Forest Stewardship Plan

Prepared for Liana May and Chase Hunt

Prepared by Liana May
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Plan Start Date: April, 2017
Plan Duration: 20 Years (January, 2037)

www.Michigan.gov/ForestStewardship

The Forest Stewardship Program is funded by the United States Forest Service and administered by thean Department of Natural Resources.

Renewal or revision of a prior Forest Stewardship Plan? – NO

Landowner Contact Information	Plan Writer Contact Information
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Property Information

Total Acres: 41	Forested Acres: 41	Acres in Plan: 41	Tax ID: 005-014-01100	
Town: 28 N	Range: 14 W	Section: NW1/4 of SW1/4 of Sec14	Township: Empire	County: Leelanau

Property Legal Description (Quarter-Quarter Section, Quarter Section, Section, Town, Range, Township, County): The property consists of approximately forty-one (41) contiguous acres, located in The NW ¼ of the SW ¼ of Section 14, T.28N, R.14W., Empire Township, Leelanau County, Michigan.

How to Find Property from Nearest Town: From the village of Empire drive east approx. two miles on M-72 to Benzonia Trail (Co. Rd. 677), turn north (left). Continue for approx 1.5 miles north to Echo Valley Rd., turn east (right). Continue east for 1 mile (Echo Valley Rd becomes an unmaintained two-track after a half mile) until you reach the 40 acres marked by a two-track on the south side of the road.

Participation in Related Forestry Programs

_____ I intend to enroll this parcel in the Qualified Forest Program (QF). (www.Michigan.gov/QFP)
_____ I intend to enroll this parcel in the Commercial Forest Program (CF). (www.Michigan.gov/CommercialForest)
_____ I intend to enroll this parcel in the American Tree Farm System. (www.TreeFarmSystem.org)
__X__ I intend to apply to the NRCS for financial assistance. (www.nrcs.usda.gov)

Michigan's Stewardship Ethic

Stewardship is an ethic recognizing that the land and its natural inhabitants have an inherent worth and that we have a responsibility to consider the land as we protect, manage, utilize, and enjoy the forest. Stewardship guides us to conduct our activities to the utmost of our abilities, to insure the future health, productivity, diversity, and well-being of the land, its natural communities and species, and to provide opportunities to our successors that are at least equal to ours to use and enjoy the land and its resources.

Signatures of Approval from Landowner, Plan Writer, and DNR Service Forester

This plan describes my goals and objectives for my forest. Participation in the Forest Stewardship Program is voluntary and only indicates my intent to practice sustainable forest management. I understand that enrolling forest land into separate property tax programs like the Commercial Forest program or the Qualified Forest program requires my compliance with an approved forest management plan in exchange for the reduction in property taxes.

Landowner:	Date:
Plan Writer:	Date:
DNR Service Forester:	Date:

After review and approval by the Landowner, the Plan Writer will submit the entire Plan to the nearest DNR Service Forester for their review. **Electronic submission of the Plan is encouraged by emailing a Word document or pdf file to the Service Forester.** The DNR Service Forester will return a hard copy or pdf of the final signature page to the Plan Writer after approval.

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Introduction

Forest Stewardship Program

The purpose of the Forest Stewardship Program is to help forest landowners manage, protect, and enjoy their land. The voluntary program connects family forest landowners with 140 professional foresters and wildlife biologists in the private sector to develop and implement a Forest Stewardship Plan. The United States Forest Service (USFS) supplies funding and partners with the Michigan Department of Natural Resources (DNR) to provide assistance to private forest landowners. See www.Michigan.gov/ForestStewardship for more information. Since 1990, more than 5,400 landowners from every county in Michigan have developed a Forest Stewardship Plan to help them manage, protect, and enjoy their own forest.

Property History and Description

The Landowners purchased this property from the Leelanau Conservancy in August of 2015. The purchase agreement required the landowners to place a Conservation Easement on the property, which was in line with the landowners' own goals. Before purchase, the Leelanau Conservancy owned the parcel for approximately two years. Past owners had selectively harvested timber from this parcel for at least 20 years. This forest was probably first cut in the early 1900's. There are remnants of several forest trails, two tracks, and staging areas. There are no structures on the property.

The parcel is located across an impressive end moraine near the top of Echo Valley with views of Big Glen Lake and the Hatlem Creek wetlands. Steep slopes greater than 20% drop 200 feet from the top slope of the end moraine to Echo Valley Rd, which runs along the valley floor. There are several drainage ways, valleys, and bench ridges on the property. Just north of the property there is an impressive 150 foot deep kettle hole. The natural community is mesic northern forest, with an area of seeps, a small spring and ephemeral stream supporting some wetland vegetation. At least seventy native species have been identified across the property including several ferns and an orchid rare to the county, and one state-threatened species, red-shouldered hawk (species listed in Appendix III). This habitat is appropriate for woodland species that require large areas of closed canopies.

Throughout the stewardship plan, the forest has been placed into three management "stands" based on forest composition, wetness, management needs, and Conservation Easement rules.

Echo Valley Conservation Easement

Upon purchase, the landowners granted a Conservation Easement to the local land conservancy, the Leelanau Conservancy, Leland MI, to preserve the forest in its predominantly natural state. The easement "conveys and warrants to the Leelanau Conservancy a perpetual conservation easement, as such term is defined in MCL § 324.2140(a), over the property." The Conservation

Easement protects the conservation value of the property while granting certain uses to the landowners. The conservation value of this property is demonstrated by natural undeveloped land important to water quality in the Glen Lake watershed, high-quality natural mesic northern forest with habitat for wildlife, part of the greenway corridor in Empire township, position within a large tact of forested land including Sleeping Dunes Bear National Lakeshore property, and steep slopes greater than 20% susceptible to erosion if vegetation was cleared.

The Conservation Easement states that the landowners may manage the forest to for personal firewood harvest, sugarbushing, wildlife habitat improvement, restoration, and recreation. The landowners may maintain and improve roads and trails to properly access and manage the property. There is a two acre "residential area" (Stand Two) in which the landowners may develop. All activities in this Forest Stewardship Plan are pursuant to the approval of the Leelanau Conservancy as outlined in Section 6 Paragraph E of the Conservation Easement.

Landowner's Goals

The landowner's primary goal for this forest is to conserve and enhance biodiversity, develop forest resources (firewood, sugarbush, hunting, shiitake logs) and recreation, and address resource concerns (forest pests, invasive species, erosion, trespassing). The landowners would like to manage within the framework of this easement to:

1. Provide recreational opportunities such as trail walking, bird watching, cross-country skiing, and white-tailed deer hunting
2. Develop forest products (firewood, maple syrup, shiitake logs)
3. Address forest health issues
4. Remove invasive species
5. Plant trees and shrubs to increase stand diversity and resilience
6. Improve wildlife habitat for small prey mammals, neotropical migratory birds, and top-level predators such as bobcat and forest raptors
7. Supplement pollinator habitat
8. Restore rare and declining species (eg. American ginseng, Canadian yew, Torreya assisted migration)
9. Stabilize exposed slopes to minimize erosion
10. Improve access roads and access control
11. Enroll in NRCS programs for financial assistance

Planning Process

The landowner is a certified Forest Stewardship Plan writer. Upon purchase of this property the landowner decided that it is a good candidate for a FSP and it is in line with recommendations for future forest management activities as outlined in the conservation easement. The landowner began to consider what they would like to see improved upon within the forest over the course of 2016 while visiting the property, walking scenic routes, recording species present, and

investigative extent of damage by forest pests. The landowner began writing the plan in early 2017.

Stand Assessment Method

I collected basic stand assessment data by visual survey while walking through the forest throughout the growing season of 2016. I have researched landforms, soil groups, slopes, and considered aerial photos in delineating the boundaries of the stands. I have also collected data of plant species distribution and abundance, animal species use of the property, and fluctuations in water table levels at the wetland throughout the year. Stands were delineated based on dominant tree species present, soils, wetness, and regulations. Ten sample points were taken to assess size, spacing, and species of trees present. Basal areas were estimated using wedge prism variable radius plots. Saplings and shrubs in the understory, invasive plants, and insect or disease issues were also noted throughout each stand.

