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## **SECTION I- MAPS AND INTRODUCTION**

## Introduction

The objective of this plan is to provide the landowners of the described property with solid information about their ownership, which can be referred to when making management decisions. The plan describes:

- Landowner goals and objectives for the property.
- All conditions and components of the land.
- Recommended management options to fit the landowner's goals while sustainably managing the land.

Vocabulary that is commonly used in management plans, but may be unfamiliar to a landowner is defined in the glossary found in Section IV.

## Objectives and Goals

The following table shows nine different aspects of the landowners' property. Each of these land values has been ranked by priority according to the landowners' goals and objectives for their property.

LANDOWNER'S PRIORITY	FOREST VALUES
1	Water & Soil Quality
2	Timber Production
3	Wetland/Riparian Area Protection
4	Rare/Endangered Plants/Animals
5	Aesthetics
6	Recreation
7	Wildlife
8	Fishery
9	Reforestation

This ranking system is used to aid in the recommended management options proposed and described later in this management plan.

In many situations, management options can be designed to achieve multiple goals. For example, forest management can be used to enhance property aesthetics, wildlife, timber production, recreation, as well as overall forest health.

Management options should also consider the area in which the property is located and how it fits into the landscape as a whole. Management activities conducted on one land ownership often affect the ecosystems of adjacent land ownerships. Implementing land management options that consider the surrounding environment are more effective in achieving landowner goals. This type of approach is effective because it reflects realistic natural occurrences within the landscape, **which do not necessarily follow property lines**. This is referred to as "landscape management". Landscape management was considered when developing the recommendations for this management plan.



## **SECTION II- THE LANDOWNERS AND THE LAND**



## General Property Description

### Location



Figure 1: Metal post marking a property corner.

This property consists of four separate parcels of land totaling 468 acres. The four parcels are spread over a rather large geographic area, but all are contained in Stanton Township. The four parcels include the Agate Beach property, the Fire Hall property, the Ball Field property and the Portage Canal property. Quality county and township roads provide excellent access to all of the parcels. The access into each parcel can be seen on the Locator Map included in Section I of this

management plan. During the property inspection there were some existing property line and corner evidence found. Some of the evidence found marking the property corners included monumented survey corners, old paint and ribbon, and bearing trees. Along the property lines old blue and yellow paint was found, along with old ribbon and cut lines created by past timber harvesting. The existing property line evidence found on this ownership is helpful in determining the approximate location of the property boundaries, but this evidence should only be considered boundaries and **not exact property lines**. Topographic maps and/or aerial photos would be very helpful when navigating through this property. The legal description for the four separate parcels is as follows:

Agate Beach Property  
T. 54 N. – R. 36 W.  
W ½ Sec. 31

Fire Hall Property  
T. 53 N. – R. 36 W.  
W ½ SW ¼ SW ¼  
Sec. 3

Portage Canal Property  
T. 56 N. – R. 34 W.  
Portions of Sec. 28 &  
Portions of Sec. 33

Ball Field Property  
T. 55 N. – R. 35 W.  
SW ¼ SE ¼  
Sec. 15



## **Brief Description**

The length of ownership of these four parcels by Stanton Township varies from 20 to 40 years. The Township extensively utilizes the ownership, with one of the primary uses being recreation. The Township has developed and maintains a campground and beach along the Lake Superior frontage of the Agate Beach property. They have also developed a day use area and pavilion near Lake Superior on the Portage Canal property. The Agate Beach and Portage Canal properties also offer many other recreational opportunities to the outdoor enthusiast including hiking, cross country skiing, ATV'ing, mountain biking, hunting, fishing and bird watching. In addition to these recreational opportunities, the Township has also established a baseball field on the Ball Field property. This field sees extensive use during the summer when the local Twilight Baseball League is in full swing.

The diversity in forest type and wildlife habitat varies greatly across the four parcels. The Agate Beach and Portage Canal properties are characterized by their vast amount of water frontage on Lake Superior, the Portage Canal, the Little Elm River and various other intermittent streams. A diversity of forest types exists across all four ownerships, ranging from lowland conifer and brush stands to upland hardwoods and conifers. This diversity of forest types provides ample habitat for many species of wildlife and recreational opportunities for sportsmen.

The terrain across the four properties is generally flat to gently rolling. However, in the southern part of the Ball Field property and portions of the Portage Canal property excessively steep slopes do exist. In the areas where the steep slopes exist, forest management and timber harvesting in particular will be inhibited.

## **Land History/ Past Land Use**

Humans have utilized this land and its resources for many years. It can be assumed that most of the property included in all four parcels was logged in the late 1800's and early 1900's. At that time the forests of the Upper Peninsula were being heavily harvested to provide wood for the booming local copper industry. White pine was a prized species and it is very likely that all the white pine trees found on this ownership were harvested at that time. During the 1860's, construction of the Portage Waterway began. The waterway was dredged at north entry to provide access for ships to Houghton. Once dredged, the waterway was used as an efficient way to move copper from Houghton to larger cities and to bring supplies into Houghton to support the community and the mining industries. The Portage Canal property owned by Stanton Township borders part of the area dredged to create this waterway. It is likely that during the dredging procedure, soil was deposited from the waterway onto the shores, which now make of part of the Stanton Township ownership. More recently, timber harvesting has played a major role on the composition of the forest. The majority of the Agate Beach and Ball Field properties was thinned within the past 25 years. The thinnings have aided the growth of the trees present and also encouraged a thick flush of regeneration to develop.

## Current Land Use

The primary use of this ownership is recreation. The campground established on the Agate Beach property is used extensively by the public during the spring, summer and fall. The beach on this property and the beach at the Portage Canal property are also used heavily by the public. In addition, a pavilion is maintained by the township on the Portage Canal property and is used for picnics and other gatherings. A network of forest roads and trails

are found on these properties that are utilized by the public to facilitate a number of recreational opportunities including hiking, ATV'ing, cross country skiing and hunting. In addition, the baseball field located on the Ball Field property is used extensively during the summer by the local Twilight Baseball League.



**Figure 2: Sign promoting the proper use of the North Canal Park on the Portage Canal property.**

Beyond recreation, this ownership is also used by the Township to house the Toivola Volunteer Fire Department. Its timber resource has also been utilized in the past to provide the Township with income to support some of its many undertakings.

## Landowner Objectives

Although the Township is currently utilizing this ownership and its many resources there are some goals to strive towards. They would like to become more active in forest management, which will improve the health and productivity of the forest while also providing an income. They would also like to incorporate forest management to help maintain the safety of the park at Agate beach and pavilion at the Portage Canal property by removing hazard trees from those areas. Through proper forest management they would like to facilitate recreational opportunities by creating hiking and cross country ski trails. Also, to add to the recreational value of the property they would like to establish a boat launch on the Portage Canal. They are also interested in using the forest and its resources for educational purposes and would like to develop projects that satisfy this goal. Additionally, it is extremely important that all forest management be conducted in a fashion that protects the soil quality and water resources of the property. These goals will be considered when developing management options for the property, which can be found in Section III, “Vegetation and Management Recommendations”.

## Education and Outreach

The Township is interested in extending the educational opportunities that its ownership can provide. They are currently one of the community partners for the EB Holman group involved in the Lake Superior Stewardship Initiative (LSSI). Through this initiative, community organizations and government units partner with schools, working together on a stewardship project that addresses a local need. LSSI prepares the students to become knowledgeable citizens that are active in their school and community. The teachers involved in LSSI frequently take their students out of the classroom and into the fields and forests. This is an excellent program that benefits the students, the organizations involved and the Lake Superior Watershed. More information on the Lake Superior Stewardship Initiative can be seen at their web [lakesuperiorstewardship.org](http://lakesuperiorstewardship.org).

As part of the LSSI project, permanent inventory plots have been established on the Ball Field property. These plots are revisited and re-measured by the students of the EB Holman School, with the aid of a teacher, so that they can have some sense of how a forest changes overtime. In addition to the inventory plots, the students are also monitoring salamander populations by inspecting boards that have been laid out in the forest to provide habitat for the salamanders.

## CURRENT LAND CONDITIONS

### Water/Wetlands

The significant water and wetland features found on the Stanton Township ownership are confined to the Agate Beach and Portage Canal properties. On the Agate Beach property, the water and wetland features present consist of the Little Elm River, numerous intermittent drainages and Lake Superior. This property contains roughly one half mile of Lake Superior frontage. The shoreline is made up of a sandy beach for the entire length of the property. The Lake Superior water is clear and cool, providing excellent habitat for many species of fish and waterfowl.



**Figure 3: Sand shoreline of Lake Superior found at the Agate Beach property.**

The second significant water feature found on the Agate Beach property is the Little Elm River. The river enters the property in the west-central part of the ownership. It flows northerly along the western portion of the property just east of the Lake Superior shoreline before exiting into Lake Superior at the south end of the campground. The stream itself is rather small, however it has water flowing the entire year. On the Agate Beach property beavers have been very active on the river resulting in a number of dams and ponds. The dams have greatly reduced the flow of the river and are likely causing increased stream temperatures. Along the river bottom the vegetation is dominated by

tag alder and other lowland brush species, many of which are dying as a result of the flooding caused by the beavers. Scattered larger trees are also present and consists primarily of white spruce and balsam fir.

Adding to the water features found on the Agate Beach property are numerous intermittent streams. These streams all originate to the east of the Little Elm River and flow westerly into the river. While

there is some variation amongst these streams, most only run during spring runoff and during excessively wet periods of the summer and fall.



**Figure 4: An intermittent stream found on the Agate Beach property.**



**Figure 5: Portage Canal at North Entry.**

The main water feature found on the Portage Canal property is the Portage Canal. The Portage Canal borders the Stanton Township property for roughly one and three-quarters mile. Most, if not all of this portion of the Canal was dug by man as part of the Portage Waterway project that was completed in 1873. This project consisted of digging a two mile long canal to connect the naturally existing Portage Waterway with Lake Superior at what now is North Entry.

In addition to the Portage Canal, the Township also owns a short distance of Lake Superior frontage in the northwest corner of the Portage Canal property. On this property, the shoreline of Lake Superior was used as a dumping site for stamp sands, an unusable byproduct of the copper mining operations. The massive amounts of stamp sands covering the natural shoreline create a significant pollution hazard due to the heavy metals that are found in them. Recently, a project has been completed at this site that covered the stamp sands with soil and established grass. This slows the movement of water across the stamps thus reducing the potential for pollution to be leached into Lake Superior.

There are not any water or wetland features found on the Fire Hall and Ball Field properties.

## **Wildlife**



The possible wildlife that may be found on and near the property is abundant and diverse for a number of reasons. The location of the property is very remote, with much of the surrounding areas being forested and uninhabited by humans. A variety of ecosystems found on or near the property also offers a continuous mix of forested stands, water and wetland features and diverse topography. All of these habitats create structure and diversity, which attract a wide variety of wildlife. This property, along with the surrounding area, offers excellent habitat for many species of birds, for example:

- The various forest types are used by migrating and non-migrating birds such as:

Black-capped Chickadee	Nuthatches	Warblers
Blue Jay	Ruffed Grouse	Woodcock
Finches	Sparrows	Woodpeckers
Grosbeaks	Thrushes	Wrens

- The northern white cedar, mature pine and mature hardwoods offer ideal perching, hunting and nesting opportunities for owls and other raptors such as:

Bald Eagle	Great Horned Owl	Red-Tailed Hawk
Barred Owl	Northern Goshawk	Rough-Legged Hawk
Broad-Winged Hawk	Red Shouldered Hawk	Saw-Whet Owl

- The wetlands and streams on the property offer good habitat for wildlife that require large amounts of lowland brush and water to survive. Some of the animals that can be found in these areas of the property are:

Beaver	Turtles
Frogs	Fish
Otter	Muskrat
Bitterns	Hérons
Waterfowl	



**Figure 6: Beaver pond constructed on the Little Elm River.**

- There are many terrestrial animals that exist on the property. The vegetation provides a variety of food sources and rotten, hollow trees offer den opportunities. Some examples of the animals that benefit from the habitat of this property and the surrounding area are:

Black Bear	Moose	Salamanders
Bobcat	Pine Marten	Snakes
Chipmunks	Porcupine	Toads
Coyote	Rabbits	Weasel
Fisher	Raccoon	White-tailed Deer
Fox	Red Squirrels	Wolves

During the field inspection a large amount of bald eagle activity was noted in Stand 3 of the Portage Canal property. There is potential that a nest may exist within this stand however visual confirmation of a nest was not made. If a nest is found in this area or any other area of the property, forest management recommendations may have to be altered to avoid disturbing the nesting eagles. This would include establishing buffers and restricting the allowable harvesting times to avoid the eagles nesting season. Information on management guidelines, buffers and other management restrictions to avoid disturbing nesting eagles can be found in the “National Bald Eagle Management Guidelines” included in the appendix of this plan.

### **Threatened and Endangered Species**

During the property inspection, no threatened or endangered plant or animal species were found. Also, a search of the Michigan Natural Features Inventory indicated that no threatened or endangered species were documented on this property. However, this does not mean that they do not exist. If they are found, special considerations will have to be made to protect them. This may mean altering some of the prescribed management options that will be discussed later in this plan.

## Trails

All of the Stanton Township properties can be accessed via well maintained county roads. The access to each individual property can be seen on the Locator Map found in Section I of this management plan. From the county roads, woods roads have been developed to provide further access for recreation and timber management. A well-developed system of woods roads begins near the north east corner of the Agate Beach property. A road heads southerly across the entire property with various stub roads branching off to the east. The main road through the property is in good condition and easily travelable with a car or pickup. The roads that branch off of the main road vary in condition from grassy and travelable to brushy and in need of improvement. The current road system provides excellent access to all of the property lying east of the Little Elm River. To obtain access to the property lying west of the river, a road will have to be constructed that crosses an adjacent ownership. Permission will have to be granted from the adjacent landowner before any new road construction begins.

The Portage Canal property also has a road system in place providing access for recreation and forest management. The roads on this property vary from well maintained gravel roads to grassy brushed in roads in need of improvement. A new boat launch is going to be installed in the central part of this property on the Portage Canal. Part of the new boat launch project involves improving existing woods roads. The location of the boat launch and the portions of the woods roads that will be improved can be seen on the "Boat Launch Construction Maps" found in the Appendix of this management plan.

The forty acres that make up the Ball Field property also have well-developed access via the Ball Field Road. From the Ball Field Road, a private woods road follows the northern property line across the entire length of the forty. A woods road then heads southeasterly from the west end of the aforementioned woods road towards the southeastern corner of the property before eventually hooking up with the Ball Field Road. This woods road is somewhat narrow and brushy and will need to be improved if used for timber harvesting.

The Fire Hall property is easily accessed as it is bordered by both the Misery Bay Road and Church Road. From Church Road, a small woods road heads easterly through the northern portion of the property.

The roads found on each individual property can be seen on the Stand Maps for the respective properties located in Section III of this management plan.

## **Soils**

The types of soil found on a parcel of land can have a significant impact on the types of trees that grow there, as well as the growth rate and quality of those trees. It is also important to consider soil characteristics when planning timber harvesting or making the decision to plant trees in an area. Soils also can impact the productivity of wildlife food plots. The necessary information for making these decisions can be obtained through soil surveys, available online through the Natural Resource Conservation Service's Web Soil Survey.

A significant component of a soil survey is a map depicting locations of each soil type across the landscape. These maps usually consist of aerial photographs with lines that show the approximate boundaries between soil types. These boundaries are never distinct meaning that the mapped lines are rarely, if ever, precise. Furthermore an area that is identified as a particular soil may include areas of different soils that were too small to map when the survey was conducted. For these reasons, the information obtained from soil surveys should be supplemented with field inspections, especially for the purposes of planning forest management activities.

The soils located on this property are very diverse and support the growth of many varied forest types. The soils range from coarse textured sands to wet muck. According to Web Soil Survey, 25 soil mapping units, classified as mucks, loams and sands, are found on this ownership. A soil mapping unit is the most specific level of classification of soils. The name of a mapping unit is derived from the soil series, the texture of the surface layer of the soil and the slope. A mapping unit name may also include modifiers such as "dissected." When the word "complex" appears as part of a mapping unit name, it indicates that an area consists of two or more soils that are more intricately mixed than would be practical to map at a large scale. The first soil listed in the name of a complex is the most common soil. Typically the soils that make up a complex have fairly similar characteristics influencing tree growth, but there may be some differences that result in variability of timber quality or species.

The specific soil mapping units found on the Stanton Township properties include:

### **Mucks:**

**77**—Tawas-Roscommon mucks

**146**—Cathro-Gay mucks

### **Loams:**

**31A**—Skanee-Gay complex, 0-3% slopes

**37**—Arnheim silt loam

**59B**—Graveraet-Ocqueoc-Kalkaska complex, 1-8% slopes

**131B**—Graveraet-Misery complex, 0-8% slopes

**139B**—Trimountain-Paavola-Waiska complex, 1-8% slopes

**148B**—Graveraet-Ocqueoc-Kalkaska complex, dissected, 1-12% slopes



**Sands:**

- 14A**—Assinins sand, 0-3% slopes
- 15B**—Kalkaska sand, 0-8% slopes
- 15E**—Kalkaska sand, 15-35% slopes
- 21B**—Keweenaw-Kalkaska complex, 1-8% slopes
- 47B**—Ocqueoc-Halfaday complex, 0-8% slopes
- 72A**—Halfaday Sand, 0-3% slopes
- 75A**—Croswell-Au Gres sands, 0-3% slopes
- 78B**—Deer Park sand, 0-8% slopes
- 96B**—Liminga fine sand, 0-8% slopes
- 96E**—Liminga fine sand, 15-35% slopes
- 96F**—Liminga fine sand, 35-70% slopes
- 107B**—Kalkaska-Waiska sands, 0-8% slopes
- 107E**—Kalkaska-Waiska sands, 15-35% slopes
- 127B**—Keweenaw-Kalkaska complex, dissected, 1-12% slopes
- 130B**—Munising-Alcona-Liminga complex, dissected, 1-12% slopes
- 130F**—Munising-Alcona-Liminga complex, dissected, 15-70% slopes

**Other**

- 68**—Stamp Sand Dumps

The distribution of each mapping unit across the ownership can be seen on the Soils Map, which is included in Section 1 of this plan. The following paragraphs describe the individual soil mapping units across the ownership. Soils having similar characteristics have been described together in the interest of brevity.

