

Landscape Stewardship Plan for Michigan's Jack Pine Ecosystem

Crawford & Oscoda Counties



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1. Executive Summary

This landscape stewardship plan, emphasizing Michigan's Jack Pine Ecosystem in Crawford and Oscoda counties, is one of nine such plans that were developed through a larger grant project funded by the U.S. Forest Service and administered by the Michigan DNR. The intent of developing this plan was to connect people and organizations to each other as well as to forest stewardship information, resources and assistance programs, thereby increasing our collective capacity to protect and maintain the forest products, services and values on which this region depends. Only by working collaboratively at the landscape scale (e.g., the region of Northeast Michigan centered around Crawford and Oscoda counties) can we better address large-scale challenges that threaten the health and sustainability of our forests and other natural resources.

This is a region rich in natural resources—a rural landscape containing vast expanses of public and private forest land, world-renowned coldwater fisheries of the Au Sable River Watershed and rare wildlife species like the charismatic Kirtland's warbler. These features help support our region's tourism and outdoor recreation-based economies, define our sense of place and serve as a source of pride for local communities. However, the maintenance of healthy and productive forests, protection of rare species and preservation of high quality water resources takes work.

Unfortunately, the sustainable management of Michigan's Jack Pine Ecosystem faces a diverse set of threats and challenges. Factors such as climate change, invasive species, tree diseases and insect pests, habitat fragmentation, nonpoint source pollution, limited financial resources and lack of awareness or participation in active and sustainable land stewardship practices place our forests, water resources, wildlife and human communities at risk. The goal of this landscape stewardship plan is to increase interest, awareness and participation in active land stewardship opportunities throughout Michigan's Jack Pine Ecosystem—an important first step in alleviating many of the challenges mentioned above and in maintaining high quality forests.

A good first activity in this process is to coordinate with landowners to develop customized Forest Stewardship Plans (see Section 4.1), which characterize existing resource features found on a particular property, and to identify strategies for meeting each landowner's goals through on-the-ground stewardship activities that also yield public benefits such as protection of clean water, provision of wildlife habitat and mitigation of various negative factors acting on the landscape scale. In fact, the layout for these landscape stewardship plans is based on the format used for individual Forest Stewardship Plans, which, while important in their own right, fail to fully address landscape-scale challenges. This plan, in a sense, serves as a forest stewardship plan for the Jack Pine Ecosystem, with emphasis on Crawford and Oscoda counties. This plan goes beyond individual plans to provide goals and guidance at the landscape scale. However,

the collective on-the-ground stewardship activities completed on individual properties remains essential to sustainable management of our region's resources.

To develop this plan, Huron Pines reviewed existing literature, including the Crawford County Master Plan (2008), MDNR Au Sable River Assessment (2001), MDNR Wildlife Action Plans (2015 draft), and Kirtland's warbler Breeding Range Conservation Plan (2014). This information was summarized to highlight the focal landscape's physical, ecological and cultural resources. Through meetings, phone calls and interviews, the process of developing each landscape stewardship plan also brought resource professionals and other stakeholders together, and the plans help to connect landowners and land managers with information about practices and programs that will help people take the next step toward becoming more engaged stewards of our natural resources. Summaries of assistance programs are compiled in Section 4, including information on the Forest Stewardship Program, American Tree Farm System, Qualified Forest Program, Commercial Forest Program, Huron Pines assistance opportunities, timber sales, and links to best management practices. Many additional resources are also included in the appendices.

Key management recommendations for the Jack Pine Ecosystem include maintenance of large tracts of suitable Kirtland's warbler breeding habitat, implementation of decontamination and prevention protocols to minimize the spread of invasive species and tree disease and protection of water resources through best management practices that reduce pollutant inputs to streams and preserve stable flow and temperature regimes. Education and collaborative management among private landowners, agencies, nonprofits and businesses will also be important in order to meet our shared ecological and socioeconomic goals for this landscape. See Section 3.5.2 for lists and descriptions of specific recommendations.

