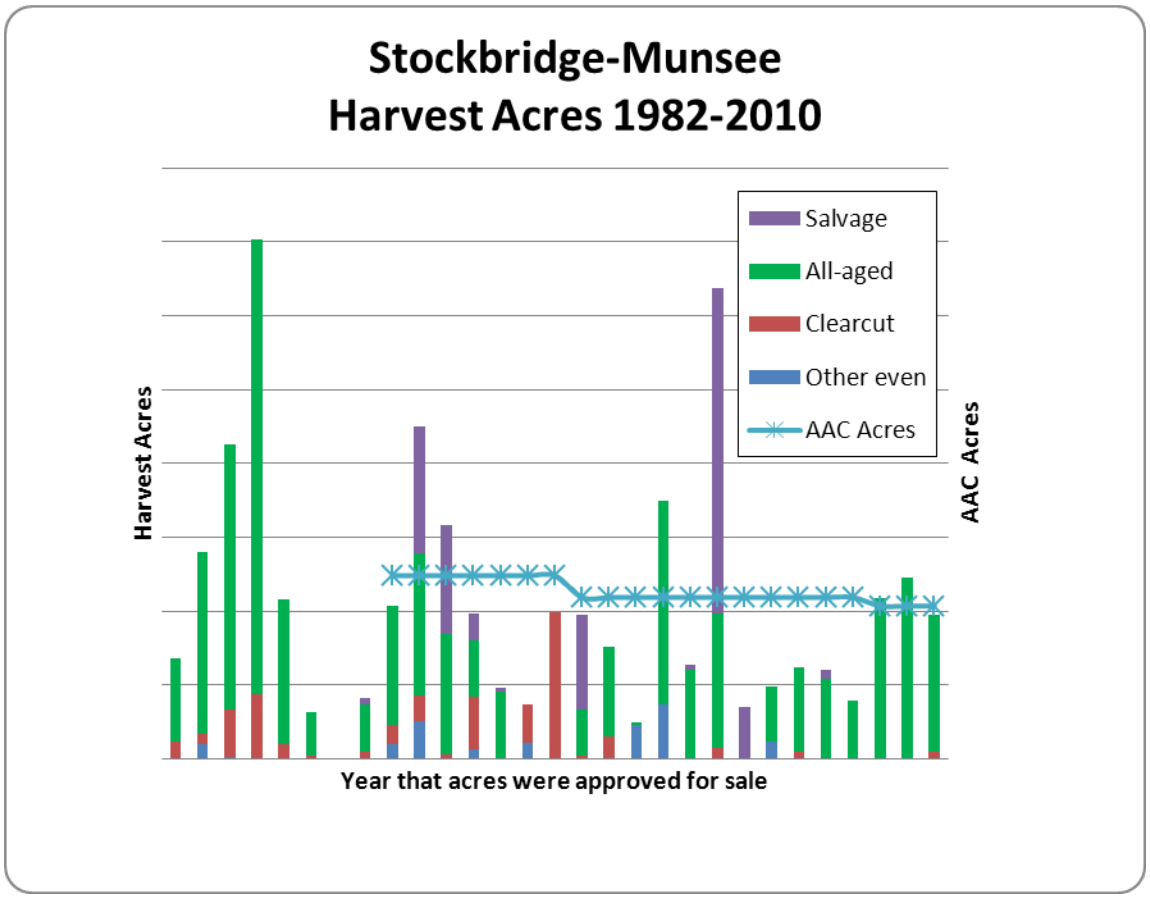
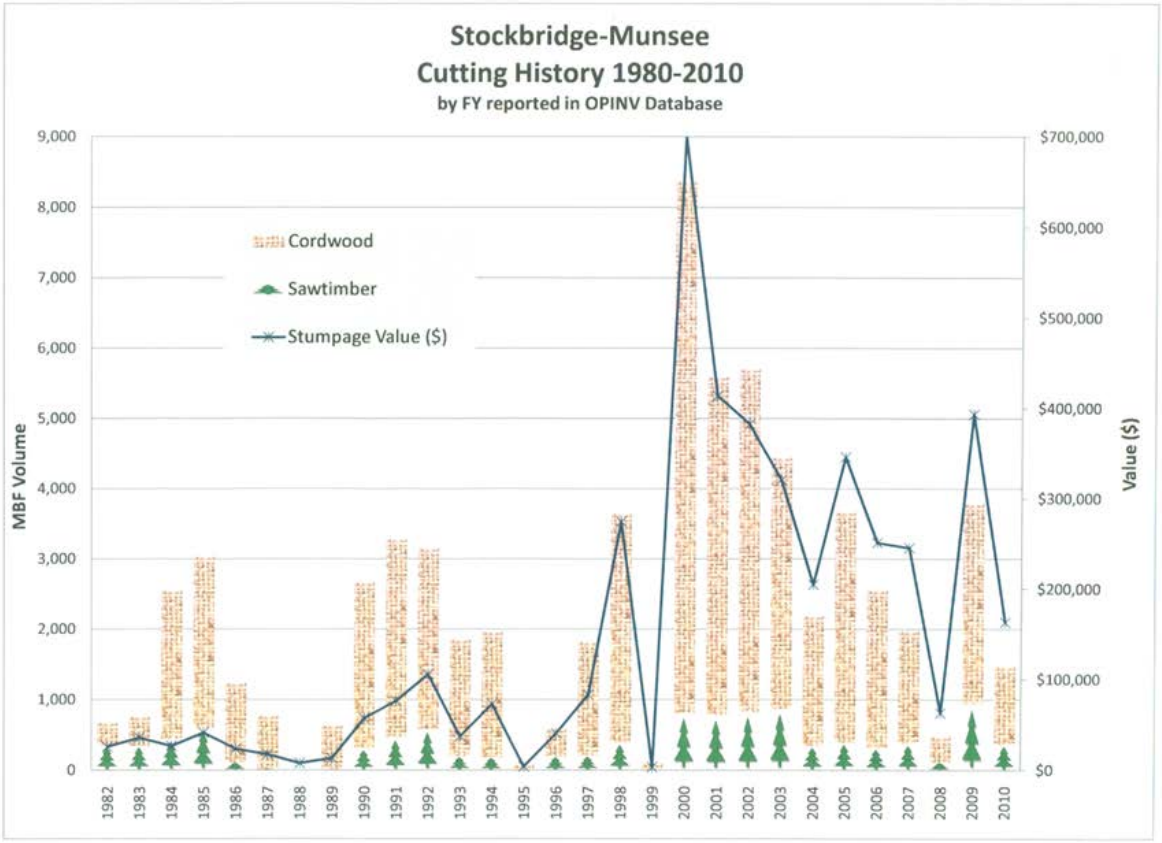


Figure 2 shows the type of silvicultural management implemented on trust lands through timber sales from 1982-2010.



In 1992 and 1993 more emphasis was given to regeneration harvests. This acreage was primarily mixed hardwood, white birch, and aspen cover types that were in rapid decline. These acres have since successfully regenerated with aspen, white birch, red oak, and red maple. A dramatic decline in timber sales occurred in 1993 as a tribal moratorium was established prohibiting further sales of timber until a forest management plan was approved and in place.

Figure 3 shows the proportion of forest products harvested from trust lands annually since 1982 and the stumpage earned through the sale of these products.



This chart also shows that the predominant forest product harvested is pulpwood which is usually produced from poor quality trees. The harvest of these trees provided additional growing space for the better quality trees that will produce higher valued saw timber. As time goes on, more and more saw timber will be harvested from the forest.

C. FOREST RESOURCE ANALYSIS

An accurate analysis of the forest resource can only be made from intensive forest inventory. An inventory is a reliable, statistically-based estimate of the timber volume on the forest as well as in each stand, by species and diameter. Forest inventory includes determination of area, growth, condition and quality of species, as well as associated trends.

There are two separate forest inventory systems that we use in order to collect the necessary forest data.

1) The first system is Continuous Forest Inventory (CFI) and was first implemented on the forest in 1959. Over 200 one-fifth acre plots were permanently established and randomly located throughout the forest. All trees in the plots were permanently numbered and these trees are re-measured every 10 to 15 years to determine growth rates. Five re-measurements have been conducted in 1964, 1969, 1979, 1989 and 2004. The ***Stockbridge-Munsee Indian Reservation CFI Field Manual*** explains the field procedures. This type of inventory provides information on total volume, growth, decline, species composition and long term trends. This system is currently being implemented on trust lands and its data extrapolated to both trust and fee land management.

2) The second system is a stand exam. Initial exams on trust lands were completed in 1988 and the initial exams on fee lands are being completed in 2012. Individual stands or forest types are identified. A forest type or stand is a contiguous area where the species, size, age and general condition of the trees is uniform enough to be distinguished from adjacent areas. The stands are delineated on aerial photos and inventoried on the ground. The objective of a stand exam is to collect information specific to individual stands and provide basic forest management data on a stand by stand basis.

On trust lands, over 450 separate stands have been identified with an average size of 33 acres. These stands are grouped into 10 compartments. Each compartment is between 1,000 and 1,500 acres in size. The stand exam data is continuously updated and refined as timber sales are prepared, regeneration surveys are completed and as forest development projects are proposed. This data is maintained and accessible electronically from the BIA and from the Stockbridge-Munsee Forestry Office. Also, the stand exam data has been integrated into the Bureau's Geographic Information System (GIS) so that forest information (i.e. cover type, stand condition, etc...) can be displayed.

An Inventory Analysis was prepared by the BIA in February of 2008 which summarizes the CFI and stand exam data for trust lands. Similar analysis is being compiled from stand exam data collected on fee lands and this plan will be updated when it becomes available. A copy of the Inventory Analysis is available upon request from the BIA. A brief summary of forest information from that document is copied below:

The 2004 Stockbridge-Munsee trust land forest had slightly fewer trees per acre than previously documented but they are considerably larger in diameter and total height. This is an expected trend from a maturing forest. Mean-annual-increment ("MAI") appeared to have leveled off, which indicates the overall forest has surpassed its maximum annual growth rate. Even though the diameter increment started to drop, tree volumes have continued to increase each year.