Two muck soils have been identified on the property. These soils vary in thickness and subsurface texture, but are similar because of the mucky surface layer and wetness for much of the year. The wetness of these soils poses limitations to growth of most upland tree species and can make them more vulnerable to damage by heavy logging equipment. If logging is planned on muck soils, it must be done during the winter when soils are frozen to minimize the potential of compaction and rutting. Forest types in areas of muck soil are typically lowland hardwoods such as red maple, black ash and yellow birch but may also include cedar and other lowland conifers including black spruce, balsam fir and tamarack. Some areas of muck soil are so wet that tree growth is excessively limited and the primary vegetation is tag alder, willow and dogwood. These soils are found only in flat areas of the property, therefore slope measurements are not required.

There are six types of loam soils on the property. Loam soils are intermediately textured between sand and clay and therefore have a wide range of characteristics that influence tree growth and forest management. Because of their intermediate texture, loam soils often do become excessively wet, but still retain enough water during dry periods to prevent drought stress in plants. Loam soils also have a sufficient nutrient availability for plants, but are not so well drained that the nutrients are leached out by water every time it rains. These characteristics can vary with the presence of large rocks which may increase the rate at which water moves through the soil, or the presence of a layer of clay which can slow or even stop the movement of water through the soil.

Loam soils are typically derived from material that had been carried by glaciers and was deposited when the glaciers retreated. Other sources of loam soils include deposits from wind and water movement. Many of the areas of loam soils on the Stanton Township property are characterized by a high water table for at least part of the year. This high water table results in wet soil conditions which can limit tree growth by causing shallow root systems. In addition to shallow rooting, wet soils often require that harvesting operations be limited to the winter months when the soil is frozen. If logging occurs when a wet soil is not frozen, it is likely that it will be rutted or compacted by machinery. This compaction can impede tree regeneration for a very long time.

Sand textured soils cover the majority of the acreage on the property. Much of the sand in this area was deposited by Lake Superior many years ago when water levels were significantly higher than they are today. Since being deposited by the lake, this sand has undergone different processes of formation due to the chemical makeup of the sand, growth of different plant communities and differences in slope and aspect. These differences have resulted in the different mapping units currently found on the landscape. Across the ownership, sixteen different sand mapping units have been identified. Many of these differ only in slope. One mapping unit, the Assinins sand (14A), occurs in lower areas and near wetlands. Like the loam soils on the property, this area has a high water table which affects the growth of timber and the potential for operation of logging equipment. The remaining fifteen mapping units of sand textured soils have deeper water tables. This reduces the rutting hazard, but can still impact the growth of timber. Sand textured soils have a very poor water retention ability which can result in moisture stress of the trees during droughty periods. Additionally, sandy soils can be very sensitive to erosion if they occur on slopes, which some of them do. Harvesting in sandy slopes must take care to leave enough trees to retain the soil.

Some of the mapping units that have been characterized as sand include the word “dissected” in their names. Dissected mapping units are those that have been significantly impacted by the movement of water across the surface of the soil. This water movement has caused the formation of ditches and ravines of varied depths. Sometimes these ravines can have extremely steep slopes which completely prevent the operation of logging equipment.

Part of the beach near the picnic shelter at the North Entry is a dump site for stamp sands from the copper mining days in Houghton and Keweenaw Counties. No trees grow on stamp sand dumps and very few plants are able to survive the harsh, dry growing conditions.

More information on the soil types found on this property may be obtained on the Natural Resources Conservation Service (NRCS) web site at:

<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

or by contacting Bruce Peterson with the Baraga County Conservation District at (906) 353-8225, ext # 108.

## Forest Health

No significant invasive or exotic forest pests were observed during field visits to the Stanton Township ownership. However, there are some forest health concerns that should be noted. A significant number of the maple trees on the property are displaying top dieback. Top dieback is a condition characterized initially by early leaf color change and eventually leads to death of the ends of most or all the twigs on a tree (see Figure 7 at right). Dieback itself is typically not deadly to trees but it decreases their ability to produce energy to fight off infections by disease and insects. This greatly increases the likelihood of the tree dying due to another factor. In addition, dieback results in decreased growth rate, which can impact the scheduling of forest management. The exact cause of top dieback in maples is not known but it is thought to be related to drought stress, overcrowding, or insufficient soil nutrients. Proper forest management targets trees that display excessive dieback in order to free up more resources for the healthiest trees and prevent further dieback.



Figure 7: Severe top dieback in maple

Another concern was noted in many of the birch trees near the picnic shelter near the North Entry. White birch is a short lived tree species, especially when compared to sugar maple. Many of the white birch in this area of the ownership are nearing, or have reached the end of their natural lives. No disease or insect is believed to be at fault. White birch wood is very susceptible to rotting, even when the bark of the tree still looks very solid. Because of this, many of these standing dead or nearly dead birch trees may pose a greater risk of falling and causing damage than they appear to. Additionally, these dead and dying trees can act as sources of an infestation when large numbers of insects are attracted to the dead trees and wind up being present at high enough levels to kill otherwise healthy trees.



Figure 8: Scar caused by the sugar maple borer.

Other natural forest health concerns that are common in Upper Michigan but which may be unfamiliar to some users of the forest are Eutypella canker and the sugar maple borer. These are both native forest pests in Upper Michigan and typically do not cause drastic damage to the forest, but may get out of hand in unmanaged forests. Eutypella canker is caused by a fungus that causes infected trees to grow a large swollen area on the trunk. Trees can live for a long time with this canker however, if a forest is thinned and trees

with *Eutypella* are not harvested, they typically are blown down by wind because the canker creates a weak spot in the tree trunk. Sugar maple borer (see Figure 8 on the preceding page) is an insect that eats its way horizontally across the sapwood of the tree. After this occurs, the tree is unable to transmit water and nutrients up to the leaves on part of the tree. Sugar maple borer usually only affects half of the tree trunk or less, but this small damage results in a swelling of the trunk that has a similar effect to that of *Eutypella* canker. Proper forest management targets trees that exhibit signs of damage by *Eutypella* and the sugar maple borer, preventing them from taking an excessive toll on the overall forest health.

With the exception of the concerns listed above, the forests on the Stanton Township property are generally healthy.

One other very significant forest health concern was not observed on the property but is still worth noting. The Upper Peninsula is currently being monitored by the Michigan Department of Agriculture (MDA) for the presence of emerald ash borer (EAB). EAB has taken a severe toll on ash trees in Lower Michigan and has been discovered in isolated instances in

the Upper Peninsula as well. EAB is a non-native invasive insect that feeds on the sapwood of ash trees, ultimately killing them. In addition to the MDA monitoring, if any users of the Stanton Township property notice ash trees that appear to be dying, the MDA should be contacted to investigate. EAB could take a serious toll on the overall composition; white ash is a major component of many northern hardwood forests and black ash is very common in lowlands and swamps. If the emerald ash borer is found on this property, management recommendations should be altered in an effort to slow the spread of the insect. This may require that all or most of the ash trees be removed from the property. More information on the emerald ash borer, including the specific signs of an infestation, can be found at [www.michigan.gov/eab](http://www.michigan.gov/eab).



Figure 9: Adult emerald ash borer.

## **SECTION III- VEGETATION AND MANAGEMENT RECOMMENDATIONS**



## **VEGETATION**

A forest inventory was conducted on the property and various forest stands were delineated. Along with every forest stand, there is a corresponding habitat type. Habitat types are determined by examining the soils, topography, tree species, and ground flora found within the stand. Habitat types indicate tree productivity and equipment limitations of a forest stand. The individual habitat type descriptions will be given at the end of this section.

The vegetation section of this management plan will be separated into four different sections by property. Each property, the Agate Beach, Portage Canal, Fire Hall and Ball Field properties will have its own section. The Stand and Activities Maps that correspond to each property can be found at the beginning of the section that describes that property.

## **MANAGEMENT OPTIONS**

Proper land management must take many issues into account; such as past land use, current land use, desired land use, conditions of the land and the potential of the land. Because nature does not consider property lines, land management must consider the landscape as a whole (landscape management). The options recommended in this plan consider the parcel of land being discussed and how it fits into the surrounding landscape. Management of this property is designed to benefit the land being managed, while not negatively impacting the adjacent and surrounding natural ecosystems.

**Pre-Treatment Activity**

Prior to the implementation of any treatment, the following details should be considered:

- Property boundaries should be checked or established if needed. This should be done either by or with the aid of a knowledgeable professional.
- Prescription implementation should be conducted either by or with the aid of a knowledgeable professional. If the prescription involves timber management, an experienced forester should be involved.
- Roads should be properly established or at least marked. This should be done either by or with the aid of a knowledgeable professional. If any roadwork near drainages or wet areas is required, the Department of Natural Resources and Environment (DNRE) should be contacted at (906) 353-6651 to obtain any necessary permits.
- If treatment is implemented and income tax assistance is needed, Jim Burns with Burns Forestry Consultants (906) 364-3238 or Susan Metcalfe with Metcalfe Forestry (989) 348-3596 can be contacted. More tax information can be seen in the Appendix of this plan.
- All forest management occurring on this ownership will have to strictly adhere to the guidelines set forth in the “Sustainable Soil and Water Quality Practices on Forest Land” manual, also known as Michigan’s Best Management Practices. This manual can be found on the Michigan DNRE website at [www.mi.gov/dnr](http://www.mi.gov/dnr). At the DNRE home page click on the *Forest, Land and Water* tab and then on *Land Management*. Under *Land Management* click on *Soil & Water Quality Manual (BMP)*. Following these guidelines will ensure that the soil and water resources, especially Spirit Creek and Lost Lake, will be protected.



## Agate Beach Property

The Agate Beach Property is a 248 acre property consisting of numerous forested and none forested stands. The terrain across the property is relatively flat to gently rolling with some short slopes that lead down to the several intermittent streams. This property has excellent potential to grow high quality forest products.

## Stand Descriptions

### Stand 1

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<b>Acres:</b>	<b>3.5</b>
<b>Forest Type:</b>	<b>M (Northern Hardwood)</b>
<b>Stocking Level:</b>	<b>9 (Over stocked Sawtimber)</b>
<b>Tree Quality and Potential</b>	<b>Average Quality with Good Potential</b>
<b>Site Index</b>	<b>55 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>145 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TM</b>
<b>Prescribed Management:</b>	<b>Individual Tree Selection</b>
<b>Treatment Year:</b>	<b>2011 - 2016</b>
<b>Management Objective:</b>	<b>Improve Health, Quality and Productivity while Maintaining Diversity and Protecting Soil and Water Quality.</b>

### Stand Description:

Stand 1 is a small stand located in the southwestern portion of the property on the west side of the Little Elm River. The river restricts admission to the stand making it necessary to cross adjacent ownerships to achieve access to the stand for timber harvesting purposes. The terrain in Stand 1 is relatively flat and the soils are somewhat dry and sandy. The stand borders part of the Little Elm River and management prescribed will have to be carried out in a fashion that does not create runoff and erosion potential.

The timber found in Stand 1 is comprised of a mixture of northern hardwood sawtimber. Common tree species found in Stand 1 include the following:

#### Dominant

Red Maple

#### Co-Dominant

Sugar Maple      Yellow Birch  
Hemlock

Red maple is the most common tree species found in Stand 1. Along with the red maples are lesser amounts of sugar maple and yellow birch. All of these hardwood species tend to range in diameter at breast height (DBH) from roughly 14 to 18 inches. Larger individuals can be found within the stand ranging up to 20 plus inches. Most of the hardwoods are healthy however some, especially the red maple and yellow birch, have some undesirable timber characteristics such as low branching and seams. Mixed with the hardwoods and providing a minor conifer component to the stand are scattered hemlocks. The hemlocks tend to range in DBH from 10 to 14 inches and most are

healthy, however not desirable from a timber stand point due to excessive frost cracking and short stubby form.

The habitat type of Stand 1 was determined to be Tsuga-Maianthemum (TM). This habitat type is commonly found on sandy to sandy loam soils. It generally supports the growth of a wide variety of tree species, both conifer and hardwood. Common ground flora species associated with the TM habitat type include the following:

Bracken Fern	Grasses	Wild Lily-of-the-Valley
Sedges	Starflower	Beaked Hazelnut

Since the soils are generally sandy in texture, timber harvesting could occur during dry periods of summer or during the winter to avoid soil damage such as rutting and compaction.

### **Recommended Management:**

The management objective for Stand 1 is to improve forest quality, health and productivity while maintaining diversity and protecting soil and water quality. To meet this objective, Stand 1 should be treated with an individual tree selection harvest between the years of 2011 and 2016. The harvest will focus on removing the poor formed and less desirable trees, thus focusing the stand growth on the higher quality trees that remain. The stocking of the stand should be reduced to a basal area ranging from 75 to 85 ft<sup>2</sup>/acre. Trees to be harvested should be selected individually using the following order of removal:

1. Risk – Cut high risk trees that are likely to die between cutting cycles.
2. Release crop trees – Cut poorer quality competitors to provide crown growing space around 40-60 crop trees per acre to promote growth and quality development. Two-sided release in sawtimber sized trees and full release in pole and sapling sized trees.
3. Vigor – Cut low vigor trees, based on crown size and condition, crown class, and potential stem decay.
4. Stem form and quality – Cut poorly formed stems, based on usable log length and potential decay.
5. Undesirable species (determined by landowner objectives).
6. Improve Spacing



**Figure 9: Northern hardwood stand  
Following an individual tree selection  
harvest.**

Beyond these criteria, all hemlocks found in the stand should be retained for diversity and the valuable wildlife habitat they provide. Additionally, where possible, high quality pole size and small sawtimber size sugar maples should be retained and promoted by thinning the trees around. This will increase the future value of the timber present in this stand.

All of the trees that are standing dead, have lost their merchantability due to excessive rot or contain an obvious active den should be left standing for wildlife use. Raptors use these trees to build their nests in or to perch and hunt from. Animals such as porcupines, bats, and owls use these trees for their dens. Once the trees die and fall over, other animals use the down logs for various purposes. Fishers, pine marten, raccoon, and fox are some of the species that use down logs for their dens. Grouse may use the logs as drumming logs during their mating season.

A 100 foot buffer should be installed along the Little Elm River to ensure it is not negatively impacted by the forest management conducted in Stand 1. Timber harvesting can occur in this buffer however a minimum of 70 percent canopy closure should be retained. This will guarantee there is adequate shade remaining on the stream to ensure the stream temperature does not rise due to excessive sunlight and negatively impact trout habitat. Also, to ensure stream protection, no slash resulting from the timber harvest should be left in or near the stream. Instead, any slash resulting from the timber harvest will have to be drug away from the stream and into Stand 1.

Timber harvesting should occur only during dry periods of the summer or the winter when the ground is frozen and protected by snow. This will reduce the potential for soil rutting and compaction.

As a result of the recommended management of this stand, the trees that are released or regenerated will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

**Stand 2**


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<b>Acres:</b>	<b>11.5</b>
<b>Forest Type:</b>	<b>M (Northern Hardwood)</b>
<b>Stocking Level:</b>	<b>8-2 (Well stocked Sawtimber over Well Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Good Quality with Excellent Potential</b>
<b>Site Index</b>	<b>55 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>95 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TM</b>
<b>Prescribed Management:</b>	<b>Individual Tree Selection</b>
<b>Treatment Year:</b>	<b>2016 - 2021</b>
<b>Management Objective:</b>	<b>Improve Health, Quality and Productivity while Maintaining Diversity and Protecting Soil and Water Quality.</b>

**Stand Description:**

Stand 2 is found in various small polygons scattered across this ownership. This stand is made up of a mixture of well stocked northern hardwood sawtimber growing over well stocked northern hardwood regeneration. Common tree species found in Stand 2 include the following:

**Dominant**

Sugar Maple

**Co-Dominant**

Red Maple

Yellow Birch

Hemlock

Sugar maple is the most common tree species found in Stand 1. Along with the sugar maples are good representations of both red maple and yellow birch. These hardwood trees tend to be healthy with no significant sign of insect or disease infestation. They range in DBH from roughly 10 to 14 inches with larger individual present reaching a DBH of up to 20 inches. The regeneration layer in this stand is somewhat thick and made up of primarily sugar maple and yellow birch seedlings and saplings. Adding a conifer component to the stand are scattered hemlock trees. The hemlocks found in this stand are not nearly as dense as the hemlocks found in the other areas of this property.



**Figure 7: Small diameter sugar maple sawtimber found in Stand 2.**

The terrain found in Stand 2 is relatively flat and poses no limitations to the use of timber harvesting equipment. The soils are sandy loam in texture and somewhat dry. Therefore they are capable of supporting timber harvesting operations during the dry periods of summer or during the winter without risking soil damage.

The habitat type of Stand 2 was determined to be Tsuga-Maianthemum (TM). This habitat type is commonly found on sandy to sandy loam soils. It generally supports the growth of a wide variety of tree species, both conifer and hardwood. Common ground flora species associated with the TM habitat type include the following:

Bracken Fern	Grasses	Wild Lily-of-the-Valley
Sedges	Starflower	Beaked Hazelnut

Since the soils are generally sandy in texture, timber harvesting could occur during dry periods of summer or during the winter without risking soil damage such as rutting and compaction.

**Recommended Management:**

The management objective for Stand 2 is to improve forest quality, health and productivity while maintaining diversity and protecting soil and water quality. To meet this objective, Stand 2 should be treated with an individual tree selection harvest between the years of 2016 and 2021. The harvest will focus on removing the poor formed and less desirable trees thus focusing the stands growth on the higher quality trees that remain. The stocking of the stand should be reduced to a basal area ranging from 75 to 85 ft<sup>2</sup>/acre. Trees to be harvested should be selected individually using the following order of removal:

1. Risk – Cut high risk trees that are likely to die between cutting cycles.
2. Release crop trees – Cut poorer quality competitors to provide crown growing space around 40-60 crop trees per acre to promote growth and quality development. Two-sided release in sawtimber sized trees and full release in pole and sapling sized trees.
3. Vigor – Cut low vigor trees, based on crown size and condition, crown class, and potential stem decay.
4. Stem form and quality – Cut poorly formed stems, based on usable log length and potential decay.
5. Undesirable species (determined by landowner objectives).
6. Improve Spacing

Beyond these criteria, all hemlocks found in the stand should be retained for diversity and the valuable wildlife habitat they provide. Additionally, where possible high quality pole size and small sawtimber size sugar maples should be selected to retain and released via thinning the trees around them to increase the future value of the timber present in this stand.

