A
MANAGEMENT PLAN
FOR
BULLHEAD LAKE NATURAL AREA

Prepared by:
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Bullhead Lake Management Plan

OBJECTIVES 4

MANAGEMENT RECOMMENDATION SUMMARY 4

PROPERTY HISTORY 4

PROPERTY ACQUISITION 4

ADMINISTRATION
- Governing Body 5
- Advisory Committee 5
- Maintenance 5
- Proposed Guidelines 5
- Enforcement 5
- Emergency Access 5
- Publicity 5
- Boundary Demarcation 6
- Future Property Acquisitions 6

RECREATION/TRAIL MANAGEMENT
- User Groups 6
- Current Trails 6
- Proposed Trail System 6
- Future Trail Construction 7
- Trail Surfaces 7
- Adjacent Lands and Trail Considerations 7
- Trailheads and Parking 7
- Restrooms and Other Facilities 7

FOREST MANAGEMENT
Management Unit Review 8
Timber Harvesting 8
Insect and Disease control 8
Non Native Plant Control 8

WILDLIFE MANAGEMENT
Hunting and Trapping 8
Special Concern Species 9

WATERSHED MANAGEMENT
Surface Water 9
Fishing 9
Erosion 9
Adjacent Lands Impact 9

EDUCATION AND INTERPRETATION
Signs 10
Trailhead Kiosks 10
Group Use 10
Research 10

TRAIL MAP 11

FORESTRY STEWARDSHIP PLAN

Objectives

The objectives of this management plan are to:

1. To improve, expand and develop opportunities for passive public recreation and outdoor education.
2. To protect natural areas, water quality and wildlife habitat.
3. To preserve scenic views and open spaces.

Management Recommendation Summary

This document lays out a general plan for achieving the objectives stated above. Management will be focused on two primary areas: providing passive recreation opportunities and protecting natural features. To this end, management activities will be minimal and needed only for user amenities and activities needed to maintain the integrity of natural features on the property. Annual work plans will be created and approved to address specific management tasks needed on the property.

Property History

The property originally contained upland forest and wooded swamp wetlands before European settlement. The vegetation was unspoiled until the mid-1800s when settlers began clearing the land. This clearing consisted of logging, subsequent burning of slash and stump removal. Logging occurred in all areas of the property with any tree species of several inches in diameter or larger being harvested. This harvest included the removal of all trees in areas with level topography (in preparation of agriculture) and most trees on sloped grades. Following this period of logging, the non-sloping areas may have been used for traditional agriculture. In more recent history, the property has been revegetated with secondary forest growth.

Property Acquisition

The Bullhead Lake Natural Area had long been used by area residents for hiking, bird watching, skiing and fishing. When threatened with the loss of this unspoiled woods and wetland to a housing development, the local residents organized as The Friends of Bullhead Lake. Their goal was to permanently protect this pristine and fragile ecosystem so that Long Lake residents could enjoy this land and their children could use the area as an outdoor learning lab. The purchase price of the 28 plus acres was 257,000 dollars. The Friends contacted the Grand Traverse Regional Land Conservancy to broker the sale of the property. Long Lake Township submitted a Natural Resources Trust Fund grant to the State and was awarded monies to purchase the land in order to "*preserve and protect the undisturbed natural area for education and passive recreation*". The grant covered 40% of the purchase price, leaving 60% to be raised by The Friends of Bullhead Lake. The Friends began a comprehensive fund raising campaign. Residents, friends and relatives were contacted and invited to "Walk in the Woods" with nature specialists with the knowledge that "you must see it to appreciate it." Annie Gurian's home on Edgewood Ave. was headquarters for the Friends and her leadership was pivotal

to the success of the group. Today as you walk the Bullhead trails you'll see a beautiful stone with many names engraved on it. These are just some of the Friends who saved a forest with 1100' of frontage on Bullhead Lake. In 1999 the Township granted a conservation easement to the Grand Traverse Regional Land Conservancy to "*preserve the natural, scenic, historic and forested condition of the property*". Thanks to the hard work of many volunteers and the Grand Traverse Regional Land Conservancy the property is now protected in perpetuity.

Public Input and Plan Development

After the natural areas ballot proposal passed in 2006 the Township sought to develop plans to guide management activities on the new properties and the existing Bullhead Lake Natural area. The Township engaged the services of the Grand Traverse Conservation District to solicit public input and develop a management plan for the Bullhead Lake property. To that end, three public input sessions were held including an on-site visit at the property. Based on public input gathered at these meetings, ballot language, deed restrictions, and safety and maintenance considerations, this plan was created to set out the broad goals and values related to the management of Bullhead Lake Natural Area. This plan should be reviewed often and modified as needed to reflect public expectations and protect the features of the property.

Administration

Governing Body

The Bullhead Lake Natural Area is governed by Long Lake Township. The Township retains control of all management and budgeting decisions for the property.

Advisory Committee

The Township may wish to authorize the creation of a citizen advisory committee. The advisory committee would make management recommendations to the Township for final approval. The Township may appoint members of the advisory committee and review appointments on an annual basis.

Maintenance

A property manager may be appointed by the Township to perform or oversee, all maintenance required at the Bullhead Lake Natural Area. This person or entity shall prepare an annual maintenance report for submittal to the Township.