Property Maps

Conservation Easement Map

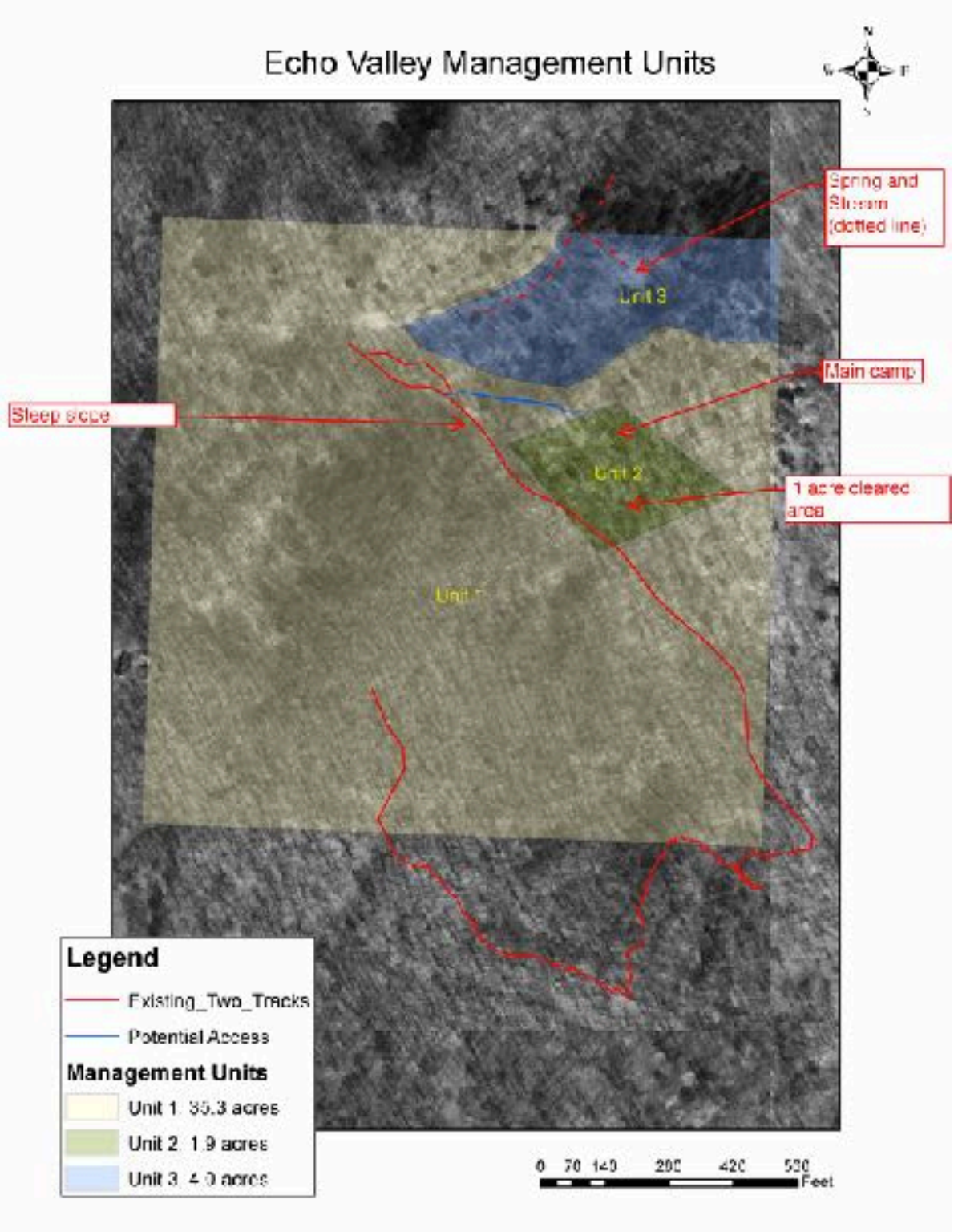
Figure 1. Map of the Landowner property (Image Source: Leelanau Conservancy, Leland, MI)

Property Locator Map

Figure 2. Echo Valley forest is located in Empire Township south of Big Glen Lake, Leelanau County, Michigan (property boundaries delineated in red, Image source: Google Earth, NOAA).

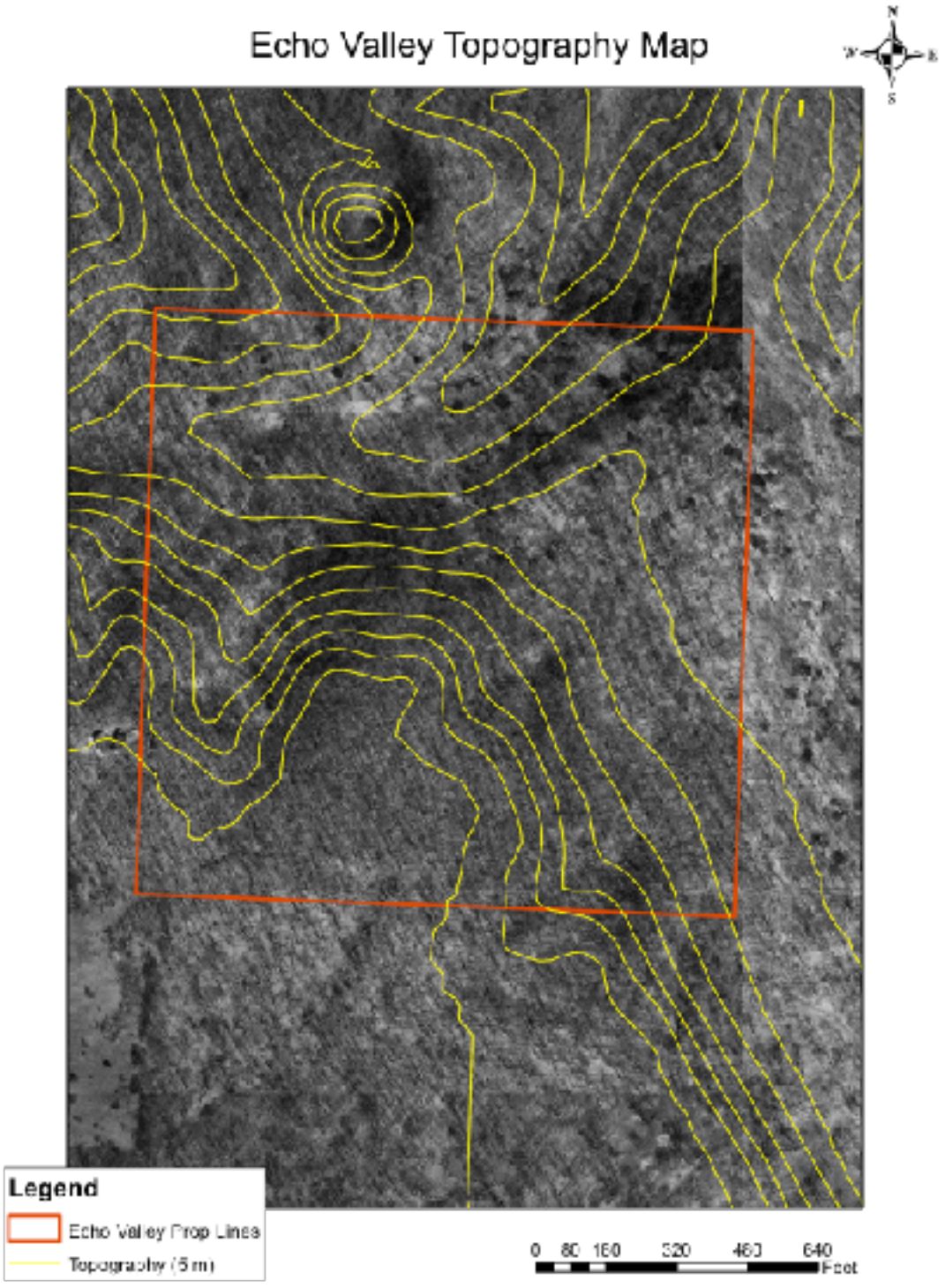
Forest Resource Map

Figure 3. Map of management units and forest resources.