All of the trees that are standing dead, have lost their merchantability due to excessive rot or contain an obvious active den should be left standing for wildlife use. Raptors use these trees to build their nests in or to perch and hunt from. Animals such as porcupines, bats, and owls use these trees for their dens. Once the trees die and fall over, other animals use the down logs for various purposes. Fishers, pine marten, raccoon, and fox are some of the species that use down logs for their dens. Grouse may use the logs as drumming logs during their mating season.

Portions of Stand 2 border or are dissected by various intermittent streams found on the property. To protect the intermittent streams a 100 foot buffer should be installed along their banks. Timber harvesting can occur in this buffer however a minimum of 70 percent canopy closure should be retained. This will guarantee there is adequate shade remaining on the streams to ensure the temperature of the water within them does not rise due to excessive sunlight and negatively impact trout habitat of other bodies of water downstream. Also, to ensure stream protection, no slash resulting from the timber harvest should be left in or near the streams. Instead, any slash resulting from the timber harvest will have to be drug away from the stream and into Stand 2.

Timber harvesting should occur only during dry periods of the summer or the winter when the ground is frozen and protected by snow to reduce the potential for soil rutting and compaction.

As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

**Stand 3**


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<b>Acres:</b>	<b>1.5</b>
<b>Forest Type:</b>	<b>M (Northern Hardwood)</b>
<b>Stocking Level:</b>	<b>6 (Over Stocked Poletimber)</b>
<b>Tree Quality and Potential</b>	<b>Average Quality with Good Potential</b>
<b>Site Index</b>	<b>60 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>120 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>ATD</b>
<b>Prescribed Management:</b>	<b>Individual Tree Selection – Top Dieback Removal</b>
<b>Treatment Year:</b>	<b>2011 – 2-16</b>
<b>Management Objective:</b>	<b>Improve Health, Quality and Productivity while Maintaining Diversity and Protecting Soil and Water Quality.</b>

**Stand Description:**

Stand 3 is found in a small polygon located in the extreme southeastern corner of the property. This stand is comprised of a mixture of northern hardwood tree species growing on sandy loam soils. Tree species commonly found in Stand 3 include the following:

**Dominant**

Sugar Maple

**Co-Dominant**

Red Maple

Yellow Birch

Basswood

Sugar maple is the most common tree species found in Stand 3. The sugar maples generally range in DBH from six to ten inches. Within the stand, there is an excessive amount of top dieback affecting the sugar maple, thus reducing their quality and productivity. Mixed with the sugar maples are lesser amounts of red maple, yellow birch and basswood. Like the sugar maple these tree are also primarily pole sized ranging in DBH from six to ten inches.

The soils found within the stand are somewhat dry due to their sandy loam texture. This makes them operable with heavy logging equipment during the dry periods of summer and the winter. The terrain within the stand is relatively flat and does not impose any equipment limitations.

The habitat type of Stand 3 was determined to be Acer-Tsuga-Dryopteris (ATD). This is the most common habitat type associated with the northern hardwood forests of the Upper Peninsula. This habitat type occurs on sandy to sandy loam soils. Common ground flora species associated with the ATD habitat type include the following:

Shield Fern  
SedgesTwisted Stalk  
StarflowerSolomon's Seal  
Wild Lily-of-the-Valley

**Recommended Management:**

The management objective for Stand 3 is to improve forest quality, health and productivity while maintaining diversity and protecting soil and water quality. To meet this objective, Stand 3 should be treated with an individual tree selection harvest between the years of 2011 and 2016. The harvest will focus on removing the poor formed and less desirable trees thus focusing the stands growth on the higher quality trees that remain. The stocking of the stand should be reduced to a basal area ranging from 75 to 85 ft<sup>2</sup>/acre. Trees to be harvested should be selected individual using the following order of removal:

1. Risk – Cut high risk trees that are likely to die between cutting cycles.
2. Release crop trees – Cut poorer quality competitors to provide crown growing space around 40-60 crop trees per acre to promote growth and quality development. Two-sided release in sawtimber sized trees and full release in pole and sapling sized trees.
3. Vigor – Cut low vigor trees, based on crown size and condition, crown class, and potential stem decay.
4. Stem form and quality – Cut poorly formed stems, based on usable log length and potential decay.
5. Undesirable species (determined by landowner objectives).
6. Improve Spacing

Beyond these criteria, all hemlocks found in the stand should be retained for diversity and the valuable wildlife habitat they provide. Additionally, sugar maple trees displaying symptoms of top dieback should be aggressively pursued for harvest.

All of the trees that are standing dead, have lost their merchantability due to excessive rot or contain an obvious active den should be left standing for wildlife use. Raptors use these trees to build their nests in or to perch and hunt from. Animals such as porcupines, bats, and owls use these trees for their dens. Once the trees die and fall over, other animals use the down logs for various purposes. Fishers, pine marten, raccoon, and fox are some of the species that use down logs for their dens. Grouse may use the logs for drumming on during their mating season.

Timber harvesting should occur only during dry periods of the summer or the winter when the ground is frozen and protected by snow to reduce the potential for soil rutting and compaction.

As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.



**Stand 4**


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<b>Acres:</b>	<b>24</b>
<b>Forest Type:</b>	<b>Mh (Northern Hardwood - Hemlock)</b>
<b>Stocking Level:</b>	<b>9 (Over Stocked Sawtimber)</b>
<b>Tree Quality and Potential</b>	<b>Good Quality with Excellent Potential</b>
<b>Site Index</b>	<b>60 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>150 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TM</b>
<b>Prescribed Management:</b>	<b>Individual Tree Selection</b>
<b>Treatment Year:</b>	<b>2011 – 2016</b>
<b>Management Objective:</b>	<b>Improve Health, Quality and Productivity while Maintaining Diversity and Aesthetics and Protecting Soil and Water Quality.</b>

**Stand Description:**

Stand 4 is found in the northern portion of the property. The western part of the stand borders the public campground and park established by the Township. This stand is comprised of mixture upland hardwood and conifer tree species growing on sandy loam soils. The terrain within the stand is relatively flat with only some short slopes present along the intermittent stream that runs through the southern part of the stand. Common tree species found in Stand 4 include the following:

**Dominant**

Sugar Maple

**Co-Dominant**

Hemlock

Red Maple

Sugar maple is the most common tree species found in Stand 4. Along with the sugar maples are good representations of both hemlock and red maple. The trees found within this stand have an average DBH of roughly 12 to 16 inches, however larger individuals are common. The understory of the stand is made up of sugar maple seedlings and saplings and a good representation of Canada yew.

For the most part, the trees found in Stand 4 are healthy and growing well. There was not any excessive disease issues noted in this stand during the time of inspection.

The habitat type of Stand 4 was determined to be Tsuga-Maianthemum (TM). This habitat type is commonly found on sandy to sandy loam soils. It generally supports the growth of a wide variety of tree species, both conifer and hardwood. Common ground flora species associated with the TM habitat type include the following:

Bracken Fern

Sedges

Grasses

Starflower

Wild Lily-of-the-Valley

Beaked Hazelnut

Since the soils are generally sandy in texture, timber harvesting could occur during dry periods of summer or during the winter without risking soil damage such as rutting and compaction.

**Recommended Management:**

The management objective for Stand 4 is to harvest timber in a fashion that promotes the health, quality and productivity of the forest while maintain aesthetics and protecting soil and water quality. To meet this objective Stand 4 should be treated with an individual tree selection harvest between the years of 2011 and 2016. The harvest will reduce the stocking of the stand to a basal area ranging from 85 to 95 ft<sup>2</sup>/acre. The recommended residual stocking of this stand is higher than that of other similar stands on this property to maintain the aesthetic value of the stand due to its close proximity to the park. The trees to be harvested will be selected using the following criteria:

1. Risk – Cut high risk trees that are likely to die between cutting cycles.
2. Release crop trees – Cut poorer quality competitors to provide crown growing space around 40-60 crop trees per acre to promote growth and quality development. Two-sided release in sawtimber sized trees and full release in pole and sapling sized trees.
3. Vigor – Cut low vigor trees, based on crown size and condition, crown class, and potential stem decay.
4. Stem form and quality – Cut poorly formed stems, based on usable log length and potential decay.
5. Undesirable species (determined by landowner objectives).
6. Improve Spacing

Beyond these criteria, all large diameter (greater than 20 inches) healthy hemlock should be retained for wildlife use and aesthetics. Additionally, scattered large diameter (greater than 20 inches) hardwood trees should also be retained for aesthetics. All trees within the stand that pose a significant safety threat due to hang limbs, rotten forks and other defects should be harvested to maintain the safety of those using the property recreationally.

Timber harvesting within Stand 4 should only occur during the winter when the park is not being used. This will ensure that the visitors to the park will not be disturbed by the loud timber harvesting equipment. Additionally, all brush should be removed from the existing trails in Stand 4 to maintain their recreational quality.

An intermittent stream runs through part of the southern part of Stand 1. To protect the intermittent stream from soil erosion and runoff a 100 foot buffer should be installed along each stream bank. Timber harvesting can occur in this buffer however a minimum of 70 percent canopy closure should be retained. This will guarantee there is adequate shade remaining on the streams to ensure the temperature of the water does not rise due to excessive sunlight and negatively impact trout habitat of other bodies of water downstream. Also, to ensure stream protection, no slash resulting from the timber harvest should be left in or near the streams. Instead, any slash resulting from the timber harvest will have to be drug away from the stream and into Stand 4.

As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

**Stand 5**


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<b>Acres:</b>	<b>52</b>
<b>Forest Type:</b>	<b>Mh (Northern Hardwood - Hemlock)</b>
<b>Stocking Level:</b>	<b>9-2 (Over Stocked Sawtimber over Well Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Average Quality with Good Potential</b>
<b>Site Index</b>	<b>60 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>130 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TM</b>
<b>Prescribed Management:</b>	<b>Individual Tree Selection – Top Dieback Removal</b>
<b>Treatment Year:</b>	<b>2011 – 2016</b>
<b>Management Objective:</b>	<b>Improve Health, Quality and Productivity while Maintaining Diversity and Protecting Soil and Water Quality.</b>

**Stand Description:**

Stand 5 is found in two separate polygons on this ownership. This stand is very similar to Stand 4 however it seems to have been harvested slightly more aggressively when last cut and therefore has a lower current basal area and a higher density of regeneration. Stand 5 is currently stocked with a mixture of upland hardwood and conifer tree species.

Common tree species found within Stand 5 include the following:

**Dominant**

Sugar Maple  
Red Maple

**Co-Dominant**

Hemlock                      Yellow Birch  
Basswood

Sugar and red maple are the most common tree species found in Stand 5. Along with the maples are good representations of hemlock and lesser amounts of yellow birch and basswood. The maples are generally healthy however pockets of top dieback do exist. The hemlocks found within the stand are also healthy and adding to the diversity and wildlife habitat of the stand. Yellow birch and basswood are present within the stand however they are not common. The average DBH of the trees found in Stand 5 range from roughly 12 to 14 inches.

Like many of the other stands on this property, Stand 5 is dissected by a number of intermittent streams. The soils within the stand are generally sandy loam in texture and capable of supporting quality tree growth. The terrain is relatively flat with the majority of the slopes being concentrated along the intermittent streams.

The habitat type of Stand 5 was determined to be Tsuga-Maianthemum (TM). This habitat type is commonly found on sandy to sandy loam soils. It generally supports the growth of a wide variety of tree species, both conifer and hardwood. Common ground flora species associated with the TM habitat type include the following:

Bracken Fern  
Sedges

Grasses  
Starflower

Wild Lily-of-the-Valley  
Beaked Hazelnut

Since the soils are generally sandy in texture, timber harvesting could occur during dry periods of summer or during the winter without risking soil damage such as rutting and compaction.

**Recommended Management:**

The management objective for Stand 5 is to improve forest quality, health and productivity while maintaining diversity and protecting soil and water quality. To meet this objective, Stand 5 should be treated with an individual tree selection harvest between the years of 2011 and 2016. The harvest will focus on removing the poor formed and less desirable trees thus focusing the stands growth on the higher quality trees that remain. The stocking of the stand should be reduced to a basal area ranging from 75 to 85 ft<sup>2</sup>/acre. Trees to be harvested should be selected individually using the following order of removal:

1. Risk – Cut high risk trees that are likely to die between cutting cycles.
2. Release crop trees – Cut poorer quality competitors to provide crown growing space around 40-60 crop trees per acre to promote growth and quality development. Two-sided release in sawtimber sized trees and full release in pole and sapling sized trees.
3. Vigor – Cut low vigor trees, based on crown size and condition, crown class, and potential stem decay.
4. Stem form and quality – Cut poorly formed stems, based on usable log length and potential decay.
5. Undesirable species (determined by landowner objectives).
6. Improve Spacing

Beyond these criteria, the majority of the hemlocks found in the stand should be retained for diversity and the valuable wildlife habitat they provide. Additionally, where possible high quality pole size and small sawtimber size sugar maples should be retained and released by thinning the trees around them, increasing the future value of the timber present in this stand.

All of the trees that are standing dead, have lost their merchantability due to excessive rot or contain an obvious active den should be left standing for wildlife use. Raptors use these trees to build their nests in or to perch and hunt from. Animals such as porcupines, bats, and owls use these trees for their dens. Once the trees die and fall over, other animals use the down logs for various purposes. Fishers, pine marten, raccoon, and fox are some of the species that use down logs for their dens. Grouse may use the logs as drumming logs during their mating season.

Portions of Stand 5 border or are dissected by various intermittent streams found on the property. To protect the intermittent streams a 100 foot buffer should be installed along their banks. Timber harvesting can occur in this buffer however a minimum of 70 percent canopy closure should be retained. This will guarantee there is adequate shade remaining on the streams to ensure the temperature of the water does not rise due to excessive sunlight and negatively impact trout habitat of other bodies of water

downstream. Also, to ensure stream protection, no slash resulting from the timber harvest should be left in or near the streams, rather drug away into Stand 5.

Timber harvesting should occur only during dry periods of the summer or the winter when the ground is frozen and protected by snow to reduce the potential for soil rutting and compaction.

As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

### **Stand 6**

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<b>Acres:</b>	<b>66</b>
<b>Forest Type:</b>	<b>Mh (Northern Hardwood - Hemlock)</b>
<b>Stocking Level:</b>	<b>8-3 (Well Stocked Sawtimber over Well Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Poor Quality with Average Potential</b>
<b>Site Index</b>	<b>60 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>95 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TM</b>
<b>Prescribed Management:</b>	<b>Individual Tree Selection</b>
<b>Treatment Year:</b>	<b>2016 - 2021</b>
<b>Management Objective:</b>	<b>Improve Health, Quality and Productivity while Maintaining Diversity and Protecting Soil and Water Quality.</b>

### **Stand Description:**

Stand 6 is found in two separate polygons on the Agate Beach property. The current composition of this stand was influenced by a timber harvest that took place roughly 15 to 20 years ago. Judging from the current stocking the past harvest was a rather aggressive approach to thinning, which has created a current situation where there are many scattered large trees with thick regeneration. Common tree species found in Stand 6 include the following:

#### **Dominant**

Sugar Maple

#### **Co-Dominant**

Red Maple  
Hemlock

Yellow Birch

Sugar maple is the most common tree species found in Stand 6. The sugar maples present are primarily found in the sapling and sawtimber size classes with many reaching a DBH as large as 20 inches, however the majority of the sugar maples are found ranging from 12 to 14 inches in DBH. Most of the sugar maples are healthy with only scattered individuals showing signs of top dieback. Mixed with the sugar maples but less frequent are red maple, yellow birch and hemlock. These tree species tend to range in DBH from 10 to 14 inches. Most are healthy however some decline can be seen in individual red

maple and yellow birch trees. While hemlocks can be found throughout the stand, they tend to be concentrated in small clumps. The majority of the hemlock trees present are healthy, however due to frost cracks and other defects they are not very desirable economically.

The terrain found in Stand 6 is nearly flat to gently rolling. Like other stands found on this ownership, Stand 6 is dissected by various intermittent streams. Short, somewhat steep slopes are present leading down to most of the intermittent streams.

The habitat type of Stand 6 was determined to be Tsuga-Maianthemum (TM). This habitat type is commonly found on sandy to sandy loam soils. It generally supports the growth of a wide variety of tree species, both conifer and hardwood. Common ground flora species associated with the TM habitat type include the following:

Bracken Fern	Grasses	Wild Lily-of-the-Valley
Sedges	Starflower	Beaked Hazelnut

Since the soils are generally sandy in texture, timber harvesting could occur during dry periods of summer or during the winter without risking soil damage such as rutting and compaction.

#### **Recommended Management:**

The management objective for Stand 6 is to improve forest quality, health and productivity while maintaining diversity and protecting soil and water quality. To meet this objective, Stand 6 should be treated with an individual tree selection harvest between the years of 2016 and 2021. The harvest will focus on removing the poor formed and less desirable trees thus focusing the stands growth on the higher quality trees that remain. The stocking of the stand should be reduced to a basal area ranging from 75 to 85 ft<sup>2</sup>/acre. Trees to be harvested should be selected individually using the following order of removal:

1. Risk – Cut high risk trees that are likely to die between cutting cycles.
2. Release crop trees – Cut poorer quality competitors to provide crown growing space around 40-60 crop trees per acre to promote growth and quality development. Two-sided release in sawtimber sized trees and full release in pole and sapling sized trees.
3. Vigor – Cut low vigor trees, based on crown size and condition, crown class, and potential stem decay.
4. Stem form and quality – Cut poorly formed stems, based on usable log length and potential decay.
5. Undesirable species (determined by landowner objectives).
6. Improve Spacing

Beyond these criteria, the majority of the hemlocks found in the stand should be retained for diversity and the valuable wildlife habitat they provide. Additionally, where possible, high quality pole size and small sawtimber size sugar maples should be retained and

released by thinning the trees around them therefore increasing the future value of the timber remaining in this stand.