This analysis was based on the 10,161 trust land acres of harvestable forest (forest capable of and administratively identified as being able to produce commercial timber products). These acres were measured to have approximately 231 million board feet of timber. The forest grew about 5 million board feet of timber per year total, 0.71 cords of pulpwood and 0.134 MBF of sawtimber growth per acre per year. Timber harvests have consumed approximately 2.7 million board feet of forest volume per year. This was comprised of 4752 cords/year of pulpwood and about 346 MBF/year of sawtimber (about 54.6% of growth). Natural mortality consumed approximately 2,156 cords of pulpwood, and about 300 MBF per year. This was about 1.4 million board feet of timber per year (about 27.6% of annual growth). Harvesting and mortality consumed 82% of annual growth.

*From this data, the AAC for trust lands is calculated to be 414 acres per year, producing approximately 3.4 million board feet of timber (*note this is much lower than the annual allowable volume value described later). This is only about 68% of the forest's annual growth, 4% higher than what has been occurring on the ground thus far.*

Northern hardwoods are still the most abundant forest type, covering approximately 44% of the forest. Swamp conifers are the second most common, occupying about 11% of the commercial forest acreage. Aspen, Hemlock, and non-forest types cover about 10% each.

The forest is maturing which has been documented in the forest's stand age distributions and in the noticeable increases in insect and disease problems. In the past, it has been subject to damaging agents such as: forest tent caterpillar, elm spanworm, sugar maple borer, and Phellinus spp. rot. Now there are new emerging threats to the forest that managers need to be aware of, such as Gypsy Moth, Emerald Ash Borer, and Oak Wilt (Ceratocystis spp.) fungus. There has even been some recent research that suggests a lot of recent Hickory mortality can be linked to the Ceratocystis fungus, and the Hickory borer. Both of which utilize over-mature trees as their preferred hosts since they are less resistant to infection. Still, the forest has an average tree survival rate of about 72%, which is excellent. For comparison, other local forest inventories have survival rates between 63% and 67%.

Timber quality in the forest is good. Cull tree volume percentages were analyzed by specific forest types, and have shown to be less than 10% for both pulpwood and sawtimber. Surprisingly, there is a higher amount of cull volume in the sawtimber, which may be attributed to the older age of these trees and the probability of being subjected to more damaging agents in nature.

Growth rates have remained relatively consistent since the last measurement. This is good, since early indications in stem diameter analysis indicate the forest's MAI had been decreasing since 1989. Growth rates indicate an increase of 2.2% per year of the commercial forest's total volume. When compared to other reservations this is above the norm as one was shown to have a 2% annual growth rate, while another had a 1.6% annual growth rate.

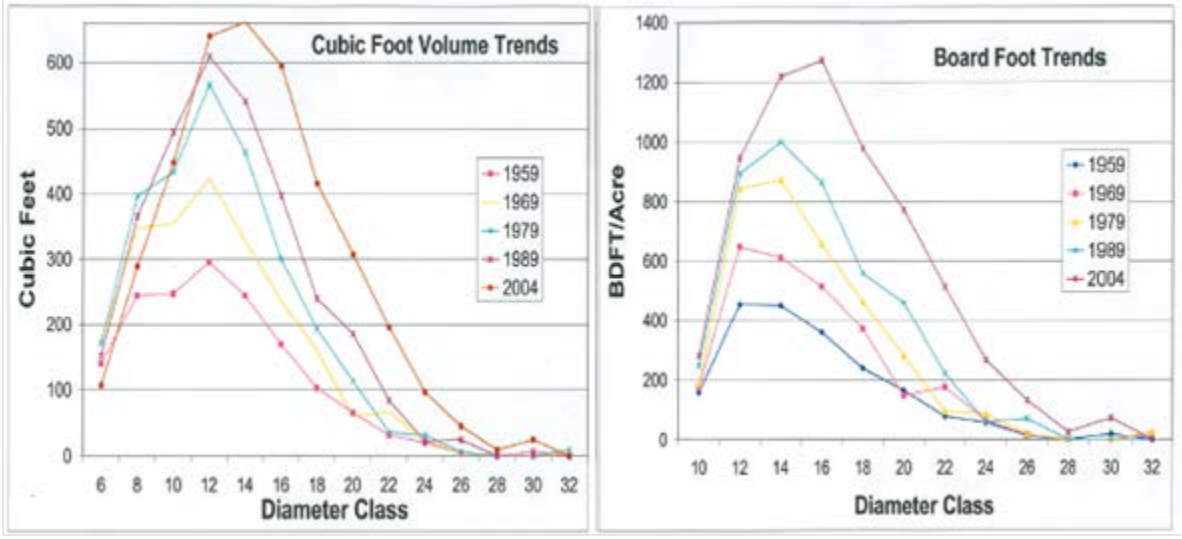
The condition of the forest has been evaluated to be good. Several factors were evaluated, including: stand age, tree problems, sawlog tree grades and causes of tree mortality. About 62% of the sample trees had no recorded problems. Heart rot was the most common problem for softwoods, affecting about 4% of the sample. Hardwoods had more recorded problems, especially ones related to the bole, such as cankers (6%) and mechanical damage (4%) caused when the bark of one tree is damaged by the falling or felling of another. Weather was a big damaging agent to both softwoods and hardwoods, affecting almost 4.5% of each.

The saw timber portion of the forest contained some very high quality timber, which equals very high value timber. Approximately 34% of the sawtimber was Tree Grade 1, which is the portion where the highest value products such as veneer are produced. Most notably, the red oak quality was excellent. Almost 50% of the live tree volume was in Tree Grade 1. Still, almost half (43%) of the forest's volume was low grade material (Tree Grade 3) which still leaves plenty of room for improvement.

The most common cause of tree mortality during the last inventory was from weather, primarily blowdown from the severe weather events over the last 10 years (1997 and 2002). This caused approximately 21% of the tree mortality. Overall natural mortality in the forest consumed about 54% of the dead trees. Timber harvesting was the cause of death for about 46% of the dead trees.

The value of an unchanged continuous forest inventory sampling design is that it provides uninterrupted information on forest trends. One trend discussed earlier, was the change in forest composition, from that of a forest dominated with early successional species such as aspen, birch and hickory, to one dominated by longer lived tree species such as ash, maple, and cedar trees. The trends also show how the forest is made up of fewer, but larger sized trees today than ever before, Figure 4.

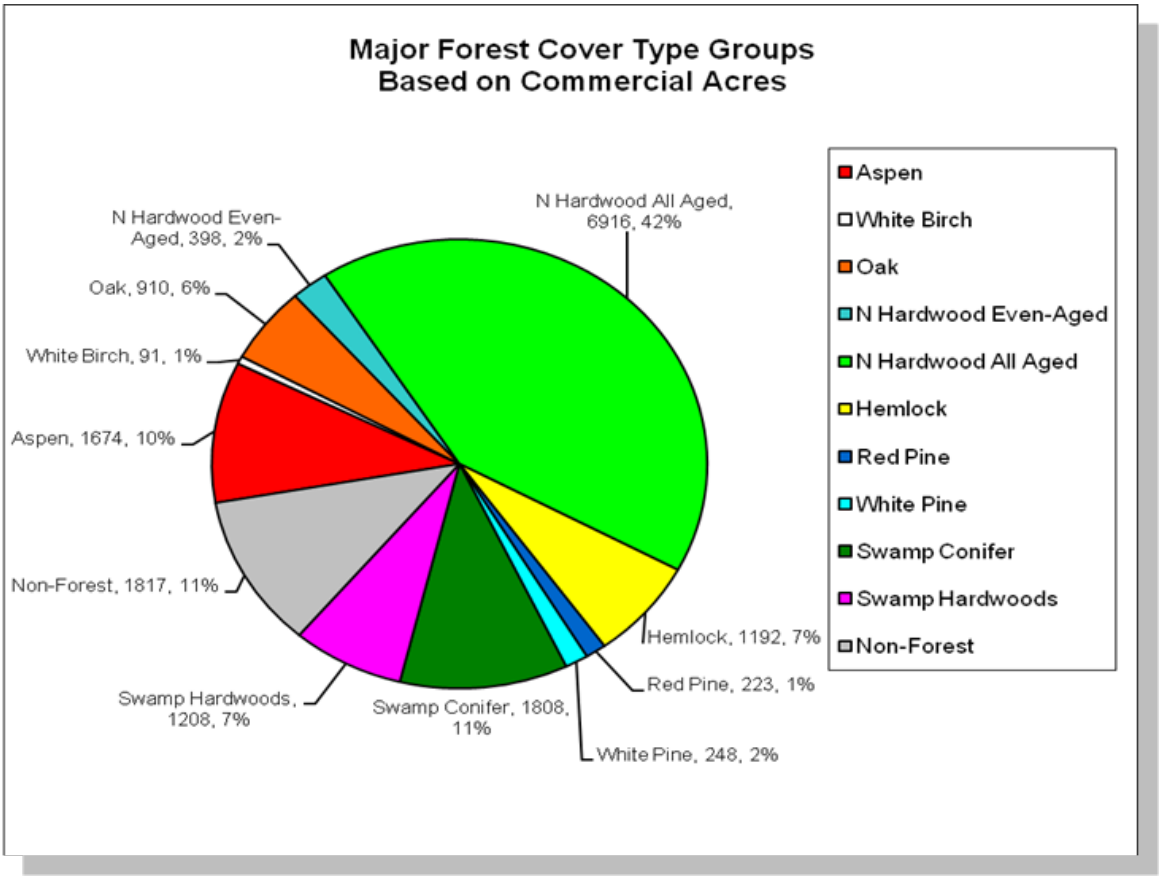
Figure 4: *Trends in forest volume and tree size classes.*



Numbers of trees in the 6 to 8 inch size classes have decreased, while the numbers in the 10 to 20 inch diameter classes have increased. Significant volume gains have been seen in the 14 to 24 diameter classes.

Eighteen forest cover types have been identified within the forest. These cover types can be lumped into seven general types. These cover types range from early successional trees species to climax tree species such as sugar maple, white ash, and hemlock.

Figure 5 shows the forest types grouped together as they are grouped in the ***Silvicultural Guidelines***.



There are 31 trees species that are documented inhabiting the various ecological habitat types across the forest. Eastern hemlock is the most abundant species found on the forest. Twenty-seven species are considered to have commercial value. Nine are softwoods and eighteen are hardwoods.