Proposed Guidelines

1. Camping and fires are prohibited.
2. Users must stay on designated improved trails, and must respect any special access restrictions.
3. The property is intended for foot traffic only.
4. Dogs are permitted, but must be kept under control. Pet owners are required to clean up after their pets.
5. Hunting and trapping on the property is prohibited.
6. Fishing is allowed in accordance with the laws of the State and the rules of the Michigan Department of Natural Resources.
7. No plants or other specimens are to be removed unless authorized by management.
8. Littering is strictly forbidden. This includes dumping of yard waste and household trash.
9. Glass containers and alcoholic beverages are prohibited.

Enforcement

The rules for the Bullhead Lake Natural Area should be approved by the township and written into local ordinance so that they may be enforced by law enforcement agencies.

Emergency Access

Emergency access will be provided at the parking areas. Emergency service agencies shall be provided with a key to any locked gates.

Publicity

Because the property has been used for recreation for many years, it is unlikely that a publicity campaign is needed at this time. However, trail maps and brochures should be available at the Township office and website.

Boundary Demarcation

The boundaries of the property should be clearly marked every 50 to 100 feet to avoid trespass concerns and so that users know when they are within or leaving the natural area.

Future Property Acquisitions

Efforts should be made to acquire adjacent, undeveloped properties from willing landowners. This could create a buffer between the natural area and existing houses. There is also a need to acquire sufficient space on Collier Road to establish a small parking area.

Recreation Management

User Groups

The grounds and trails of Bullhead Lake Natural Area are intended to provide for outdoor education and those activities that are considered as "passive recreation." Passive recreation, in this case, is defined as non-consumptive of the resource and non-organized. The opposite of passive is active recreation, which includes improvements such as soccer and baseball fields. The Bullhead Lake Natural Area will accommodate many low impact users including but not limited to:

- Hikers
- Nature Enthusiasts
- Trail Runners
- Cross Country Skiers
- Dog Owners

No fees will be assed to users of the property. Motorized bike, ORV, and snowmobile traffic is not allowed, unless required for management/maintenance activities. Paintball is also prohibited.

In order to ensure that user needs are being met, it is important that the Township stay abreast of the numbers and types of users on the property. This may be accomplished with comment cards and a place to file them at each trailhead or through public input meetings or advisory committees.

Current Trails

The current trail system evolved from logging roads, and areas of repeated use. The trail system is well used, but of poor quality. There are numerous trip and fall hazards and several trails dead-end at private property boundaries.

Proposed Trail System

It is recommended that existing trails be utilized when appropriate and expanded as needed to create loop trails. The creation of a boundary trail would provide a scenic loop trail and a clear delineation of the public/private boundary line. This trail could also serve as a firebreak. The Township may wish to partner with outside organizations specializing in trail design to ensure trails are sustainable and user friendly.

Future Trail Construction

Future trail construction should be kept to a minimum and done in manner that minimizes environmental impact and disruption to user activities. If new trails become established by frequent visitor use, these new trails should either be blocked or properly marked and maintained to prevent erosion. A map of current and potential future trails may be found at the end of this document.

Trail Surfaces

Trail surfaces should be designed first and foremost to limit erosion. Secondarily, they should be easily maintained and provide an enjoyable experience for all user groups.

Woodchips are an easily renewable and inexpensive way to surface trails. Wood chips should be used where necessary to prevent erosion, and trail surfaces should be left "natural" when practical.

Adjacent Lands and Trail Considerations

As noted above, it may be desirable for a boundary trail to be developed. This trail should be near the property boundary, but well posted and far enough away from private property that it is unlikely trail users would stray onto private land.

Trailheads & Parking

Parking areas and corresponding trailheads should be established at one or both of the following locations.

1. Edgewood Rd
2. Collier Rd off Edgewood.

Each trailhead/parking area should include a garbage bin as well as, an information station/kiosk. Trail maps and dog waste bags should also be made available at trailheads. The parking areas should be clearly delineated and prevent vehicles from entering the trails. Parking areas should be sized according to expected demand and spatial limitations. The conservation easement on the property states that one parking lot may be established no more than 40 feet from Edgewood or Collier Roads and that its size shall not exceed 900 square feet. Parking lots that do not meet theses requirements may require prior permission from the Grand Traverse Regional Land Conservancy.

Restrooms and Other Facilities

It is recommended that no toilet facilities be installed at this time.

Forest Management

Management Unit Review

A Forest Stewardship Plan has been created for the Bullhead Lake Natural Area and is included at the end of this document. The plan divides the property into several management units and lays out recommended management practices for each. It should be noted however, that these management activities are only suggestions and that the pros and cons to implementing these recommendations must be weighed against the overall objectives of the property i.e. passive recreation and outdoor education.

Timber Harvesting

Timber harvesting for monetary gain should be done only with the guidance of a Forest Stewardship Plan and should not negatively affect the natural integrity or recreational uses of the property. Harvesting for uses within the property (e.g. fencing, erosion cribs, etc.) may be useful. Harvesting for this purpose shall be conducted only with approval of the Township. Management should be granted the right to harvest trees in order to keep the integrity of the forest from deteriorating or if the safety of the visitor is in question. The removal of dead trees along trails is an important issue. However, dead trees (standing and fallen) are important to the ecological health of the natural area and should be retained if not deemed hazardous.