All of the trees that are standing dead, have lost their merchantability due to excessive rot or contain an obvious active den should be left standing for wildlife use. Raptors use these trees to build their nests in or to perch and hunt from. Animals such as porcupines, bats, and owls use these trees for their dens. Once the trees die and fall over, other animals use the down logs for various purposes. Fishers, pine marten, raccoon, and fox are some of the species that use down logs for their dens. Grouse may use the logs as drumming logs during their mating season.

Portions of Stand 6 border or are dissected by various intermittent streams found on the property. To protect the intermittent streams a 100 foot buffer should be installed along their banks. Timber harvesting can occur in this buffer however a minimum of 70 percent canopy closure should be retained. This will guarantee there is adequate shade remaining on the streams to ensure the temperature of the water within does not rise due to excessive sunlight. Also, to ensure stream protection, no slash resulting from the timber harvest should be left in or near the streams. Instead, any slash resulting from the timber harvest will have to be drug away from the stream and into Stand 6.

Timber harvesting should occur only during dry periods of the summer or the winter when the ground is frozen and protected by snow to reduce the potential for soil rutting and compaction.

As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

**Stand 7**


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<b>Acres:</b>	<b>22</b>
<b>Forest Type:</b>	<b>Me (Northern Hardwood – Lowland Hardwoods)</b>
<b>Stocking Level:</b>	<b>5-2 (Well Stocked Poletimber over Well Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Poor Quality with Poor Potential</b>
<b>Site Index</b>	<b>45 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>75 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TMC</b>
<b>Prescribed Management:</b>	<b>Overstory Removal</b>
<b>Treatment Year:</b>	<b>2011 – 2016</b>
<b>Management Objective:</b>	<b>Utilizing Dying Trees and Release Regeneration</b>

**Stand Description:**

Stand 7 is found in the southeastern portion of the property. This stand is comprised of a mixture of tree species growing on somewhat wet soils. Common tree species found within Stand 7 include the following:

<u><b>Dominant</b></u>	<u><b>Co-Dominant</b></u>
Sugar Maple    Red Maple	Black Ash                  Balsam Fir

The most common tree species found in the overstory of Stand 7 are sugar and red maples. The maples have an average DBH ranging from five to eight inches with some slightly larger individuals present. The majority of the maples in this stand are affected by top dieback. This is likely due to the high soil moisture found within the stand. Mixed with the maples are balsam fir and black ash. The balsam fir trees range from saplings to the small poles, while the majority of the black ash trees present are found in the sapling size class ranging from two to four inches in DBH. The black ash trees are better suited to grow on this somewhat wet site and therefore are healthier and more vigorously growing than the maples.

The habitat type of Stand 7 was determined to be Tsuga-Maianthemum-Coptis (TMC). This habitat type commonly occurs on soils of various textures with impeded drainage. Common ground flora species that are associated with the TMC habitat type include the following:

Goldthread	Bunchberry	Wild Lily-of-the-Valley
Starflower	Sedges	Wild Sarsapirilla

Due to the excessive soil moisture associated with this habitat type, timber harvesting should be restricted to the winter when the ground is adequately frozen and less susceptible to damage such as rutting and compaction.



**Recommended Management:**

The management objective for Stand 7 is to utilize the dying trees and release the healthy regeneration that has already been established. To meet this objective Stand 7 should be treated with and modified overstory removal harvest between the years 2011 and 2016. This harvest will be aimed at removing all trees five inches in DBH and larger, with a few exceptions, to fully open the overstory and provide sunlight to the established regeneration. Trees to be retained within the stand would include all hemlock, cedar or pine present, along with any healthy black or white ash trees. By conducting an overstory removal, the dying sugar and red maple trees will be utilized and the black ash saplings will be encouraged to recruit into the overstory due to the increased amount of sunlight they will receive. Since black ash trees are better suited to grow on the wet soils than the maples, the future forest will be healthier and have a better potential to produce quality timber products.

Any timber harvesting that does occur in Stand 7 will have to be restricted to the winter months to protect the wet sensitive soils. Harvesting during the winter when the ground is frozen will greatly reduce or eliminate the possibility of rutting and soil compaction.

As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

**Stand 8**


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<b>Acres:</b>	<b>4</b>
<b>Forest Type:</b>	<b>Hm (Hemlock - Northern Hardwood)</b>
<b>Stocking Level:</b>	<b>9 (Over Stocked Sawtimber)</b>
<b>Tree Quality and Potential</b>	<b>Average Quality with Average Potential</b>
<b>Site Index</b>	<b>50 Feet Tall at Age 50 – Red Maple</b>
<b>Basal Area</b>	<b>175 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TMV</b>
<b>Prescribed Management:</b>	<b>No Active Management</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Maintain Large Hemlocks for Diversity, Habitat and Aesthetics.</b>

**Stand Description:**

Stand 8 is found in two small polygons along the Little Elm River. This stand is very densely stocked with large hemlock and hardwood trees. Common tree species found in Stand 8 include the following:

**Dominant**

Hemlock

**Co-Dominant**

Sugar Maple

Red Maple

Yellow Birch

Hemlock is by far the most common tree species found in Stand 8. The hemlocks within this stand tend to be very large with some individual trees nearing 30 inches in DBH. These trees are generally healthy and are currently not showing any signs of decline. However, many are of low timber value due to frost cracks, seams and rot. Mixed with the hemlocks are lesser amounts of sugar maple, red maple and yellow birch. These hardwood species tend to range in DBH from 10 to 18 inches and are sparsely scattered throughout the stand.

The terrain found in Stand 8 is relatively flat. The soils are sandy to sandy loam in texture and seem to be well suited to support the growth of hemlock.

The habitat type of Stand 8 was determined to be Tsuga-Maianthemum-Vaccinium (TMV). This habitat type is commonly found on sandy soils. It was dominated by white pine prior to the heavy timber harvesting that occurred during the late 1800's and early 1900's. Common ground flora species that are associated with the TMV habitat type include the following:

Bracken Fern

Canada Blueberry

Wild Lily-of-the-Valley

Large Leaved Aster

Beaked Hazelnut

Wild Sarsaparilla

Due to the sandy soils associated with this habitat type, operation of heavy logging equipment can occur during dry periods of the summer and fall or during the winter.

**Recommended Management:**

The management objective for Stand 8 is to maintain the large hemlocks present for diversity, wildlife habitat and aesthetics. To meet this objective there should be no active management carried out. Instead this stand should be allowed progress naturally free of human disturbance. Since hemlock is a very long lived tree species they will be maintained on this site for many years to come, thus providing unique habitat for wildlife and aesthetic value. To monitor forest health this stand should be reevaluated in 2020.

**Stand 9**


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<b>Acres:</b>	<b>23</b>
<b>Forest Type:</b>	<b>Bf (White Birch – Spruce / fir)</b>
<b>Stocking Level:</b>	<b>5-2 (Well Stocked Poletimber over Well Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Poor Quality with Average Potential</b>
<b>Site Index</b>	<b>50 Feet Tall at Age 50 – Red Maple</b>
<b>Basal Area</b>	<b>85 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TMV</b>
<b>Prescribed Management:</b>	<b>Modified Clearcut</b>
<b>Treatment Year:</b>	<b>2011 – 2016</b>
<b>Management Objective:</b>	<b>Utilize Dying Trees while Encouraging Natural Regeneration and Protect Soil and Water Quality.</b>

**Stand Description:**

Stand 9 is found in the western portion of the property between the Little Elm River and Lake Superior. This stand is growing on sandy soils with gentle terrain. The tree species present are comprised primarily of upland hardwoods and conifers. Common tree species in Stand 9 include the following:

**Dominant**

White Birch  
Balsam Fir

**Co-Dominant**

Red Maple	Red Pine
Hemlock	Cedar
White Spruce	



**Figure 8: Dying white birch and healthy red pine found in Stand 9.**

White birch is the most common tree species found in the overstory of this stand. Many of the birch trees are mature and are naturally beginning to die. Mixed with the white birches are thick areas of balsam fir saplings and poletimber. Found less frequently throughout the stand are red maple, red pine, hemlock, cedar and white spruce. The red maples are generally pole sized trees of which most are healthy. The scattered red pine trees are very healthy. They have grown from seeds that have been carried to the stand naturally and are not remnants of an old plantation. Like the red pine, hemlock, cedar and white spruce are found scattered throughout the stand at low frequencies.

This stand is bordered on one side by the Little Elm River and the other side by Lake Superior. Therefore, it is very important that all timber management conducted within this stand following the guidelines stated in the “Sustainable Soil and Water Quality Practices on Forest Land” manual to ensure erosion and sedimentation does not occur and negatively impact the water resources that border the stand.

The habitat type of Stand 9 was determined to be Tsuga-Maianthemum-Vaccinium (TMV). This habitat type is commonly found on sandy soils. It was dominated by white pine prior to the heavy timber harvesting that occurred during the late 1800’s and early 1900’s. Common ground flora species that are associated with the TMV habitat type include the following:

Bracken Fern	Canada Blueberry	Large Leaved Aster
Beaked Hazelnut	Wild Sarsaparilla	Wild Lily-of-the-Valley

Due to the sandy soils associated with this habitat type, operation of heavy logging equipment can occur during dry periods of the summer and fall or during the winter.

**Recommended Management:**

The management objective for Stand 9 is to utilize the dying trees present while naturally regenerating the stand and protecting soil and water quality. To meet this objective Stand 9 should be harvested by means of a modified clearcut between the years of 2011 and 2016. This harvest will focus on removing all trees two inches in DBH and larger from the stand with a few exceptions. All red pine, hemlock and cedar trees should be retained for diversity and as a seed source to help regenerate the stand.

If possible, the timber harvest in Stand 9 should be conducted during the summer or fall prior to snow fall so that the harvesting equipment can be used to scarify the soil thus providing a mineral soil seed bed and encouraging natural regeneration of the stand. To scarify the soil, the harvesters should be encouraged to make sharp turns and skid trees throughout the harvested area.

Buffers should be installed along the Lake Superior shoreline and the Little Elm River to ensure they are protected from soil erosion and sedimentation. These buffers should be 100 feet wide. The buffer along Lake Superior should begin at the tree line along the beach while the buffer along the Little Elm River should begin at the high water mark of the river or at the edge of any beaver ponds that currently exist. There should be no timber harvesting within these buffers. This will ensure that the current vegetation within the buffers will remain intact and filter sedimentation and soil erosion that may occur due to the timber harvest before it reaches either Lake Superior or the Little Elm River. Installing these buffers will result in a narrow strip of timber being harvest through the middle of this stand.

As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

**Stand 10**


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<b>Acres:</b>	<b>8</b>
<b>Forest Type:</b>	<b>Qe (Lowland Conifer – Lowland Hardwood)</b>
<b>Stocking Level:</b>	<b>4-2 (Poorly Stocked Poletimber over Well Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Poor Quality with Poor Potential</b>
<b>Site Index</b>	<b>40 Feet Tall at Age 50 – Red Maple</b>
<b>Basal Area</b>	<b>35 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TMC</b>
<b>Prescribed Management:</b>	<b>No Active Management</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Allow Stand to Progress Naturally and Preserve Wildlife Cover.</b>

**Stand Description:**

Stand 10 is found in the southeastern portion of the property. This stand is found on relatively wet soils with a slight clay component. The terrain is gently sloping with a slight westerly aspect. The tree species found growing in Stand 10 include the following:

**Dominant**

Balsam Fir  
Hemlock

**Co-Dominant**

Sugar Maple	Red Maple
Black Ash	Yellow Birch
Cedar	

Balsam fir is the most common tree species found within Stand 10. Along with the balsam firs is a good representation of hemlock. Hardwoods including sugar maple, red maple, yellow birch and black ash are also found within the stand. Cedars are present but at a very low frequency. All of the trees found in Stand 10 are displaying very low timber quality. Many are stunted and slow growing. The hardwoods seem to be the poorest quality trees with many showing significant signs of excessive top dieback. The trees present are most commonly found in the sapling and pole timber size classes and range from roughly two to eight inches in DBH.

The habitat type of Stand 10 was determined to be Tsuga-Maianthemum-Coptis (TMC). This habitat type will occur on soils of various textures with impeded drainage. It often supports the growth of a diverse mixture of conifer and hardwood tree species. Common ground flora species associated with the TMC habitat type include the following:

Goldthread	Bunchberry	Yellow Beadlily
Starflower	Sedges	Wild Lily-of-the-Valley

Due to the impeded drainage associated with this habitat type, timber harvesting should be restricted to winter only when the soil is adequately frozen and protected from damage such as rutting and compaction.

**Recommended Management:**

The management objective for Stand 10 is to allow it to progress naturally and maintain the thick cover for wildlife. To meet this objective there should not be any active management carried out. The current stocking of the stand is much too low to support a commercial timber sale and due to the low quality of the site it will likely be many years before this site can be harvested again. This stand should be reevaluated in 2020 to monitor forest health and growth.

**Stand 11**


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<b>Acres:</b>	<b>3.5</b>
<b>Forest Type:</b>	<b>Ab (Aspen - Birch)</b>
<b>Stocking Level:</b>	<b>2 (Average Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Low Quality with Low Potential</b>
<b>Site Index</b>	<b>NA</b>
<b>Basal Area</b>	<b>NA</b>
<b>Habitat Type</b>	<b>NA</b>
<b>Prescribed Management:</b>	<b>No Active Management</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Allow Stand to Progress Naturally and Become Fully Stocked.</b>

**Stand Description:**

Stand 11 is found in the northeast corner of this property. This stand is made up of a mix of regeneration that has established itself in a manmade opening. This area seems to have been cleared and used as a barrow or gravel pit during the construction of the woods roads on the property. Currently the stand is comprised of the following tree species.

**Dominant**

Aspen

**Co-Dominant**

White Birch



**Figure 9: Aspen and white birch regenerating in Stand 11.**

Aspen and white birch are the only two tree species that make up majority of saplings present. The aspen and birch saplings seem to be healthy however they are only sparsely regenerating from seeds that have blown into the stand. The terrain in this stand is flat and the soils have been disturbed by past human use.

The habitat type of Stand 11 was not determined due to the high amount of disturbance that has occurred here.

**Recommended Management:**

The management objective for Stand 11 is to allow the stand to progress naturally and become fully stocked. To meet this objective there should not be any active management conducted in Stand 10. Instead the stand should be allowed to develop free of human disturbance. If left free of disturbance, it can be expected that more aspen and white birch will continue to seed into this stand and eventually over time the stand will reach a fully stocked state. This stand should be reevaluated in 2020 to monitor forest health and growth.

**Stand 12**


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<b>Acres:</b>	<b>15</b>
<b>Forest Type:</b>	<b>XL (Lowland Brush)</b>
<b>Stocking Level:</b>	<b>NA</b>
<b>Tree Quality and Potential</b>	<b>NA</b>
<b>Site Index</b>	<b>NA</b>
<b>Basal Area</b>	<b>NA</b>
<b>Habitat Type</b>	<b>NA</b>
<b>Prescribed Management:</b>	<b>No Active Management</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Soil and Water Protection.</b>

**Stand Description:**

Stand 12 is made up of a narrow strip of land that follows the Little Elm River. This stand is comprised primarily of lowland brush such as tag alder and willow and has very little to no merchantable timber growing in it. The soils in this stand are extremely wet and mucky. They are very susceptible to damage such as rutting and compaction if operated on with heavy equipment. The terrain of the stand is flat. Currently, beavers have dammed portions of the river, thus flooding small areas of Stand 12.

Tag alder and other associated plants in wetlands serve the important ecological function of filtering runoff water before it enters surface water bodies or flows downward into groundwater reserves. Although not a commercially productive portion of this property from a timber standpoint, Stand 12 contributes added habitat diversity to a wide range of wildlife, as well as helping to provide clean water.

**Recommended Management:**

The management objective for Stand 12 is to protect soil and water quality. To meet this objective there should be no active management conducted. Instead, this stand should remain free of human disturbance and timber harvesting equipment to ensure the soil and water resources are not negatively impacted. Furthermore, timber harvesting buffers in adjacent stands will be utilized to ensure protection of Stand 12 and the Little Elm River. The guidelines to be followed regarding buffer size and timber harvesting in the buffers is discussed in the management recommendations of the adjacent stands. Stand 12 should be reevaluated in 2020 to ensure there are no soil erosion or sedimentation issues.

**Stand 13**


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<b>Acres:</b>	<b>8</b>
<b>Forest Type:</b>	<b>O (Open)</b>
<b>Stocking Level:</b>	<b>NA</b>
<b>Tree Quality and Potential</b>	<b>NA</b>
<b>Site Index</b>	<b>NA</b>
<b>Basal Area</b>	<b>NA</b>
<b>Habitat Type</b>	<b>NA</b>
<b>Prescribed Management:</b>	<b>No Active Management</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Water Protection.</b>

**Stand Description:**

Stand 13 is made up of the open, non-forested areas of the property. These areas consist of the sandy beach along Lake Superior and the small opening in the northeastern part of the ownership. The opening in the northeastern part of the ownership seems to have been cleared and used as a barrow or gravel pit during construction of the woods roads on the property. This area has continued to exist free of trees due to continued human use and vehicular traffic.



**Figure 10: View of the Lake Superior shoreline.**

The beach along Lake Superior contains sand the entire length of the Agate Beach property. There are currently no trees growing on the beach however some dune grasses have established on the backside of the beach along the timberline.

**Management Recommendations:**

The management objective for Stand 13 is to protect the water and unique beach habitat. To meet this objective all vehicular traffic should be restricted from driving on the beach, including the use of ATV's. Limiting the beach to only foot traffic will protect it and the sensitive dune grass growing there. The beach should be reevaluated in 2020 to ensure there are not any erosion or motor vehicle issues.

The pit found in the northeast corner of the property should continue to be used as needed to supply fill to maintain the system of woods roads found on the property.



**Stand 14**


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<b>Acres:</b>	<b>6</b>
<b>Forest Type:</b>	<b>P (Park)</b>
<b>Stocking Level:</b>	<b>NA</b>
<b>Tree Quality and Potential</b>	<b>NA</b>
<b>Site Index</b>	<b>NA</b>
<b>Basal Area</b>	<b>NA</b>
<b>Habitat Type</b>	<b>NA</b>
<b>Prescribed Management:</b>	<b>High Risk Tree Removal</b>
<b>Treatment Year:</b>	<b>Continuous</b>
<b>Management Objective:</b>	<b>Maintain Park Aesthetics and Public Safety.</b>

**Stand Description:**

Stand 14 is made up of the park area found in the northwestern corner of the property. Included in the park are a number of campsites, a picnic area and out buildings. The park sees use almost daily through the spring, summer, and fall.

