Michigan Forest Stewardship Plan

Prepared For Landowner: **CANAVERA LLC.**

Prepared By Forest Stewardship Plan Provider:

Dean R. Francis, State Registered Forester #608

Upper Michigan Land Management & Wildlife Services, Inc.

State of Michigan
Canavera LLC. CFA Forest Plan

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<u>FOREST PLAN ATTACHMENTS</u>

FOREST STEWARDSHIP & COMMERCIAL FOREST ACT PLAN

Landowner:

Canavera LLC (David Canavera-President)
436 Faulkner Lane
Danville, Kentucky 40422
(859) 516-2529 Cell
davidcanavera@aol.com

FS Certified Plan Writer: Dean Francis, Upper Michigan Land Management, 1705 Fourth Avenue North, Escanaba, MI 49829, 906.786.3488 (Office), 906.235.0369 (Cell), Email: dean@michiganforesters.com

County: Delta **Township Name:** Maple Ridge **Town:** T43N **Range:** R23W **Section:** 2

Legal Description: NE1/4 NE1/4, NW1/4 NE1/4, SW1/4 NE1/4, SE1/4 NE1/4 EXC. THE SE 10.0 NON-CFA ACRES, NE1/4 SE1/4, NW1/4 SE1/4, SW1/4 SE1/4, 270.0 CFA ACRES

Total Plan Acreage: 270.0 **Plan Implementation Date:** 02.15.2023 **Plan Ending Date:** 02.15.2043

Directions to Property: From Rock, travel North on M-35 approximately 6.2 miles to Lathrop. From Lathrop, Travel East and North on Lathrop 42.25 Lane approximately 2.5 miles to end of county road. Continue East through forest industry and private land approximately 2.0 miles to Western property line of Canavera property.

Landowner Goals & Objectives: Per FSP Assessment Form, "The land will be used primarily for recreational activity by the shareholders including camping, hiking and hunting. Produce a healthy, productive and sustainable forest. To maintain within the State of Michigan's, Commercial Forest Act program.

MICHIGAN'S STEWARDSHIP ETHIC

Stewardship is an ethic recognizing that land and its natural inhabitants have an inherent worth and that we have a responsibility to manage our actions as part of that. It guides us to manage our activities to the utmost of our abilities, to insure the future health, productivity, and well-being of the land, its natural communities and species, and to allow our successor's opportunities at least equal to ours to use the land and its resources. If this plan is used to enroll within the State of Michigan's Commercial Forest Act (CFA), we commit to comply with all terms and conditions of this plan, and to conform to the requirements of the CFA Program. We further understand that following the CFA Plan is mandatory in order for the property to be approved for the CFA program and that failing to follow the CFA Plan will cause the property to become ineligible for the CFA and tax relief. We understand and agree that all activities on this land shall be consistent with this CFA Forest Management Plan.

Landowner: David Canavera - President **Date**

Dean R. Francis 02.16.2023

FS-CFA Plan Writer: Dean R. Francis **Date**

Jason Caron 02 - 28 - 2023

BRIEF SUMMARY OF PROPERTY CONDITIONS

WHAT IS THE FOREST STEWARDSHIP PROGRAM?

Michigan's Forests. Michigan ranks 11th in the nation with 20.3 million acres of forest land that cover 55% of the land area of our two peninsulas. The State and Federal governments own and manage 7 million acres of forest land in Michigan. Private corporations own and manage almost 3 million acres of forest land. However, Michigan's 400,000 family forest owners are the largest group of forest owners with more than 9 million acres of forest land.

What is the Forest Stewardship Program? The Forest Stewardship Program is a partnership between the United States Forest Service (USFS), the Department of Natural Resources (DNR), and private sector foresters to offer professional planning and technical assistance to forest landowners. The voluntary Program connects landowners with professional foresters to develop and implement a Forest Stewardship Plan. Since 1991, more than 5,000 landowners in Michigan have used a Forest Stewardship Plan to help them manage, protect, and enjoy their forest.

Simple yet Comprehensive Plans. Each Forest Stewardship Plan is a custom plan that describes the landowner's personal goals, unique forest resources, and suggested management activities. The DNR trains private sector foresters and wildlife biologists to write Forest Stewardship Plans that meet USFS guidelines for a simple yet comprehensive plan. There are 80 certified Plan Writers with several available to write plans in every county in Michigan. DNR Service Foresters review Forest Stewardship Plans to ensure that the plans meet Program standards.

Financial Assistance. The Michigan Forest Stewardship Program also provides financial assistance to lower the cost of a Forest Stewardship Plan. A partial cost share ($200 per plan plus $0.50 per acre up to $2,500) for parcels ≥20 acres is available throughout the year. The cost share is paid through grants to the certified Plan Writers to minimize the application and payment process for landowners. Fees for plan writing will vary between Plan Writers.

Program Benefits. Investing in a Forest Stewardship Plan produces both economic and ecological benefits. A landowner may use their Forest Stewardship Plan to enroll in the Commercial Forest Program or the Qualified Forest Program to lower their property taxes. Although participation in the Forest Stewardship Program is voluntary, these tax law programs require that landowners comply with their forest management plan in exchange for a reduced property tax. The Natural Resources Conservation Service also accepts Forest Stewardship Plans when a landowner applies for financial assistance to implement conservation practices recommended in their plan. Landowners might also use their Forest Stewardship Plan to enroll in the American Tree Farm System to certify the sustainable management of their forest land. A Forest Stewardship Plan also helps prepare for sustainable harvests that fulfill landowner objectives, improve the ecology of the forest, and optimize both current and future income.

Planning Process. The process for developing a Forest Stewardship Plan is simple, but may take a few months. Landowners should contact several certified Plan Writers to interview them about their management philosophy, time schedule, and fees. Call a DNR Service Forester or visit the Program website for a list of Plan Writers who work in your county. After you hire your selected Plan Writer, fill out the short application form with your Plan Writer, who will send the form to the DNR. After a discussion about your goals for your land, preferably while walking through your forest together, the Plan Writer will do an assessment to gather

When your forester has a draft of your plan ready a few weeks later, read it over, ask lots of clarifying questions, and suggest any needed modifications. When both you and your Plan Writer are satisfied with your Forest Stewardship Plan, the Plan Writer will submit it to a DNR Service Forester for review and approval. After your plan is approved, the DNR will pay the partial cost share payment to the Plan Writer. At the end of the year, the DNR will send a "Stewardship Forest" sign to you to recognize your excellent forest stewardship.

Outreach and Education Grants. Municipal forest owners (schools, counties, townships) and other private groups may be eligible for a grant to develop a Forest Stewardship Plan or a Demonstration Project. These grants are for public land or land open to the public and must include educational opportunities for private landowners.

DNR Service Foresters: West Upper Peninsula - Gary Willis, Baraga, (906) 353 - 6651, willisg2@michigan.gov
Eastern Upper Peninsula – Jason Caron, Escanaba, (906) 786 – 2351, caron.jason@michigan.gov
Northern Lower Peninsula - Mike Hanley, Haslett, (517) 243 - 2028, hanleym@michigan.gov
DNR Forest Stewardship Coordinator - Mike Smalligan, Lansing, (517) 284-5884, smalliganm@michigan.gov

"My Forest Stewardship Plan helps me manage, protect and enjoy my forest."

www.michigan.gov/foreststewardship

This property is Enrolled within State of Michigan's, Commercial Forest Act (CFA).

The **Commercial Forest Program** provides a property tax reduction to private landowners as an incentive to retain and manage forestland for long-term timber production. Landowners participating in this program pay a reduced property tax of $1.25 per acre listed in the program. Additionally, the State of Michigan pays $1.25 per acre annually to each county where land is listed in the program.

There are approximately 2.2 million acres listed in this program under the ownership of more than 1250 private landowners. Landowners include private individuals, clubs, forest industry, and other businesses. Landowners in this program agree to develop, maintain and manage the land as commercial forest through planting, natural reproduction, or other silvicultural practices.

Applications to list land in the program must be postmarked no later than April 1 to be considered for listing in the next tax year.

Lands listed in this program are open to the public for hunting and fishing. The CF lands are not public lands. These lands are private lands under the control of private owners, who through CF allow the public the privilege of hunting and fishing only. The CF lands are not posted or signed as Commercial Forests and may be fenced and/or gated.

While permission to hunt of fish on CF lands is not required, we recommend you notify the landowner of your intention to do so. It is a courtesy they will appreciate, and it will contribute to your own safety.

Although a person has a right to hunt and fish on these lands, the property is privately owned and subject to normal private property rights.

CFA: Unless you have permission of the property owner, the right to hunt on the land does not extend to associated activities such as the following:

* Littering
* Camping
* The cutting of shooting lanes, or the cutting or destruction of brush, trees or other plants for any purpose.
* The use of nails, bolts, wire, tree steps or other materials or activities which harm, lessen or destroy the value of trees.
* The construction of blinds or the construction or placement of other structures, except for the gathering of dead materials found on the ground.
* Target-shooting or sighting-in firearms.
* The use of Off Road Vehicles or other vehicles on private property when prohibited by fencing or posting. If vehicles are allowed, care should be taken to avoid blocking access to roads or parking areas.

A person engaging in an activity not allowed by a property owner may be criminally or civilly liable, or both under the CFA program.

PROPERTY HISTORY

The landowner has owned this property since May of 2000.

The property was purchased from Mead Paper and Escanaba Forest Lands. Prior to selling the property, Mead Paper completed timber harvesting within Forest Stand #2 along the Eastern property line. Even-age clearcutting resulted in very good regeneration of the aspen, white birch, red maple, balsam fir and spruce.

The Canavera's removed 10.0 acres from the CFA Program and built a small rustic log cabin. See Forest Type Map.

In 2001, Dean R. Francis of Upper Michigan Land Management completed a Forest Stewardship-Commercial Forest Act plan for Canavera LLC. in order to meet the CFA requirements.

In 2011, Dean R. Francis of Upper Michigan Land Management completed a Forest Stewardship-Commercial Forest Act plan for Canavera LLC. in order to meet the CFA requirements.

No commercial timber harvesting as occurred since 2000.

LANDOWNER GOALS & OBJECTIVES

Canavera LLC. Forest Values (Forest Stewardship Questionnaire):

1) High Priority: Protect Water Quality, Enjoy Natural Resources & Aesthetics, Commercial Production of Timber Products, Protect Archeological, Cultural & Historical Sites, Protect Unique Natural Features

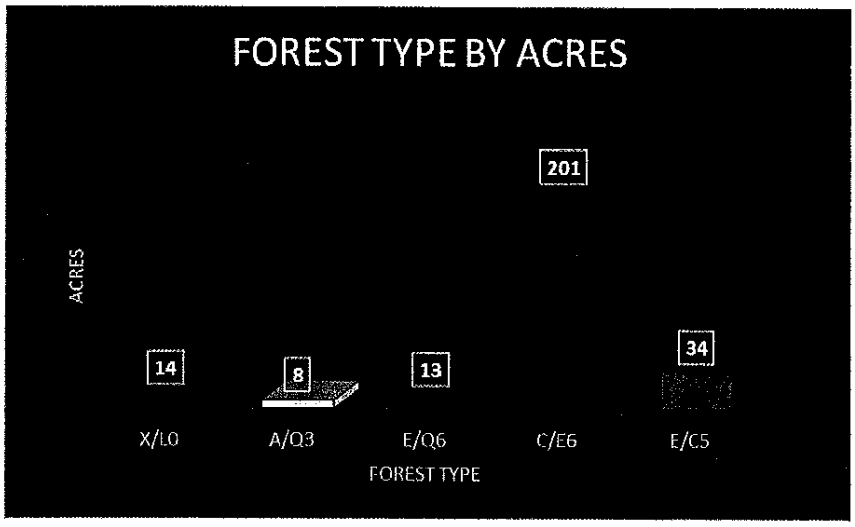
3) Medium Priority: Protect Soil Resources, Maintain and Improve Biological Diversity, Recreation – Hunting, Hiking, Firewood Production, Improve upon Wildlife Habitat through Tree & Shrub Planting, Protect & Minimize from Invasive Species, Maintain a Healthy Forest, Protect Wetlands, Minimize Fire Risk, Pass Land onto Children

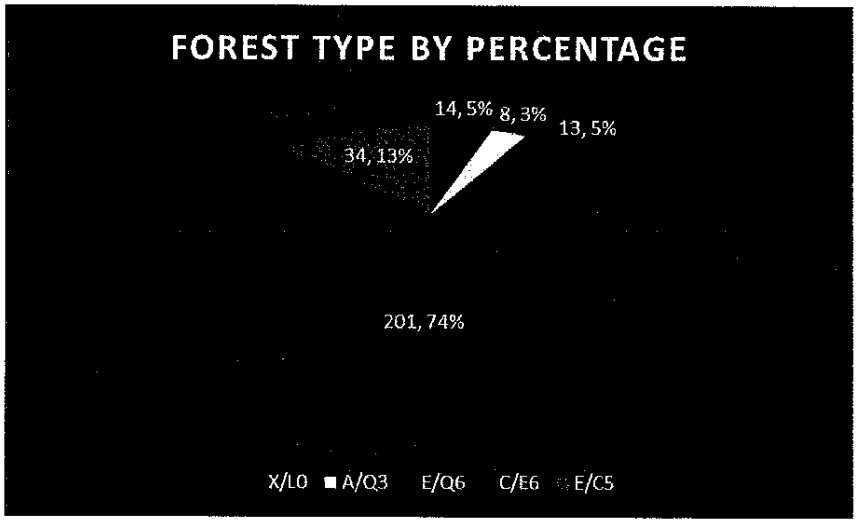
5) Low Priority: Manage Carbon Stocks, Produce Non-Timber Products

FOREST STAND TYPES

St #	Acres	Description	Forest Code
1	14	Marshy Wetlands – Tag Alder, Dogwood, Willow, Sedge, Cattails	X/L0
2	8	Aspen, Balm, R. Maple, B. Ash, B. Fir, Spruce, N. W. Cedar	A/Q3
3	13	B. Ash, Balm, R. Maple, W. Birch, B. Fir, B. Spruce, Tamarack, N. W. Cedar	E/Q6
4	201	N. W. Cedar, B. Fir, B. Spruce, Tamarack, B. Ash, Balm, W. Birch, Tag Alder	C/E6
5	34	B. Ash, Balm, R. Maple, W. Birch, N. W. Cedar, B. Spruce, Tamarack	E/C5

FOREST STAND TYPE GRAPHS





BRIEF DESCRIPTION OF FOREST TYPES

Forest Stand #1 is described as two marshy wetland areas with flooded dead timber, wetland sedge, cattails and willow. The northern wetland flooding is a result of recent beaver activity. These areas could be managed for wildlife habitat to benefit wetland birds, and waterfowl. Do to recent beaver activity, flooded trees are either dead or dying.

Forest Stand #2 is described as a well-stocked mixed hardwood-conifer stand dominated by aspen, balm, red maple, and white birch large saplings with balsam fir and spruce scattered beneath the main forest type. This forest stand was harvest through even-age clearcutting in 2000 by Mead Paper and Escanaba Paper Lands.

Forest Stand #3 is described as a well-stocked, polesize lowland hardwood-conifer stand comprised of mature to over-mature black ash, balm, red maple and white birch with associated conifer species of balsam fir, black spruce, tamarack and northern white cedar. This area could be harvested in order to improve upon forest health, regeneration and wildlife habitat, if timber harvesting can be completed when soils are frozen as to not rut and compact soils. A resource concern is opening up the forest canopy and introducing invasive wetland species such as Phragmites and Glossy Buckthorn. There is slight Spruce Budworm damage.

Forest Stand #4 is described as a well-stocked lowland swamp conifer stand comprised primarily of northern white cedar, balsam fir, black spruce and tamarack with secondary hardwood species of black ash, balm, white birch and tag alder. This area could be harvested in order to improve upon forest health, regeneration and wildlife habitat, only if timber harvesting can be completed when soils are frozen as to not rut and compact soils. A resource concern is opening up the forest canopy and introducing invasive wetland species such as Phragmites and Glossy Buckthorn. There is slight Spruce Budworm damage.

