



# **Yellow Dog River Community Forest Plan**

Adopted on February 8, 2017  
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## I. Introduction

The Yellow Dog River Community Forest is a protected area in the Upper Peninsula of Michigan that is revered locally and afar for its wilderness characteristics and ample recreational opportunities. The Community Forest will be used for a variety of endeavors and the management of those uses has been designed after implementing a Public Participation Process, which was modeled from the International Association for Public Participation. This document is to serve as the primary resource for those wishing to learn more about the forest. The plan describes in detail the condition of the forest resources, the community's priority uses, management actions needed to reach the intended goals, and more.

## II. History of the Yellow Dog River Community Forest

The Yellow Dog Watershed Preserve (YDWP) long ago identified the present day Yellow Dog River Community Forest area as a key target for land protection in 1995. The property's key attributes make it important ecologically and culturally, but also susceptible to negative impacts from any potential development. An opportunity to purchase the area became available to YDWP in 2013. The previous owners contacted the organization to offer first chance at purchasing the property before it was put up on the market and potentially subdivided into smaller, fragmented parcels. Parcelization, as it is called, can damage the ecosystem and change the way the community uses the area. If the property was sold to numerous, smaller land holders, it would be very challenging to maintain the area for its multitude of benefits it provides. In addition, public access would be seriously diminished, if not lost entirely. YDWP agreed to pursue the purchase of the property to keep it in a natural state and open to the public. Upon embarking on this project, YDWP set forth the primary goal which was to protect and maintain the natural resources of the property while ensuring the community is able to utilize the area for a variety of uses. Additionally, these objectives were identified.

1. We aimed to increase the amount of protected land and water: 688 acres and 5.28 miles of stream corridor would be protected through perpetuity.
2. We aimed to increase the amount of community involvement: At least 200 people would be directly involved during the planning and establishment process.
3. We aimed to secure public access: This project would permanently established 2 public access points to the property.

Four years of work went into the project including procuring the funds to acquire the property, gathering data on the natural resources, building a Community Forest Committee, researching public planning procedures, and finally the creation of management strategies. The work was completed primarily by YDWP staff with the aid of many volunteers, committee members, consultants, donors, and stakeholders.

Funding was finally accrued in March of 2016. The largest sources of funds for the purchase came from a \$400,000 federal grant under the U.S. Forest Service's Community Forest and Open Space Program. Several private foundations provided substantial funds in the tune of \$400,000. An anonymous donor provided \$115,000. And hundreds of individuals and community organizations brought in \$185,000. Max and Mary Putters donated their 20 acre tract of land to be included as well.

The purchase was completed on September 30, 2016 and the Yellow Dog Watershed Preserve became the legal owners of the property known as the Yellow Dog River Community Forest. It will be their responsibility to keep the property protected in perpetuity. In conjunction with the Community Forest Committee, they will implement the management decisions laid out in this plan.

### III. Natural Features of the Community Forest

The Yellow Dog River Community Forest is one of the most scenic areas along the entire Yellow Dog River, as well as the key access point for the public. It is located in the Upper Peninsula of Michigan in the northwest portion of Marquette County. Most of the land is located in Ishpeming Township, although 22 acres are located in Powell Township. The Community Forest features 688 acres of forest, granite knobs, and picturesque waterfalls along the 5.28 miles of stream and tributary. While the property is comprised of three separate parcels along the stream, the bulk of the property is one contiguous section.

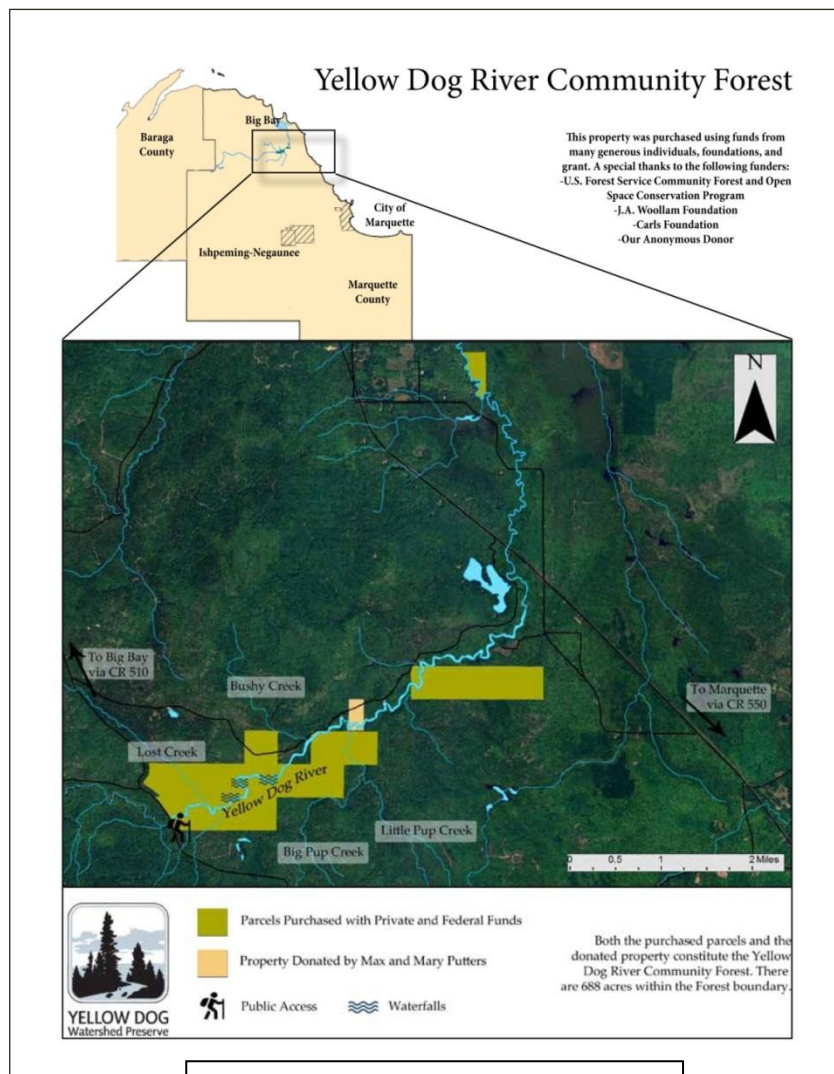


Figure 1: Map of the Geographic Location of the Community Forest

### a. Land Cover

Land cover of the Community Forest is dominated by forests, which comprise 86% of the land base. Other land cover types include 8% wetlands, 2% open space/water, and 4% herbaceous/shrubs.

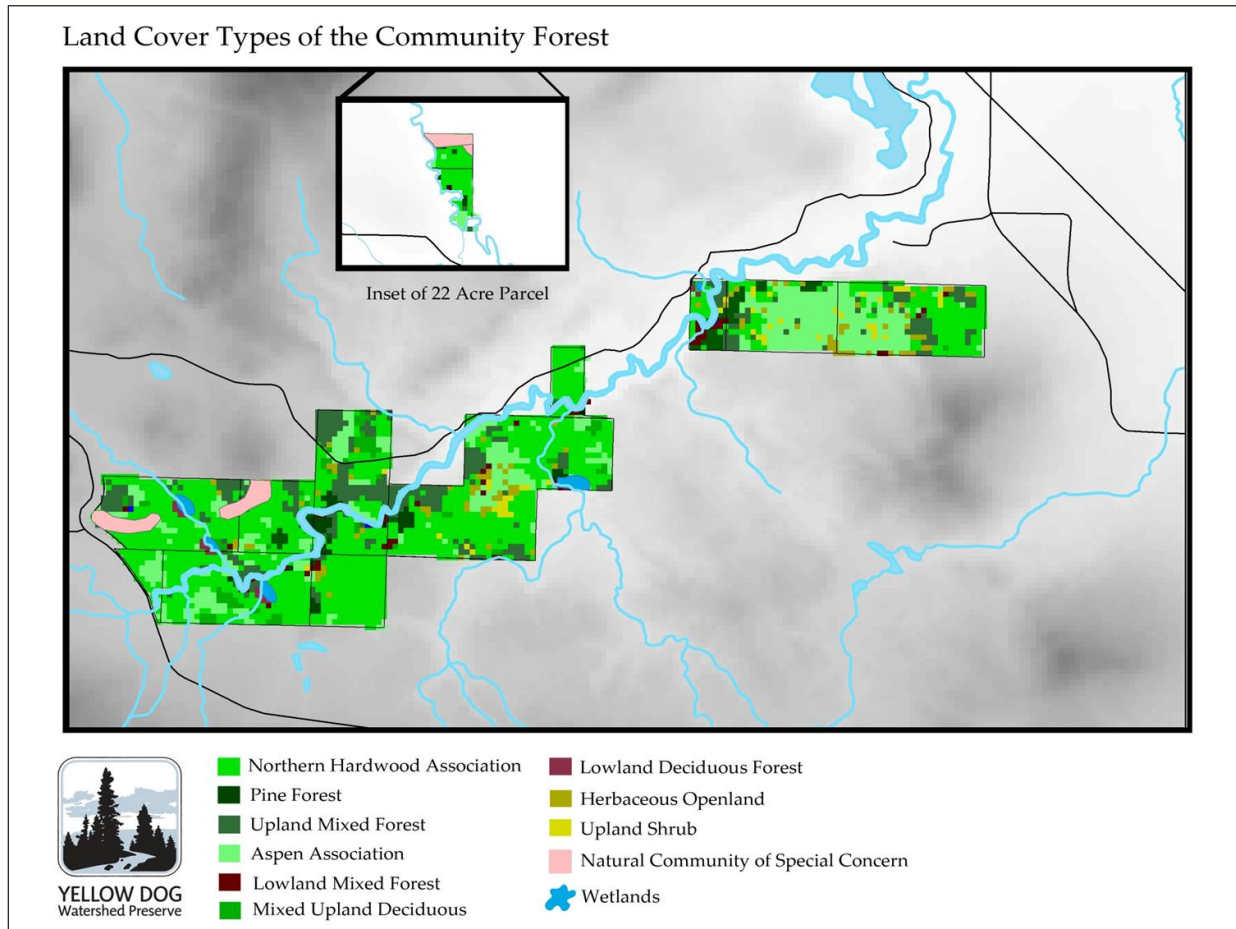


Figure 2: Map of the Land Cover of the Community Forest

### b. Topography

The Community Forest has a variety of topographical features ranging from areas of low elevation to steep, rocky slopes and outcrops. Of special note is the Community Forest's location within the Michigamme Highlands, a regional landscape featuring some of the most scenic landscapes in Michigan and highly valued for its recreational opportunities and ecological significance. This landscape is defined by the uplands of exposed Precambrian bedrock. The bedrock is part of the Canadian Shield formation, estimated at 3.5 billion years old, which is known to be some of the oldest rocks found on face of the planet.

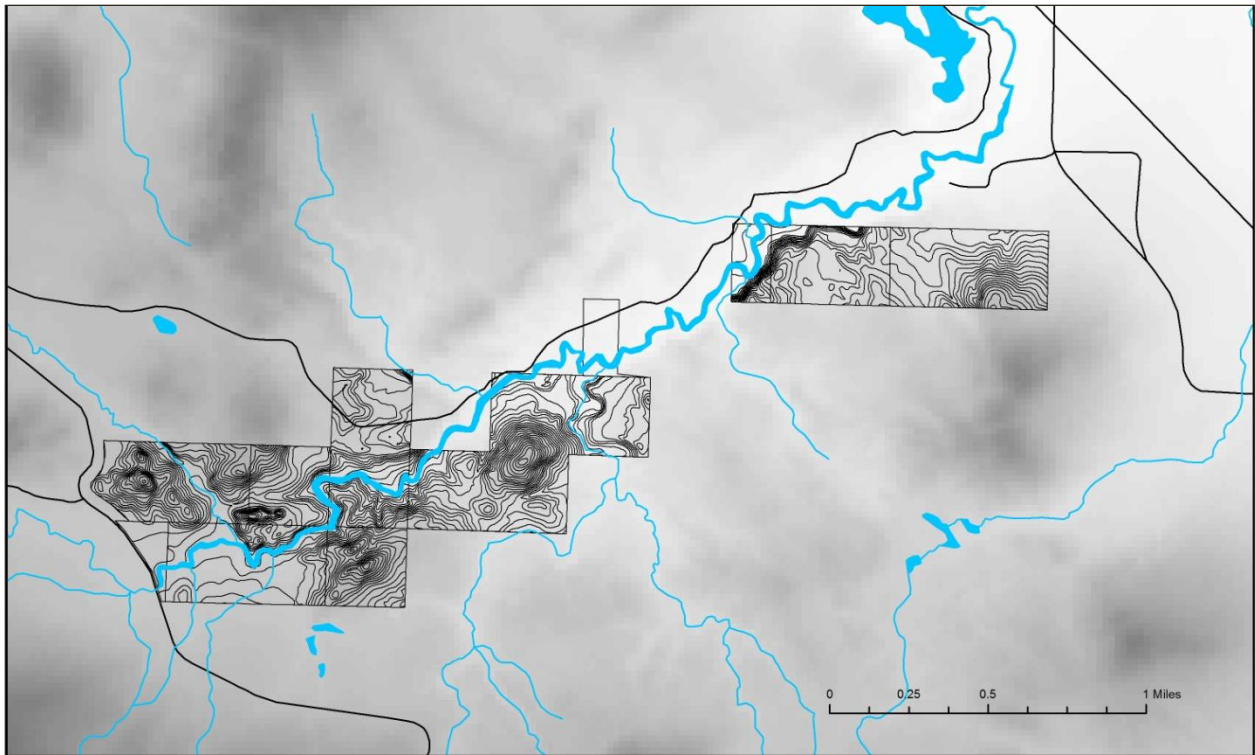


Figure 3: Map of the Topography of the Community Forest. Each contour line is 10ft.



Figure 4: Photograph Illustrating the Community Forest's Topographical Features



### c. Soils and Geology

Three types of bedrock can be found under the Community Forest; Archean Granite and Gneiss, Jacobsville Sandstone, and Michigamme Formation. The most prominent bedrock type is the Archean Granite and Gneiss which comprises 96.6% of the total. The other two types represent a very small fraction of the total, with Jacobsville Sandstone at 3.3% and Michigamme Formation at .1%.

The soil types are much more variable than the bedrock and include 36 different types. Each type varies in its slope, porosity, and dissection. Most are non-hydric soils and feature steep slopes and rocky/sandy composition.

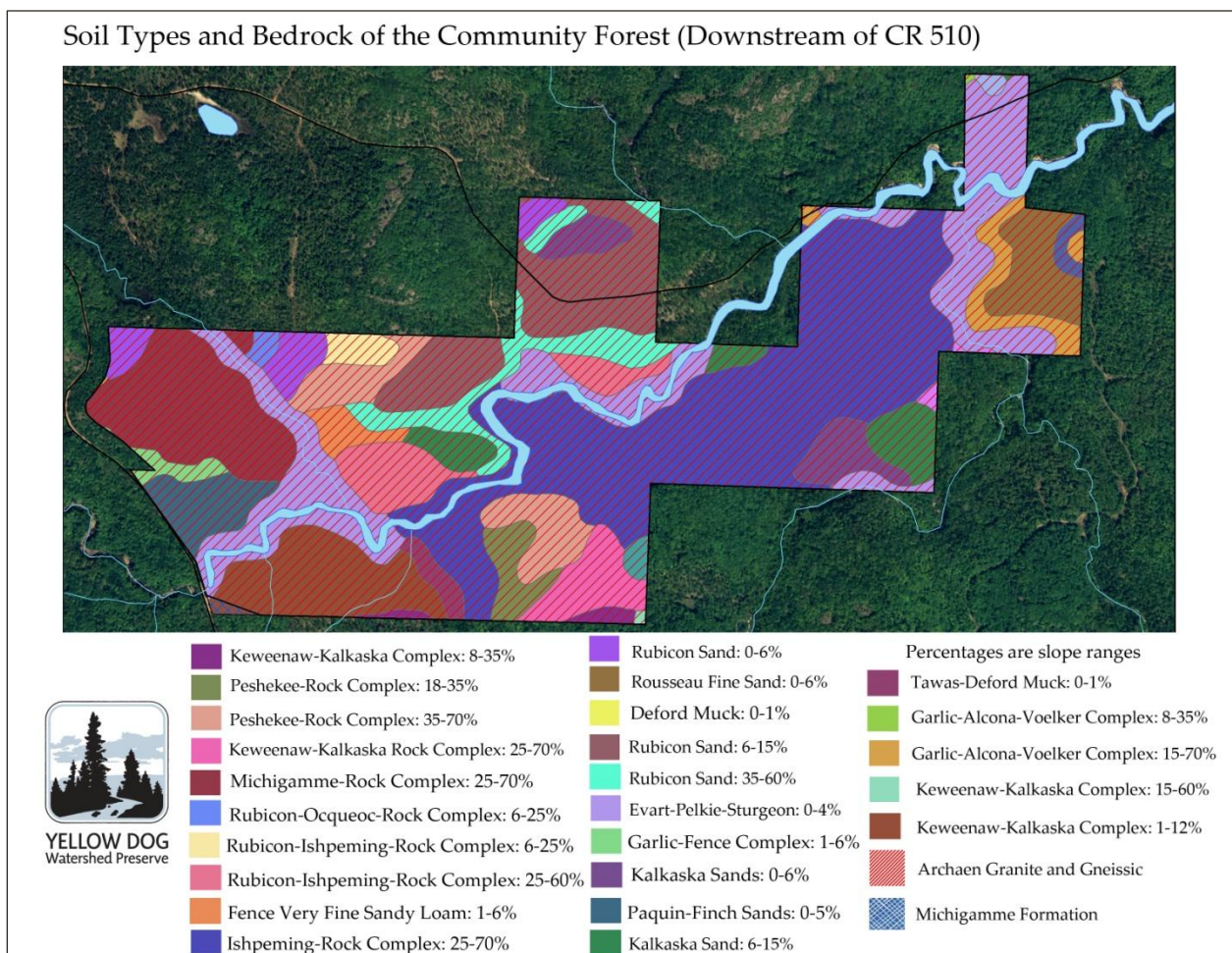


Figure 5. Map of the Soil and Bedrock Types Downstream of CR 510

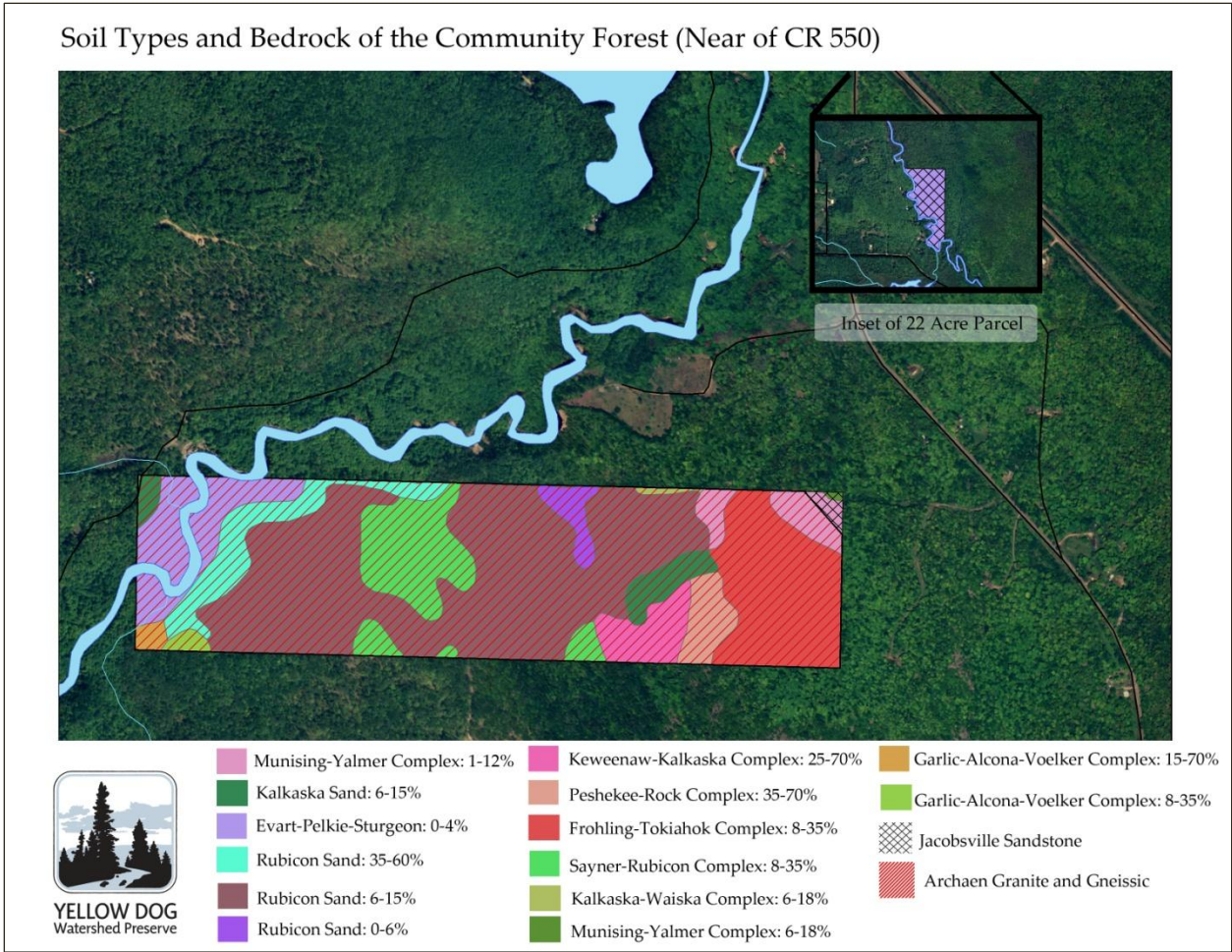


Figure 6. Map of the Soil and Bedrock Types near CR 550

d. Natural Communities

A natural community is an assemblage of plant and animal species found in a given physical environment. They are delineated using three basic criteria: plant composition, vegetative structure, and physical conditions. The leading authority in Michigan on natural communities is the Michigan Natural Features Inventory. Using data collection and analysis, a map was created that identifies the types of natural communities found in the Community Forest. Of note are two natural communities of special concern; Granite Bedrock Glades and Boreal Forests.

i. Granite Bedrock Glades

Granite Bedrock Glades are highpoints that provide panoramic vistas of the river valley, surrounding forest, and Lake Superior. These ecosystems are rated as an S2 by the Michigan Natural Features Inventory. This classification means that the ecosystem type is imperiled in the state due to a highly restricted range. Granite Bedrock Glades

occur in only 3 Michigan counties, with the majority of them in northern Marquette County near the Community Forest.

These glades are very vulnerable. The thin soils and constant exposure to wind and drought create unique and fragile living conditions for many types of plants. As such, these areas are known to harbor rare plants, particularly fern species.

Several factors threaten these natural communities including development and building of seasonal/permanent dwellings. This type of activity results in eroding the small layer of soil, introduction of motorized traffic, and impacts from septic systems. Introduction of invasive species is also a threat. It is recommended that maintaining a mature, unfragmented forested buffer around the glades would aid in reducing the threats.

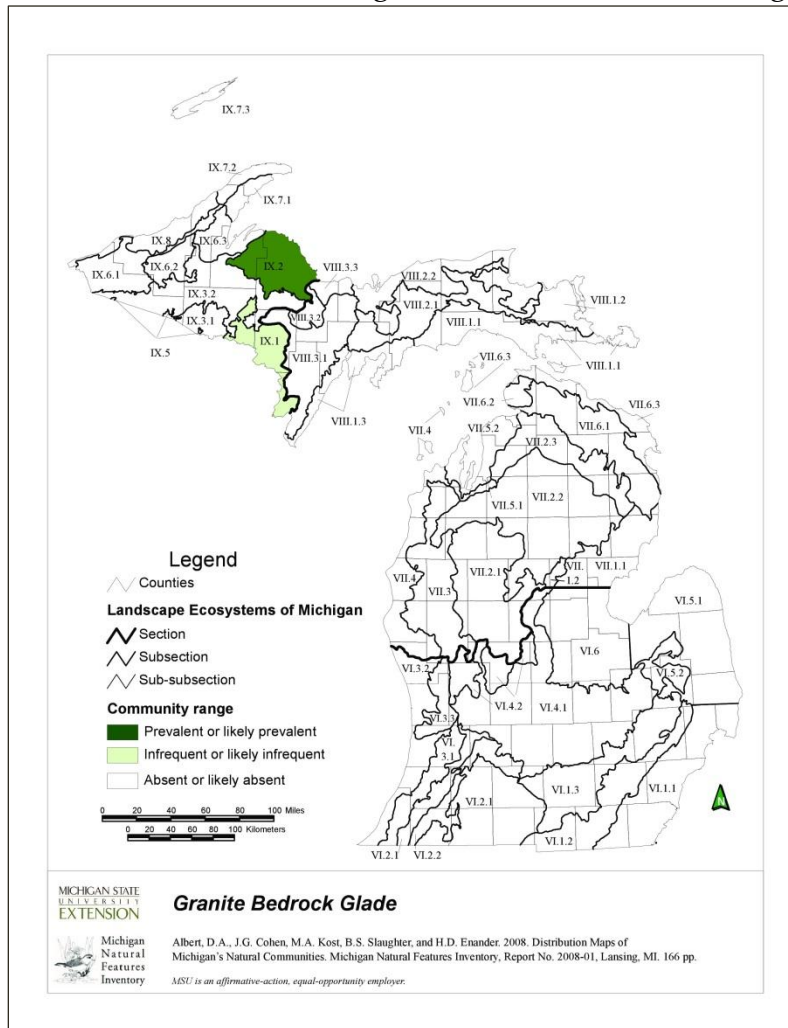


Figure 7: Distribution Map of Michigan's Granite Bedrock Glades

## ii. Boreal Forests

The Community Forest also contains Boreal Forests, another ecosystem type that is ranked by the Michigan Natural Features Inventory as S3, which means these forests are declining and vulnerable due to their restricted range. This natural community is associated with the Michigamme Highlands. Michigan boreal forests critical feeding,

roosting, and perching habitat for migrating shorebirds, waterfowl, and songbirds in the spring. The majority of shrubs found within boreal forest have fleshy fruit, an important food source for birds such as grosbeak, crossbills, warblers, and white-throated sparrow. Timber harvest, development, and excessive browsing by deer are the primary threats to boreal forests. When the primary conservation objective is to maintain biodiversity in boreal forests, the best management is to leave large tracts unharvested and allow natural processes (e.g., windthrow, insect defoliation, and fire) to operate unhindered and stochastically generate a range of successional stages.

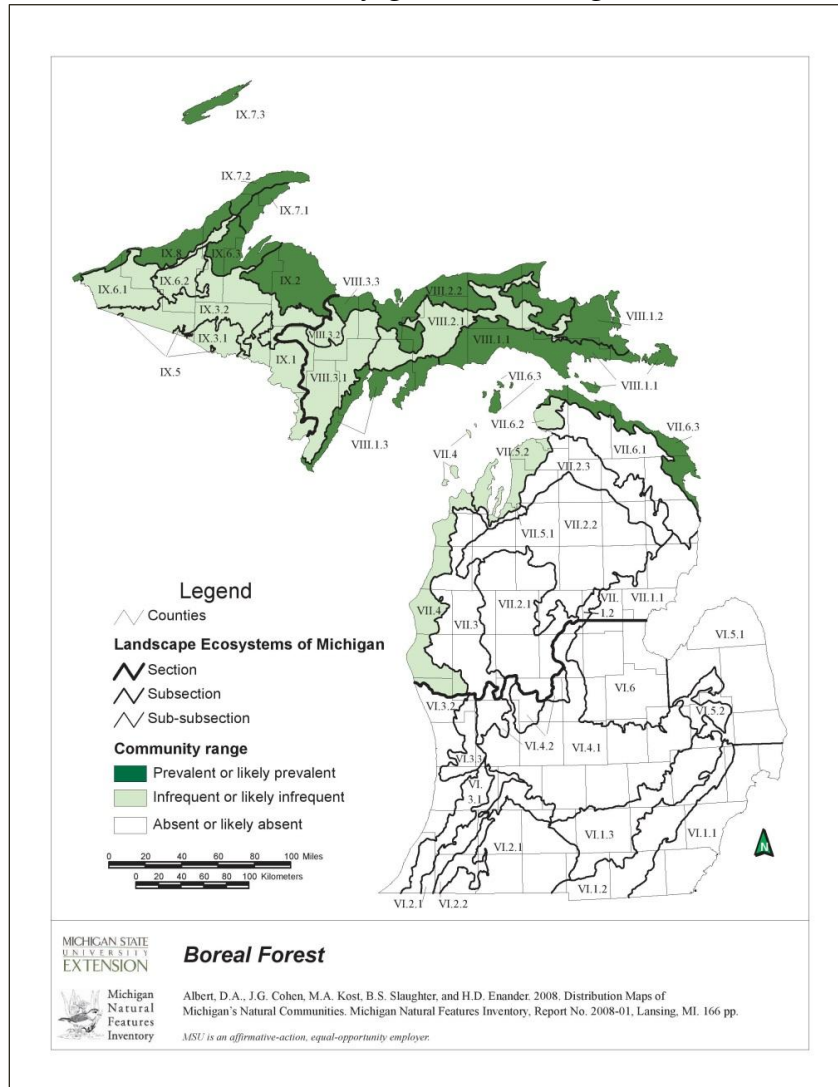


Figure 8: Distribution Map of Michigan's Boreal Forests

### e. Forest Composition

The most prominent forest type found in the Community Forest is the mesic northern forest complex. This forest type is dominated by Sugar Maple, Hemlock, Yellow Birch, White Cedar, and Red Oak. White pine is found dispersed throughout, growing at super canopy heights. Subcanopy vegetation in this forest type includes Balsam Fir,

Striped Maple, Ironwood, Dogwood, and Beaked Hazelnut. Other forest types that are found in small proportions in the project area include dry northern forest which is dominated by pines and hardwood conifer swamp dominated by spruce and ash.