A key element of each landscape stewardship plan is the collection of inspirational stewardship stories told by the people living and working within the focal landscapes. Through these stories, which are included at the end of this documents, local landowners and land managers share, in their own words, why and how they are active stewards of the land they own or manage. Whether that means a small private property or a vast area of public land, these stories are told in the hope of inspiring other people to join the effort to protect our collective forest resources. Our forests are, after all, interconnected with all of the other physical, ecological and cultural elements of the landscape we call home. We cannot live well without them.

2. Project Introduction

This landscape stewardship plan focuses on Michigan's Jack Pine Ecosystem, with particular emphasis on Crawford and Oscoda counties, and was developed by Huron Pines as part of a larger collaboration to promote sustainable stewardship of private and public forest land across the state of Michigan. The larger project began in 2015 when the Michigan Department of Natural Resources (MDNR) received a grant from the United States Forest Service (USFS) to partner with three 501(c)(3) nonprofit conservation organizations including Huron Pines, The Nature Conservancy and The Stewardship Network in order to develop nine such landscape stewardship plans, each covering a unique forest ecosystem Michigan (Figure 2.1).

Each of the nine landscape stewardship plans covers an area ranging from two to four counties. These plans characterize the physical, biological and cultural context of the focal landscapes and provide resources to help connect landowners with assistance programs and land stewardship opportunities. Each plan also includes a collection of stewardship stories told by landowners and land managers living and working within each focal landscape. Rather than simply listing recommended land management practices, this approach engages people to share their own stories and it is our hope that their examples inspire you, whether you own property or are involved in managing property, to be as engaged as possible in managing your own forest.

The general purpose of these plans is to increase voluntary participation in land stewardship activities by highlighting available opportunities and making it easy for landowners to take the next step toward protecting and preserving Michigan's unique natural resources. This needs to be achieved at the landscape scale—with private and public land managers working in concert to maintain healthy forests, clean water and other natural resources for the use and enjoyment of current and future generations. It takes individual participation for this approach to be successful, but even as individuals they are not alone. There are many benefits to active land stewardship and many assistance programs to help people manage their land sustainably. These plans seek to connect people with each other, with our land, with new ideas, and with technical and financial assistance opportunities.

Huron Pines developed two landscape stewardship plans, this Jack Pine Ecosystem plan and one covering Michigan's Northern Hardwoods, focusing on Cheboygan and Otsego counties. Both of these northern Lower Peninsula landscapes contain fairly large tracts of forest land under a mixture of private, state and federal ownership. This rural area contains in-tact and functional forests, but long-term protection of these resources faces many challenges.

The Stewardship Network developed six landscape stewardship plans covering a large swathe of the southern Lower Peninsula. This region is a mosaic of urban areas, agricultural lands and

small private forests. There is comparatively little public land in southern Michigan. Seventy-five percent of Michigan’s 10 million residents live in this region. Its limited areas of public forest are heavily visited and so land management activities can affect a large number of people.

The Nature Conservancy also developed one landscape stewardship plan, for the eastern Upper Peninsula, which covers parts of Alger, Luce, Mackinac and Schoolcraft counties. This is an area dominated by large blocks of public land, some private forest land, and little development.

While the lead nonprofit organizations were responsible for developing their own respective landscape stewardship plans, the content of each plan was generated with substantial input from other resource professionals, landowners and land managers willing to tell their stories, and summarizes existing resource assessments, stewardship plans and other literature.

Project partners also worked with Dr. Stuart Gage, Michigan State University professor emeritus, to install acoustic monitoring devices that capture the “soundscape” of the forests. These sounds of the forest tell a story of their own—birds, insects, amphibians, storms, highway traffic and other anthropogenic sounds—and will be published on the project website.

Finally, a portion of the grant funding will be administered by the MDNR to provide cost-share to landowners within the nine landscape focus areas for developing and implementing unique Forest Stewardship Plans for their properties. MDNR has also developed an interactive website to host the stewardship stories, sound clips and images collected as part of this project.