Within the park there are various trees used for shade, which also provide aesthetic beauty. A thin strip of trees is found between the campground area and the beach. Common tree species found within the park include the following:

<u><b>Dominant</b></u>	<u><b>Co-Dominant</b></u>
White Birch    Aspen	Sugar Maple    Red Maple

The white birch and aspen are found primarily along the east side of the beach between the beach and the campground. Many of the birch and aspen are reaching maturity and showing signs of decline. The sugar and red maples are found more commonly throughout the campground and along the back side of the campground. The maples are generally healthy, large diameter trees however some have pockets of rot and other defects that make them hazards to public safety.



**Figure 11: Campsite at the Agate Beach property.**

**Recommended Management:**

The management objective for the park is to maintain its aesthetics and protect the individuals that use it. To meet this objective “hazard” trees should be removed from the park when timber harvesting is being conducted on other parts of the property. Hazard trees are those that pose a high risk of falling over or losing large limbs that could severely injure those using the park. Hazard trees to remove would include all the mature and dying white birch and aspen found in and around the park. In addition, the sugar and red maple trees should be inspected individually and their risk factor determined. High risk maple trees would include those trees with severe rot, cankers or other deformities that greatly increase the chances of wind-throw or loss of large limbs. All high risk trees should be removed. Any trees that need to be removed should be cut during the winter when the park is not being used by the public.

It may be desirable for the township to expand the size of the park. In the past park expansion plans have been prepared and proposed to the township board. If it is decided that the township would like to expand the park some of the preparations of the expansion project could be rolled into the timber harvesting that is scheduled for the property. This may include clearing trees, brush and stumps to create more campsites and establishing hiking trails to improve recreational opportunities.

**Recommended Treatment Schedule – Agate Beach Property**

The following table shows each stand located on the Agate Beach property and the corresponding treatments that were recommended above.

<b>Stand</b>	<b>Stand Type</b>	<b>Acres</b>	<b>Treatment Description</b>	<b>Treatment Year</b>	<b>Re-Evaluation Year</b>
<b>1</b>	<b>M9</b>	<b>3.5</b>	<b>Individual Tree Selection</b>	<b>2011- 2016</b>	<b>2020</b>
<b>2</b>	<b>M8-2</b>	<b>11.5</b>	<b>Individual Tree Selection</b>	<b>2016 - 2021</b>	<b>2020</b>
<b>3</b>	<b>M6</b>	<b>1.5</b>	<b>Individual Tree Selection / Top Dieback Removal</b>	<b>2011 - 2016</b>	<b>2020</b>
<b>4</b>	<b>Mh9</b>	<b>24</b>	<b>Individual Tree Selection</b>	<b>2011 - 2016</b>	<b>2020</b>
<b>5</b>	<b>Mh9-2</b>	<b>52</b>	<b>Individual Tree Selection / Top Dieback Removal</b>	<b>2011 - 2016</b>	<b>2020</b>
<b>6</b>	<b>Mh8-3</b>	<b>66</b>	<b>Individual Tree Selection</b>	<b>2016 - 2021</b>	<b>2020</b>
<b>7</b>	<b>Me5-2</b>	<b>22</b>	<b>Overstory Removal</b>	<b>2011 - 2016</b>	<b>2020</b>
<b>8</b>	<b>Hm9</b>	<b>4</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>
<b>9</b>	<b>Bf5-2</b>	<b>23</b>	<b>Modified Clearcut</b>	<b>2011 - 2016</b>	<b>2020</b>
<b>10</b>	<b>Qe4-3</b>	<b>8</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>
<b>11</b>	<b>Ab2</b>	<b>3.5</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>
<b>12</b>	<b>XL</b>	<b>15</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>
<b>13</b>	<b>O</b>	<b>8</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>
<b>14</b>	<b>P</b>	<b>6</b>	<b>High Risk Tree Removal</b>	<b>Continuous</b>	<b>2020</b>

**Recorded Treatment Activity – Agate Beach Property**

The following table lists each stand located on the Agate Beach property. As recommended practices are implemented they should be recorded here.

<b>Stand</b>	<b>Stand Type</b>	<b>Acres</b>	<b>Activity</b>	<b>Treatment Year</b>
<b>1</b>	<b>M9</b>			
<b>2</b>	<b>M8-2</b>			
<b>3</b>	<b>M6</b>			
<b>4</b>	<b>Mh9</b>			
<b>5</b>	<b>Mh9-2</b>			
<b>6</b>	<b>Mh8-3</b>			
<b>7</b>	<b>Me5-2</b>			
<b>8</b>	<b>Hm9</b>			
<b>9</b>	<b>Bf5-2</b>			
<b>10</b>	<b>Qe4-3</b>			
<b>11</b>	<b>Ab2</b>			
<b>12</b>	<b>XL</b>			
<b>13</b>	<b>O</b>			
<b>14</b>	<b>P</b>			

## Fire Hall Property

The fire hall property consists of 20 acres located off of the Misery Bay Road. The terrain of the property is generally flat with some short, small hills. The timber includes a mix of upland and lowland hardwood and softwood. This property is the currently houses the Toivola Volunteer Fire Department.

## Stand Descriptions

### Stand 1

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<b>Acres:</b>	<b>6</b>
<b>Forest Type:</b>	<b>Mh (Northern Hardwood - Hemlock)</b>
<b>Stocking Level:</b>	<b>9 (Overstocked Sawtimber)</b>
<b>Tree Quality and Potential:</b>	<b>Good Quality with Excellent Potential</b>
<b>Site Index:</b>	<b>50 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area:</b>	<b>120 ft<sup>2</sup>/acre</b>
<b>Habitat Type:</b>	<b>TAM</b>
<b>Prescribed Management:</b>	<b>Individual Tree Selection</b>
<b>Treatment Year:</b>	<b>2011 – 2016</b>
<b>Management Objective:</b>	<b>Improve Forest Health, Quality and Growth while Encouraging Diversity and Maintaining Wildlife Habitat.</b>

### Stand Description:

Stand 1 is located in the northern portion of the Fire Hall property. This stand is comprised of a diverse mix of upland hardwood tree species, along with the occasional conifer. Common tree species found in this stand include the following:

<u><b>Dominant</b></u>	<u><b>Co-Dominant</b></u>
Sugar Maple	Red Maple      White Ash
	Basswood      Hemlock
	Quaking Aspen

The majority of the trees found within this stand are sugar maple. The sugar maples average roughly 14 inches in DBH with many larger individuals present. They are generally healthy, good quality trees however, some are experiencing top dieback. Mixed with the sugar maples are good representations of red maple, basswood, and white ash trees. Like the sugar maples, most of these trees are healthy and capable of producing quality timber products. Found at a very low frequency within the stand are small clones of quaking aspen. These clones generally only consist of four to eight trees. They are reaching maturity and should be considered for harvest. Adding a conifer component to the stand are two pockets of hemlock. Within these pockets the hemlock trees mix with the other hardwood species present. The hemlocks are generally healthy and are providing diversity and wildlife habitat to the stand.

The terrain within the stand is relatively flat, making it easily accessible for timber harvesting operations. The soils are somewhat dry and capable of supporting the use of heavy equipment during the dry periods of summer or during the winter.

The habitat type of Stand 1 was determined to be Tsuga-Acer-Mitchella (TAM). This habitat type is generally found on clay loam or clay textured soils. It commonly supports the growth of a wide range of upland hardwood and softwood tree species. Common ground flora plants associated with the TAM habitat type include the following:

Sedges	Wild Sarsaparilla	Wild Lily-of-the-Valley
Lady Fern	Shield Fern	Bracken Fern

Due to the clay component of this habitat type, timber harvesting should be restricted to the dry periods of summer or during the winter when the ground is frozen. Harvesting during these times of the year will reduce the potential for soil rutting and compaction.

**Recommended Management:**

The management objective for Stand 1 is to improve its overall quality, health and growth while encouraging diversity and maintaining wildlife habitat. To meet this objective Stand 1 should be treated with an individual tree selection harvest between the years of 2011 and 2016. The harvest will focus on removing the poor form and high risk trees present thus focusing the stands growth on the higher quality trees that remain. The stocking of the stand should be reduced to a basal area ranging between 75 and 85 ft<sup>2</sup>/acre. The trees to be harvested should be selected using the following order of removal:

1. Risk – Cut high risk trees that are likely to die between cutting cycles.
2. Release crop trees – Cut poorer quality competitors to provide crown growing space around 40-60 crop trees per acre to promote growth and quality development. Two-sided release in sawtimber sized trees and full release in pole and sapling sized trees.
3. Vigor – Cut low vigor trees, based on crown size and condition, crown class, and potential stem decay.
4. Stem form and quality – Cut poorly formed stems, based on usable log length and potential decay.
5. Undesirable species (determined by landowner objectives).
6. Improve Spacing

Beyond these criteria, all aspen present within the stand should be harvested as it is likely they will not survive until the next cutting cycle. The majority of the hemlocks should be retained for the diversity and wildlife habitat they provide. In some areas retaining the hemlock may result in a residual basal area higher than the recommended range. Trees to focus on removing would be any high risk or poor formed tree, especially those expressing symptoms of top dieback.

All of the trees that are standing dead, have lost their merchantability due to excessive rot, or contain an obvious active den should be left standing for wildlife use. Raptors use these trees to build their nests in or to perch and hunt from. Animals such as porcupines, bats, and owls use these trees for their dens. Once the trees die and fall over, other animals use the down logs for various purposes. Fishers, pine marten, raccoon, and fox are some of the species that use down logs for their dens. Grouse may use the logs as drumming logs during their mating season.

Timber harvesting should occur only during dry periods of the summer or the winter when the ground is frozen and protected by snow to reduce the potential for soil rutting and compaction. As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

**Stand 2**


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<b>Acres:</b>	<b>5.5</b>
<b>Forest Type:</b>	<b>Mq (Northern Hardwood – Lowland Conifer)</b>
<b>Stocking Level:</b>	<b>6-2 (Overstocked Poletimber over Well Stocked Regeneration)</b>
<b>Tree Quality and Potential:</b>	<b>Poor Quality with Average Potential</b>
<b>Site Index:</b>	<b>45 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area:</b>	<b>110 ft<sup>2</sup>/acre</b>
<b>Habitat Type:</b>	<b>TAM</b>
<b>Prescribed Management:</b>	<b>Salvage Top Dieback</b>
<b>Treatment Year:</b>	<b>2011 – 2016</b>
<b>Management Objective:</b>	<b>Utilize Dying Timber and Promote Forest Health, Growth and Productivity.</b>

**Stand Description:**

Stand 2 is located in two separate polygons on the Fire Hall property. This stand is comprised of a diverse mix of upland and lowland hardwood and conifer tree species and serves as a transition area from a northern hardwood forest to a lowland conifer forest. Common tree species found in Stand 2 include the following:

**Dominant**

Red Maple  
Sugar Maple

**Co-Dominant**

Balsam Fir	Hemlock
White Spruce	Cedar
Yellow Birch	

The stand is made up primarily of pole-sized red and sugar maple trees ranging in DBH from five to ten inches. Many of the maples within this stand are poor quality trees showing strong symptoms of top dieback. Mixed with the maples is a good representation of conifers such as balsam fir, hemlock, white spruce, and cedar. Of the conifers, balsam fir is the most common. Many of the balsam fir trees are found in the poletimber size class ranging from five to ten inches in DBH. The white spruce trees



**Figure 12: Excessive top dieback in Stand 2.**

present are slightly larger with many ranging in DBH from eight to twelve inches. Mixed within the stand at somewhat low frequencies are hemlock and cedar trees. Most of the hemlock and cedar are healthy, however many are poor formed. These trees offer excellent wildlife habitat and also provide diversity to the stand. Yellow birch trees are present within this stand however they are fairly uncommon and many are poor formed, low quality trees.



The habitat type of Stand 2 was determined to be Tsuga-Acer-Mitchella (TAM). This habitat type is generally found on clay loam or clay textured soils. It commonly supports the growth of a wide range of upland hardwood and softwood tree species. Common ground flora plants associated with the TAM habitat type include the following:

Sedges	Wild Sarsaparilla	Wild Lily-of-the-Valley
Lady Fern	Shield Fern	Bracken Fern

Due to the clay component of this habitat type, timber harvesting should be restricted to the dry periods of summer or during the winter when the ground is frozen. Harvesting during these times of the year will reduce the potential for soil rutting and compaction.

**Recommended Management:**

The management objective for Stand 2 is to utilize the dying timber present while improving forest health, diversity and productivity. To meet this objective this stand should be treated with a species removal harvest between the years of 2011 and 2016. The harvest will focus on removing the tree species from the stand that are least healthy. Within the stand all sugar maple should be cut due to the high frequency of top dieback present. In addition to harvesting all of the sugar maple trees, all merchantable balsam fir and white spruce larger than 14 inches in DBH should also be cut. Excessively poor quality red maple and yellow birch should also be selected for removal. To maintain diversity and wildlife habitat all hemlock and cedar present should be retained regardless of condition.

Timber harvesting should occur only during dry periods of the summer or the winter when the ground is frozen and protected by snow to reduce the potential for soil rutting and compaction. As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

**Stand 3**


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<b>Acres:</b>	<b>5</b>
<b>Forest Type:</b>	<b>Qe (Lowland Conifer – Lowland Hardwood)</b>
<b>Stocking Level:</b>	<b>5 (Well Stocked Poletimber)</b>
<b>Tree Quality and Potential:</b>	<b>Poor Quality with Poor Potential</b>
<b>Site Index:</b>	<b>35 Feet Tall at Age 50 – Cedar</b>
<b>Basal Area:</b>	<b>95 ft<sup>2</sup>/acre</b>
<b>Habitat Type:</b>	<b>TTS</b>
<b>Prescribed Management:</b>	<b>No Active Management</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Maintain Wildlife Habitat and Protect Soils</b>

**Stand Description:**

Stand 3 is found in the southern portion of the Fire Hall property. This stand is made up of a very diverse mix of lowland conifer and hardwood tree species growing on relatively flat wet soil. Common tree species found in Stand 3 include the following:

**Dominant**

Hemlock  
Cedar

**Co-Dominant**

White Spruce	Balsam Fir
Black Ash	Red Maple
Yellow Birch	



**Figure 13: Lowland tree species found in Stand 3.**

Hemlock and cedar are the most common tree species found within Stand 3. They are generally pole-sized trees with an average DBH of roughly ten inches. Most are healthy and providing the stand with excellent wildlife habitat. Other conifer tree species found in Stand 3 include white spruce and balsam fir. Many of the balsam fir trees are found in the sapling and poletimber size class while the white spruce are slightly larger and found ranging up to 14 inches in DBH. Comprising the

hardwood component of the stand is a mix of black ash, red maple and yellow birch. The ash trees are generally healthy and well formed as they are adapted to grow on the wet soils found in the stand. The yellow birch and red maples are generally stunted and poor quality due to the soil quality.

The terrain in Stand 3 is flat. The soils are somewhat wet to excessively wet and very susceptible to damage if operated on with heavy logging equipment.

The habitat type of Stand 3 was determined to be Tsuga-Thuja-Sphagnum (TTS). This habitat type is found on soils with excessive soil moisture. Often times the top layer of the soil contains highly decomposed organic matter. Common ground flora species associated with the TTS habitat type include the following:

Goldthread	Bunchberry	Sphagnum Moss
Sedges	Blueberry	Starflower

Due to the excessive amount of soil moisture associated with the TTS habitat type any operation of heavy logging equipment will be restricted to the winter when the ground is adequately frozen and protected from the potential of rutting and soil compaction.

**Recommended Management:**

The management objective for Stand 3 is to maintain the wildlife habitat the stand provides and protect the wet sensitive soils from rutting, compaction and other damage. To meet this objective Stand 3 should not be actively managed. Not conducting a timber harvest in Stand 3 will ensure the hemlock and cedar trees are retained and given an opportunity to mature and grow, thus maintaining excellent wildlife cover and habitat. Additionally, not harvesting this stand will ensure that the wet sensitive soils present will be protected and not damaged by the operation of heavy logging equipment. Reevaluation of Stand 3 should take place in 2020 to monitor the stands health and growth.

**Stand 4**


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<b>Acres:</b>	<b>1</b>
<b>Forest Type:</b>	<b>M (Northern Hardwood)</b>
<b>Stocking Level:</b>	<b>4-3 (Poor Stocked Poletimber over Well Stock Regeneration)</b>
<b>Tree Quality and Potential:</b>	<b>Average Quality with Average Potential</b>
<b>Site Index:</b>	<b>50 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area:</b>	<b>40 ft<sup>2</sup>/acre</b>
<b>Habitat Type:</b>	<b>TAM</b>
<b>Prescribed Management:</b>	<b>No Active Management</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Allow Stand to Mature</b>

**Stand Description:**

Stand 4 is made up of a small area surrounding the Fire Hall. This area seems to have been cleared at one time and since has reverted back to forest cover. Currently this stand is made up of primarily hardwood regeneration with a scattered overstory of low quality hardwood poletimber. Common tree species found within Stand 4 include:

**Dominant**

Sugar Maple  
Red Maple

**Co-Dominant**

White Ash  
Hemlock

Sugar maple is the most common tree species found in Stand 4. Along with the sugar maple is a good representation of red maple and a fair representation of white ash. The majority of the hardwoods present are in the sapling size class with an average of roughly two inches in DBH. The overstory of the stand is made up of highly scattered sugar maple, red maple and hemlock poles ranging from five to ten inches in DBH. The overstory is very poorly stocked and made up of generally low quality trees. Due to the low stocking of the overstory, the regeneration present is receiving plenty of sunlight and seems to be healthy and growing vigorously.



**Figure 14: Young regeneration found in Stand 4.**

The terrain in Stand 4 is flat and the soils are dry to somewhat dry. Due to the moisture conditions of the soil, timber harvesting could occur during dry periods of the summer or during the winter when the ground is frozen.