Softwoods	Hardwoods
Eastern Hemlock	Sugar Maple
Balsam Fir	Red Maple
White Pine	Northern Red Oak
Red Pine	White Birch
Jack Pine	Yellow Birch
White Spruce	Basswood
Black Spruce	White Ash
Northern White Cedar	Black Ash
Tamarack	Quaking Aspen
	Bigtooth Aspen
	Black Cherry
	Bitternut Hickory
	Butternut
	American Beech
	American Elm
	Rock Elm
	Slippery Elm
	White Oak

Four are not considered as commercially valuable.

Black Willow
Silver Maple
Balsam Poplar
Ironwood

A range of ecological habitat types, from dry-nutrient poor to wet-nutrient rich types, are found across the forest. Sugar maple is present on most of these sites, but is more productive on drier habitat sites where red oak and white pine management is possible. These existing habitat types are grouped into three broad but distinct groups of closely related habitat types based on soil moisture and nutrients, which affect forest dynamics and productivity. These categories are:

1- Rich northern hardwood habitat types
2- Dry, nutrient poor red oak and white pine habitat types and the hemlock habitat on soils with poor drainage
3- Wetlands, including swamp conifers and swamp hardwoods

II. CURRENT FOREST MANAGEMENT PROGRAM

This management plan covers the 20,817.9 acres of commercial forested land broken into harvestable forest (15,647.9 acres) and High Conservation Value Forest reserve (HCVFs) (5,170 acres). (HCVFs will be defined in detail later in this document.) Lands not included are housing developments, utilities, industrial, commercial, government, agricultural, parks and recreation and multi-purpose areas.

The Stockbridge-Munsee Forestry Department is currently staffed by a BIA forester and one tribal forestry technician that manage tribal trust lands. In addition, the Forestry Department has one full-time tribal forester and one full-time forestry aide that manage tribal lands owned in fee simple status. The Tribe has a Public Law 93-638 forest management contract with the BIA that provides partial funding for the forestry technician's salary, fringe, indirect costs, travel and supplies.

The BIA forester is responsible for forest management on tribal trust lands since the forest is considered to be a trust resource. This includes preparing timber harvesting schedules, timber sale preparation, timber sale contract administration and the collection and maintenance of all records on trust lands. Also, the BIA forester develops and administers forest development projects such as tree planting, release cutting, road maintenance projects, etc. The forestry technician assists the BIA forester with work on trust land but may also assist the tribal forester on fee lands as needed (although funding is not provided for this purpose through the BIA).

The tribal forester's duties in relation to the fee land forest include forest inventory, marking timber, setting up timber sale contracts and generally overseeing the fee lands before they go into trust. The tribal forester and tribal forestry aide may also assist on trust lands when needed.

The forestry personnel of the Branch of Forestry at the Great Lakes Agency at the BIA provide technical assistance, overhead and support staff to administer this program along with forestry programs on nine other reservations in northern Wisconsin. The Forest Development Officer (current Agency Silivculturalist) assists with stand management decisions. This person is responsible for planning and maintaining the forest inventory systems used in forest management decisions. This person also provides technical assistance in developing forest management plans and GIS mapping. Timber trespass and forest fire prevention and suppression are handled by the BIA forester. The entire program is administered by the Agency Forester.

Occasionally, assistance is obtained from other agencies and organizations. The Wisconsin Department of Natural Resources, from the Bowler Ranger Station and the Keshena Ranger Station, along with the Stockbridge-Munsee Fire Department, provide fire protection services for the forest. The United States Forest Service provides consultation and funding on insect and disease problems. In the past, the College of Natural Resources at the University of Wisconsin-Stevens Point provided expertise with the development of the management plan.

Multi-year cutting plans, based on the forest inventory, outline proposed timber sales. Three year cutting plans will be the minimum. In-depth field reconnaissance refines these proposed timber sales and a timber sale is prepared after approval from the Tribe's Forestry Committee and Tribal Council. The forester's proposal explains how the proposed treatment meets the Tribe's management goals. This report describes all aspects of the proposed timber sale. Included with the forester's report is a sample timber sale contract. These documents are reviewed by the Bureau for trust land before the timbers sale is awarded. BIA approval of the report assures that acceptable silvicultural procedures, following sustained yield forest management principles, are observed.

All timber sales identified in the multi-year cutting plan of the regular timber sale program are normally advertised on the open market to the highest bidder. However, the Tribe may opt to directly negotiate some timber sales with loggers to expedite the harvest of damaged timber. The Tribe may decide to enterprise timber sale(s) on some fee lands in order to maximize timber value. The Tribe may also purchase the timber sale(s) themselves. These situations are generally the exception rather than the rule. Such exceptions will require a recommendation from the Forestry Committee and Tribal Council approval. Efforts will be made to contact tribal bidders in all logging jobs.

The BIA forester is responsible for resources accountability in relation to forest resources on trust land. For each active sale on trust land forest, a monthly "Report of Timber Cut" is submitted by the forestry department to the Stockbridge-Munsee Forestry Department Head, Tribe, contractor, and Bureau. These reports should show the volume and value of forest products harvested during that period. Contract compliance is also noted along with a running tally of all volume and value harvested to date and stumpage income earned. The tribal forester is responsible for tracking forest resources and contract compliance in relation to fee land forest.

Stumpage payments for trust land forest sales are made through the Bureau of Indian Affairs. One hundred percent of these funds are transferred to the Tribal Trust Fund Account where it is available to the Tribe to use as they wish.

The Stockbridge-Munsee Tribe has adopted the Forest Resources Regulation Ordinance, Chapter 22, and regulates the use of the forest resource. The Tribe conducts and manages its forest operations under the authority of the Tribal Council through the Stockbridge-Munsee Constitution. The Forestry Committee was established through Chapter 22 to aid in the protection and conservation of the forest resource. This Committee recommends forest activities to the Tribal Council after visiting the proposed project sites. The By-Laws of the Forestry Committee are part of Chapter 22. Chapter 22 also establishes a system for permitting and regulating cutting of the forest resources, as well as penalties for violations of the ordinance. Lastly, Chapter 22 contains the Tribal Timber Sale Bid Policy. The Stockbridge-Munsee Constitution, Forest Resource Regulations Ordinance, Forestry Committee's Policies and Procedures, and the Stockbridge-Munsee Forestry Committee's By-Laws are on file at the Stockbridge-Munsee Tribal Office and many are available on the Tribe's website (www.mohican-nsn.gov).

A. TRIBAL GOALS AND OBJECTIVES

The goals and objectives clearly state the purposes of the forest management of the Tribe's forests. These statements allow the Tribe and its foresters to share each other's perspectives on the management of the forest. These goals and objectives shall be completely understood by all parties.

The goals and objectives in the management of the Stockbridge-Munsee Tribe's forest lands are as follows:

1 - **Protection of the forest from commercial and residential development and land use otherwise known as fragmentation.**

Indiscriminate and poorly planned commercial and residential development in the forest was occurring at an ever increasing rate prior to the adoption of the Mohican Land Use Code, Chapter 43, and Land Use Plan. These documents were adopted by Tribal Council in 2002 and these policies now help prevent the fragmentation that once occurred in the forest.

2 – **The entire natural ecosystem shall be maintained and protected in a fashion that does not rely solely on profit-making. The forest shall continue to provide life for the plants, trees, wildlife, water life and endangered species without destruction to any of these groups.**

This objective not only guides forest management, but mandates sustainable management in all facets of natural resources; including wildlife management, vegetation management, aesthetics, wilderness, fish management and the management of endangered species. The wildlife biologist, environmentalist and hydrologist will be consulted to review each sale and make comments. This consultation will occur before the marking of timber takes place.

3 – **Develop a triad approach to forest land management in which HCVF areas and intensive high-yield timber management areas can co-exist; surrounded by and embedded within a landscape managed by alternative silvicultural systems that can retain some of the values of old-growth forests.**

Selected high-productivity sites with no special ecological characteristics would be allocated to high-yield silvicultural methods, while other lands of unique ecological value would be set aside as HCVFs, also known as "reserves". Then, on the remaining lands that do not qualify for the "high-yield" or "HCVF" status, modified forestry practices would be employed.

III. IMPLEMENTATION OF FOREST MANAGEMENT

Managing the forest to meet the desired tribal goals will require careful timing and sequencing of timber management activities over a long period of time. A written forest management plan allows for an orderly program of management following the Tribe's goals and objectives. It also provides for an element of long term continuity through changes in Tribal Council and forestry staff. This Forest Management Plan (FMP) will be a comprehensive plan that will function as a long range 100 year plan that must be reviewed every ten years. It will provide a long range guide for the current requirements of the Tribal Community as well as satisfying the needs of at least the next seven generations.

This section of the management plan outlines the course of projects based on the Tribe's desired direction of forest management.

A. MEETING TRIBAL GOALS AND OBJECTIVES

> **<u>GOAL #1</u> – Protection of the forest from commercial and residential development and land use that is not consistent with the needs of the Forest Management Plan.**

The implementation of this Forest Management Plan along with the Land Use Code and Land Use Plan will protect the forest from commercial and residential development by zoning the entire land base. These plans have delineated the land base into two zones where non-conforming land use activities will be prohibited. In one zone, commercial and residential development can occur. In the second zone, development cannot occur. This non-development zone includes the commercial forest and the HCVFs..

> **<u>GOAL #2</u> – The entire natural ecosystem shall be maintained and protected in a fashion that does not rely solely on profit-making. The forest management activities shall continue to provide enhancement for the plants, trees, wildlife, waters and endangered species without excessive degradation to any resources.**

1. <u>Ecosystems Types</u>

As stated in the general overview, Stockbridge-Munsee Reservation is located in the northern hardwood forest region of Wisconsin with a mosaic of unique upland and wetland ecosystems. Due to the long history of this property in the ownership of the Tribe, all applicable pre-European settlement ecosystems are represented on the reservation. In 2000, a comprehensive plant survey was conducted to determine ecosystem types found on the reservation and quantify herbaceous cover types. A brief summary of the ecosystems described in the 2000 Plant Survey Final Report follows;

Northern mixed hardwood forest habitat type - This is the most common habitat type at 53% of the forested land base. This forest type is dominated by early and mid-successional species like hard maple, northern red oak, yellow birch, white birch,

American beech, quaking aspen, bigtooth aspen, and hickory. The forest structure is diverse often with multiple age classes, intermediate canopies, a diverse shrub layer and extensive herbaceous layer on rich well-drained soils.