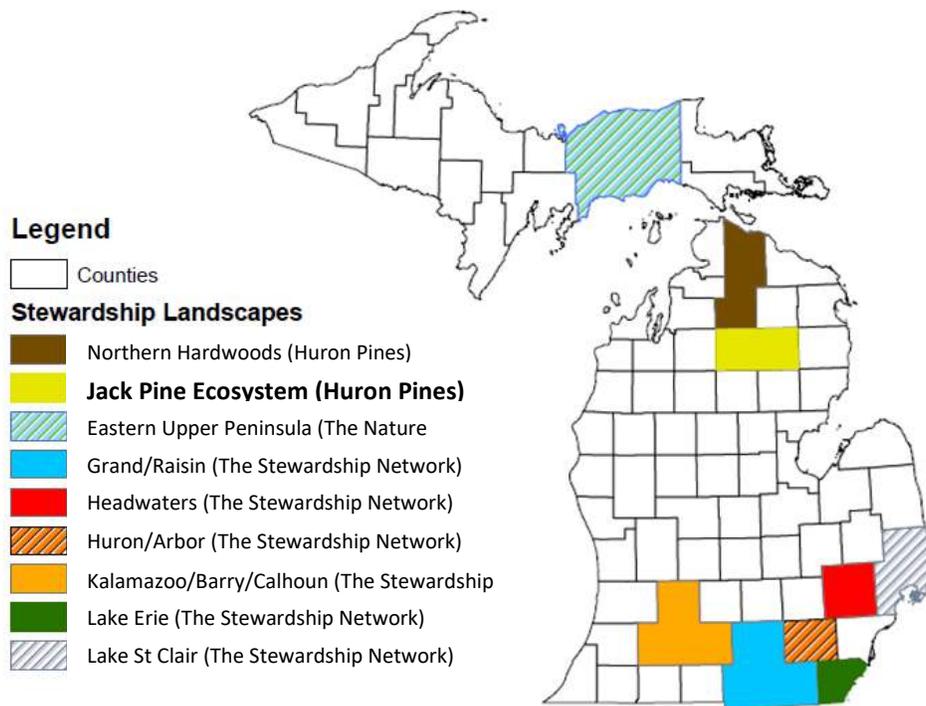


Figure 2.1 Map – areas covered by the nine landscape stewardship plans.

2.1 Project Goals and Objectives

Michigan's forests face myriad threats—invasive species, tree diseases, habitat fragmentation, financial challenges—that sometimes make it difficult to achieve forest stewardship goals. It is estimated that only 20% of Michigan's 12 million non-industrial private forest lands are being actively managed, yet active stewardship of private forest land is vital to the long-term health and productivity of the forest resources (including soil, water and wildlife) on which our local economies and communities depend. Without intact ecosystems, clean water and healthy wildlife we lose the things that make our region a great place to live, work, play and recreate. The overarching goal of this project is to **increase interest, awareness and participation in active forest stewardship opportunities** through the development of landscape stewardship plans covering strategic and unique forest ecosystems throughout the state of Michigan.

Specific objectives that we seek to accomplish in order to achieve that goal include:

- Objective 1: Describe the physical, cultural and resource management context of each of the nine landscapes to serve as a comprehensive reference for landowners and land managers.
- Objective 2: Facilitate collaborative management of multi-county areas by state, federal and local resource agencies, nonprofit conservation organizations, private sector professionals and individual landowners.
- Objective 3: Promote sustainable forest management practices and encourage people to be more active stewards of their land (e.g., develop and implement a Forest Stewardship Plan).
- Objective 4: Connect people with tools, resources and programs to help them take the next steps toward achieving their personal land management goals and increase our collective capacity to manage forest resources at the landscape scale.