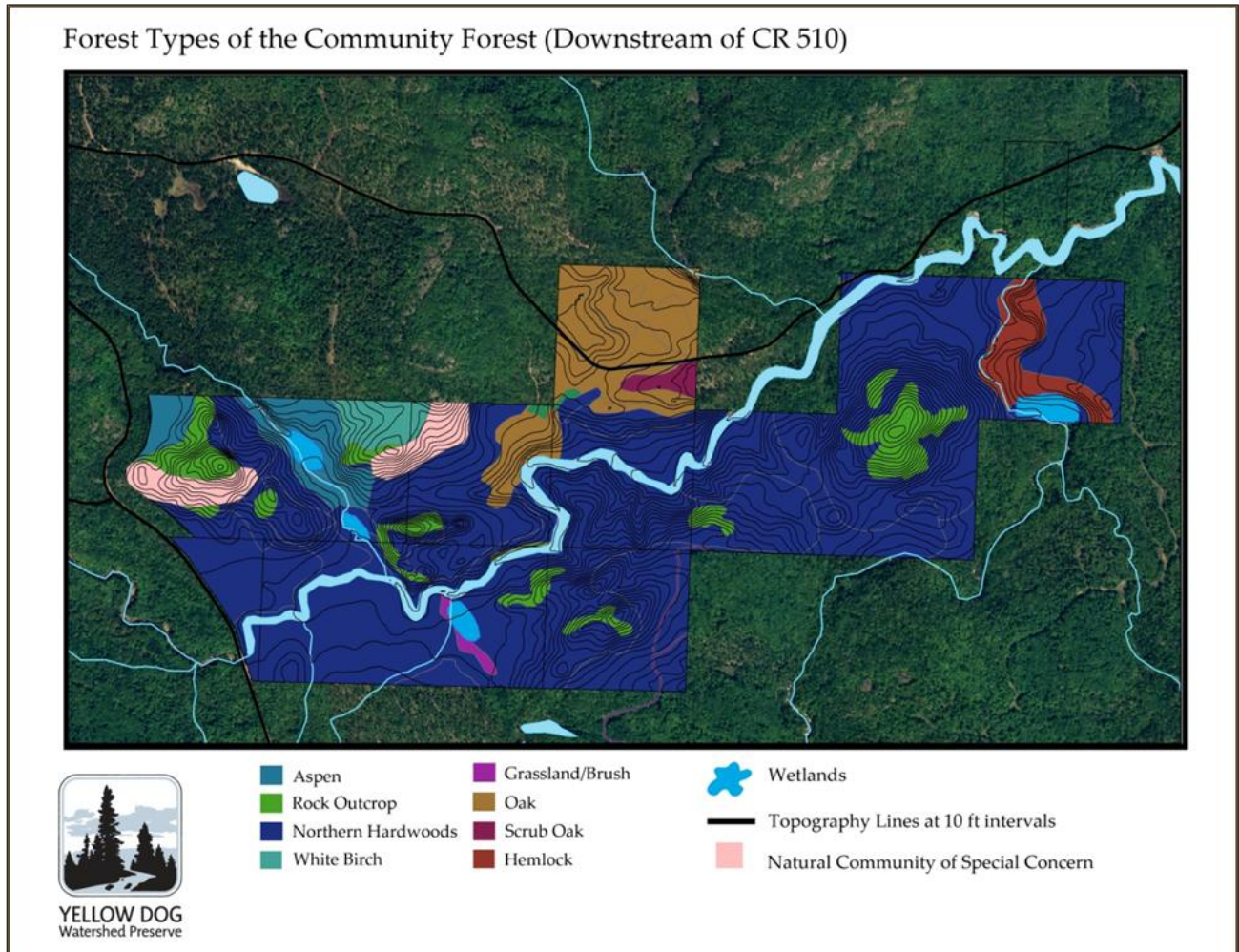


Figure 9: Map of the Forest Types of the Community Forest Downstream of CR 510

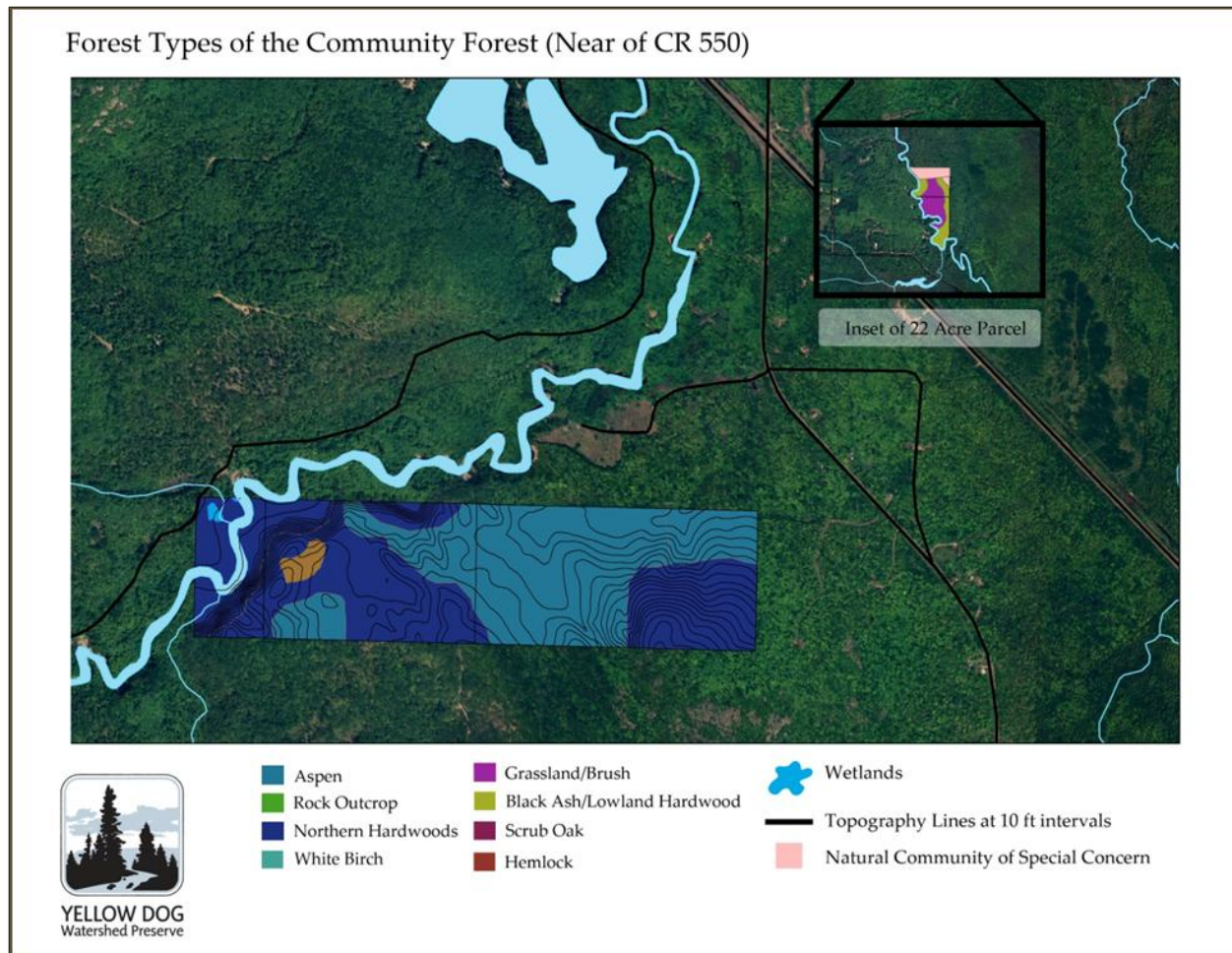


Figure 10: Map of the Forest Types of the Community Forest near CR 550

## f. Understory Plants

Vegetation surveys were conducted in a variety of locations in the Community Forest. The purpose of these surveys was to gain an understanding of the community types present, identify rare plant species and their associated communities, and create a species list for all encountered vascular plants. Survey methods consisted of establishing 22 relevé style plots and a meander survey.

To select plot locations, several random points were placed within the boundaries of differing land cover types from the 1992 National Land Cover Dataset (NLCD). Points were then scouted for habitat accuracy. Sampling locations were then chosen from those which were correctly classified in the NLCD. In addition to randomly selected plot locations, other locations were subjectively selected to capture communities not included in NLCD. Within each plot, plants were identified to species level if possible and assigned a cover value using the Braun-Blanquet cover abundance scale. The meander surveys focused on riparian zones of Lost Creek, Big Pup Creek, and Yellow Dog River, as well as rock outcrop habitat.

A total of 279 species were observed, with 253 native species (91%) and 26 non-native species (9%). The mean coefficient of conservation (C) of native species is 4.3. This average reflects a relatively normal distribution of C values, with a mode of 5. The distribution represents an array of habitat qualities in the three areas. There are some locations of high habitat quality that likely have not received a recent, major disturbance (e.g granite rock bald and granite cliff); areas which have been recently disturbed (previously logged portions and logging roads), and areas which have received disturbance somewhat recently but are in stable phase. The high number of middle range C values suggests that much of the habitat is in a relatively stable state.

Two state listed species were encountered during the surveys: *Cystopteris laurentiana* (Laurentian Fragile Fern) and *Dryopteris filix-mas* (Male Fern). These species are indicative of high quality habitats and receive special status because of concern for the health of their populations. Other noteworthy ferns are *Asplenium trichomanes subsp. trichomanes* (Maidenhair Spleenwort) and *Woodsia ilvensis* (Rusty Woodsia). All four of these ferns are associated with rock outcrops (Granite Bedrock Glades and granite cliff community types). See Appendix A for Plant Species List.

#### g. Animals

There is a variety of animal species found within the Community Forest. No surveys have been specifically done to observe mammals, reptiles, and amphibians. However, several bird and aquatic invertebrate surveys show the known species.

#### i. Mammals

Many mammal species use this area for their primary habitat and migration routes. The forests are used by predators such as the gray wolf, coyote, and bobcat. Significant predator populations equate to healthy, vibrant ecosystems and keep natural cycles in check. Additionally, species like pine martens, black bear, and moose inhabit the Community Forest. Moose in particular are tied to this area, since they have a narrow range of habitat requirements.



Figure 11: Photograph of a Moose near the Community Forest

They need large tracts of undeveloped forest for grazing, along with access to water and aquatic plants. Many studies have recently come out stating that moose are declining due to a rise in temperature. The project area is able to provide various microclimates that are cooler that allows moose to seek refuge during warm spells. Mountain lion and Gray wolf are endangered and their habitat requirements should be included in management decisions. In addition, Moose are considered a Species of Concern in Michigan. See Appendix B for the Mammal Species List.

## ii. Birds

The Community Forest provides habitat for upland birds, neotropical migratory birds, raptors, water birds, and song birds. Multiple bird survey were completed between the fall of 2014 and summer 2015, which found 68 species observed, including the Bald Eagle, Great Blue Heron, and Pileated Woodpecker. Additional surveys are likely to aid in increasing the total number of species present. See Appendix C for the Bird Species list.



Figure 12: Common Redpoll Spotted in Winter along Lost Creek

## iii. Reptiles and Amphibians

With both terrestrial and aquatic habitats, there is a diversity of reptiles and amphibians found in the Community Forest. While it is not projected that any species in this category are rare, threatened, endangered, or a species of concern, efforts will be made to further complete the survey of these species. See Appendix D for the Reptile and Amphibian Species List.

## iv. Aquatic Invertebrates

There is a healthy diversity of aquatic invertebrate species found within the waters of Community Forest. With ten years of data collected from this location, the species diversity and relative abundance rank high, and scores the site as excellent or good. During any given survey period, you are likely to find the following invertebrates:



Figure 13: Photography of Aquatic Invertebrates Found during Survey of the Yellow Dog River in the Community Forest



*Trichoptera, Megaloptera, Ephemeroptera, Gastropoda, Plecoptera, Coleoptera, Diptera, Pelecypoda, Decapoda, Odonata, Amphipoda, Isopoda, Oligochaeta, Hirudinea, and Hemiptera.*

## v. Aquatic Vertebrates

A smaller number of aquatic vertebrates have been observed in the waterways of the Community Forest. This number is likely to increase with additional surveys. At this time, the following species have been observed: *Salvelineus fontinalus*, *Oncorhynchus mykiss*, *Salmo trutta*, and *Cottus bairdi*.

## h. Water Features

The Community Forest contains several types of important water features. There is significant water frontage along the Yellow Dog River and its tributaries, 27,780 feet in total. Along that stretch are numerous waterfalls as well, some as large as Class IV. In addition, there are small isolated wetlands that contribute to the hydrology of the property.



Figure 14. Aerial Photograph of the Yellow Dog River as it Runs through the Community Forest.

### i. Yellow Dog River

The main water feature found in the Community Forest is the

Yellow Dog River, a Type 1 cold water trout stream of medium order revered locally and afar for its fishing and wild character. The river itself begins in a chain of lakes in the McCormick Wilderness Area, a federally protected area in the Ottawa National Forest. After it flows through the Community Forest, the river eventually empties into Lake Superior via Lake Independence and the Iron River. Roughly 2.7 miles of "main thread" and .84 miles of "single thread" river run through the property.

### ii. Tributaries

Within the Community Forest, there is frontage on two important tributaries of the Yellow Dog River; Lost Creek (.55 miles) and Big Pup Creek (.59 miles). In addition, there are another .6 miles of frontage along Bushy Creek and other small feeder streams. These tributaries provide a steady base flow of water and nutrients to the main stream and are important features for protection.

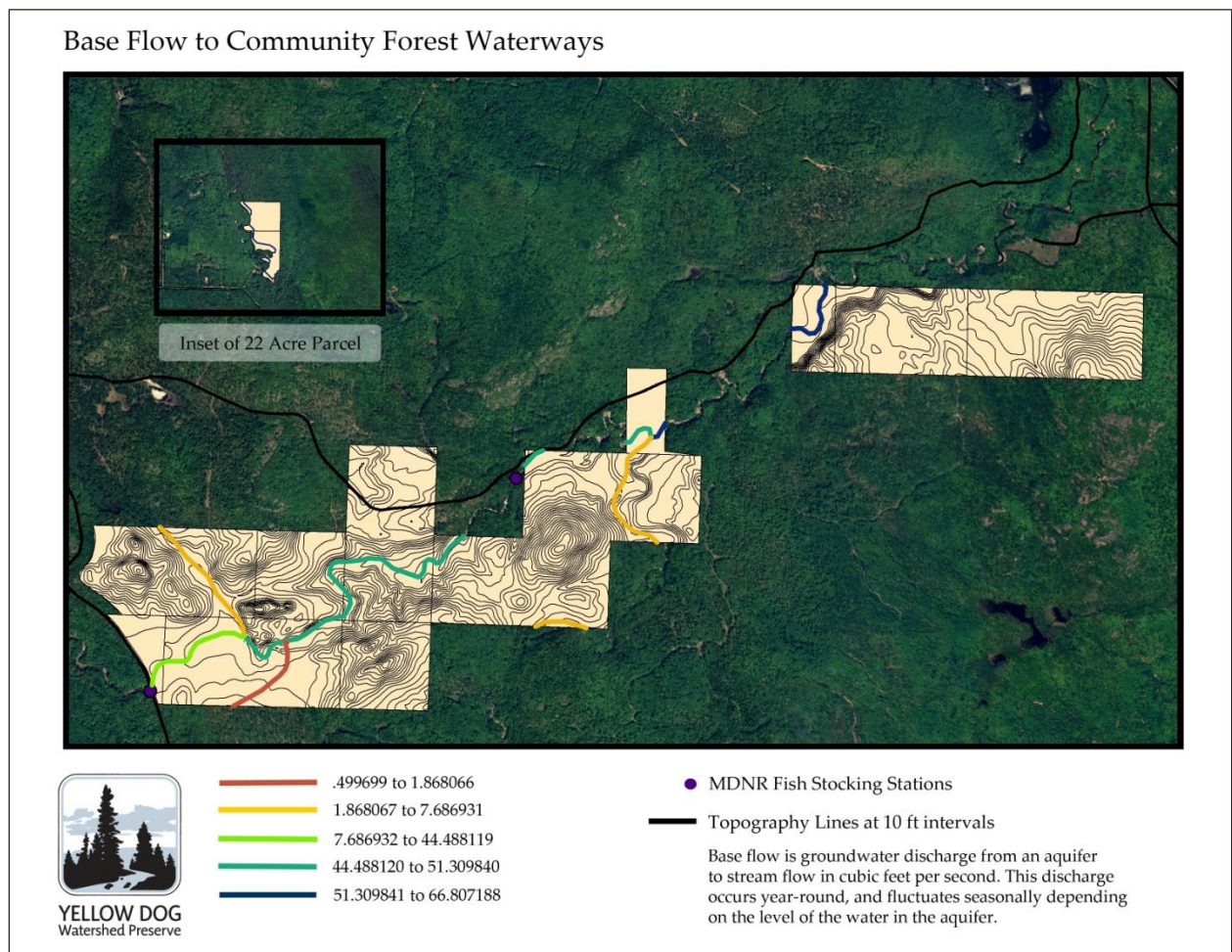


Figure 15. Map of the Base Flow of the Community Forest's Waterways

### iii. Waterfalls

The Yellow Dog River cascades through the Community Forest at an average gradient of 45 feet per mile. This gradient has created five major waterfalls with whitewater classification ranging from Class III+ to Class IV+, along with many minor falls in between. These features make it the most visited section of the river. The most well-known falls on the property is Yellow Dog Falls, known locally as Hills Falls.

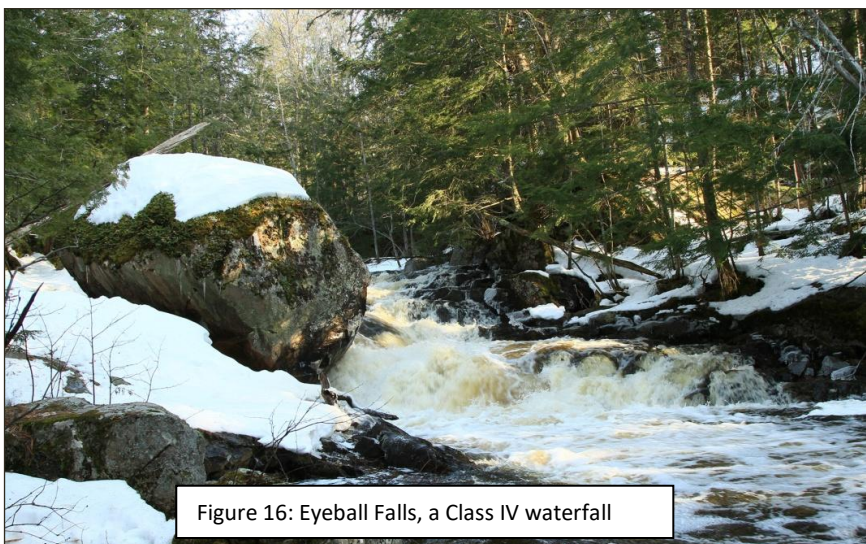


Figure 16: Eyeball Falls, a Class IV waterfall

#### iv. Wetlands

There are approximately 15.89 acres of wetlands within the Community Forest. They are classified by U.S. Fish and Wildlife Service as Palustrine Wooded wetlands, which are declining nationally. These areas are important for wildlife and plant habitats, hydrological regulation, and water purification. Further plants studies should be undertaken that target these specific wetlands.

#### v. Groundwater

The Community Forest is of moderate importance a source for groundwater recharge. The average recharge rate of the Community Forest is 12 inches per year. However, it is important to maintain these numbers for residents downstream who may have wells for their domestic water supply.

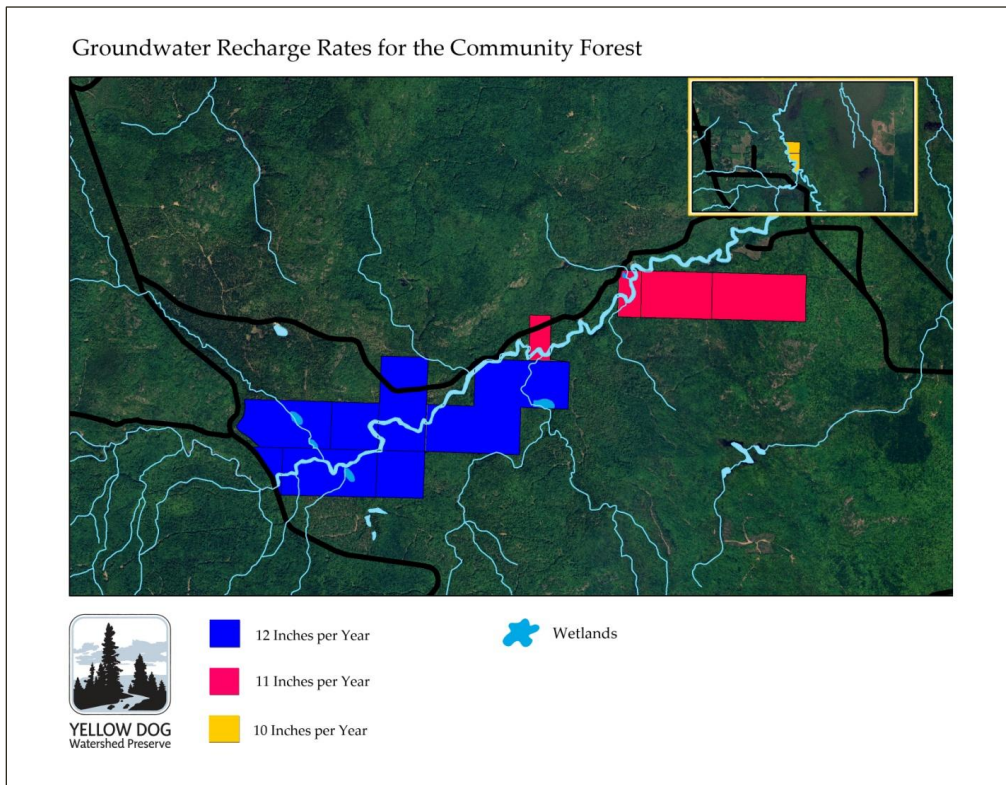


Figure 17. Map of Groundwater Recharge Rates in the Community Forest

### IV. Recreational Features of the Community Forest

The public has been using this property for recreation for quite some time. Its natural beauty is alluring and those who seek a quieter experience know this property can offer that. The previous owners had the property enrolled in Michigan's Commercial Forest Program, which requires foot access to the general public for hunting and fishing. As such, many silent sport recreational activities have transpired.



Figure 18. Whitewater kayaker during Spring Flood

Two important features helped make this area popular for recreation. Firstly, the vast majority of visitors use an access point located on County Road 510 as it crosses the Yellow Dog River. This access point is located on a year round, maintained public road. Parking is easy and available along the shoulder of the road. Secondly, a hiking trail that was created by foot traffic over decades of use provides easy access and navigation to Yellow Dog Falls. The trail is about .75

miles long, previously unmaintained, and currently a dead end. There are several spur trails that lead to the river for fishing ingress/egress also.

## V. Community Demographics

The nearest populace to the Community Forest is a small town called Big Bay in Powell Township. It is the only population cluster in the watershed (pop. 816). To illustrate the area's remoteness, Powell Township aptly uses the motto "Where the road ends and the adventure begins." There are 34.5 people per square mile, according to County level statistics, while that figure is much lower in the surrounding areas of the watershed. Big Bay has a long forestry heritage, being founded mainly as a wood production community. Today the main industries are timber, tourism, mining, and hospitality. It is a resource based rural economy.

The majority of the populace however is found in the nearby city of Marquette, as well as the urban corridor running from Marquette up to Ishpeming Township. Marquette is the largest town by population (pop. 21, 532) in the Upper Peninsula and is 17 miles to the southeast of the watershed as the crow flies. Marquette is known for having an active outdoor recreation community and the watershed is frequently used as a location for recreation and solitude.

## VI. Management of the Community Forest

Maintaining the current condition of the natural resources and continuing to provide recreational access are critical in managing the Yellow Dog River Community Forest. The successful establishment and long term care of the Community Forest can occur only with the meaningful involvement from various sectors of the community. The idea of the Community Forest itself is defined by the involvement of the public.

## a. Roles and Responsibilities

When discussing the “community” involvement, it is important to outline the roles and responsibilities that each sector is invited to have in the planning and implementation of the project. The community can be categorized into four different roles.

### i. The Landowner

The Yellow Dog Watershed Preserve will legally own and possess the Yellow Dog River Community Forest. YDWP began in 1995 as a non-profit organization whose mission is to preserve and protect the watershed for the benefit of present and future generations. The group owns and manages 412 acres of land in the watershed as nature preserves and provides experience and knowledge in land protection projects. YDWP has a long history of using the area for hosting outdoor events and educational workshops to promote awareness of the watershed.

YDWP’s role will be to coordinate groups and individuals involved in the planning and long term stewardship of the Community Forest. They will also provide one representative to be part of the Community Forest Committee, defined below. YDWP shoulders all of the legal and fiscal responsibilities relating to the ownership of the property.

### ii. The Community Forest Committee

There are currently eight members that comprise the Community Forest Committee. Additional committee members can be added over time but there must always be at least 5 active on the committee. Committee members are responsible for providing information regarding their specific expertise during planning and management of the Community Forest. They represent their respective constituencies and will bring the input of their members to the discussion. Ultimately, the committee makes the final decisions after the maximum amount of public engagement and input has transpired. Below is a list of the members as of 2017.

#### *Upper Peninsula Land Conservancy*

The U. P. Land Conservancy began in 1999 as Central Lake Superior Land Conservancy. They are now a regional nonprofit land conservancy with a working board and professional staff. The Conservancy promotes the permanent legal protection of the conservation values of natural, agricultural, recreational, and scenic lands in Michigan's Upper Peninsula (U.P.) through the use of conservation easements, land donations, and education.

#### *Yellow Dog Watershed Preserve*

YDWP began in 1995 to preserve and protect the Yellow Dog River watershed. The group will participate on the committee by bringing their expertise on watershed issues,

leading outreach pertaining to the Community Forest, and leading long term monitoring efforts. If for any reason the public and the committee reach a decision regarding the management of the Community Forest that is in direct contrast to the protection of the area, YDWP retains the right to veto that decision.

#### *Powell Township School*

This school district serves the small community of Big Bay. Small class size makes it ideal for taking students out to the project area for outdoor education. The school takes classrooms out for science class, especially the upper grades that are learning about water and physical measurements.

#### *Fred Waara Chapter of Trout Unlimited*

The Fred Waara Chapter of Trout Unlimited is based in Marquette and has over 300 members, virtually all of whom are trout fishers. The Yellow Dog River is one of the favorite fishing destinations for its members and their guests. Many of the Chapter's members fly fish, and the Yellow Dog is an excellent fly fishing stream, being very wadeable with a thriving native brook trout population. Many of members will spend 2-3 days on the Yellow Dog each fishing season. In addition to their member's enjoyment of the Yellow Dog, our Chapter frequently get inquiries from visitors to the Marquette area about preferred places to fish. The Yellow Dog is a favorite referral destination. The Fred Waara Chapter of Trout Unlimited supports all efforts to preserve the Yellow Dog as an excellent trout stream with good public access.

#### *Ishpeming Township*

The majority of the Community Forest is within Ishpeming Township. Its zoning law and management policies directly impact the forest. It is imperative that the Committee be comprised of local authorities such as Ishpeming Township, so that the project is sure to follow any local ordinances and zoning. The township representative will ensure that activities within the Community Forest complement efforts in the greater area.

#### *Michigan Department of Natural Resources Wildlife Division*

Decisions regarding wildlife in the Community Forest will be improved with the assistance of the MDNR's Wildlife Division. The division can provide critical data regarding species and examples of how state agencies handle wildlife issues.

#### *Marquette County Conservation District*

The Conservation District has years of experience conducting programs associated with invasive species removal, sustainable forestry, and watershed restoration. Their knowledge and expertise will be very useful during planning and implementation.

### *Marquette County U.P. Whitetails*

From the U.P. Whitetails perspective the project area is an important wildlife corridor to protect and maintain. As winter sets in and whitetails migrate, they tend to follow watersheds down closer to Lake Superior where there is lower snowfall and warmer temperatures. Deer use this area and it's hemlock thermal cover as resting areas on the way to their winter yarding complex. The group values this area for its hunting opportunities. The group will play a role by reviewing any forestry plans to ensure they meet the needs of the hunting community.

### *Member at Large*

Any member of the public that wishes to serve on the Committee and bring forth the public's recommendations will be allowed run for a seat on the Committee. Information regarding this position will be posted on websites, in press releases, and through other networks. Interested candidates will be voted in via the remaining committee members.

### iii. The Public

Since the public is the primary user of the Community Forest, strong engagement of the public will be necessary for the project to be successful. The public will be invited to participate in the following ways:

1. Get informed: Information will be provided to the public via websites, press releases, and outreach activities such as hikes or ski events in the Community Forest.
2. Provide feedback: Opportunities will be available during planning and implementation of the Community Forest for feedback. These opportunities will include feedback forms on websites, comments on social media, surveys during outreach events, and more.
3. Help problem solve: During planning, the public will be invited to workshops to help identify and solve any potential management issue. Input will be sought during workshops through public comment, written comments, and in person discussions during the workshops.
4. Direct decision making: A seat on the Community Forest Committee will be made available to any member of the public who wishes to be part of the direct decision making and management discussions.
5. Be involved in stewardship: Volunteers for long term management and monitoring will be sought from the public sector. There will be on-going opportunities for the public to be directly involved.

### iv. Other Partners

Other organizations will be involved in the project outside of sitting on the Community Forest Committee. Thus far, three organizations have agreed to partner with YDWP and

the Committee. Their primary role will be to help implement the management actions that are identified in this plan.

*Partner, Cedar Tree Institute*

Established in 1995, The Cedar Tree Institute is a nonprofit organization providing services and initiating projects in the areas of mental health, religion, and the environment. It offers mental health services on an individual basis, works with faith communities and environmental groups, and is currently involved in ongoing partnerships with the US Environmental Protection Agency, the United States Forest Service, and four American Indian tribes in Michigan's Upper Peninsula. The CTI has been coming to the project area as part of their Manitou Project for the past 2 years. The project aims to plant 10,000 Northern White Cedar trees throughout the Upper Peninsula as a region wide restoration effort. This initiative is partnership comprised of CTI, Keweenaw Bay Indian Community, and the U.S. Forest Service. The CTI's partnership will ensure that the Community Forest remains a haven for solitude and spiritual connection to the natural environment. CTI plans on continuing plantings of Cedar Trees in the Community Forest in order to promote forest diversity while engaging volunteers and other faith based organizations.

*Partner, Keweenaw Bay Indian Community*

KBIC supports this project for its benefits to their ceded territory and for maintaining uses for tribal members. Activities like hunting, gathering, and fishing are all important uses to continue. KBIC will partner in the future in monitoring activities by offering their natural resources department staff. Those monitoring activities would include fisheries research, water quality testing, and coordination with KBIC's internal management plans.

*Partner, Marquette County Planning Division*

The Planning Division can provide assistance that will ensure the Community Forest progresses according to the goals and objectives identified by the County. This partner can also assist in reaching out to the public to solicit input, help direct the planning process, and provide insight on forest management.

## b. Givens and Restrictions

Several mandates exist that cannot be changed which stem from associated legislation, policies, grant agreements, and ownership conditions that apply to the Yellow Dog River Community Forest that affect management planning and development. Many of the "givens" are from the U.S. Forest Service as a condition of the grant that was used to purchase the property. In addition, any acreage remaining in the Commercial Forest program under the Michigan Department of Natural Resources must meet certain criteria. The combined givens and restrictions are listed below:



- Must allow public access
- Must be maintained as a forested landscape
- Following uses are prohibited:
  - Subdivision
  - Residential Development
  - Agriculture
  - Development (Roads, power lines)
  - Mining/Non-renewable resource extraction\*(except those activities that would not require surface disturbance)
  - Industrial use (Wind or hydro power, etc.)
  - No structures/facilities
  - Continuous organized uses that compact the forest soil/degrade the natural resources
  - Commercial use except sustainable timber and/or limited uses associated with recreational, cultural, or educational use of the Community Forest by the public

## VII. The Public Participation Process

There exists a variety of ways to collect, compile, and incorporate input from the public in management decisions. The key is to design a Public Participation Process that asks the right questions and provides meaningful opportunities for discussion and dialogue.

### a. Visitor Experience and Resource Protection Planning Process

In attempting to design a productive Public Participation Process, the Yellow Dog Watershed Preserve applied for and received an in-kind grant from the National Park Service's Rivers, Trails, and Conservation Assistance Program. The program offers assistance that focuses on planning for visitor experience and resource protection. This process is often used by federal agencies when planning the management of parks or trails and has been vetted nationally. The Visitor Experience and Resource Protection Planning Process (VERP) is a proactive and goal driven process which defines:

- the different types of visitor experience opportunities
- the essential elements of those experiences
- what resource conditions will support the type and level of use
- where within the Community Forest do those conditions occur
- the resource management goals
- amount of land to be allocated to visitor experiences and management objectives

The range of possible visitor experiences and resource conditions that can be managed and developed within the Community Forest is determined by:

- public feedback, desires, and goals
- the corridor's natural and cultural resources and physical conditions

- other factors such as administrative and legislative policies

Based on this information, possible management and development scenarios, or zones, are determined which describe the types of visitor uses and resource management objectives. Using a common set of possible management zones, management alternatives are created for the Community Forest. A preferred alternative is then selected which provides the basis for the Yellow Dog River Community Forest Plan.