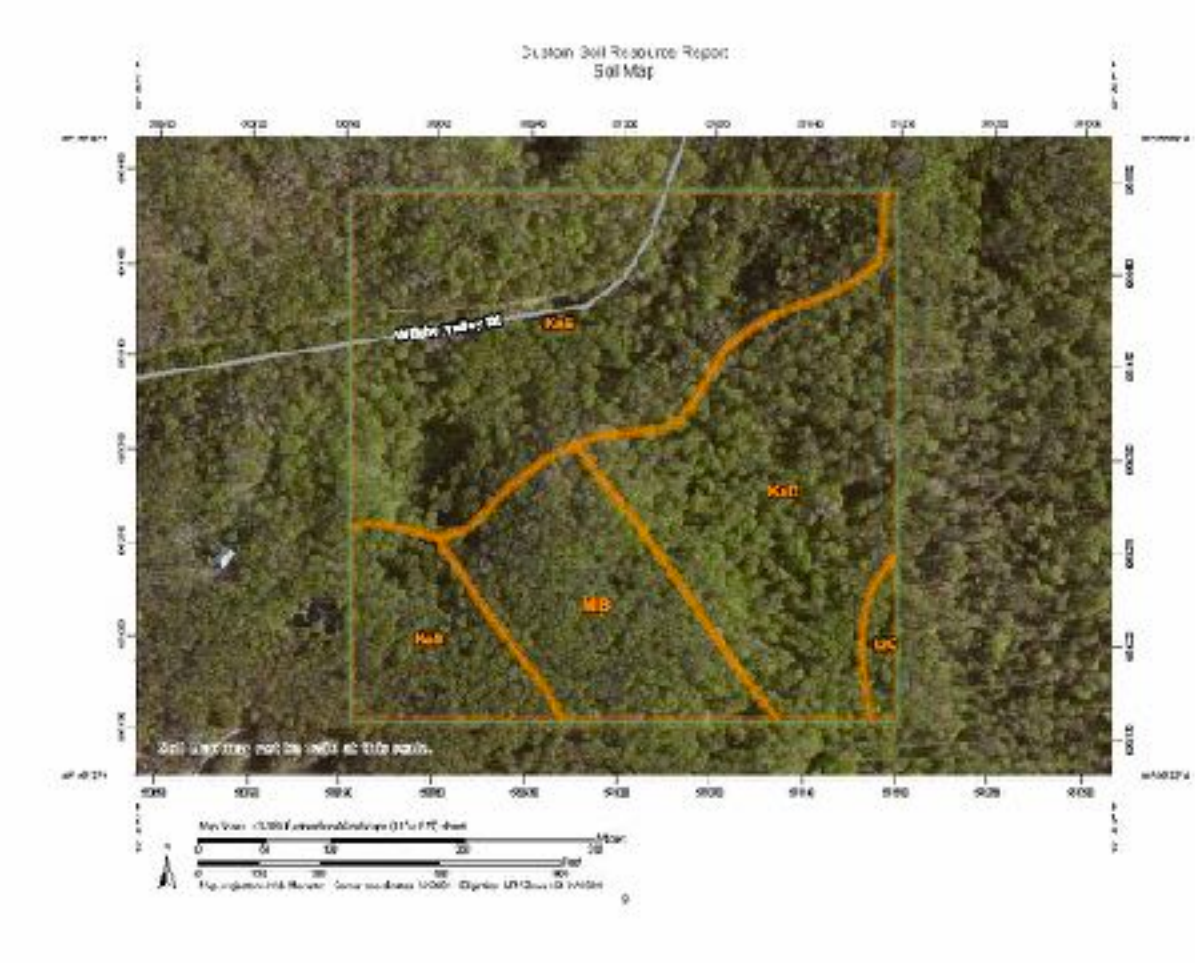
Topographic Map

Figure 4. Map of topography using USGS 5m contours. The top slope (SW corner) is 975 ft and the low slope (N center) is 795 ft.



Soil Map

Figure 4. Soil map of the Landowner forest obtained from USDA Web Soil Survey.



Map Unit Legend

Leelanau County, Michigan (MI009)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
KaB	Kalkaska sand, 0 to 6 percent slopes	4.0	9.8%
KaD	Kalkaska sand, 12 to 18 percent slopes	12.1	29.6%
KaE	Kalkaska sand, 18 to 35 percent slopes	17.3	42.4%
MC	Manistee-East Lake loamy sands, 6 to 12 percent slopes	0.7	1.6%
MIB	Manistee-East Lake loamy sands, 0 to 6 percent slopes	6.8	16.6%
Totals for Area of Interest		40.9	100.0%

Soil Series

Kaleva Series. The Kaleva series consists of very deep, excessively drained soils on outwash plains, lake plains, and moraines. These soils are formed in sandy deposits. Slope ranges from 0 to 50 percent. Mean annual precipitation is about 872 mm (34 in), and mean annual temperature is about 7.0 degrees C (45 degrees).

East Lake Series. The East Lake series consists of very deep, somewhat excessively drained soils that formed in sandy and gravelly outwash on outwash plains, stream terraces, lake terraces, lake basins, deltas, eskers, and beach ridges. Slope ranges from 0 to 50 percent. Mean annual precipitation is about 762 mm (30 inches), and mean annual temperature is about 6.1 degrees C (43 degrees F).

Leelanau Series. The Leelanau series consists of very deep, well drained soils that formed in sandy and loamy deposits on moraines. Slope ranges from 0 to 50 percent. Mean annual precipitation is about 762 mm (30 inches), and mean annual temperature is about 6.7 degrees C (44 degrees F).

Mancelona Series. The Mancelona series consists of very deep, somewhat excessively drained soils that formed in sandy and gravelly outwash on moraines, outwash plains, lake plains, deltas, eskers, stream terraces, kame moraines, and old beach ridges. Slope ranges from 0 to 70 percent. Mean annual precipitation is about 762 mm (30 inches), and mean annual temperature is about 6.1 degrees C (43 degrees F).

(Source: http://websoilsurvey.nrcs.usda.gov/)

Natural Resource Elements

Entire Property

Resource Description

The following natural resource elements are more applicable to the entire property than the stand level scale so they can be described in general terms for the entire property.

Roads and Access. The forest boundaries are marked by standard forestry paint markings. Each corner of the parcel is marked by flagging tape on a wooden survey stake and an orange plastic stake. There is one main two-track that runs between Echo Valley Rd and the neighbor's parcel to the south. The two-track follows a >20% grade for 40 feet as it ascends from Echo Valley Rd to Stand 2. A proposed alternative route up the slope is provided on Figure 2. There is no access on the parcel to the upper-most portion of the property, approximately 10 acres in the southwest quarter; it can accessed via two-tracks on the neighbor's parcel (see Figure 1). There are several overgrown forest trails throughout the parcel.

Threatened and Endangered Species. The U.S. Fish and Wildlife Service maintain the list of the federally listed threatened or endangered species for Michigan at www.fws.gov/midwest/endangered/lists/michigan-spp.html. There are more species on the State of Michigan list than are on the federal list of threatened or endangered species. The state list of T&E animals is available at http://mnfi.anr.msu.edu/data/specialanimals.cfm. The state list of T&E plants is available at http://mnfi.anr.msu.edu/data/specialplants.cfm.

A positive identification of two red-shouldered hawks was made in 2015 by the landowner. Red-shouldered hawks are a threatened species listed by the Michigan Department of Natural Resources (DNR). There are no reports of these hawks in the area from the Michigan Natural Features Inventory (MNFI) or the DNR. There is a locally-known nesting site in the Hatlem Creek wetlands at the base of Echo Valley about one mile northeast of the property. The nesting site and the sighting of the red-shouldered hawk on the Echo Valley property should be surveyed in March-April of 2017 and documented with the Michigan Natural Features Inventory.