Insect and Disease Control

- Damage from insects and diseases can be extremely serious to the health of a forest. However, there are no known problems existing on the property. The manager should monitor for new insect or disease damage.

Non-Native Plant Control

Where practical the manager should remove non-native invasive species. The species of most concern at are Purple Loosestrife, Phragmites, and Autumn Olive. While there may not be significant amounts of these species presently, management should monitor the situation to ensure that colonies do not become established.

Wildlife Management

A basic wildlife inventory has been performed on the property. The inventory shows that the property is home to many species of native plants and animals. Management activities should be preformed in a manner that minimizes disturbance to wildlife and improves habitat if possible. In general, the feeding of wildlife on the property should be discouraged.

Hunting and Trapping:

A. Hunting, trapping, or removal of any wildlife is prohibited The removal of wildlife may be used as a tool for management purposes if other avenues are cost prohibitive or otherwise not practical.

Note: Certain species such as deer and beaver can degrade habitat and recreational opportunities if populations become too large.

Special Concern Species:

There are no “endangered” or “special concern” species known to reside on the property. However, the property includes habitat suitable for several of these species.

As mentioned above, management activities should be conducted in a manner that minimizes disruption to wildlife or improves habitat conditions. If any "endangered" or "special concern" species are identified this management plan may need to be revised in order to protect them.

Watershed Management

Surface Water

Water features on the property are dominated by Bullhead Lake and emergent wetlands surrounding it. Trails and other recreational resources should be planned and maintained in such a way that minimizes impacts to these features.

Fishing

Fishing is allowed on the property. It shall be conducted according to all state and MDNR rules and regulations.

Erosion

Erosion caused by human activities and the introduction of excess sediment to water bodies is the primary threat to surface waters on the property. An established trail system with appropriate surfaces will minimize erosion caused by foot traffic. Constructing boardwalks or bridges will also minimize damage and sediment delivery by protecting stream or wetland crossing points on any future trails.

Adjacent Lands Impact

The water features on the property may also be impacted by land use or management changes on lands adjacent to the property. The township should work closely with adjacent landowners to minimize negative impacts from these lands.

Education/Interpretation

Signs

1. Informational Signs

Trails should be clearly marked to provide a safe and comfortable atmosphere for the visitor; international symbols should be used on signs. Any rules should be clearly displayed at each parking area.

2. Interpretive Signs

The Township or property manager should decide on topics for interpretive signage. Interpretative signage will be limited in order to keep the natural character of the property intact.

Trailhead Kiosks

Trailhead kiosks or information stations will be an important aspect of the trail system. They are what the visitor will encounter upon arrival and the last thing they see as they leave. This unique situation presents an opportunity to not only orient the visitor through the use of trail maps, but to educate the user on management practices and etiquette.