These landscape stewardship plans also aim to support and inform strategies for addressing national priorities and state-level issues identified in "Michigan Forest Resource Assessment and Strategy," which was completed by the MDNR in 2010. These priorities and issues are:

- National Priority 1: Conserve Working Forest Landscapes
 - Issue 1.1: Promote Sustainable Active Management of Private Forests
 - Issue 1.2: Reduce Divestiture, Parcelization and Conversion of Private Forestlands
 - Issue 1.3: Reduce the High Cost of Owning Private Forestland
- National Priority 2: Protect Forests from Threats
 - Issue 2.1: Maintain and Restore Aquatic Ecosystems and Watersheds
 - Issue 2.2: Reduce Threats from Invasive Species, Pests and Disease
 - Issue 2.4: Reduce Impact of Recreational Activities on Forest Resources
- National Priority 3: Enhance Public Benefits from Forests

- Issue 3.1: Maintain Markets for Utilization of Forest Products
- Issue 3.2: Maintain Ecosystem Services from Private Forestlands
- Issue 3.3: Provide Effective Conservation Outreach for Private Forestlands
- Issue 3.5: Maintain Community Quality of Life and Economic Resiliency
- Issue 3.6: Maintain and Enhance Scenic and Cultural Quality on Private Forestland
- Issue 3.7: Maintain Forested Ecosystems for Biodiversity and for Wildlife Habitat
- Issue 3.8: Maintain and Enhance Access to Recreational Activities on Private Forestlands



Active and collaborative forest stewardship will help protect healthy forests as well as the wildlife and water resources on which our health and livelihoods depend. Photo: North Branch Au Sable River in Crawford County.

2.2 The Need for Active Forest Stewardship

Forest land accounts for 55% of Michigan's total land area, and of Michigan's 20 million acres of forests, 12 million of those are privately owned. State and federal agencies are responsible for managing our public lands, but the overall health of Michigan's unique forest, water and wildlife resources ultimately depends on the collective management activities of all landowners. Yet a survey conducted by Michigan State University revealed that only 20% of Michigan's non-industrial private forest lands are currently under active management.

The health of any particular forest property depends on the condition of other forest lands throughout the landscape. Similarly, the management actions (or lack of active management) on a single property can impact forests, rivers, wildlife, property and people beyond the boundary of that individual piece of land. For example, native wildlife, forest fires, harmful invasive species, tree diseases and insect pests can all move freely among private and public lands—they do not recognize property boundaries. Likewise, rivers and streams flowing from one property to the next carry the effects of poor land management activities downstream (upstream areas may be negatively affected as well, as in the case of dams or poorly designed road crossings that act as barriers for fish movement).

Maintaining healthy forests is also an important goal at the regional and even global scales. We all depend on our forests for timber and other forest products and services. Our forests provide wildlife habitat, help mitigate climate change, and are important for protecting the quality and quantity of our water resources and for the myriad aesthetic, recreational and spiritual values they provide. Protecting Michigan's forests, and their products, services and intangible values, starts with active stewardship of individual properties by landowners and land managers.

Because widespread threats to forest health act at scales larger than single parcels, our approach to maintaining healthy, functional and sustainable forests must also incorporate landscape-scale considerations. The purpose of this project is to encourage and inspire people to actively manage their forests to realize benefits for themselves as well as the larger community. The next section describes our methodology for doing so.

2.3 Methodology: A Landscape Approach to Natural Resource Conservation

The Michigan DNR applied for and was awarded funding by the USFS in 2015 to coordinate with Huron Pines, The Stewardship Network and The Nature Conservancy to develop nine landscape stewardship plans. These partners strategically identified landscape types containing sets of unique physical and cultural features that help to define each landscape area while also distinguishing them from other landscapes. The plan counties are mapped in Figure 2.1.