This site is an ideal area for the re-introduction of Michigan threatened species American ginseng, *Panax quinquefolius.* A wild population can be found 1.5 miles south of the parcel in similar forested habitat. Other species are considered as well. See conservation practices below.

Forests of Recognized Importance. Forests of Recognized Importance (FORI) are defined as "globally, regionally and nationally significant large landscape areas of exceptional ecological, social, cultural or biological values." FORI occur at the landscape level, not the individual stand or ownership level. This forest contains high conservation-value mesic northern forest, important wildlife habitat for a threatened species, habitat for species that require core forest habitat, and is

located within a 1,500 acre contiguous forest with intact canopy cover. These qualities make this stand appropriate for designation as a "Forest of Recognized Importance" (FORI).

Archeological, Cultural, or Unique Natural Sites. The DNR reports that the archeological database does not show any concerns for historical sites in this section of the Township. There are no known special sites on the property. More information about historical sites in Michigan is available at www.Michigan.gov/Archaeology.

Carbon Cycle. Carbon dioxide is removed from the atmosphere through photosynthesis and decomposition of organic matter into the soil. Carbon dioxide is released to the atmosphere through respiration, deforestation, and soil tillage. More than 63% of the terrestrial carbon stocks in Michigan's forests are in soil organic carbon while only 19% is in the above ground biomass (trunk, branches, leaves). Below ground biomass (roots), dead wood, and litter (dry leaves) make up the remaining 17% of the carbon stocks in Michigan's forests. Healthy forests produce clean air and oxygen through photosynthesis. Therefore, forests in Michigan and around the world are very important ecosystems that remove carbon dioxide from the atmosphere and help to reduce the global impacts of climate change. More information about the forest carbon cycle is available at www.fs.fed.us/ecosystemservices/carbon.shtml.

Desired Future Conditions

Forestry management activities are meant to accomplish the landowner's goals for that particular stand and to bring about desired future conditions for the forest. The goals for the entire property include recreation, developing proper forest trails and road access, conducting sustainable firewood harvests, developing sugarbush potential, maintaining and enhancing excellent wildlife habitat and biodiversity, increasing forest basal area, and protecting soil and water quality. Wildlife habitat priorities are pollinators, small prey mammals, neotropical migrant birds, woodland raptors, bobcat, and other predators. Biodiversity conservation priorities include (re)introducing state-threatened American ginseng, planting and fencing Canadian yew, and assisted migration of selected species.

Planned NRCS Conservation Practices for Entire Property

Activity 0-1: Improve Access Control (472) – 0.1 acre, August 2017. The rural nature of the property makes enforcement of property boundaries difficult. There are frequent trespasses from deer and mushroom hunters and several blinds and tree stands have been erected without permission. The access road is not gated and there is frequent trespassing by ORVs, dirt bikes, snowmobiles, and other vehicles from Echo Valley Rd. Trespassing is causing erosion on the steep slope of the access road which the landowners seek to close and reroute (see Improve Access Road (560) below). Improve access control by increasing private property signage and gating the access road at Echo Valley road within the next year. Private property signs should be placed near forest trails and along Echo Valley Rd. The gate should only allow the landowners

drive a vehicle onto the property. The right to maintain a gate is permitted in the Conservation Easement in Section 4 Paragraph J.

Activity 0-2: Improve Access Road (560) – 150 ft, August 2019. Currently the access road has a greater than 20% slope for an approximately 40 ft long section. The landowners do not use this section of the road and seek to close and reroute it for better access to Stand One and Two. Conservation practice standards guide that resource access roads should have a maximum grade no greater than 18% for short sections with a preferred grade less than 10% to minimize erosion. A 10% grade may be obtained by rerouting the access road to cut diagonally across the slope. Provisions to improve the access road are included in the Conservation Easement Section 4 Paragraph J.

Additional Management Plans for the Entire Property

Enhance Forest Plant Biodiversity with Rare and Declining Species – various acreage, May 2017-Ongoing. Biodiversity conservation is the landowner's primary interest for the long-term functionality of the parcel in the regional landscape. Planting locations will be marked with stakes and flagging, and GPS located. Species currently identified for enhancement include the following:

Panax quinquefolius – This forest parcel is prime habitat for Michigan-threatened American ginseng. 500 pre-stratified seeds will be planted in a few locations across the property in May of 2017 and monitored.

Taxus canadensis – Canadian yew will be re-introduced to this parcel and fenced to prevent hebivory. Plans may be incorporated into Stand One shrub establishment plans.

Torreya taxifolia – Assisted migration of federally endangered species from Florida in collaboration with Torreya Guardians (www.torreyagaurdians.org). Endemic to northern mesophytic seepheads in the Florida panhandle, it is theorized this tree once had a wide range including northern hardwood forests: "The dominant trees in a torreya ravine [in Florida] are red maple, southern sugar maple, beech, magnolia, basswood, elm, torreya, and sabal palm. Most of these species have northern affinities and are more commonly found in Appalachian cove forests. Other plants found in torreya ravines also represent species of northern affinities such as strawberry bush, hydrangea, and redbud." (Charles Wharton, *The Natural Environments of Georgia,* 1978). Therefore, assisted migration experiments are currently taking place to establish this species outside of the known historically native range in a hope to stage the U.S. population for recovery in the face of climate change. Plant in seephead slopes and protected valleys.

Monitoring and Documentation of E, T, and SC Species, March-April 2017. Future red-shouldered hawk sightings should be documented, indicating the time, date, location, and behavior. The nesting site should be located by a natural resource professional using playbacks of

conspecific territorial calls and following the birds. The site should be geo-located, and documented with an Michigan Natural Features Inventory Special Animal form. Survey times are between late March and early May. Research costs and opportunities associated with reintroducing American ginseng at this site.

Monitor Forest Health Annually. Forest health is an issue of highest concern with Emerald Ash Borer and Beech Bark Disease in all stands. I recommend monitoring the forest regularly (each year and during different seasons) for changes that may indicate additional insect or disease problems. The "Forest Health Highlights" publication about forest insects and diseases is a great resource updated annually and available at www.Michigan.gov/ForestHealth. MDA has information on regulated forestry pests at www.Michigan.gov/ExoticPests.

There are several new insects and diseases that are not yet present in Michigan but are in nearby states so landowners should monitor their forest and report any unusual problems to the DNR for an early response (Asian longhorn beetle for maple, Thousand cankers of walnut, etc.). To report an unusual insect or disease in your forest, please contact Roger Mech, the DNR Forest Health Monitoring Specialist, at MechR@michigan.gov, or 517-243-0300.

Integrated Pest Management (IPM) should be practiced to protect soil and water. IPM requires correctly identifying pests, setting an economic or action threshold, and then implementing the best method to control the pest. IPM actions may include cultural, mechanical, biological, and chemical controls. Chemical pesticides are a useful tool but should not be the first or only choice to control pests. For example, the best way to prevent oak wilt is the cultural practice of not wounding oaks between April and July. If oak wilt does become established, the primary action is a mechanical control of severing roots to prevent the spread of the fungus through root grafts.

Emerald Ash Borer. The Emerald Ash Borer (EAB) is an exotic pest that is attracted to both healthy and dying ash trees. All dead and dying ash trees should be included in the next timber harvest. This County is within the Level One Quarantine Area so logs or firewood cannot legally leave the Lower Peninsula. Girdled trees could be left standing to provide tall snags for wildlife, but ash crowns quickly become brittle and fall apart. See www.EmeraldAshBorer.info for more information about EAB.

Beech Bark Disease. Beech bark disease (BBD) is initiated by a scale insect that attaches to the tree and feeds on its sap. The tiny scale (~1 mm) secretes a white, wooly, waxy covering and the trunks look like they are covered in white powder. The scale feeding damage allows a fungus to invade the tree which inhibits the flow of sap which causes a general decline in tree health and eventually kills the tree. Controlling the natural spread of BBD is not feasible because both the scale and fungus are moved by the wind. Beech scale is present in these woods and dead and dying beech trees should be included in the next firewood harvest. Do not move infested firewood as this will spread the scale and fungus that causes beech bark disease. See http://na.fs.fed.us/fhp/bbd.