### i. Methods for Solicitation of Public Input

Two Community Forest Planning Sessions were held to provide information to the public. Topics covered included the types of natural resources present on site, the process for public participation, and the “givens”. Opportunities were then provided to help develop resource management and visitor experience goals, and gather their input



Figure 19. Participants in the Planning Process

for solving management concerns. The first meeting was held on November 1, 2016 at the Peter White Public Library and was attended by 32 individuals. A second meeting was held on December 6<sup>th</sup>, 2016 at the Peter White Public Library and was attended by 43 individuals. Collectively this information has helped to guide and shape this plan.

Questionnaires were made available for public comment during and after the first Planning Session and comments were also taken online at the Yellow Dog Watershed Preserve website. Comments were from 50 questionnaires compiled, assessed, and incorporated into the resource management and visitor experience goals. A final survey was circulated on January 26<sup>th</sup> regarding the preferred alternative.

### ii. Project Timeline

- Purchase of Yellow Dog River Community Forest completed: September 30<sup>th</sup>, 2016
- Technical Assistance Application to National Park Service – Rivers, Trails, and Conservation Assistance Program (RTCA) accepted: Oct. 1, 2016
- Community Forest Committee and RTCA orientation meeting: Oct. 6, 2016
- Natural resource inventory data completed: Oct. 30, 2016

- Notification of Community Forest Planning Session One via Marquette Monthly, the Mining Journal, radio announcements, social media, websites, direct stakeholder invites, and Committee networks: Oct. 15-30, 2016
- Community Forest Planning Session One held: Nov.1, 2016
- Online questionnaire available: Nov. 8-22, 2016
- Notification of Community Forest Planning Session Two via the Mining Journal, NPR, radio announcements, social media, websites, direct stakeholder invites, and Committee networks: Nov. 15-21, 2016
- Planning Session One and Questionnaire results compiled: Nov 23-29, 2016
- Community Forest Planning Session Two held: Dec. 6, 2016
- Community Forest Committee Meeting: Jan. 19, 2017
- Public Comment Period on Preferred Alternative: Jan. 27-Feb. 6, 2017
- Plan completed and approved: Feb. 8, 2017

## b. Results of VERP

With the assistance of a wide variety of individuals and groups, the planning efforts reached favorable results. Opinions were diverse but all could agree that the protection of the natural resources was paramount in making management decisions. Below are the specific results.

### i. Purpose Statement

The Community Forest Committee created, reviewed, and edited a Purpose Statement, which lays out the reasons why the Yellow Dog River Community Forest was acquired. It contains clear, concise statements which will lead to defining management priorities. Purpose statements are important to planning because they are basic to all other assumptions about the Community Forest and ways in which it should be managed. Below is the Purpose Statement for the Yellow Dog River Community Forest:

*As local community members, we believe in creating a protected area that meets both human needs and environmental quality while maintaining our unique way of life.*

*We seek a Community Forest;*

*-that balances conservation and preservation, ensuring that a variety of public uses can occur while maintaining or improving the integrity of high quality terrestrial and aquatic ecosystems.*

*-that inspires active participation and involvement by community members of all generations to further secure the ecological health of the landscape.*

*-that provides place-based opportunities for forward thinking recreational, educational, environmental, and socio-economic activities.*

## ii. Desired and Prohibited Uses

Based on public feedback, it becomes clear that the strongest support in terms of uses is as follows: 1) Environmental Uses (Ecological Services) 2) Recreational Uses 3) Educational Uses 4) Economic Uses. Support for specific uses was ranked as percentages from highest to lowest (100 to 0% support). Percentages were then categorized into 3 divisions.

High Priority Use: 67-100% support

Moderate Priority Use: 34-66% support

Low Priority Use: 0-33% support

<b>Environmental Uses</b>	<b>Priority</b>
<b>Water Quality Protection</b>	<i>High</i>
<b>Wildlife Habitat</b>	<i>High</i>
<b>Protect Coldwater Fisheries</b>	<i>High</i>
<b>Protect RTE Species</b>	<i>High</i>
<b>Maintain Biodiversity</b>	<i>High</i>
<b>Sustain Air Quality</b>	<i>High</i>
<b>Buffer Climate Change</b>	<i>High</i>

<b>Recreational Use</b>	<b>Priority</b>
<b>Photography</b>	<i>High</i>
<b>Hiking</b>	<i>High</i>
<b>Birding</b>	<i>High</i>
<b>Fishing</b>	<i>High</i>
<b>Backcountry skiing</b>	<i>High</i>
<b>Non-motorized boating</b>	<i>Moderate</i>
<b>Camping</b>	<i>Moderate</i>
<b>Hunting</b>	<i>Moderate</i>
<b>Mountain Biking</b>	<i>Low</i>
<b>Groomed trail skiing</b>	<i>Low</i>
<b>Trapping</b>	<i>Low</i>

<b>Educational Use</b>	<b>Priority</b>
<b>Volunteer Monitoring</b>	<i>High</i>
<b>Youth/Service Corps</b>	<i>High</i>
<b>Interpretive Hikes</b>	<i>High</i>
<b>University Research</b>	<i>High</i>
<b>K-12 Outdoor Ed</b>	<i>High</i>
<b>Wilderness Skills</b>	<i>Moderate</i>
<b>Climate Demonstration Forest</b>	<i>Moderate</i>

<b>Economic Use</b>	<b>Priority</b>
<b>Guided Rec/Ecotourism</b>	<i>Moderate</i>
<b>Wild Food</b>	<i>Moderate</i>
<b>Forestry</b>	<i>Moderate</i>
<b>Native Seed</b>	<i>Moderate</i>
<b>Maple Syrup</b>	<i>Moderate</i>
<b>Firewood/Forest Products</b>	<i>Low</i>
<b>None</b>	<i>Low</i>

Only two activities will be listed as prohibited at this time: Horse-back riding and motorized recreational vehicle usage.

### iii. Goals and Objectives

Goals are descriptions of what the Community Forest could be like based on the resource conditions, the desired uses, and visitor experiences. They may be thought of as park development goals and management objectives. The Community Forest Committee used a number of methods, previously described, to solicit public input to determine goals for visitor use and resource management. Five primary goals and related objectives were identified from the public input.

*Environmental Goal:* The Community Forest should be managed to provide all high priority ecological services and other uses should not impede these ecological services.

*High Priority Environmental Objectives:*

Advance activities that:

- Improve wildlife habitat
- Protect cold water fisheries
- Protect rare, threatened, endangered, or species of concern
- Sustain the quality of the water
- Maintain species biodiversity
- Sustain the quality of the air
- Buffer for potential climate effects

*Moderate Priority Environmental Objectives:*

None

*Low Priority Environmental Objectives:*

None

*Recreational Goal:*

The Community Forest should be managed to support diverse recreational activities, primarily low impact silent sports while striving to create a safe place for multiple uses.

*High Priority Recreational Objectives:*

Advance activities that would allow the public to use the property for these types of recreation:

- Hiking
- Photography
- Birding
- Fishing
- Backcountry skiing

*Moderate Priority Recreational Objectives:*

Maintain activities that would allow the public to use the property for these types of recreation:

- Camping
- Kayaking/canoeing
- Hunting/Trapping

*Low Priority Recreational Objectives:*

Limit activities that would allow the public to use the property for these types of recreation:

- Mountain biking
- Groomed trail cross country skiing

*Educational Goal:*

The Community Forest should be managed to stage low impact, place based learning for a broad public base in an effort to increase environmental stewardship and wise resource decision making.

*High Priority Educational Objectives:*

Advance activities that would support educational programs such as:

- Interpretive hikes and skis
- Volunteer monitoring programs
- Youth service corps programs
- University research
- K-12 outdoor education

*Moderate Priority Educational Objectives:*

Maintain activities that would support educational programs such as:

- Wilderness skills
- Climate demonstration forest

*Low Priority Educational Objectives:*

None

*Economic Goal:*

The Community Forest will be managed for economic activities that will not degrade the land or water and will not impede other uses. Any economic income will be put towards the sustainability of the Community Forest.

*High Priority Economic Objectives:*

Advance activities that could create economic benefits such as:

- None

*Moderate Priority Economic Objectives:*

Maintain activities that could create economic benefits such as:

- Guided recreation/Ecotourism
- Wild food/Medicine gathering
- Sustainable forestry
- Maple syrup production
- Native seed production

*Low Priority Economic Objectives:*

Limit activities that could create economic benefits such as:

- Firewood or other forest products

#### iv. The User Experience

When gathering input from the public regarding their desired user experience, three types of experiences were proposed; Wilderness, Natural, and Multi-Use. These user experience types are further defined below.

**Wilderness**

- The Environment.....Unmodified natural environment
- Zone Size.....Large parcels
- Access.....Limited, not designated/maintained
- The Social Experience.....Solitude, low concentration of users
- The Physical Experience..... Self-reliance and challenge
- Usership.....Evidence of other users is minimal
- Infrastructure.....No signage, local materials used

**Natural**

- The Environment.....Predominantly unmodified environment
- Zone Size.....Moderate to large size parcels
- Access.....Designated/maintained points
- The Social Experience.....Concentration of users is low, opportunity for isolation
- The Physical Experience.....Moderate challenge and risk
- Usership.....Evidence of other users is noticeable
- Infrastructure.....Subtle structures, minimal signage, local materials if possible

**Multi-Use**

- The Environment.....Predominantly natural environment
- Zone Size.....Any size parcel

Access..... Designated/maintained points that can accommodate groups  
 The Social Experience.....Moderate concentration of users, opportunity for social interaction  
 The Physical Experience.....Challenge and risk not very important  
 Usership.....Evidence of other users is prevalent  
 Infrastructure.....Some rustic facilities, some signage

## v. Conceptual Design and Alternatives

YDWP and RTCA staff worked to develop alternative management scenarios for visitor experiences and resource objectives which provide a realistic approach for dealing with existing and future constraints while achieving the desired futures/goals. This design uses “zoning” which describes the resource conditions, kind of uses, and levels of development necessary to support the desired user experience and resource objectives. Three “User Experience – Resource Management Zones” were developed to accommodate the desired user experience and associated resource management objectives. The three zones, Wilderness, Natural, and Multi-Use, roughly equate to the types of user experiences and are described below.

### Wilderness Zone

The Wilderness Zone is characterized by essentially unmodified natural environment of fairly large size. Concentration of users is fairly low and evidence of other area users is minimal. The area is managed to be essentially free from evidence of man-induced restrictions and controls. Only essential facilities for resource protection are used and are constructed of on-site materials. No facilities for comfort or convenience of the user are provided. Spacing of groups is informal and dispersed to minimize contacts with other groups or individuals. The Wilderness Zone will be managed to meet all priority environmental objectives, high priority educational objectives, high priority recreational objectives, and no economic objectives. The zone will be managed through limited access and will be restricted to activities that are dispersed and do not impact the environment. Special events will not be permitted.

### Natural Zone

The Natural Zone is characterized by a predominantly unmodified natural environment of moderate to large size. Concentration of users is low, but there is often evidence of other area users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but is subtle. Facilities are primarily provided for the protection of resource values and safety of users. On-site materials are used where possible. Spacing of groups may be formalized to disperse use and provide low-to-moderate contacts with other groups or individuals. There will be some opportunity for isolation from the sight and sounds of others, but not as many as for wilderness opportunities. There will be opportunity to have a high degree of interaction with the



natural environment, to have moderate challenge and risk, and to use outdoor skills. Wayfinding signage may be present. The Natural Zone will be managed to meet all priority environmental objectives, all priority educational objectives, high and moderate priority recreational objectives, and moderate priority economic objectives minus forestry. Special events are possible with permission.

### Multi-Use Zone

The Multi-Use Zone is characterized by predominantly natural environment with moderate evidences of the sights and sounds of others. Such evidences usually harmonize with the natural environment. Concentration of users may be low to moderate. Evidence of other users is prevalent. Rustic infrastructure is provided for convenience of the user as well as for safety and resource protection. A moderate density of groups is provided for in developed sites and on roads and trails. Low to moderate densities prevail away from developed sites and facilities. Renewable resource modification and utilization practices are evident, but harmonize with the natural environment. There will be opportunity to have a high degree of interaction with the natural environment, as well as social interaction. Challenge and risk opportunities are not very important. The Multi-Use Zone will be managed to meet all priority environmental, educational, recreational, and economic uses. Special events are possible with permission.

Three alternatives were provided to the public during the Community Forest Planning Session Two. Each alternative differed in many respects including size and location of zones, amount of total acreage in each zone, river buffer setbacks, recreational features, etc. See Appendix E for the three conceptual alternatives. Comments were collected regarding public opinion on each management alternative.

### vi. Selected Management Alternative

The Community Forest Committee met to consider the collected public feedback. Many things were adopted according to the public's desires. For example, utilizing a 300ft buffer for stream protection was selected. Additionally, plans for limiting the number of access points to 2 and creating a loop trail were selected. Ultimately, the Committee decided that the number of management zones should be reduced to 2 in order to alleviate potentially burdensome management actions. The Natural Zone was removed and the Wilderness and Multi-Use Zone remained. Once the zones were reorganized, a new map was created to reflect the changes.

The Selected Management Alternative attempts to reach all environmental, recreational, educational, and economic goals while still maintaining the quality of the natural resources. Roughly 182 acres will be included in the Wilderness Zone, which essentially is an area free from the evidence of man. These parcels will be taken out of Michigan's

Commercial Forest Program. The remaining acreage will be included in the Multi-Use Zone. These parcels will remain in Michigan’s Commercial Forest Program.

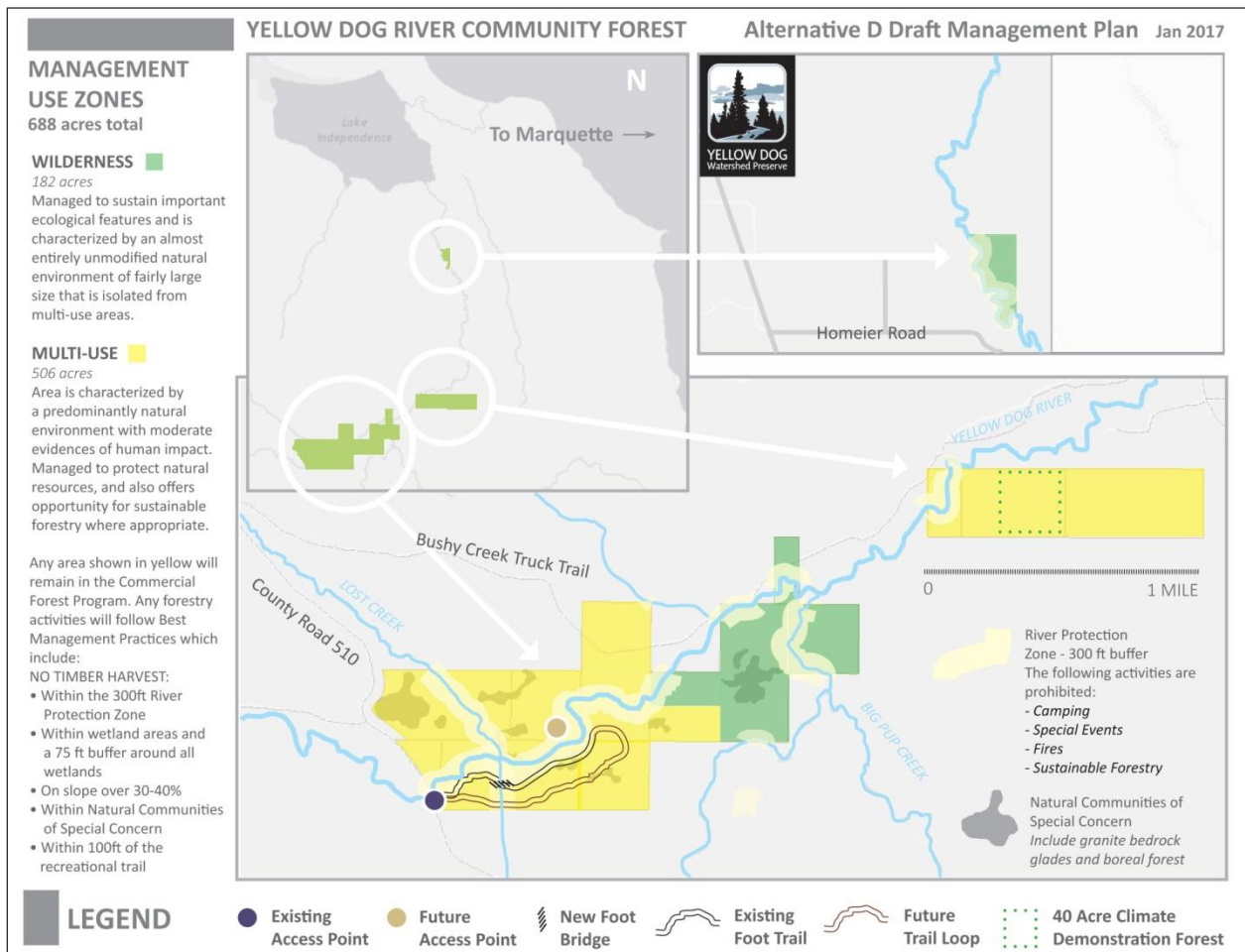


Figure 20. Selected Management Alternative for the Community Forest

### VIII. Priority Management Actions

To reach the goals and meet the objectives identified previously, certain management actions will be implemented. Below is the outlay of the management actions for each type of use. The result of this analysis is a task list and schedule of activities that will be taken by the Yellow Dog Watershed Preserve, the Community Forest Committee, other community partners, and volunteers.

### a. Environmental Use Task List

<b>Environmental Use</b>	<b>Environmental Objectives</b>	<b>Action</b>
Water Quality Protection	Improve the quality of the waterways	-Continue Volunteer Stream Monitoring Program -Establish sedimentation monitoring points -Implement Watershed Management Plan for stream bank stabilization
Wildlife Habitat Protection	Improve the quality and quantity of habitat for both non-game and game species	-Install trail cams to monitor wildlife activities -Conduct appropriate forestry activities -Monitor and treat invasive species
Protect Coldwater Fisheries	Improve the quality of the fisheries	-Install foot bridge erosion prone area along trail -Implement Watershed Management Plan for stream bank stabilization and fish passage
Protect Rare, Threatened, Endangered, and Species of Concern	Maintain or increase amount and quality of habitat for RTE species	-Preclude areas where know RTE species reside from forestry activities - Monitor and treat invasive species
Maintain Biodiversity	Maintain or improve current levels of biodiversity	-Monitor and treat invasive species and forest pathogens -Install a boot brush at trailheads -Monitor vegetation plots -Maintain varied aged stands of forest
Sustain Air Quality	Maintain or improve the forest's ability to purify air	-Keep land cover at 86% forested -Time timber harvests appropriately
Buffer Climate Change	Maintain or improve forest's ability to mitigate climate changes	-Keep land cover at 86% forested -Work with USDA's Climate Change Response Framework

### b. Recreational Use Task List

<b>Recreational Use</b>	<b>Recreational Objectives</b>	<b>Task List</b>
Photography	Increase efforts to facilitate photography	-Invite users to share photos on social media -Conduct nature based photography workshops through YDWP Nature School
Hiking	Improve conditions to facilitate hiking	-Provide basic signage and trail map -Create new loop trail
Birding	Improve conditions to facilitate birding	-Ensure forest conditions are optimal for a variety of species -Provide information at trailhead

		-Conduct birding events
Fishing	Improve efforts to facilitate fishing	-Engage with DNR about fish stocking -Look into different fishing regulations -Identify ingress/egress on trailhead map
Backcountry skiing	Improve efforts to facilitate backcountry skiing	-Hold skiing events
Non-motorized boating	Maintain conditions that facilitate non-motorized boating	-Outreach to American Whitewater -Discuss safety guidelines at trailhead
Camping	Maintain conditions that facilitate camping	-Prohibit camping within a 300 feet of the river, trails, and/or parking area -Provide Leave No Trace brochure at trailhead
Hunting/Trapping	Maintain conditions that facilitate hunting	-Keep a portion of the Community Forest enrolled in the Commercial Forest program -Post hunting safety guidelines/seasons at trailhead
Mountain Biking	Limit conditions that facilitate mountain biking	-Restrict the use of mountain bikes to roads only -Outreach on trailhead
Groomed Trail Skiing	Limit conditions that facilitate motorized recreational vehicle use	-Prohibit development of groomed trails

### c. Educational Use Task List

<b>Educational Uses</b>	<b>Educational Objectives</b>	<b>Task List</b>
Volunteer Monitoring	Increase opportunities to engage in volunteer monitoring	-Continue Volunteer Stream Monitoring Program and Volunteer Land Stewardship Program -Conduct citizen monitoring through a BioBlitz
Youth/Service Corps	Increase opportunities for youth/service corps groups to become engaged	-Build a footbridge with Boy/Girl Scouts and AmeriCorps -Trail work with KBIC youth crew
Interpretive Hikes	Increase opportunities for the public to visit during interpretive hikes/outdoor events	-Lead hikes with a specific reason
University Research	Increase opportunities to engage with universities for ongoing research projects	- Work with Northern Michigan University's Biology department to continually monitor vegetation plots for trend analysis -Work with Northern Michigan University to investigate any climate modeling in conjunction with the USDA's Climate Response Framework
K-12 Outdoor Education	Increase opportunities to engage with k-12 educational entities to conduct	-Work with Powell Township School to create a Forest Health Monitoring program by surveying for Red backed Salamanders

	environmental outdoor education	-Reach out to Superior Watershed Partnership to inquire about their existing educational programming
Wilderness Skills	Maintain opportunities for the public to develop wilderness skills	-Work through YDWP's Nature School to conduct wilderness skills education
Climate Demonstration Forest	Maintain learning opportunities about climate change and response via demonstration forest	-Work with USDA's Climate Change Response Framework

#### d. Economic Use Task List

Economic Use	Economic Objectives	Task List
Eco-Tourism/Guided Recreation	Maintain opportunities for tourism to benefit the local economy	-Reach out to local tourism bureaus and recreational businesses -Reach out to outfitters to ensure permissible use
Sustainable Forestry	Maintain opportunities for forestry to be an asset to the local economy	-Implement the Forest Stewardship Plan as prescribed in Appendix F
Wild Food Collection	Maintain opportunities for the collection of wild food to augment the local communities' needs	-Work with YDWP's Nature School to conduct workshops on wild food gathering
Maple Syrup	Investigate potential for maple syrup income	-Review forest information to identify areas where syrup production could occur
Native Seed Sourcing	Improve wildlife habitat and native plant diversity while expanding potential to harvest seed	-Identify areas that could be used to cultivate patches of native plants that are popular for restoration

#### e. Schedule of Activities

Below is a table that contains a schedule of when the primary actions needed to meet the goals will occur. Some activities will be ongoing and some will be one time actions.

Task	Goals Met				Timeline				
	Environmental	Recreational	Educational	Economic	Year 1	Year 2	Year 3	Year 4	Year 5
Continue Volunteer Stream Monitoring Program	X		X						
Continue Volunteer Land Stewardship Program	X		X						
Establish Sedimentation Monitoring Points	X								
Implement WMP Projects	X	X							
Install Trail Cameras	X								
Implement Forest Stewardship Plan	X		X	X					
Monitor and Treat Invasive Species	X		X						
Install Foot Bridge over Tributary	X	X	X						
Monitor NMU Vegetative Plots	X		X						
Install Bootbrush at Trailhead	X		X						
Work with USDA Climate Change Response Framework	X		X						
Social Media Outreach		X							
Nature School Workshops	X	X	X	X					
Install Trailhead Signage	X	X	X						
Create New Loop Trail		X	X						
Outreach to other Agencies and Groups	X	X	X	X					
Conduct BioBlitz	X	X	X						
Forest Health Study with Powell Township School	X	X	X						

## IX. Long Term Stewardship

The community as a whole will be encouraged to participate in the long term stewardship of the Community Forest in a variety of ways. However, the leadership in stewardship will come from the Community Forest Committee and from the landowner, YDWP. There will be need to monitor the property which is two-fold. Firstly, adherence to the basic tenets of the Community Forest rules and regulations as set forth will be imperative. Secondly, monitoring the condition of the natural resources on site will be the primary focus of stewardship. Monitoring methods will follow YDWP's Volunteer Land Stewardship program.



Figure 21: Photograph of Keweenaw Bay Indian Community youth crew

### a. Stewardship Funding Mechanisms

Funding to pay for staff time, insurance, and materials will be necessary over time for maintenance, monitoring, and upkeep needs. Listed below are methods which can assist in procuring stewardship funds.

1. *Timber Harvest Proceeds*: Portions of the Community Forest will be subject to timber harvest as recommended under the Forest Stewardship Plan. The proceeds of the timber harvest would be deposited into YDWP's Endowment Fund.
2. *Community Forest Endowment Fund*: The Yellow Dog Watershed Preserve has an endowment fund established and can be a source of income for long term management of the Community Forest. This fund is invested and the capital gains are either rolled back into the fund or withdrawn for use in management activities. We will continue to build the fund over time with other contributions.
3. *Community Forest Fundraising*: The collection of donations on or off site could generate income to go toward long term management costs. In addition, there will be occasional fundraising ventures that the committee will choose to do when necessary.

4. *In-kind Assistance*: The utilization of volunteers and in-kind services will be paramount to offset the expenditure of limited funds. With several volunteer programs in existence, there is ample opportunity to engage the public in service.
5. *Trailhead Advertisements*: A small area on the trailhead sign that can be changeable from year to year could offer a location where local businesses would want to advertise. Each business would pay an annual fee to have their logo and information available to visitors of the Community Forest.
6. *Grants*: There are several grant programs that can be sources of funding for some of the stewardship activities, primarily those that are one time, infrastructure related activities.

## b. Adaptive Management

Choosing to use low impact management strategies is the most efficient and cost effective way to manage the forest with a high likelihood of continued success. However, even with the best written plans, things do not always progress in the intended direction. As such, adaptive management is a process that will be employed. Adaptive management is a long term approach that requires the effective use of gathered information to change strategies if and when needed. In order to identify if management strategies are reaching the goals and objectives, a review of the plan by the Committee and the public will occur every five years.

## X. Conclusion

A great deal of work and organization has transpired to bring this project to fruition. The Yellow Dog Watershed Preserve staff, board, and volunteers worked for roughly four years on a continual basis to set up the transaction, secure funding, employ the Public Participation Process, and plan for future care of the property. We recognize that the features of the property that made it a high priority for protection are the most important features to consider as we move forward.

The Public Participation Process was intended to be comprehensive, inclusive, and well structured. We understand that decisions about natural resources are always difficult, since there is a wide range of opinions on virtually every topic. We appreciate the participation of the Community Forest Committee and those members of the public who attended our workshops or filled out any surveys.

And so we move forward with implementing this plan. There is a great deal of work to do. We believe the tasks that lie ahead will be fun and educational and hope the community will actively participate in our activities.

Appendix A  
Plant Species List

<i>Abies balsamea</i>	<i>Carex crawfordii</i>	<i>Dryopteris filix-mas</i> subsp. <i>brittonii</i>	<i>Hypericum perforatum</i>
<i>Acer pensylvanicum</i>	<i>Carex crinita</i>	<i>Dryopteris fragrans</i>	<i>Ilex verticillata</i>
<i>Acer rubrum</i>	<i>Carex deweyana</i>	<i>Dryopteris goldiana</i>	<i>Impatiens capensis</i>
<i>Acer saccharum</i>	<i>Carex flava</i>	<i>Dryopteris intermedia</i>	<i>Iris versicolor</i>
<i>Acer spicatum</i>	<i>Carex gracillima</i>	<i>Dulichium arundinaceum</i>	<i>Juncus balticus</i>
<i>Achillea millefolium</i>	<i>Carex grayi</i>	<i>Epigaea repens</i>	<i>Juncus bufonius</i>
<i>Actaea pachypoda</i>	<i>Carex intumescens</i>	<i>Equisetum arvense</i>	<i>Juncus effusus</i>
<i>Actaea rubra</i>	<i>Carex lacustris</i>	<i>Equisetum fluviatile</i>	<i>Juncus tenuis</i>
<i>Adiantum pedatum</i>	<i>Carex leptoneura</i> cf.	<i>Equisetum hyemale</i>	<i>Juniperus communis</i>
<i>Alisma triviale</i>	<i>Carex pedunculata</i>	<i>Equisetum palustre</i>	<i>Lactuca canadensis</i>
<i>Alnus incana</i>	<i>Carex scoparia</i>	<i>Equisetum scirpoides</i>	<i>Lonicera canadensis</i>
<i>Alnus rugosa</i>	<i>Carex subg. ovales</i>	<i>Equisetum sylvaticum</i>	<i>Lonicera dioica</i>
<i>Alnus viridis</i>	<i>Centaurea stoebe</i>	<i>Erigeron annuus</i>	<i>Lycopodium clavatum</i>
<i>Amelanchier arborea</i>	<i>Chimaphila umbellata</i>	<i>Eurybia macrophylla</i>	<i>Lycopus americanus</i>
<i>Amelanchier bartramiana</i>	<i>Cinna latifolia</i>	<i>Euthamia graminifolia</i>	<i>Lycopus uniflorus</i>
<i>Amelanchier interior</i>	<i>Cirsium arvense</i>	<i>Eutrochium maculatum</i>	<i>Maianthemum canadense</i>
<i>Amelanchier sanguinea</i>	<i>Cirsium muticum</i>	<i>Fallopia convolvulus</i>	<i>Maianthemum racemosum</i>
<i>Anaphalis margaritacea</i>	<i>Cirsium palustre</i>	<i>Festuca rubra</i>	<i>Matteuccia struthiopteris</i>
<i>Antennaria howellii</i>	<i>Cirsium vulgare</i>	<i>Fragaria vesca</i>	<i>Medicago lupulina</i>
<i>Apocynum androsaemifolium</i>	<i>Clematis virginiana</i>	<i>Fragaria virginiana</i>	<i>Mentha canadensis</i>
<i>Aquilegia canadensis</i>	<i>Clinopodium vulgare</i> ( <i>Satureja vulgaris</i> )	<i>Fraxinus nigra</i>	<i>Mitchella repens</i>
<i>Aralia hispida</i>	<i>Clintonia borealis</i>	<i>Galium asprellum</i>	<i>Mitella nuda</i>
<i>Aralia nudicaulis</i>	<i>Collinsia parviflora</i>	<i>Galium boreale</i>	<i>Oenothera biennis</i>
<i>Arctostaphylos uva-ursi</i>	<i>Coptis trifolia</i>	<i>Galium palustre</i>	<i>Onoclea sensibilis</i>
<i>Asplenium trichomanes</i>	<i>Cornus alternifolia</i>	<i>Gaultheria hispidula</i>	<i>Oryzopsis asperifolia</i>
<i>Athyrium filix-femina</i>	<i>Cornus canadensis</i>	<i>Gaultheria procumbens</i>	<i>Osmorhiza claytonii</i>
<i>Avenella flexuosa</i>	<i>Cornus rugosa</i>	<i>Gaylussacia baccata</i>	<i>Osmunda cinnamomea</i>
<i>Betula alleghaniensis</i>	<i>Cornus sericea</i>	<i>Geum aleppicum</i> cf.	<i>Osmunda claytoniana</i>
<i>Betula papyrifera</i>	<i>Corylus cornuta</i>	<i>Glyceria canadensis</i>	<i>Osmunda regalis</i>
<i>Bidens cernua</i>	<i>Cypripedium acaule</i>	<i>Glyceria striata</i>	<i>Ostrya virginiana</i>
<i>Bidens discoidea</i>	<i>Dactylis glomerata</i>	<i>Goodyera oblongifolia</i> ( <i>Lycopodium d.</i> )	<i>Oxalis acetosella</i>
<i>Botrychium multifidum</i>	<i>Dendrolycopodium dendroideum</i>	<i>Goodyera pubescens</i>	<i>Oxalis stricta</i>
<i>Brachyelytrum aristosum</i>	<i>Dichanthelium depauperatum</i>	<i>Gymnocarpium dryopteris</i>	<i>Persicaria hydropiperoides</i>
<i>Brachyelytrum erectum</i>	<i>Dichanthelium implicatum</i>	<i>Heracleum maximum</i>	<i>Persicaria lapathifolia</i>
<i>Calamagrostis canadensis</i>	<i>Dichanthelium xanthophyllum</i>	<i>Hieracium aurantiacum</i>	<i>Phleum pratense</i>
<i>Capnoides sempervirens</i>	<i>Diervilla lonicera</i>	<i>Hieracium piloselloides</i>	<i>Physocarpus opulifolius</i>
<i>Carex aquatilis</i>	<i>Diphasiastrum complanatum</i>	<i>Huperzia lucidula</i>	<i>Picea glauca</i>
<i>Carex arctata</i>	<i>Diphasiastrum digitatum</i>	<i>Huperzia selago</i>	<i>Picea mariana</i>
<i>Carex bebbii</i>	<i>Dirca palustris</i>	<i>Hypericum canadense</i>	<i>Pilea pumila</i>
<i>Carex communis</i>	<i>Dryopteris carthusiana</i>		<i>Pinus banksiana</i>
<i>Pinus resinosa</i>	<i>Quercus rubra</i>	<i>Solanum dulcamara</i>	<i>Vaccinium angustifolium</i>