While the collection of features in a particular landscape gives a region its character and shapes a sense of identity for the people living within it, defining the landscape boundaries is not an easy task. Ecological landscapes do not adhere to political boundaries. Instead, they transition gradually and unevenly from one landscape type to another and contain all sorts of internal variation. Natural processes and cultural history also cause landscapes to evolve over time. Michigan's Jack Pine Ecosystem landscape, therefore, is not a homogeneous jack pine forest but rather a mosaic of different forest types, prairies, wetlands, urban areas and water bodies. Due to historical forest use and management there are fewer jack pine here than there once was, yet jack pine barrens remain the predominant land cover type across much of central Northeast Michigan and are an integral part of our region's history. Jack Pine is also intimately tied to the cold and stable rivers and wildlife found here, and also to our own sense of place and identity.

In order to address forest health issues and challenges at the landscape scale while also keeping these landscape stewardship plans relevant to local landowners and land managers, we are examining each landscape based on county boundaries. A practical advantage of defining the landscape stewardship plan geography based on county boundaries is that these often align with the jurisdictions of resource agencies and nonprofit organizations, and their programs, resources and opportunities. This also helps keep these plans relevant to the local audience.

The Jack Pine Ecosystem was identified as an appropriate focal landscape due to the features that make this region unique and the need to protect these very features. The sandy and well-drained soils form the foundation of this landscape and are the reason we have extensive jack pine forests and exceptionally stable rivers and streams in terms of flow and water temperature. The fisheries, wildlife, fire history, climate and scarcity of arable soil of this region have helped shape the cultural values, land ownership picture and recreational pursuits of the people living within and visiting the Jack Pine Ecosystem. Crawford and Oscoda counties lie at the heart of this landscape and serve as the focal area for this landscape stewardship plan.

To complete each plan, project partners collaborated to develop project goals and methods (Section 2), as well as to compile information about statewide and regional assistance opportunities applicable to all nine landscapes (Section 4). Sections 3 of this plan covers

information unique to Michigan's Jack Pine Ecosystem, emphasizing Crawford and Oscoda counties, and were completed by Huron Pines through review of existing resources and with significant input from various stakeholders.

A unique aspect of these landscape stewardship plans is their collection of stewardship stories, told by local landowners and land managers, which are attached at the end of this document. These stories help illustrate some of the land stewardship practices that people are engaging in right here in Crawford and Oscoda counties. In addition to listing a few land management recommendations the inclusion of stories will hopefully inspire other people to become more active stewards of their forest land and to take advantage of the wide range of opportunities that are out there.

Huron Pines, in collaboration with Irontone Press, conducted one-on-one conversations with individuals and corporate, state and federal land owners and managers to collect stories about the wide range of land stewardship activities that people are doing here in Michigan's Jack Pine Ecosystem. The stewardship stories included in this plan were shared voluntarily for inclusion in this plan and with permission to distribute these stories freely in the hopes of encouraging other landowners to enjoy and engage in stewardship of their land as much as possible.

Another unique element of the project is the installation of acoustic monitoring devices in many of the landscape areas. Huron Pines installed an acoustic monitoring device in a Kirtland's warbler Management Area located on state land. This unit was set to record for one minute, every half hour throughout the day, and was recording from mid-May through August of 2016. Similar acoustic monitoring devices were deployed in several other landscapes throughout the state of Michigan by other project partners. The Michigan DNR hosts an interactive story map, accessible at www.michigan.gov/forestry, where you can read the stewardship stories collected through this project, submit your own stories, view images and listen to sounds of our forests. Our forests tell a story of their own and we recommend you check it out and we encourage you to share your own stories.

Finally, the landscape stewardship plans feature appendices containing contact information for local agencies, organizations and private resource providers to help you take the next step in managing a sustainable, healthy and productive forest. Other appendix materials include maps, a glossary of common forestry terms, a bibliography and links to additional resources.

3. Landscape Context

Michigan’s Jack Pine Ecosystem invokes a variety of images and feelings from different people. It is a landscape defined by sand, fire, jack pine, its world-renowned coldwater fisheries, and a storied little bird—the Kirtland’s warbler—which has, with the help of active land stewardship practices, returned from the brink of extinction. This landscape is also defined by the people for which this document was written, the people that call this place home. The people of Crawford and Oscoda counties rely heavily on the natural resources that surround us and the health and productivity of those natural resources depend on people. Active and collaborative stewardship of our landscape will be essential if we are to successfully address the threats facing the forests, water resources and wildlife that define who we are and upon which our livelihoods depend.