Forest Stand #5 is described as a well-stocked lowland hardwood-conifer stand comprised primarily of black ash, balm, red maple and white birch with secondary conifer species of northern white cedar, balsam fir, black spruce and tamarack. This area could be harvested in order to improve upon forest health, regeneration and wildlife habitat, only if timber harvesting can be completed when soils are frozen as to not rut and compact soils. A resource concern is opening up the forest canopy and introducing invasive wetland species such as Phragmites and Glossy Buckthorn. There is slight Spruce Budworm damage.

WILDLIFE HABITAT TYPES

This property is comprised of (5) forest types that provide a good amount of diversity, wildlife escape cover, denning trees, nesting sites, bedding locations, food and water resources. Where these forest types meet, **Wildlife "Edge"** is created and defined as a location where two or more forest types or forest age classes meet to create diversity, unique habitat and many forms of available food and cover.

The marshy wetlands provide very good habitat for wetland bird species and waterfowl. Beaver activity has created a flooded timber area adjacent to the northeastern property line. The young aspen-balm-maple-balsam fir provides a good source of forest cover and habitat for deer, grouse, woodcock and rabbits. The well-stocked lowland hardwood-conifer stands provide very good escape cover for whitetail deer and black bear. This lowland hardwood-conifer stands provides only fair winter thermal cover for a variety of mammals and birds. The well-stocked lowland conifer swamp provides good winter thermal cover for whitetail deer and other birds and mammals. Blown down trees provide horizontal forest floor cover for snowshoe rabbits.

General Information – Forest & Wildlife Management within Michigan; Young aspen forest stands (0-5) years, provide good woody browse for whitetail deer, (10-20) year old aspen provides good nesting cover for ruffed grouse and woodcock.

Well-stocked northern white cedar stands with closed forest canopies provide very good winter thermal cover and escape cover.

Northern hardwood forest stands provide nesting and denning sites for non-game bird species and squirrels.

Pine, spruce and larch plantations provide bedding areas for deer, escape cover for turkeys and nesting sites for a variety of non-game birds.

Forested wetland areas provide a source of water for mammals and waterfowl.

Lowland well-stocked conifer habitat provides good cover for whitetail deer and black bear.

Open areas and native berries such as raspberries, black berries and blueberries are utilized by black bear during the mid to late summer months.

Flooded wetland areas provide very good waterfowl and wetland bird habitat. Small shallow water wildlife ponds provide habitat for wetland birds and waterfowl.

Rivers, creeks and streams are quite often good fish habitat for smallmouth bass, walleye, brook trout, brown trout and rainbow trout.

OTHER INFORMATION

The landowners would like to protect and improve wildlife habitat for whitetail deer and ruffed grouse.

The landowners are not aware of any threatened/endangered plant or animal species.

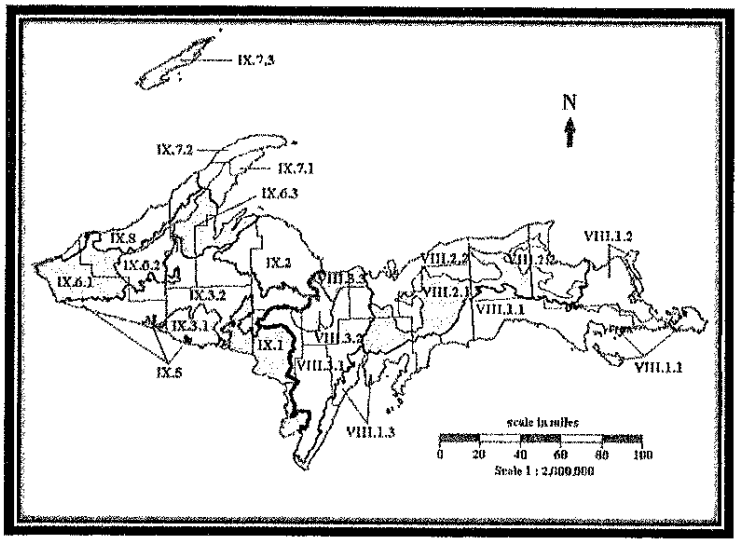
The landowners are not aware of any of any invasive plant or animal species.

No significant regional trails.

No registered historical sites or unique geological sites.

There are personal use trails throughout the property which are used for walking access and snowmobile access during the winter months.

Canavera LLC. will follow the FS-CFA management plan in order to maintain a healthy, and productive forest while managing for good quality wildlife habitat and recreational opportunities.



REGIONAL LANDSCAPE ECOSYSTEM INFORMATION

SUB-SUBSECTION VIII.3.1. Northern Lake Michigan (Hermansville) Till Plain

Sandy and loamy ground moraine, drumlin fields; northern hardwood forest (with large amounts of hemlock and northern white-cedar), northern white-cedar swamp, hardwood-conifer swamp.

DISCUSSION: The topography of the sub-subsection consists of a broad plain of loamy ground moraine. Soils are rocky, and limestone bedrock is generally less than 50 feet below the surface. Drumlin ridges, trending northeast-southwest, characterize most of the sub-subsection in Michigan; but they are uncommon in Wisconsin, where the landscape consists of a gently sloping till plain.

ELEVATION: 580 to 1,250 feet (177 to 381 m).

AREA: 3,880 square miles (10,057 sq. km).

STATES: Michigan and Wisconsin.

CLIMATE: The temperature is moderated by Lake Michigan. In Wisconsin, the growing season is nearly 150 days along Lake Michigan, but only 120 days at the west edge of the sub-subsection (Hole and Germain 1994). In Michigan, the growing season ranges from 140 days in the south, to shorter than 100 days in the north (Eichenlaub *et al.* 1990). Extreme minimum temperature ranges from -32 in the south, near Lake Michigan to -40 in the north, farther inland. Influence of the Great Lakes is less here than in the rest of the subsection; snowfall is relatively light, 60 to 80 inches annually in Michigan (Eichenlaub *et al.* 1990) and 40 to 60 inches in Wisconsin (Wisconsin Statistical Reporting Service 1967). Average annual precipitation is relatively uniform, from 28 to 32 inches.

BEDROCK GEOLOGY: Paleozoic limestone and dolomite are generally within 30 feet of the surface, accounting for the rocky nature of the glacial drift and the nutrient-rich, sandy loam soils (Vanlier 1963b, Sinclair 1960). Surface deposits of glacial drift reflect the local bedrock from which the till was derived; the bedrock in the northern third of Michigan is Cambrian sandstone, and bedrock in the remainder of Michigan and Wisconsin is limestone and dolomite. Bedrock close to the surface in Michigan accounts for the high percentage of wetland within the sub-subsection.

LANDFORMS: A broad till plain (ground moraine). In Michigan, drumlins oriented northeast-southwest cover much of the plain, but there are few drumlins on the undulating till plain in Wisconsin. Drumlin ridges are typically one-eighth to one-fourth mile wide, less than a mile long, and 20 to 60 feet high (Albert *et al.* 1986). The highest drumlins are less than 100 feet high. Wetlands are extensive throughout the sub-subsection, but they have been more extensively drained for agriculture to the south in Wisconsin than elsewhere.

LAKES AND STREAMS: A few small, linear lakes, trending southwest-northeast; many large, shallow wetlands also trending southwest-northeast. Many small rivers and creeks drain the numerous linear wetlands of the sub-subsection. Large rivers: Oconto, Peshtigo, and Menominee.

SOILS: Dominant soils are rocky, podzolized, pink sandy loams. Peat and muck soils are common. Soils on the drumlins are generally well to moderately well drained; but some of the smaller, more gently sloping drumlins can have poorly drained soils (Albert 1990). Soils are classified primarily as Spodosols and Alfisols (Hole 1976). In Wisconsin, Typic Hapludalfs are common; farther north in Michigan, Haplorthods and Fragiorthods are predominant (USDA Soil Conservation Service 1967).

PRESETTLEMENT VEGETATION: On the loamy drumlins and undulating ground moraine were northern hardwood forests of sugar maple, beech, hemlock, northern white-cedar, and yellow birch (Albert 1990). Hemlock and white pine were much more common here than on the clay plain of Sub-subsection VIII.1.4 to the southeast. In Michigan, hemlock and occasionally northern white-cedar formed upland stands. Small drumlins within wetlands were often dominated by either hemlock, white pine, or a mix of the two.

In Michigan, wetlands covered all but the drumlin ridges, accounting for 30 to 70 percent of the land surface. A cross section of the flat plain between the drumlins had northern white-cedar and tamarack at the margins of the drumlins (on poorly drained mineral soil or shallow organic soils) and black spruce and open bog or wet meadow at the center of the plain (on very poorly drained peats or mucks).

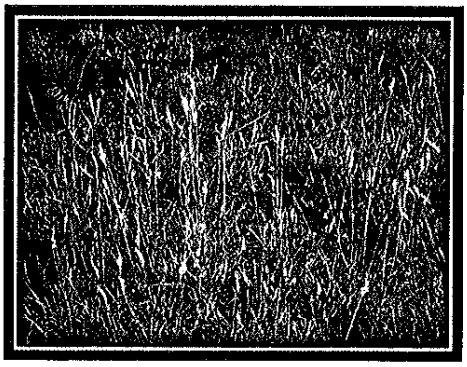
At the northern edge of the sub-subsection in Michigan, where the texture of the drumlin ridges was sand, the dominant vegetation was originally a mixed red, jack, and white-pine forest. Logging followed by fire converted most pine forests to bigtooth aspen.

NATURAL DISTURBANCE: Windthrow was common, both in Michigan and Wisconsin, occurring both on the isolated drumlin ridges and within the vast wetlands (Comer *et al.* 1993a, Canham and Loucks 1984).

PRESENT VEGETATION AND LAND USE: Early logging of white pine occurred in the sub-subsection; later, agriculture predominated. Until the early 1980's, pasture was the primary agricultural use, but hybrid corn is now being planted on many uplands.

RARE NATURAL COMMUNITIES: None identified to date.

RARE PLANTS (Michigan): *Danthonia intermedia* (wild oat-grass), *Linum sulcatum* (furrowed flax), *Ranunculus cymbalaria* (seaside crowfoot).



***Danthonia intermedia* (Wild Oat-grass)**

Key Characteristics: Densely tufted grass of alvar; leaves very narrow (2-4 mm) and roughened; spikelets purple, borne on ascending branches of the inflorescence; lemma glabrous on back.

Status and Rank: State Status: SC - Special Concern (rare or uncertain; not legally protected), State Rank: S1S2 - Rank is uncertain, ranging from critically imperiled to imperiled, Global Rank: G5 - Secure

County Name	Number of Occurrences	Year Last Observed
Delta	2	1990
Keweenaw	4	1982
Marquette	1	1990
Schoolcraft	1	1978

Habitat: Found on limestone pavement and bedrock shorelines, though the species poorly known in Michigan. Taxonomic questions about this species require resolution.

Natural Community Types

- Alvar
- Limestone bedrock lakeshore
- Limestone cliff
- Volcanic bedrock lakeshore
- Volcanic cliff

Associated Plants: New England violet, bulrush sedge, wild chives, butterwort, northern spikemoss, and veiny meadow-rue.

Management: Little is known of this species, though protection of bedrock shorelines is likely important. The primary need at present is to determine status and taxonomy.

General Survey Guidelines: Random meander search covers areas that appear likely to have rare taxa, based on habitat and the judgment of the investigator.

Survey Methods: Meander search, Survey Period: From first week of June to first week of July.

***Linum sulcatum* (Furrowed Flax)**

Photo by Merel Black

Key Characteristics: Small slender forb of dry sand prairies; leaves narrow and scattered along the stem, with a pair of dark stipular glands at the leaf base; flowers yellow, the tiny outer sepals (4 mm) with minute glandular teeth on the margin.

Status and Rank: State Status: SC - Special Concern (rare or uncertain; not legally protected), State Rank: S2S3 - Rank is uncertain, ranging from imperiled to vulnerable, Global Rank: G5 - Secure

County Name	Number of Occurrences	Year Last Observed
Allegan	1	2005
Genesee	1	1927
Kalamazoo	1	1838
Kent	1	1896
Lapeer	1	1927
Leelanau	1	1953
Mecosta	2	1990
Menominee	1	1984
Muskegon	1	1949
Newaygo	10	2008
Oakland	2	2006
Tuscola	1	1910

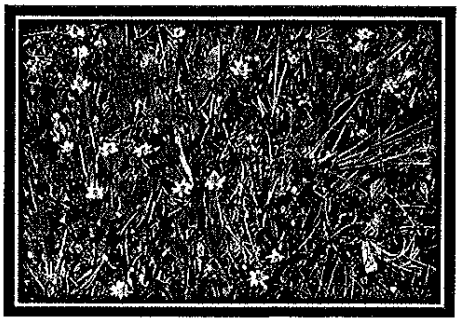
Habitat: This species is found in disturbed pockets with exposed mineral soil within oak barrens and dry prairie remnants.

Natural Community Types: Dry sand prairie, Oak barrens, Oak-pine barrens

Associated Plants: Big and little bluestem, goat rue, prairie smoke, Pennsylvania sedge, prairie willow.

Management: This species likely needs openings and may respond positively to prescribed fire.

General Survey Guidelines: Random meander search covers areas that appear likely to have rare taxa, based on habitat and the judgment of the investigator. Survey Methods: Meander search, Survey Period: From first week of June to fourth week of August.



Ranunculus cymbalaria (Seaside Crowfoot)

Emmet J. Judziewicz

Key Characteristics: Clumped perennial forb of moist boggy shores, spreading by leafy stolons; leaves round to heart-shaped with bluntly-toothed margins; flower yellow, small (1 cm or less), 5 petals and sepals.

Status and Rank: US Status: No Status/Not Listed, State Status: T - Threatened (legally protected), Global Rank: G5 – Secure, State Rank: SX - Presumed extirpated

County	Occurrences	Year Last Observed
Charlevoix	1	1957
Gogebic	1	1960

Habitat: This species is known from damp shores of meadows, marshes, and streams and moist, boggy lakeshores.

Natural Community Types: Intermittent wetland

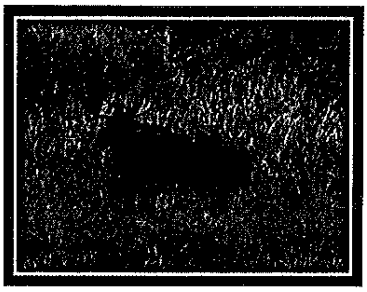
Associated Plants: Little is known about this species, since collection data are old and no associates have been recorded.

Management Recommendations: The primary need is a status survey for this species. If found, it would likely benefit from protection of hydrology.

Survey Methods: Random meander search covers areas that appear likely to have rare taxa, based on habitat and the judgment of the investigator.

Meander Search: Survey Period: From first week of July to fourth week of August

RARE ANIMALS (Michigan): *Alces alces* (moose).



MOOSE, Alces alces

PICTURE BY DEAN R. FRANCIS

Few animals are as imposing or majestic as the moose. Its widespread distribution makes the moose a popular symbol of the northern forests. The sight of a moose wading along the shoreline of a lake or stream is one of the rare wildlife opportunities in Michigan's Upper Peninsula. The word "moose" comes from the Native American language "moosah" meaning big nose. Moose are found in northern evergreen forests in Europe, Siberia, and North America. All are of the same species, although they vary somewhat in size and coloration over their range.

The moose is Michigan's largest mammal and also is the largest member of the deer family. The moose was once common in the Northern Lower and Upper Peninsulas. The meat and skins of moose were important to native Americans, and helped the early pioneers survive. Logging and market hunting to feed iron and copper miners eliminated moose in Michigan by 1900. Until recently the major population existed on Isle Royale in Lake Superior with scattered individuals in the eastern Upper Peninsula. Two releases of moose from Canada in 1985 and 1986 established a resident herd in the western end of the Upper Peninsula.