Enroll in an NRCS Program. The NRCS offers programs through the USDA to fund conservation practices on private non-industrial forested land. The landowner's forest meets the qualifications for these programs and this Forest Stewardship Plan can be used to enroll in these programs. For more information on these programs see http://www.nrcs.usda.gov/programs/.

The Conservation Stewardship Program (CSP) offers stewardship contracts to landowners who meet a certain threshold of land stewardship and agree to maintain and improve their land. This program pays a per acre rate for five years to supplement the landowners implementation of recommended conservation practices.

The Environmental Quality Incentives Program (EQIP) offers financial assistance and technical help to assist eligible participants including forest owners with management practices on their lands. A forest management plan is required to participate.

Stand One – Mesic Northern Forest (35.3 acres)

Resource Description

Stand Description. Stand one is 35.3 acres overwhelmingly dominated by sugar maple, American beech and white ash, with smaller amounts of white pine, black cherry, American basswood, yellow and paper birch, and big-toothed aspen, and eastern hemlock. Ironwood can be found in the understory. It encompasses the flat top-slope of the end moraine, steep slopes, valley floor, and a bench ridge. The rise from the valley floor to the top of the moraine is about 200 feet, and much of the property is steep slopes. The topslope forest appears to be regrowth after a cut approximately fifty years ago; most trees are pole-sized. The steep slopes, bench ridge, and valley floor have mature (sawlog) trees. These areas have undergone single-tree harvest for at least 20 years. There is a ~1 acre trespass clear cut performed by past neighbors near the western edge of this stand to open the view to Big Glen Lake, which is now densely repopulated with saplings of canopy species. White ash is heavily impacted by emerald ash borer and approximately 50% of ash trees are dead and standing, while the rest have significant crown damage. Beech trees are at the mid-stages of infection by beech bark disease, and considerable mortality is expected in the next ten to twenty years.

Soil. Soils are mostly Mancelona-East Lake loamy sands on the top slope and Kaleva sands across the slopes, bench ridge, and valleys. There is a small amount of Leelanau-East Lake loamy sand in the southeast corner. All areas have a high proportion of gravel, cobbles, and boulders, typical for an end moraine. The slope across this site range from 0-35%. Both soil types tend to be excessively drained. The site index for sugar maple is 58 and 64 on Mancelona-East Lake loamy sand and Kaleva sands, respectively. Big-toothed aspen has a site index of 80 on Kaleva sands. There is erosion on the access road as it ascends a steep slope (>20%) to the bench ridge and Stand Two; this has been exasperated by off-roaders and snowmobilers trespassing and using this for a hill climb.

Water. Stand One does not have any surface water.

Wetlands. Stand One has well-drained soils and does not contain any wetlands.

Biological Diversity. Stand One has at least eight tree species. The dominant species in the stand are American beech, sugar maple and white ash. Secondary species include paper birch, big tooth aspen, black cherry, American basswood, and ironwood. There is a very high diversity of understory plant species including a full show of spring ephemeral flowers and excellent pollinator habitat. Fifty native plant species have been observed in Stand One (see Appendix 3).

Invasive Species. There is a small population of common barberry *(Berberis vulgaris)* on the top-slope of the moraine in Stand One. There are several non-native species occurring in low density along Echo Valley road and in areas where past logging has introduced seeds across the property: high-priority invasives reed canary-grass *(Phalaris arundinacea)*, Canada thistle *(Cirsium arvense)*, and bull thistle *(Cirsium vulgare)* and low priority invasives hounds-tongue *(Cynoglossum offinale)* and common mullein *(Verbascum thapsus)*.

Recreation. Stand One is used for camping and deer hunting, as well as hiking, cross-country skiing, bird watching, and other recreational activities. Recreational trails follow the old forest trail system and are oevergrown.

Roads and Trails. The two-track and Echo Valley Rd. provides access to the lower elevations of Stand One, however because of the steep grade ascent and erosion, the middle and upper elevations are not accessible by vehicle. The steep grade is eroding from trespass ORV use. The neighbor to the south currently allows access to the middle and upper sections of Stand One via his property but no long-term agreement has been made. See more in Entire Property Description.

Wood Products Potential. Stand one is an average hardwood forest well stocked with trees across all age classes with the exception of large, mature trees. The most frequent canopy trees are 10-16" DBH sugar maple, beech, big-tooth aspen, and white ash. White ash has 50% mortality from emerald ash borer currently, which is expected to reach 99%. American beech is in the early to mid stages of beech bark disease with no mortality at this time. American beech comprise the majority of saplings, largely ramets. Big-tooth aspen is over-mature and declining. Eastern hemlock is uncommon and less than 10" DBH. The basal area of the stand is about 80 sqft/acre. Spacing is of a wild stand and larger trees are spaced 10-15 ft apart. The only allowable timber use for Stand One is personal firewood harvest per the Conservation Easement. No heavy machinery is allowed to access the forest outside of the two-tracks, however wood may be moved in ways that do not decrease the conservation value of the property.

Fish and Wildlife. Stand One has average wildlife habitat. Mature beech provide good porcupine dens and there are at least two living on the property. White-tailed deer trails are common across the property and rely heavily on palatable understory species. There are signs (scat, tracks) of coyote and bobcat. Barred owls and red-shouldered hawks are seen and heard

regularly. There is a good population of neotropical migratory songbirds including warblers, scarlet tanagers, thrush, and ruby-throated hummingbirds. Masting nut trees (beech) are declining. There is little cover in Stand One. It provides excellent habitat for species that rely on forest interiors. The diversity of native understory herbs provide excellent pollinator habitat.

Forest Health. Emerald ash borer and beech bark disease are significant forest health concern in Stand One. Ash and beech are as much as half of the basal area in many areas in Stand One so there is significant concern for keeping the canopy intact and supplementing the diversity of canopy trees. Tree regeneration is largely beech which will lead to failed succession in canopy gaps. Deer browse is limiting growth and regeneration of desirable canopy species (sugar maple) and understory herbs and shrubs, and negatively impacting biodiversity, composition, and structure.

Existing Conservation Practices. A biodiversity survey was conducted during the summer of 2016 to better understand the plant species composition. Invasive species have been pulled opportunistically. White-tailed deer are hunted each fall to reduce browse pressure. There are no other active management activities in this stand.

Resource Concerns

- Soil erosion – sheet and rill on steep 2-track grade (visual inspection)
- Degraded plant condition – Undesirable plant productivity / plant pest pressure from heavy deer browse limiting herb, shrub, and tree seedling growth (Inventory and photos)
- Inadequate habitat for fish and wildlife – Habitat degradation from degraded plant condition limiting cover and forage species for wildlife, i.e. small mammal prey species and birds (WHSI ratings)

Desired Future Condition

The desired forest condition is that of a mature, healthy mesic northern forest with high biodiversity and excellent wildlife habitat and minimal disturbance from recreation and firewood harvest. The abundance of understory wildflowers makes this important pollinator habitat which should be preserved and enhanced. It is well stocked with dead and dying ash and, to a lesser extent, beech, which should be harvested in accordance with the Conservation Easement. The landowner would like to grow the total basal area of the forest to be reflective of old growth northern hardwoods, >100 ft^2/acre basal area, with a focus on maintaining large sugar maple for future sugar-bushing.

Stand One will benefit from enhancing with additional species to replace dying ash and beech and to supplement wildlife habitat, increasing forage for prey mammal species and cover and forage for birds, including *Amelanchier* spp, elderberries, dogwoods, red oak, white oak, red pine, white pine, and white spruce. There is interest in assisted migrations of masting nut trees such as hickories or chestnuts.