<i>Pinus strobus</i>	<i>Ranunculus hispidus</i> var. <i>caricetosus</i>	<i>Solidago altissima</i>	<i>Vaccinium cespitosum</i>
<i>Plantago lanceolata</i>	<i>Ranunculus recurvatus</i>	<i>Solidago caesia</i>	<i>Vaccinium myrtilloides</i>
<i>Poa annua</i>	<i>Rhus glabra</i>	<i>Solidago canadensis</i>	<i>Verbascum thapsus</i>
<i>Poa compressa</i>	<i>Rosa acicularis</i>	<i>Solidago gigantea</i>	<i>Veronica officinalis</i>
<i>Poa nemoralis</i>	<i>Rubus allegheniensis</i>	<i>Solidago nemoralis</i>	<i>Veronica serpyllifolia</i>
<i>Poa palustris</i>	<i>Rubus parviflorus</i>	<i>Spiraea tomentosa</i>	
<i>Poa pratensis</i>	<i>Rubus pubescens</i>	<i>Symphyotrichum ciliolatum</i>	
<i>Polypodium virginianum</i>	<i>Rubus strigosus</i>	<i>Symphyotrichum dumosum</i>	
<i>Polystichum lonchitis</i>	<i>Rumex acetosella</i>	<i>Symphyotrichum lanceolatum</i>	
<i>Polytrichum spp.</i>	<i>Salix amygdaloides</i>	<i>Symphyotrichum lateriflorum</i>	
<i>Populus balsamifera</i>	<i>Salix bebbiana</i>	<i>Taraxacum officinale</i>	
<i>Populus grandidentata</i>	<i>Salix discolor</i>	<i>Thalictrum dasycarpum</i>	
<i>Populus tremuloides</i>	<i>Salix petiolaris</i>	<i>Thelypteris noveboracensis</i>	
<i>Prenanthes alba</i>	<i>Salix purpurea</i>	<i>Thuja occidentalis</i>	
<i>Prunella vulgaris</i>	<i>Sambucus racemosa</i>	<i>Trientalis borealis</i>	
<i>Prunus pensylvanica</i>	<i>Scirpus atrocinctus</i>	<i>Trifolium arvense</i>	
<i>Prunus virginiana</i>	<i>Scirpus cyperinus</i> cf.	<i>Trifolium hybridum</i>	
<i>Pteridium aquilinum</i>	<i>Scrophularia lanceolata</i>	<i>Tsuga canadensis</i>	
<i>Pyrola asarifolia</i>	<i>Selaginella rupestris</i>	<i>Ulmus americana</i>	
<i>Pyrola elliptica</i>			

## Mammal Species List

<u>Common Name</u>	<u>Scientific Name</u>	<u>Observed (O) or Likely To Occur (L)</u> <u>Possible (P)</u>	<u>State Status</u>	<u>Federal Status</u>
Opposum	<i>Didelphis virginiana</i>	P	-	
Masked Shrew	<i>Sorex cinereus</i>	O		
Water Shrew	<i>Sorex palustris</i>	L		
Arctic Shrew	<i>Sorex arcticus</i>	L		
Pygmy Shrew	<i>Sorex hoyi</i>	L		
Northern Short-Tailed Shrew	<i>Blarina brevicauda</i>	L		
Star-Nosed Mole	<i>Condylura cristata</i>	L	-	
Little Brown Bat	<i>Myotis lucifugus</i>	L	SC	
Big Brown Bat	<i>Eptesicus fuscus</i>	L		
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	P	SC	T
Silver-Haired Bat	<i>Lasionycteris noctivagans</i>	P		
Tricolored Bat	<i>Pipistrellus subflavus</i>	P	SC	
Eastern Red Bat	<i>Lasiurus borealis</i>	L		
Hoary Bat	<i>Lasiurus cinereus</i>	L		
Deer Mouse	<i>Peromyscus maniculatus gracilis</i>	O		
White-Footed Mouse	<i>Peromyscus leucopus</i>	P		
Meadow Jumping Mouse	<i>Zapus hudsonius</i>	P		
Woodland Jumping Mouse	<i>Napaeozapus insignis</i>	P		
Southern Red-Backed Vole	<i>Clethrionomys gapperi</i>	L		
Meadow Vole	<i>Microtus pennsylvanicus</i>	L		
Southern Bog Lemming	<i>Synaptomys cooperi</i>	L		
Beaver	<i>Castor canadensis</i>	O		

Muskrat	<i>Ondatra zibethicus</i>	L	
			-
Porcupine	<i>Hystricomorph hystricadae</i>	O	
			-
Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	L	
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	O	
Northern Flying Squirrel	<i>Glaucomys sabrinus</i>	O	SC
			-
Least Chipmunk	<i>Tamias minimus</i>	L	
Eastern Chipmunk	<i>Tamias striatus</i>	O	
Woodchuck	<i>Marmota monax</i>	P	
	<i>Spermophilus</i>		
Thirteen-Lined Ground Squirrel	<i>tridecemlineatus</i>	P	
			-
Snowshoe Hare	<i>Lepus americanus</i>	O	
Eastern Cottontail Rabbit	<i>Sylvilagus floridanus</i>	P	
			-
American Marten	<i>Martes americana</i>	O	
Fisher	<i>Martes pennanti</i>	L	
Ermine	<i>Mustela erminea</i>	L	
Least Weasel	<i>Mustela nivalis</i>	P	
Long-Tailed Weasel	<i>Mustela frenata</i>	O	
Mink	<i>Mustela vison</i>	L	
American Badger	<i>Taxidea taxus</i>	P	
Striped Skunk	<i>Mephitis mephitis</i>	O	
Northern River Otter	<i>Lutra canadensis</i>	O	
			-
Common Raccoon	<i>Procyon lotor</i>	O	
			-
Black Bear	<i>Ursus americanus</i>	O	
			-
Mountain Lion	<i>Felis concolor</i>	O	E
Bobcat	<i>Lynx rufus</i>	L	
			-
Coyote	<i>Canis latrans</i>	O	
Red Fox	<i>Vulpes vulpes</i>	O	
Gray Fox	<i>Urocyon cinereoargenteus</i>	P	
Gray Wolf	<i>Canis lupis</i>	O	E
			-
Whitetailed Deer	<i>Odocoileus virginianus</i>	O	
Moose	<i>Alces alces</i>	O	SC

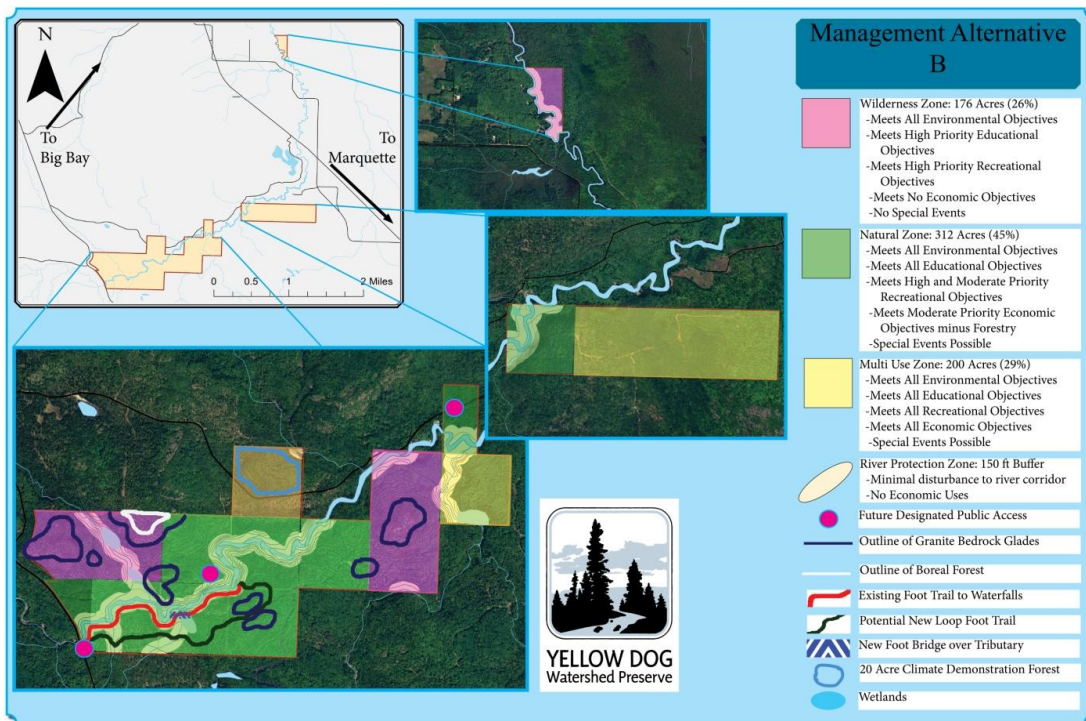
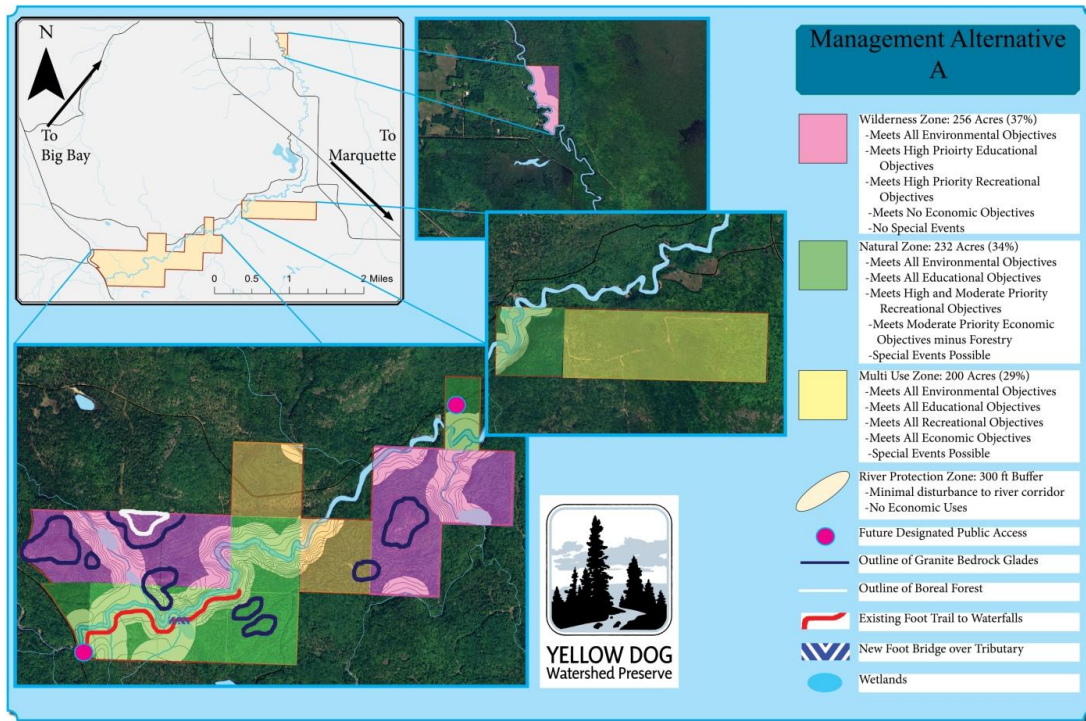
# Appendix C Bird Species List

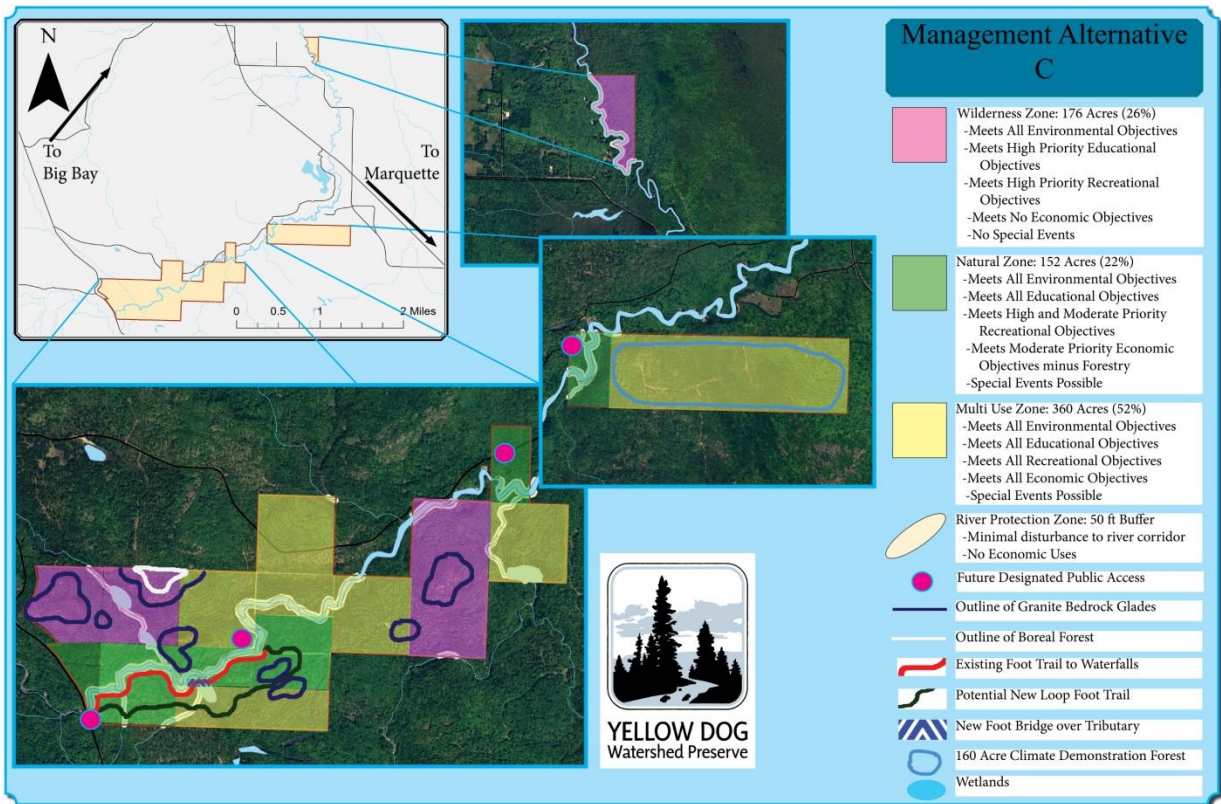
Bird Species List					
Common Name	Scientific Name	Observed (O) or Likely To Occur (L)		State Status	Federal Status
		Possible (P)			
Canada Goose	<i>Branta canadensis</i>	P			
Mallard	<i>Anas platyrhynchos</i>	O			
Wood Duck	<i>Aix sponsa</i>	L			
Hooded Merganser	<i>Lophodytes cucullatus</i>	O			
Turkey vulture	<i>Cathartes aura</i>	O			
Northern Goshawk	<i>Accipiter gentilis</i>	L		SC	
Sharp-shinned Hawk	<i>Accipiter striatus</i>	L			
Cospar's Hawk	<i>Accipiter cooperii</i>	O			
Red-tailed Hawk	<i>Buteo jamaicensis</i>	P			
Broad-winged Hawk	<i>Buteo platyterus</i>	L			
Red-shouldered Hawk	<i>Buteo lineatus</i>	P		T	
Bald Eagle	<i>Haliaeetus leucocephalus</i>	O		SC	
Golden Eagle	<i>Aquila chrysaetos</i>	P			
American Kestrel	<i>Falco sparverius</i>	L			
Martin	<i>Falco columbarius</i>	L		T	
Peregrine Falcon	<i>Falco peregrinus</i>	P		E	E
Spruce Grouse	<i>Falco pennsylvanicus</i>	P		SC	
Ruffed Grouse	<i>Bonasa umbellus</i>	O			
Great Blue Heron	<i>Ardea herodias</i>	O			
Sandhill Crane	<i>Grus canadensis</i>	O			
Solitary Sandpiper	<i>Tringa solitaria</i>	O			
Spotted Sandpiper	<i>Actitis macularia</i>	O			
Common Snipe	<i>Gallinago gallinago</i>	L			
American Woodcock	<i>Scolopax minor</i>	O			
Mourning Dove	<i>Zenaidura macroura</i>	O			
Barred Owl	<i>Strix varia</i>	O			
Great Horned Owl	<i>Bubo virginianus</i>	P			
Boreal Owl	<i>Asio accipitrinus</i>	L			
Northern Saw-whet Owl	<i>Anguillula borealis</i>	L			
Whippoorwill	<i>Anstrosomus vociferus</i>	O		SC	
Common Nighthawk	<i>Chordeiles minor</i>	O		SC	
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	O			
Belted Kingfisher	<i>Megascops alcyon</i>	O			
Downy Woodpecker	<i>Picoides pubescens</i>	O			
Hairy Woodpecker	<i>Picoides villosus</i>	O			
Plumbeous Woodpecker	<i>Dryocopus pileatus</i>	O			
Red Bellied Woodpecker	<i>Melanerpes carolinus</i>	O			
Red Headed Woodpecker	<i>Melanerpes erythrocephalus</i>	O		SC	
Black-backed Woodpecker	<i>Picoides arcticus</i>	P		SC	
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	O			
Northern Flicker	<i>Colaptes auratus</i>	O			
Eastern Phoebe	<i>Sayornis phoebe</i>	O			
Olive-sided Flycatcher	<i>Contopus cooperi</i>	L			
Least Flycatcher	<i>Empidonax minimus</i>	O			
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	L			
Alder Flycatcher	<i>Empidonax alhorum</i>	L			
Eastern Wood-Pewee	<i>Contopus virens</i>	O			
Blue Jay	<i>Cyanocitta cristata</i>	O			
Gray Jay	<i>Perisoreus canadensis</i>	L			
American Crow	<i>Corvus brachyrhynchos</i>	O			
Common Raven	<i>Corvus corax</i>	L			
Black-capped Chickadee	<i>Parus atricapillus</i>	O			
Boreal Chickadee	<i>Parus hudsonicus</i>	P			
Red-breasted Nuthatch	<i>Sitta canadensis</i>	O			
White-breasted Nuthatch	<i>Sitta carolinensis</i>	O			
Brown Creeper	<i>Certhia americana</i>	L			
House Wren	<i>Troglodytes aedon</i>	O			
Winter Wren	<i>Troglodytes hiemalis</i>	O			
Golden-crowned Kinglet	<i>Regulus satrapa</i>	O			
Ruby-crowned Kinglet	<i>Regulus calendula</i>	O			
Veery	<i>Catharus fuscescens</i>	O			
Swainson's Thrush	<i>Catharus ustulatus</i>	O			
Hermits Thrush	<i>Catharus guttatus</i>	O			
American Robin	<i>Turdus migratorius</i>	O			
Gray Catbird	<i>Dumetella carolinensis</i>	P			
Brown Thrasher	<i>Toxostoma rufum</i>	O			
Cedar Waxwing	<i>Bombycilla cedrorum</i>	O			
Starling	<i>Sturnus vulgaris</i>	O			
Red-eyed Vireo	<i>Vireo olivaceus</i>	O			
Blue-headed Vireo	<i>Vireo solitarius</i>	O			
Philadelphia Vireo	<i>Vireo philadelphicus</i>	L			
Black-and-white Warbler	<i>Mniotilta varia</i>	O			
Blackburnian Warbler	<i>Setophaga fusca</i>	O			
Black-throated Blue Warbler	<i>Setophaga caerulescens</i>	O			
Black-throated Green Warbler	<i>Setophaga virens</i>	O			
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	O			
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	L		SC	
Magnolia Warbler	<i>Setophaga magnolia</i>	O			
Common Yellowthroat	<i>Geothlypis trichas</i>	O			
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	O			
Northern Parula	<i>Setophaga americana</i>	O			
Yellow Warbler	<i>Setophaga petechia</i>	O			
Yellow-rumped Warbler	<i>Setophaga coronata</i>	O			
Cape May Warbler	<i>Dendroica striata</i>	L			
Pine Warbler	<i>Dendroica striata</i>	P			
Bay-breasted Warbler	<i>Dendroica castanea</i>	P			
Cerulean Warbler	<i>Dendroica cerulea</i>	L		T	
American Redstart	<i>Setophaga ruticilla</i>	O			
Ovenbird	<i>Seiurus aurocapilla</i>	O			
Common Yellowthroat	<i>Geothlypis trichas</i>	L			
Northern Waterthrush	<i>Seiurus noveboracensis</i>	P			
Connecticut Warbler	<i>Opornis agilis</i>	P			
Mourning Warbler	<i>Opornis philadelphia</i>	L			
Canada Warbler	<i>Wilsonia canadensis</i>	L			
Scarlet Tanager	<i>Piranga olivacea</i>	L			
Northern Cardinal	<i>Cardinalis cardinalis</i>	P			
Rose Breasted Grosbeak	<i>Phœucticus ludovicianus</i>	O			
Indigo Bunting	<i>Passerina cyanea</i>	P			
Chipping Sparrow	<i>Spizella passerina</i>	O			
Song Sparrow	<i>Melospiza melodia</i>	L			
Lincoln's Sparrow	<i>Melospiza lincolni</i>	P			
White-throated Sparrow	<i>Zonotrichia albicollis</i>	O			
Dark-eyed Junco	<i>Junco hyemalis</i>	O			
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	O			
Purple Finch	<i>Haemorrhous purpureus</i>	O			
Red Cross Bill	<i>Loxia curvirostra</i>	O			
White-winged Crossbill	<i>Loxia leucoptera</i>	P			
Pine Siskin	<i>Carduelis pinus</i>	L			
American Goldfinch	<i>Spinus tristis</i>	O			
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	O			
Pine Grosbeak	<i>Picus maricabius</i>	O			
Common Redpoll	<i>Acantha flammea</i>	O			
Hoary Redpoll	<i>Carduelis hornemanni</i>	O			
House Sparrow	<i>Passer domesticus</i>	P			

Appendix D  
Reptile and Amphibian Species List

<b>Reptiles and Amphibians</b>				
<u>Common Name</u>	<u>Scientific Name</u>	<u>Observed (O) or Likely To Occur (L)</u> <u>Possible (P)</u>	<u>State Status</u>	<u>Federal Status</u>
Red Backed Salamader	<i>Plethodon cinereus</i>	O		
Spotted Salamander	<i>Ambystoma maculatum</i>	O		
Northern Leopard Frog	<i>Rana pipiens</i>	P		
Mink Frog	<i>Rana septentrionalis</i>	L		
Wood Frog	<i>Rana sylvatica</i>	L		
Green Frog	<i>Rana clamitans</i>	L		
Pickerel Frog	<i>Rana palustris</i>	L	SC	
Eastern Gray Treefrog	<i>Hyla versicolor</i>	O		
American Toad	<i>Bufo americanus</i>	O		
Five lined Skink	<i>Eumeces fasciatus</i>	O		
Common Snapping Turtle	<i>Chelydra serpentina</i>	O		
Painted Turtle	<i>Chrysemys picta</i>	O		
Wood Turtle	<i>Clemmys insculpta</i>	P	SC	
Blanding's Turtle	<i>Emydoidea blandingii</i>	P	SC	
Eastern Garter Snake	<i>Thamnophis sirtalis sirtalis</i>	O		
Red-bellied Snake	<i>Storeria occipitomaculata</i>	O		
Ringneck Snake	<i>Diadophis punctatus</i>	P		
Western Fox Snake	<i>Elaphe vulpina vulpina</i>	P		

# Appendix E Conceptual Alternatives





# Forest Stewardship Plan



Prepared for the Yellow Dog Watershed Preserve

Plan by Cory Howes  
Registered Forester

Plan Duration: 2017 to 2037



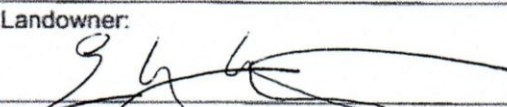



The Forest Stewardship Program is funded by the United States Forest Service and administered by the Michigan Department of Natural Resources.

This plan also meets the requirements of the American Tree Farm System.

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

[www.Michigan.gov/ForestStewardship\](http://www.Michigan.gov/ForestStewardship)

Landowner Contact Information		Plan Writer Contact Information		
Name: Yellow Dog Watershed Preserve		Name: Cory Howes		
Address: P.O. Box 5 Big Bay, MI 49808		Address: 126 W. Ridge St. Marquette, MI 49855		
Phone: 906-345-9223		Phone: 906-236-4605		
Email: emily@yellowdogwatershed.org		Email: coryhowes@jmlongyear.com		
Property Information				
Total Acres: 688	Forested Acres: 642	Acres in Plan: 688	Tax ID:	
Town: T50N	Range: R27W	Section: 17, 16, 10, 36	Township: Ishpeming, Powell	County: Marquette
<p><b>Property Legal Description (Quarter-Quarter Section, Quarter Section, Section, Town, Range, Township, County):</b>  That part of NW1/4 of SW1/4 lying East of Co Rd 510 ROW (11.9 Acres), SW1/4 of NE1/4 (40 acres), E1/2 of NE1/4 (80 acres), NW1/4 of SE1/4; NE1/4 of SW1/4 (80 acres), NE1/4 of SE1/4 (40 acres), That part of S1/2 of NW1/4 E of Co. Rd. 510 ROW (73.8 acres), T50N-R27W, Sec. 17. NW1/4 of NE1/4; NE1/4 of NW1/4; S1/2 of NW1/4 (160 acres), T50N-R27W, Sec. 16. N1/2 of SE1/4 (80 acres), NE1/4 of SW1/4; E1/2 of NW1/4 of SW1/4 (60 acres), W1/2 of NW1/4 of SW1/4 (20 acres), T50N-R27W, Sec. 10. S1/2 of NE1/4 of NE1/4 exc. that part lying on Wly Side of Yellow Dog River (12 acres). That part of SE 1/4 of NE1/4 lying on the E'ly side of the Yellow Dog River (10 acres), T51N-R27W, Sec. 36. W 1/2 of SW 1/4 of SE 1/4, Sec. 9. T50N R27W, Marquette County, MI.</p>				
<p><b>How to Find Property from Nearest Town:</b> From Marquette, turn left onto County Rd 550 towards Big Bay (23.1 mi). Turn left onto Co Rd 510. Continue on 510 for 6.7 until you reach the Yellow Dog River Bridge. Park on the south side of the bridge, trail begins at parking lot.</p>				
Participation in Related Forestry Programs				
<input type="checkbox"/> I intend to enroll this parcel in the Qualified Forest Program (QF).		<a href="http://www.Michigan.gov/QFP">www.Michigan.gov/QFP</a>		
<input checked="" type="checkbox"/> I intend to enroll this parcel in the Commercial Forest Program (CF).		<a href="http://www.Michigan.gov/CommercialForest">www.Michigan.gov/CommercialForest</a>		
<input checked="" type="checkbox"/> I intend to enroll this parcel in the American Tree Farm System.		<a href="http://www.TreeFarmSystem.org">www.TreeFarmSystem.org</a>		
<input checked="" type="checkbox"/> I intend to apply to the NRCS for financial assistance.		<a href="http://www.nrcs.usda.gov">www.nrcs.usda.gov</a>		
Michigan's Stewardship Ethic				
<p>Stewardship is an ethic recognizing that the land and its natural inhabitants have an inherent worth. We acknowledge that we have a responsibility to consider the current and far distant future value of the land as we manage, protect, and enjoy the forest. Stewardship guides us to conduct our activities to the utmost of our abilities and to ensure the future health, productivity, diversity, and well-being of the land, its natural communities and native species. Stewardship today provides opportunities to future generations to use and enjoy the land and its resources.</p>				
Signatures of Approval from Landowner, Plan Writer, and DNR Service Forester				
<p>This plan describes the community's goals and objectives for the Yellow Dog Community Forest (YDCF). Participation in the Forest Stewardship Program is voluntary and only indicates intent to practice sustainable forest management. I understand that enrolling forest land into separate property tax programs like the Commercial Forest program or the Qualified Forest program requires YDCF board compliance with an approved forest management plan in exchange for the reduction in property taxes.</p>				
Landowner:		Date:		
		9/27/2017		
Plan Writer:		Date:		
		9/12/2017		
DNR Service Forester:		Date:		
<p>After review and signed approval by the Landowner, the Plan Writer submits the entire Plan to the nearest DNR Service Forester for their review. <b>Electronic submission of the Plan is encouraged by emailing a Word document or PDF file to the Service Forester.</b> The DNR Service Forester will return a hard copy or PDF of the signature page and plan to the Plan Writer after approval.</p>				

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## Introduction

### ***Forest Stewardship Program***

The purpose of the Forest Stewardship Program is to help forest landowners manage, protect, and enjoy their land. The voluntary program connects family forest landowners with 150 professional foresters and twenty wildlife biologists in the private sector to develop and implement a Forest Stewardship Plan. The United States Forest Service (USFS) supplies funding and partners with the Michigan Department of Natural Resources (DNR) to provide assistance to private forest landowners. See [www.Michigan.gov/ForestStewardship](http://www.Michigan.gov/ForestStewardship) for more information. Since 1990, more than 5,700 landowners from every county in Michigan have developed a Forest Stewardship Plan to help them manage, protect, and *enjoy* their own forest.

### ***Yellow Dog Community Forest Acquisition Process***

Through donations, grants, and foundation support, the Yellow Dog Watershed Preserve raised \$1.1 million in order to purchase the 688 acres described in this Forest Stewardship Plan. The property was purchased with the aid of several funding sources including a \$400,000 grant from the U.S. Forest Service's Community Forest and Open Space Conservation Program. In addition, support was provided by the J.A. Woollam Foundation, the Carls Foundation, anonymous donors, Max and Mary Putters, and many other individuals, small grants, community organizations, and fundraisers.

The Yellow Dog Watershed Preserve spearheaded the campaign to create a protected area, ensuring permanent public access, preventing development, and maintaining the property as a forested natural landscape.

The next step in the project was to create the long term plan for the Yellow Dog River Community Forest with a strong emphasis on community involvement in the decision making process. This was accomplished through the Public Participation Process. YDWP applied to the National Park Service's Rivers, Trails and Conservation Assistance Program and was selected to receive assistance in designing and implementing a solid process for informing and including the public.

Input on management was also taken from the public through a series of open houses and surveys. The Community Forest Committee (selected by the Yellow Dog Watershed Preserve to represent a broad range of community interests), regularly met to aid in planning the management of the Community Forest. Below are the members and their affiliations.