3.1 Geographic Scope

This landscape stewardship plan covers Crawford and Oscoda counties in Northeast Michigan. While the Jack Pine Ecosystem also extends to the Upper Peninsula and parts of Wisconsin and Canada, Crawford and Oscoda counties lie at the heart of Michigan’s Jack Pine Ecosystem and also encompass most of the upper Au Sable River Watershed (Figures 3.1 and Appendix 9, Map 1). While the landscape features discussed in Section 3 are specific to Crawford and Oscoda counties, much of this content is applicable throughout Michigan’s Jack Pine Ecosystem.

Together, Crawford and Oscoda counties contain a combined 1,134 square miles (725,932 acres) of land, most of which is sparsely populated and heavily forested. More than half of this land area is publicly owned (MDNR and USFS), and rural private properties are also well-forested.

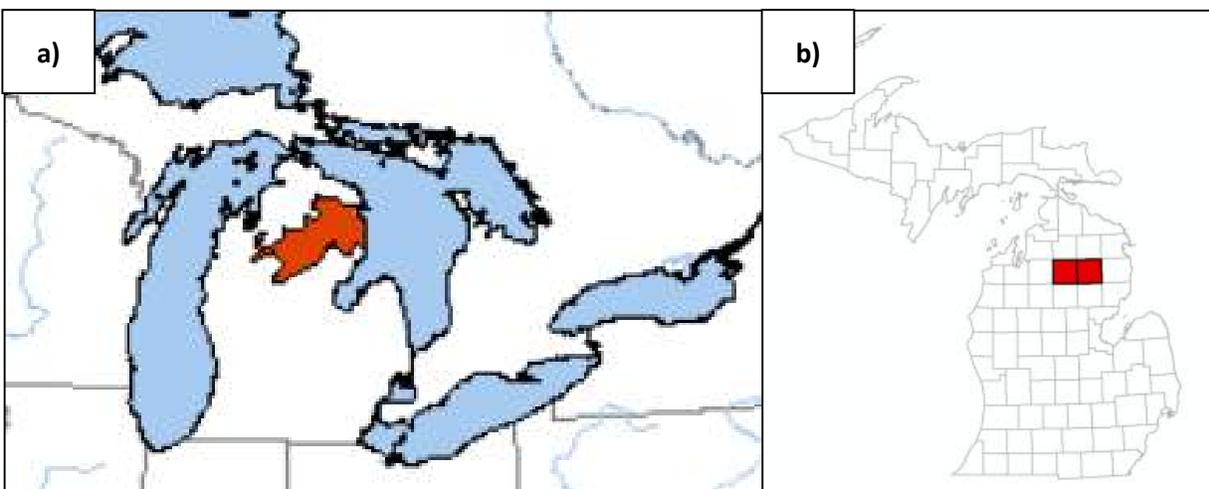


Figure 3.1

a) Kirtland’s warbler breeding range and the extent of Michigan’s Jack Pine Ecosystem (map courtesy natureserve.org). **b)** Crawford and Oscoda counties lie at the heart of Michigan’s Jack Pine Ecosystem.

3.2 The Physical Landscape

Climate, geology, topography and human history all determine the content and configuration of the ecological and cultural features found in Crawford and Oscoda counties. Together, these factors restrict the types of vegetation that can grow here and regulate the amount and runoff pattern of water, which in turn determines stream flow characteristics. Land cover, hydrology and land management activities influence which species of terrestrial and aquatic wildlife are present in the landscape. The availability or absence of various natural resources, such as timber, oil and gas, trout and other wildlife species also shape which human activities are possible, popular, and profitable. Section 3.2 provides an overview of the physical landscape characteristics that form the foundation of Michigan's Jack Pine Ecosystem.