Monospecific eastern hemlock forest habitat type - This habitat type is the second most common system sampled at 13.8% of the forested land base. These stands are dominated by eastern hemlock with little regeneration or understory. Soil types are often mesic well-drained to poorly drained.

Eastern hemlock-mixed hardwood cover type - This cover type is classified as a hemlock stand interspersed with hardwoods (oaks and maples) covering 7.3% of the forested land base. These stands occur on moderately rich and often well-drained soils that allow for the inclusion of hardwood species.

Northern white cedar swamp cover type - This is a very species rich habitat type covering 9.2% of the forested land base. The overstory is dominated by northern white cedar often occurring on poorly drained soils. A diverse array of herbaceous species populates the forest floor with a few shrub species. This forest type can be very important as an overwintering area for white tailed deer.

Second growth/recently disturbed forest cover type - This was a forest cover type with a great variability between respective sample sites. This cover type occupies 8.3% of the forested land base and included early successional species like aspens, red maple, white birch and black cherry. Due to the limited occurrence of large scale disturbances like fire, this forest type is commonly perpetuated through forest management techniques. Many game species occur in this forest cover type making it an important type to perpetuate.

Red pine forest cover type - This is an uncommon vegetation type in the Stockbridge forests and was comprised mainly of plantation stands covering 3.7% of the forested land base. The few occurrences of this forest habitat type were dominated by overstory red pine and white pine and sparse herbaceous and shrub layers. These forests occur on drier sandy soils which are relatively uncommon on the reservation.

White pine forest cover type - This was one of the rarer cover types (pure stands of white pines) covering 1.8% of the forested land base. White pine as a species is not uncommon on the reservation but pure stands are. This white pine dominated forest cover type was historically dominant in the area before the cutover around the turn of the century when the forests were largely in a climax state. The young age of the forests on the reservation are the main reason for the lack of this type. However, this habitat type is a main component and the direction of much of the upland HCVFs.

Red oak forest cover type - This cover type was rare on the reservation covering 0.9% of the forested land base, but was composed of large mature high value trees. These forest cover types are often small and on mesic sandy sites that are not suitable for richer northern hardwoods. Forest management goals will attempt to increase this forest cover type where conditions allow.

Wetland habitat types - Seventeen wetland ecosystems occur on the reservation covering nearly 30% of the current reservation. These habitats are variable in species composition. Habitat types ranged from riparian graminoid-forb dominated meadows to wet sedge meadows, those dominated by woody vegetation (leather leaf, Labrador tea, silky dogwood) to fern-dominated wetlands. Sphagnum moss was a conspicuous component of several wetland communities. Most of these wetland habitats consist of small depressions/basins of one to several acres scattered throughout the forest. All wetlands on the reservation are classified as HCVFs and are protected from development and logging except in emergency salvage operations. See: Timber Harvesting Operations for more conservation efforts regarding wetlands.

2. **<u>High Conservation Value Forests (HCVFs)</u>**
   These areas include places that harbor uncommon features such as the old growth character of unmanaged second growth timber, remote areas, uncommon habitats such as rock outcrops and riparian zones, along with all wetlands which include swamp hardwood and swamp conifer forest types. Also included in the HCVFs are 300 foot buffer strips on each side of the Red River, West Branch of the Red River, and Silver Creek. HCVFs are to be protected from development and non-emergency logging prescriptions. Non-emergency forest management will not be implemented in areas designated as HCVFs. Salvage operations (emergency forest management) from insect and disease outbreaks will be determined and analyzed by the Forestry Department and the information will be brought to the Forestry Committee and then

recommended to Tribal Council for possible salvage or treatment. The integrity of the HCVFs will always be the primary focus in any decisions. The HCVFs will provide a primary old growth component in the landscape and provide the community with recreational and spiritual opportunities. Firewood cutting will be allowed with a free use permit issued by the Forestry Department. Fires will be suppressed to protect all of the commercial forest.

High Conservation Value Forest (forest reserve) lands total 5,170 acres (24.8% of the total commercial forest) with 4,661acres (32% of the trust commercial forest) on trust lands and 509 acres on fee lands (8% of the fee commercial forest). The relatively low amount of HCVFs on fee land can be attributed to the large amount of fee lands in MFL or Forest Crop programs which do not allow for this designation. However, about 813 more acres of fee land are treated as HCVFs, for a total of 1,322 acres (21.5% of fee commercial forest) and will be defined as such once these enrollments have expired. On trust lands these HCVFs include 2,048 acres of forested uplands and 2,613 acres of forested swamps. On fee lands the HCVFs are almost entirely wetlands. The Stockbridge-Munsee Community High Conservation Value Forest Assessment and the Wisconsin Natural Heritage Inventory will be used to evaluate the potential of new land purchased by the Tribe and, if necessary, recommend new HCVFs to the Forestry Committee and Tribal Council.

3. **Representative Sample Areas (RSAs)**

RSAs are ecologically viable areas designed to serve as an ecological reference condition, to create or maintain under-represented ecological conditions, or to protect areas or refugia for species and communities types. Most of these diverse and rare habitat types are protected as HCVFs. However, some RSAs are not represented in these HCVFs because the reserve type protection perpetuates late successional ecosystem types like those dominated by eastern hemlock and white pine. Earlier successional ecosystems types like aspen or red oak, second growth/recently disturbed forest and northern mixed hardwoods are best represented and perpetuated in the actively managed commercial forest. The Forestry Department uses data from stand exams (updated every 8-10 years) and CFI (updated every 15 years) to evaluate the composition of the current forest and to make sure all potential forest cover types are represented at any given time. These acres and areas are always changing but as stands reach maturity the prescriptions will be drafted to perpetuate the best potential forest habitat type applicable and take into consideration the need for RSAs, soils, hydrology and topography. To evaluate the need for new RSAs the forestry staff will analyze the stand exam, CFI, land cover and soil data to determine potential forest ecosystem occurrence and manage stands accordingly. As new parcels of land are acquired by the Tribe, the forestry staff will use stand exams, land cover data, soil data, the HCVF assessment and Wisconsin Natural Heritage Inventory to evaluate the forest ecosystem and may recommend new RSAs to the Forestry Committee and Tribal Council as needed.

4. **Rare, Threatened and Endangered Species (RTEs)**

The large number of HVCFs and RSAs on the reservation helps to protect the occurrence of any RTEs. The majority of plant species that fit into these categories are found in wetlands or old growth ecosystems which are heavily favored in the

HCVFs. No RTEs plants have been documented on the reservation however, their occurrence is probable. A few species of fauna are classified as RTE, for example, the red-shouldered hawk, gray wolf, and four-toed salamander are known to occur on the reservation (see: SMC High Conservation Forest Assessment for more complete list). If, and when, species are found, the forestry staff, in collaboration with the Conservation and Environmental Department, will be consulted and an area appropriate for the species will be conserved as either a RSA or HCVF. Some known species of concern already have monitoring protocols in place and similar documents may be developed as species are found and need requires (see red-shouldered hawk monitoring protocol and wolf monitoring protocol).

5. **Invasive Species**

The greatest threat to the natural ecosystem is not poor forest management activities; but the invasion of wild lands by residential and commercial development and the future threat of non-native invasive species and diseases. The inclusion of this plan into the social network of the Tribe along with the Land Use Code and Plan will prevent further unplanned loss of wild acres. Invasive species have already infested small areas of the reservation and if left uncontrolled will become a major issue in the future. The Tribe has already implemented a plan of eradication on a number of sites and will continue to coordinate its efforts to keep these threats in check. The Forestry, Environmental and Conservation Department staffs will continue to monitor for invasive species and diseases, see the Tribe's 'Invasive Species Management Plan' and the 'Oak Wilt Management Plan.' The Emerald Ash Borer (EAB) is already a threat to the ash trees in southern Wisconsin and will be monitored on all Tribal lands (see: Emerald Ash Borer Management Plan).

6. **Ecological Monitoring**

Since the reservation is over 24,000 acres in size, complete monitoring by foot is impractical. Each summer at least one aerial survey will be conducted paying particular attention to HCVFs. Flights will be scheduled after extreme storm events, high winds, fires or when required by disease. However, if no events warrant a survey flight by August 1st, one will be scheduled. This time period was chosen because it is soon after spring and early summer storms with the potential for blowdown events and it is toward the end of the oak wilt infection season when newly infected trees will be easiest to detect. Notes will be taken on observations and concerns, and the development of a reaction plan will be completed if needed. The "Annual Monitoring Plan for Reserves" form will be completed during these flights. The forestry staff will be responsible for this survey and will be responsible to conduct follow-up ground surveys of any observations recorded during the flight(s). Other flights may be implemented when conditions require.

7. **Forest Certification**

The tribal forest was FSC Certified (Forest Stewardship Council) through the Rainforest Alliance certification program in 1998, but the certification was ended in 2003 due to funds. The tribal forest was again FSC Certified through the Rainforest Alliance[1] in November, 2011. The Tribe, through the Forest Management Plan, should maintain a certification program in the future. This certification process will help to insure that the forest is managed using the most up to date silvicultural practices available along with following the best management practices available.

8. **Soils and Hydrology**

Gathering is a very important cultural event that occurs yearly. Maple syrup collection occurs during the spring break up time of year and can have a dramatic influence on soil. When maple syrup collection requires the use of motorized vehicles that may have an impact on the soil or logging roads, a maple syrup collection permit must be issued by the Forestry Department. This permit will allow for the use of motorized vehicles during the spring break up period, but will require that the logging roads be brought back to pre-damaged conditions by the permit holder when the harvesting is complete.

This plan also requires the protection of water quality during forest management activities. The Tribe's Environmental Department has developed an extensive water quality evaluation and monitoring program, outlined in the "FY2010 Tribal Assessment Report". This document, testing and future analysis will be used to monitor the forest management's effectiveness at protecting and enhancing water quality for the Tribe. To ensure high water quality is maintained for the Tribe, the FMP will comply with tribal water resource laws and following applicable recommended guidelines outlined in "Wisconsin's Forestry Best Management Practices (BMPs) for Water Quality, A Field Manual for Loggers, Landowners, and Land Managers", published in 1995 by the Bureau of Forestry, Wisconsin Department of Natural Resources. These recommendations will be referred to as BMPs and will be followed unless more specific protocol is desired as outlined in the FMP. Specific BMPs may be listed for certain sections of this document and will be labeled with "BMP – Chapter", however this is not meant to be an exclusive listing.