Description: Adult moose average 700-800 pounds in weight, 6-9 feet in length and 5-6 feet high at the shoulder. A mature bull may weigh as much as 1600 pounds, the same weight as the average horse. The antlers are also large. They can be 4-5 feet wide and may reach 6 feet or more between the tips. The main beams are palmate (flat), with a series of short tines along the edge. The antlers are shed each winter and grown again the following summer. The large head and body of the moose seems out of place on the long legs and smaller rump. The nose is long and down turned, ending in a flexible upper lip, which can grasp twigs and plants. Color ranges from black-brown to reddish or grayish brown on the head and back, with paler or white legs and belly. The winter coat is shed during May and June. During this time the moose can look quite scruffy. The pelage (coat) is fully re-grown by September. One of the most unusual features is a fur-covered flap of skin 8-10 inches long hanging beneath the throat. This hanging skin is called a dewlap or bell. The hooves are cloven and about 6 inches long. They can be spread to support the moose on wet or soft ground. Moose have excellent senses of smell and hearing. Their vision is not as good. Moose depend heavily on smell to identify threats and other moose. Normally, moose are distributed at about 1 or 2 per square mile. Higher densities may occur, but can lead to starvation and disease. The largest concentration of moose in Michigan exists on Isle Royale with smaller herds in the western Upper Peninsula. Migrating moose often cross the St. Mary's River from Canada and help maintain a scattered population in the eastern Upper Peninsula.

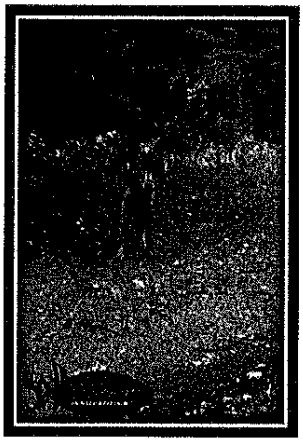
Habitat: Moose are found in forested areas usually near lakes, streams, or swamps. The preferred habitat is forest in an early stage of succession, where young trees and shrubs dominate and a variety of plant species are present. Thick brush is no hindrance. Moose can crash through the most tangled vegetation. Much time is spent in or near the water, and in nearby forest during the summer. In winter moose often frequent brushy valleys and hillsides. Fires and logging in forests are important in maintaining moose habitat. This allows smaller shrubs and trees to grow where mature trees grew previously. The twigs and leaves moose often feed on can then be reached.

Food and Feeding Behavior: Moose are herbivores, normally eating only plant material. An adult will eat 50 to 60 pounds of forage per day in summer and 40-50 in winter, eating mostly leaves and twigs, but also grazes on grass sedges, and weeds. In summer, moose feed heavily on aquatic plants, leaves of shrubs and saplings. They have an unusual feeding method when eating leaves. A branch is grasped by the muzzle and is stripped of leaves as it passes through the mouth. Moose can stretch to reach 8 to 12 feet. When leaves and twigs are out of reach the moose straddles saplings and breaks the stem with its muzzle. Young trees up to 2.5 inches in length can be broken down. Some of the moose's favorite summer foods include water lilies, poplar, birch, dogwood, alder, and mountain ash, grasses, sedges and herbs. Moose are often seen wading in swamps, ponds, and lakes, reaching underwater for plants on the bottom. They have even been known to dive to 18 feet or more for their favorite water plants. Moose congregate around certain low-lying areas where they can obtain mineral salts. They may drink stagnant water or actually ingest the soil at these "salt licks". In winter, only twigs and shrubs are available for the moose. Balsam fir is an important winter food, as are the summer food trees when still available. White pine, white cedar and spruce may also be eaten at this time. When food becomes scarce, moose will strip the bark from trees. As snow accumulates, moose sometimes feed in "yards", where the snow has been trampled down.

Mortality: Coyotes and bears sometimes prey on calves. Wolves are the major natural predators on moose in most areas. The relationship between Isle Royale's moose herd and resident timber wolves has been studied for a number of years. Wolves usually feed on moose in the winter. A wolf pack will chase a moose bite its flanks, and follow it until blood loss downs the animal. Wolves typically target Weak or injured animals. Parasites are common on moose. Heavy infestations of ticks and tapeworms can seriously weaken the animals. Weak animals may die if there is also a food shortage. One important parasite is brain worm. This small worm occurs naturally in Michigan's moose habitat. It can infect both moose and whitetail deer. The eggs of the brain worm are passed out through the feces. Snails consume the eggs as they feed on vegetation. The snail acting as an intermediate host is sometimes ingested when deer and moose eat vegetation. The worm enters the bloodstream and into the brain cavity. The parasite has no effect on whitetails but can cause severe brain damage and death to infected moose. In areas of high deer populations, the brain worm can be abundant and prevent the establishment of resident moose herds. The lack of food in winter can also be a cause of mortality in moose. When the population exceeds carrying capacity (the number of animals the habitat can support) malnutrition, disease, or starvation can occur. Large moose populations on Isle Royale have reduced the food supply and caused large winter die-offs of the moose.

General Behavior: In early September, moose begin the mating behavior that occurs during the rut (mating season). The bull moose rub their antlers against trees and brush, removing the velvet. As the rut reaches its peak, Bull Moose become very aggressive and will thrash and tear areas of shrub and small trees. During this season, a cow attracts perspective mates with her quiet, wailing "bawl". The bull often calls with loud bellows and grunts. Mating takes place in mid-September. Generally, a bull will stay with one cow moose while she remains receptive to breeding. Bulls also bellow to challenge rival bulls. When two bulls meet, an impressive fight may occur. Broken or lost antlers are common results. Serious injury seldom occurs. In areas where hunting is allowed, hunters will imitate the call of a bull or cow moose. About one-half of the cows become pregnant each year with one calf is born (sometime two, very rarely three) in late May or June. The calf will stay with its mother until the following spring. Although a bull may spend all summer within a home range of 100 acres, during the rutting season he will wander far in search of mates. Moose may be active at any time but are more likely to be seen in early morning and the evening. Moose are powerful swimmers, capable of crossing up to 12 miles of open water. Calves can swim at an early age. They sometimes rest their head on the cows back while swimming.

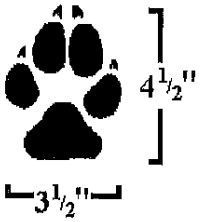
Not So Uncommon Animals



GRAY WOLF, Canis lupus

PICTURE BY DEAN R. FRANCIS

Gray wolves (a.k.a. timber wolves and eastern timber wolves) are the largest member of the Canid family (wild dogs), which also includes coyotes, and red and gray foxes. The sub-species found in Michigan are Canis lupus lycaon. As adults, gray wolves average 30 inches in height at the shoulder and 65 pounds.



Their feet are generally 3 1/2 inches wide and 4 1/2 inches long, and provide an easy way of differentiating wolves from coyotes, whose feet are only 1 1/2 inches wide and 2 1/2 inches long. Wolves have a very strict dominance/sub-ordinate social structure that is constantly being maintained and reinforced. A typical pack consists of one alpha male, one alpha female, the young of the year, and a few others that may or may not be related to the alpha pair. New packs are often formed by lone wolves that have broken from a pack, but have been able to find a mate and new territory in which to hunt. In Michigan, the average pack size is expected to be around six members, but may be as small as two members. Pack size is dependent on prey availability.

Habitat: Although wolves do not need "wilderness" (i.e. non-managed, roadless areas), they do need large areas of contiguous forest in which to range that support stable populations of their preferred prey. Timber cutting, wildlife habitat management and other practices that create more diverse and productive forests enhance Wolf habitat. Generally, a pack of gray wolves will roam an area of at least 100 square miles.

Food and Feeding Behavior: The diet of wolves in Michigan consists mainly deer, beaver, snowshoe hare, rodents and other small mammals, but may also include woodchuck, muskrat, coyote, raccoon, insects, nuts, berries and grasses. They are the only Canid species in Michigan that hunts in a social unit (the pack). While wolves can go for a week without eating, when they do eat, their meal can include 20 pounds of meat at a time.

General Behavior: Breeding (between the alpha male and female only) generally occurs in February, with six to ten (average seven) pups born in April in a den prepared by the alpha female. While the pups are still nursing, the alpha female remains with them and is fed by the rest of the pack. After the pups are weaned, the alpha female will again join the pack in hunting and all members of the pack aid in providing the pups with nourishment through regurgitation of meat. When the pups are old enough, they are moved out of the den and often to a nursery area, called a "rendezvous site", where they remain while the adult members of the pack go out to hunt. This area is often located in rank vegetation near water, such as a beaver flooding that has since become a wild grass meadow. Although they are still tended by the adults, who bring them meat, this is where the young learn hunting skills by practicing with shrews, mice and other small animals. Communication occurs between wolves in many ways, such as scent marking, but howling may be the most

Gray Wolves - History in Michigan

It is believed that wolves were once present in all 83 counties in the state of Michigan. Loss of and alterations to habitat, as well as direct extermination through hunting caused the gray wolf to be nearly completely eliminated from the state: by 1840, they could no longer be found in the southern portion of the Lower Peninsula; by around 1910 they had completely disappeared from the Lower Peninsula; and by 1960, when the state-paid bounty on wolves was repealed, they had nearly vanished from the Upper Peninsula. The last known pups born, before the 1990s resurgence of wolves in the state, were produced in what is now the Pictured Rocks National Lakeshore in 1954-56. An attempt to translocate four animals from Minnesota to northern Marquette County in 1974 failed, as all four animals were killed within several months. However, by 1990, the majority of Michigan residents were ready for the gray wolf to return to their state. Survey results indicated that 64 percent of Upper Peninsula respondents and 57 percent of Lower Peninsula respondents supported wolf recovery. Through the 1980s the only verified sightings of wolves, other than on Isle Royale, were of individual animals, but in 1989, the tracks of two wolves traveling together were verified. In the spring of 1991, this pair produced pups, the first to be documented on the mainland of Michigan in 35 years. The most recent (1997) winter survey of wolves found 112 animals; four had been lost to manage, during the winter. Most of these were believed to be lone animals that immigrated to the Upper Peninsula from populations in Wisconsin, Minnesota or Ontario, or descendants of those recent pilgrims. Gray wolves have been protected by the state since 1965 and were listed as a federally endangered species in 1974. The state of Michigan has made a commitment to the ongoing protection and management of its wolves. The "Michigan Gray Wolf Recovery and Management Plan" has now been completed and was signed by the Director on December 15, 1997.

NATURAL AREAS (Michigan): Michigan Nature Association Preserves: Daubendiek Memorial (Escanaba River alvar).

PUBLIC LAND MANAGERS (Michigan): State Forests: Escanaba River, Copper Country; National Forests: Ottawa, Upper Peninsula Experimental Forest.

CONSERVATION CONCERNS: Very little biological survey has been done within the sub-subsection. The calcareous substrate should provide habitat similar to that found along the Great Lakes shorelines, but there are few or no records of many of the threatened plants one would expect in such habitats. This sub-subsection is considered very important to the deer herd of northern Michigan, due to the excellent juxtaposition of upland and wetland conifers for winter cover and food. Commercial forestry logging practices destroyed most of the mature upland hemlock stands during the 1980's, causing public concern. The logging of mature conifers may have also been detrimental to migratory songbirds, especially some of the warblers. The large amounts of remote conifer swamp in the northern part of the sub-subsection may provide significant habitat for large mammals and migratory songbirds.

Forest Plan Survey Methods:

Inventory Methods:

On-Site Visit: May 31, 2022

1) 10 BAF Variable Radius Plots within each forest stand in order to determine average basal area per acre.

2) Measured Tree Diameters with standard DBH Tape.

3) Forest Types – Identified on Terrain Navigator software prior to field visit.

4) Roads, Existing Corners, Wildlife Projects were GPS'd.

5) Forest Stand and Wildlife Projects were photographed.

6) All resource concerns, for example, timber harvesting, RMZ locations were identified during the on-site visit, photographed, marked on the aerial photo and GPS'd.

7) Wildlife Fire: No Concerns

FOREST STAND INFORMATION

STAND UNIT NO.: 1 **STAND TYPE SYMBOL:** X/LO **CFA STAND ACREAGE:** 14.0

SIZE CLASS: NA **STAND DENSITY:** NA

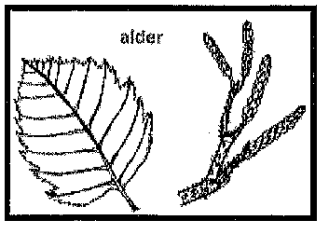
SOIL TYPE: (Ck) Cathro and Tacoosh Mucks, Map Unit Setting: Farmland classification: Not prime farmland, Map Unit Composition: Cathro and similar soils: 55 percent Tacoosh and similar soils: 45 percent

Description of Cathro: Landform: Depressions, lake plains, moraines, outwash plains, Typical profile: muck to sandy loam, Properties and qualities: Slope: 0 to 2 percent, Depth to restrictive feature: More than 80 inches Drainage class: Very poorly drained, Runoff class: Very low Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr.), Depth to water table: About 0 inches, Frequency of flooding: None, Frequency of ponding: Frequent, Calcium carbonate, maximum content: 25 percent, Available water supply, 0 to 60 inches: Very high (about 16.5 inches), Interpretive groups: Land capability classification (irrigated): None specified, Land capability classification (nonirrigated): 6w, Hydrologic Soil Group: B/D Ecological site: F094BY002MI - Mucky Swamp Hydric soil rating: Yes

Description of Tacoosh, Landform: Depressions, lake plains, moraines, outwash plains, Typical profile: muck to mucky peat, to sandy loam, Properties and qualities: Slope: 0 to 2 percent, Depth to restrictive feature: More than 80 inches, Drainage class: Very poorly drained, Runoff class: Very low, Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr.), Depth to water table: About 0 inches Frequency of flooding: None, Frequency of ponding: Frequent, Calcium carbonate, maximum content: 30 percent, Available water supply, 0 to 60 inches: Very high (about 22.4 inches), Interpretive groups: Land capability classification (irrigated): None specified, Land capability classification (nonirrigated): 6w, Hydrologic Soil Group: A/D, Ecological site: F094BY002MI - Mucky Swamp, Hydric soil rating: Yes

SITE QUALITY: Poor **STAND QUALITY:** Timber (Poor), Wildlife (Good) **AGE:** NA

EXISTING CONDITIONS



COVER TYPE & MAJOR SPECIES: tag alder, dogwood, willow, sedge, cattails, dead standing timber (cedar, black ash)

STAND DESCRIPTION: This wetland forest stand encompasses approximately 14.0 acres and is described as a wetland marsh and flooded timber comprised of tag alder, dogwood, willow, sedge, cattails and dead standing timber (cedar, black ash). There is standing water and plenty of wetland vegetation.

GENERAL WETLAND INFORMATION

Michigan wetlands are classified according to where they are found. Wetlands that occur on the edges of lakes and reservoirs are called lacustrine. Wetlands that form on the edges of shallow bodies of water such as marshes or bogs are called palustrine. Those that include rivers, streams, and surrounding areas are called riverine.

FOREST STAND #1 CONTINUED:

Riverine wetlands are often the least stable because periodic flooding causes erosion and sedimentation, and are considered among the most important. Streams and rivers serve as travel corridors for wildlife, both resident and migratory. Streams are identified as flowing bodies of water with a defined bank and bottom. These waterways, along with adjacent communities called riparian zones, provide a variety of substrates and an abundance of food--insects for birds and fish; and amphibians and reptiles for herons, raccoons, and other predators. Water, combined with trees, shrubs, and grasses, furnishes a rich variety of habitat for muskrats, mink, and beaver. Frogs and salamanders live in the shallow water of streams and along their muddy banks. Wood ducks laze in quiet backwaters and nest in tree cavities. Kingfishers fish from tree limbs above the river. Vireos, thrushes, and warblers use streamside cover as part of their nesting habitat and as shelter during migration. Brown bats and swallows gorge themselves on insects produced by these waterways and their adjacent communities. Shallow river expanses also provide important spawning-nursery habitat for fish, especially northern pike.