The access road from Echo Valley cuts up a very steep grade and trespassing is causing erosion. Access should be controlled to reduce trespassing, and the access road should be re-routed along a <10% grade. Currently there is no access to the upper portion of the stand without crossing the neighbor's property; a route for long term access should be established.

Planned Conservation Practices

Activity 1-1: Forest Stand Improvement (666) – 35.3 acres, October 2017-Ongoing. A forest stand improvement will address removing dead and dying trees (ash and beech) and removing a portion of the beech ramets to encourage more desirable tree species regeneration, while providing firewood in terms with Conservation Easement Section 4 Paragraph G. I recommend targeting dead, downed and hazard trees for firewood as needed. Healthy white ash and American beech can be left standing and monitored. Dead ash should be removed as soon as possible before they become to rotten to use for firewood. Beech can be harvested as they decline over the next twenty years, depending on the rate of infection and kill. It is not necessary to conduct the harvest at once since there will be no bulk sale and incremental harvests are more appropriate for personal firewood use. I recommend cutting trees for firewood on site then using a light vehicle to move it. Leave at least three snags per acre for habitat and maintain large beech as possible for red-shouldered hawk nesting habitat. If a red-shouldered hawk nest is located on the property, establish a buffer around the nest tree and do not harvest during nesting season. Most of Michigan is under a federal quarantine to slow the spread of the EAB (see www.EmeraldAshBorer.info), but seasoned ash firewood can be moved within the quarantined areas. See attached Forest Stand Improvement Job Sheet.

Conservation Easement Considerations: While the landowner retains the right to cut vegetation and conduct forestry activities, the Conservation Easement restricts aspects of timber harvest on Stand One and the what it may be used for in Section 4. Activity 1-1 will target hazardous and down trees which will be then used for firewood at the landowners primary residence, as permissible in Section 4 Paragraph G of the Conservation Easement. Additionally Section 4 Paragraph L permits the landowner to access harvested wood by driving vehicles off-road as long as the Conservation Value of the property is not negatively impacted. Off-road use of heavy machinery is considered a use that negatively impacts the Conservation Value of the property because of the extent in which it disturbs the understory vegetation and topsoil. A light vehicle can be used to remove timber that is not directly along a forest road. To fulfill requirements in Section 4 Paragraph G Subsection 3 (f) requirement to avoid erosion on steep slopes, no timber will be cut or collected from any slopes greater than an 8% grade. To fulfill requirements in Section 4 Paragraph 2, an appropriate amount of course woody debris (slash) will be left on the forest floor.

Activity 1-2: Improve Upland Wildlife Habitat (645) – 35.3 acres, April 2018. The mesic northern forest has valuable wildlife habitat but suffers from heavy deer browse limiting the regeneration of important forage and cover species. Additionally, declining diseased tree species are reducing resources available, such as beech nuts. Improvements should focus on establishing a diverse tree and shrub community that increases wildlife shelter and food, and resilience to

future disturbances. Special consideration should be given to red-shouldered hawk habitat, such as conserving large beech for nesting trees and restricting Forest Stand Improvement activities during nesting season. See Tech Note #12 Wildlife Habitat Evaluation.

- Limiting factors for wildlife:
    - low tree species diversity (3-4 species common in >2 age classes)
    - low % canopy of masting trees (25% beech; goal 40%)
    - low shrub cover (<5%; goal 30%)
    - low conifer component (<15%; goal 30%)
- Wildlife management plan to remove limiting factors:
    - establish tree species, particularly hard mast and conifer species: white pine, red pine, white spruce, white oak, red oak, hickory
    - plant shrub species for wildlife: elderberry, downy and arrowwood viburnum, serviceberry, dogwoods

Activity 1-3: Conservation Cover (327) – <0.1 acre, April 2017. There is erosion on the steep section of the access road that runs through Stand One. This slope should be reinforced with native, shade tolerant grasses. See Native Grass Establishment for Wildlife Job Sheet.

Activity 1-4. Herbaceous Weed Control (315) – 3 acres, May 2017-Ongoing. Invasive species are non-native species that grow aggressively and can cause economic or environmental harm, or harm human health. The most important stage in controlling invasive species is early detection and rapid response. The populations of invasive species on the property are relatively small and isolated, however they could easily increase in size with disturbance and canopy gaps from dying white ash and beech. Follow instructions on species-specific removal techniques. Bag all plant parts and dispose of in the landfill to prevent further spread; even uprooted plants can continue to develop and disperse seeds. Always monitor in years following removal for persistent individuals and new seedlings. Since plants occur in low density clusters with native species, planting to re-vegetate the sites will not be necessary. See attached Job Sheet Herbaceous Weed Control (315).

Reed Canary Grass. Reed canary-grass can be difficult to kill without the use of herbicides. The swipe method can be used to avoid killing non-target species. The small population along Echo Valley road could likely be hand-pulled successfully because it is in loose, upland soils. This may be the native genotype, but it is physically indistinguishable based on physical characteristics.

Canada Thistle. Canada thistle, growing in the open space and along Echo Valley Rd., should be cut back to the base of the plant each year, several times throughout the growing season to starve root reserves. Glyphosate can be applied to the vegetation preferably in the spring before it flowers. An additional fall application can be helpful in killing the roots.

Bull thistle. Bull thistle is occasional in open areas. A shovel could be used to sever the tap root before it goes to seed.

Common Barberry. Occasional individuals of common barberry can be hand-pulled fairly easily since they have a small root system. Return to the site the following year to see if any root fragments resprouted, and hand pull again as needed.

Additional Management Considerations

Forest Trails. The forest trail system should be developed for recreational uses (hiking, skiing, etc) and for accessing firewood and managing resources. This system can be based on the existing overgrown forest trails. Forest trails should be developed and maintained as specified in the Conservation Easement.

Hunting. White-tailed deer hunting should continue to reduce herds' impact on native vegetation.

Stand Two – Recreational Area (1.9 acres)

Resource Description

Stand Description. Stand Two consists of 1.9 acres located across a bench ridge that sits mid-way in elevation between the upper moraine and the valley floor. This area is similar in composition to the other stands, with a mixture of American beech, sugar maple, white ash, American basswood, and bigtooth aspen. In 2016, all white ash were removed because of the hazard they pose to the camping area. About 1 acre was cleared (and some stumps were pulled) to create a small opening in the forest, labeled as "cleared area" on the map. This cleared area was an old landing for previous selective timber harvest. Dense beech ramets that had previously resprouted after the landing was cleared (~10 years ago) were removed by the landowners to decrease competition with sugar maple and to open up the area for recreation. This area contains the landowner's main camp. This area does not have the restrictions imposed by the Conservation Easement.

Soil. Soils are identified as Kaleva sands with 0% slope by the NRCS. Soils are excessively to well-drained with a large proportion of cobbles. The site index for Kaleva sands is 80 for big-tooth aspen and 64 for sugar maple. There is about a half acre of bare soil from land clearing operations that poses an erosion concern.

Water. There are no water resources on Stand Two.

Wetlands. There are no wetlands on Stand Two.

Biological Diversity. Stand Two has average biodiversity, with a plant composition similar to other areas on the parcel. The timber harvest has degraded the understory plant community. There is a population of the high conservation value putty-root orchid *Aplectrum hyemale.*

Invasive Species. After the 2016 logging in Stand Two, first year rosettes of bull thistle *(Circium vulgare)* were noted. This is a high-priority invasive species. Hounds tongue *(Cynoglossum vulgae)* and common mullein *(Verbascum thapsus)* were also noted since logging.

Recreation. Stand Two is the primary area of the forest used for recreation. There is a camp with a fire pit which is used routinely throughout the summer.

Roads and Trails. There is no road access to Stand Two from Echo Valley Rd. It is currently accessed by foot or via the neighbor's parcel to the south. See comments in Entire Property description.

Wood Products Potential. Stand Two has sawlog sized (12-23" DBH) sugar maple and beech. In 2016, a salvage cut removed most of the white ash trees and a few merchantable sugar maple and beech. With the onset of beech bark disease it may be necessary to remove additional hazard beech trees. The landowners are not interested in harvesting any more mature trees if they are not hazardous.