Jerome Maynard: Fred Waara Chapter of Trout Unlimited  
Chris Burnett: Upper Peninsula Land Conservancy  
Jan Zender: Yellow Dog Watershed Preserve  
Kathy Wright: Powell Township School  
George Lindquist: UP Whitetails of Marquette County  
Brian Roell: Michigan DNR Wildlife Division  
Matt Watkeys: Marquette County Conservation District  
Tod Poirer: Member at Large

### ***Public Input Survey Results***

Priority was determined primarily by the first questionnaire/online survey. Percentages were calculated in terms of support, and then put into the following categories:

- High Priority: 67-100% support
- Moderate Priority: 34-66% support
- Low Priority: 0-33% support

<b>Environmental Uses</b>	<b>Priority</b>
<b>Water Quality Protection</b>	<i>High</i>
<b>Wildlife Habitat</b>	<i>High</i>
<b>Protect Coldwater Fisheries</b>	<i>High</i>
<b>Protect RTE Species</b>	<i>High</i>
<b>Maintain Biodiversity</b>	<i>High</i>
<b>Sustain Air Quality</b>	<i>High</i>
<b>Buffer Climate Change</b>	<i>High</i>

<b>Recreational Use</b>	<b>Priority</b>
<b>Photography</b>	<i>High</i>
<b>Hiking</b>	<i>High</i>
<b>Birding</b>	<i>High</i>
<b>Fishing</b>	<i>High</i>
<b>Backcountry skiing</b>	<i>High</i>
<b>Non-motorized boating</b>	<i>Moderate</i>
<b>Camping</b>	<i>Moderate</i>
<b>Hunting</b>	<i>Moderate</i>
<b>Mountain Biking</b>	<i>Low</i>
<b>Groomed trail skiing</b>	<i>Low</i>
<b>Trapping</b>	<i>Low</i>

<b>Educational Use</b>	<b>Priority</b>
<b>Volunteer Monitoring</b>	<i>High</i>
<b>Youth/Service Corps</b>	<i>High</i>
<b>Interpretive Hikes</b>	<i>High</i>
<b>University Research</b>	<i>High</i>
<b>K-12 Outdoor Ed</b>	<i>High</i>
<b>Wilderness Skills</b>	<i>Moderate</i>

<b>Climate Demonstration Forest</b>	<i>Moderate</i>
-------------------------------------	-----------------

<b>Economic Use</b>	<b>Priority</b>
<b>Guided Rec/Ecotourism</b>	<i>Moderate</i>
<b>Wild Food</b>	<i>Moderate</i>
<b>Forestry</b>	<i>Moderate</i>
<b>Native Seed</b>	<i>Moderate</i>
<b>Maple Syrup</b>	<i>Moderate</i>
<b>Firewood/Forest Products</b>	<i>Low</i>
<b>None</b>	<i>Low</i>

### ***Mission Statement***

The mission of the Yellow Dog Community Forest is to create a protected area that meets both human needs and environmental quality while maintaining our unique way of life.

### ***Goals and Objectives Determined Through Public Input***

We seek a Community Forest:

- That balances conservation and preservation, ensuring that a variety of public uses can occur while maintaining or improving the integrity of high quality terrestrial and aquatic ecosystems.
- That inspires active participation and involvement by community members of all generations to further secure the ecological health of the landscape.
- That provides place-based opportunities for forward thinking recreational, educational, environmental, and socio-economic activities.

### ***Environmental Goal:***

The Community Forest should be managed to provide all high priority ecological services and other uses should not impede these ecological services.

#### ***High Priority Environmental Objectives:***

Advance activities that:

- Improve wildlife habitat
- Protect cold water fisheries
- Protect rare, threatened, endangered, or species of concern
- Sustain the quality of the water
- Maintain species biodiversity
- Sustain the quality of the air
- Buffer for potential climate effects

***Moderate Priority Environmental Objectives:*** None

***Low Priority Environmental Objectives:*** None

***Recreational Goal:***

The Community Forest should be managed to support diverse recreational activities, primarily low impact silent sports while striving to create a safe place for multiple uses.

***High Priority Recreational Objectives:***

Advance activities that would allow the public to use the property for these types of recreation:

- Hiking
- Photography
- Birding
- Fishing
- Backcountry skiing

***Moderate Priority Recreational Objectives:***

Maintain activities that would allow the public to use the property for these types of recreation:

- Camping
- Kayaking/canoeing
- Hunting

***Low Priority Recreational Objectives:***

Limit activities that would allow the public to use the property for these types of recreation:

- Mountain biking
- Groomed trail cross country skiing
- Trapping (wilderness zone only)
- Motorized recreational vehicles

***Educational Goal:***

The Community Forest should be managed to stage low impact, place based learning for a broad public base in an effort to increase environmental stewardship and wise resource decision making.

***High Priority Educational Objectives:***

Advance activities that would support educational programs such as:

- Interpretive hikes and skis
- Volunteer monitoring programs
- Youth service corps programs
- University research
- K-12 outdoor education

***Moderate Priority Educational Objectives:***

Maintain activities that would support educational programs such as:

- Wilderness skills
- Climate demonstration forest

***Low Priority Educational Objectives:*** None

***Economic Goal:***

Lands listed under the Commercial Forest program will follow specific state statutes that prohibit economic producing activities other than timber management. Lands listed in CF will be managed to sustainably capture the economic value of the mature timber, and increase the vigor and growth of the healthy standing timber. Any economic activities other than forestry would only be allowable if parcels were removed from the Commercial Forest program but retained in the Multi-Use zone as described in this plan.

***High Priority Economic Objectives:***

Advance activities that could create economic benefits such as: None

***Moderate Priority Economic Objectives:***

Maintain activities that could create economic benefits such as:

- Guided recreation/ecotourism
- Wild food/medicine gathering
- Sustainable forestry
- Maple syrup production
- Native seed production
- Fee-based special events

***Low Priority Economic Objectives:***

Limit activities that could create economic benefits such as:

- Firewood or other forest products

Note: The commercial Forest Program (CF) does not allow landowners to produce income on CF land other than from the sale of timber products. Lands listed in CF must be devoted to commercial forest management. Maple syrup production is not compatible with CF and would take place in the wilderness zone if any. Any economic producing activities would take place within the Wilderness Zone of the community forest. The land remaining in commercial forest will be managed to sustainably capture the economic value of the mature timber, and increase the vigor and growth of the healthy standing timber.



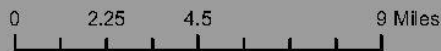


# Yellow Dog Community Forest Locator Map



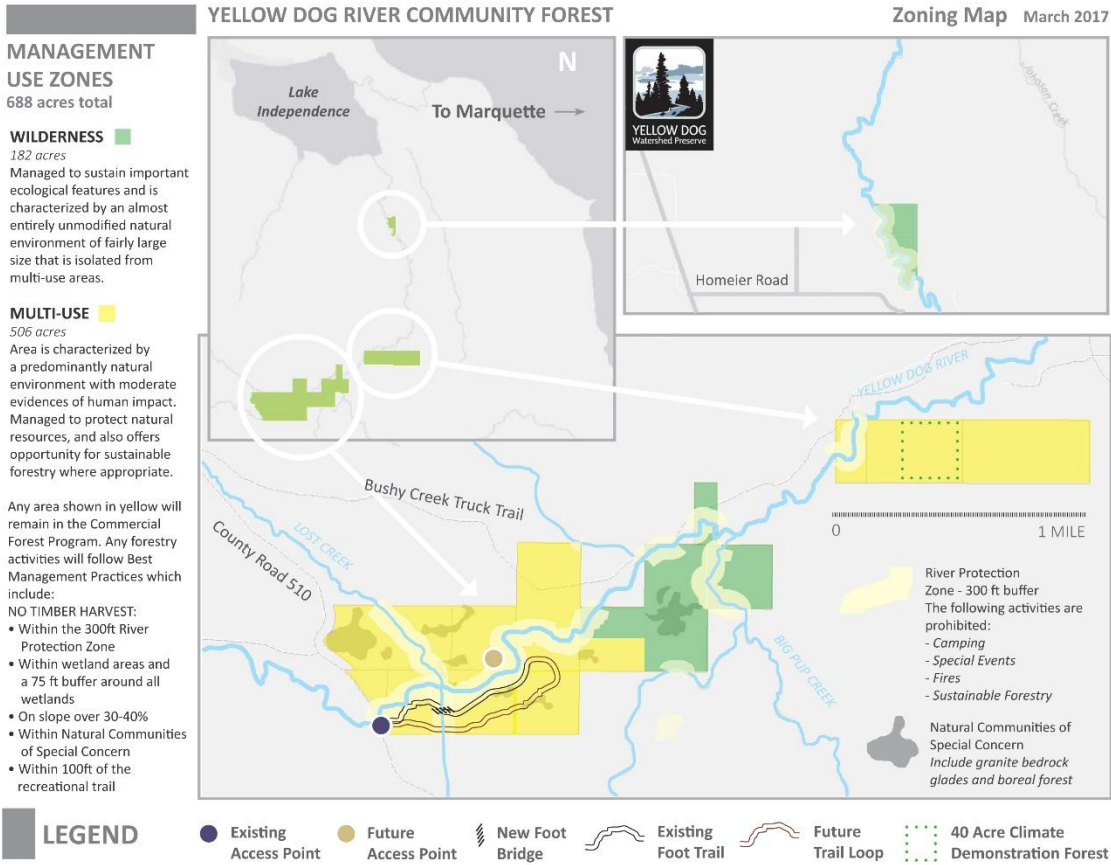
**Legend**

- State Roads
- YD Property Boundary



Scale: 1:220,000  
Produced By: Cory Howes  
Date: 4/24/2017

# Yellow Dog Community Forest Zone Descriptions Map



## Zone Descriptions

### Wilderness Zone

The Wilderness Zone is characterized by large unmodified natural environments. Concentration of users is fairly low and evidence of other area users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Only essential facilities for resource protection are used and are constructed of on-site materials. No facilities for comfort or convenience of the user are provided. Spacing of groups is informal and dispersed to minimize contacts with other groups or individuals.

The Wilderness Zone will be managed to meet all priority environmental objectives, high-priority educational objectives, and high-priority recreational objectives. Economic objectives will not be serviced. The zone will be managed through limited access and will be restricted to activities that are dispersed and do not impact the environment. Special events will not be permitted.

The Environment.....Unmodified natural environment  
 Zone Size.....Large parcels  
 Access.....Limited, not designated/maintained  
 The Social Experience.....Solitude, low concentration of users  
 The Physical Experience.....Self-reliance and challenge

Usership.....Evidence of other users is minimal  
Infrastructure.....No signage, local materials used

Multi-Use Zone

The Multi-Use Zone is characterized by predominantly natural environment with moderate evidences of the sights and sounds of others. Concentration of users may be low to moderate. Renewable resource modification and utilization practices are evident and will complement the natural environment. There will be opportunity to have a high degree of interaction with the natural environment, as well as social interaction.

The Multi-Use Zone will be managed to meet all priority environmental, educational, recreational, and economic uses. Special events are possible with permission.

The Multi-Use Zone will remain in the Commercial Forest Program and will abide by the rules and regulations of the program.

The Environment.....Predominantly natural environment  
Zone Size.....Any size parcel  
Access.....Designated/maintained points that can accommodate groups  
The Social Experience.....Moderate concentration of users, social interaction  
The Physical Experience.....Challenge and risk not very important  
Usership.....Evidence of other users is prevalent  
Infrastructure.....some signage

## ***Property History***

The forests of the Upper Peninsula of Michigan were composed of vast areas of hardwoods and conifers. The forests were rich in diversity, especially that of the more fertile loams. These forests were composed of multiple age classes of white pine, hemlock, sugar maple, red maple, red oak, yellow birch, white spruce, white ash, American elm, ironwood, balsam fir, and cedar. The forests were always subject to change as a result of increasing age, natural succession, wind, fire, and other disturbances. The pre-settlement forest type around Marquette County was a Northern Mesic Forest. The exposed rock outcropping on this particular landscape were likely dominated by Krummholzed oak and white pine. The remainder of the stand would have been likely a mixed northern hardwood stand with a fair amount of large white pine and hemlock adjacent to the Yellow Dog River. White pine have been known to reach six feet in diameter, and hemlock to live up to 800 years of age.

Logging in the Upper Peninsula of Michigan became prominent by the mid 1800's. The first trees that were sought after were the white pines. After this came the hemlock and Tan Bark Industry. The hemlock were considered worthless, as the wood was brittle, and prone to ring-shake and splintering; however, with the quickly growing livestock industry, hemlock bark became widely used for converting hides into leather.

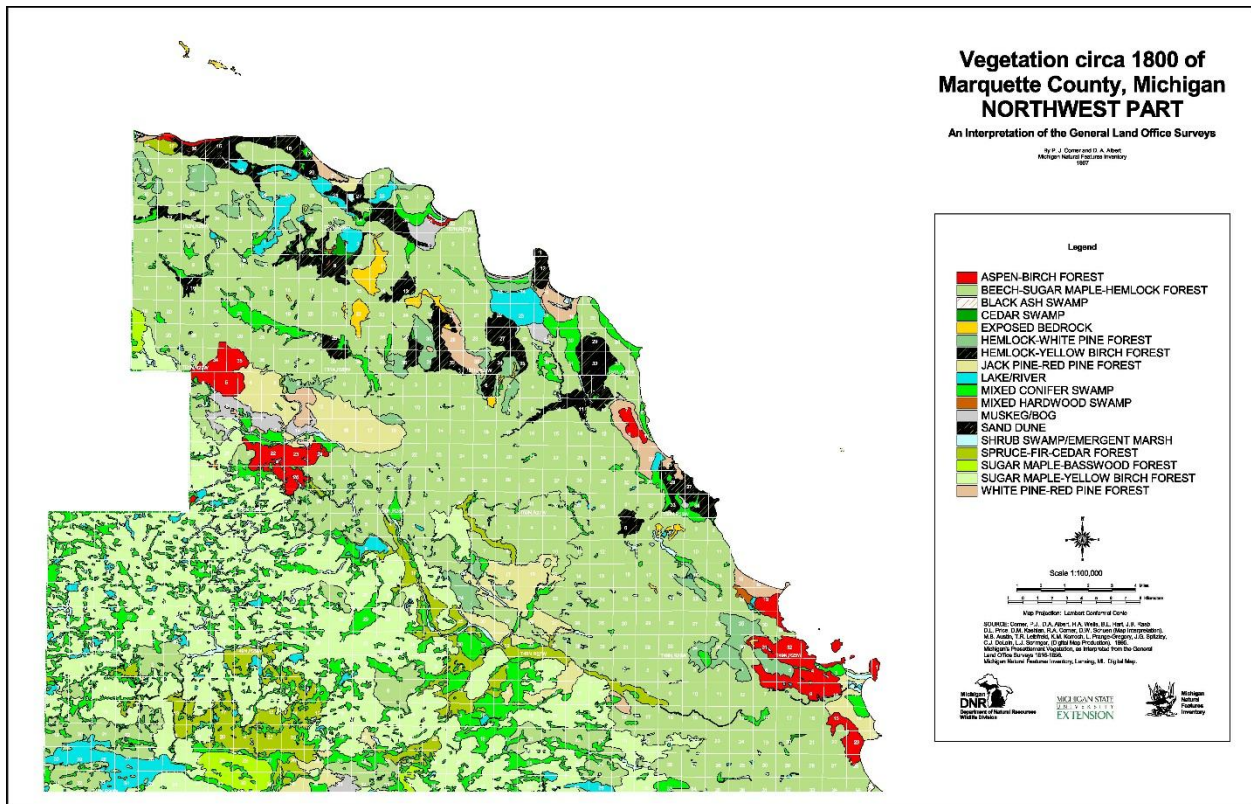
The hardwood industry began around 1900. Since hardwood logs float poorly, the transport of logs shifted from water to rail. It was not until post WWII before the Pulpwood Era or Industrial Era began. We now live in an era where there is literally no forest material waste. Saw mill blades have been reduced to as small as 1/64 of an inch, and the little waste that is produced is recycled to power and heat the mill.

A total of 668 acres of the community forest was purchased from J.M. Longyear, a natural resource company based out of Marquette, MI. The remaining 20 acres was donated by Max and Mary Putters. The vast majority of the 688 acres has been thinned, yet there are a few patches of timber left that were too cumbersome to harvest. The land has been selectively logged and managed, most likely every 15-20 years throughout the duration of ownerships. The majority of the forest consists of northern hardwoods, all of which vary in age classes.

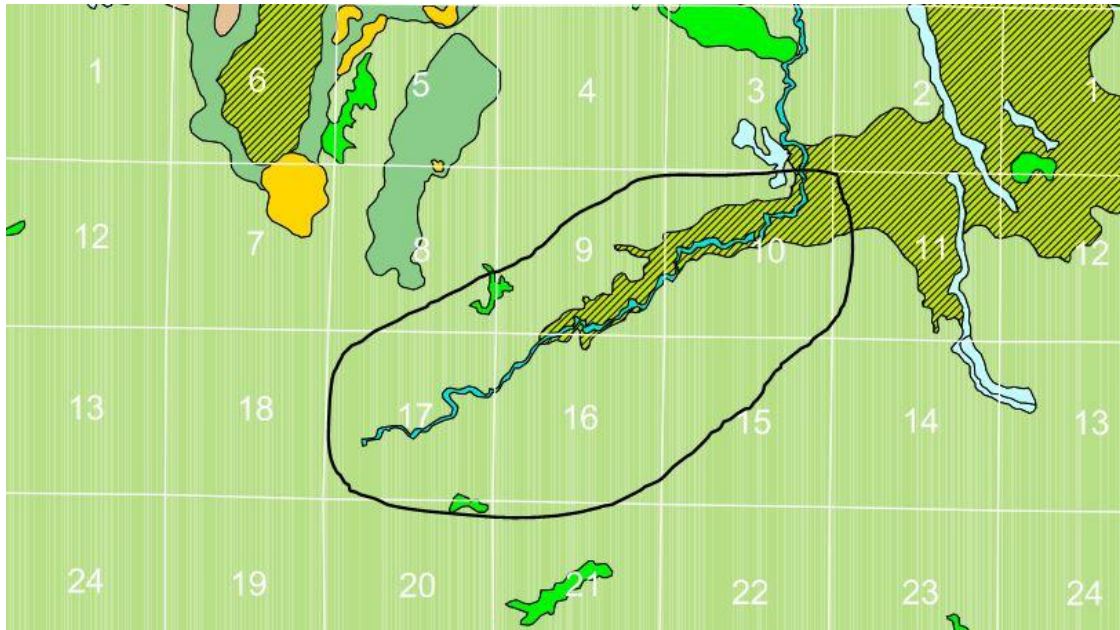
## **Pre-Logging Forest Types**

Between 1816 and 1856, Michigan was systematically surveyed by the General Land Office (GLO), which had been established by the federal government in 1785. The detailed notes taken by the land surveyors have proven to be a useful source of information on Michigan's landscape as it appeared prior to wide-spread European settlement. Surveyors took detailed notes on the location, species, and diameter of each tree used to mark section lines and section corners. They commented on the locations of rivers, lakes, wetlands, the agricultural potential of soils and the general quality of timber along each section line as they were measured out. Biologists from the

Michigan Natural Features Inventory developed a methodology to translate the notes of the GLO surveys into a digital map that can be used by researchers, land managers, and the general public (see Vegetation circa 1800 Map below).



**Image 1:** Zoomed in area of Vegetation circa 1800 for the Yellow Dog Community Forest. Dominated by Sugar Maple-Yellow Birch Forest with Hemlock – Yellow Birch Forest along the Yellow Dog River.



### ***General Property Description***

The Yellow Dog River Community Forest begins along the scenic County Road 510 in northern Marquette County. The property comprises both banks of the river and follows it downstream until it reaches private property. In addition to river frontage and waterfalls, visitors can find upland mixed forests, old growth hemlock stands, granite rock outcrops, wetlands, and rare plant and animal species. A trail beginning at the CR 510 Yellow Dog River bridge leads to one of the larger water falls within the ownership. The Community forest will be managed in two main zones, multi-use and wilderness. The wilderness zone will be taken out of the Commercial Forest Program (CF) and no active forest management is planned or scheduled within this zone. The Multi-use zone will remain in CF and will be managed sustainably according to the silvicultural practices described in this plan.

### ***Forest Management Plan Development***

To collect data for the development of this plan, variable radius plots (point sampling) was conducted at points set up on a grid spaced every 5 x 10 chains (1 chain = 66') throughout the property. Data was collected across six separate days between March and April of 2017. To determine basal area, a ten factor prism was used to identify which trees (>4" DBH) were in each plot. Within each stand, these basic observations were made: tree species composition, tree size class, tree stocking, regeneration stocking, tree quality and health, geomorphological features, and wildlife habitat suitability. Site quality of the stands were determined using the Web Soil Survey. This information was used to estimate productivity of the stand, as well as harvest equipment limitations.

To determine forest stand regeneration, a 1/50 acre plot was used at each sample point where all seedlings and saplings were recorded. Tables were constructed showing number of saplings per acre by species. Strong signs of forest regeneration along with small amounts of deer browse were observed across the forested tract.

### ***Assessment for the Natural Resources Conservation Service***

A “resource concern” is an expected degradation of the soil, water, air, plant, or animal resource base to an extent that the sustainability or intended use of the resource is impaired. Once concerns are addressed and identified, potential funding may be available through the Natural Resource Conservation Service to help aid in mitigating the issue. Resource concerns that are present or possible on the Yellow Dog Community Forest include:

- 1.) Invasive plants
- 2.) Soil erosion
- 3.) Water quality degradation
- 4.) Forest road erosion

Potential “conservation practices” to help prevent and or remediate the resource concerns include forest trails and landings, riparian forest buffers, forest stand improvement, and brush management.

### ***Wildlife Management***

Creating and maintaining diverse vegetation is the key to providing a large variety of wildlife with suitable habitat. Management should be planned for a whole rotation and dispersed throughout a compartment to provide a well-regulated range of age classes. This will result in several vegetation stages ranging from open, through areas of saplings, poles, immature sawtimber, and mature sawtimber. Each of these stages contributes to the habitat requirements of different groups of wildlife species. Some species need an open overstory and a well-developed midstory (conditions often found in old growth stands). Retaining selected stands beyond the normal rotation will provide these conditions.

During a thinning operation, a few dead snags, cull or un-merchantable trees should be left to provide cavities or potential cavity nesting wildlife species. Raptors use these trees as nesting locations, or to perch in and hunt from. Bats and owls will also use the cavities as dens. The decaying wood will additionally attract insects and thus larva which provides valuable nutrients to birds, woodpeckers, bats, reptiles, and amphibians. Once the snags fall to the forest floor, they provide valuable cover for foxes, mink, ermines, and other small mammals. The wood also retains moisture, providing crucial habitat for salamanders, amphibians, and can act as nurse logs for hemlock and yellow birch seedlings.

Aspen stands provide a valuable food source for ruffed grouse, woodcock, white-tailed deer, and a variety of other wildlife species. Ruffed grouse prefer young aspen stands (<25 years old) with high stem densities. Older trees that provide sites for roosting and budding are also important. Grouse feed on buds, catkins, and leaves as well as the flower buds of older aspen (>25 years old). Thus, various age classes are important to this species. To increase ruffed grouse, aspen



should be managed on a 50-70 year rotation, in patches at approximate 15 year intervals. This will provide a multi aged aspen stand suitable for all life stages of grouse.

White-tailed deer also rely heavily on aspen, especially for spring and fall range. The cutting schedule recommended for grouse can also be applied for deer habitat. Moose are also dependent upon the aspen community which provides a large amount of browse.

Oaks are a highly valued wildlife habitat species, providing nutritional food during autumn and early winter that benefits species including white tailed deer, turkey, fox, squirrels, ruffed grouse, bobcats, and other birds. Thinnings that stimulate vigor and tree growth will also stimulate acorn production, which will provide a higher percentage of mast for wildlife species and promote regenerating oaks.

A deer wintering complex (DWC) is the landscape mosaic of food and cover resources used by deer in winter conditions. In other words, a DWC is a local area where weather, forest cover, timber harvest, past deer patterns and behavioral conditions, and ecological conditions interact, resulting in a specific local area important to deer survivorship during typical winters. Deer wintering complexes have sometimes been called "deer yards," but because there are differences or variations in accepted definitions of "deer yard," this term is not ideal for a description or for our use. A "deer concentration area" is a localized site or area where deer are found during any individual winter, and this can vary widely. Compare these to deer wintering complexes, which are very important landscape locations for deer which result from complex interaction of several factors:

- **Winter Weather:** In northern climates that receive abundant snowfall and long periods of subfreezing temperatures, deer vacate their summer range and concentrate in ecologically distinct wintering complexes. The amount of food and shelter present on the landscape, along with prevailing snow depth, determines the capability of the deer wintering complex to support deer during the winter.
- **Site Conditions:** The term site conditions means land cover related aspects of forest habitat, stand composition and relates to timber harvest. Conifer tree cover is important in determining the location of winter complexes, particularly in the higher snowfall areas. Conifer cover provides deer with shelter from snow, wind, and cold temperatures. In addition, conifer branches intercept and retain snow, allowing deer easier travel. In the Upper Peninsula, it appears that preferred winter cover is upland stands of eastern hemlock and swamps of northern white cedar that are of appropriate age and stocking rates. Deciduous trees and shrubs adjoining conifer cover provide food for deer. Logging operations in close proximity to conifer cover provide deer with temporary abundant browse that would ordinarily be out of reach, but also may be a source for disturbance on local deer populations.
- **Past Migratory Behavior and Behavior Conditions:** This term includes established migratory deer patterns, deer movement behavior or instinct, and other behavior responses, dynamics or conditions. Fawns learn wintering locations from their mother or matrilineal family members and develop long lasting affinities for specific wintering complexes. Following the onset of winter conditions, deer may migrate up to fifty miles from summer range to reach specific or preferred wintering complexes. Following winter break-up, deer disperse back to their summer areas.

- **Ecological Conditions:** The capability of wintering complexes to support deer depends on the quantity, quality, and spatial arrangement of shelter and food resources over time. The optimal habitat mix of shelter and food, at the landscape scale, appears to be approximately 50% conifer cover and 50% deciduous food. Northern white cedar stands have the capability of providing both shelter and preferred winter food. Deer utilization of wintering complexes can be dynamic depending upon the onset, severity and duration of winter weather.

Hemlock and Conifer stands can act as thermal cover for deer and a variety of wildlife species during harsh winter conditions even though the hemlock and conifer stands within the community forest are not recognized as a designated Deer Wintering Complex.

## **Climate Change**

Climate change may relieve some stressors, while exacerbating others. It is predicted that overall annual temperatures will increase, growing seasons will get longer, the nature and timing of precipitation will change, soil moisture pattern will change, and pests and diseases will increase and become more severe. It is difficult to predict on a micro-level how severe these changes will be. In general, suitable habitat for many tree species will slowly move northward; thus species at the southern end of their range will be the most heavily affected. Species including balsam fir, white spruce, paper birch, and quaking aspen are projected to decline as their suitable habitat decreases. In a study conducted by the Northern Institute of Applied Climate Science & US Forest Service, lowland conifer and upland spruce-fir forests are considered to be the most vulnerable to climate change. Oak and white pine forests were rated the least vulnerable because of their ability to withstand drought.

In response to the projected climate change, flexible and adaptive land management is needed that incorporates new knowledge and experience over time. It is crucial to plan ahead, assess risk, and ensure that the benefits forests provide are sustained into the future. For this particular tract of property, it is recommended to monitor the stand periodically. If there are any significant signs of maple dieback, decline in trembling aspen, diseased trees, or other predisposing factors, the harvest schedule and forest management plan may need to be altered to accommodate accordingly. It is always wise to diversify the stand where possible. Invasive pests such as Hemlock Woolly Adelgid may be capable of inhabiting the Upper Peninsula with warmer winter

temperatures. Currently, winters are thought to be slightly too cold for this destructive pest. By diversifying the stand and planting a variety of different species, you are ensuring a future forest even if an invasive pest happens to kill all of a specific species in an area. Management recommendations for each particular stand are described under Stand Management starting on page 25.

YDWP will begin to work with the Northern Institute of Applied Climate Science and US Forest Service to further incorporate climate change issues into the overall management of the Community Forest. Specifically, potential actions to increase the forest's ability to buffer climate change via forestry management and activities will be researched and included in the Stewardship Plan when appropriate.

### ***Archeological, Cultural and Historic Sites***

Archeological sites came up positive in T50N, R27W Sec 17 in the MDNR database. The YDWP will be in contact with the State Archeologist Dean Anderson to protect the site.

### ***Special Sites***

Scattered outcrops in forested landscape. Sparse dwarf shrubland. Dominant trees: *Quercus rubra* (red oak); *Pinus strobus*, (white pine). Species list: *Deschampsia cespitosa*, *Danthonia spicata*, *Cladonia rangiferina*, Crustose/Foliose lichens

**Granite Bedrock Glade** (ranked S2) –Granite bedrock glade consists of an open forested or savanna community found where knobs of granitic bedrock types are exposed at the surface. The sparse vegetation consists of scattered open-grown trees, scattered shrubs or shrub thickets, and a partial turf of herbs, grasses, sedges, mosses, and lichens. Granite bedrock glades typically occupy areas of steep to stair-stepped slopes, with short cliffs, and exposed knobs of bedrock. The community occurs in the western Upper Peninsula with primary concentrations in Marquette, Baraga, and Dickinson Counties.

Windthrow, desiccation, fire, and exfoliation of rock slabs are all important natural processes for bedrock glade communities. Windthrown trees are common as a result of thin soils and strong winds associated with Lake Superior. Thin soils, cold winter temperatures, steady winds, and summer droughts make vegetation especially prone to desiccation. Rain that lands on sloping bedrock outcrops quickly runs off to lower elevation areas, further contributing to dry conditions

and removing accumulated plant debris and small rock debris that could otherwise initiate soil formation. Glades are subject to fires from both lightning and human sources. Both white pine and red pine form a super canopy and are prime targets for lightning strikes associated with Lake Superior storms. The open structure and elevated position of glades make them ideal places for historic and modern human gathering, which were and are associated with escaped campfires.

Invasive plants that threaten the diversity and community structure in granite bedrock glade include sheep sorrel (*Rumex acetosella*), common mullein (*Verbascum 64retens*), spotted knapweed (*Centaurea stoebe*), ox-eye daisy (*Leucanthemum vulgare*), hawkweeds (*Hieracium* spp.), common St. John's-wort (*Hypericum perforatum*), timothy (*Phleum 64retense*), Canada bluegrass (*Poa compressa*), and Kentucky bluegrass (*P. pratensis*). Monitoring and control efforts to detect and remove invasive plants are critical to the long-term viability of bedrock glades. Maintaining a mature, unfragmented forested buffer around bedrock glades may help limit the local seed source for invasive species distributed by wind or birds.

Ants are quite abundant in this dry, thin-soiled environment. Black bears use this habitat, possibly because of the abundant ants, other insects, and wild fruit.

More information at: <https://mnfi.anr.msu.edu/communities/community.cfm?id=15978>

### ***Endangered, Threatened, and Species of Concern Species***

Bald Eagle, Cerulean Warbler, Golden Winged Warbler, Whipporwill, Common Nighthawk, Spruce Grouse, Peregrine Falcon, Merlin Northern Goshawk, Little Brown Bat, Northern Long Eared Bat, Tricolored Bat, Northern Flying Squirrel, Mountain Lion, Gray Wolf, Moose, Pickerel Frog, Maidenhair Spleenwort, Carex Trisperma, Laurentian Fragile Fern, Male Fern, Meadow Horsetail, Waxy Meadow-Rue, Brooklime, Rusty Woodsia.