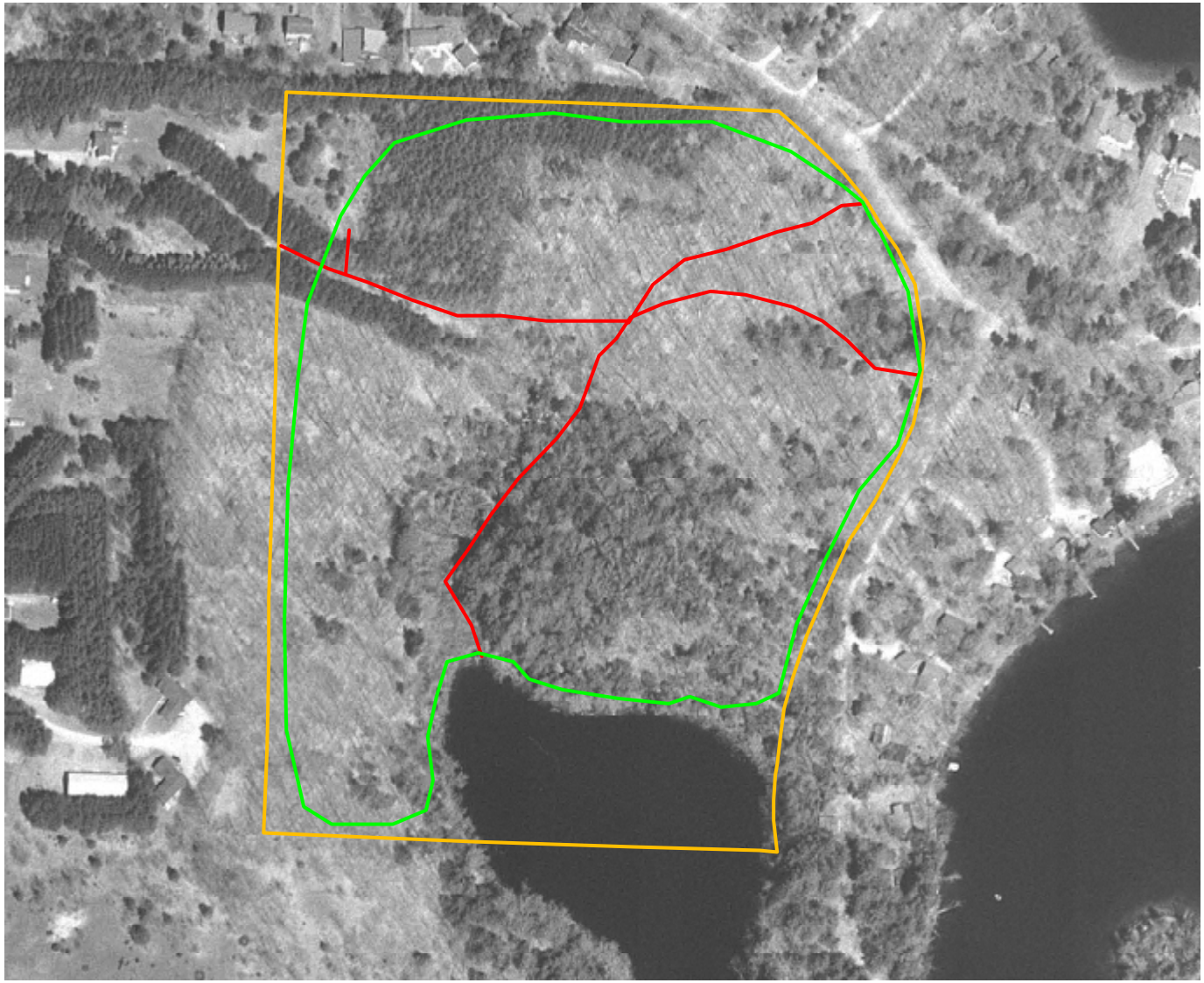
Group Use

Group use will be welcomed at the Bullhead Lake Natural Area. Organized groups of more than 50 people should contact the Township or manager before use of the property.

Research

Research regarding the natural and recreational qualities of the Bullhead Lake Natural Area should be encouraged. The Township shall review all research projects before they are carried out. This research will be beneficial to the ongoing management and improvement of the property

Bullhead Lake Trails



Bullhead Lake Property

Exisiting Trails

Potential Future Trail

0.1 0 0.1 0.2 Miles

Traverse City, MI 49684
Planned Property Location: W ½ of the SE ¼ of the SW1/4 and the E ½ of the SW ¼ of the SW 1/4 of Section 16, Long Lake Township, Grand Traverse County, Michigan

31 Acres Adjacent to Bullhead Lake

Plan Written By:

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Table of Contents

Forest Management Plan Written for Long Lake Township
8870 N. Long Lake Rd.
Traverse City, MI 49684
Planned Property Location: W ½ of the SE ¼ of the SW1/4 and the E ½ of the SW ¼ of the SW 1/4 of Section 16, Long Lake Township, Grand Traverse County, Michigan
31 Acres-Adjoining Bullhead Lake

Page #	Description
1	Title Page
2	Table of Contents
3	Introduction of property
4	Forest Health Reminders and Requirements
5-12	Recommended Management and Stand Descriptions
13	Timeline for management of stands
14	Key for Management Types (MDNR)
15	Aerial Photo
16	Stand #'s Map
17	Soils Map
18	Soils data page

Introduction to the Long Lake Township Land

This property is 31 acres and unique in many regards. It has frontage on a small inland lake, Bullhead Lake and it is a refuge among housing developments. The main goal of this property is passive recreation and sound resource management. The terrain is quite hilly and there are several different kinds of management units throughout the parcel. Pine plantations, northern hardwoods and lowland areas make a diverse system to be enjoyed by humans and animals.

There has been some forest management done on the parcel in years past, likely before the Township acquired the parcel. The cutting activity focused on removing some substantial value with a commercial timber harvest in the hardwoods but thankfully there are plenty of trees left that are both of larger size and of decent value. Much of the pine plantations are seeded in with hardwood saplings since there is ample seed source adjacent to these stands. These pine trees were likely planted to help stop soil erosion in their respective areas decades ago. They have achieved that soil stabilization along with the ample addition of the hardwood saplings and are growing quite well due to the good soils on the property. The stand surrounding Bullhead Lake is holding the soil quite well, filtering sediments and providing wildlife food and cover. This area will be off limits for forest management unless an invasive species is found or some other significant problem needs to be remedied within this sensitive area.

This forest management plan offers a road map to manage the forest resources well. There are many other ways to achieve good management but this is a great start. The Township is encouraged to work with their constituents and hire a professional to decide how to best manage this parcel.

Management Timing on all the Stands and Other Forest Health Issues

Some of these stands have the capacity to have oaks in them. For the oaks present any cutting, harvesting or machine work should be done when the leaves are not on the trees or even about to come on to inhibit the spread of the oak wilt disease and keep damage to remaining trees to a minimum. Oak wilt will not bother other species of trees but cutting during the growing season, especially in the spring, has the potential to greatly degrade the standing value of any woodlot. With oak wilt in the county already any cutting or pruning of oaks during the growing season will increase the likelihood of the oaks getting the disease and is strictly not allowed.

There is another pest that could potentially move into the area called Emerald Ash Borer. This insect can kill any type of ash tree fairly quickly. This pest should not cause a panicked harvest on this or any land, but it should warrant some consideration when the next scheduled harvest time comes. A good idea is to remove more ash trees than normal, to get some value out of them rather than having them killed by Emerald Ash Borer. With EAB many miles away this should not be a huge concern for this property, especially since the canopy is less than 15% ash in one stand.