The habitat type of Stand 4 was determined to be Tsuga-Acer-Mitchella (TAM). This habitat type is generally found on clay loam or clay textured soils. It commonly supports the growth of a wide range of upland hardwood and softwood tree species. Common ground flora plants associated with the TAM habitat type include the following:

Sedges	Wild Sarsaparilla	Wild Lily-of-the-Valley
Lady Fern	Shield Fern	Bracken Fern

Due to the clay component of this habitat type, timber harvesting should be restricted to the dry periods of summer or during the winter when the ground is frozen. Harvesting during these times of the year will reduce the potential for soil rutting and compaction.

**Recommended Management:**

The management objective for Stand 4 is to allow it to mature and grow free of human disturbance. To meet this objective there is no active management scheduled for this stand. Instead, the stand should be reevaluated in 2020 to monitor for any forest pest or disease issues that may occur and also to determine future timber harvesting recommendations.

**Stand 5**


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<b>Acres:</b>	<b>2.5</b>
<b>Forest Type:</b>	<b>O (Open)</b>
<b>Stocking Level:</b>	<b>NA</b>
<b>Tree Quality and Potential:</b>	<b>NA</b>
<b>Site Index:</b>	<b>NA</b>
<b>Basal Area:</b>	<b>NA</b>
<b>Habitat Type:</b>	<b>NA</b>
<b>Prescribed Management:</b>	<b>No Active Management</b>
<b>Treatment Year:</b>	<b>NA</b>
<b>Management Objective:</b>	<b>Continue to Use as Fire Hall</b>

**Stand Description:**

Stand 5 is made up of the small open area in the southwest corner of the property where the Fire Hall is located. Currently, this consists only of a small open grassy area and the buildings that house the equipment for the Toivola Volunteer Fire Department.

**Recommended Management:**

This stand should continue to be used to house the equipment for the fire department and should be omitted from forest management.



**Figure 15: Building located in Stand 5 that houses the equipment of the Toivola Volunteer Fire Department.**

**Recommended Treatment Schedule – Fire Hall Property**

The following table shows each stand located on the Fire Hall property and the corresponding treatments that were recommended above.

<b>Stand</b>	<b>Stand Type</b>	<b>Acres</b>	<b>Treatment Description</b>	<b>Treatment Year</b>	<b>Re-Evaluation Year</b>
<b>1</b>	<b>Mh9</b>	<b>6</b>	<b>Individual Tree Selection</b>	<b>2011-2016</b>	<b>2020</b>
<b>2</b>	<b>Mq6-2</b>	<b>5.5</b>	<b>Salvage Top Dieback</b>	<b>2011-2016</b>	<b>2020</b>
<b>3</b>	<b>Qe5</b>	<b>5</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>
<b>4</b>	<b>M4-3</b>	<b>1</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>
<b>5</b>	<b>O</b>	<b>2.5</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>

**Recorded Treatment Activity – Fire Hall**

The following table lists each stand located on the Fire Hall property. As recommended practices are implemented they should be recorded here.

<b>Stand</b>	<b>Stand Type</b>	<b>Acres</b>	<b>Activity</b>	<b>Treatment Year</b>
<b>1</b>	<b>Mh9</b>			
<b>2</b>	<b>Mq6-2</b>			
<b>3</b>	<b>Qe5</b>			
<b>4</b>	<b>M4-3</b>			
<b>5</b>	<b>O</b>			

## Portage Canal Property

The Portage Canal property is a 146 acre property consisting of numerous forested and non-forested stands. It is bordered by both the Portage Canal and Lake Superior. The Township has developed and maintains a park in the north end of the property to be utilized by the public.

## Stand Descriptions

### Stand 1

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<b>Acres:</b>	<b>5</b>
<b>Forest Type:</b>	<b>M (Northern Hardwood)</b>
<b>Stocking Level:</b>	<b>7-3 (Poorly stocked Sawtimber over Well Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Average Quality with Excellent Potential</b>
<b>Site Index</b>	<b>60 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>40 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>ATD</b>
<b>Prescribed Management:</b>	<b>Overstory Removal</b>
<b>Treatment Year:</b>	<b>2011 – 2016</b>
<b>Management Objective:</b>	<b>Salvage Dying Trees and Release Regeneration</b>

### Stand Description:

Stand 1 is found in two separate small polygons in the southern portion of the property. This stand has a sparse overstory of upland hardwoods growing over a dense layer of regeneration. Common tree species found in Stand 1 include the following:

#### Dominant

Sugar Maple

#### Co-Dominant

Red Maple

Sugar maple and red maple are the only two tree species that make up a significant percentage of the stems present in Stand 1. Sugar maple is by far more common than red maple. The maples found in the overstory of this stand average roughly 16 inches in DBH. Nearly all of them are displaying strong symptoms of top dieback. Under the sparse overstory is a thick layer of regeneration. Sugar maple makes up the majority of the regenerating trees. Unlike the overstory, the regeneration present is healthy and vigorously growing.

The habitat type of Stand 1 was determined to be Acer-Tsuga-Dryopteris (ATD). This is the most common habitat type associated with the northern hardwood forests of the Upper Peninsula. This habitat type occurs on sandy to sandy loam soils. Common ground flora species associated with the ATD habitat type include the following:

Shield Fern  
Sedges

Twisted Stalk  
Starflower

Solomon's Seal  
Wild Lily-of-the-Valley



**Recommended Management:**

The management objective for Stand 1 is to salvage the dying trees while releasing the healthy regeneration already established. To meet this objective Stand 1 should be treated with an overstory removal harvest between the years of 2011 and 2016. This harvest will focus on removing all of the overstory trees by harvest all trees ten inches in DBH and larger within the stand. By conducting an overstory removal the larger diameter trees, most of which are displaying symptoms of top dieback, will be utilized. Additionally, the canopy will be opened and full sunlight will be allowed to reach the healthy regeneration already established. Eventually the regeneration will recruit into the overstory, creating a healthy future forest.

The soils found in Stand 1 are sandy to sandy loam in texture and fairly well drained. Therefore, they are capable of supporting timber harvesting operations during dry periods of the summer or during the winter without risking excessive soil damage such as rutting or compaction. However, harvesting should not occur during the early spring when the melting snow creates an excessively wet situation.

**Stand 2**


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<b>Acres:</b>	<b>14</b>
<b>Forest Type:</b>	<b>Mb (Northern Hardwood – White Birch)</b>
<b>Stocking Level:</b>	<b>6 (Over stocked Poletimber)</b>
<b>Tree Quality and Potential Site Index</b>	<b>Good Quality with Excellent Potential 65 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>120 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>ATD</b>
<b>Prescribed Management:</b>	<b>Individual Tree Selection – Species Removal</b>
<b>Treatment Year:</b>	<b>2011- 2016</b>
<b>Management Objective:</b>	<b>Promote Forest Health, Quality and Productivity while Protecting Wildlife Habitat, Soil and Water Quality.</b>

**Stand Description:**

Stand 2 is in the southeastern portion of the property along the Portage Canal. This stand includes a diverse mixture of upland hardwood and conifer tree species. Common tree species found in Stand 2 include the following:

**Dominant**

Sugar Maple  
White Birch

**Co-Dominant**

Red Maple	Basswood
Red Oak	Hemlock
White Pine	

Sugar maple and white birch comprise most of the timber volume found in Stand 1. The sugar maples are very healthy and vigorously growing while the white birch trees present are nearing maturity and starting to show signs of decline. Mixed with the sugar maple and white birch are scattered red maple, basswood and red oak. The hardwoods average roughly nine inches in DBH. Adding diversity to the stand is the presence of hemlock and white pine, which are scattered throughout the stand. Most are healthy and can be expected to remain a component of the stand for many years to come. The regeneration layer of Stand 2 is nearly non-existent due to the dense stocking of poletimber limiting sunlight from reaching the forest floor.



**Figure 16: Hardwood poletimber found in Stand 2.**

The habitat type of Stand 1 was determined to be Acer-Tsuga-Dryopteris (ATD). This is the most common habitat type associated with the northern hardwood forests of the Upper Peninsula. This habitat type occurs on sandy to sandy loam soils. Common ground flora species associated with the ATD habitat type include the following:

Shield Fern  
Sedges

Twisted Stalk  
Starflower

Solomon's Seal  
Wild Lily-of-the-Valley

**Recommended Management:**

The management objective for Stand 2 is to promote forest health, quality and growth while protecting wildlife habitat and soil and water quality. To meet this objective Stand 2 should be treated with an individual tree selection harvest between the years of 2011 and 2016. This harvest will focus on removing the low vigor and poor formed trees, which will encourage growth of the higher quality trees that remain. The basal area of the stand should be reduced to 75 to 85 ft<sup>2</sup>/acre. Trees to be harvested should be selected individually using the following criteria:

1. Risk – Cut high risk trees that are likely to die between cutting cycles.
2. Release crop trees – Cut poorer quality competitors to provide crown growing space around 40-60 crop trees per acre to promote growth and quality development. Two-sided release in sawtimber sized trees and full release in pole and sapling sized trees.
3. Vigor – Cut low vigor trees, based on crown size and condition, crown class, and potential stem decay.
4. Stem form and quality – Cut poorly formed stems, based on usable log length and potential decay.
5. Undesirable species (determined by landowner objectives).
6. Improve Spacing

Beyond these criteria, all white birch trees present should be harvested as they are nearing maturity and beginning to die. Additionally, where pockets of aspen exist small patch clearcuts should be installed. The patch clearcuts should range from one-quarter to one acre in size. Within the patch clearcuts all trees two inches in DBH and larger should be removed to allow full sunlight to reach the forest floor and encourage the aspen to regenerate through root sprouts. The regenerating aspen will create food and cover valuable to many species of wildlife. Also, to promote diversity, areas of around healthy white pine, hemlock and red oak seed trees should be thinned slightly more aggressively to encourage regeneration of those species.

The timber harvest prescribed for Stand 2 can be conducted either during dry period of the summer or fall or during the winter when the ground is frozen. Harvesting should be avoided during the spring as the ground will be saturated with water from the spring runoff making the site very susceptible to soil damage such as rutting and compaction.

Due to the proximity of the Portage Canal, a harvest buffer will have to be installed to ensure protection of the water resource. The buffer should be 100 feet wide, beginning at the waters edge and extend back into the stand. Within the buffer the canopy closure should not be reduced below 70 percent. Additionally, soil disturbance within the buffer should be kept to a minimum.

As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

**Stand 3**


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<b>Acres:</b>	<b>7</b>
<b>Forest Type:</b>	<b>Mf (Northern Hardwood – Spruce/Fir)</b>
<b>Stocking Level:</b>	<b>6 (Over stocked Poletimber)</b>
<b>Tree Quality and Potential</b>	<b>Average Quality with Good Potential</b>
<b>Site Index</b>	<b>60 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>110 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>ATD</b>
<b>Prescribed Management:</b>	<b>Species Removal</b>
<b>Treatment Year:</b>	<b>2011 – 2016</b>
<b>Management Objective:</b>	<b>Promote Forest Health, Quality and Productivity while Salvaging Mature Wood and Protecting Wildlife Habitat.</b>

**Stand Description:**

Stand 3 is found in the southern portion of the property. This stand is comprised of a mixture of upland hardwood and conifer tree species. Common tree species found in Stand 3 include the following:

<b><u>Dominant</u></b>	<b><u>Co-Dominant</u></b>	
Sugar Maple	Red Maple	Aspen
Balsam Fir	White Pine	Red Oak
	Hemlock	

Sugar maple and balsam fir are the most common tree species found in Stand 3. The sugar maples are generally pole-sized trees averaging roughly eight inches in DBH. They are healthy and seem to be display good growth rates. The balsam fir trees present are also found primarily as pole-sized trees. Many of the balsam firs are reaching maturity and beginning to die. Also found relatively frequently throughout the stand are red maple and aspen trees. Less common are scattered white pine, red oak, and hemlock.

During the field inspection of Stand 3, eagles were very active near a large white pine tree indicating that a nest may be present. The thick canopy restricted sight and a visual confirmation of a nest was not made. However future management should consider the possibility that an eagle's nest may be present.

The habitat type of Stand 1 was determined to be Acer-Tsuga-Dryopteris (ATD). This is the most common habitat type associated with the northern hardwood forests of the Upper Peninsula. This habitat type occurs of sandy to sandy loam soils. Common ground flora species associated with the ATD habitat type include the following:

Shield Fern	Twisted Stalk	Solomon's Seal
Sedges	Starflower	Wild Lily-of-the-Valley

**Recommended Management:**

The management objective for Stand 3 is to promote forest health, quality and productivity while salvaging mature wood and protecting wildlife habitat. To meet this objective, Stand 3 should be treated with a species removal timber harvest between the years of 2011 and 2016. This harvest will focus on removing all balsam fir, aspen and white birch trees present. Balsam fir, aspen and white birch are all short lived tree species and many within this stand are reaching maturity and showing strong signs of decline. By removing these species the forest products they contain will be utilized before they die and decompose. Additionally, removing these species will open the canopy enough to favor the growth of the hardwood species that remain.

The timber harvest prescribed for Stand 3 can be conducted either during dry periods of the summer or fall or during the winter when the ground is frozen. Harvesting should be avoided during the spring as the ground will be saturated with water from the spring runoff making the site very susceptible to soil damage such as rutting and compaction.

If it is determined that an active eagle nest is present within this stand, the timber harvesting prescribed should be altered. If a nest is present, no harvesting should be conducted within 660 feet of the nest during the eagle's nesting season, which is from the beginning of March through August. In addition, the overstory should remain fully intact within a 330 foot buffer of the nest. For this stand, that will result in no timber being harvested within 330 feet of the nest. More information on bald eagles can be seen in the "National Bald Eagle Management Guidelines" found in the Appendix of this plan.

As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

**Stand 4**


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<b>Acres:</b>	<b>14</b>
<b>Forest Type:</b>	<b>M (Northern Hardwood)</b>
<b>Stocking Level:</b>	<b>5-2 (Well Stocked Poletimber Over Average Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Average Quality with Good Potential</b>
<b>Site Index</b>	<b>60 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>80 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>AQVib</b>
<b>Prescribed Management:</b>	<b>Reevaluate</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Allow Stand to Develop Naturally</b>

**Stand Description:**

Stand 4 is located on the western side of the property in the central part of the ownership. This stand is made up of a mixture of well stocked hardwood poletimber over an average stocking of hardwood regeneration. The terrain is relatively flat and the soils are somewhat sandy and slightly dry. Common tree species found in Stand 14 include the following:

**Dominant**

Sugar Maple  
White Ash

**Co-Dominant**

Basswood      Red Maple  
Yellow Birch

Sugar maple is the most common tree species present in Stand 4. Along with the sugar maples is a good representation of white ash and lesser amounts of basswood, red maple, and yellow birch. The trees found within this stand have an average DBH of roughly eight inches. They are generally healthy, however there is a small presence of top dieback affecting the sugar and red maples.

The regeneration layer of Stand 4 is somewhat well represented by sugar maple and red maple seedlings and saplings. In areas, beaked hazelnut makes up the majority of the regeneration layer.

The habitat type of Stand 4 was determined to be Acer-Quercus-Viburnum (AQVib). The soils associated with this habitat type are generally well drained and somewhat stoney. Common ground flora species associated with the AQVib include the following:

Mapleleaf Viburnum  
Choke Cherry

Solomon's Seal  
Grasses

Bracken Fern  
Beaked Hazelnut

Due to the well drained soils associated with this habitat type, there are not any logging equipment limitations.

**Recommended Management:**

The management objective for Stand 4 is to allow the trees present to mature naturally and create a fully stocked stand. To meet this objective Stand 4 should not be actively managed during the scope of this management plan. Instead it should be left free of human disturbance and reevaluated in 2020. During the reevaluation the stands stocking and quality should be noted and recommendations for forest management can be made.

**Stand 5**


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<b>Acres:</b>	<b>7</b>
<b>Forest Type:</b>	<b>M (Northern Hardwood)</b>
<b>Stocking Level:</b>	<b>4-2 (Poorly Stocked Poletimber Over Average Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Poor Quality with Average Potential</b>
<b>Site Index</b>	<b>60 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>40 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>ATD</b>
<b>Prescribed Management:</b>	<b>Reevaluate</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Allow Stand to Develop Naturally</b>

**Stand Description:**

Stand 5 is located in a few separate small polygons across the property. This stand has poorly stocked poletimber over average stocked regeneration. Common tree species found in Stand 5 include the following:

**Dominant**

Sugar Maple

**Co-Dominant**

Ironwood

White Ash

Red Maple

Basswood

Sugar maple is the most common tree species found in Stand 5. Along with the sugar maple are varying amounts of ironwood, red maple, white ash, and basswood. In localized areas ironwood is somewhat dominant and shading out more desirable tree species. The overstory trees found in Stand 5 are generally small and average roughly seven inches in DBH. The regeneration found in Stand 5 is made up of primarily ironwood and sugar maple seedling and saplings.

The habitat type of Stand 1 was determined to be Acer-Tsuga-Dryopteris (ATD). This is the most common habitat type associated with the northern hardwood forests of the Upper Peninsula. This habitat type occurs on sandy to sandy loam soils. Common ground flora species associated with the ATD habitat type include the following:

Shield Fern

Sedges

Twisted Stalk

Starflower

Solomon's Seal

Wild Lily-of-the-Valley

**Recommended Management:**

The management objective for Stand 5 is to allow the trees present to mature naturally and create a fully stocked stand. To meet this objective Stand 4 should not be actively managed during the scope of this management plan. Instead it should be left free of human disturbance and reevaluated in 2020. During the reevaluation the stands stocking and quality should be noted and recommendations for forest management can be made.



**Stand 6**


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<b>Acres:</b>	<b>4.5</b>
<b>Forest Type:</b>	<b>M (Northern Hardwood)</b>
<b>Stocking Level:</b>	<b>2 (Average Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Average Quality with Good Potential</b>
<b>Site Index</b>	<b>60 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>NA</b>
<b>Habitat Type</b>	<b>ATD</b>
<b>Prescribed Management:</b>	<b>Reevaluate</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Allow Stand to Develop Naturally</b>

**Stand Description:**

Stand 6 is located in two separate polygons in the central part of the ownership. Areas of this stand were once cleared and possibly used as landings while other parts of this stand seem to have been clearcut and did not regenerate well. Common tree species that are found in Stand 6 include the following:

**Dominant**

Sugar Maple

**Co-Dominant**

Red Maple

Sugar maple makes up the majority of the stems found in Stand 6 however there is also a good representation of red maple. The maples are all found in the seedling and sapling size classes. There are currently no merchantable trees growing in this stand. Due to past land use, the regeneration in this stand is rather patchy with some areas containing thick vigorous stems and other areas being more sparsely stocked with lower quality stems.