### ***Wetlands***

The DEQ Wetlands Map Viewer at [www.mcgi.state.mi.us/wetlands](http://www.mcgi.state.mi.us/wetlands) indicates that there are both soil areas and wetlands as identified on NWI and MIRIS (part 303 final wetland inventory). These areas are confined adjacent to the Yellow Dog River Lost Creek and the Big Pup Creek. A 300' buffer will be in place along these riparian systems. Best Management Practices under the "Sustainable Soil and Water Quality Practices on Forest Land" will be followed to reduce any possibility of impact.

### ***Fire***

Prescribed fire is a management tool used to reduce hazardous fuels or unwanted understory plants (invasive, undesirable species, etc.). Prescribed fire should only be conducted by highly trained and properly insured professionals. More information about prescribed fire is available on the Michigan Prescribed Fire Council website at <http://firecouncil.org>. Wildfire is not a significant risk in this county or for the forest types on the property. Forests dominated by pines or on sandy soils are more prone to wildfire. However, more information about minimizing the risk of wildfire in Michigan can be found at <http://firewise.msu.edu>.



**Photo** by Cory Howes: Old burned pine stump. Many stumps similar to this are present through the property, mostly on the exposed rock outcrops. Lightning strikes can cause fires during dry summer months. These stumps were likely burned over fifty years ago and are degrading very slowly due to the dry mesic habitat present on the outcroppings.

### ***Forests of Recognized Importance***

This property is located within a “Forest of Recognized Importance” (FORI), which in Michigan are forests along the Great Lakes coastline, forests along Natural or Wild and Scenic Rivers, rare forest types (old growth), or forests that provide important wildlife habitat (>500 contiguous acres in the southern Lower Peninsula, or required habitat for threatened or endangered species statewide). Landowners within a FORI should manage their forest to protect the ecological integrity of that larger important ecosystem.

### ***Carbon Cycle***

Carbon dioxide is removed from the atmosphere through photosynthesis and decomposition of organic matter into the soil. Carbon dioxide is then released to the atmosphere through respiration, deforestation, and soil tillage. More than 63% of the terrestrial carbon stocks in Michigan’s forests are in soil organic carbon while only 19% is in the above ground biomass (trunk, branches, leaves). Below ground biomass (roots), dead wood, and litter (dry leaves) make up the remaining 18% of the carbon stocks in Michigan’s forests. Healthy forests clean the

air and produce oxygen through photosynthesis. Therefore, forests in Michigan and around the world are very important ecosystems that remove carbon dioxide from the atmosphere and help to reduce the global impacts of climate change. More information about the forest carbon cycle is available at [www.fs.fed.us/ecosystemservices/carbon.shtml](http://www.fs.fed.us/ecosystemservices/carbon.shtml).

### ***Agroforestry and Range***

Agroforestry is a land-use system that combines both agriculture and forestry in one location. The five most common temperate agroforestry systems are alley cropping, forest farming, riparian forest buffers, silvopasture, and windbreaks (see definitions in the glossary in the Appendix). The Landowners are not presently doing any agroforestry practices in their forest, but more information can be found at [www.centerforagroforestry.org](http://www.centerforagroforestry.org). Range refers to cattle grazing in natural landscapes. Free ranging cattle are more common in the national forests and other public land in the western United States, and the practice is rarely used in Michigan forests. Range animals may be used to control unwanted understory vegetation, but they can also be very damaging to the natural regeneration of desirable tree species as well.

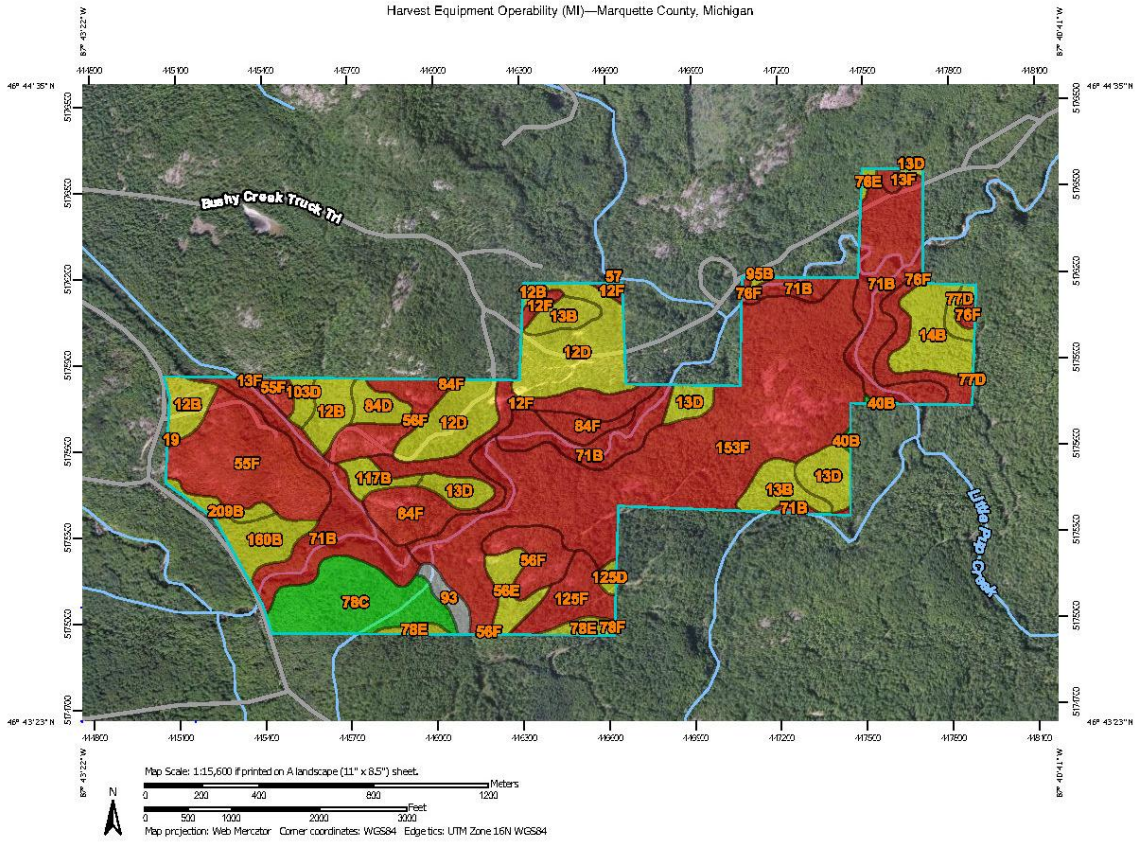
### ***Soil Erosion Prevention***

To minimize any disturbance, compaction, and/or erosion potential to the property, it is recommended to implement a thinning/harvest during winter months. This will reduce overall disturbance to the soil and existing vegetation. Non-merchantable tree tops should be placed on main forwarding trails to prevent further disturbance. It is also important to avoid driving machinery on slopes >30%. It is a high priority to do everything possible to minimize disturbance across the forested landscape. Tree length skidding will not be permitted to avoid the exposure of soil and potential erosion concerns.

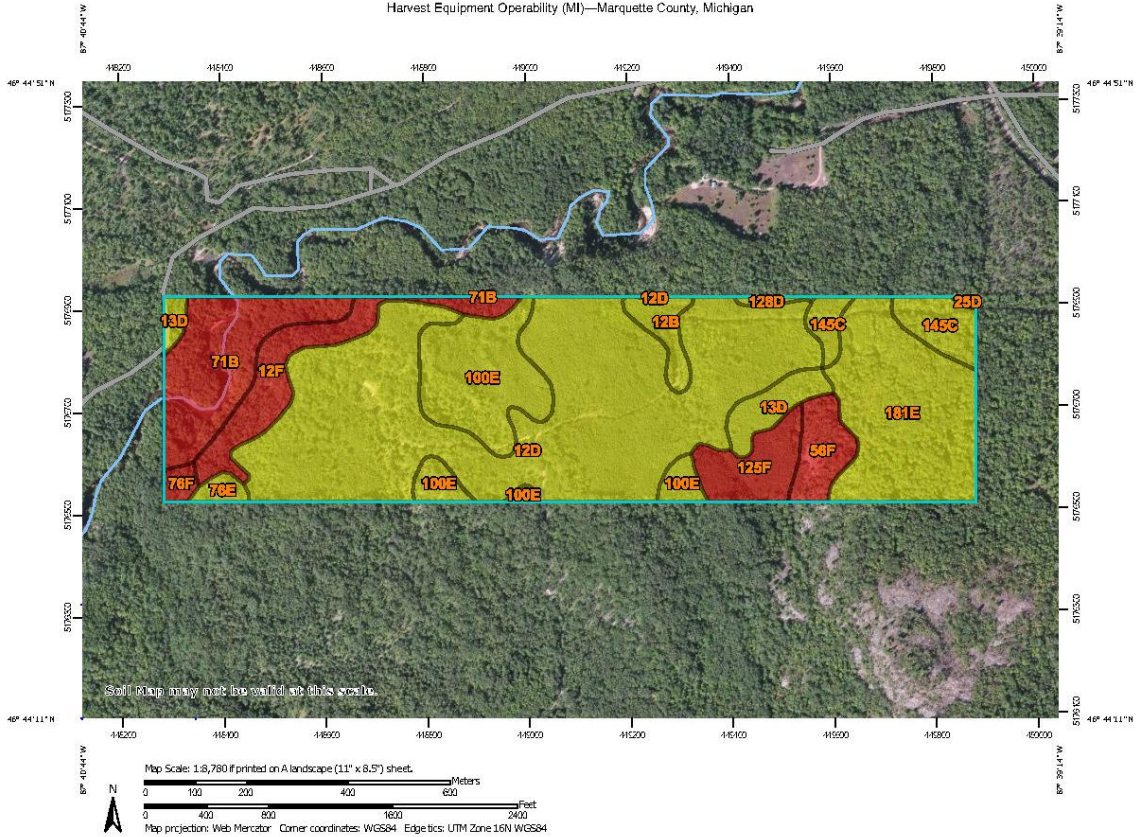
**Soil Erosion Susceptibility**

Surface Soil Texture	Susceptibility to Erosion (1=Highest)
Silt, silt loam, loam, very fine sandy loam	1
Sandy clay loam, silty clay loam, clay loam	2
Clay, silty clay, sandy clay, very fine loamy sand	3
Sandy loams, loamy sands, sands	4

Harvest Equipment Operability (MI)—Marquette County, Michigan



Harvest Equipment Operability (MI)—Marquette County, Michigan



MAP LEGEND		MAP INFORMATION
<b>Area of Interest (AOI)</b>	<b>Background</b>	<p>The soil surveys that comprise your AOI were mapped at 1:24,000.</p> <p>Please rely on the bar scale on each map sheet for map measurements.</p> <p>Source of Map: Natural Resources Conservation Service                      Web Soil Survey URL:                      Coordinate System: Web Mercator (EPSG:3857)</p> <p>Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.</p> <p>This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.</p> <p>Soil Survey Area: Marquette County, Michigan                      Survey Area Data: Version 11, Sep 22, 2016</p> <p>Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.</p> <p>Date(s) aerial images were photographed: Data not available.</p> <p>The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.</p>
Area of Interest (AOI)	Aerial Photography	
<b>Soils</b>		
<b>Soil Rating Polygons</b>		
Poorly suited		
Moderately suited		
Well suited		
Not rated or not available		
<b>Soil Rating Lines</b>		
Poorly suited		
Moderately suited		
Well suited		
Not rated or not available		
<b>Soil Rating Points</b>		
Poorly suited		
Moderately suited		
Well suited		
Not rated or not available		
<b>Water Features</b>		
Streams and Canals		
<b>Transportation</b>		
Rails		
Interstate Highways		
US Routes		
Major Roads		
Local Roads		



### ***Trails and Roads***

The road and skid trail system is in moderate to good condition. See Pg. 24 for forest trails and road network.

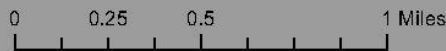
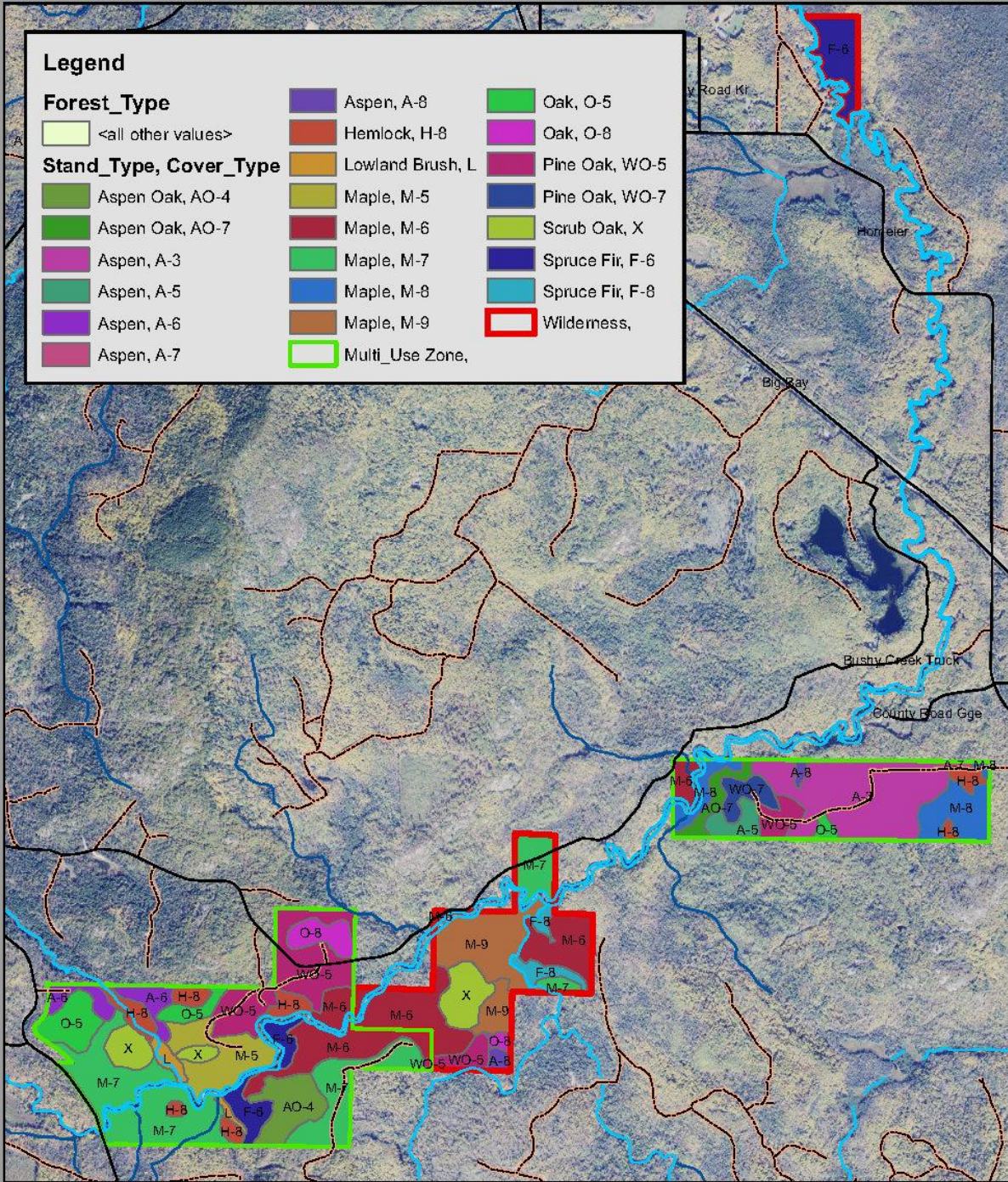


### ***Noxious and Invasive Species***

Invasive species were not found during the forest inventory because data was collected during winter months. However, several invasive species are known to be in the general area. Regular monitoring should be conducted to watch out for the species listed in the table below.

<b>Invasive Species to Watch For</b>	
Exotic Honeysuckles	Japanese Knotweed
Buckthorns (common and glossy)	Canada Thistle
Garlic Mustard	Spotted Knapweed
Purple Loosestrife	Crown Vetch
Asian Bittersweet	Cutleaf Teasel
Multiflora Rose	Japanese Stiltgrass
Common Reed	

# Yellow Dog Community Forest Stand Map



Scale: 1:25,000  
 Produced By: Cory Howes  
 Date: 4/24/2017

**Forest Type: Aspen Oak AO 4**



**Current Conditions**

Land Unit Acres: 21.4

Basal Area: 66 ft<sup>2</sup>/acre

Soil Type: 56F Peshekee-Rock outcrop complex, 35-70% slopes, 56E Peshekee-Rock outcrop complex, 18-35% slopes

Average Tree Diameter: 6.4”

Trees per Acre: 339

Site Index: Red Oak 56, White Pine 53, Paper Birch 56

Species Composition: Red Oak, Quaking Aspen, Red Maple, Balsam Fir, Ironwood, White Spruce, Paper Birch

Stocking: 9 cords/acre, 192.6 total mixed hardwood and softwood pulp

Wood Products Potential: Aspen bolts, mixed hardwood and soft pulp, future sawlog potential (30+yrs)

Topography: 5-70% slopes, rocky

Roads and Trails: Unimproved dirt road located 150' to the east of the stand

Forest Health: Monitor for Hypoxylon Canker on Aspen

Wildlife and Wildlife Habitat Elements: Maintain red oak and aspen as food sources for white tailed deer, ruffed grouse, and black bear

Water Features: None

Harvest History: Last cut in 2007, patches were harvested via clearcuts and single tree selection

Desired Future Condition: Promote healthy growing stems, retain as a mixed upland forest

Management Recommendations: No harvest scheduled for the duration of this plan. Revisit in ~15 yrs. Potentially ready for harvest by 2037.

=====**Management Unit 2**=====

**Forest Type: Aspen Oak AO 7**



**Current Conditions**

Land Unit Acres: 9.1

Basal Area: 80 ft<sup>2</sup>/acre

Soil Type: 12F Rubicon Sand

Average Tree Diameter: 10.0’’

Trees per Acre: 182

Site Index: Bigtooth Aspen 66, White Pine 45, Red Maple 57

Species Composition: Red Oak, Bigtooth Aspen, Quaking Aspen, Red Maple, White Pine

Stocking: 20 cords/acre

<b>Species</b>	<b>Cords</b>	<b>Bolts</b>	<b>Sawtimber (MBF)</b>
Aspen	32	25	
Red Maple	8		
White Pine	10		
Red Oak	107		4
<b>Total</b>	<b>157</b>	<b>25</b>	<b>4</b>

Wood Products Potential: Aspen bolts, hard and softwood pulp, oak sawtimber

Topography: Flat, operable, good fall ground

Roads and Trails: Decent unimproved dirt road to the east of the stand

Forest Health: Monitor for Hypoxylon Canker on Aspen, do not cut or prune any Red Oak from April 15 – July 15 to help prevent the possibility of introducing Oak Wilt Disease

Wildlife and Wildlife Habitat Elements: Maintain red oak and aspen as food sources for white tailed deer, ruffed grouse, and black bear

Water Features: None

Harvest History: Was likely clear cut leaving residual red oak between 40 or 50 years ago

Desired Future Condition: Promote healthy growing stems, retain as a mixed upland forest

Management Recommendations: Harvest mature aspen in 8-10 yrs. Retain red oak unless specific stems are showing signs of disease or dieback. Manage stand to increase the number of Red Oak and promote white pine when possible. Red Oak sapling regeneration is strong at 450 seedling and saplings/acre, White Pine 150/acre.

=====**Management Unit 3**=====

**Forest Type: Aspen A3, A5, A6, A7, A8**



## **Current Conditions**

Land Unit Acres: 103.9 acres total

Basal Area: 40-100 ft<sup>2</sup>/acre

Soil Type: 12B Rubicon Sand, 0-6% slopes, 12D Rubicon Sand, 6-15% slopes

Average Tree Diameter: 3-12''

Trees per Acre: Adequate aspen regeneration and stocking

Site Index: Bigtooth aspen 66, Quaking Aspen 60

Species Composition: Aspen dominated throughout. Mostly trembling aspen, with some patches of bigtooth aspen. Sporadic white pine, white spruce, balsam fir, and red maple. Most areas that were cut have satisfactory aspen regeneration.

Stocking: TBD – When mature avg. of 30-45 cords/acre

Wood Products Potential: Aspen bolts and pulp

Topography: 0-15% slopes, operable ground

Roads and Trails: Decent unimproved dirt roads and skid trails

Forest Health: Monitor for Hypoxylon Canker on Aspen

Wildlife and Wildlife Habitat Elements: Great for grouse and deer habitat. Conifers can act as thermal cover for deer and as shelter for snowshoe hare.

Water Features: None

Harvest History: The majority of the stand was harvested between seven and fifteen years ago

Desired Future Condition: Manage for aspen, create multiple patches of different age classes to provide beneficial wildlife habitat and cover

### **Management Recommendations:**

Aspen stands will be managed in small blocks to encourage multiple age classes in close proximity to one another. Management activities in the past have resulted in variable sized stands of primarily young aspen. Future management activities will further enhance the age class diversity. The majority of the aspen stand is 10-15 yrs old (A-3). Stands will be harvested when they reach maturity at around 60 yrs of age. Usually about 25% of the stand will produce bolts, the highest quality/grade in aspen, and the remainder will be harvested for pulpwood. If the stand



matures beyond ~60 yrs of age, the centers of the trees will begin to rot and the bolt value will degrade to pulp. This occurs because aspen are a short lived species and will quickly succumb to disease and windthrow once they are 55-70 years old. The aspen stands will be managed using selective thinning and the aspen reserve method. This method leaves 7-15 dominant or codominant aspen per acre at a uniform spacing. Young aspen sprouts create excellent wildlife habitat for a variety of species. Additionally, value is added to the stand by creating natural regeneration. The soils are well suited for aspen, and thus it makes sense to continue growing aspen within this stand. Aspen stands A7 and A8 (accounting for ~3 acres in CFA) should be harvested coinciding with the northern hardwood thinning in Management Unit 9 taking place in 3-5 yrs.

===== **Management Unit 4** =====

**Forest Type: Hemlock H-8**



### **Current Conditions**

Land Unit Acres: 28.0

Basal Area: 140 ft<sup>2</sup>/acre

Soil Type: 71B Evart-Pelkie-Sturgeon Complex 0-4% slopes, 100E Sayner-Rubicon complex, 8-35% slopes, 84D Rubicon-Ishpeming-Rock outcrop complex, 6-25% slopes

Average Tree Diameter: 14''

Trees per Acre: 137

Site Index: Sugar Maple 65, White Pine 57

Species Composition: Hemlock, Yellow Birch, Red Maple, Sugar Maple

Stocking: 38.9 cords/acre pulp, 1.5 MBF/acre

<b>Species</b>	<b>Cords</b>	<b>Bolts</b>	<b>Sawtimber (MBF)</b>
Hemlock	820		
Yellow Birch	84		12
Cedar	26		
Red Maple	131		23
Sugar Maple	30		9
<b>Total</b>	<b>1091</b>		<b>44</b>

Wood Products Potential: Leave hemlock for diversity, thermal cover and wildlife habitat unless stems are showing signs of dieback or decline, then harvest for pulp

Topography: 0-35% slopes

Roads and Trails: Unimproved dirt roads and skid trails in close proximity to hemlock stands

Forest Health: Monitor for hemlock wooly adelgid. Spruce budworm will also defoliate hemlock, but usually will not kill the tree

Wildlife and Wildlife Habitat Elements: Very important wildlife thermal cover

Water Features: Yellow Dog River and its tributary

Harvest History: Some stumps present. Single tree selection harvest occurred likely ~20 years ago in patches and easily accessible areas

Desired Future Condition: Retain as a hemlock stand, promote hemlock regeneration where possible

Management Recommendations: Retain high basal area and canopy cover to provide for thermal cover. When surrounding stands are up for harvest (A-6, M-5) in approximately 20 years (2037), mature and unhealthy stems may be selectively removed to promote future regeneration. Heavy red maple regen present in parts of the stand. Promote hemlock when possible.

===== Management Unit 5 =====

**Forest Type: Lowland Brush**



**Current Conditions**

Land Unit Acres: 6.3

Basal Area: 0 ft<sup>2</sup>/acre

Soil Type: 71B Evert-Pelkie-Sturgeon complex, 0-4 % slopes, 93 Tawas-Deford Mucks

Average Tree Diameter: N/A

Trees per Acre: N/A

Site Index: Balsam Fir 40

Species Composition: Mixture of tag alder, grasses, sedges

Stocking: N/A

Wood Products Potential: N/A

Topography: 0% slopes

Roads and Trails: None

Forest Health: N/A

Wildlife and Wildlife Habitat Elements: Idyllic for woodcock habitat. This area contains small clearings, tag alder patches, moist, rich soils, cover and food for a variety of wildlife species

Water Features: Wetland area

Harvest History: N/A

Desired Future Condition: Maintain as a wetland, early successional stand

Management Recommendations: None

===== Management Unit 6 =====

**Forest Type: Maple M-5**



**Current Conditions**

Land Unit Acres: 28.9

Basal Area: 55 ft<sup>2</sup>/acre

Soil Type: 13D - Kalkaska Sand 6-18% slopes, 84F - Rubicon-Ishpeming-Rock outcrop complex 25-60% slopes, 117 B - Fence very fine sandy loam 1-6% slopes

Average Tree Diameter: 7.5’’

Trees per Acre: 235

Site Index: Red Maple 63, Bigtooth Aspen 66, Sugar Maple 65, White Pine 45

Species Composition: Red Maple, Sugar Maple, Trembling Aspen, Red Oak, White Pine

Stocking: 7 cords/acre mixed hardwood and softwood

Wood Products Potential: Promote healthy and tall growing stems regardless of species type. Sawlog potential in 20-30 yrs.

Topography: Small rock outcroppings and rock ridge lines present

Roads and Trails: Unimproved two-track coming from the north-east end of the stand

Forest Health: Monitor for sugar maple borer, spruce budworm

Wildlife and Wildlife Habitat Elements: Yellow birch provides catkins for grouse to forage on. High diversity of trees allows for a variety of wildlife species. Leave 1-3 large snag trees for potential den sites and woodpeckers. Moderate deer browse on red oak seedlings

Water Features: Yellow Dog River on south end of forested stand

Harvest History: Last cut in 2007 via single tree selection

Desired Future Condition: Retain as a mixed hardwood stand. Promote diversity where possible and promote Yellow Birch

Management Recommendations: Implement a timber stand improvement in ~20 yrs (2037). This will allow for stems to compete amongst each other and promote height growth. During the time of harvest, remove any diseased, or unhealthy trees. Then concentrate on retaining species diversity and creating ideal spacing. Timber should be marked by a registered forester (accompanied by the landowner) and thinned to a basal area of 80-90 ft<sup>2</sup>/acre.

### **Seedlings and Saplings per acre by species for Maple M-5 Forest Type**

<u>Stand</u>	<u>Species</u>	<u>Saplings per Acre</u>
M-5	Sugar Maple	50

Balsam Fir	100
White Pine	100
Red Oak	500
Paper Birch	200

---

===== **Management Unit 7** =====

**Forest Type: Maple M-6**





**Current Conditions**

Land Unit Acres: 96.5

Basal Area: 72.5 ft<sup>2</sup>/acre

Soil Type: 13D Kalkaska Sand 6-15% slopes, 71B Evart-Pelkie Sturgeon Complex 0-4% slopes, 153F Ishpeming-Rock outcrop complex, 25-70% slopes, very bouldery

Average Tree Diameter: 10.6’’

Trees per Acre: 134

Site Index: Red Maple 63, Sugar Maple, 65, Bigtooth Aspen 68,

Species Composition: Red Maple, Sugar Maple, Yellow Birch, White Spruce, Balsam Fir, White Pine

Stocking: 19.5 cords/acre.

Species	Cords
---------	-------

White Pine	80.6
White Spruce	81.2
Balsam Fir	47.8
Yellow Birch	108.4
Sugar Maple	475.9
Red Maple	1039.1
<b>Total</b>	<b>1833</b>

Wood Products Potential: Softwood bolts/pulp. Hardwood saw timber/pulp

Topography: Rugged, rock 0-70% slopes

Roads and Trails: Unimproved dirt roads and skid trails present or nearby

Forest Health: Monitor for sugar maple borer, spruce budworm

Wildlife and Wildlife Habitat Elements: Yellow birch provides catkins for grouse to forage on. High diversity of trees allows for a variety of wildlife species. Leave 1-3 large snag trees for potential den sites and woodpeckers.

Water Features: Yellow Dog River, potential vernal pools

Harvest History:

Desired Future Condition: Retain as a mixed hardwood stand. Promote species diversity when possible. Favor Yellow Birch

Management Recommendations: Implement a timber stand improvement in 15-20 yrs (2032). This will allow for stems to compete amongst each other and promote height growth. During the time of harvest, remove any diseased, or unhealthy trees. Next, concentrate on retaining species diversity and implementing proper spacing. Timber should be marked by a registered forester (accompanied by the landowner) and thinned to a basal area of 80-90 ft<sup>2</sup>/acre.

**Seedlings and Saplings per acre by species for Maple M-6 Forest Type**

Stand	Species	Saplings per Acre
M-6	White Pine	150
	Balsam Fir	167
	White Spruce	150
	Red Oak	67
	Striped Maple	150
	Sugar Maple	133
	Yellow Birch	67

=====**Management Unit 8**=====

**Forest Type: Maple M-7**



**Current Conditions**

Land Unit Acres: 111.8

Basal Area: 98.3 ft<sup>2</sup>/acre

Soil Type: 71B, Ewart-Pelkie-Sturgeon Complex 0-4% slopes, 78C Keweenaw-Kalkaska complex 1-12 % slopes, 160B Paquin-Finch sands, 0-5 % slopes, 125F Keweenaw-Kalkaska-Rock Outcrop complex 25-70% slopes, bouldery

Average Tree Diameter: 11.5''

Trees per Acre: 193

Site Index: Sugar Maple 65, Red Maple 63, Red Oak 64 (rocky soils)

Species Composition: Red Maple, Sugar Maple, Yellow Birch, White Spruce, Balsam Fir, Hemlock, Red Oak

Stocking: 25.9 cords/acre and 1.3 MBF/acre

<b>Species</b>	<b>Cords</b>	<b>Bolts</b>	<b>Sawtimber (MBF)</b>
Hemlock	62.3		
White Spruce	36.6	194	
Balsam Fir	52.5		
Yellow Birch	83.4		
Sugar Maple	69.9		
Red Maple	2331.2		117.8
Red Oak	65.7		29.4
<b>Total</b>	<b>2701.6</b>	<b>194</b>	<b>147.2</b>

Wood Products Potential: Softwood bolts/pulp. Hardwood saw timber/pulp. Site index of 64 for soil type 78C- promote red oak in this portion of the stand. Favor Red Maple over Sugar Maple in soil type 160B – site index for sugar maple is 58.

Topography: Relatively flat with heavy soils

Roads and Trails: Some improved access roads with 3’’ rock on slopes, truck turn arounds present along with established skid trails

Forest Health: Monitor for sugar maple borer, spruce budworm

Wildlife and Wildlife Habitat Elements: Yellow birch provides catkins for grouse to forage on. High diversity of trees allows for a variety of wildlife species. Leave 1-3 large snag trees for potential den sites and woodpeckers.

Water Features: Yellow Dog River – See Riparian Management Zone (RMZ) section

Harvest History: Last cut in 2005 via single tree selection

Desired Future Condition: Retain as a mixed hardwood stand. Promote diversity when possible

Harvest Recommendations: Implement a timber stand improvement in 8-10 yrs. Site index of 64 for soil type 78C- promote red oak in this portion of the stand. Timber should be marked by a registered forester (accompanied by the landowner) and thinned to a basal area of 80-90 ft<sup>2</sup>/acre. Any stems likely to die in the next 12-15 years, trees of poor form, trees that have reached maturity, and over-crowded stems will be targeted for removal. The harvest will focus on retaining quality and healthy stems to increase standing volume of sawlogs over time all while promoting wildlife habitat for a variety of species.