A third disease could move into the area called beech bark disease. This is a two factor disease that starts with a scale insect, secondly a fungus gets into the wounds from the scale insects and can eventually kills large beech trees. To prepare for the coming of this disease the larger rougher barked beech trees should be harvested during the next scheduled harvest. The younger soother barked trees are less likely to get this disease since the rain washes away the crawler stage of the scale insect before they can cover themselves with their protective scale. Should the beech trees on this property get this disease, the moving of beech firewood or logs is prohibited from mid summer to late fall. This is the time of year that the scale insects are in their crawler stage and can re-infect neighboring trees when the infected wood is moved to a new location. This disease is quite an issue in Michigan, but the beech component on this property is less than 15-20% of the tree canopy so there should be no rash decisions to cut any one species completely off of the property.

Finally, any mechanical work of any kind should not be done on this land during the spring "bark slip" period. This is the time of year when the leaves are just about to or have recently come out. The tree trunk is growing quickly and the bark is therefore quite loose on the tree accelerating any mechanical injury to the stem. Therefore, between April 15th and June 15th machine driven work of any kind should not take place on this property.

These forest health issues need to be addressed when management takes place on this property even though none of these problems are immediately near this land. The landowner is encouraged to keep in contact with the Conservation District and/or a Professional Forester to keep up on any new treatment measures for these or other forest health issues. Should any widespread control measures be found for these diseases these professionals should be the first to know about them.

Management Unit#1

Red Pine Plantation with Dense Hardwood Regeneration

Management Unit Information

Management Unit Number: 1 **Number of Acres**: (2) 1 Acre Units

==========Major Objectives of Unit==========

Manage for high dollar sawtimber and utility poles/cabin logs or remove the pine to allow the hardwoods to re-claim the stand quickly.

==========Existing Conditions==========

Size Class: R6-9 **Soil Type**: KaD
Site Quality: Excellent **Stand Quality**: Good-Excellent **Stand Density**: 160-250 ft^2/acre

Management Unit Description:

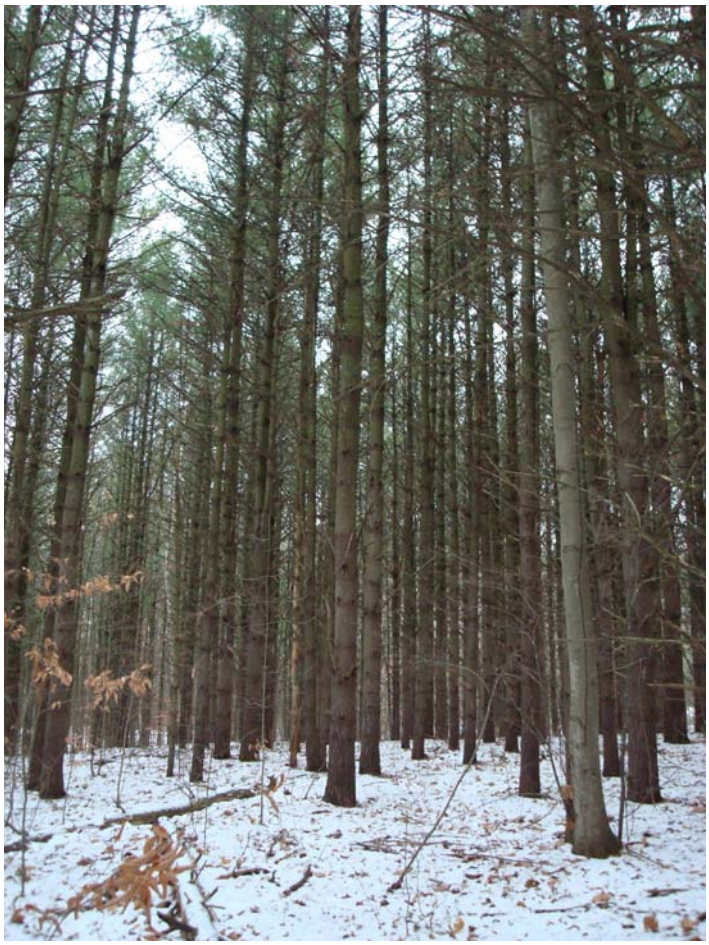
This is a red pine plantation planted on 6' x 8' spacing though the initial die off and planting regime make this stand less than homogeneous. The average diameter is about 10" with sizes ranging from 6-12". Merchantable tree height is 40-50' tall making it prime size and density for some management. The herbaceous understory is much suppressed, but the hardwood understory is doing quite well. Eventual thinnings will encourage more hardwood establishment underneath these trees, which will improve wildlife habitat.

==========Planned Management Activities==========

There is an immediate management need in this stand. This stand could be managed for higher dollar red pine products or it can be removed altogether allowing the established hardwood trees to reclaim this area. This stand is ready to be thinned since the merchantable height is greater than 35'. Merchantable height is the amount of stem a tree has before it reaches the first live branch and is saleable commercially. Since these trees have exceeded that height, a thinning is needed. To manage this stand for longer-term value in red pine the following management regime should be followed. This first thinning should be completed soon and this thinning typically removes a third of the trees by removing one of every third row within the stand. This allows remaining trees to grow into the now open spaces. Once competition is released trees often expand their diameters more rapidly than their height growth. These trees are already prime candidates for being sold as utility poles once they increase their diameters after the first thinning. After the first thinning a second harvest should be done in 10-15 years. This thinning is done when the branches of adjoining trees physically touch. This thinning usually removes another third of the trees by cutting one of every third tree within the rows. This cut will likely have plenty of sawtimber and utility pole quality trees expanding the value of that harvest. While these thinnings are taking place the hardwood regeneration becomes more advanced and will take over the site after the pine rotation is complete provided the pine cutters use care not to damage these small trees.