> **GOAL #3 - Develop a triad approach to forest land allocation in which HCVF areas and intensive, high-yield timber management areas would co-exist, surrounded by, and embedded within, a landscape managed by alternative silvicultural systems of new forestry techniques that will retain some of the values of old-growth forests.**

The adoption of the triad approach to forest land allocation in Goal #3 will enhance biological diversity throughout the landscape more than can be possible under a total reserve or a total commercial forest allocation. The 'Land Use Map' shows the location of the HCVFs and the commercial forest land and will be posted in the Land Office with the Tribal President's signature and date. Similar reference maps can be seen on pages 28 and 29.

[1] Legislative Note: The original text stated "SmartWood Certified", however terminology has been corrected to "FSC Certified through the Rainforest Alliance" since SmartWood is no longer a valid name. Sept 8, 2016.

1. **HCVFs**

These lands total 5,170 acres as previously stated under Goal #2. Reserving 25% of the commercial forest from intensive timber management will significantly reduce the calculated AAC (available volume). The exclusion of the HCVFs reduces the AAC on trust lands from 437 acres to 414 acres, a 5% reduction in acres. However, the volume of the AAC increases 7% from 4,286,000 board feet to 4,581,000 board feet due to the larger timber now found on trust lands.

2. **Commercial Forest**

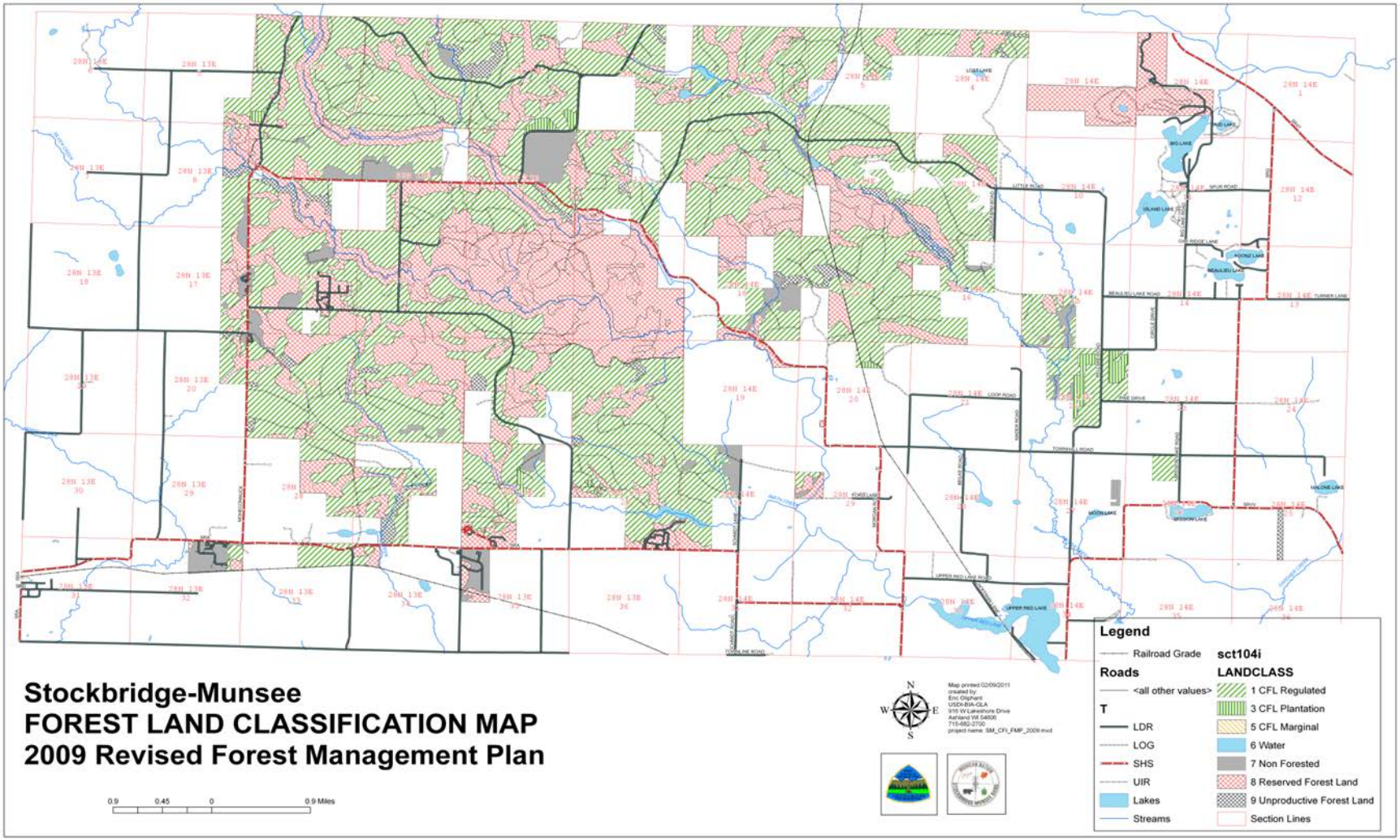
a. ALL-AGE MANEGEMENT

All-age management lands include 7,876 trust land acres of northern hardwood and hemlock/hardwood forest cover types on the richer habitat types (55% of the commercial forest). All-age management systems will be employed using state-of-the-art silviculture. The cover types in this group will be managed using the all-age system of select cutting with the primary emphasis on high quality sawtimber production. Approximately 2-4 large cull trees and den or cavity trees per acre will be maintained for wildlife use.

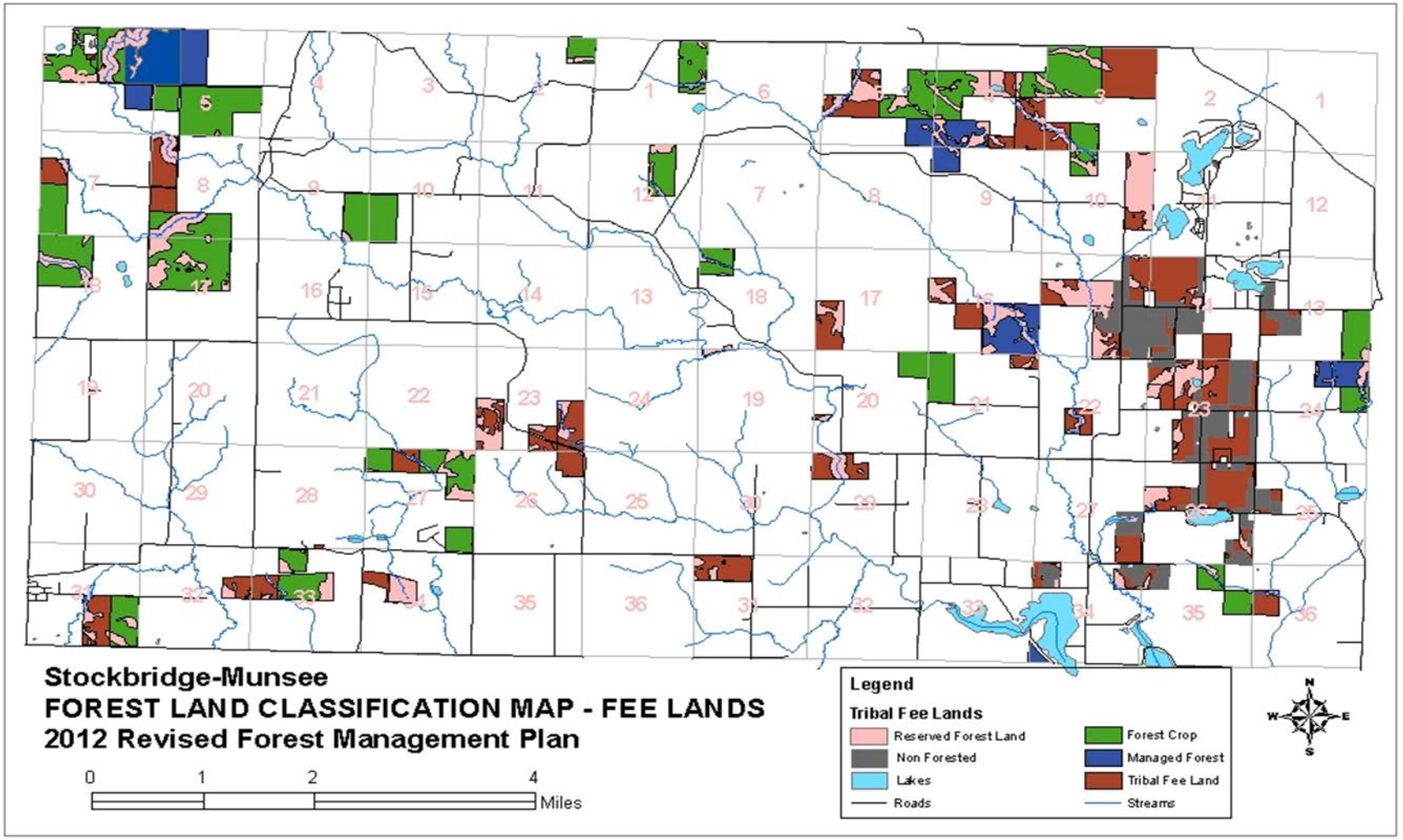
b. EVEN-AGE MANAGEMENT

Even-age management lands include 1,848 trust land acres of aspen, mixed hardwood, red oak, and pine forest cover types on drier habitat types (13% of the commercial forest). Even-age management techniques will be used with some significant modifications. The primary emphasis will be to produce quality pulpwood and sawtimber with a secondary emphasis on maintaining and enhancing wildlife habitat.

The aspen cover type will be managed using the even-age system of clearcutting. The mixed hardwood, red oak, and pine cover types will be managed using the even-age system of shelterwood cutting. Stands of these cover types will be restricted to a maximum unit size of 20 acres. When a stand exceeds 20 acres it will be broken into two or more units each containing 20 acres or less. For stands containing 2 or more units only 1 unit of the stand may be harvested during any given harvest entry. In addition, re-entry to harvest another unit of the stand acres will be delayed for 10 years following the previous harvest. To prevent a rigid checkerboard appearance natural landscape features will be utilized when breaking large stands into smaller units. Multiple age classes will be developed to enhance wildlife habitat, provide species diversity and minimize the aesthetic impacts of even-age harvesting. Furthermore, to maintain and enhance biological diversity, vertical diversity of the forest canopy will be maintained by leaving some large living trees, standing dead snags, and large downed woody debris.