### **Seedlings and Saplings per acre by species for Maple M-7 Forest Type**

<b>Stand</b>	<b>Species</b>	<b>Saplings per Acre</b>
--------------	----------------	--------------------------

M-7	Balsam Fir	50
	Red Maple	533
	Aspen	183
	Yellow Birch	100
	Hemlock	167

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=====**Management Unit 9**=====

**Forest Type: Maple M-8**



**Current Conditions**

Land Unit Acres: 30.3

Basal Area: 130 ft<sup>2</sup>/acre

Soil Type: 71B, Evert-Pelkie-Sturgeon Complex 0-4% slopes, 181 E, Frohling – Tokiahok complex, 8-35% slopes, very stony

Average Tree Diameter: 12.8’’

Trees per Acre: 155

Site Index: Sugar Maple 61, Red Maple 61

Species Composition: Red Maple, Sugar Maple, Hemlock, Red Oak, Yellow Birch

Stocking: 30.5 cords/acre pulp, 2.4 MBF/acre Saw Timber

<b>Species</b>	<b>Cords</b>	<b>Bolts</b>	<b>Sawtimber (MBF)</b>
Hemlock	150		0
Yellow Birch	34		5.7
Sugar Maple	240		27.1
Red Maple	405		23
Red Oak	87		18.3
<b>Total</b>	<b>916</b>		<b>74.1</b>

Wood Products Potential: Hard and soft wood pulp. Hardwood saw timber

Topography: 8-35 % slopes, rocky

Roads and Trails: Unimproved dirt 2-tracks present

Forest Health: Monitor for sugar maple borer, spruce budworm

Wildlife and Wildlife Habitat Elements: Yellow birch provides catkins for grouse to forage on. High diversity of trees allows for a variety of wildlife species. Leave 1-3 large snag tree’s for potential den sites and woodpeckers.

Water Features: None

Harvest History: Likely harvested between 10 and 12 years ago.

Desired Future Condition: Retain as a mixed hardwood stand. Promote diversity when possible

Harvest Recommendations: Implement a timber stand improvement in 3-5 yrs. Timber should be marked by a registered forester (accompanied by the landowner) to a residual average BA of 80-90ft<sup>2</sup>/acre. All trees managed for best tree in place. Any stems likely to die in the next 12-15 years, trees of poor form, trees that have reached maturity, and over-crowded stems will be targeted for removal. The harvest will focus on retaining quality and healthy stems to increase standing volume of sawlogs over time all while promoting wildlife habitat for a variety of species.

## Seedlings and Saplings per acre by species for Maple M-8 Forest Type

Stand	Species	Saplings per Acre
M-8	Balsam Fir	50
	Red Maple	200
	Sugar Maple	150
	Hemlock	100

===== Management Unit 10 =====

### Forest Type: Maple M-9



### Current Conditions

Land Unit Acres: 44.9

Basal Area: 145 ft<sup>2</sup>/acre

Soil Type: 13D Kalkaska Sand, 6-15% slopes, 40B Waiska cobbly loamy sand 0-6% slopes, 153F Ishpeming-Rock outcrop complex, 25-70% slopes

Average Tree Diameter: 13''

Trees per Acre: 240

Site Index: Red Maple 63, Sugar Maple 65, Bigtooth Aspen 68

Species Composition: Red Maple, Sugar Maple, Red Oak, Yellow Birch, Balsam Fir, Aspen

Stocking: 34 cords/acre pulp, 2.8 MBF/acre

<b>Species</b>	<b>Cords</b>	<b>Bolts</b>	<b>Sawtimber (MBF)</b>
Balsam Fir	182		
Aspen	116	40	
Yellow Birch	66		
Sugar Maple	490		16.4
Red Maple	587		79
Red Oak	120		32.7
<b>Total</b>	<b>1561</b>		<b>128.1</b>

Wood Products Potential: N/A Wilderness Zone

Topography: Mostly flat with portions of 25-70% slopes

Roads and Trails: None

Forest Health: Monitor for sugar maple borer, spruce budworm

Wildlife and Wildlife Habitat Elements: Yellow birch provides catkins for grouse to forage on. High diversity of trees allows for a variety of wildlife species. Leave 1-3 large snag tree's for potential den sites and woodpeckers.

Water Features: Yellow Dog River, Big Pub Creek

Harvest History: Possibly harvested 50+ years ago via single tree selection

Desired Future Condition: Retain as a mixed hardwood stand, wilderness zone



Harvest Recommendations: No harvest scheduled – Wilderness Zone

=====**Management Unit 11**=====

**Forest Type: Oak O5**



### **Current Conditions**

Land Unit Acres: 25.7

Basal Area: 60 ft<sup>2</sup>/acre

Soil Type: 55F Michigamme-Rock outcrop 25-70% slopes, 56F Peshekee-Rock outcrop complex, 18-35% slopes

Average Tree Diameter: 9

Trees per Acre: 165

Site Index: Sugar Maple 60, Red Oak 55, White Pine 53

Species Composition: Red Oak, Red Maple, White Pine, Aspen

Stocking: 13.7 cords/acre

<b>Species</b>	<b>Cords</b>	<b>Bolts</b>	<b>Sawtimber (MBF)</b>
White Pine	25		
White Spruce	8	12	
Aspen	54	34	
Red Maple	47		
Red Oak	161		
<b>Total</b>	<b>295</b>	<b>46</b>	<b>0</b>

Wood Products Potential: Hardwood and softwood pulp, oak sawtimber in 25 yrs

Topography: 10-70% slopes

Roads and Trails: Unimproved dirt roads and skid trails in close proximity

Forest Health: Monitor for two lined chestnut borer and oak wilt disease

Wildlife and Wildlife Habitat Elements: Large oak component, supplies high nutritional value to deer, squirrels and a variety of other wildlife

Water Features: None

Harvest History: Last harvested in 2009 via shelterwood, and patch clear cuts

Desired Future Condition: Retain as an oak dominated stand to benefit wildlife all while promoting quality oak sawtimber

Management Recommendations: No harvest scheduled. Revisit in ~15 yrs. Timber may be ready for a thinning by 2037.

=====**Management Unit 12**=====

**Forest Type: Oak O8**



**Current Conditions**

Land Unit Acres: 13.3

Basal Area: 90 ft<sup>2</sup>/acre

Soil Type: 13B Kalkaska Sand 0-6 % slopes, 13D Kalkaska Sand, 6-15% slopes

Average Tree Diameter: 12.2''

Trees per Acre: 176

Site Index: Bigtooth aspen 80, Red Pine 66, Red Maple 63

Species Composition: Red Oak, White Pine, Balsam Fir

Stocking: 18.4 cords/acre mixed pulp, 2.1 MBF/acre

<b>Species</b>	<b>Cords</b>	<b>Bolts</b>	<b>Sawtimber (MBF)</b>
White Pine	49		
Balsam Fir	11		
Red Oak	186		28.1
<b>Total</b>	<b>246</b>	<b>0</b>	<b>28.1</b>

Wood Products Potential: Quality red oak sawtimber

Topography: 0-15% slopes, sandy, good fall ground

Roads and Trails: Good dirt roads present within/nearby oak stand

Forest Health: Monitor for two lined chestnut borer and oak wilt disease

Wildlife and Wildlife Habitat Elements: Large oak component, supplies high nutritional value to deer, squirrels and a variety of other wildlife

Water Features: None

Harvest History: Harvested in 2007 via single tree selection

Desired Future Condition: Retain as an oak dominated stand to benefit wildlife all while promoting quality oak sawtimber

Management Recommendations: Implement a Timber Stand Improvement in 5-7 yrs. Harvest unhealthy and poor growing stems. Have timber marked by a registered forester (accompanied by the landowner). This will be a light harvest. Concentrate on releasing quality stems. Do not bring basal area below 70 ft<sup>2</sup>/acre. Good red oak and white pine regeneration present.

=====**Management Unit 13**=====

**Forest Type: Scrub Oak X**



**Current Conditions**

Land Unit Acres: 29.6

Basal Area: 0-40 ft<sup>2</sup>/acre

Soil Type: 55F Michigamme Rock outcrop complex, 25-70 % slopes, 84F Rubicon-Ishpeming-Rock outcrop complex 25-60 % slopes, 153F Ishpeming Rock outcrop complex, 25-70% slopes

Average Tree Diameter: 6''

Trees per Acre: N/A

Site Index: Sugar Maple 60, White Pine 45, Bigtooth Aspen 68

Species Composition: Red Oak, Red Maple, White Pine, Aspen, Paper Birch

Stocking: N/A

Wood Products Potential: On exposed rock outcropping, red oak are stunted and appear windswept (krummholz growth). In small ravines, some nice oaks exists with tall, straight stems. A small amount of sawlog potential.

Topography: Rocky and some steep slopes. 10-70 % slopes

Roads and Trails: N/A

Forest Health: Monitor for two lined chestnut borer and oak wilt disease. Epicormic branching common, stunted growth, krummholz formation on rock outcrops and exposed faces

Wildlife and Wildlife Habitat Elements: Large oak component, supplies high nutritional value to deer, squirrels and a variety of other wildlife

Water Features: None

Harvest History: Scattered old white pine stumps with fire scars 50+ yrs old

Desired Future Condition: Retain as an oak dominated stand for wildlife habitat

Management Recommendations: None – See Pg 18 – Granite Bedrock Glade

===== **Management Unit 14** =====

**Forest Type: Pine Oak WO 5**





### **Current Conditions**

Land Unit Acres: 64.9

Basal Area: 65 ft<sup>2</sup>/acre

Soil Type: 12D Rubicon Sand, 6-15% slopes, 12F Rubicon Sand, 35-60% slopes, 100E Sayner-Rubicon Complex, 8-35% slopes

Average Tree Diameter: 9

Trees per Acre: 139

Site Index: White Pine 45, Bigtooth Aspen 66, Red Pine 53, White Pine 57 (100E),

Species Composition: White Pine, Red Pine, Red Oak, Balsam Fir, Yellow Birch, Red Maple

Stocking: 15.0 cords/acre, .31 MBF/acre

<b>Species</b>	<b>Cords</b>	<b>Bolts</b>	<b>Sawtimber (MBF)</b>
White Pine	560		
Red Pine	45	100	
Balsam Fir	40		
Yellow Birch	57		
Red Maple	72		
Red Oak	90		20.3
<b>Total</b>	<b>864</b>	<b>100</b>	<b>20.3</b>

Wood Products Potential: Hardwood and softwood pulp, red pine bolts, red oak sawtimber

Topography: Mostly sandy, 0-20% slopes

Roads and Trails: Dirt 2-tracks present throughout stand

Forest Health: Monitor for white pine weevil on regeneration

Wildlife and Wildlife Habitat Elements:

Water Features: None

Harvest History: Harvested via shelterwood in 2007

Desired Future Condition: Manage for white pine, red pine and red oak

Planned Conservation Practices:

Management Recommendations: No harvest scheduled (possibly by 2047), revisit in ~15 yrs

=====**Management Unit 15**=====

**Forest Type: Pine Oak WO 7**



**Current Conditions**

Land Unit Acres: 9.9

Basal Area: 60 ft<sup>2</sup>/acre

Soil Type: 12D Rubicon Sand, 6-15% slopes

Average Tree Diameter: 11''

Trees per Acre: 127

Site Index: White Pine 45

Species Composition: White Pine, Red Oak, Aspen, Red Maple

Stocking: 12 cords/acre

<b>Species</b>	<b>Cords</b>	<b>Bolts</b>	<b>Sawtimber (MBF)</b>
White Pine	58		
Aspen	20		
Red Maple	19		
Red Oak	20		4
<b>Total</b>	<b>117</b>	<b>0</b>	<b>4</b>

Wood Products Potential: Softwood pulp, red oak sawtimber

Topography: 0-15% slopes

Roads and Trails: Decent unimproved dirt two-track

Forest Health: Monitor for white pine blister rust, white pine weevil and oak wilt disease

Wildlife and Wildlife Habitat Elements:

Water Features: None

Harvest History: Likely harvested via single tree selection 10-12 years ago

Desired Future Condition: Manage to promote diversity, retain red oak and white pine as dominant tree species

Planned Conservation Practices:

Management Recommendations: No harvest scheduled (possibly by 2037), revisit in ~ 15 yrs

===== Management Unit 16 =====

**Forest Type: Spruce Fir F6, F8**



**Current Conditions**

Land Unit Acres: 25.0+21.8

Basal Area: 80 ft<sup>2</sup>/acre

Soil Type: 153F Ishpeming-Rock outcrop complex, 25-70% slopes, 76F Garlic-Alcona-Voelker complex, 15-70% slopes

Average Tree Diameter: 7.4’’

Trees per Acre: 294

Site Index: Bigtooth Aspen 68, Sugar Maple 62

Species Composition: White Spruce, Balsam Fir, White Pine, Red Maple, Aspen

Stocking: 17 cords/acre mostly softwood pulp

<b>Species</b>	<b>Cords</b>	<b>Bolts</b>	<b>Sawtimber (MBF)</b>
White Pine	84		
White Spruce	95	78	
Balsam Fir	36		
Aspen	60	23	
Red Maple	50		
<b>Total</b>	<b>325</b>	<b>101</b>	<b>0</b>

Wood Products Potential: Pulpwood production mainly and bolts

Topography: 10-70 % slopes

Roads and Trails: Poor road access, possible from dirt road to south

Forest Health: Watch for spruce budworm on balsam fir and white spruce trees

Wildlife and Wildlife Habitat Elements: Conifers provide thermal cover for deer, and protection for grouse and woodcock

Water Features: Yellow Dog River

Harvest History: Was likely clear cut in patches ~30-40 years ago

Desired Future Condition: Retain as a mixed coniferous stand to provide shelter for wildlife. Promote white pine where possible

Management Recommendations: F6- Multi-Use Zone 15.6 acres- Harvest in ~2032 coinciding with adjacent M-6 stand

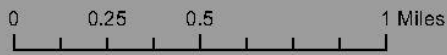
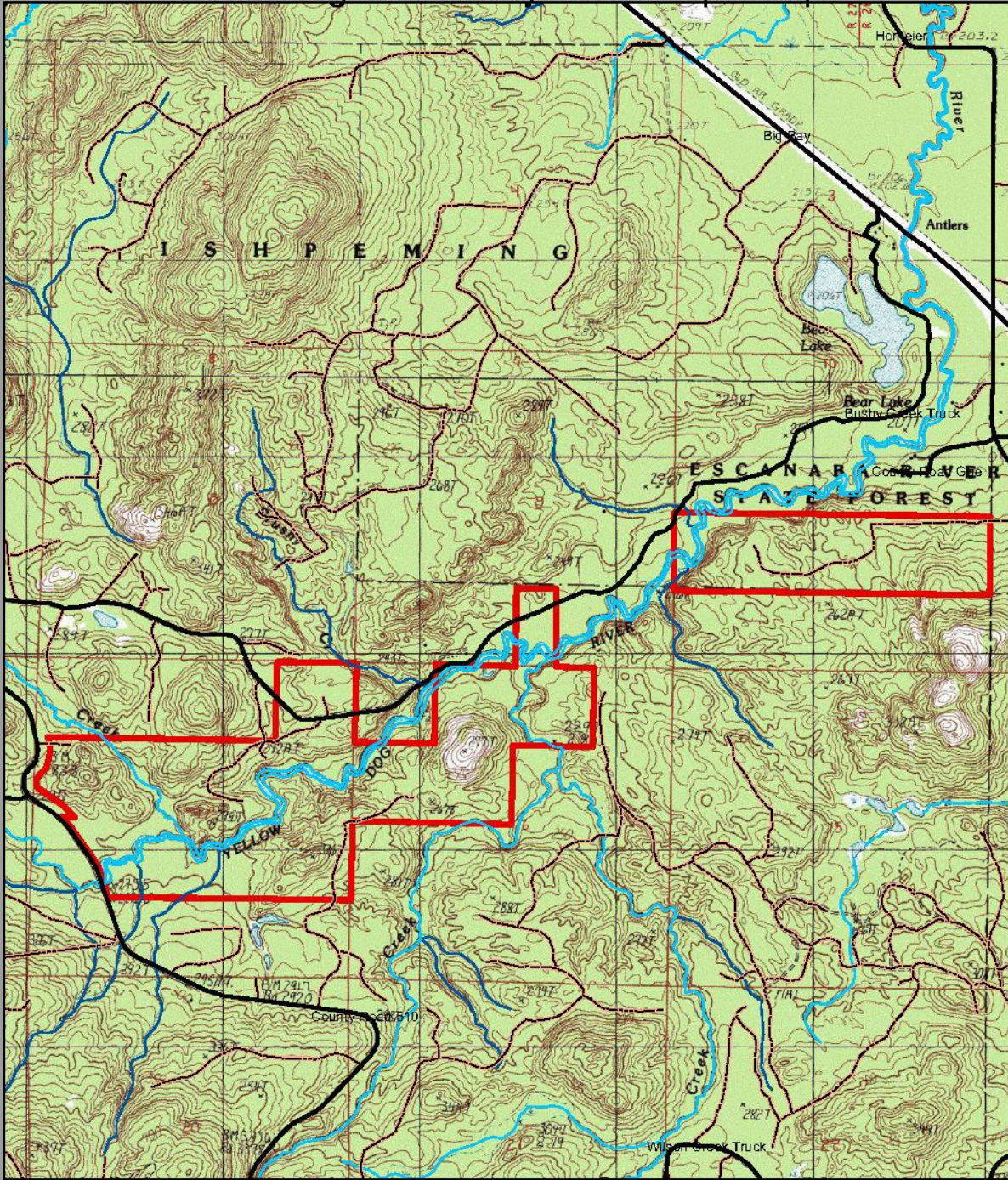
F8 – Wilderness zone 21.8 acres- No harvest schedule- Monitor for spruce budworm

Forest Stand Summary Table								
Mgmt Unit	Forest Type	DNR Code	Acres in CF	Acres in Wilderness	Total Acres	Silvicultural Practice	Prescription Year	Date Completed
3	Aspen	A7	1.6	0	1.6	Aspen Reserve Method	2020-2022	
3	Aspen	A8	1.6	3.1	4.7	Aspen Reserve Method	2020-2022	
9	Maple	M8	30.3	0	30.3	Single Tree Selection	2020-2022	
12	Oak	O8	10.8	2.4	13.2	Shelterwood	2022-2025	
2	Aspen Oak	AO7	9.1	0	9.1	Shelterwood	2025-2028	
8	Maple	M7	93.2	18.6	111.8	Single Tree Selection	2025-2028	
7	Maple	M6	43.7	52.8	96.5	Single Tree Selection	2032	
16	Spruce Fir	F6	15.7	21.8	37.5	Shelterwood	2032	
1	Aspen Oak	AO4	21.4	0	21.4	Shelterwood	2037	
3	Aspen	A6	17	0	17	Aspen Reserve Method	2037	
6	Maple	M5	28.9	0	28.9	Single Tree Selection	2037	
11	Oak	O5	25.7	0	25.7	Shelterwood	2037	
15	Pine Oak	WO7	9.9	0	9.9	Shelterwood	2037	
4	Hemlock	H8	28	0	28	Single Tree Selection	2037	
3	Aspen	A5	9.3	0	9.3	Aspen Reserve Method	2047	
14	Pine Oak	WO5	56.9	8	64.9	Shelterwood	2047	
3	Aspen	A3	71.3	0	71.3	Aspen Reserve Method	2067	
5	Lowland Brush	L	6.3	0	6.3	None	No Harvest Scheduled	
10	Maple	M9	0	44.9	44.9	Single Tree Selection	No Harvest Scheduled	
13	Scrub Oak	X	13.9	15.7	29.6	None	No Harvest Scheduled	
16	Spruce Fir	F8	0	9.2	9.2	None	No Harvest Scheduled	
	River		11.4	5.5	16.9			
	<b>Total Acres</b>		<b>506</b>	<b>182</b>	<b>688</b>			

- Timber harvest prescriptions will only take place in the lands enrolled into the Commercial Forest Program (CF). No harvest will occur in the Wilderness zone.

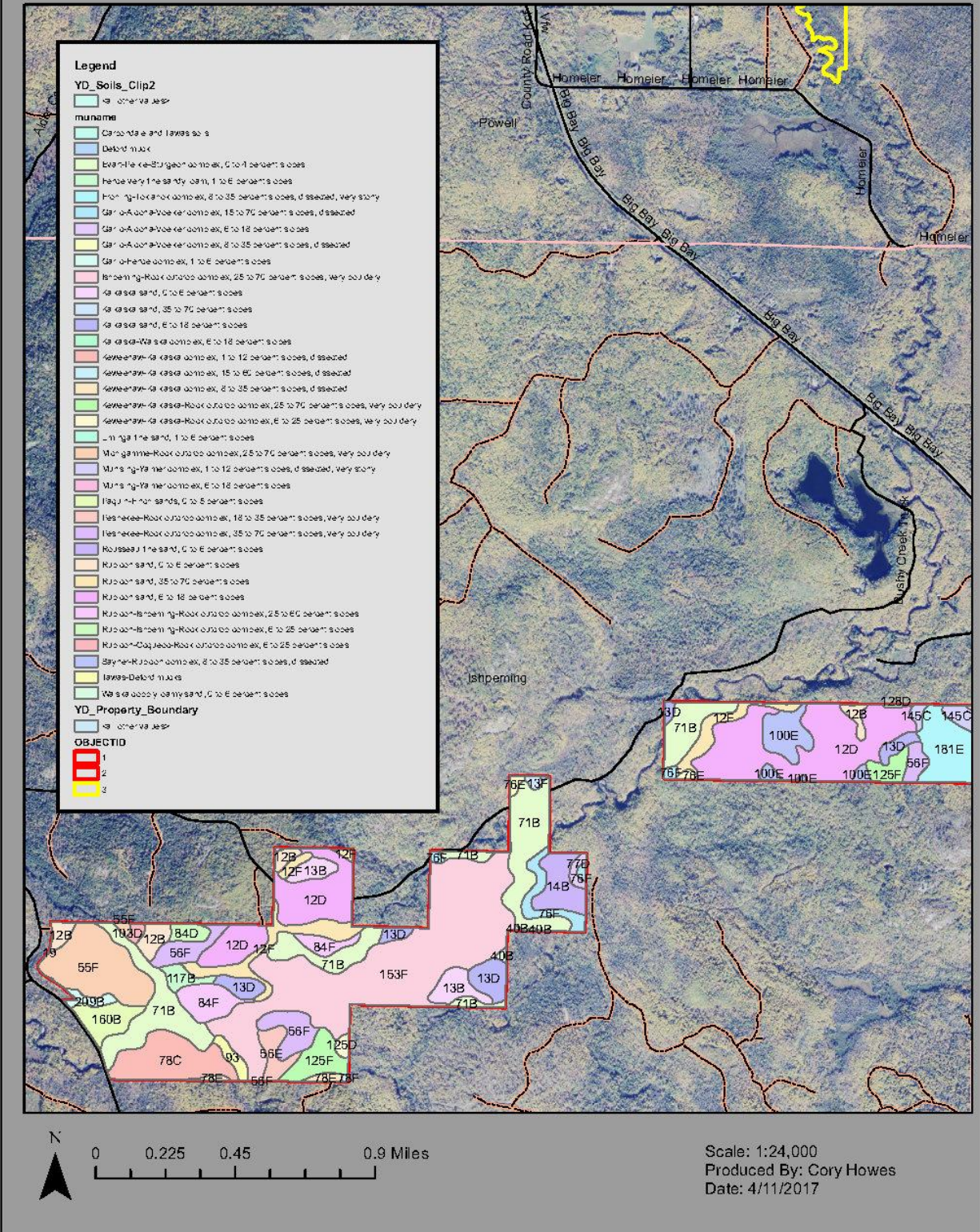


# Yellow Dog Community Forest Topo Map

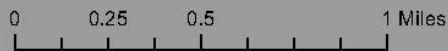
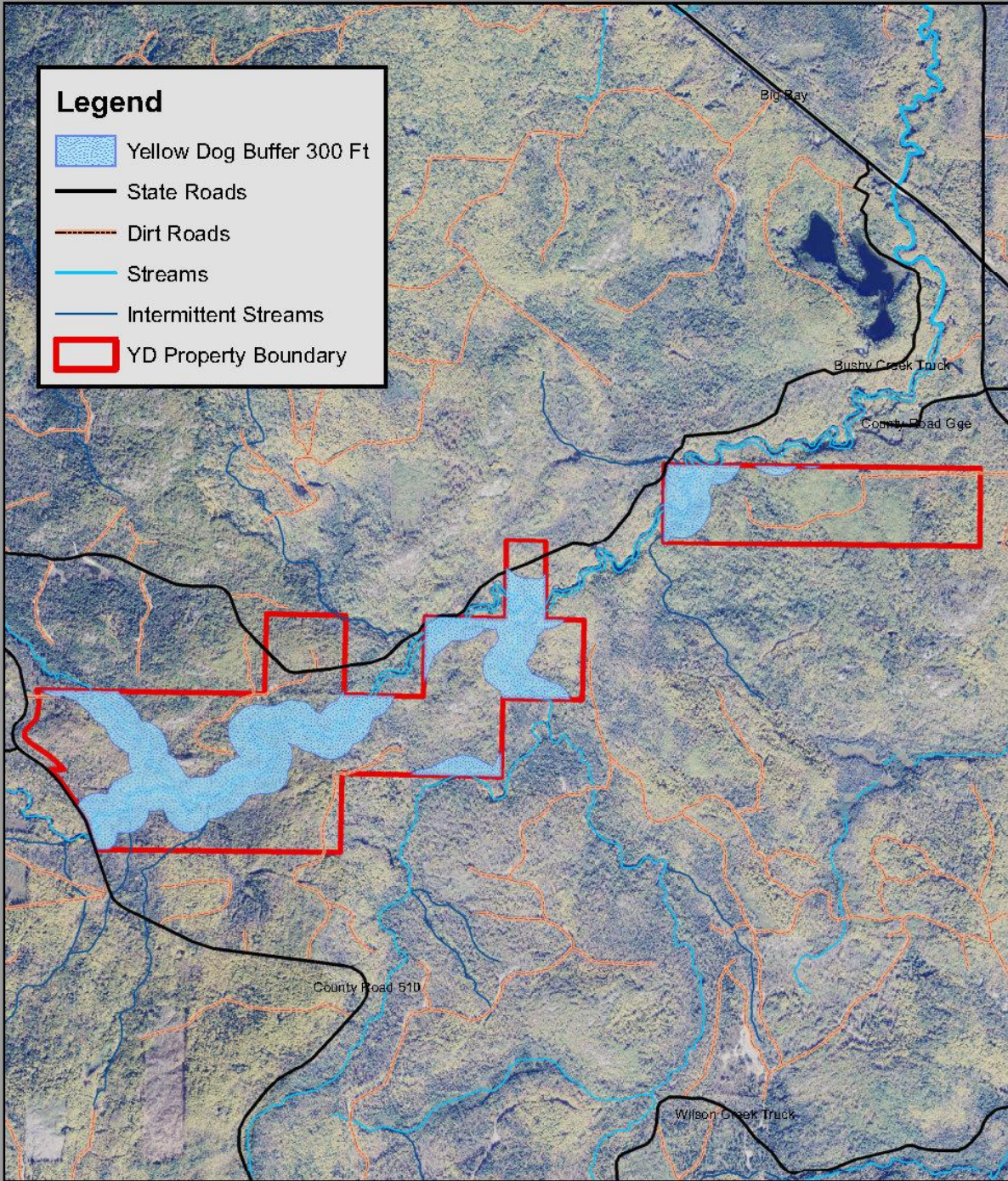


Scale: 1:25,000  
Produced By: Cory Howes  
Date: 4/23/2017

# Yellow Dog Community Forest Soils



# Yellow Dog Community Forest Riparian Management Zone



Scale: 1:25,000  
Produced By: Cory Howes  
Date: 4/23/2017

## ***Riparian Management Zone.***

Riparian Management Zones (RMZs) are sometimes called buffer strips, or streamside management areas. A RMZ occurs on both sides of perennial or intermittent streams where extra precaution is used in carrying out forest management practices.

One of the purposes of a management zone is for water quality protection to provide an area of vegetation to interrupt water flow and to trap and filter out suspended sediments, nutrients, chemicals, and other polluting agents. A RMZ can also provide shade to the stream or river, protecting it from thermal pollution.

The area nearest to the stream bank can also provide an important contribution to the aquatic food chain. As trees naturally die within the RMZ, portions of the tree fall into the stream and can provide essential aquatic habitat for the riparian system. The Coarse Woody Debris (CWD) can provide shaded cover for fish, amphibians and aquatic insects, and can provide important isolated platforms for reptiles and small mammals.

One of the highest priorities in this community forest is to ensure that the Yellow Dog River and its tributaries described in this plan are not impacted by timber management. To assure that the water quality functions of the RMZ are maintained, a 300' buffer strip has been set to protect the riparian system. The Yellow Dog River is considered a cold water fishery and a blue ribbon trout stream by the State of Michigan. The increased buffer will greatly aid in protecting the River for generations to come.

## ***Wild and Scenic River***

The Yellow Dog River is a unique river system, and has been designated as a Wild and Scenic River by the U.S. Forest Service from its origin at the outlet of Bulldog Lake Dam to the boundary of the Ottawa National Forest (4 miles in length).

In 1968, Congress passed the National Wild and Scenic Rivers Act, establishing a nationwide system of outstanding free-flowing rivers. The primary purpose of the Act is to balance river development with river protection and conservation. The Act specifically protects rivers from future hydroelectric power development and requires administering agencies to protect and enhance those values for which the river was designated.

As defined by the Act, a National Wild and Scenic River (WSR) must be maintained in a free-flowing condition and must have its water quality protected. In addition, the river must have at least one outstandingly remarkable scenic, recreational, geologic, fish, wildlife, historic, cultural, or other similar value. Outstandingly remarkable values (ORVs) are those values that are river related, that owe their existence or location to the river, and that are rare, unique, or exemplary in

character. Rivers may be added to the system by an Act of Congress or by order of the Secretary of the Interior upon official request by a State.

The Yellow Dog River's Outstandingly Remarkable Values include scenery, geology and wildlife.

### ***Best Management Practices***

Best Management Practices (BMPs) are guidelines published by the State of Michigan to protect Michigan's water resources from nonpoint source pollution and erosion while working on forest land. BMPs are now called "Sustainable Soil and Water Quality Practices on Forest Land" and the document is online at [www.Michigan.gov/PrivateForestLand](http://www.Michigan.gov/PrivateForestLand). BMPs include proper location and construction of logging roads, the use of riparian management zones, installation of culverts and other stream crossings, proper use of pesticides and other chemicals, and site preparation for planting. BMPs also include the proper seasonal timing of activities to minimize the spread of insects or disease. Any forest management activities should minimize soil erosion near wetlands and surface water. Tree Farm certification requires compliance with best management practices.

**The goal is to not only follow Michigan's Best Management Practices, but to go above and beyond in protecting the Yellow Dog River, its tributaries, and wetlands within the Yellow Dog Community Forest.**

## ***Timber Harvest Process***

The primary objective for any timber sale is to *improve the forest*, as defined according to the values of the landowner and the attributes of the forest. A timber sale should improve the species composition and growing conditions of remaining trees for future timber sales. A forester's primary concern is *keeping quality trees* in the designated forest, instead of selling most of the quality trees (a very poor practice called "high-grading"). A timber sale can be used to improve wildlife habitat, develop trails for recreation, improve forest health and regenerate new trees. Finally, a timber sale should also seek to *optimize* (but not necessarily maximize) the profits for the landowner in keeping with the above objectives.