Should harvest values and longer term red pine management not be a goal within this stand the stand could be left as is, or entirely removed leaving the hardwood understory to take over the site immediately after cutting. Cutting in this fashion will reduce the longer term hardwood damage and get a more natural species composition in this area in the shortest amount of time. With a more natural stand in place wildlife species will be able to utilize this unit more as they are adapted to using naturally occurring hardwood stands.

Management Unit #2



White Pine Plantation without Hardwood Regeneration

Management Unit Information

Management Unit Number: 2 **Number of Acres**: 3

==========Major Objectives of Unit==========

Utilize for pine wood products and revert this stand to northern hardwoods after the pine rotation is complete.

==========Existing Conditions==========

Size Class: W 6-9 **Soil Type**: KaB, KaC, KaD
Site Quality: Good-Excellent **Stand Quality**: Good **Stand Density**: 230-260 ft^2/Acre

Management Unit Description:

This stand is a white pine plantation planted roughly the same time the red pine trees were. Trees were planted on a 6x6' spacing but initial planting mortality was apparent. Diameters range form 5-12". Merchantable height is about 40-50'. There is little to no understory growth under these trees including hardwood trees.

==========Planned Management Activities==========

This stand is in need of a thinning or complete removal described in the red pine unit #1 description. Clearing this stand will be more difficult as there is no hardwood regeneration under the stand and the public and/or neighbors may object to the trees being completely removed. The Township and/or their forester should communicate with neighbors and interested public to ascertain their opinion before proceeding with this management decision.

With public opposition to clearing this stand it is best managed by thinning a third of the trees within a year or two. Thinning some of the trees will allow the hardwoods to begin establishing underneath the white pine trees. Once these hardwood trees become established future thinnings or removals will allow these hardwoods to more easily take over the site once the pine rotation is complete. Typically thinnings within pine plantations occur every 10-15 years. So within 30-35 years the pine trees should be removed completely with an advanced hardwood stand growing to replace the pine trees. The advantage to clearing all the trees initially is the advanced hardwood regeneration will not be damaged by the logging equipment during subsequent cuttings. The public and neighbor's opinions should direct the management of this stand.

Management Unit #3

Oaks cover much of the northeastern canopy of this stand (above) with northern hardwoods dominating the rest of the unit.

Management Unit Information

Management Unit Number: 3 **Number of Acres**: 15

==========Major Objectives of Unit==========

Manage for passive recreational use with hiking trails and possibly utilize the tree resource for some eventual income.

==========Existing Conditions==========

Size Class: M9 **Soil Type**: KaB, KaD. KaD2, KaF
Site Quality: Good-Excellent **Stand Quality**: Good **Stand Density**: 110-150ft^2/acre

Management Unit Description:

This unit is a diverse mix of over stocked northern hardwood trees. Species present include; sugar maple, american beech, red oak, hemlock, white ash and some scattered basswood and ironwood. This is a mature stand of trees with some evidence of cutting several/many years ago. Terrain is quite hilly in areas making access with mechanical machinery difficult but not impossible. There are two unique areas within this stand one is a young hardwood pole stand in the southeastern edge of the parcel and a ridge with a significant hemlock component in the eastern end of the parcel. Neither of these areas needs extra management different than what is described below at this time.

==========Planned Management Activities==========

This stand could make the Township some perpetual income every 10-15 years provided it is managed well during each of those management entries. Trees on the property are very mature and some are likely declining in value since they are aging beyond their income "prime". To manage this stand to protect its beauty and receive some income the Township should hire a professional forester to administer the management activity on the property. This forester should mark trees for removal to 1) improve the health, safety and quality of the remaining stand and 2) reduce the canopy competition to bring the stand density to 90-100ft^2/acre. There are many options to remove these selected trees without much damage to the remaining stand and reduce/eliminate public out-cry. Horse logging or very careful mechanical operators should only be allowed to work on the property and the forester can offer insight on the best operator to choose.

This stand can also be left unmanaged. This is not suggested in that the older a stand gets the fewer species of wildlife are able to use the stand. Also, the risk of stand replacing catastrophic events increases with stand age and much of the value that could have been received from the stand is lost when it is left unmanaged.

Either management method chosen, hazard trees will need to be constantly monitored and removed when they become dangerous. Hazard trees are trees that have some defect making them prone to stem failure near places where people congregate or property is. Areas needing hazard tree assessments are benches, look outs areas, parking lots and heavily used trails.

Management Unit #4

Lowland species adjacent to Bullhead Lake, with a dense understory of hemlock.

Management Unit Information

Management Unit Number: 4 **Number of Acres**: 9

==========Major Objectives of Unit==========

Retain in its current state, allow recreational use and safety needs dictate management.

==========Existing Conditions==========

Size Class: Lowland Species-9 **Soil Type**: KaF
Site Quality: Good **Stand Quality**: Good **Stand Density**: 100-220ft^2/acre

Management Unit Description:

This unit is the unit closest to Bullhead Lake and the species composition suggest it is close to water. Tree species within this unit are; Hemlock and white birch predominating with yellow birch, big-toothed aspen, red maple, sugar maple, and beech scattered throughout the stand. Much of the tree understory is hemlock, with some scattered maple and beech trees.