Because waterways are dynamic pieces of the wildlife-habitat puzzle, you are fortunate if a stream or river crosses your property. Michigan has an abundance of moving water--more than 36,000 running miles of navigable rivers and streams--plus countless more miles of brooks and other tiny tributaries. Some are so small they are barely noticeable, and yet each is vitally important.

No threatened or endangered plant species identified during field assessment. However, I would recommend a thorough investigation of your wetlands and identify those T & E Species. For more T & E Species Information, see the following link; Michigan Natural Features Inventory (msu.edu).

No invasive wetland plant species identified during field assessment. However, I would recommend a thorough investigation of your wetlands and identify locations. Keep an eye out for invasive species such as garlic mustard, glossy buckthorn, purple loosestrife or phragmites. For more Invasive Species information, See Link: Invasive Species - Invasive Species (michigan.gov).

Wildlife habitat is good and should be managed for those species mentioned above under Riverine Wetlands.

Soil & Ground Characteristics: Slight Off-Road Erosion Hazard, Slight Road-Trail Erosion Hazard, Poorly-Suited for Equipment Operability, Poorly-Suited for Mechanical Site Preparation, Low Fire Damage Potential, High Seedling Mortality Potential, Severe Windthrow Hazard, Severe Soil Rutting Hazard, Moderate-Suited for Hand Planting, Poorly-Suited for Haul Road and Decking Areas.

The woodland land capability or site productivity is 6w with a site index of 15 for black spruce at 50 years. Site index is the measurement of forest site quality based on the height of the dominant and superior co-dominant trees at 50 years of age.

MAJOR OBJECTIVES FOR THIS STAND: Our goals are to manage and protect these marshy flooded areas as critical habitat for wetland birds, mammals and waterfowl. Minimize introduction of invasive wetland plant species.

FOREST STAND #1 CONTINUED:

***** PLANNED MANAGEMENT ACTIVITIES *****

1. Wetland Habitat Management & Protection, Date: 02.2023, Acres: 14.0: From 2023 through 2043, retain and protect these areas as important habitat for wetland birds, mammals, and waterfowl. No commercial timber harvesting is recommended or required.

General Information: Found throughout Michigan, wetlands such as wet meadows, marshes, swamps, and peatlands, originally covered 11 million acres or about one-third of the state's landmass. During the last 200 years, over 35 percent of these wetlands have been drained or filled for agricultural fields, building projects, or other human purposes. Chemical contamination, isolation, and fragmentation have also contributed to the loss of wetlands. Fragmentation occurs when roads, trails, homes, and other forms of development break up the wetland area.

Since wetland birds rely on moist areas for food and cover, wetland losses have caused the decline of many of these species including least bitterns, yellow rails, black-crowned night herons, Forster's tern, and marsh and sedge wrens. More than half of all remaining Michigan wetlands are less than one acre in size. Bird species that inhabit small swamps and other wetlands include red-winged blackbirds, yellow warblers, green herons, woodcock and tree swallows. Therefore, protecting or restoring wetlands on your property may help increase wetland bird populations. The wetlands and associated uplands that are present on your property will determine what species of wetland birds will be attracted.

It is important to remember that some wetlands are not always wet. Seasonal wetlands, for example, may contain water only during wet periods in the spring and fall. All wetlands, however, are important to wildlife. Waterfowl, shorebirds, wading birds, raptors, loons, grebes, cranes, woodcock, kingfishers, and many songbirds depend on wetlands during all or part of their life cycles. Wetlands associated with springs and seeps may be as small as a few square feet while some Great Lakes marshes or peatlands cover thousands of acres.

Many different wetland birds are attracted to a variety of wetlands based on the type of food and cover. For example, plovers and sandpipers are attracted to shorelines with little vegetation where they nest, and find insects and other food. Bitterns, yellow rails, and herons are wading species that depend upon shallow water with cattails, bulrush, and smartweed to provide food such as small fish, frogs, and invertebrates such as snails, crayfish, and insects. Throughout the year, different types of wetlands contain varying depths of water, or no water at all, which determines the type of vegetation that will grow there.

Wetlands with both dense and sparse stands of vegetation provide food and cover for specific types of birds. Some wetland cover types include dense cattail stands, grassy meadows, and wooded swamps. Sedge fields, wet meadows, mud flats, and beaches all provide good food sources, including insects and seeds, for a variety of wetland birds. The food and cover needs of many bird species also varies by seasonal activity. Migration stop-over, pair bonding, nesting, and brood rearing often require different components of a wetland.
In general, if you want to attract and manage for a diversity of wetland birds, restore and protect several wetlands or a diversity of wetland types, which will provide a variety of food and cover.

FOREST STAND #1 CONTINUED:

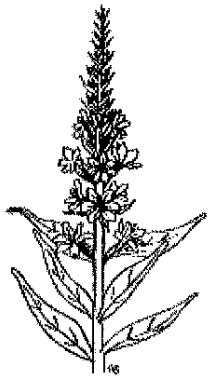
Wetland Management Considerations

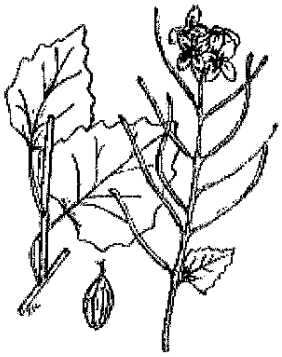
To meet the diverse needs of wetland birds, landowners should protect existing wetlands and restore former wetlands when feasible.

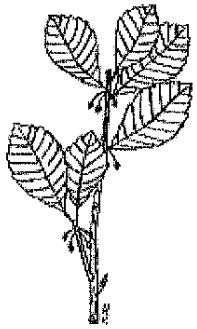
General management considerations that apply to most wetlands;

- Do not fragment any wetland on your property with roads, trails, or buildings regardless of the wetland size.
- Provide a buffer of upland vegetation of 100 feet or more around the wetland to protect it from sediment and chemical runoff, and other degradation.
- Plant buffers to dense grass. If necessary, shrubs or trees can also be maintained within the grasses. Maintain this buffer along streams and rivers, and on lake front properties as well. In the process you will help maintain a healthy fringe of the wetland vegetation at the edge of lakes and streams.
- Leave naturally dying and decaying trees standing in swamps because they provide insects for woodpeckers and homes for cavity dwellers.
- Use proper timber management techniques if timber harvest is an economic necessity.
- Prevent pesticide, lawn and farm chemicals, including fertilizer, and petroleum products, from reaching the wetland so they do not kill invertebrate food by contaminating the water body.
- Restore or create corridors of grass and/or shrubs that connect two or more wetlands. These areas are important for travel, especially for females with flightless young.
- Expect and allow natural fluctuations in water levels. Do not artificially manipulate water levels without assistance as you may alter the present vegetation composition. Incorrect manipulation of water levels may be harmful to wildlife or result in the invasion of undesirable plants.
- Remove invasive plants such as purple loosestrife, phragmites, and glossy buckthorn, through the careful use of prescribed herbicides such as Rodeo. Be sure to follow all label directions. Invasive species tend to eliminate native species reducing plant diversity.

FOREST STAND #1 CONTINUED:


purple loosestrife


garlic mustard


glossy buckthorn

- Allow development of smartweed, wild millet, cattails, bullrush, sedges, reeds, and other valuable plants, which produce food and cover for wetland birds and a variety of other wildlife.
- Minimize disturbance to your wetlands. Enjoy birds and other wildlife from afar. Too many disturbances by people or free-roaming pets may deter breeding, cause nest abandonment, and reduce hatching success and fledgling survival.
- Do not drain or plow meadow as they are important producers of grasses and forbs that provide food and cover for many species of wildlife.
- Restrict forestland and grassland manipulation such as logging, mining, mowing, burning, and grazing until after July 15 and before August 30 to minimize impact to nesting birds and allow sufficient new growth for winter and spring cover.
- Mow only one-third of grassy areas each year. The other two-thirds should be left alone to provide wildlife habitat.
- Burn in late winter or early spring (before April 1) to aid in the regeneration of warm season grasses and forbs, cattails, sedges, and other wetland vegetation, and to minimize impacts to frogs and turtles.
- Manage uplands in association with wetlands for nesting cover.

FOREST STAND #1 CONTINUED:

E. Waterfowl & Habitat Management

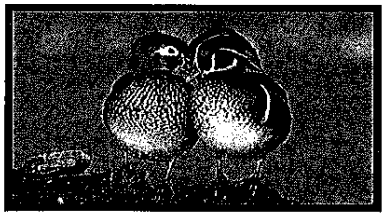
With its vast water resources, Michigan is a key state for protecting and managing North American waterfowl populations. Many species of ducks, geese, and swans pause to rest and feed here as they migrate further north in spring and south in fall. Mallards, wood ducks, blue-winged teal, and Canada geese are the most common summer residents and nest in all 83 counties. Hooded mergansers and black ducks are also widespread but less common. Ring-necked ducks, common goldeneye, and common and red-breasted mergansers generally nest only in the northern two-thirds of the state. Michigan nesting waterfowl that are the least common include green-winged teal, northern pintails, northern shovelers, gadwalls, American wigeon, canvasbacks, redheads, and ruddy ducks. Through reintroduction efforts, the native trumpeter swan, our largest waterfowl, is once again nesting in Michigan.

The long-term loss and degradation of wetlands and associated uplands has resulted in a national decline in several duck species, and other wildlife also dependent on these habitats. In Michigan an estimated 35 percent of the original 11 million acres of wetlands have been drained or filled, mostly for farming or building purposes. Wetland losses continue with an ever-spreading urban population. With much of the state's land base in private ownership, especially in southern Michigan, opportunities to protect and restore waterfowl habitat rest with private landowners. Landowners who protect or restore both wetlands and associated upland cover are likely to attract waterfowl, as well as small mammals, songbirds, reptiles, and amphibians.

Wetlands and associated uplands that are present on your property will determine what species of waterfowl will be attracted. Each species has certain needs that are linked to different kinds of wetlands and uplands. For example, mallards and blue-winged teals, nest in upland, grass-dominated habitats surrounding wetlands. They prefer uplands consisting of a diverse mixture of grasses and wetlands that have a variety of water depths at all times of the year. On the other hand, wood ducks, black ducks, and hooded mergansers select wetlands associated with wooded uplands.

Life Cycles of Three Common Waterfowl

The following brief explanations illustrate the special needs that different species of waterfowl require:



The Wood Duck

Wood Ducks arrive in Michigan from southern wintering areas typically in March. Because females lack the fat and protein reserves needed for egg production, they disperse into forested and stream bottom areas where they feed heavily on acorns and aquatic seeds. Water depths averaging 8 inches are ideal for foraging wood ducks, and loafing and roosting sites can be maintained where water is deeper. During this time, nesting pairs also begin searching for suitable nesting cavities mostly along forested waterways, although they may select trees a mile or more from water. Trees with diameters at least 14 inches at chest height produce most of the suitable nesting cavities. Average clutch size is 12 eggs, and incubation takes about 28 days. Hens and their broods are highly mobile from nesting sites to wetlands, occasionally moving up to 2-1/2 miles. S hallow, flooded habitat with good overstory cover are important brood rearing areas. Button bush. willow. and emergent vegetation such as cattails can provide this cover.

FOREST STAND #1 CONTINUED:

The Blue-Winged Teal

Breeding pairs of blue-winged teal prefer seasonally or temporarily flooded, shallow wetlands. They usually feed in those portions with less than 8 inches of water. In dry years, gently sloping basins that provide shallow water all summer are important. The hen typically nests in upland grasses or wet meadow sedges near such water, although nests may be located as far away as one mile. Areas with short grasses have the highest nesting success. Clutch size averages 10 eggs, which the hen incubates for 23 days. Semi-permanent wetlands located near nesting areas are important for brood rearing. Livestock ponds with well-developed emergent vegetation provide locally important brood habitat. Seasonal wetlands also provide excellent brood habitat, but because blue-winged teal are relatively late nesters, seasonal wetlands are often unavailable when ducklings leave nests.

The Mallard

The breeding range of mallards is the most extensive of any duck species in North America. Like other ducks, female mallards are influenced by their homing instinct when returning to the breeding grounds. Because hens and drakes form bond pairs during fall and on the wintering grounds, the drakes follow their mates back to the hen's breeding site. In the spring, females seek midges, crustaceans, mollusks, and other aquatic invertebrates rich in nutrients needed for egg production. Hens normally like grassy areas, including hayfields, in which to lay their eggs. Nest sites may be up to a mile away from wetlands, but are typically within 500 ft. The hen lays one egg each day for 9 or 10 days until the clutch is complete. After the last egg is laid, the hen will incubate her clutch for about 25 days. After hatching, the hen leads her ducklings to water. Mosquitoes, dragon-flies and other insect larvae are among the types of protein-rich foods that the ducklings eat. The young are able to fly in 50 to 60 days. Fall and winter foods of mallards consist mostly of high-energy seeds from aquatic or emergent wetland plants and farm crops. Native foods include seeds, leaves and roots from sedges, millet, smartweed, coontail, duck potato, duckweed, and mast from nut-producing trees. Cultivated grains include corn, sorghum, wheat, barley, and oats.

Waterfowl Management Considerations

Landowners can adopt many practices to increase the number and kinds of waterfowl on their lands. Perhaps the most important consideration is to protect all wetlands on the property by maintaining them in their natural state. Temporary shallow pools and seasonally flooded woodlands or fields are just as important as permanent wetlands such as swamps, marshes, ponds, and streams.

General Waterfowl Management Considerations:

- Restore any drained or degraded wetland basins you have identified. Potential sites may be located in

FOREST STAND #1 CONTINUED:

- Protect, maintain, or restore upland habitats around the wetland. If a buffer at least 100 feet wide does not exist, create one by planting grass, which many duck species will use for nesting. A grassland that is three to six times larger than the wetland itself dramatically improves reproduction success by reducing the impact of predators.

- Plant upland nesting areas and buffer zones with a diverse mixture of native warm season grasses and forbs, such as big blue stem, little bluestem, Indiangrass, bush clover, leadplant, and wildflowers. Cool season mixes of orchard grass, timothy, and various clovers (ladino, white, and red), and alfalfa can also be used. Fields of native warm season grasses and forbs next to fields of cool season grasses make a good nesting complex.

- Mow grasses between July 15 and August 30 to minimize nest disturbance, and to allow time for grasses to grow before the next nesting season.

- Manage for large, overly mature trees along waterways and within one mile of good brood wetlands. Trees such as silver maple, sugar maple, basswood, and aspen as provide potential cavity sites for nesting wood ducks, hooded mergansers, and common goldeneyes. Also, leave mast-producing trees such as oak, maple, and elm to provide food for wood ducks, mallards, and black ducks.

- If you wish to encourage geese, who are grazers, provide mowed grass areas next to wetlands. In a similar manner, to discourage geese, do not mow next to wetlands, and promote tall grasses and possibly shrubs.

- Provide supplemental nesting structures if nesting cover (tree cavities, for example) is limited within one-half mile of brood wetlands. See MDNR Landowner Guide, "Homes for Wildlife".

- If you are managing a marsh, establish a 50:50 mix of open water and wetland vegetation. If cattails are invading, cut them just above the ice line during the winter. Allow them to lie on the ice until spring thaw as it can help boost the growth of invertebrates, providing more food for waterfowl. Burn a portion of the marsh every three years, or a portion of the marsh each year, in late winter/early spring to help native vegetation regenerate.

- If your wetland has a water-control device, you can reduce undesirable plants through flooding, or allow development of smartweed and other valuable plants through drawdowns. Each wetland, however, is unique. A wildlife biologist or wetlands specialist can explain the advantages and disadvantages to manipulating water levels.

- Because invertebrates are critical food items, avoid using insecticides in and around the wetland. When necessary, use insecticides that have little or no impact on both aquatic invertebrates and vertebrates. Landowners should also prevent lawn and farm chemicals from reaching the wetland.

- Minimize disturbance to your wetlands. Enjoy waterfowl from a distance by using binoculars or spotting scopes, or build viewing blinds before nesting begins.