3.2.1 Climate

Crawford and Oscoda counties are located in the interior of northern Michigan, an area with a harsh climate featuring frigid, snowy winters and warm summers. The region experiences a relatively short growing season (about 115 days) and extreme temperatures (with more than a 100°F difference between the average annual minimum and maximum). The dominantly coarse, sandy and well-drained soils of the region leave little soil moisture during periods of drought. These sandy soils also preclude successful agriculture and restrict vegetation to those plants specially adapted for surviving in these conditions. The harsh climate affects people, too. Individual landowners brave the elements year-round, but many others own seasonal or recreational properties here but maintain permanent residences elsewhere. Tourism and outdoor recreation activities here are also seasonal and closely tied to our region's climate and natural features. Climate is also influenced by topography. Central northern Michigan forms a sort of plateau, and air moving across the area rises, cools and often leads to precipitation.

3.2.2 Geology and Topography

The local bedrock geology of shale, limestone and dolomite is buried beneath hundreds of feet of coarse glacial outwash deposits that were left covering the area after the retreat of the latest glaciation, approximately 10,000 years ago. This geology is economically significant for oil and gas production and there are more than 3,500 wells operating in the area. The combination of an exceptionally deep layer of outwash sand (Appendix 9, Map 2) and the regional topography (Appendix 9, Map 3) allows precipitation to seep down deep and enter our rivers as groundwater rather than as surface runoff, which is the primary reason the Au Sable and Manistee rivers rank among the most stable in the nation in terms of flow and temperature—great news for coldwater fish and the anglers that pursue them! The filtering effect of soil particles on water as it seeps slowly through the ground helps keep our water clean and cold.

Regional topography consists of rolling hills vegetated with prairies, pine barrens and mixed forests. River valleys represent some of the steeper areas in the regional landscape.

Maximum elevation in the landscape stewardship plan focal area is 1,540 feet above sea level (Crawford County, southwest of the City of Grayling) and the minimum elevation is 783 feet above sea level (Oscoda County, the South Branch Thunder Bay River at the Oscoda and Montmorency county border).

3.2.3 Water & Wetlands

Crawford and Oscoda counties lie within the heart of the upper Au Sable River Watershed, and headwater portions of the Manistee, Muskegon and Thunder Bay river watersheds also originate here (Appendix 9, Map 4). These cold, groundwater-fed rivers rank among the most stable in the nation in terms of flow and water temperature, owing to the exceptionally well-drained soils that allow precipitation to percolate quickly and deeply into the ground. These conditions support a world-class fishery for native brook trout and introduced brown trout and rainbow trout. The Au Sable River was even once home to a thriving population of arctic grayling, a species normally restricted to much higher latitudes or elevations. Unfortunately, as a consequence of over-harvest, competition with introduced trout species, degradation of habitat, and alteration of the channel due to historical logging and other poor land use practices, there are no wild grayling left in Michigan. Over the past century, habitat conditions in the Au Sable River have gradually improved as our forests have been allowed to regenerate and as we have implemented better land stewardship practices. The Au Sable River, the birthplace of Trout Unlimited, is now a famous trout fishing destination. Even so, attempts to reintroduce hatchery-raised grayling to the Au Sable River have not been successful.

There are approximately 1,148 total miles of rivers and streams within Crawford and Oscoda counties, many of which are formally recognized for their high water quality, productive fisheries and scenic beauty by various federal and state designations including

- 172 miles of Blue Ribbon Trout Stream—a Michigan DNR designation for stream reaches that sport exceptional insect hatches, healthy populations of resident trout, excellent water quality and good public access (<http://www.trailstotrou.com/blueribbon.html>).
- 270 miles of stream designated under the Natural Rivers Program, which is a Michigan DNR designation protecting the river corridor and riparian zone through river-specific management plans and zoning restrictions that limit development activities within and along the river corridor (www.michigan.gov/dnrnaturalrivers).