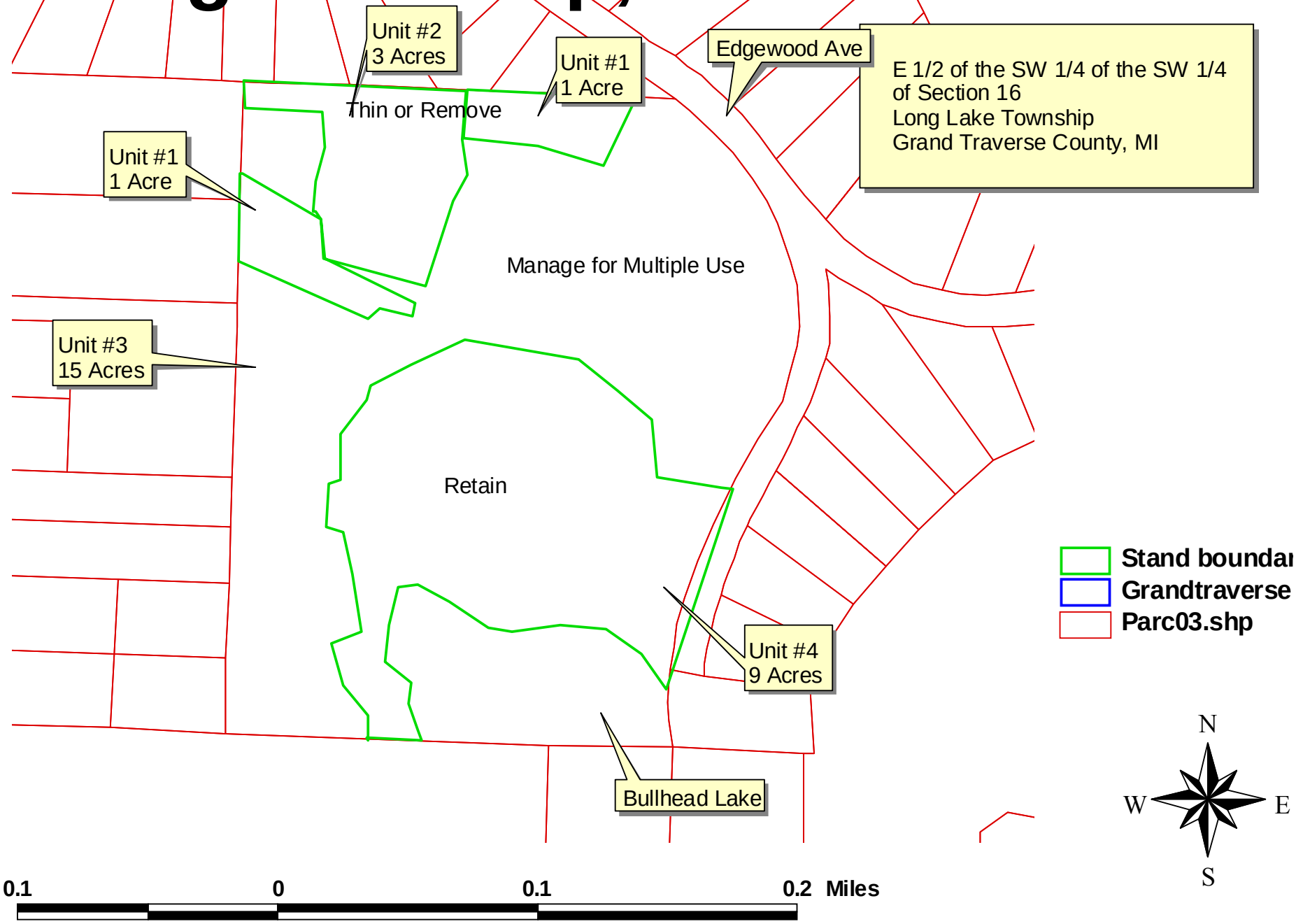
==========Planned Management Activities==========

Forest management is not needed in this unit at this time. Proximity and sensitivity to water make management of this stand difficult and tree values negate the need to get creative with active management. This area provides natural cover for wildlife refuge, water and food. Water and wetland areas are further described in other parts of this plan and management of these areas is explicitly described there.

<u>Timeline for Forest Management</u>
Long Lake Township
8870 N. Long Lake Rd.
Traverse City, MI 49684
Planned Property Location: W ½ of the SE ¼ of the SW1/4 and the E ½ of the SW ¼ of the SW 1/4 of Section 16, Long Lake Township, Grand Traverse County, Michigan
31 Acres-Adjoining Bullhead Lake

Unit #	Management Activity	Year Planned	Year Complete
1	Thin by a third or completely remove	2008-2009	
2	Thin by a third or completely remove	2008-2009	
3	Commercial Improvement Harvest	2008-2009	
4	Retain for wildlife/recreation use	Each Year	
All Units	Assess trees for Hazards to persons/property	Each Year	
1 and 2	Thin by another third if not removed	2018-2022	
3	Perpetual Commercial Improvement Harvest	Every 10-15 Years	
1 and 2	Thin by another third if not removed	2028-2030	