*** **For additional Information, See MDNR Website:** Landowner's Guide: Table of Contents (state.mi.us)

FOREST STAND #1 - FIELD PICTURES

FOREST STAND INFORMATION

STAND UNIT NO.: 2 **STAND TYPE SYMBOL:** A/Q3 **CFA STAND ACREAGE:** 8.0

SIZE CLASS: Saplings (1.0-3.0" Diameter at Breast Height, DBH)

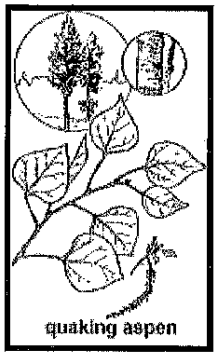
STAND DENSITY: Well-Stocked **AVERAGE BASAL AREA:** 2000 Non-Merchantable Stems per Acre

SOIL TYPE: (ClA) Charlevoix Sandy Loam, Map Unit Setting: Farmland classification: Prime farmland if drained, Map Unit Composition: Charlevoix and similar soils: 85 percent, Minor components: 15 percent

Description of Charlevoix: Landform: Lake plains, moraines, outwash plains, Typical profile: sandy loam to loam, Properties and qualities: Slope: 0 to 4 percent, Depth to restrictive feature: More than 80 inches Drainage class: Somewhat poorly drained, Runoff class: Very low Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr.), Depth to water table: About 12 to 24 inches, Frequency of flooding: None, Frequency of ponding: None, Calcium carbonate, maximum content: 30 percent, Available water supply, 0 to 60 inches: Moderate (about 7.0 inches), Interpretive groups: Land capability classification (irrigated): None specified, Land capability classification (nonirrigated): 2e, Hydrologic Soil Group: A/D, Ecological site: F094BY007MI - Moist Loamy Lowland, Hydric soil rating: No

SITE QUALITY: Good **STAND QUALITY:** Timber (Good), Wildlife (Fair) **AGE:** 22-23 years (Aspen)

EXISTING CONDITIONS


quaking aspen

COVER TYPE & MAJOR SPECIES: quaking aspen, balm, red maple, white birch, black ash, balsam fir, white spruce, northern white cedar

STAND DESCRIPTION: This forest stand encompasses approximately 8.0 acres and is described as a well-stocked stand of quaking aspen, red maple, white birch and balsam fir with secondary species of white spruce, balm, black ash and northern white cedar. This forest stand was harvested approximately 22-23 years ago through even-age clearcutting.

Current stocking levels range from 1750-2250 non-merchantable saplings per acre with an average of 2000 Stems per Acre. Individual tree diameters range from 1.0-3.0", Diameter at Breast Height (DBH), with an average of 2.0".

Individual tree form and quality if very good, young early successional habitat.

Regeneration and early successional habitat is very good as a result of even-age clearcutting. Red maple and balsam fir seedlings are found beneath the taller aspen and white birch.

Wildlife habitat especially forest cover is ideal for ruffed grouse, woodcock and rabbits.

No threatened or endangered plant species identified during field assessment. However, I would recommend a thorough investigation of your wetlands and identify those T & E Species. For more T & E Species Information, see the following link: Michigan Natural Features Inventory (msu.edu).

FOREST STAND #2 CONTINUED:

No invasive plant species identified during field assessment. However, I would recommend a thorough investigation of your wetlands and identify locations. Keep an eye out for invasive species such as garlic mustard, glossy buckthorn, purple loosestrife or phragmites. For more Invasive Species information, See Link: Invasive Species - Invasive Species (michigan.gov).

Forest access to the stand is good utilizing old forest road along the eastern property line.

Soil & Ground Characteristics: Slight Off-Road Erosion Hazard, Slight Road-Trail Erosion Hazard, Moderately-Suited for Equipment Operability, Well-Suited for Mechanical Site Preparation, Low Fire Damage Potential, Low Seedling Mortality Potential, Moderate Windthrow Hazard, Moderate Soil Rutting Hazard, Well-Suited for Hand Planting, Moderately-Suited for Haul Road and Decking Areas.

The woodland land capability or site productivity is 2e with a site index of 65 for red maple at 50 years. Site index is the measurement of forest site quality based on the height of the dominant and superior co-dominant trees at 50 years of age.

MAJOR OBJECTIVES FOR THIS STAND: Our goals are to manage and maintain a healthy and productive mixed quaking aspen-conifer stand as wildlife habitat for whitetail deer, ruffed grouse, woodcock and rabbits. To produce commercial timber products through even-age clearcutting at time of forest stand maturity.

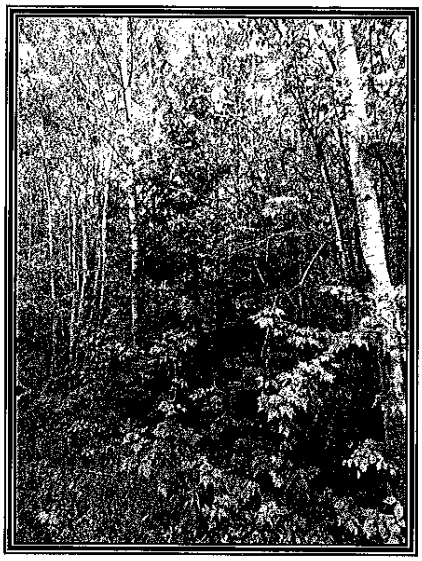
***** PLANNED MANAGEMENT ACTIVITIES *****

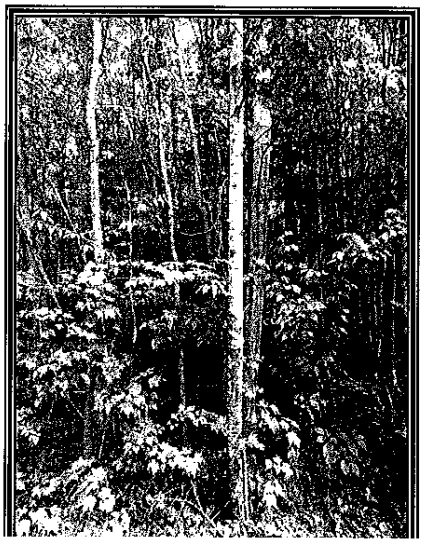
1. Forest Stand Improvement, Even-Age Aspen-Fir Clearcutting, Date: 01.2040, Acres: 8.0. The purpose of this timber harvesting project is to improve upon forest health, aspen-fir regeneration, forest diversity, and wildlife habitat through even-age clearcutting. From 2040-2042, the following timber harvesting practices are recommended and required under the CFA Program;

- Harvest All mature to over-mature tree species 5.0" in diameter and greater with (2) or more 100" sticks.
- You may retain scattered unique eastern hemlock and eastern white pine as "Seed" trees.
- Winter harvesting should be scheduled in order to minimize soil rutting and compaction.
- Cut tree stumps should be no higher than 6.0-12.0 inches. Process tree tops down to 3.0-4.0 inches outside diameter. Felled tree tops can be cut so they are no higher than 1.0-2.0 feet above the ground or left higher as wildlife habitat brush piles.
- All dead and down trees, logs and branches should be retained as woody debris for small mammals and amphibians.
- Timber products will be primarily aspen pulpwood, conifer pulpwood and hardwood pulpwood.

For additional information, see MDNR Landowner Guide, "Mesic Conifers", "Timber Harvesting" and MSUE

FOREST STAND #2 - FIELD PICTURES





FOREST STAND INFORMATION

STAND UNIT NO.: 3 **STAND TYPE SYMBOL:** E/Q6 **CFA STAND ACREAGE:** 13.0

SIZE CLASS: Polesize (4.0-12.0" Diameter in Breast Height, DBH)

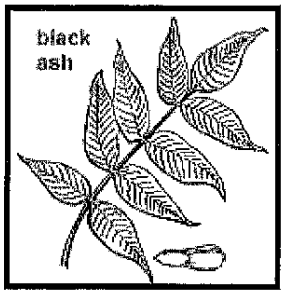
STAND DENSITY: Well-Stocked **AVERAGE BASAL AREA:** 90 Sq. Ft. per Acre

SOIL TYPE: (ClA) Charlevoix Sandy Loam, Map Unit Setting: Farmland classification: Prime farmland if drained, Map Unit Composition: Charlevoix and similar soils: 85 percent, Minor components: 15 percent

Description of Charlevoix: Landform: Lake plains, moraines, outwash plains, Typical profile: sandy loam to loam, Properties and qualities: Slope: 0 to 4 percent, Depth to restrictive feature: More than 80 inches Drainage class: Somewhat poorly drained, Runoff class: Very low Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr.), Depth to water table: About 12 to 24 inches, Frequency of flooding: None, Frequency of ponding: None, Calcium carbonate, maximum content: 30 percent, Available water supply, 0 to 60 inches: Moderate (about 7.0 inches), Interpretive groups: Land capability classification (irrigated): None specified, Land capability classification (nonirrigated): 2e, Hydrologic Soil Group: A/D, Ecological site: F094BY007MI - Moist Loamy Lowland, Hydric soil rating: No

SITE QUALITY: Poor **STAND QUALITY:** Timber (Fair), Wildlife (Fair) **AGE:** 85-90 years (B. Ash)

EXISTING CONDITIONS



COVER TYPE & MAJOR SPECIES: black ash, balm, red maple, white birch, balsam fir, black spruce, northern white cedar, tamarack, northern white cedar

STAND DESCRIPTION: This forest stand encompasses approximately 13.0 acres and is described as a well-stocked stand of lowland hardwood-conifer species comprised of mature to over-mature black ash, balm, red maple and white birch with associated conifer species of balsam fir, black spruce, tamarack and northern white cedar.

Current stocking levels range from 70-100 square feet per acre in merchantable trees with an average of 90 Sq. Ft. per Acre. Individual tree diameters range from 4.0-12.0", Diameter at Breast Height (DBH), with an average of 10.0".

Individual tree form and quality ranges from over-mature black ash, balm, red maple, white birch and balsam fir pulpwood trees, to fair quality northern white cedar bolts. There is a small ridge of quaking aspen along the northwestern property line which is over-mature, declining in health and productivity.

Regeneration is comprised of black ash, balsam fir, and spruce 1.0-10. Feet in height.

Wildlife habitat is only fair do to lack of young woody browse and early successional habitat.

No threatened or endangered plant species identified during field assessment. However, I would recommend a thorough investigation of your wetlands and identify those T & E Species. For more T & E Species Information, see the following link: Michigan Natural Features Inventory (msu.edu)

FOREST STAND #3 CONTINUED:

No invasive plant species identified during field assessment. However, I would recommend a thorough investigation of your wetlands and identify locations. Keep an eye out for invasive species such as garlic mustard, glossy buckthorn, purple loosestrife or phragmites. For more Invasive Species information, See Link: Invasive Species - Invasive Species (michigan.gov).

Forest access to this stand is difficult from most directions.

Soil & Ground Characteristics: Slight Off-Road Erosion Hazard, Slight Road-Trail Erosion Hazard, Moderately-Suited for Equipment Operability, Well-Suited for Mechanical Site Preparation, Low Fire Damage Potential, Low Seedling Mortality Potential, Moderate Windthrow Hazard, Moderate Soil Rutting Hazard, Well-Suited for Hand Planting, Moderately-Suited for Haul Road and Decking Areas.

The woodland land capability or site productivity is 2e with a site index of 65 for red maple at 50 years. Site index is the measurement of forest site quality based on the height of the dominant and superior co-dominant trees at 50 years of age.

MAJOR OBJECTIVES FOR THIS STAND: Our goals are to manage and maintain a healthy and productive mixed lowland hardwood-conifer stand as wildlife habitat for whitetail deer, ruffed grouse, woodcock and rabbits. To produce commercial timber products through even-age clearcutting at time of forest stand maturity.

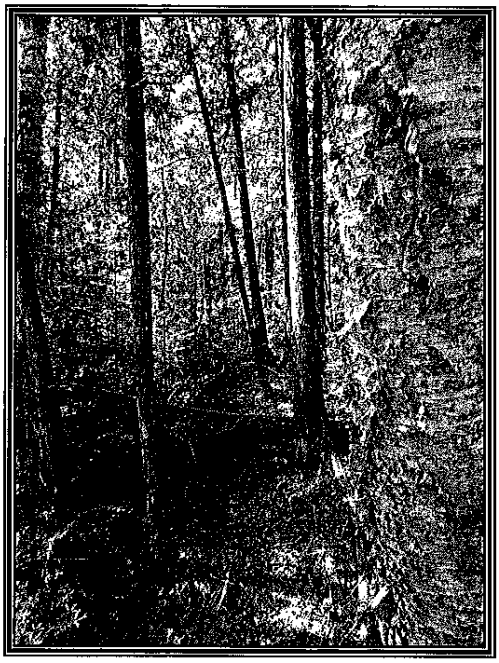
***** PLANNED MANAGEMENT ACTIVITIES *****

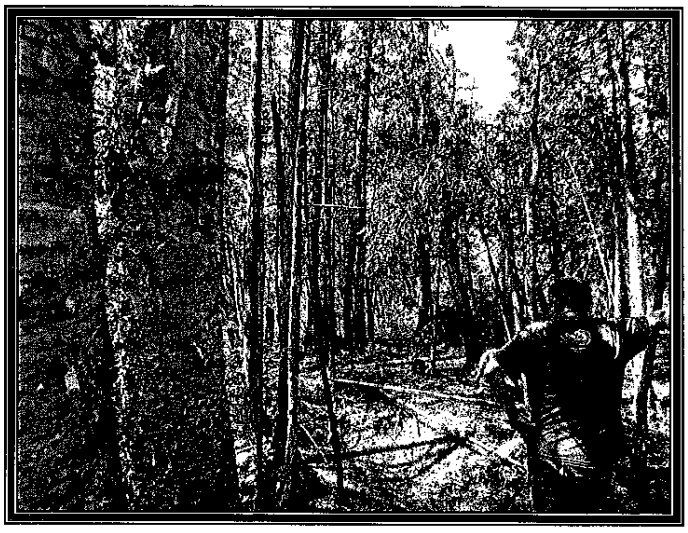
1. Forest Stand Improvement, Even-Age Lowland Hardwood-Conifer Clearcutting, Date: 01.2025, Acres: 13.0. The purpose of this timber harvesting project is to improve upon forest health, lowland hardwood regeneration, forest diversity, and wildlife habitat through even-age clearcutting. From 2025-2027, the following timber harvesting practices are recommended and required under the CFA Program;

- Harvest All mature to over-mature tree species 5.0" in diameter and greater with (2) or more 100" sticks.
- You may retain scattered unique eastern hemlock and eastern white pine as "Seed" trees.
- Winter harvesting should be scheduled in order to minimize soil rutting and compaction.
- Cut tree stumps should be no higher than 6.0-12.0 inches. Process tree tops down to 3.0-4.0 inches outside diameter. Felled tree tops can be cut so they are no higher than 1.0-2.0 feet above the ground or left higher as wildlife habitat brush piles.
- All dead and down trees, logs and branches should be retained as woody debris for small mammals and amphibians.
- Timber products will be primarily hardwood pulpwood, conifer pulpwood and cedar bolts.