The habitat type of Stand 1 was determined to be Acer-Tsuga-Dryopteris (ATD). This is the most common habitat type associated with the northern hardwood forests of the Upper Peninsula. This habitat type occurs on sandy to sandy loam soils. Common ground flora species associated with the ATD habitat type include the following:

Shield Fern  
Sedges

Twisted Stalk  
Starflower

Solomon's Seal  
Wild Lily-of-the-Valley

**Recommended Management:**

The management objective for Stand 6 is to allow the trees present to mature naturally and create a fully stocked stand. To meet this objective Stand 6 should not be actively managed during the scope of this management plan. Instead it should be left free of human disturbance and reevaluated in 2020. During the reevaluation the stands stocking and quality should be noted and recommendations for forest management can be made.

**Stand 7**


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<b>Acres:</b>	<b>8.5</b>
<b>Forest Type:</b>	<b>Mq (Northern Hardwood – Lowland Conifer)</b>
<b>Stocking Level:</b>	<b>9 (Over Stocked Sawtimber)</b>
<b>Tree Quality and Potential</b>	<b>Average Quality with Excellent Potential</b>
<b>Site Index</b>	<b>55 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>150 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TM</b>
<b>Prescribed Management:</b>	<b>Individual Tree Selection – Species Removal</b>
<b>Treatment Year:</b>	<b>2011 – 2016</b>
<b>Management Objective:</b>	<b>Improve Stand Health, Quality and Productivity while Protecting Soil and Water Quality.</b>

**Stand Description:**

Stand 7 is located in a couple separate polygons found in the central part of the ownership bordering the Portage Canal. This stand is made up of a diverse mixture of tree species growing on somewhat sandy, dry soils. Common tree species found in Stand 7 include the following:

**Dominant**

Sugar Maple  
Red Maple

**Co-Dominant**

Yellow Birch	Cedar
White Spruce	Balsam Fir
Hemlock	

Sugar and red maple are the most common tree species found in Stand 7. Along with the maples are good representations of yellow birch, cedar, white spruce, and balsam fir with lesser amounts of hemlock present. The trees within the stand average roughly 14 inches in DBH. They are generally healthy, however many of the white spruce and balsam fir are over mature and beginning to die.

The habitat type of Stand 7 was determined to be Tsuga-Maianthemum (TM). This habitat type is often found on sandy to sandy loam texture soils. It often supports a diverse mix of tree species. Common ground flora species found on the TM habitat type include the following:

Grasses	Sedges	Wild Lily-of-the-Valley
Bracken Fern	Starflower	Wild Sarsaparilla

Due to the sandy somewhat dry soils associated with this habitat type, timber harvesting can take place during dry periods of the summer or fall or during the winter without potentially damaging the soil.

**Recommended Management:**

The management objective for Stand 7 is to improve forest health, quality and productivity while protecting soil and water quality. To meet this objective Stand 7 should be treated with an individual tree selection/species removal harvest between the years of 2011 and 2016. This harvest will focus on removing the low vigor and poor

formed trees to focus the stands growth on the higher quality trees that remain. The basal area of the stand should be reduced to 75 to 85 ft<sup>2</sup>/acre. Trees to be harvested should be selected individually using the following criteria:

1. Risk – Cut high risk trees that are likely to die between cutting cycles.
2. Release crop trees – Cut poorer quality competitors to provide crown growing space around 40-60 crop trees per acre to promote growth and quality development. Two-sided release in sawtimber sized trees and full release in pole and sapling sized trees.
3. Vigor – Cut low vigor trees, based on crown size and condition, crown class, and potential stem decay.
4. Stem form and quality – Cut poorly formed stems, based on usable log length and potential decay.
5. Undesirable species (determined by landowner objectives).
6. Improve Spacing

Beyond these criteria, all white spruce and balsam fir trees present should be harvested as they are nearing maturity and beginning to die.

The timber harvest prescribed for Stand 7 can be conducted either during dry period of the summer or fall or during the winter when the ground is frozen. Harvesting should be avoided during the spring as the ground will be saturated with water from the spring runoff making the site very susceptible to soil damage such as rutting and compaction.

Due to the proximity of the Portage Canal, a harvest buffer will have to be installed to ensure protection of the water resource. The buffer should be 100 feet wide and begin at the waters edge and extend back into the stand. Within the buffer the canopy closure should not be reduced below 70 percent and soil disturbance within the buffer should be kept to a minimum.

As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

**Stand 8**


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<b>Acres:</b>	<b>7.5</b>
<b>Forest Type:</b>	<b>Cb (Cedar – White Birch)</b>
<b>Stocking Level:</b>	<b>9 (Over Stocked Sawtimber)</b>
<b>Tree Quality and Potential</b>	<b>Excellent Quality with Excellent Potential</b>
<b>Site Index</b>	<b>40 Feet Tall at Age 50 – Cedar</b>
<b>Basal Area</b>	<b>210 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TTM</b>
<b>Prescribed Management:</b>	<b>Reevaluate</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Retain Cedar for Wild Habitat.</b>

**Stand Description:**

Stand 8 is found in a couple different polygons in the central part of the ownership. This stand is comprised of a diverse mixture of low conifer and hardwoods tree species growing on mucky soils. Common tree species found in Stand 8 include the following:

**Dominant**

Cedar  
White Birch

**Co-Dominant**

Yellow Birch	White Spruce
Balsam Fir	Hemlock

The most common tree species found in Stand 8 is cedar. The cedar trees present are very healthy and average roughly 13 inches in DBH. Mixed with the cedar is a good representation of white birch. Some of the white birch are reaching maturity and beginning to die. Also found within the stand at lower frequencies is yellow birch, white spruce, balsam fir, and hemlock. The yellow birch trees are displaying somewhat poor quality due to the excessive soil moisture and some of the white spruce and balsam fir are nearing maturity and beginning to decline. The hemlocks found in the stand are generally healthy.

The soils found in Stand 8 are very mucky and excessively wet. They are extremely susceptible to damage if operated on with heavy logging equipment.

The habitat type of Stand 8 was determined to be Tsuga-Thuja-Mitchella (TTM). This habitat type occurs on soils with excessive soil moisture. Over harvesting on this habitat type can cause the water table to rise and displace some of the tree species in favor of lowland brush such as tag alder. Common ground flora species found in Stand 8 include the following:

Mosses	Sedges	Wild Lily-of-the-Valley
Starflower	Naked Miterwort	Twinflower

Due to the excessively wet soils associated with this habitat type operation of heavy logging equipment should be restricted to winter when the ground is adequately frozen. This will reduce or eliminate the potential for soil damage to occur such as rutting and compaction.

**Recommended Management:**

The management objective for Stand 8 is to retain the cedar component for the valuable wildlife habitat it provides. To meet this objective Stand 8 should be not be actively managed. This will ensure the cedar (which is an extremely long lived species) is retained as a major part of this stand for years to come. Maintaining the cedar will preserve the diversity of the property and continue to provide excellent winter wildlife habitat. Stand 8 should be reevaluated in 2020 to monitor for any forest health issues that may arise that might alter the prescribe management.

**Stand 9**


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<b>Acres:</b>	<b>7.5</b>
<b>Forest Type:</b>	<b>Qb (Lowland Conifer – White Birch)</b>
<b>Stocking Level:</b>	<b>6-3 (Over Stocked Poletimber over Well Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Good Quality with Good Potential</b>
<b>Site Index</b>	<b>40 Feet Tall at Age 50 – Cedar</b>
<b>Basal Area</b>	<b>110 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TTM</b>
<b>Prescribed Management:</b>	<b>Species Removal</b>
<b>Treatment Year:</b>	<b>2011 – 2016</b>
<b>Management Objective:</b>	<b>Utilize Dying Timber and Release Healthy Trees.</b>

**Stand Description:**

Stand 9 is found in a few separate polygons across the property. This stand consists of a mixture of primarily lowland conifer with white birch also present. Common tree species found in Stand 9 include the following:

**Dominant**

Cedar  
White Birch

**Co-Dominant**

White Spruce      Balsam Fir  
Hemlock

Cedar is the most common tree species found in Stand 9. Along with the cedar is a good representation of white birch. The white birch are nearing maturity and beginning to show signs of decline. Also found within the stand at lower frequencies are white spruce, balsam fir, and hemlock. Like the white birch, the balsam fir and white spruce are nearing maturity and beginning to decline. The cedars and hemlock found in the stand seem to be healthy and growing well. The northern most polygon of Stand 9 has a lower representation of white birch and balsam fir than the other polygons to the south.



**Figure 17: Lowland conifers found in Stand 9.**

The habitat type of Stand 8 was determined to be Tsuga-Thuja-Mitchella (TTM). This habitat type occurs on soils with excessive soil moisture. Over harvesting on this habitat type can cause the water table to rise and displace some of the tree species in favor of lowland brush such as tag alder. Common ground flora species found in Stand 8 include the following:

Mosses	Sedges	Wild Lily-of-the-Valley
Starflower	Naked Miterwort	Twinflower

Due to the excessively wet soils associated with this habitat type operation of heavy logging equipment should be restricted to winter when the ground is adequately frozen. This will reduce or eliminate the potential for soil damage to occur such as rutting and compaction.

**Recommended Management:**

The management objective for Stand 9 is to utilize the dying trees while releasing the healthy trees. To meet this objective, Stand 9 should be harvested by means of a species removal between the years of 2011 and 2016. This timber harvest will focus on removing all white birch, balsam fir, and white spruce to capture their value before they die. Removing these mature and degrading trees will open canopy space for the healthier cedar and hemlock to fill, thus creating a more health, vigorously growing stand. Due to the lack of white birch and balsam fir in the northernmost polygon, it should be omitted from the management prescribed above and allowed to progress naturally free of human disturbance.

The excessively wet soils found in Stand 9 require all timber harvesting to be restricted to the winter when the ground is adequately frozen and capable of supporting the operation of heavy logging equipment. This will greatly reduce or eliminate the potential for soil damage such as rutting or compaction to occur.

Due to the proximity of the Portage Canal, a harvest buffer will have to be installed to ensure protection of the water resource. The buffer should be 100 feet wide and begin at the waters edge and extend back into the stand. Within the buffer the canopy closure should not be reduced below 70 percent and soil disturbance within the buffer should be kept to a minimum.

As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

**Stand 10**


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<b>Acres:</b>	<b>23</b>
<b>Forest Type:</b>	<b>Bf (White Birch – Spruce/Fir)</b>
<b>Stocking Level:</b>	<b>5-2 (Well Stocked Poletimber over Average Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Poor Quality with Average Potential</b>
<b>Site Index</b>	<b>55 Feet Tall at Age 50 – Red Maple</b>
<b>Basal Area</b>	<b>70 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TM</b>
<b>Prescribed Management:</b>	<b>Seed Tree Harvest</b>
<b>Treatment Year:</b>	<b>2011 – 2016</b>
<b>Management Objective:</b>	<b>Utilize Dying Timber and Increase Species Diversity.</b>

**Stand Description:**

Stand 10 is in the area around the park in the north portion of the property. This stand is comprised of a mixture of upland hardwood and conifer tree species growing on somewhat sandy dry soils. Common tree species found in Stand 10 include the following:

**Dominant**

White Birch  
Balsam Fir

**Co-Dominant**

Red Maple	White Spruce
Red Oak	Red Pine
White Pine	

White birch and balsam fir are the most common tree species found in Stand 10. These trees are over mature and many of them are either dead or showing strong signs of decline. The dead and declining trees in and around the park area pose a safety hazard to the users of the park. Mixed with the white birch and balsam fir are lesser amounts of red maple and white spruce. The maples are generally healthy but low quality trees, while the spruce are nearing maturity and beginning to decline. Also found scattered throughout the stand at very low frequencies are red oak, red pine, and white pine. The oak and pine are healthy and displaying good growth rates. The regeneration layer of the stand is made up of balsam fir, red maple and beaked hazelnut.

The habitat type of Stand 9 was determined to be Tsuga-Maianthemum-Vaccinium (TMV). This habitat type is commonly found on sandy soils. It was dominated by white pine prior to the heavy timber harvesting that occurred during the late 1800's and early 1900's. Common ground flora species that are associated with the TMV habitat type include the following:

Bracken Fern	Canada Blueberry	Large Leaved Aster
Beaked Hazelnut	Wild Sarsaparilla	Wild Lily-of-the-Valley

Due to the sandy soils associated with this habitat type, operation of heavy logging equipment can occur during dry periods of the summer and fall or during the winter.



**Recommended Management:**

The management objective for Stand 10 is to harvest the over mature trees present and increase the stands diversity. To meet this objective Stand 10 should be treated with a seed tree harvest between the years of 2011 and 2016. This harvest will focus on removing all trees in the stand two inches in DBH and larger with a few exceptions. Any existing red oak, white pine, and red pine should be retained for diversity and as a seed source to regenerate the stand.

Because of the public use this area sees during the spring, summer and fall, all harvesting should be restricted to the winter for safety reasons. Following the harvest, the stand should be underplanted with a mixture of red oak, white pine and red pine. The underplanted trees will further increase the diversity of the stand and also promote the recruitment of long live trees unlikely to degrade and cause a safety hazard at a young age.

There may be cost sharing money available through the Landowner Incentive Program (LIP) for the underplanting project. A LIP application is included in the Appendix of this plan. For more information on under planting, obtaining seedlings and LIP contact Terry McFadden with the Michigan DNRE at (906) 228-6561 ext. 3025.

For more information on underplanting, tree seedling availability, and planting costs contact Tom Nolta with Timberland Forestry Services, Inc. at (906) 387-4350.

**Stand 11**


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<b>Acres:</b>	<b>11</b>
<b>Forest Type:</b>	<b>Ab (Aspen – White Birch)</b>
<b>Stocking Level:</b>	<b>4-3 (Poorly Stocked Poletimber over Average Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Poor Quality with Good Potential</b>
<b>Site Index</b>	<b>55 Feet Tall at Age 50 – Red Maple</b>
<b>Basal Area</b>	<b>30 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TM</b>
<b>Prescribed Management:</b>	<b>Reevaluate</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Allow Trees to Mature and Create a Fully Stocked Stand.</b>

**Stand Description:**

Stand 11 is found in the northern portion of the property. This stand was influenced by a timber harvest that was conducted roughly ten to 15 years ago. The timber harvest that was conducted was rather aggressive and left only a low stocking of pole-sized red maple and white birch. Currently the stand is poorly stocked with poletimber and well stocked with regeneration. Common tree species found in Stand 11 include the following:

<u><b>Dominant</b></u>	<u><b>Co-Dominant</b></u>
White Birch    Aspen	Red Maple

White birch and aspen are the most common tree species found in Stand 11. The majority of the white birch and aspen stems are found in the seedling and sapling size class with only a scattering of merchantable sized white birch present. The red maples found in the stand are highly scattered and primarily pole sized trees.

The habitat type of Stand 9 was determined to be Tsuga-Maianthemum-Vaccinium (TMV). This habitat type is commonly found on sandy soils. It was dominated by white pine prior to the heavy timber harvesting that occurred during the late 1800's and early 1900's. Common ground flora species that are associated with the TMV habitat type include the following:

Bracken Fern	Canada Blueberry	Large Leaved Aster
Beaked Hazelnut	Wild Sarsaparilla	Wild Lily-of-the-Valley

Due to the sandy soils associated with this habitat type, operation of heavy logging equipment can occur during dry periods of the summer and fall or during the winter.

**Recommended Management:**

The management objective for Stand 11 is to allow the trees present to mature naturally and create a fully stocked stand. To meet this objective Stand 11 should not be actively managed during the scope of this management plan. Instead it should be left free of human disturbance and reevaluated in 2020. During the reevaluation the stands stocking and quality should be noted and recommendations for forest management can be made

**Stand 12**


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<b>Acres:</b>	<b>6</b>
<b>Forest Type:</b>	<b>Exl (Lowland Hardwood – Lowland Brush)</b>
<b>Stocking Level:</b>	<b>7-3 (Poorly Stocked Sawtimber over Well Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Poor Quality with Poor Potential</b>
<b>Site Index</b>	<b>55 Feet Tall at Age 50 – Red Maple</b>
<b>Basal Area</b>	<b>30 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>TMC</b>
<b>Prescribed Management:</b>	<b>Reevaluate</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Wildlife Habitat</b>

**Stand Description:**

Stand 12 is found in one polygon in the northern part of the ownership. This stand consists of a mixture of lowland hardwoods and lowland brush growing on wet mucky soils. Common tree species found in Stand 12 include the following:

**Dominant**

Red Maple

**Co-Dominant**

Sugar Maple

Hemlock

Cedar

Yellow Birch

The overstory of Stand 12 is very sparsely stocked with low quality sawtimber sized trees. Red maple is the most common tree species found in the overstory with lesser amounts of sugar maple, hemlock, cedar and yellow birch also present. The understory of the stand has a dense layer of mountain maple.

The habitat type of Stand 12 was determined to be Tsuga-Maianthemum-Coptis (TMC). This habitat type will occur on soils of various textures with impeded drainage. It often supports the growth of a diverse mixture of conifer and hardwood tree species. Common ground flora species associated with the TMC habitat type include the following:

Goldthread

Bunchberry

Yellow Beadlily

Starflower

Sedges

Wild Lily-of-the-Valley

Due to the impeded drainage associated with this habitat type, timber harvesting should be restricted to winter only when the soil is adequately frozen and protected from damage such as rutting and compaction.

**Recommended Management:**

The management objective for Stand 12 is to maintain cover for wildlife. To meet this objective there should not be any active management conducted in Stand 12. Instead the stand should be allowed to develop naturally free from human disturbance. This will ensure that the dense understory of the stand will remain intact for many years to come given that the overstory of the stand is so sparsely stocked. This dense understory will continue to provide excellent cover for many species of wildlife. Stand 12 should then be reevaluated in 2020 to monitor forest health and growth.