Fish and Wildlife. Stand Two has similar wildlife resources as other stands, with porcupine, white-tailed deer, and songbirds. A significant number of garter snakes were seen here on one day in April of 2016.

Forest Health. Emerald ash borer and beech bark disease are the primary concerns, though the white ash have been removed from this stand. In 2016, sugar maples were heavily infested by a lecanium scale insect, which caused mortality of small branches on all trees. Three 18" DBH sugar maples were removed in 2016 because they had 80% crown dieback and were severely infected with sooty mold.

Existing Conservation Practices. In addition to the removal of diseased trees, dense thickets of beech ramets have been cleared to decrease competition with sugar maple saplings, and to open up the area for recreation. Bull thistle rosettes were severed at the root in the fall of 2016.

Resource Concerns

- Soil erosion – Rill and wind on slope of cleared area

Desired Future Conditions

Stand Two is a 1.9 acre hardwood stand with the highest recreational use and some timber resources. This stand will need continual management for hazard trees which can also be used for firewood. The area cleared in 2016 needs to be seeded with native grasses and forbs to prevent erosion. This is a good opportunity to supplement pollinator habitat with a wildflower planting. Stand two should be managed for aesthetics and recreational uses while maximizing conservation value. The future condition is that of a mature, open mesic northern forest with reliance to recreational uses.

Planned Conservation Practices

Activity 2-1: Conservation Cover (327) – 1 acre, April 2017. Native grasses and wildflowers should be established on the cleared area to decrease erosion and supplement pollinator and wildlife habitat. See Wildflower Planting Job Sheet for more information.

Activity 2-2: Herbaceous Weed Control (315) – 1 acre, May 2017-Ongoing. Target emerging invasive species bull thistle and hound's tongue. See attached Herbaceous Weed Control (315) Job Sheet.

Additional Management Considerations

Plant Trees and Shrubs – 1 acre, Ongoing. Increase forage such as American plum, chestnut, elderberry, and *Rubus* species on an ongoing basis as desired by landowners.

Stand Three – Wildlife Area (4.0 acres)

Resource Description

Stand Description. Stand Three is a 4.0 acre wet-mesic northern forest situated across a small step ridge and the valley floor. There are several seeps and a spring that form an ephemeral stream following Echo Valley Rd to the northeast. It has a similar canopy composition as the other stands, with a higher proportion of bigtooth aspen and yellow birch, and a dense eastern hemlock stand in the northeast corner. There are several rare ferns and a diversity of obligate wetland species. This stand is visible along Echo Valley Rd.

Soil. Soils are identified as Kaleva sands with 0 to >20% slopes. The soil in Stand Three, however, is saturated most of the year from groundwater seeps, resulting in very soft upper horizons and sapric mucks around the spring; this is too small of an inclusion to be mapped by the NRCS Soil Survey. This soil is fragile and susceptible to disturbances and erosion; there is evidence of past heavy machinery driving across the wetland. The site index for Kaleva sands is 80 for big-tooth aspen and 64 for sugar maple.

Water. There are several seeps and one spring in Stand Three. These converge to form a small intermittent stream that follows the valley floor for 100-200 ft before it re-enters the ground. Flow decreases during dry summer months. This is an important water source for wildlife.

Wetlands. There is wetland vegetation and soil surrounding the spring, approximately 100 feet in diameter. This area is too small for state or federal recognition but is an important natural feature on the property.

Biological Diversity. Stand Three contributes significant biodiversity to the property by facilitating wetland taxa, breeding ground for insects and amphibians, habitat for mammals, and hunting area for barred owls and woodland raptors. Two ferns rare to Leelanau County occur

here, Goldie's woodfern *(Dryopteris goldiana)* and narrow-leaved spleenwort *(Homalosorus pycnocarpos)*. There is a similar overstory composition as the other stands with the addition of a stand of hemlock, and a higher proportion of bigtooth aspen and yellow birch.

Invasive Species. Reed canary grass *(Phalaris arundinacea)*, marsh thistle *(Cirsium palustre)* and Canada thistle *(Cirsium arvense)* grow in the wetland area.

Roads and Trails. There is no road access to Stand Three. No road access is planned. There is a trail that allows landowner access.

Recreation. Stand Three is along Echo Valley Rd where neighbors routinely walk and ski.

Wood Product Potential. Stand Three will not be used for firewood harvest because of the sensitive soils. There is a shiitake log stack for personal production in Stand Three.

Fish and Wildlife. Stand Three is important foraging and breeding ground for insects, herpetofauna, avifauna, and mammals. White-tailed deer trails are most common and there is heavy deer browse on plants. Porcupines and barred owls are often observed in this area. This area provides surface water for wildlife.

Forest Health. Emerald ash borer and beech bark disease are causing partial mortality and death of some trees in the stand creating light gaps. There is a concern for future hemlock wooly adelgid invasions, where are now known in Ottawa Co, MI. Deer over-browse is limiting growth and survival of shrubs and herbaceous species, and have decreased the structural complexity and diversity of the stand.

Resource Concerns

- Inadequate wildlife habitat – foraging and cover species inadequate for birds and small mammals, low diversity and cover of shrub species/poor structure (inventory)
- Degraded plant condition – excessive plant pest pressure causing inadequate structure and composition from heavy white-tailed deer browse (inventory, photos)

Desired Future Condition

This area is important for wildlife habitat. The desired future condition is a mixed hardwood-conifer northern forest with rich biodiversity and excellent wildlife habitat. Increased diversity of important cover and forage species will further develop habitat for wildlife species.

Planned Conservation Practices

Activity 3-1: Trees and Shrub Establishment (612) – 2.0 acres, April 2018. Establish trees and shrubs to supplement wildlife habitat, with a focus on enhancing habitat for small prey mammals, neotropical migrant birds and wildlife cover. Young seedlings will require fencing or tree tubes to prevent deer or rodent damage. If you are buying a large quantity of tree seedlings,

purchase them directly at wholesale prices from a commercial seedling nursery. Use local genotypes as available. The DNR maintains a list of about 25 commercial nurseries around the state that produce tree seedlings for forestry planting available at www.Michigan.gov/PrivateForestLand. See Tree and Shrub Establishment Job Sheet (612).

A**ctivity 3-2: Herbaceous Weed Control (315) – 0.1 acres, April 2017.** This practice is the control of invasive species that cause economic and ecological harm. See Herbaceous Weed Control Job Sheet (315).

Marsh Thistle. Marsh thistle in the wetland area should be hand pulled when it sends up the flowering stalk and before it goes to seed, taking care to remove at least the upper portion of the taproot. A stand-up weeder can be helpful in removing the root.

Reed Canary Grass. A very small population of reed canary-grass is growing in the wetland near the spring. It can be difficult to kill without the use of herbicides. The swipe method can be used with a wetland-approved formulation of glyphosate if necessary.

Canada Thistle. Canada thistle is growing in the wetland near the spring. It should be cut back to the base of the plant each year, several times throughout the growing season to starve root reserves. Glyphosate can be applied to the vegetation preferably in the spring before it goes to seed. An additional fall application can be helpful in killing the roots.

Additional Management Considerations

Hunting. Continue to manage for high white-tailed deer population through hunting. Monitor impacts of deer browse on plant species structure and composition.

Summary Table

The previous recommended activities are summarized in Table 1. This table includes space for you to make notes about your management decisions over the next twenty years. See descriptions above for the proper season to conduct management activities. The timing of timber sales should be based primarily upon biological considerations like stand age, density, and forest health issues, but timing can be modified by several years according to other factors including economics (timber prices, income needs, taxes) or landowner preferences. Please note that enrolling in the Commercial Forest or Qualified Forest property tax programs will require complying with the recommendations in this Forest Stewardship Plan.

Table 1. Summary of Recommended Management Activities for the Next Twenty Years.