For additional information, see MDNR Landowner Guide, "Lowland Hardwoods", "Timber Harvesting" and

FOREST STAND #3 - FIELD PICTURES





FOREST STAND INFORMATION

STAND UNIT NO.: 4 **STAND TYPE SYMBOL:** C/E6 **CFA STAND ACREAGE:** 201.0

SIZE CLASS: Polesize (2.0-12.0" Diameter in Breast Height, DBH)

STAND DENSITY: Well to Very Well-Stocked **AVERAGE BASAL AREA:** 110 Sq. Ft. per Acre

SOIL TYPE: (Ck) Cathro and Tacoosh Mucks, Map Unit Setting: Farmland classification: Not prime farmland, Map Unit Composition: Cathro and similar soils: 55 percent Tacoosh and similar soils: 45 percent

Description of Cathro: Landform: Depressions, lake plains, moraines, outwash plains, Typical profile: muck to sandy loam, Properties and qualities: Slope: 0 to 2 percent, Depth to restrictive feature: More than 80 inches Drainage class: Very poorly drained, Runoff class: Very low Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr.), Depth to water table: About 0 inches, Frequency of flooding: None, Frequency of ponding: Frequent, Calcium carbonate, maximum content: 25 percent, Available water supply, 0 to 60 inches: Very high (about 16.5 inches), Interpretive groups: Land capability classification (irrigated): None specified, Land capability classification (nonirrigated): 6w, Hydrologic Soil Group: B/D Ecological site: F094BY002MI - Mucky Swamp Hydric soil rating: Yes

Description of Tacoosh, Landform: Depressions, lake plains, moraines, outwash plains, Typical profile: muck to mucky peat, to sandy loam, Properties and qualities: Slope: 0 to 2 percent, Depth to restrictive feature: More than 80 inches, Drainage class: Very poorly drained, Runoff class: Very low, Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr.), Depth to water table: About 0 inches Frequency of flooding: None, Frequency of ponding: Frequent, Calcium carbonate, maximum content: 30 percent, Available water supply, 0 to 60 inches: Very high (about 22.4 inches), Interpretive groups: Land capability classification (irrigated): None specified, Land capability classification (nonirrigated): 6w, Hydrologic Soil Group: A/D, Ecological site: F094BY002MI - Mucky Swamp, Hydric soil rating: Yes

SITE QUALITY: Fair **STAND QUALITY:** Timber (Fair), Wildlife (Good) **AGE:** 100-120 years (Cedar)

EXISTING CONDITIONS


northern white cedar

COVER TYPE & MAJOR SPECIES: northern white cedar, balsam fir, black spruce, tamarack, black ash, balm, white birch, tag alder

STAND DESCRIPTION: This forest stand encompasses approximately 201.0 acres and is described as a well to very well-stocked stand of lowland conifer-hardwood species comprised primarily of mature northern white cedar with secondary over-mature balsam fir, black spruce, tamarack, black ash, balm and white birch. There are pockets of brushy tag alder. No commercial timber harvesting has occurred in many years.

Current stocking levels range from 70-130 square feet per acre in merchantable trees with an average of 110 Sq. Ft. per Acre. Individual tree diameters range from 2.0-12.0", Diameter at Breast Height (DBH), with an average of 10.0".

Individual tree form and quality ranges from over-mature balsam fir, black spruce, tamarack, balm and white birch pulpwood trees, to poor quality northern white cedar pulpwood trees, to good quality northern white

FOREST STAND #4 CONTINUED:

Regeneration is comprised of northern white cedar, balsam fir, and spruce 1.0-15.0 feet in height.

Wildlife habitat is only good due to moderate to fully closed forest canopy which provides good winter thermal cover.

No threatened or endangered plant species identified during field assessment. However, I would recommend a thorough investigation of your wetlands and identify those T & E Species. For more T & E Species Information, see the following link: Michigan Natural Features Inventory (msu.edu).

No invasive plant species identified during field assessment. However, I would recommend a thorough investigation of your wetlands and identify locations. Keep an eye out for invasive species such as garlic mustard, glossy buckthorn, purple loosestrife or phragmites. For more Invasive Species information, See Link: Invasive Species - Invasive Species (michigan.gov).

Forest access to this stand is difficult to do soil-site conditions.

Soil & Ground Characteristics: Slight Off-Road Erosion Hazard, Slight Road-Trail Erosion Hazard, Poorly-Suited for Equipment Operability, Poorly-Suited for Mechanical Site Preparation, Low Fire Damage Potential, High Seedling Mortality Potential, Severe Windthrow Hazard, Severe Soil Rutting Hazard, Moderate-Suited for Hand Planting, Poorly-Suited for Haul Road and Decking Areas.

The woodland land capability or site productivity is 6w with a site index of 15 for black spruce at 50 years. Site index is the measurement of forest site quality based on the height of the dominant and superior co-dominant trees at 50 years of age.

MAJOR OBJECTIVES FOR THIS STAND: Our goals are to manage and maintain a healthy and productive mixed swamp conifer-hardwood stand as wildlife habitat for whitetail deer, black bears and snowshoe rabbits. To produce commercial timber products through even-age patch or strip clearcutting at time of forest stand maturity.

FOREST STAND #4 CONTINUED:

***** PLANNED MANAGEMENT ACTIVITIES *****

1. Forest Stand Improvement, Even-Age Patch or Strip Clearcutting, Date: 01.2025, Acres: 20.0. The purpose of this timber harvesting project is to improve upon forest health, conifer regeneration, forest diversity, and wildlife habitat through even-age clearcutting. From 2025-2027, the following timber harvesting practices are recommended and required under the CFA Program;

- Within cutting units, harvest All mature to over-mature tree species 5.0" in diameter and greater with (2) or more 100" sticks. You may locate several east-west or north-south strip clearcut and/or irregular shaped patch clearcuts.
- Be careful not to damage advance conifer regeneration.
- Retain a large portion of this stand as wintering habitat for whitetail deer and protect natural blown down trees and root wads as black bear hibernation areas.
- Winter harvesting should be scheduled in order to minimize soil rutting and compaction.
- Cut tree stumps should be no higher than 6.0-12.0 inches.
- Process tree tops down to 3.0-4.0 inches outside diameter. Felled tree tops can be cut so they are no higher than 1.0-2.0 feet above the ground or left higher as wildlife habitat brush piles.
- All dead and down trees, logs and branches should be retained as woody debris for small mammals and amphibians.
- Timber products will be primarily cedar pulpwood, cedar bolts, softwood pulpwood, hardwood pulpwood and bolts.

For additional information, see MDNR Landowner Guide, "Lowland Conifer", "Timber Harvesting" and MSUE Guides, Forest Types of Michigan, "Swamp Conifer", "Silvicultural Systems".

FOREST STAND #4 - FIELD PICTURES

FOREST STAND INFORMATION

STAND UNIT NO.: 5 **STAND TYPE SYMBOL:** E/C5 **CFA STAND ACREAGE:** 34.0

SIZE CLASS: Polesize (2.0-10.0" Diameter in Breast Height, DBH)

STAND DENSITY: Moderately-Stocked **AVERAGE BASAL AREA:** 65 Sq. Ft. per Acre

SOIL TYPE: (Ck) Cathro and Tacoosh Mucks, Map Unit Setting: Farmland classification: Not prime farmland, Map Unit Composition: Cathro and similar soils: 55 percent Tacoosh and similar soils: 45 percent

Description of Cathro: Landform: Depressions, lake plains, moraines, outwash plains, Typical profile: muck to sandy loam, Properties and qualities: Slope: 0 to 2 percent, Depth to restrictive feature: More than 80 inches Drainage class: Very poorly drained, Runoff class: Very low Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr.), Depth to water table: About 0 inches, Frequency of flooding: None, Frequency of ponding: Frequent, Calcium carbonate, maximum content: 25 percent, Available water supply, 0 to 60 inches: Very high (about 16.5 inches), Interpretive groups: Land capability classification (irrigated): None specified, Land capability classification (nonirrigated): 6w, Hydrologic Soil Group: B/D Ecological site: F094BY002MI - Mucky Swamp Hydric soil rating: Yes

Description of Tacoosh, Landform: Depressions, lake plains, moraines, outwash plains, Typical profile: muck to mucky peat, to sandy loam, Properties and qualities: Slope: 0 to 2 percent, Depth to restrictive feature: More than 80 inches, Drainage class: Very poorly drained, Runoff class: Very low, Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr.), Depth to water table: About 0 inches Frequency of flooding: None, Frequency of ponding: Frequent, Calcium carbonate, maximum content: 30 percent, Available water supply, 0 to 60 inches: Very high (about 22.4 inches), Interpretive groups: Land capability classification (irrigated): None specified, Land capability classification (nonirrigated): 6w, Hydrologic Soil Group: A/D, Ecological site: F094BY002MI - Mucky Swamp, Hydric soil rating: Yes

SITE QUALITY: Poor **STAND QUALITY:** Timber (Poor), Wildlife (Fair) **AGE:** 85-90 years (B. Ash)

EXISTING CONDITIONS


northern
white cedar

COVER TYPE & MAJOR SPECIES: black ash, balm, red maple, white birch, quaking aspen, northern white cedar, black spruce, tamarack

STAND DESCRIPTION: This forest stand encompasses approximately 34.0 acres and is described as a moderate-stocked stand of lowland hardwood-conifer species comprised primarily of black ash, balm, red maple and white birch with secondary species of quaking aspen, northern white cedar, black spruce and tamarack. No commercial timber harvesting has occurred in many years.

Current stocking levels range from 50-80 square feet per acre in merchantable trees with an average of 65 Sq. Ft. per Acre. Individual tree diameters range from 2.0-10.0", Diameter at Breast Height (DBH), with an average of 8.0".

Individual tree form and quality ranges from over-mature black ash, balsam fir, tamarack, balm, red maple, white birch and quaking aspen pulpwood trees, to poor quality northern white cedar pulpwood trees, to good

FOREST STAND #4 CONTINUED:

Regeneration is comprised of black ash, balsam fir and spruce 1.0-15.0 feet in height.

Wildlife habitat is only fair which can be improved upon through the creation of woody browse and early successional habitat through even-age clearcutting.

No threatened or endangered plant species identified during field assessment. However, I would recommend a thorough investigation of your wetlands and identify those T & E Species. For more T & E Species Information, see the following link: Michigan Natural Features Inventory (msu.edu).

No invasive plant species identified during field assessment. However, I would recommend a thorough investigation of your wetlands and identify locations. Keep an eye out for invasive species such as garlic mustard, glossy buckthorn, purple loosestrife or phragmites. For more Invasive Species information, See Link: Invasive Species - Invasive Species (michigan.gov).

Forest access to this stand is difficult to do soil-site conditions.

Soil & Ground Characteristics: Slight Off-Road Erosion Hazard, Slight Road-Trail Erosion Hazard, Poorly-Suited for Equipment Operability, Poorly-Suited for Mechanical Site Preparation, Low Fire Damage Potential, High Seedling Mortality Potential, Severe Windthrow Hazard, Severe Soil Rutting Hazard, Moderate-Suited for Hand Planting, Poorly-Suited for Haul Road and Decking Areas.

The woodland land capability or site productivity is 6w with a site index of 15 for black spruce at 50 years. Site index is the measurement of forest site quality based on the height of the dominant and superior co-dominant trees at 50 years of age.

MAJOR OBJECTIVES FOR THIS STAND: Our goals are to manage and maintain a healthy and productive swamp hardwood-conifer stand as wildlife habitat for whitetail deer, black bears and snowshoe rabbits. To produce commercial timber products through even-age clearcutting at time of forest stand maturity.

FOREST STAND #5 CONTINUED:

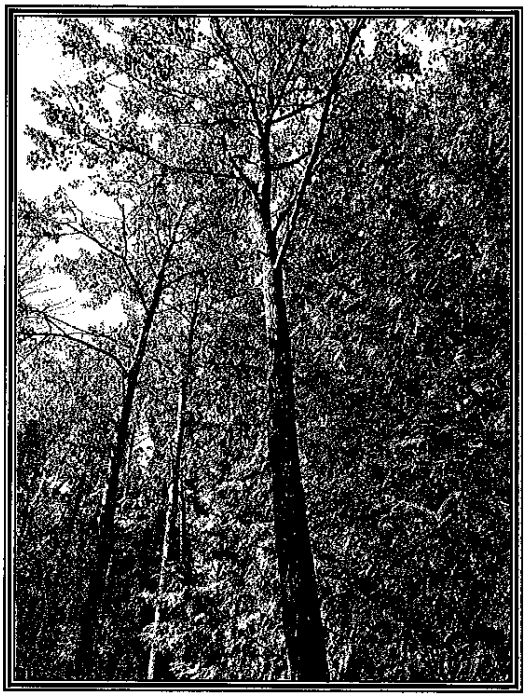
***** PLANNED MANAGEMENT ACTIVITIES *****

1. Forest Stand Improvement, Even-Age Hardwood-Conifer Clearcutting, Date: 01.2025, Acres: 34.0. The purpose of this timber harvesting project is to improve upon forest health, conifer regeneration, forest diversity, and wildlife habitat through even-age clearcutting. From 2025-2027, the following timber harvesting practices are recommended and required under the CFA Program;

- Harvest All mature to over-mature tree species 5.0" in diameter and greater with (2) or more 100" sticks.
- Retain a No-Harvest Buffer Strip around Forest Stand #1 in order to protect the wetlands.
- Be careful not to damage advance conifer regeneration.
- Winter harvesting should be scheduled in order to minimize soil rutting and compaction.
- Cut tree stumps should be no higher than 6.0-12.0 inches.
- Process tree tops down to 3.0-4.0 inches outside diameter. Felled tree tops can be cut so they are no higher than 1.0-2.0 feet above the ground or left higher as wildlife habitat brush piles.
- All dead and down trees, logs and branches should be retained as woody debris for small mammals and amphibians.
- Timber products will be primarily hardwood pulpwood, softwood pulpwood, bolts and maple sawlogs.

For additional information, see MDNR Landowner Guide, "Lowland Hardwoods", "Timber Harvesting" and MSUE Guides, Forest Types of Michigan, "Swamp Conifer", "Silvicultural Systems".

FOREST STAND #5 - FIELD PICTURES



Upland & Lowland Wildlife Management, Wildlife Den & Snag Trees: The purpose of this conservation practice is to protect wildlife den trees and snags for woodpeckers, squirrels and non-game songbirds. From 2023, protect 1-3 den trees, and 1-3 hardwood-softwood snags per acre. Hard snags have rotten centers with a solid exterior and a few limbs. These usually make the best den trees as the center can be easily excavated to form a home. Trees that usually form good cavities are large hardwoods that decay slowly such as sugar maple, elm, black and white oak, hickory, and butternut. Soft snags have softer exterior wood, and usually have no limbs. These snags usually make good foraging sites for insect-eating birds, as well as nesting sites for woodpeckers, chickadees, and nuthatches. Trees that often form soft snags have short life spans, and rot quickly. These too are important to wildlife as they produce cavities more quickly than harder wood, as well as habitat for many insects that provide food for birds, mammals, amphibians, and reptiles. Coniferous snags do not usually last as long as hardwoods, and are usually not used for den trees. One exception to this is northern white cedar, as it makes an excellent cavity tree. Other conifers, such as white pine and tamarack, make excellent nest and perch sites for eagles and osprey when located next to water. In general, regardless of the kind of snag, the larger it is the more wildlife it can support. The best den trees, live or dead, are over 15 inches diameter at breast height (DBH) with a den opening of four inches or more. Keep an eye out for trees that appear to be potential snags. These trees have large, sprawling branches, and often are fruit and nut producers. Missing or bare branches, fungal growth, wounds, and discolored bark are all signs of a dying tree. Also, look for woodpecker holes, which usually indicate a rotting core.

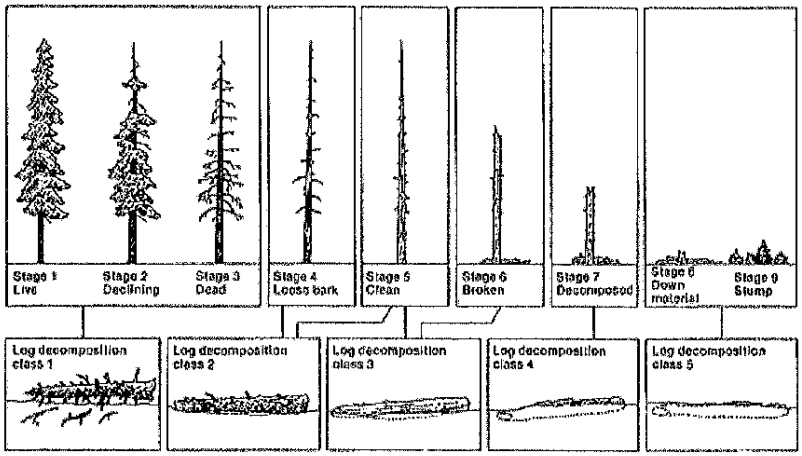
Upland & Lowland Wildlife Management: Dead, Down Woody Debris Retention: The purpose of this conservation practice is to protect and maintain all dead, down woody debris as wildlife habitat for small birds, small mammals and amphibians. From 2023, protect existing fallen trees and old decaying logs as habitat for small critters and amphibians.