Stockbridge-Munsee
FOREST LAND CLASSIFICATION MAP
2009 Revised Forest Management Plan


Stockbridge-Munsee
FOREST LAND CLASSIFICATION MAP - FEE LANDS
2012 Revised Forest Management Plan
0
1
2
4
Miles
Legend
Tribal Fee Lands
Reserved Forest Land
Non Forested
Lakes
Roads
Forest Crop
Managed Forest
Tribal Fee Land
Streams
N
W
E
S

B. MANAGEMENT TREATMENTS AND TECHNIQUES

The choice of forest management treatments and techniques are limited. A treatment or technique is used either to encourage reproduction of young trees or to modify the spacing, species or ages of trees in an existing stand. This section describes the allowable treatments and techniques that will be used on this forest. The ***Silvicultural Guidelines*** provides site specific guidelines depending on the existing timber types, habitat types and the site's potential.

1. Reproduction and Regeneration Techniques

When a tree or stand becomes mature, it is time to regenerate the site, and turn the focus of management to its successor. Reproduction and regeneration techniques are used to encourage vigorous young trees to develop. These treatments manipulate environmental conditions such as the competition for moisture, nutrients and especially light, that occurs among the trees on a site.

There are two general systems of promoting tree regeneration in a managed forest. The first system uses even-age management methods. This system of regeneration is employed at the end of a stand's rotation as a final harvest. This system is applied within a relatively concentrated time period so all the trees in the new stand will be of approximately the same age. The second system of promoting regeneration produces an uneven or all-age stand. Frequent and periodic harvesting creates scattered small $1/50^{th}$ to $1/100^{th}$ acre openings which appropriate space for regeneration of new trees while still maintaining a more or less continuous overstory of larger trees. Select cutting is the only regeneration system intended to create and maintain and uneven-age stand with at least three different age classes. There are definite trade-offs within each system. It is the goal of this plan to use both systems in the appropriate place.

a. NATURAL REGENERATION

Natural regeneration methods are used to develop the next generation of trees from seed, seedlings, suckers or stump sprouts. Different techniques are distinguished by the combinations of light, temperature and moisture to create proper regeneration conditions on the forest floor.

i. Clearcutting System – The even-age system uses a complete overstory removal of all trees, two inches and larger at breast height, in a single operation. There are two distinct situations in which clearcutting are appropriate.

In the first situation, advanced regeneration of semi-shade tolerant and shade tolerant trees species is present. When the seedlings become well established with sufficient numbers in the under story of the current stand, clearcutting can be used to release it, thus forming a new stand. Secondly, clearcutting is the most appropriate method for regenerating shade intolerant species such as aspen and white birch. In this case, overstory removal can be conducted before the seedlings of the new stand are present as advanced regeneration. Considering their intolerance to shade, some species will not regenerate until the overstory has been removed. After clearcutting, regeneration will depend

on nearby seed sources, seed already present on the site or from stump sprouts or root suckers.

ii. Shelterwood System -- This even-age system gradually reduces the canopy, securing advanced regeneration before the overstory is removed. This system is suited to regenerating trees of medium shade tolerance such as red oak and white pine while discouraging the establishment of competing shade intolerant species.

The shelterwood system involves a sequence of treatments as the overstory nears maturity. The regeneration cut is designed to reduce the forest canopy to let sufficient light to reach the forest floor to stimulate seed germination. This cut removes the less vigorous trees and unwanted tree species. Summer logging is recommended for the regeneration cut if soil scarification is desired. The final cut, an overstory removal, is normally completed within 3 to 10 years following the regeneration cut. The final overstory removal is not made until advanced regeneration of desirable species, in adequate numbers, are present and successfully established. Winter logging may be optimal once regenerating has been established because snow cover helps to protect the seedlings. The shelterwood system of regeneration may take as long as 20 years, although the period is usually shorter.

iii. Select Cutting System -- This all-age system works by regenerating trees in small canopy gaps created by the removal of large crowned mature trees or groups of low quality, undesirable species or low vigor trees. In essence, these gaps are miniature clearcuts which average $1/50^{th}$ to $1/100^{th}$ acre in size and represent approximately 10% of the total stand acreage. During each entry the majority of the all-age stand (90% of the stand acreage) will be treated with the appropriate intermediate treatments.

This method is best applied in stands of very shade tolerant species that have the capacity to regenerate in small openings. Such species are sugar maple, beech, white ash, hemlock and balsam fir. With less tolerant species such as red oak or white pine, this method may be unsuitable because it is possible to eventually run out of trees to cut. Smaller trees of the less tolerant species, once suppressed, are unlikely to respond to release and do not regenerate in the small openings. Of all regeneration methods, select cutting may result in the most damage to young reproduction so caution must be used when harvesting.

b. ARTIFICIAL REGENERATION

Artificial regeneration is the introduction of a species that does not currently occur on the site. Artificial regeneration is primarily used in reforesting agricultural sites but can also be used in converting one forest cover type to another. It can be very costly to procure seed and seedlings and is even more costly to prepare planting sites, plant seedlings or seed and complete the subsequent release of the plantation. Therefore, natural regeneration will always be considered before artificial regeneration is deemed necessary.

There are times when chemical spraying is required to control competing vegetation, pests or disease. Any use of chemicals will be applied in accordance with the approved “Stockbridge-Munsee Policy Regulating Pesticide Use”. The applicator will be required to have a valid “Pesticide Applicators License”. With the dramatic increase of invasive species, insect and disease occurring on the forest, it is becoming more important then ever to plan regeneration methods. It is

also important to develop seed banks for the future requirements of our forest. The Forestry Department will actively work to develop the seed bank to help protect the forest resource for future generations.

2. <u>Stand Improvement and Intermediate Treatments – Even-Age Management</u>

Once regeneration of young trees is established, forest management efforts focus on producing high quality timber of valuable species that reach merchantable size quickly. The purpose of stand improvement treatments is to stimulate growth rates and to remove competition from surrounding crop trees. The following stand improvement and intermediate treatments are used with the even-age management system:

a. PRE-COMMERCIAL RELEASE CUTTING

Pre-commercial release cuttings are applied early in the life of a stand, before it passes the sapling stage.

i. Cleaning and weeding -- seek to control both the form and the species composition by removing trees of poor form and less valuable species that are of similar age to the desirable trees. The first step in this operation is the identification of high quality trees to be favored throughout the rotation of the stand. Species, form and spacing are the primary criteria used in the selection process. This operation allows the desirable trees to maintain a competitive advantage in the stand by giving the crowns room to expand.

ii. Liberation differs from cleaning and weeding in that the trees removed overtop the stand and are older than the target individuals. Their removal makes available, to the younger trees, a considerable amount of light, moisture and nutrients. This operation is most commonly needed when large, poor quality trees or inferior species overtop and dominate a sapling stand of greater potential.

b. COMMERCIAL RELEASE/ IMPROVEMENT CUTTING/ INTERMEDIATE THINNING

These treatments take place once the stand reaches pole timber size (5"+ dbh) and are designed to regulate species composition and improve overall tree quality and vigor by removing undesirable trees. The trees removed are of poor form, vigor, quality and/or species. The sole purpose is to increase the growth rates of the residual crop trees and to harvest those trees which, if left in the stand, would die from suppression. There is a transfer of growth potential from the trees removed to the residual trees. It is important that the residual trees be capable of good growth, have potential as good sawtimber or crop trees and fully stock the stand.

Thinning should be prescribed whenever it is evident that a reduction in stem diameter growth is occurring due to stand overcrowding. A program of thinnings carried out throughout the rotation of a stand serves to maintain a high, even growth rate.

Each thinning involves further refinement in the selection of crop trees, removing trees with less potential that reduce crop tree growth and provides more desired trees with sufficient growing space. Thinning should encourage ideal tree form which represents a compromise between the need for a well-developed crown to fuel rapid growth and the need for a straight bole, free of branches, to provide high quality lumber.

c. PRUNING

Pruning is an intermediate treatment that does not involve the removal of trees. It removes live or dead branches for the purpose of preventing knots in lumber increasing its potential value. Pruning is applied mostly to the fast growing red and white pine. Hardwoods are seldom pruned for timber production because in forest conditions they are less likely to have persistent lower branches and their relatively slow growth makes the pruning investment too lengthy.

Pruning is most often undertaken in pole size stands at a time when crop trees can be fairly well identified. Branches are removed up to a height of 17 feet in order to assure high quality, clear, knot-free 16 foot butt sawlogs.

3. <u>Select Cutting System – All-Age Management</u>

This is an all-age management system that uses a combination of improvement cuttings and intermediate thinnings to improve the existing crop trees while clearing gaps to regenerate new trees. The point of the selection method is to make an ideal apportionment of growth potential of a site among all age classes, from the current year's reproduction to fully mature sawtimber, thereby forming an uneven-age stand in which a few high quality mature trees and some younger pulpwood trees are harvested from each acre at relatively short intervals. The selection method does not entail rotations as the stand is continuously regenerated and stand improvement is done simultaneously. The periods between selection cuts are called cutting cycles instead of rotations. Typically, cutting cycles are about 10 to 20 years apart to ensure harvest volumes large enough to be worthwhile.

The select cutting system is easiest to apply in existing all-age stands and best adapted to the northern hardwood cover type. However, very few true all-age northern hardwood stands exist within the forest due to its relatively young age. They are also difficult to recognize visually, since a small tree is not necessarily a young tree. The select cutting system is also best applied in stands of tolerant species that have the capacity to respond to release at relatively advanced ages. Such species are sugar maple, beech, and hemlock. The ability to respond to release means that smaller trees as old as 70 years can be counted on to move into larger size classes with each select cut. With less tolerant species the use of this system may be unsuitable because it is possible to eventually run out of trees to cut. Smaller trees of the less tolerant species, once suppressed, are unlikely to respond to release and do not regenerate in shade. Red oak is a typical species in this regard. Other less tolerant species, such as pine, black cherry, butternut and white birch, react in a similar way.