Timber Harvest Method. Foresters use "even aged" and "uneven aged" methods to harvest trees. Even aged methods create a new cohort of trees with a similar age throughout the entire stand. "Shelterwood" or "aspen reserve" favors the regeneration of shade intolerant species like aspen, oak or black walnut. Even aged management will be used in management units 1, 2, 3, and 16. Uneven aged methods preserve variation in age classes in the stand. "Single tree selection" or "group selection" favor the regeneration of shade tolerant species like sugar maple and beech. Uneven aged methods will be used in the remainder of the management units that are enrolled in the Commercial Forest Program to maintain diverse age classes and species.

Timber Sale Process. A consulting forester can be hired to assist with a timber sale or it can be managed privately. Either way, there are five basic steps in a timber sale. The timber sale process can take six to eighteen months, so start planning a year before the desired time.

**Step One.** A forest inventory measures the attributes of the forest to determine how to proceed with the sale. This Forest Stewardship Plan includes a basic inventory, but it is recommended to obtain a more comprehensive inventory soon before a proposed harvest is scheduled.

**Step Two.** The inventory is used to decide what trees to sell and what trees to keep. Determine the trees to sell, paint those trees at stump and breast height, measure volume, and estimate market value. Based on a licensed boundary survey, identify the property corners and property lines so that all trees that are included in the sale are within the property boundary.

**Step Three.** You, your Forester, or a respected party should advertise the timber sale. The true market value of the trees marked for sale is determined by getting multiple bids. Send the prospectus to several reputable timber buyers to invite them to inspect the trees marked for harvest and bid on the sale.

**Step Four.** The fourth step is to negotiate a timber sale contract between the landowner and the timber buyer. Select the best buyer based on price and other factors (reputation, timing, equipment, references, etc.). Negotiate a comprehensive contract, collect a performance bond, verify insurance, and collect full payment *prior to* harvest (for a lump sum stumpage sale).

**Step Five.** Supervise the harvest to ensure the contract is followed. Determine the location of skid trails and log landing for harvest equipment (place them where it would improve recreational trails for later use). Visit the site during timber harvest to verify performance. Also visit the site after the harvest to determine the refund of the performance bond.

### ***General Management Recommendations and Information***

**Monitor Forest Health Annually.** I recommend monitoring the forest regularly (each year and during different seasons) for changes that may indicate additional insect or disease problems. See page 67 for common forest health diseases and pests or check out the “Forest Health Highlights” publication about forest insects and diseases at [www.Michigan.gov/ForestHealth](http://www.Michigan.gov/ForestHealth). MDARD has information on regulated forest pests and quarantines at [www.Michigan.gov/ExoticPests](http://www.Michigan.gov/ExoticPests).

There are several new insects and diseases that are not yet present or well established in Michigan but are in nearby states (Asian longhorn beetle, Thousand cankers on walnut, Hemlock Woolly Adelgid, etc.). Report any unusual problems to the DNR or MDARD. Contact Roger Mech, the DNR Forest Health Specialist, at [MechR@michigan.gov](mailto:MechR@michigan.gov), or 517-243-0300.

Integrated Pest Management (IPM) should be practiced to protect soil and water. IPM requires correctly identifying pests, setting an economic or action threshold, and then implementing the best method to control the pest. IPM actions may include cultural, mechanical, biological, and chemical controls. Chemical pesticides are a useful tool, but should not be the first or only choice to control pests. For example, oak wilt is prevented by the cultural practice of not wounding oaks between April 15 and July 15. After oak wilt is established, the primary action is a mechanical control to cut oak roots to prevent the spread of the fungus through root grafts. See Forest Health Section for more information regarding both native and non-native forest pests.

**American Tree Farm System and Michigan Forest Association.** The Yellow Dog Community Forest has joined the American Tree Farm System ([www.TreeFarmSystem.org](http://www.TreeFarmSystem.org)) to certify that this forest is sustainably managed. Certification documents the public goods that “Tree Farmers” provide to society

including wood, water, recreation and wildlife. Certified forests are assessed by a third party to show society that both the American Tree Farm System and forest landowners are complying with their “Standards of Sustainability.” The minimum requirements to join Tree Farm are ten acres of forest, a current forest management plan, compliance with the “Standards of Sustainability” listed below, and a free inspection by a Tree Farm Inspector. See [www.TreeFarmSystem.org](http://www.TreeFarmSystem.org) for information about the Tree Farm program, forest certification, and the full Standards of Sustainability.

1. **Commitment to Practicing Sustainable Forestry.** Forest owner demonstrates commitment to forest vitality by developing and implementing a sustainable forest management plan.
2. **Compliance with Laws.** Forest management activities comply with all relevant federal, state and local laws, regulations and ordinances.
3. **Reforestation and Afforestation.** Forest owner completes timely restocking of desired species of trees on harvested sites and non-stocked areas where tree growing is consistent with land use practices and the forest owner’s management objectives.
4. **Air, Water, and Soil Protection.** Forest management practices maintain or enhance the environment and ecosystems, including air, water, soil and site quality.
5. **Fish, Wildlife and Biodiversity.** Forest management activities contribute to the conservation of biodiversity.
6. **Forest Aesthetics.** Forest management plans and management activities recognize the value of forest aesthetics.
7. **Protect Special Sites.** Special sites are managed in ways that recognize their unique historical, archeological, cultural, geological, biological or ecological characteristics.
8. **Forest Product Harvests and Other Activities.** Forest product harvests and other management activities are conducted in accordance with the management plan and consider other forest values.

**Commercial Forest Program:** The Commercial Forest (CF) program is intended to provide an incentive to private landowner to retain and manage forestland for long-term timber production. It is a voluntary program and participating landowners may withdraw from the program at any time. The Yellow Dog Community Forest Board has decided through public input to retain 506 acres in the Commercial Forest Program. Benefits include that landowners do not pay ad valorem general property taxes. Instead, the landowners pay a specific tax of \$1.30 per acre annually. The State of Michigan pays an additional \$1.30 per acre on behalf of the landowner to the county annually. In order to participate in the program, the landowners must have a forest management plan written by a registered forester that describes how the listed land will be managed and that schedules treatment such as reforestation and timber harvesting. Listed land must be open to the public for fishing, hunting and trapping. The public access is limited to foot access for the specific purposes of fishing, hunting, and trapping. The Yellow Dog Community Forest will also allow foot access for recreation use. For more information, see [www.Michigan.gov/CommercialForest](http://www.Michigan.gov/CommercialForest).



**Financial Assistance Programs:** The Natural Resources Conservation Service (NRCS) administers several programs such as the Environmental Quality Incentives Program (EQIP) or Conservation Stewardship Program (CSP) that may provide financial assistance to forest owners to implement “conservation practices” to address “resource concerns” on their land. Landowners must have an approved forest management plan prior to enrolling. Forest Stewardship Plans are accepted by the NRCS when applying for EQIP funding, although they do not require the same level of detail as NRCS conservation activity plans. Work with your NRCS District Conservationist and forester to fill out supplemental “Job Sheets.” See [www.mi.nrcs.usda.gov/technical/forestry.html](http://www.mi.nrcs.usda.gov/technical/forestry.html) for info.

Some of the recommended activities in this plan have potential for financial assistance. NRCS forestry “conservation practices” include forest trails and landings, stream crossings, riparian forest buffers, stream habitat improvement, forest stand improvement, tree and shrub establishment, brush management, early succession habitat, wetland wildlife habitat, and upland wildlife habitat. NRCS conservation practices address “resource concerns” (environmental problems) like soil erosion, soil quality, water quality degradation, plant productivity, habitat fragmentation, invasive plants, forest health, etc. Contact your local NRCS Service Center to apply for financial assistance (see [www.nrcs.usda.gov/wps/portal/nrcs/main/mi/contact/local](http://www.nrcs.usda.gov/wps/portal/nrcs/main/mi/contact/local)).

### **Federal and State Laws Related to Forest Management**

- USA - Federal Insecticide, Fungicide, and Rodenticide Act, 1947
- USA - National Historic Preservation Act, 1966
- USA - Clean Water Act, 1948 and 1972
- USA - Endangered Species Act, 1973
- MI - Michigan Pesticide Control Act, Public Act 171 of 1976
- MI - Natural Resources and Environmental Protection Act, Public Act 451 of 1994
- MI - Right to Forest Act, Public Act 676 of 2002

**Wildlife Habitat:** The DNR Wildlife Division has an excellent publication on managing wildlife habitat at:

[www.michigandnr.com/publications/pdfs/huntingwildlifehabitat/Landowners\\_Guide/index.htm](http://www.michigandnr.com/publications/pdfs/huntingwildlifehabitat/Landowners_Guide/index.htm).

DNR Wildlife Division – [www.Michigan.gov/Wildlife](http://www.Michigan.gov/Wildlife)

Michigan United Conservation Clubs - <https://mucc.org>

Quality Deer Management Association – [www.qdma.com](http://www.qdma.com)

Audubon Society - [www.MichiganAudubon.org](http://www.MichiganAudubon.org)

Foresters for the Birds – <http://vt.audubon.org/foresters-birds>

Ruffed Grouse Society - [www.RuffedGrouseSociety.org](http://www.RuffedGrouseSociety.org)

National Wild Turkey Federation - [www.nwtf.org](http://www.nwtf.org)

Michigan Trout Unlimited – [www.MichiganTU.org](http://www.MichiganTU.org)

US Fish and Wildlife Service - [www.fws.gov/partners](http://www.fws.gov/partners)

### ***Forest Health and Pathology***

Forest types and ecological habitats have been driven by natural forces such as climatic fluctuation, successional processes, and disturbance from fire, wind, disease and insect infestation for thousands of years. It is obviously a natural cycle; however, with the increased amount of transportation amongst countries throughout the world, forest pathology has become a heightened concern. The simplification of many forest systems throughout Michigan and the Midwest may lead to unforeseen declines as many exotic insects and diseases are introduced to local ecosystems. Well known outbreaks including American elm's diseases, chestnut blight, and beech bark disease have completely changed the forests as society knows them. The list below is a guide to both native and exotic pests and diseases that pose as a threat or potential future threat to the Yellow Dog Community Forest. Consistent monitoring of the designated tract would be wise to ensure a total outbreak does not occur. This guide can be used to look for appropriate signs and symptoms of the pests and diseases.

**Armillaria Root Rot** (Honey Fungus) is a native fungi that affects the coarse roots and lower stems of most broad leaved and coniferous tree species. High risk trees are those suffering from a long drought, recent disturbance, insect defoliation, or generally unfavorable growing conditions.

**Asian Longhorned Beetle (ALB)** is an invasive pest that infests mainly maple, but can also use poplar, willow and elm as suitable hosts. ALB is from China and poses serious threat to maple stands. The insect has not been detected in Michigan yet, but has caused catastrophic damage to maple stands in New York, New Jersey, Massachusetts, and Parts of Illinois. The damage can be seen as small holes in the bark with sawdust accumulation around the tree. Once infested, the canopy begins to die back, and the tree dies within a relatively short amount of time. There are no biological control methods, thus if detected a total eradication of the infested stand with a large buffer surrounding it must be clear cut.

**Beech Bark Disease** has had a profound effect already in the eastern side of the Upper Peninsula and down state Michigan. The invasive and exotic scale secretes a white and waxy (wool like) substance and appears on the bark of the infected tree. The exotic fungus *Nectria* then infects the tree where it grows under the scale damaged bark. The fungus is unable to infect the tree without the presence of the scale.



**Burls** are a tree growth in which the grain has grown in a deformed manner and can be a grading deduction on timber intended for lumber. It is commonly found in the form of a rounded outgrowth on a tree trunk or branch. Burls can be initiated by an insect or disease presence, or by an injury or genetic predisposition. Burls can be highly sought after and can be sold to wood workers at a premium rate.



**Emerald Ash Borer** is an invasive pest that infests all species of ash. First signs are canopy dieback beginning in the top 1/3 of the canopy with D-shaped exit holes on the trunk of the tree. Increased woodpecker activity will soon follow. S-shaped galleries are present when the bark is scuffed or peeled off. So far nothing has been discovered to stop or slow the spread of the insect.



**European Buckthorn** and **Glossy Buckthorn** are both small, invasive shrubby trees that can quickly spread through the understory of northern hardwood stands. They are shade tolerant and can grow in a variety of soils. The trees take nutrients that native plants need and their thick canopies do not allow sunlight to reach the understory floor which can halt native plant and tree regeneration.



**Eutypella Canker** was found in the maple stand. The canker is a fungal infection that can cause mortality in small trees, but is otherwise not generally fatal. It can weaken a stem, making it more susceptible to wind throw. The main effect is that it lowers the value of the timber. Management consists of cutting infected



trees and laying them canker side down in an effort to reduce spread of the spores to other stems.

**Forest Tent Caterpillar** is a native species that will eat tree buds, defoliate leaves, as well as eat flowers. Unlike the name, the forest tent caterpillar does not make a tent. It pupates in folded leaves or other protected areas. Up to 90% defoliation can occur on trees which will lead to stress and diameter growth reduction. Deciduous trees can tolerate a year of defoliation, but if defoliated in multiple consecutive years, mortality can occur. Typical outbreaks occur every ten years.

**Frost cracks** are a result of freeze-thaw cycles causing expansion and contraction in the bark and wood of trees resulting in vertical cracks in the wood. These cracks lower the value of timber as well as acting as an entrance for pathogens and pests. Stems that are susceptible are those that are exposed to direct sunlight. There is not much that can be done to prevent or manage for them other than maintaining enough density to prevent direct sunlight exposure to stems. This is not a current concern on this tract of property.

**Garlic Mustard** is an invasive, exotic plant that spreads prolifically throughout northern hardwood forest floors. It is an aggressive invader, and will outcompete most other native communities. It also produces toxins, and affects the mycorrhizal communities having an adverse effect to the soils and surrounding tree community. If detected, notify the local conservation district and remove by pulling ASAP.



**Gypsy moth** is present in Michigan's Upper Peninsula and can cause extensive damage including defoliation and mortality to oak species and some other hardwoods if they are repeatedly defoliated. Gypsy moth is an exotic species that has become naturalized as native predators and parasites have adapted to feed on the larvae. This minimizes length of breakouts and makes artificial means of control such as pesticides generally unnecessary. The primary sign of gypsy moth infestation is defoliation.



**Hemlock Woolly Adelgid** is an exotic invasive species from Asia and is currently devastating hemlock populations across the East Coast. The trademark sign to look for in affected trees include: white woolly masses that can be observed early to mid-summer covering the underside of the hemlock needles, thinning crown, discolored needles, and premature needle loss. The females reproduce asexually and have two generations in one year. Hemlock plays an important ecological role in forests and are a symbolic part of the eastern old-growth forests. They provide valuable thermal cover for deer and other wildlife during the winter as well. It has been detected in the southern portion of the lower



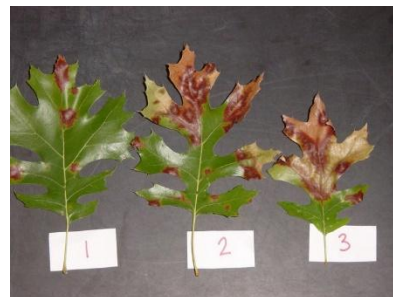
peninsula of Michigan. It is thought that severe, cold winters have prevented the disease to reach the Upper Peninsula of Michigan.

**Hypoxylon Canker** is a native pest that affects aspen, particularly Trembling aspen. The fungus creates a canker in the bark of the tree that is yellowish orange and slightly sunken. As it matures, it causes the bark to blister and slough off. The fungus then appears black and rough at this stage. The tree will become girdled and die within 3-5 years. If less than a quarter of the stand is infected, then the stand should be harvested early and productive regeneration will hopefully follow. If more than a quarter of the stand is infected, the stand should be harvested and replanted with another suitable tree species for that particular site.

**Logging damage** was present, but scarce. Only a few trees were affected, mostly in the maple stand along old skid trails. Though any damage can be an entry point for pathogens and pests, it was not an issue which requires an action since it was infrequent and minor enough to not cause any type of long term problem. However, those trees with wounds around the base may be selected to be cut during the next harvest if stocking levels allow it.

**Nectria Canker** is a native pest that affects ash, birch, elm, dogwood, and maple in the Great Lakes region. Once a tree is infected with the fungus, a canker is formed. The fungi grows in between the bark and the wood, killing that portion of the tree. The tree can die if the fungus girdles the stem, which usually only occurs to smaller stems. To manage in forested stands, the infected trees should be removed during harvest.

**Oak Wilt** can kill an oak tree in just a few weeks. The fungus is an exotic, and infects over sixteen species of oak. Red oak is very susceptible to the pathogen. Infections occur mainly in the spring. Leaves will turn dull green or bronze and may look water-soaked and wilt before they turn yellow or brown. Often, color change will begin from the outer edge of the leaf and moves inwards towards the midrib and base. The fungus is spread in two ways. The more common is via root grafts. The second is by sap beetles. The beetles feed on the fungus mats and transfer it to other trees. Control can be established by severing the root grafts between the infected trees and healthy ones. Oak wilt has not yet been detected in Marquette County, but is in Iron County, as well as Dickinson and Menominee counties. Northern red oak is one of the dominant species on the stand.



**Sugar Maple Borer**: This is a native boring insect that was observed on the property in relatively low frequency. This is not a serious threat





B – Paper Birch	1 – Seedlings/Saplings – Poorly Stocked
C – Cedar	2 – Seedlings/Saplings – Moderately Stocked
D – Treed Bog	3 – Seedlings/Saplings – Well Stocked
E – Lowland Hardwoods	
F – White Spruce/Fir	4 – Poletimber – Poorly Stocked
G – Grass	5 – Poletimber – Moderately Stocked
H – Hemlock	6 – Poletimber – Well Stocked I
– Local Use (various non-commercial or exotic)	7 – Sawtimber – Poorly Stocked
J – Jack Pine	8 – Sawtimber – Moderately Stocked
K – Rock	9 – Sawtimber – Well Stocked
L– Lowland Brush	
M – Northern Hardwoods	
N – Marsh	
O – Oak	
P – Lowland Poplar (Bam)	
Q – Mixed Lowland Conifers	
R – Red Pine	
S – Black Spruce	
T – Tamarack	
U – Upland Brush	
V – Bog or Muskeg	
W – White Pine	
X – Non-Stocked	
Y – Sand Dunes	
Z – Water	
LM – Lowland Mixed	
MC – Upland Mixed Conifers	
MD – Mixed Deciduous	
UM – Upland Mixed	

### **Soil Protection Precautions (for rutting)**

- If a possible problem arises or threatens to worsen, **stop operations. Assess the situation.** Can operations be moved to another area to minimize problems without creating additional problems or should operations be stopped until conditions improve?
- Can precautionary measures eliminate the problem? For example:
- Use slash or logs to prevent movement of sediment offsite.
- Install rock check dams (using rock 3-12 inches in diameter) or water bars at appropriate intervals (water bars can be made from old conveyor belts or other rubberized material).
- Use slash, tire mats, or PVC pipe linked together with chain or cable and lay over areas susceptible to rutting or use other suitable methods to prevent further rutting.
- Install silt fence at edges of landing or other active areas to prevent movement of sediment off site.

- In RMZ's, fill in rutted areas, apply geotextile fabric over rutted and susceptible areas, then apply gravel or crushed rock over the fabric at a depth no less than 3 inches (6 inches is optimal).

Location	Precautions may be needed if:	Maintenance/Restoration options
Everywhere	A gully or rut of any depth is channelizing flow to an open water body, (i.e. stream, lake or wetland). Note: the discharge of sediment into a surface water body is in a violation of Part 31, Water Quality Protection, NREPA, PA 451, 1994. Enforcement action and daily fines by DEQ may result if the discharge is not stopped	Review site conditions and determine if site remediation would cause more damage to soil resources and site productivity than leaving ruts as they are. Repair gullies and ruts. Disc, plow, smooth, where necessary. Seed and mulch per recommended procedures (see Appendix E). Check dams and water bars should be left in place until grassy vegetation is firmly established. No restoration is recommended if such action causes more damage to site (e.g. disking and plowing may result in unacceptable damage to the root systems of the trees affected by the rutting). Areas prone to rutting may require frequent inspections.
Roads	· In a riparian management zone (RMZ) or wetland where a gully or rut is 6 inches deep and 25 feet long. · In an upland area (outside of RMZ) where a gully or rut is 12 inches deep and 50 feet long.	Review site conditions and determine if site remediation would cause more damage to soil resources and site productivity than leaving ruts as they are. Where water quality will not be affected, remediation may not be necessary. The type of road and use (temporary, intermittent, continuous or heavy use), may determine the level of restoration effort. If a rutted road must be used (e.g. for access, to move forest products), options for repair include 1) fill in ruts as conditions allow, 2) lay a barrier such as geotextile fabric over the length of the rutted portions and apply gravel or crushed rock at a depth no less than 3 inches (6 inches is optimal). Smooth, seed and mulch as appropriate, for example after timber harvest is completed (Refer to Appendix E for instructions). Be aware of vehicle safety concerns on forest roads. Rutting may require frequent grading during rainy seasons.
Landings (should not be located in RMZ)	Soil moves from the landing area.	When landing is no longer needed, smooth, seed and mulch as appropriate (Refer to Appendix E for instructions). Silt fence or barriers should be left in place until grassy vegetation is firmly established. Remove silt fence or barriers after its purpose is no longer required.
Skid trails and harvest areas	Where a gully or rut is 12 inches deep and 50 feet long.	No restoration is recommended if such action causes more damage to site (e.g. disking and plowing may result in unacceptable damage to the root systems of the trees affected by the rutting). Remove barriers and materials (tire mats, PVC pipe, etc.) after their use is no longer required and their removal does not create additional problems.

## Glossary

**Basal Area:** 1) The cross-sectional area of a single stem, including the bark, measured at breast height. 2) The cross-sectional area of all stems in a stand expressed per unit of land area.

**Biological Diversity (Biodiversity):** The spectrum of life forms and ecological processes that support and sustain them. Biological diversity occurs at four interacting levels: genetic, species, community, and ecosystem.

**Board Foot:** The amount of wood contained in an unfinished board 1 in thick, 12 in long, and 12 in wide.

**Clearcut:** The removal in one operation of essentially all the trees in a stand.

**Climax Forest:** 1) An ecological community that represents the culminating stage of a natural forest succession for its environment.



Coarse Woody Debris (CWD): 1) Any piece(s) of dead woody material on the ground in forest stands or in streams. 2) Dead woody material, > 4 inches diameter inside bark at the small end, on the ground in forest stands or in water.

Cohort: 1) An age group of individuals.

Composition: 1) The constituent elements of an entity (e.g. the species that constitute a plant community). 2) The proportion of each tree species in a stand expressed as a percentage of the total number, basal area, or volume of all tree species in the stand.

Coppice Regeneration Method: A silvicultural method designed to naturally regenerate a stand using vegetative reproduction.

Cord: A stack of wood that measures 4 x 4 x 8 feet (128 ft<sup>3</sup>).

Crop Tree: 1) Timber crop trees are trees selected to become a component of a future commercial harvest. 2) Sawtimber crop trees are the best quality, high vigor trees of desirable species that are targeted for (near) final harvest; they will be grown to rotation age or maximum desired size class.

Cull: Any item of production (e.g. trees, logs, lumber, seedlings) rejected because it does not meet certain specifications of usability or grade.

Diameter (at) Breast Height (DBH, dbh): The diameter of the stem of a tree measured at 4.5 ft. (1.37 m) from the ground (on the uphill side).

Disturbance: Any relatively discreet event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment.

Ecosystem: A spatially explicit, relatively homogeneous unit of the earth that includes all interacting organisms and components of the abiotic environment within its boundaries.

Endangered Species: 1) A species threatened with extinction throughout all or a significant portion of its range. 2) A species whose continued existence as a viable component of Wisconsin's wild animals or plants is determined to be in jeopardy on the basis of scientific evidence.

Epicormic Branch: A shoot arising spontaneously from an adventitious or dormant bud on the stem or branch of a woody plant often following exposure to increased light levels or fire.

Even-aged Stand: A stand where the trees have only small differences in their ages (a single age class). By convention, the spread of ages does not differ by more than 20% of the intended rotation.

Exotic (Nonnative): A species introduced from another country or geographic region outside its natural range (an exotic can become naturalized, i.e. establish, grow, reproduce, and maintain itself).

Forest Cover Type: 1) A category of forest usually defined by its vegetation, particularly its dominant vegetation as based on percentage cover of trees. 2) The plant species forming a plurality of composition across a given area.

Forest Health: The perceived condition of a forest derived from concerns about such factors as its age, structure, composition, function, vigor, presence of unusual levels of insects or disease, and resilience to disturbance.

Forest Management: The practical application of biological, physical, quantitative, managerial, economic, social, and policy principles to the regeneration, management, utilization, and conservation of forests to meet specified goals and objectives while maintaining the productivity of the forest.

Gap: The space occurring in forest stands due to individual or group tree mortality or blowdown.

Grading: The classification of logs, stems, lumber, or seedlings according to quality, value, potential use, or function.

Habitat: The place (environment) where an animal, plant, or population naturally or normally lives and develops.

Habitat Type Classification System: A site classification system based on the floristic composition of plant communities. The system depends on the identification of potential climax associations, repeatable patterns in the composition of the understory vegetation, and differential understory species. It groups land units with similar capacity to produce vegetation. The floristic composition of the plant community is used as an integrated indicator of those environmental factors that affect species reproduction, growth, competition, and community development. A system to classify forest plant communities and the sites on which they develop.

Harvesting (Logging): The process of gathering a timber crop. It includes felling, skidding/forwarding, on-site processing, and removal of products from the site.

**Improvement Cutting:** The removal of less desirable trees of any species in a stand of poles or larger trees, primarily to improve composition and quality.

**Increment Borer:** An auger-like instrument with a hollow bit and an extractor used to extract thin radial cylinders of wood (increment cores) from trees having annual growth rings, to determine increment or age.

**Krummholz:** German *krumm* “crooked, bent, twisted” and *holz* “wood”. Is a particular feature of sub-arctic and subalpine tree line landscapes. Continual exposure to fierce, freezing winds causes vegetation to become stunted and deformed.

**Layering:** A form of vegetative reproduction in which any intact branch develops roots as the result of contact with soil or other media.

**Litter Layer (Forest):** A layer that lies above the mineral soil, made up of organic debris, including leaves, needles, bark, and wood, in different stages of decomposition, with a variety of insects, microbes, and fungi that feed on the litter.

**Management Plan:** A predetermined course of action and direction to achieve a set of results, usually specified as goals, objectives, and policies.

**Management Prescription:** A set of management practices and intensities scheduled for application on a specific area to satisfy multiple goals and objectives.

**Mast:** Fruit and nuts consumed as food by livestock and certain kinds of wildlife.

**Milacre:** An area of 1/1000 (0.001) acres.

**Mycorrhizal Association:** The usually symbiotic association between higher plant roots (host) and mycelia of specific fungi that aid plants in the uptake of water and certain nutrients and may offer protection against other soil-borne organisms.

**Natural Regeneration:** The establishment of young trees through natural seeding, sprouting, suckering, or layering. *Silviculture Handbook*

**Nonnative (Exotic) Invasive Plants:** Plant species accidentally or intentionally introduced from another country or geographic region, having the ability to significantly displace desirable vegetation or reduce crop yields.

**Nurse Tree(s):** A tree, or group of trees, used to improve survival or improve the form of a more desirable tree, or group of trees.

**Old-growth Forest:** Forests which are relatively old and relatively undisturbed by humans. The forest is biologically old, containing some trees which are nearing or beyond their average expected lifespan. The original even-aged overstory, established following a catastrophic disturbance, is becoming senescent, is senescing, or has senesced.

**Overmature:** 1) A tree or even-aged stand that has reached that stage of development when it is declining in vigor and health and reaching the end of its natural life span. 2) A tree or even-aged stand that has begun to lessen in commercial value because of size, age, decay, or other factors.

**Pioneer:** A plant capable of invading bare sites and persisting there or colonizing them until supplanted by successional species.

**Poletimber:** A tree of a size between a sapling and a sawtimber tree. Hardwood trees ranging in size from 5 to 11 inches dbh, and conifers ranging in size from 5 to 9 inches dbh.

**Pruning:** The removal, close to the branch collar or flush with the stem, of side branches and multiple leaders from a standing tree.

**Reforestation:** The practice of regenerating and growing healthy trees on previously forested sites.

**Regeneration (Reproduction):** 1) The seedlings or saplings existing in a stand. 2) The act of renewing tree cover by establishing young trees naturally or artificially.

**Root Collar:** The location on a plant where the primary vascular anatomy changes from that of a stem to that of a root.

**Sawtimber:** Trees with minimum diameter and length and with stem quality suitable for conversion to lumber. Hardwood trees larger than 11 inches dbh, and conifers larger than 9 inches dbh.

**Scaling:** The measurement or estimation of the quantity or quality of felled timber.

**Scarification:** Mechanical removal of competing vegetation and/or interfering debris, or disturbance of the soil surface, designed to enhance regeneration for species that require mineral soil seed beds. *Silviculture Handbook*

Single-tree selection: Regeneration managed in gaps <0.1 acres.

Group selection: Regeneration managed in group openings 0.1 – 0.5 acres.

Patch selection: Regeneration managed in patches >0.5 acres.

Selective (Partial) Cutting: The removal of only a portion of the trees in a stand.

Silviculture: The practice of controlling forest composition, structure, and growth to maintain and enhance the forest's utility for any purpose.

Single-tree Selection (see selection regeneration method): A regeneration method where regeneration is managed in gaps <0.1 acres in size (comprising part of a larger uneven-aged stand).

Site Index: A species-specific measure of actual or potential forest productivity (usually for even-aged stands), expressed in terms of the average height of trees included in a specified stand component (dominants, codominants, or the largest and tallest trees) at a specified index or base age.

Site Quality (Site Productivity): The productive capacity of a site, usually expressed as volume production of a given species.

Slash: The residue left on the ground after logging, or accumulating as a result of storm, fire, girdling, or delimiting.

Snag: A standing dead tree.

Stand Density: 1) A quantitative measure of stocking expressed either absolutely in terms of number of trees, basal area, or volume per unit area or relative to some standard condition.

Stocking: 1) An indication of growing-space occupancy relative to a pre-established standard. Common indices of stocking are based on percent occupancy, basal area, relative density, stand density index, and crown competition factor.

Stump Sprout: Regeneration of shoot growth from either adventitious or dormant buds from a cut tree stump.

Succession: The gradual supplanting of one community of plants by another (compositional change).

Sucker (Root Sprout): Shoots arising from below ground level either from a rhizome or from a root.

Suppressed (Overtopped) Crown Class: A tree whose crown is completely overtopped by the crowns of one or more neighboring trees.

Sustainability: The capacity of forests, ranging from stands to ecoregions, to maintain their health, productivity, diversity, and overall integrity, in the long run, in the context of human activity and use.

Sustainable Forest Management (Sustainable Forestry): WDNR: The practice of managing dynamic forest ecosystems to provide ecological, economic, social, and cultural benefits for present and future generations.

Thinning: 1) A cultural treatment made to reduce stand density of trees primarily to improve growth, enhance forest health, or recover potential mortality. 2) To reduce in number or bulk, thickness or depth, density or viscosity, or to dilute or weaken.

Threatened Species: A species likely to become endangered within the foreseeable future, based on scientific evidence. Silviculture Handbook

Timber Quality (Tree): Tree stem form, soundness, and potential timber value.

(Timber) Stand Improvement (TSI): 1) An intermediate treatment made to improve stand composition, structure, condition, health, and growth. 2) Non-commercial intermediate treatments.

Understory: All forest vegetation growing under an overstory.

Uneven-aged Stand: A stand where the trees differ markedly in their ages, with trees of three or more distinct age classes either mixed or in small groups.

Viability: 1) The capacity of a seed, spore, or pollen grain to germinate and develop under given conditions. Actual viability is determined by measuring germinative capacity.

Vigor: Active healthy well-balanced growth.