Dead and down woody material in the form of stumps, root wads, bark, limbs, and logs, in various stages of decay, occurs in most forest ecosystems. These dead and down materials have long been viewed as potential wood products that should be salvaged, as fuels that create fire hazards, as physical barriers to tree planting, and as a haven for small mammals which may impede forest regeneration. All of these are valid concerns; however, dead and down woody material serves many important functions that should be recognized. Not only is this material important in mineral cycling, nutrient mobilization, and natural forest regeneration, but it also creates a structure and diversity of habitats that are valuable to a great many wildlife species, terrestrial and aquatic.

The Origin and Importance of Dead and Down Woody Material as Habitat for Wildlife
Origin of Dead and Down Woody Material

Natural tree mortality, which includes trees killed by insects, disease, or injury, provides snags to the forest environment. Snags eventually deteriorate, collapse, and become logs. Living trees that fall as a result of severe winds, landslides, and floods also are a source of logs. These logs, if not harvested, become the most significant element of the dead and down component of the forest. Large snags and logs are integral components of old-growth stands.

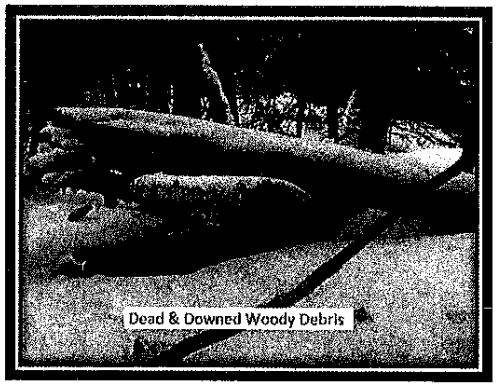
Both of these structural features are carried over into young stands that originate after wildfire or other natural catastrophe has removed the old-growth stand. Large snags and logs may or may not remain following timber harvest, but if planned for, both can be retained during forest management activities. For additional information, see USDA Forest Service, "Dead and Down Woody Material".



USDA Forest Service

Dead and Down Woody Material

Ronald Bartels John D. Dell Richard L. Knight Gail Schaefer



Upland & Lowland Wildlife Habitat Management, Rabbit Structures: The purpose of this Wildlife Habitat Improvement Project is to create structures that would support small critters and rabbits. From 2023, establish (2-4) woodland "Rabbitat" structures throughout all forest stands.

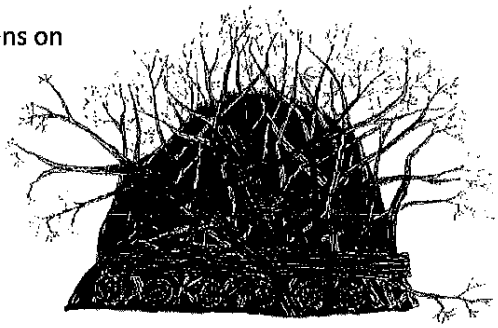
Brushpiles Information

Brushpiles provide a hiding place from ground predators (dogs, foxes, coyotes, mink, and weasels) and give rabbit's thermal protection during cold weather. Brushpiles should be placed away from the tall edge of the woodlot and closer to an open food source. Doing so denies avian predators (hawks and owls) a perch from which to launch their attack.

The best brushpiles are five feet high and 15 feet wide (about the size of a small car) and have more than one entrance/exit. Build a base of large logs or stumps or use non-decaying materials such as stones, at least six inches in diameter. Criss-cross a second layer of 12-inch diameter logs, and then add a third crisscrossed layer of 6- to 10-inch diameter logs. Brushpiles can be placed 20-30 yards apart. Succeeding layers become smaller in diameter. Built in this manner, the brushpile should last for several years. As the material decays you can add fresh layers.

For additional cover place live-lopped trees on top of the pile. Live-lopping is the practice of cutting a tree trunk on a 30-degree angle three-fourths of the way through. The tree should be growing next to the brushpile. The best candidates have large side branches and are four to eight inches in diameter. If you make the cut about three feet from the ground, the tree will fall over the brushpile. Because the tree will not be severed, its branches may continue to provide green cover for several years.

Winter is a good time to build brushpiles from tree-cutting operations on your land. The tops and branches of felled trees make for a ready supply of material. As you thin your woodlot, build a series of brushpiles on the border with an open grass field or grain field. If you don't plan to thin trees throughout the stand, consider felling those immediately next to the open area so as to create favorable edge habitat and to have materials for building brushpiles. Brushpiles in areas with dense saplings or shrubs make outstanding rabbit habitat.



Michigan's Best Management Practices

Pre-harvest planning is a collection of information and materials about the area to be harvested. The information is used to determine best times to harvest, road and skid trail locations, impacts on the physical site and management practices necessary.

Harvest during extremely dry summer periods or during the winter months when the ground is frozen.

When harvesting, avoid slopes in excess of 8-10% where potential erosion may occur.

Buffer strips are utilized for the protection of water and for visual impact. Buffer strips vary in width depending upon the slope of the land above a water body or stream.

BUFFER STRIP WIDTHS

Slope of Land Above Water Body or Stream (%)	**Minimum Width of Strip (Feet)**
0-10	**100**
10-20	115
20-30	135
30-40	155
40-50	175
50+	Activity Not Advisable

Forest Road – Decking Areas, Soil Stabilization: Seed all exposed mineral soil, i.e. harvest roads and decking areas with the following seed mixture: (Per Acre) White Clover @ 2 Lbs. + Alsike Clover @ 1 Lb. + Timothy @ 3 Lbs. + Medium Red Clover @ 4 Lbs. Prepare an adequate seedbed via disking. Seed mixture in early spring (mid-May) or late summer (mid-August). Spread seed evenly and plant shallow. Firm the soil over the seeds. Mulching may be necessary. These seedings will not only stabilize the soil but will also provide a source of food for wildlife such as deer, bear, turkeys and grouse.

FOREST STEWARDSHIP – COMMERCIAL FOREST ACT PLAN SUMMARY

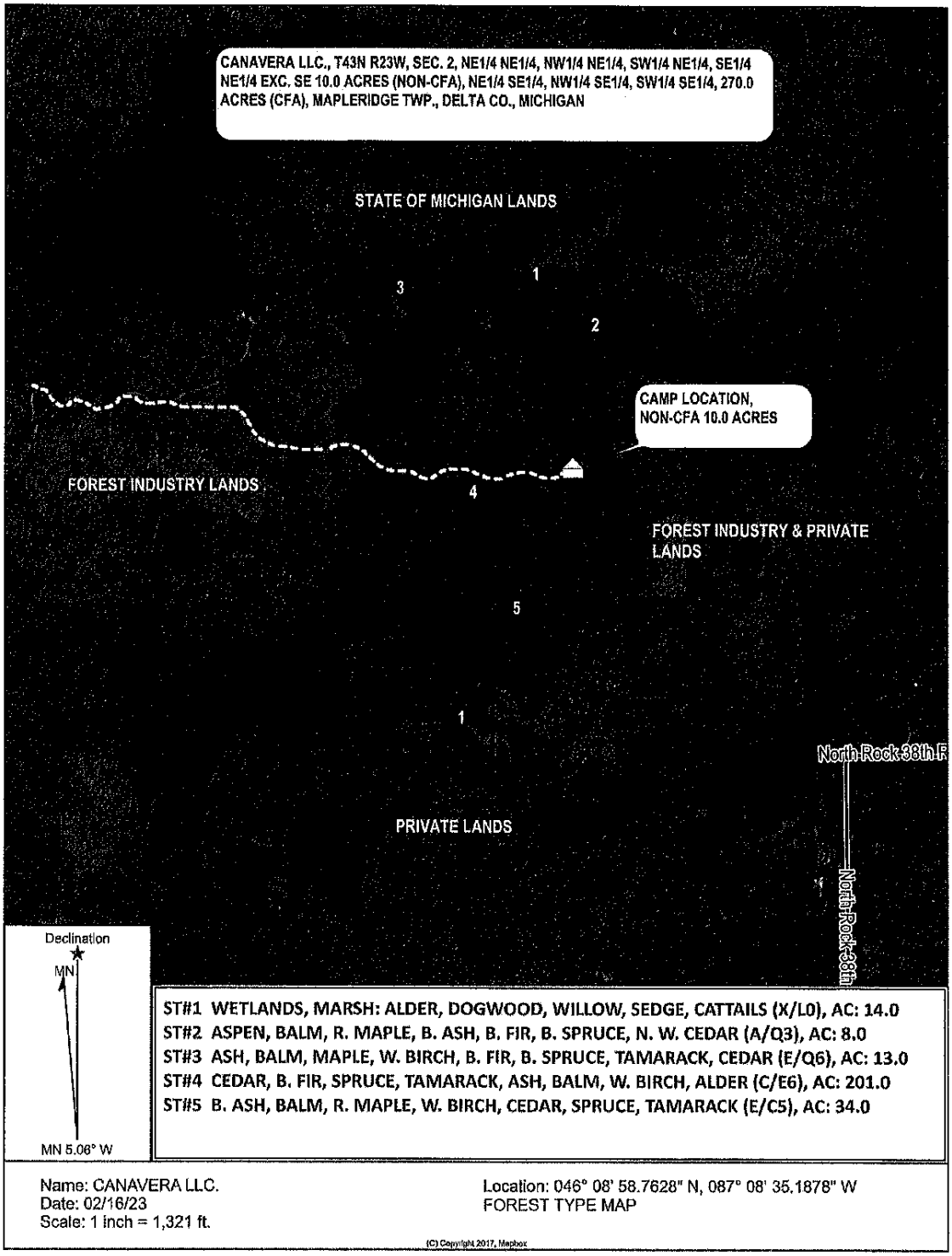
Unit #	Prescription	Planned	Acres
	REQUIRED CFA TIMBER MANAGEMENT RECOMMENDATIONS		
1	Wetland Habitat Management & Protection – Wetland Birds, Waterfowl	02.2023	14.0
2	Forest Stand Improvement, Even-Age Aspen-Fir Clearcutting	01.2040	8.0
3	Forest Stand Improvement, Even-Age Low Hardwood-Conifer Clearcutting	01.2025	13.0
4	Forest Stand Improvement, Even-Age Patch or Strip Clearcutting	01.2025	20.0
5	Forest Stand Improvement, Even-Age Hardwood-Conifer Clearcutting	01.2025	34.0
	ADDITIONAL WILDILFE MANAGEMENT RECOMMENDATIONS		
1-5	Protect Wildlife Den Trees, Hardwood & Softwood Snags	02.2023	160.0
1-5	Protect Dead, Down Woody Debris for Small Mammals	02.2023	160.0
1-5	Create Small Mammal "Rabbitat" Huts	02.2023	160.0

Plan Date: February 16, 2023 **Forest Plan Acres: 270.0**

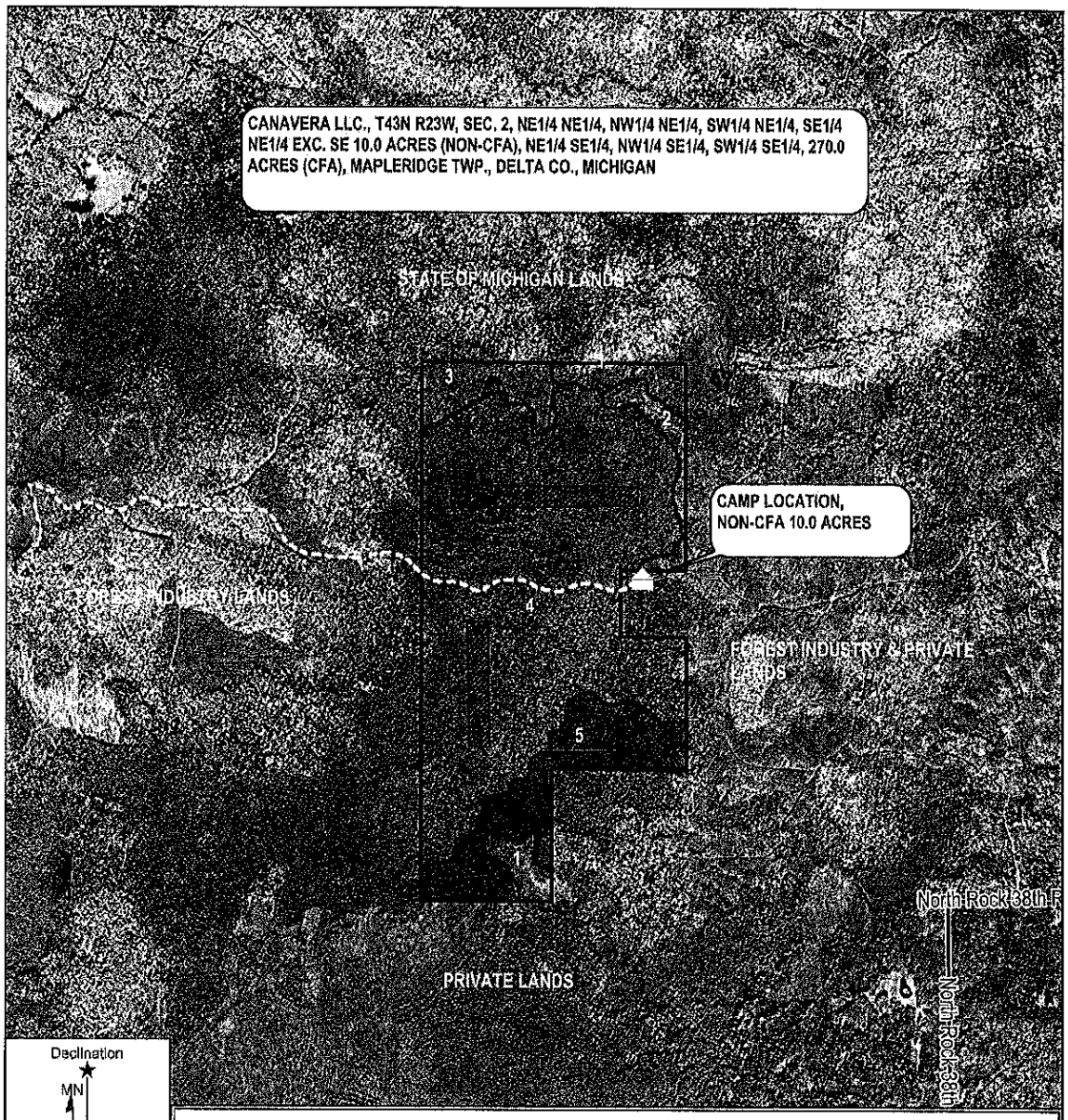
This Forest Stewardship – Commercial Forest Act Plan is good for 20 years as of the date of signing.

We hereby acknowledge that we have reviewed this forest management plan and understand our responsibilities regarding conducting management practices and harvests as called for in this plan.