The primary purpose of the select cutting system is to develop a distribution of tree ages and size classes in the stand. Diameter distribution is important because trees have to be maintained in all size classes to ensure the availability of some large trees at each harvest. The silvicultural purpose of each harvest is to reduce the number of trees in each class to an optimum density for maximum growth while creating openings in the main canopy for seedling establishment and development.

4. <u>Salvage Operations</u>

Catastrophic events from weather, fire, insects or diseases can have a significant negative impact on the forest. This risk of loss, both environmentally and economically, is highly variable. Each occurrence is unique and each occurrence will

require special consideration. Depending on the severity of damage from a catastrophic event, different forest management treatments and techniques will be utilized:

a. In instances where it has been determined the damage is insignificant, no treatment will be utilized.
b. In instances where stands have been recently thinned, a single tree salvage treatment will be utilized.
c. In instances where stands have not been recently thinned, a combination of management techniques such as thinning and salvage cutting will be utilized.
d. In instances where it has been determined the damage is highly severe, a complete liquidation of the stand will be prescribed. Reproduction and regeneration techniques will be implemented. Such techniques will include shelterwood cuts, clearcuts, and tree planting.

In instances where some form of a salvage operation is warranted, it is imperative that the timber be harvested as soon as possible. Cut or damaged timber is a perishable commodity that must be processed and marketed immediately, especially during the summer season. In the event of such a catastrophic event timber harvested or acres cut will not be counted against the AAC.

5. Invasive Species Management

Non-native invasive species are a major threat to Stockbridge-Munsee Reservation lands. With the fragmentation of the surrounding landscape and differing management techniques on private lands, invasive species management is becoming more and more important. For this reason the Tribe has developed an Invasive Species Management Plan (ISMP) with a Pesticide Use Protocol. This FMP will abide by the ISMP and take all necessary precautions to prevent the introduction and infestation of non-native invasive species. In special cases, determined by Conservation, Forestry or Environmental staff, logging roads or portions thereof may be closed to motor vehicle traffic.

C. TIMBER HARVEST POLICY

1. Timber Sale Marking

Once a stand is chosen for harvest (pre-commercial, improvement or commercial) a marking prescription will be developed by the BIA for trust lands or the tribal forester for fee lands. This prescription will outline the stands, timber management strategy, marking strategy and any other management concerns. This prescription will be recommended to the Forestry Committee and once accepted, be distributed to the forestry staff.

Key to Marking Paint Colors:

- **Double Bar Blue** – Stand boundaries between areas of tribal ownership and along/around wetlands. Loggers may **NOT** cross this ‘line’ with equipment or leave un-merchantable timber, like tree tops, across this ‘line’.

- **Red Square** – Property boundaries between areas of tribal ownership and private lands. Loggers may **NOT** cross this 'line' for any reason or leave un-merchantable timber, like tree tops, across this 'line'.
- **Orange** – Trees marked for removal, 'cut tree' method.
- **Green** – Trees marked to remain, 'leave tree' method.
- **Yellow** – Boundaries of a clear-cut or shelterwood cut. All trees inside of the boundary must be removed unless marked with green (shelterwood).
- **Other Red** – Special reasons outlined in specific contracts.

2. <u>Logging Season</u>

The logging season on all forested lands begins on September 1st and ends approximately March 15 or when the spring road weight limit postings commence. This is a period of approximately 170 days. Approximately half of this period falls within the winter season when the ground is generally frozen and snow covered. Disturbance to dormant vegetation is minimal. The bark of trees is very tight reducing injury from logging equipment. Visibility for sawyers and equipment operators increase as the understory foliage has dropped. Logging roads are easier and cheaper to build and maintain during this part of the year. The only exceptions to these dates are as follows:

a. Logging in pine plantations, where soil conditions are acceptable, can start on June 1st. All softwood stumps cut during the growing season must be sprayed immediately after cutting with Cell-U-Treat (or Sporox) with dye to prevent Annosum Root Rot infection.
b. Logging of live oak can only start after September 1st, unless allowed under the domestic home use clearing permit and cutting subject to the restrictions on that permit.

Some timber sale operations, such as regeneration cuts designed to scarify the ground, can be implemented during the summer season with excellent results. Salvage operations may occur in the summer months to capture as much value from the trees before these high valued forest products degrade. These operations will be the exception rather than the rule. Seldom will logging operations be permitted during the spring and early summer as the ground is very wet. Furthermore, heavy trucks are banned from most secondary highways during this time, greatly limiting the hauling of forest products to market.

The majority of animals breed, nest and/or raise their young during the spring and summer seasons. Restricting most timber sale operations to the fall and winter seasons has less impact on wildlife populations. Furthermore, white tail deer greatly benefit during the winter from browse produced from felled trees.

3. <u>Harvesting Operation Activities</u>

Timber harvesting operations include felling, bucking, forwarding or skidding, sorting, loading and hauling. These activities have the potential to seriously affect environmental quality if adequate precautions are not taken. Guidelines to protect the environment in and around the harvest areas are defined. All applicable BMPs will also be followed. These guidelines consider wildlife protection and enhancement,

water quality, aesthetics and soil conservation to minimize compaction and erosion and to minimize sediment, chemical, nutrient, and debris movement into surface water or ground water. The Stockbridge-Munsee Conservation and Environmental Departments (SMCED) will be given the opportunity to review potential timber sales to determining potential environmental risks. Recommendations to reduce these risks will be considered prior to timber marking.

Factors to consider during timber sale set-up include, but are not limited to:

a. Location of surface water and wetlands.
b. Number and location of landings and roads.
c. Location of other areas that may require special attention such as residential areas, roads, rivers, steep slopes, rock outcrops and spring seeps.
d. Compatibility of the timing of harvesting operations with soil, topography, weather conditions, established regeneration and seed source availability.

Buffer strips will be established around homes, rivers and roads. No cut buffer strips will be implemented within 100 feet of any trout stream unless otherwise specified by the Forestry Committee and all applicable BMPs will be considered in these determinations. Other members of the SMCEDs will be consulted. The Forestry Committee will review the action and make note of it in the meeting minutes. This will be completed on a site by site basis near residential areas and along rivers and roadways. Any timber harvesting that will occur on a Tribal members home land assignment, the forester in charge will notify the home owner during the marking of the timber to keep them informed regarding the timber harvest. Also, at least a 300 foot, no cut, buffer strip will be maintained along the Red River, West Branch of the Red River and Silver Creek.

a. FELLING AND BUCKING STANDARDS

   Good felling and bucking practices are a prerequisite for minimizing damage to the residual stand. These practices must match the skidding and yarding systems employed in the operation. In a thinning operation using a cable skidder, trees should be felled either toward or away from the skid trail, whenever possible, to facilitate skidding without the need to “turn” logs or trees. Bucking into shorter lengths may become necessary if full tree skidding cannot be accomplished without causing damage to the residual trees.

   All slash must lie singularly and in contact with the ground. All limbing and topping must be done at the stump to avoid excessive slash buildup on landings. Felling timber into streams, lakes, and wetlands will be avoided when possible. Trees felled into these areas will be pulled back into the harvest area prior to harvest completion.

   All merchantable products will be bucked from the tree. Stump height shall not exceed (12 inches or ½ the diameter). Long butting is allowed only to increase the product from a pulp stick to a sawlog.

   Individuals not complying with safe and efficient felling and bucking practices will be restricted from further activity.

BMP – Chapter 6 Timber Harvesting

- Do not dispose of or pile slash in areas where runoff may wash slash into lakes, streams or wetlands.

b. SKIDDERS, PROCESSORS, PREHAULERS, TRUCKING

To prevent the spread of invasive plants, all off road equipment must be free of mud and debris prior to moving equipment on to the sale. (For the purpose of this provision, "off-road equipment" includes all logging and construction machinery, except for log trucks, service vehicles, pickups, cars and similar vehicles), All equipment must be cleaned before transportation onto the reservation. Purchaser shall notify the forest officer-in-charge of its cleaning methods and make the equipment available for inspection at a site and time as agreed upon. The forest officer-in-charge shall after the inspection approve that the equipment can move to the logging site when it has been deemed "Clean of Debris". Equipment shall be considered "Clean of Debris" when a visual inspection does not disclose seeds, soil, vegetative matter or any other debris that could contain or hold seeds.

Individual timber sales may have restrictions on equipment or methods depending on the objectives of the sale. The forester can restrict a skidder or its operator at any time during the course of a timber sale to prevent excessive damage to residual timber or other resources.

Logs will be winched off of steep slopes, whenever possible, if erosion and sedimentation would result from conventional skidding.

Skidding will not occur over springs, seeps (unless frozen) or rock outcrops. Skidding through streambeds will be avoided where possible and may only be permitted during frozen conditions and under the direction of the Forestry Committee. If crossings are deemed necessary, all applicable BMPs will be followed.

Similar to the BMPs addressing lakes and streams in Chapter 7 of the WDNR BMP Field Manual, no wheeled or tracked equipment will operate within 50 feet of the normal high water mark of a spring, seep or vernal pool unless frozen. This is in an attempt to reduce the risk of degradation to these sensitive areas. The SMCEDs will be consulted to comment in areas with springs, seeps and vernal pools.

Installation of temporary corduroy structures will be used during the winter to prevent repeated soil and stream bank disturbance where no practical alternative exists to crossing streambeds. These temporary crossings will be removed when harvesting is complete.

BMP – Chapter 6 Timber Harvesting

- Use existing skid trails if they provide the best long-term access.

- Limit the length and number of skid trails, landings and stream crossings to the minimum necessary for conducting the harvest operation and to meet the landowner's objectives.
- Where possible, keep skid trail grades less than 15%.
- Whenever possible, winch logs up steep slopes if conventional skidding could cause erosion that affects water quality.
- For winter harvesting, mark stream channels, dry washes and existing culvert locations before snowfall.
- Minimize soil exposure and compaction to protect ground vegetation and the duff layer.

BMP – Chapter 7 Riparian Management Zones (RMZ)

- In RMZs, use selection harvests and promote long-lived tree species appropriate to the site.
- Operate wheeled or tracked equipment within 15 feet of the ordinary high water mark only when the ground is frozen or dry.