Long Lake Twp, Bullhead Lake



Long Lake Twp, Bullhead Lake

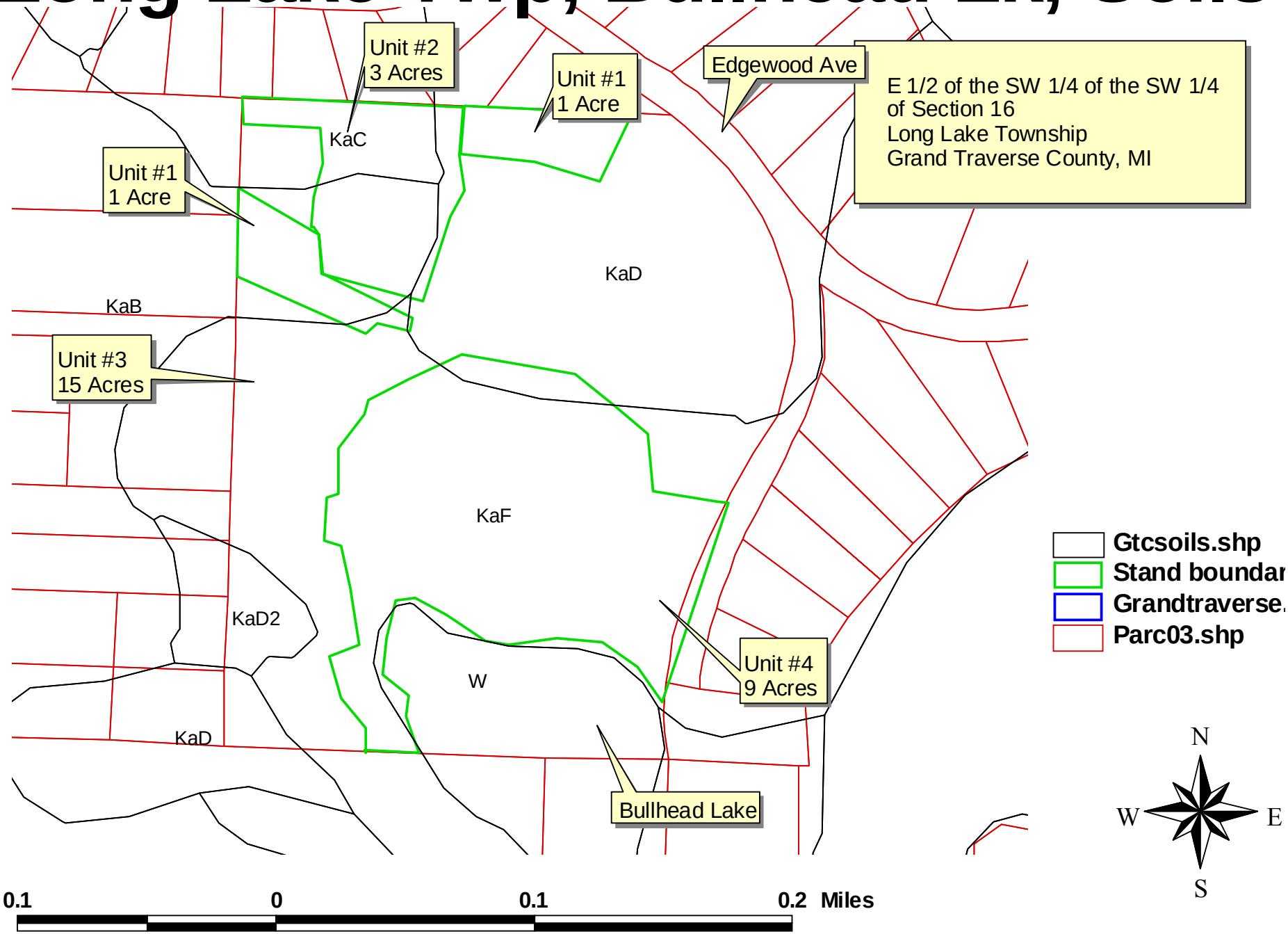
E 1/2 of the SW 1/4 of the SW 1/4
of Section 16
Long Lake Township
Grand Traverse County, MI

Stand boundaries.sh
Grandtraverse.shp
Parc03.shp

N
W
E
S

0.1 0 0.1 0.2 Miles

Long Lake Twp, Bullhead Lk, Soils



KaA - KaF2: Kalkaska loamy sand, (0 - 45 percent slopes)

Soils of the Kalkaska series are well drained and very sandy.

Common Trees:

Sugar maple	Quaking aspen	Red pine
White pine	Beech	Paper birch
Red oak	Red maple	Bigtooth aspen

Trees to plant:
Red pine, jack pine.

Soil Name	Erosion Hazard	Equipment Limitation	Seedling Mortality	Windthrow Hazard
KaA - KaD2	Slight	Moderate	Moderate	Slight
KaE, KaE2	Moderate	Moderate	Moderate	Slight
KaF, KaF2	Severe	Severe	Moderate	Slight

The Kalkaska series contains deep, well-drained, sandy soils that have rapid or very rapid internal drainage. The moisture supplying capacity is poor to very poor, and the soils are droughty during dry periods. Aeration is rapid, and natural fertility is low.

The potential productivity of this soil series is generally high for pine and medium for aspen and northern hardwoods.

On the steeper slopes (18 - 45%), the use of planting and harvesting equipment is moderately to severely limited. Erosion is a severe hazard on these slopes.