FOREST TYPE MAP



CFA TIMBER HARVEST MAP

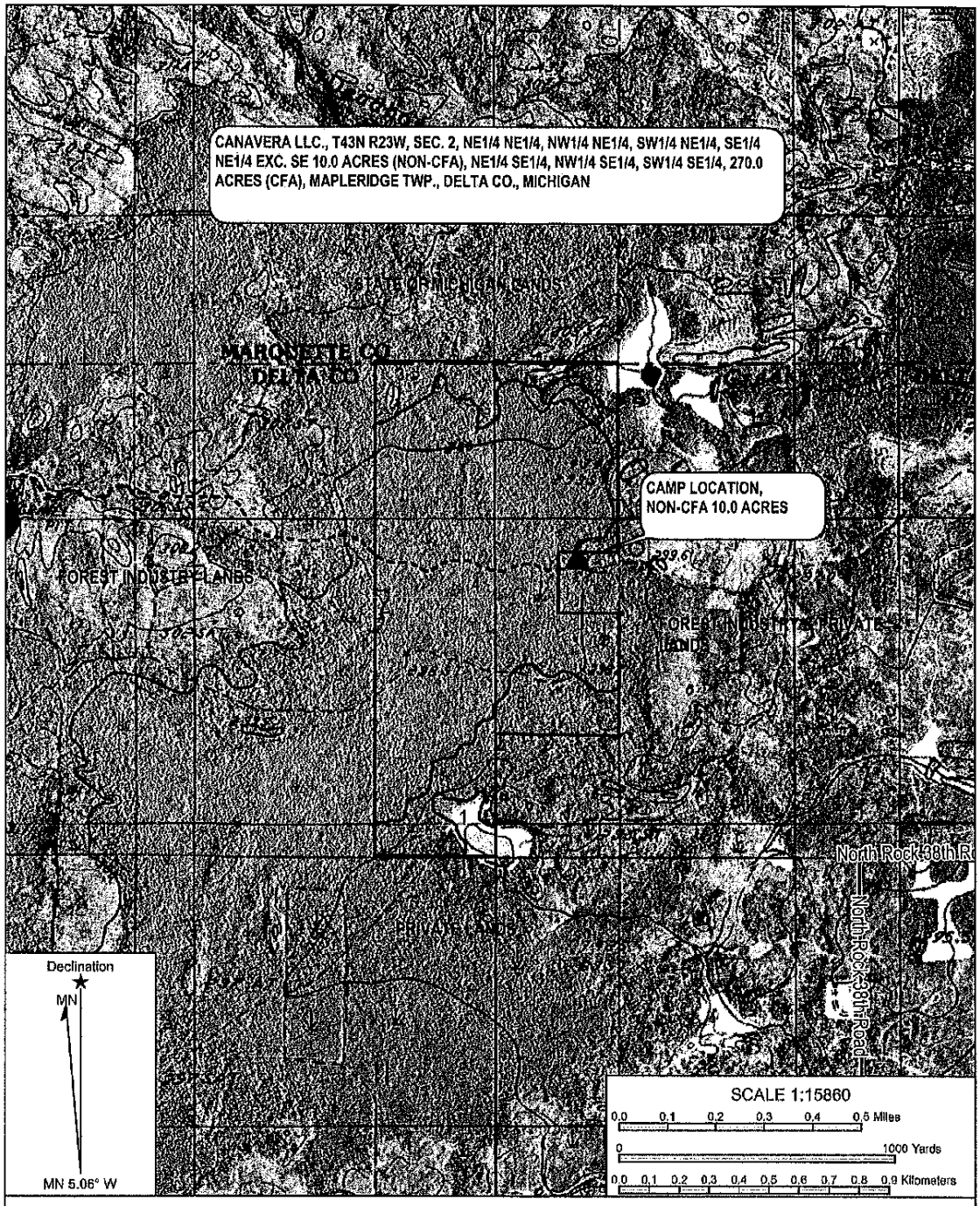


ST#1 - WETLAND PROTECTION, NO COMMERCIAL HARVESTING, DATE: 02.2023, AC: 14.0
ST#2 - EVEN-AGE ASPEN-FIR CLEARCUTTING, DATE: 01.2040, AC: 8.0
ST#3 - EVEN-AGE HARDWOOD-CONIFER CLEARCUTTING, DATE: 01.2025, AC: 13.0
ST#4 - EVEN-AGE CONIFER-HARDWOOD CLEARCUTTING, DATE: 01.2025, AC: 20.0
ST#5 - EVEN-AGE HARDWOOD-CONIFER CLEARCUTTING, DATE: 01.2025, AC: 30.0

Name: CANAVERA LLC.
Date: 02/16/23
Scale: 1 Inch = 1,321 ft.

Location: 046° 09' 03.8776" N, 087° 08' 35.1069" W
CFA TIMBER HARVEST MAP

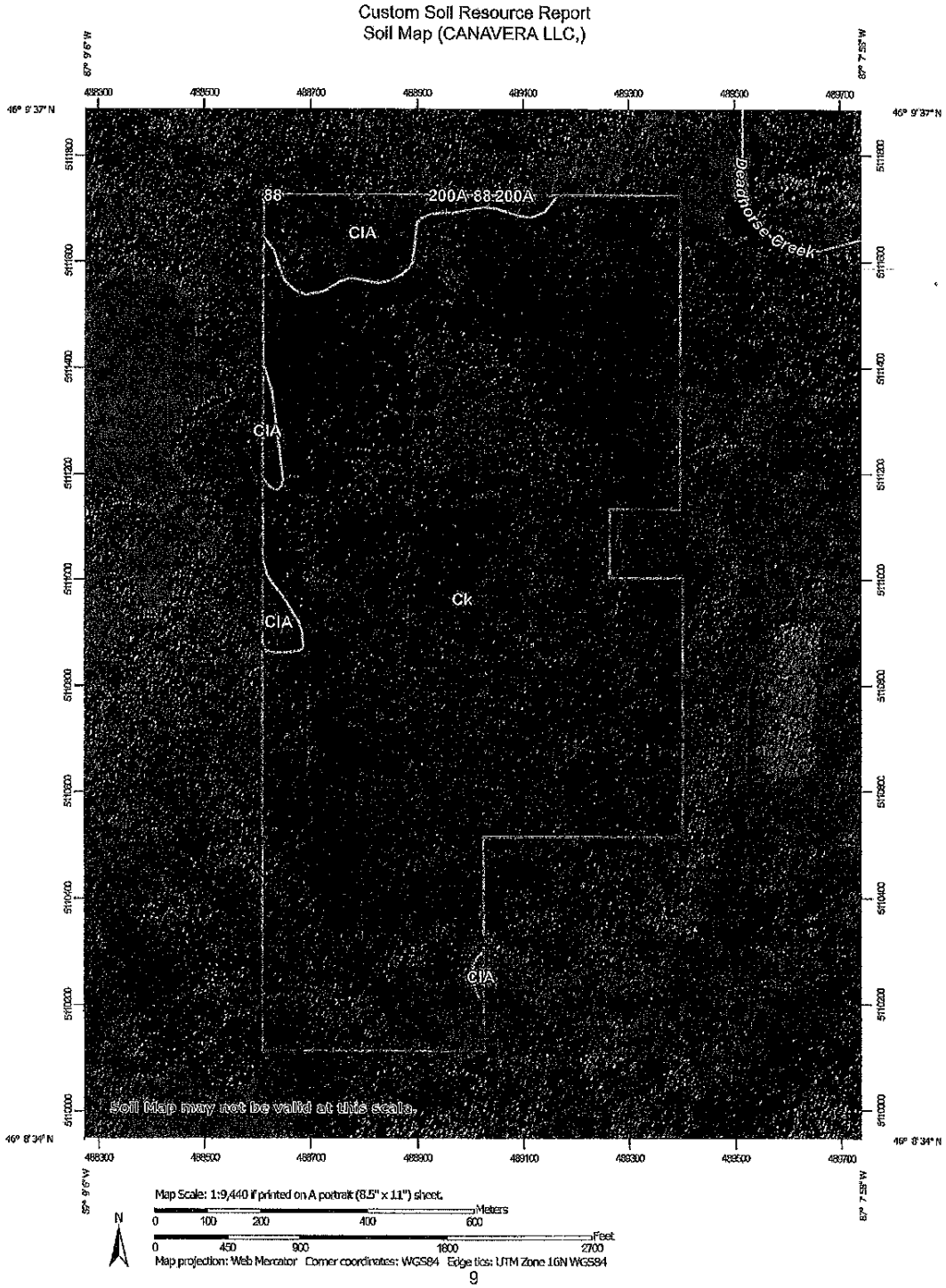
USGS ENHANCED TOPO MAP



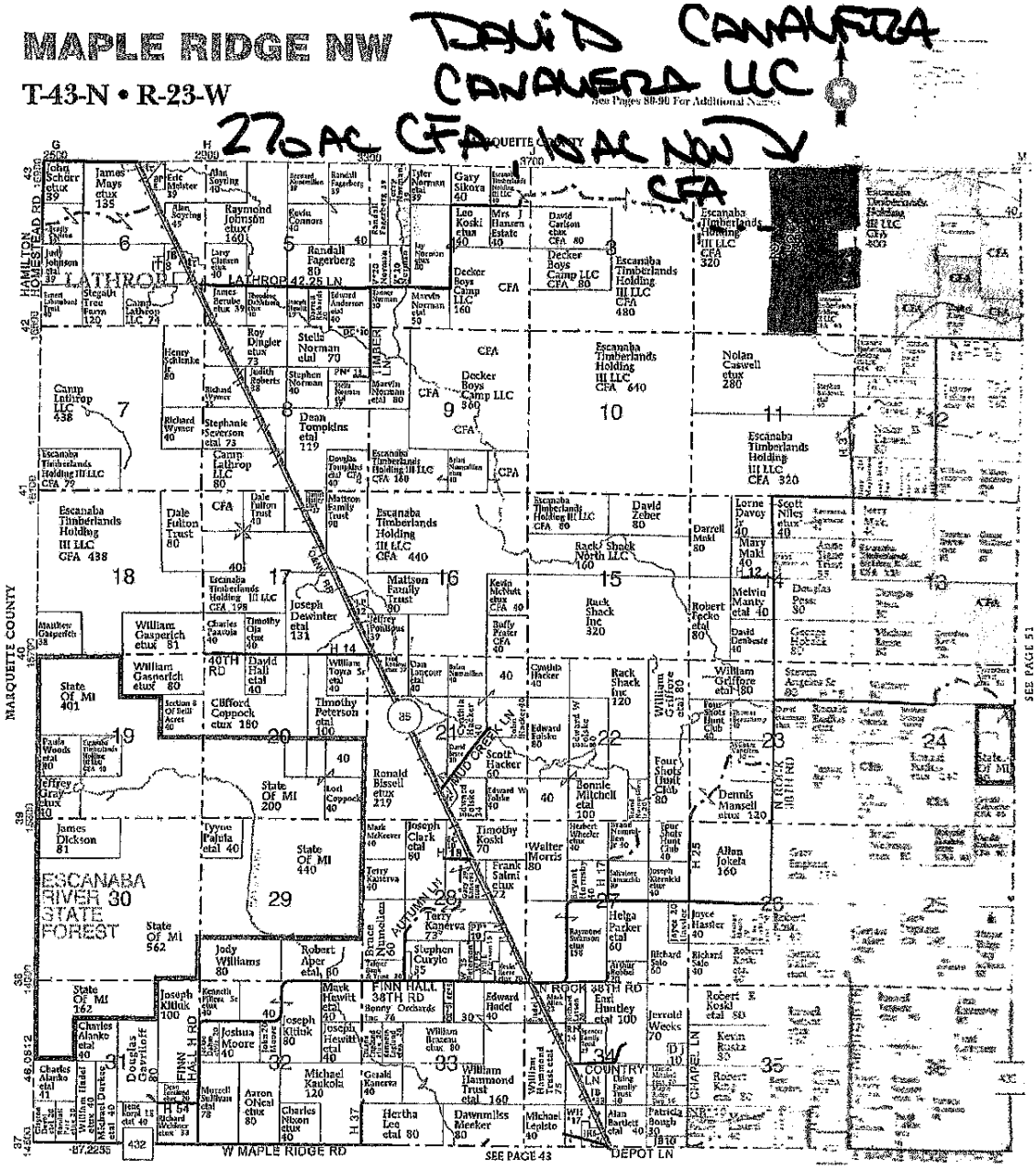
Name: CANAVERA LLC.
Date: 02/16/23
Scale: 1 inch = 1,321 ft.

Location: 046° 09' 07.0803" N, 087° 08' 33.3620" W
USGS ENHANCED TOPO MAP

USDA SOIL SURVEY MAP



DELTA COUNTY PLAT MAP



Michigan Department of Natural Resources – Forest Resources Division

REQUIREMENTS FOR FOREST MANAGEMENT PLANS FOR LANDS LISTED UNDER THE COMMERCIAL FOREST (CF) PROGRAM

By authority of Part 511, 1994 PA 451, as amended.

PURPOSE OF THE PLAN: To prescribe measures to optimize production, utilization, and regeneration of forest resources.

All plans must include the following and must be submitted with the completed "CF Stand Summary and Harvest Schedule" form:

1. Name, address, email address and telephone number of all owners. NOTE: There cannot be more than one CF ownership in a plan.
2. All owners must sign and date the plan with the following statement "I/We agree to manage the CF land listed in this plan according to the plan. I/We understand that a violation of this plan is a violation of the CF program, subject to removal of the land from the program with a fee and penalty. I/We agree to get an updated or new plan prior to the expiration of this plan."
3. Name, address, telephone number, email address, signature, and date of signature of plan writer.
4. Legal description of the property and total acreage covered by the plan. Note which parcels are CF and which parcels are not CF, if applicable.
5. Date plan was completed, and time period covered by plan (must be at least ten 10 years and not more than twenty 20 years).
6. Statement of owner's objectives and intentions for commercial forestry and any other forest uses and benefits.
7. Soil information, including restrictions on use to prevent rutting or soil disturbance during harvesting operations or equipment use. Address best management practices for each stand.

   Type map:

   A. Enumerating stands by stand ID#, cover type, size and density (See DNR cover type symbols on page 2)

   B. Show scale (must be at least 4 inches = 1 mile)

   C. Location within Township/Range/Section

   D. Trails and surface water

   E. If the property does not border a county or state controlled road, indicate the legal and physical access for timber removal and public hunting and fishing

8. **Narrative descriptions of each stand** including the acreage, cover type, stand composition, stand density by size class, and stand age. Indicate for which forest products the stand is being managed and the silvicultural system used to achieve them. Include remarks on how to optimize production, harvesting, utilization, and promotion of effective regeneration.
9. Summary table of all stands listing the prescribed practices and their approximate harvest schedule dates.
10. Provision for keeping a continuous record of silvicultural practices accomplished.
11. Provision for amendments to reflect disasters or other unexpected events.

Note: The plan must be prepared by a registered forester or a natural resources professional the DNR has determined to be qualified to write forest management plans. Landowners are required to notify the DNR 10 days before beginning any harvesting operation by completing and submitting the CF harvest notification form , which is available online at *Michigan.gov/Commercial Forest,* "Remove Forest Products".

COVER TYPE, SIZE, AND DENSITY SYMBOLS
(OPTIONAL)

Cover Type

A - Aspen (Upland)
B - Paper Birch
C - Cedar
D - Treed Bog
E - Swamp Hardwoods
F - Spruce – Fir (Upland, including Upland Black Spruce)
G - Grass
H - Hemlock
I - Local Use
J - Jack Pine
K - Rock
L - Lowland Brush
M - Northern Hardwood
N - Marsh
O - Oak
P - Balsam Poplar & Swamp Aspen and Swamp White Birch
Q - Mixed Swamp Conifer
R - Red Pine
S - Black Spruce – Swamp
T - Tamarack
U - Upland Brush
V - Bog or Muskeg
W - White Pine
X - Other non-stocked or non-forest or non-productive
Y - Sand Dunes
Z - Water

Size Density (Stocking)

0 - Non-stocked (less than 17% stocked)
1 - Seedling – Sapling, poor stocking (17% - 39%)
2 - Seedling – Sapling, medium stocking (40% - 69%)
3 - Seedling – Sapling, well stocked (70% +)
4 - Pole-timber, poor stocking (10 – 39 sq ft basal area)
5 - Pole-timber, medium stocking (40 – 69 sq ft basal area)
6 - Pole-timber, well stocked (70 + sq ft basal area)
7 - Saw-timber, poor stocking (10 – 39 sq ft basal area)
8 - Saw-timber, medium stocking (40 – 69 sq ft basal area)
9 - Saw-timber, well stocked (70 + sq ft basal area)