BMP – Chapter 8 Wetlands

- Do not dispose of or move upland slash into a wetland.
- No equipment maintenance or fueling in wetlands.
- Use low ground pressure equipment, such as wide tire or tracked equipment, if necessary, to minimize rutting.
- Cease equipment operations before rutting becomes excessive.

c. LANDINGS

Equipment maintenance and fueling operations usually occur on landings, see III.C.2.d. All landing locations will consider surface water flow at and near the area and will be located away from low or poorly drained areas, preferable on level or gently sloping stable ground. Landing construction will utilize all applicable BMPs.

BMP – Chapter 6 Timber Harvesting

- Locate landings on frozen ground or on firm well-drained soils that have a slight slope or that have been shaped to promote efficient drainage.
- Use existing landings if possible.

d. FUELS, LUBRICANTS, WASTE AND SPILLS

Use of fuel, hydraulic fluid, motor oil, fuel filters will require careful handling and proper disposal. All refuse will be removed from the site and appropriately discarded by the operator.

If a spill occurs:

1) Protect yourself and others. Wear protective clothing and equipment appropriate for any hazardous materials on the operation. Avoid coming in contact with any toxic drift or fumes that may be released.
2) If you are able, control the spill; stop the leak.
3) If you are able, contain the spill; keep if from spreading. Shovel a dike around the spill or us absorbent materials to soak up fluid. Keep spill from entering waterways.

4) Isolate the spill material.
5) Report the spill to the forest officer in charge who will contact the Tribe's environmental office, who will contact the DNR regional office if appropriate, for disposal guidance.
   - ❖ **NOTE:** A reportable spill is 1+ gal. of gasoline or 5+ gal. of diesel
6) Report all hazardous substance spills immediately to the Wisconsin 24-hour hotline: 1-800-943-0003

BMP – Chapter 9 Fuels, Lubricants, Waste and Spills

- Maintain equipment regularly to prevent leaks or spills.
- Use biodegradable lubricants whenever practical.
- Collect all waste lubricants, containers and trash.
  - ❖ **NOTE:** It is illegal to dump fuel or lubricants on the land or in the water on tribal lands
- Designate specific areas for equipment maintenance and fueling
- Maintain a spill containment and clean-up kit appropriate for the materials on the operation.

e. FOREST ROADS

Forest roads connect the most remote parts of the forest to the existing transportation system of town and county highways. These forest roads are managed to provide adequate access to the forest lands for forest management and recreational activities. Generally, these are low volume roads that must carry heavy loads for short periods of time during their service life. The potential for adverse impacts from forest roads exists in areas which have steep slopes, erodible soils or where forest roads are located near water. Forest roads will comply with BMPs. These roads need to be monitored for degradation to ensure access and reduce the potential for adverse environmental impacts. This monitoring will be conducted with the help of the SMCEDs who collectively travel the majority of these forested roads each year. These employees will report any damage or degradation using the 'SMC Forest Road Monitoring Reporting Form' and return the complete form back to the forestry staff for further inspection and mitigation.

When new forest roads or any structures are being developed the SMCEDs will be consulted. A written document will be submitted showing on an aerial photo with topographic contours the proposed location of the work to be performed. This document will have the proposed plan of what type of work will be completed along with structures that may be installed or built. Any disturbance of more than 1 acre in size will require that the SMCEDs be notified and they will determine if a storm water protection plan must be developed for the project. The SMCEDs must give approval before any work can commence. In addition, any disturbance of more than 1 acre in size on lands held in trust will be subject to the Environmental Protection Agency – Storm Water General Permitting Process. On lands owned in fee simple, any disturbance of more than 1-acre in size will require a storm water permit obtained through the State of Wisconsin.

BMP – Chapter 4 Forest Roads

- Use existing roads when they provide the best long-term access.
- Select road locations that allow for drainage away from the road.
- Where possible, locate roads on well-drained soils.
- Minimize the number of stream, dry wash and wetland crossings.
- Identify optimum stream, dry wash and wetland crossing locations before locating the rest of the road.
- Locate roads outside of RMZs and wetland filter strips except at crossings.
- Road grades should not exceed 10%, construct roads with 1% to 2% grades when possible.
- Compact the road base material or allow it to settle before using the road to reduce the amount of water that soaks into it.
- Surface the road with gravel.
- Install drainage structures at grades of at least 2% more than the ditch grade and at a 30 to 45 degree angle to the road.
- Install sediment control structures where necessary to slow the flow of runoff and to trap sediment until vegetation is established at the sediment source.

f. WATER CROSSINGS

Permanent water crossings, using bridges and culverts, are recommended when long-term use is expected. When permanent water crossings are necessary the SMCEDs will be asked to review and recommend options for construction. All existing permanent water crossings will be reviewed by the SMCEDs and necessary improvements will be made in accordance with applicable BMPs and applicable permits. Temporary low water crossings and fords should be used

when short term use is expected. When low water crossings are deemed necessary, all applicable BMPs will be followed. Fords and low water crossings should only be used in locations where the soil contains large amounts of rock with few fine particles and water is not expected to be present during its use.

BMP – Chapter 5 Stream Crossings

- Identify optimum stream crossing locations.
- Obtain any required permits (depending on whether trust or fee land, this may include tribal, federal or Wisconsin permits).
- Install stream crossing structures at right angles to the stream, where practicable.
- Use soil stabilization practices on exposed soil at stream crossings.
- Design, construct and maintain stream crossings to avoid disrupting the migration or movement of fish and other aquatic life.
- Install stream crossings using materials that are clean, non-erodible, and non-toxic to aquatic life.
- Minimize channel changes and the amount of excavation or fill needed at crossings.
- Limit construction activities in the streambed to periods of low flow or no flow.
- Use diversion ditches, broad-based dips, or other practices on the road approaches to prevent road runoff from entering the stream.
- Install culverts that extend at least 1 foot beyond the road fill.
- Install culverts that are large enough to pass flood flows
  - ❖ **NOTE:** The Tribe defines flood flow as a 50 year flood flow in this case.
- Install culverts so there is no change in streambed elevation.
- Firmly compact material around culverts, particularly the bottom half.
- Use riprap around the inlet and outlet of culverts to prevent water from eroding and undercutting the culvert.
- Keep culverts clear and free of debris so that water can pass unimpeded at all times.
- Use temporary stream crossings such as timber mats, pole fords or frozen fords when appropriate.
- Clear debris from culverts, ditches, dips and other drainage structures to prevent clogging that can lead to washouts.

BMP – Chapter 8 Wetlands

- Provide adequate cross-drainage in roads to minimize changes to natural surface and subsurface water flow in the wetland.

g. HAULING POLICIES

Hauling on forest roads has the greatest potential to cause damage (rutting) to the roads. Forest road damage may contribute to other resource damage, such as impeding water flow and depositing sedimentation into streams. Forest roads must receive periodic maintenance to keep them in a functional condition and to avoid other resource impacts. Winter hauling is the most preferred period which has little or no effect on forest roads. Hauling during periods when roads are not frozen may require a substantial amount of maintenance during and following use to protect forest resources. All applicable BMPs will be followed to reduce the risk of environmental impacts from the hauling process. The Forester will monitor conditions during spring break-up and they will be the deciding factor when motor vehicle traffic will be stopped.

Due to normal working hours of the SMCEDs, hauling will be allowed between 5am and 6pm, Monday through Friday. Alterations to this policy may be made on a case by case basis and determined by the Forestry Committee. The Conservation Department will be notified of any approved alterations.

BMP – Chapter 4 Forest Roads

- Keep traffic to a minimum during wet periods to reduce maintenance needs.
- Hauling is prohibited during spring break-up.

h. SEEDING

In some cases landings, forest roads or maintenance may require seeding to prevent excess runoff, erosion or invasion from non-native species. Whenever seeding is deemed necessary or desired by the forestry staff, the SMCEDs will be consulted for recommendations on seed mixtures. Seed mixtures will need to be composed of plants native to the Stockbridge-Munsee lands and appropriate for the site. When applicable, seed from similar ecotones will be used to maintain local genetics.

i. MERCHANTABILITY STANDARDS

Merchantability standards are defined on every timber sale contract or permit. The general definitions of the two major forest products are as follows:

Cordwood – is defined as a reasonably straight and sound 8' (+trim) stick that is at least 3" diameter on the small end inside the bark.

Sawlogs – are defined as an 8' (+trim) stick or longer (usually in 2 ft. increments) that has an inside the bark small end diameter of at least 9" for softwood species and 10" for hardwood species and meets the requirements for at least a grade #3 sawlog. A grade #3 sawlog for purposes of this FMP is defined by the "Official Grading Rules for Northern Hardwood" adopted by the Timber Producers Association of Michigan and Wisconsin.

4. <u>Firewood Provisions</u>

Forest management will provide for firewood cutting opportunities for Tribal members.

D. ANNUAL ALLOWABLE CUT AND HARVEST SCHEDULE

The 1992 Forest Inventory Analysis gives a detailed explanation of the AAC Calculation.

1. **Trust Land AAC**
   Commercial forest operations will be implemented on 10,161 trust land acres. This is 69% of the total commercial forest base of 14,678 acres. The acreage to be treated annually will be reduced by 5% from 437 acres per year to 414. The annual allowable cut volume can be increased by 7% from 4,286,000 board feet to 4,581,000 board feet. Annual sawtimber harvest can be 1,002,600 board feet per year.

2. **Fee Land AAC**
   Commercial forest operations will be implemented on 5,486.9 acres of fee land. This is 89% of the total commercial forest base of 6,139.9 acres. Currently there is no AAC calculated for fee lands as analysis of the 2012 stand exams is not complete. As soon as this value can be calculated, this plan will be updated accordingly.

   Land that is enrolled in Wisconsin Managed Forest Land or Forest Crop programs will be managed according to law and overseen by the Wisconsin Department of Natural Resources. Whenever possible, forest management will be conducted according to this management plan. It is understood that this FMP fulfills the requirements of both of these programs and management should not have to adjust to comply. Harvests on these lands will be included in the yearly fee lands AAC tally.

3. **Harvest Schedule**
   The harvest schedule on trust and fee lands shall incorporate the maximum allowable cut with the size of the cut for each tract based on data presented by the BIA and the tribal forester. Management cuts will be determined by cruise data that will suggest when stands are ready for a prescription based on basal area determinations along with other factors that may be present.

   A multi-year (>3) cut plan will be created each year for both trust and fee lands and presented to the Forestry Committee and Conservation and Environmental Departments for review and notification.