				Dates	Cost	Cost /

Stand	#	Acres	Activity Description	Planned	Complete	Share	Income
Entire Forest	0-1	41	Improve Access Control	Aug 2017			
Entire Forest	0-2	41	Improve Access Road	Aug 2019			
One	1-1	37	Forest Stand Improvement	2017-2027			
One	1-2	37	Upland Wildlife Habitat	April 2018			
One	1-3	0.1	Conservation Cover	April 2017			
One	1-4	3	Herbaceous Weed Control	May 2017			
Two	2-1	2	Conservation Cover	April 2017			
Two	2-2	1	Herbaceous Weed Control	April 2017			
Three	3-1	2	Plant Trees and Shrubs	April 2018			
Tree	3-2	0.1	Herbaceous Weed Control	April 2017			

Monitoring

The successful implementation of this Forest Stewardship Plan is dependent upon frequent monitoring by the landowner. The landowner or their agent should walk the entire forest at least annually to inspect the forest for changes and to evaluate the success of earlier management activities. Monitoring for forest health issues should occur more frequently, at least two or three times a year to look for signs and symptoms of insects or disease during different seasons. Monitoring wildlife habitat and ecological community change should occur biannually (summer and winter) to evaluate wildlife conservation practices.

All Forest Stewardship Plans should also be adaptable and flexible enough to accommodate changes in landowner goals or forest resources over the ten to twenty year planning period. Please use the table at the end of this plan to record notes and make modifications to this plan as needed.

Signatures and Approvals

Landowner
I have reviewed this plan and believe the management recommendations will help me meet my goals and objectives for my property. I agree to follow this plan to ensure the sustainability of my management.

_____ _____
Landowner Date

Forest Stewardship Program
I certify that this Forest Management Plan meets the requirements of the federal Forest Stewardship Program.

_____ _____
Plan Author Date

I certify that this Forest Management Plan meets the requirements of the federal Forest Stewardship Program.

_____ _____
State Forestry Representative Date

Forest Stewardship Tracking Number: (if necessary) _____

NRCS Assistance Programs
I certify that this Forest Management Plan meets the requirements of the USDA Environmental Quality Incentives (EQIP) Program and/or the Quality Criteria for forest activity plans in Section III of the USDA NRCS Field Office Technical Guide.

_____ _____ _____
Technical Service Provider Number Date

_____ _____
District Conservationist Date

American Tree Farm Program
I certify that this Forest Management Plan meets the requirements of the American Forest Foundation's American Tree Farm System.

_____ _____ _____
ATFS Inspecting Forester Number Date

Certified Tree Farm Number: (e.g. AL 1234) _____ Date of ATFS Certification: _____

Appendix I – General Forestry Information

Michigan Laws Related to Forestry

- Natural Resources and Environmental Protection Act, Public Act 451 of 1994
- Right to Forest Act, Public Act 676 of 2002
- Commercial Forest Act, Parts 511 and 512 of Public Act 451, 1994, as amended
- Qualified Forest Program, Public Acts 42 and 45 of 2013

Forest Health

The DNR publishes the annual "Forest Health Highlights" that has information about the forest insect and disease problems in Michigan. See www.Michigan.gov/ForestHealth for a pdf of the most recent edition. To report an unusual insect or disease in your forest, please contact Roger Mech, the DNR Forest Health Monitoring Specialist at MechR@michigan.gov or 517-243-0300.

DNR Forest Health - www.Michigan.gov/ForestHealth
DNR Invasive Species Info - www.Michigan.gov/InvasiveSpecies
MDARD Exotic Forest Pests – www.Michigan.gov/ExoticPests
USFS Forest Health - http://fhm.fs.fed.us/

Wildlife Habitat

The DNR Wildlife Division has an excellent publication on managing wildlife habitat at www.michigandnr.com/publications/pdfs/huntingwildlifehabitat/Landowners_Guide/index.htm.

DNR Wildlife Division's Landowner Incentive Program – www.Michigan.gov/DNRLIP
Michigan United Conservation Clubs - https://mucc.org
Quality Deer Management Association – www.qdma.com
Audubon Society - www.MichiganAudubon.org
Foresters for the Birds – http://vt.audubon.org/foresters-birds
Ruffed Grouse Society - www.RuffedGrouseSociety.org
National Wild Turkey Federation - www.nwtf.org
Michigan Trout Unlimited – www.MichiganTU.org

Best Management Practices

Best Management Practices (BMPs) are guidelines published by the State of Michigan to protect Michigan's water resources from non-point source pollution and erosion while working on forest land. BMPs are now called "Sustainable Soil and Water Quality Practices on Forest Land" and the document is online at www.Michigan.gov/PrivateForestLand. BMPs include proper location and construction of logging roads, the use of riparian management zones, installation of culverts and other stream crossings, proper use of pesticides and other chemicals, and site preparation for planting. BMPs also include the proper seasonal timing of activities to minimize the spread of

insects or disease. Any forest management activities should minimize soil erosion near wetlands and surface water. Tree Farm certification requires compliance with best management practices.

Forest Economics

Capital Gains Tax Information. Profits from timber sales are taxed as capital gains, rather than ordinary income, if you own the timber for more than twelve months. Expenses, including the cost of a management plan or a consulting forester's fees for a timber sale, can be deducted from profits. There are many great tax related resources available on www.TimberTax.org, including the most recent edition of the annual "Tax Tips for Forest Landowners."

Appendix III – Species Inventory (2016)

SPECIES NAME	TAXON
Aplectrum hyemale	Plantae
Claytonia caroliniana	Plantae
Carex plantaginea	Plantae
Anemone acutiloba	Plantae
Dicentra cucullaria	Plantae
Allium tricoccum	Plantae
Trillium grandiflorum	Plantae
Uvularia grandiflora	Plantae
Tiarella cordifolia	Plantae
Viola canadensis	Plantae
Rubus idaeus strigosus	Plantae
Cardamine diphylla	Plantae
Viola pubescens	Plantae
Onoclea sensibilis	Plantae
Dicentra canadensis	Plantae
Aralia nudicaulis	Plantae
Viola rostrata	Plantae
Acer saccharum	Plantae
Caulophyllum thalictroides	Plantae
Botrypus virginianus	Plantae
Tilia americana	Plantae
Fagus grandifolia	Plantae
Matteuccia struthiopteris	Plantae
Fraxinus americana	Plantae
Populus grandidentata	Plantae
Maianthemum canadense	Plantae
Aplectrum hyemale	Plantae
Adiantum pedatum	Plantae
Equisetum	Plantae
Rubus pubescens	Plantae
Mitella diphylla	Plantae
Ranunculus abortivus	Plantae
Ribes	Plantae
Betula alleghaniensis	Plantae
Maianthemum racemosum	Plantae
Taraxacum officinale	Plantae
Lonicera canadensis	Plantae
Actaea pachypoda	Plantae
Tsuga canadensis	Plantae
Solidago caesia	Plantae
Symphyotrichum lateriflorum	Plantae
Chenopodium capitatum	Plantae
Epifagus virginiana	Plantae
Solidago rugosa	Plantae
Osmunda regalis	Plantae
Osmundastrum cinnamomeum	Plantae
Impatiens capensis	Plantae
Eurybia macrophylla	Plantae
Veronica beccabunga	Plantae
Dryopteris goldiana	Plantae
Homalosorus pycnocarpos	Plantae
Cornus alternifolia	Plantae

Lonicera canadensis	Plantae
Porcupine	Mammalia
coyote	Mammalia
bobcat	Mammalia
American raven	Aves
Red-shouldered Hawk	Aves
Hermit thrush	Aves
American robin	Aves
Scarlet tananger	Aves
Veery	Aves
Black-capped chickadee	Aves
Red-breasted nuthatch	Aves
White-breasted nuthatch	Aves
Downy woodpecker	Aves
Hairy Woodpecker	Aves
Piliated Woodpecker	Aves
Warblers (not id'ed)	Aves
Black-throated green warbler	Aves
white-tailed deer	Mammalia
Barred Owl	Aves

Updates and Modifications