**Stand 13**


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<b>Acres:</b>	<b>27</b>
<b>Forest Type:</b>	<b>O (Open)</b>
<b>Stocking Level:</b>	<b>NA</b>
<b>Tree Quality and Potential</b>	<b>NA</b>
<b>Site Index</b>	<b>NA</b>
<b>Basal Area</b>	<b>NA</b>
<b>Habitat Type</b>	<b>NA</b>
<b>Prescribed Management:</b>	<b>Reevaluate</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Allow Vegetation to Establish and Progress Naturally and Utilize Possible Gravel and Sand Resources for Road Maintenance and Establishment.</b>

**Stand Description:**

Stand 13 consists of the open areas of the property. These areas include the beach along Lake Superior and the Portage Canal, the old gravel or sand pit, and other various manmade areas. The open area along the beach was once used by the copper mining companies as a place to dispose of the stamps that were produced during the copper milling process. For many years the stamp sands had been exposed with very little to no vegetation growing on them. However, recently a project was implemented that brought in soil to cover the stamp sands and promote vegetative growth on the site. Currently, planted grasses cover the ground in this location, which was once only a dumping site for the stamp sand waste.

Another significant manmade opening is located in the central part of the property. This opening was developed for use as a gravel or sand pit. The gravel and sand dug from this pit was likely utilized during the construction of the woods roads found on the property. Other smaller openings can be found along and just inland from the Portage Canal.

**Recommended Management:**

The management objective for Stand 13 is to allow grasses and other vegetation to establish naturally in the open areas free of human disturbance and to utilize possible resources that are found within the openings. To meet this objective the majority of the open areas should be allowed to convert naturally to grasses and other vegetation including trees, especially on the old stamp sand site along Lake Superior and in the smaller openings found along the Portage Canal. The gravel pit found on the western side of the property could be allowed to naturally convert to vegetation, or if needed, gravel and sand could be dug from this spot to be used for woods road maintenance and construction on the property. Stand 13 should be reevaluated in 2020 to monitor for the presence of non-native invasive plant species.

**Recommended Treatment Schedule – Portage Canal Property**

The following table shows each stand located on the Portage Canal property and the corresponding treatments that were recommended above.

<b>Stand</b>	<b>Stand Type</b>	<b>Acres</b>	<b>Treatment Description</b>	<b>Treatment Year</b>	<b>Re-Evaluation Year</b>
<b>1</b>	<b>M7-3</b>	<b>5</b>	<b>Overstory Removal</b>	<b>2011 - 2016</b>	<b>2020</b>
<b>2</b>	<b>Mb6</b>	<b>14</b>	<b>Individual Tree Selection / Species Removal</b>	<b>2011 - 2016</b>	<b>2020</b>
<b>3</b>	<b>Mf6</b>	<b>7</b>	<b>Species Removal</b>	<b>2011 - 2016</b>	<b>2020</b>
<b>4</b>	<b>M5-2</b>	<b>14</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>
<b>5</b>	<b>M4-2</b>	<b>7</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>
<b>6</b>	<b>M2</b>	<b>4.5</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>
<b>7</b>	<b>Mq9</b>	<b>8.5</b>	<b>Individual Tree Selection / Species Removal</b>	<b>2011 - 2016</b>	<b>2020</b>
<b>8</b>	<b>Cb9</b>	<b>7.5</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>
<b>9</b>	<b>Qb6-3</b>	<b>11.5</b>	<b>Species Removal</b>	<b>2011 - 2016</b>	<b>2020</b>
<b>10</b>	<b>Bf5-2</b>	<b>23</b>	<b>Seed Tree</b>	<b>2011 - 2016</b>	<b>2020</b>
<b>11</b>	<b>Ab4-3</b>	<b>11</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>
<b>12</b>	<b>EXI7-3</b>	<b>6</b>	<b>No Active Management</b>	<b>NA</b>	<b>2020</b>
<b>13</b>	<b>O</b>	<b>27</b>	<b>No Active Management</b>	<b>NA</b>	<b>NA</b>

**Recorded Treatment Activity – Portage Canal Property**

The following table lists each stand located on the Portage Canal property. As recommended practices are implemented they should be recorded here.

<b>Stand</b>	<b>Stand Type</b>	<b>Acres</b>	<b>Activity</b>	<b>Treatment Year</b>
<b>1</b>	<b>M7-3</b>			
<b>2</b>	<b>Mb6</b>			
<b>3</b>	<b>Mf6</b>			
<b>4</b>	<b>M5-2</b>			
<b>5</b>	<b>M4-2</b>			
<b>6</b>	<b>M2</b>			
<b>7</b>	<b>Mq9</b>			
<b>8</b>	<b>Cb9</b>			
<b>9</b>	<b>Qb6-3</b>			
<b>10</b>	<b>Bf5-2</b>			
<b>11</b>	<b>Ab4-3</b>			
<b>12</b>	<b>EXI7-3</b>			
<b>13</b>	<b>O</b>			

## Ball Field Property

The Ball Field Property is a 40 acre property consisting of two separate stands, one of which is forested. The terrain across the property is relatively flat with the exception of some excessively steep slopes found along the southern property line. This property has excellent potential to grow high quality forest products.

## Stand Descriptions

### Stand 1

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<b>Acres:</b>	<b>36</b>
<b>Forest Type:</b>	<b>M (Northern Hardwood)</b>
<b>Stocking Level:</b>	<b>9-3 (Overstocked Sawtimber – Well Stocked Regeneration)</b>
<b>Tree Quality and Potential</b>	<b>Excellent Quality with Excellent Potential</b>
<b>Site Index</b>	<b>65 Feet Tall at Age 50 – Sugar Maple</b>
<b>Basal Area</b>	<b>105 ft<sup>2</sup>/acre</b>
<b>Habitat Type</b>	<b>AVO</b>
<b>Prescribed Management:</b>	<b>Individual Tree Selection</b>
<b>Treatment Year:</b>	<b>2011 – 2016</b>
<b>Management Objective:</b>	<b>Continue to Encourage the Growth of High Quality Northern Hardwood Sawtimber through Sustainable Forest Management.</b>

### Stand Description:

Stand 1 makes up the majority of the Ball Field property. This stand is an extremely high quality northern hardwood forest growing on high quality soils. The terrain throughout most of this stand is nearly flat, with the exception of some excessively steep slopes found along the southern property line. A forest road runs from the southeast corner to the northwest corner of the property, dissecting this stand and providing excellent access for timber harvesting.

Tree species commonly found within Stand 1 include the following:

<u><b>Dominant</b></u>	<u><b>Co-Dominant</b></u>
Sugar Maple	Red Maple      Yellow Birch
	Red Oak        White Birch
	Basswood      Hemlock
	Aspen

Sugar maple is by far the most common tree species found in this stand. The sugar maple trees present are well represented in all size classes. Many of them are high quality sawlog sized trees ranging in DBH from 14 to 20 inches. Also found within the stand is a good representation of sugar maple poles ranging from five to ten inches at DBH and an excellent representation of vigorously growing regeneration. Other tree species found in Stand 1 but at much lower frequencies include red maple, yellow birch, white birch,

basswood, red oak, and hemlock. These tree species are scattered amongst the stand with the majority of the red oak found in the southern portion of the stand near the old log landing. Like the sugar maple trees, most of the other tree species are healthy and well suited to grow on this site. However, the white birch trees present are nearing their ecological maturity and can be expected to begin showing signs of decline. In addition, there is a small clone of aspen found in the eastern part of the stand along the Ball Field Road. The aspen trees within this clone are nearing maturity and should be considered for harvest.

The soils within this stand are comprised primarily of a high quality sandy loam. They can be expected to continue to support the growth of high quality trees assuming proper forest management is conducted. This soil type is dry enough to support the operation of heavy logging equipment during the summer however the use of equipment should be restricted during the early spring and any excessively wet periods of the summer and fall.

The habitat type of Stand 1 was determined to be Acer-Viola-Osmorhiza (AVO). This habitat type commonly occurs on loam and silt loam textured soils. This habitat type is very suitable to support the growth of the northern hardwood forest type and is commonly dominated by sugar maple. Ground flora species associated with the AVO habitat type include the following:

Sweet Cicely	Sedges	Shield Fern
Violets	Solomon's Seal	Lady Fern

**Recommended Management:**

The management objective for Stand 1 is to continue to encourage the growth of high quality northern hardwood sawtimber through the practice of sustainable forest management. To meet this objective Stand 1 should be harvested by means of an individual tree selection harvest between the years of 2011 and 2016. The harvest will focus on utilizing the mature sugar maple sawtimber present and also removing the poor quality and high risk trees to encourage future stand growth and quality. The overall stocking of Stand 1 should be reduced to a basal area ranging from 75 to 85 ft<sup>2</sup>/acre. The trees to be harvested should be selected individually using the following order of removal:

1. Risk – Cut high risk trees that are likely to die between cutting cycles.
2. Release crop trees – Cut poorer quality competitors to provide crown growing space around 40-60 crop trees per acre to promote growth and quality development. Two-sided release in sawtimber sized trees and full release in pole and sapling sized trees.
3. Vigor – Cut low vigor trees, based on crown size and condition, crown class, and potential stem decay.
4. Stem form and quality – Cut poorly formed stems, based on usable log length and potential decay.
5. Undesirable species (determined by landowner objectives).
6. Improve Spacing



In addition to these criteria, all white birch and aspen found within the stand should be harvested. These trees are nearing their ecological maturity and can be expected to die before the next cutting cycle and therefore should be harvested and utilized now. Harvesting all of the aspen present within the stand may result in a very small patch clearcut along the Ball Field Road where a small clone of aspen currently exists. To maintain stand diversity and wildlife habitat, all red oak and hemlock should be retained within the stand. Additionally, healthy yellow birch should also be retained regardless of size. The sugar maple, red maple and basswood trees should be thinned according to the guidelines set above.

All of the trees that are standing dead, have lost their merchantability due to excessive rot, or contain an obvious active den should be left standing for wildlife use. Raptors use these trees to build their nests in or to perch and hunt from. Animals such as porcupines, bats, and owls use these trees for their dens. Once the trees die and fall over, other animals use the down logs for various purposes. Fishers, pine marten, raccoon, and fox are some of the species that use down logs for their dens. Grouse may use the logs as drumming logs during their mating season.

Timber harvesting should occur only during dry periods of the summer or the winter when the ground is frozen and protected by snow to reduce the potential for soil rutting and compaction.

As a result of the recommended management of this stand, the trees that are released or regenerate will be more productive and healthier than the current stand. The proposed treatment area and the timing of the harvest can be seen on the Activities Map, which is located in beginning of this section.

**Stand 2**


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<b>Acres:</b>	<b>4</b>
<b>Forest Type:</b>	<b>O (Open)</b>
<b>Stocking Level:</b>	<b>NA</b>
<b>Tree Quality and Potential</b>	<b>NA</b>
<b>Site Index</b>	<b>NA</b>
<b>Basal Area</b>	<b>NA</b>
<b>Habitat Type</b>	<b>NA</b>
<b>Prescribed Management:</b>	<b>Yearly Mowing</b>
<b>Treatment Year:</b>	<b>2020</b>
<b>Management Objective:</b>	<b>Maintain Openings for Recreation, Wildlife and Future Timber Harvesting.</b>

**Stand Description:**

Stand 2 encompasses the open areas of the property. One open area includes the ball field in the northeast corner of the property and the second opening consists of an old log landing in the southeast corner of the property. The ball field is currently being used and maintained and has no forest value. The old log landing is currently made up of tall grasses, but is beginning to seed in with trees. Tree species seeding into the landing include aspen and white birch, while white pine and red oak seedlings are establishing themselves along the edges.



**Figure 18: Old log landing found in the southeast corner of the property.**

**Recommended Management:**

The management objective for Stand 2 is to maintain the openings for recreation, wildlife and future timber sale use. To meet this objective the ball field should continue to be maintained and utilized by the local baseball league. To maintain a clear playing field and to help reduce the amount of maintenance needed for the fence, the large crowned trees with branches extending into the ball field should be cut. This should be done in conjunction with the timber harvest recommended for Stand 1 so that the harvested trees can be utilized.

The old logging landing found in the southeast corner of the property should be maintained as an opening that can be utilized as a landing during future timber harvesting operations. If possible, the old log landing should be mowed yearly to discourage trees from seeding in and becoming established. Following timber harvesting operations, the landing could be planted with a mix of native grasses and forbs to provide a new food source for wildlife. Stand 2 should be reevaluated in 2020 to monitor for the presence of non-native invasive plant species.

**Recommended Treatment Schedule – Ball Field Property**

The following table shows each stand located on the Ball Field property and the corresponding treatments that were recommended above.

<b>Stand</b>	<b>Stand Type</b>	<b>Acres</b>	<b>Treatment Description</b>	<b>Treatment Year</b>	<b>Re-Evaluation Year</b>
<b>1</b>	<b>M9</b>	<b>36</b>	<b>Individual Tree Selection</b>	<b>2011-2016</b>	<b>2020</b>
<b>2</b>	<b>O</b>	<b>4</b>	<b>Mowing</b>	<b>Yearly</b>	<b>2020</b>

**Recorded Treatment Activity – Ball Field Property**

The following table lists each stand located on the Ball Field property. As recommended practices are implemented they should be recorded here.

<b>Stand</b>	<b>Stand Type</b>	<b>Acres</b>	<b>Activity</b>	<b>Treatment Year</b>
<b>1</b>	<b>M9</b>			
<b>2</b>	<b>O</b>			

## **SECTION IV- DEFINITIONS/APPENDIX**



## GLOSSARY

<b>Basal Area-</b>	Measurement taken to evaluate forest density. Units expressed in square feet/acre. Represents the cross-sectional area of trees in the forest.
<b>Canopy-</b>	The cover of branches and foliage formed collectively by the crowns of adjacent trees.
<b>Co-dominant-</b>	Trees that are also in the overstory, usually right below the dominant trees.
<b>Clay Soil-</b>	Soil class based on the size of mineral fragments (less than or equal to 0.002 millimeters in diameter). Clay soils are very fine and poorly drained. This means that they hold excessive water during wet times of the year.
<b>Crop Trees-</b>	Upper-crown residual trees of higher quality that will eventually form the final tree community at the time of stand maturity.
<b>DBH-</b>	Diameter of individual trees measured at breast height (4.5 feet from the ground).
<b>Dendrochronology-</b>	The study of past forest fires using the scars and other evidence found in the current forest.
<b>Ecosystem-</b>	The living and non-living components of an area that make up an environment.
<b>Habitat Type-</b>	Particular ecosystem, which is classified based on soil type, forest type, and ground flora. Habitat types are used to help determine site management potential, limitations, and concerns.
<b>Landscape Management-</b>	Consideration of the all the ecosystems within an area.
<b>Loam-</b>	Soil that is made up of a mix of clay, silt and less than 50 percent sand particles.
<b>Mature-</b>	The period of time that trees are fully developed and at their highest quality. The sized of the tree varies by species and site index.
<b>Merchantable-</b>	Trees that are of a size and quality that can be harvested and sold.

<b>Muck Soil-</b>	Soil type that is dark in color and fine in texture. It contains primarily well-decomposed organic material. It is poorly to very poorly drained and holds water throughout the year. This soil can be associated with wetlands.
<b>Northern Hardwoods-</b>	A forest type including sugar maple, red maple, American basswood, yellow birch and white ash.
<b>Old growth-</b>	An age class of a forest. Referring to a forest that is very old and unchanged by humans.
<b>Over-mature-</b>	Trees that have grown beyond maturity and are beginning to decay.
<b>Overstory-</b>	Trees within the forest forming the uppermost canopy layer.
<b>Pole-sized tree-</b>	Usually immature or suppressed trees 6-12 inches in diameter (dbh).
<b>Pre-Merchantable-</b>	Trees that are not of a size or quality to be harvested or sold
<b>Pulp/Cord-</b>	A merchantable forest product measured in cords. One cord equals 128 cubic feet. Pulp logs are cut 100 inches long and must have a diameter of 4 inches or greater. They also must be reasonable straight and sound.
<b>Regeneration-</b>	The smaller trees that establish on the forest floor
<b>Release-</b>	Allow individual trees more room to expand their crowns. This increases tree production, health and vigor.
<b>Residual-</b>	Forest volume or density after a timber harvest.
<b>Sawlog-sized tree-</b>	Larger, usually older trees 12 + inches in diameter (dbh). These trees meet the minimum diameter specs. for sawlog products.
<b>Sawtimber/MBF-</b>	A merchantable forest product measured in MBF (thousand board feet. One board foot equals 1ft by 1 ft by 1 inch).
<b>Sandy Loam Soil-</b>	Soil class that is a little finer in texture than sand, containing some silt and clay mixed with sand.
<b>Sandy Soil-</b>	Soil class based on the size of mineral fragments (0.05 - 2.0 millimeters in diameter). Sandy soils are considered to be coarse and well-drained.

<b>Sapling-</b>	Small and young trees, 1 – 4 inches in diameter (dbh) and 6 – 20 feet tall.
<b>Scarification-</b>	Lightly disturb forest floor to expose bare soil. Generally for the purpose of creating a seedbed for desired tree species that require such conditions.
<b>Seedling-</b>	Small and young trees, less than 1 inch in diameter (dbh) and less than 5 feet tall.
<b>Silt Soil-</b>	Soil class based on the size of mineral fragments (0.05 - 0.002 millimeters in diameter). Silt soils are considered to be fine but not as fine as clay. They are fair to poorly drained, meaning that they hold water during wet times of the year.
<b>Site Index-</b>	A measure of productiveness based on the height of the dominant trees in a stand at a base age. Largely influenced by the soil composition and climate.
<b>Soil Series-</b>	A classification level for soils based on the orientation and characteristics of soil layers and the factors influencing soil formation. Soil series names often are based on a geographic location where the soil is very common.
<b>Stand-</b>	Land areas grouped together based on their forest and vegetative species structure, site quality, and current conditions. Stands are usually greater than 2 acres in size.
<b>Succession-</b>	Refers to the natural evolution of a forest over time and can be measured by the species composition of the forest.
<b>Tree Stocking-</b>	Term used to express the density of the trees in a forest.
<b>Understory-</b>	Trees within the forest growing beneath the overstory.
<b>Vernal Ponds-</b>	Pools of water that form in the forest during the wet seasons





## **APPENDIX**

1. Tree Farm Group Invitation
2. Timber Tax Information
3. Boat Launch Construction Plans
4. Ecosystem Services and Carbon Sequestration in Forests
5. National Bald Eagle Management Guidelines