- 17.5 miles of the Au Sable River in Oscoda County are designated under the National Wild and Scenic Rivers Act—a program of national recognition for rivers that have remarkable scenic, recreational, biological and historical values along with a national commitment to protecting such features (<https://www.rivers.gov/rivers/ausable.php>).

Because the region’s deep soils are so course and permeable there are relatively few lakes here. The natural lakes and wetland areas of Crawford and Oscoda counties therefore tend to be in areas with a higher proportion of clay soils, where the water table is elevated. Lake Margrethe, covering 1,920 acres and reaching 65 feet in depth, is the largest natural lake in the landscape focus area. It is part of the Upper Manistee River Watershed. There are also several man-made impoundments in Crawford and Oscoda counties, ranging from small farm ponds impounding small creeks to the Mio Dam Pond, which covers about 944 acres. The Mio Dam is one of six large hydroelectric dams along the entire main stem of the Au Sable River.

Wetlands play an important ecological role and provide many benefits to people. Fens, bogs, vernal pools and floodplains help filter pollutants from water and provide unique conditions that support many rare species of plants and animals. Small mammals, birds, and many reptiles and amphibians rely on these relatively rare (in Crawford and Oscoda counties) but important types of habitat. There are special regulations and permit requirements in place to help protect wetlands against pressures of development (habitat fragmentation; reduction of wetland areas) and inputs of pollution (degradation of wetland quality/function). The extent of wetlands in Crawford and Oscoda counties is shown in Appendix 9, Map 5. Approximately 2% of the area is classified as wetland. Most of our wetlands are forested or shrub wetlands and floodplains that have high hydrological connectivity with surface waters. Our course and sandy soil limits the formation of wetlands because water is able to percolate deep into the ground in most areas.



The Au Sable River flows from west to east through Crawford and Oscoda counties.

3.3 The Ecological Landscape

3.3.1 Land Cover

Prior to Michigan’s logging boom in the late 1800s, more than 80% of the upper Au Sable River Watershed was covered in conifer forests that were regulated by frequent wildfires. These fire disturbances promoted the growth of conifers—particularly jack pine, which even requires fire to open its cones and spread its seeds. But in the past century humans have been intentionally suppressing wildfire in order to protect homes and other property. This has allowed hardwoods to gain more of a foothold in Crawford and Oscoda counties, where today coniferous forests make up only about 45% of the total land area. Fire suppression and current land use practices have also reduced the amount of prairie-savannah habitat in our landscape. Hardwoods now occupy approximately 30% of the total land area in Crawford and Oscoda counties, and the remaining areas contain a mixture of cover types that include wetlands, agriculture, savannah-prairie, and developed areas (Table 3.1).

Table 3.1 Land Cover in Crawford and Oscoda Counties (Source: NLCD, 2011)

Land Cover Type	% of Total Area (Crawford)	% of Total Area (Oscoda)
Forested	86.3	82.6
Developed	3.0	2.3
Agriculture	1.1	3.3
Wetlands	1.1	3.1
Open Water	1.1	1.1
Other (prairie, open, etc.)	7.4	7.6

Land cover is variable across the landscape due to differences in soil type, topography, land use history and other factors. In lowland areas and near rivers our most common tree species are ash, maple, balsam poplar, tag alder, deciduous shrubs, white cedar, balsam fir, tamarack and black spruce. These riparian forests provide food and habitat for wildlife, shade stream channels, offer scenic value for river users and contribute large woody material into the stream channel, which provides cover for fish and helps maintain diversity of stream flow conditions.

Upland forests are characterized by different species. Excessively well-drained soils support jack pine and also red pine, pin oak and white pine. Moderately drained upland forests support a mix of hardwoods including beech, maple, birch, aspen, and oak. Red pine, jack pine and white pine are often intermixed with hardwoods in these areas. Jack pine are most prevalent in southern Oscoda County and southern and eastern Crawford County—areas that are mostly publicly owned and often managed for Kirtland’s warbler habitat, among other uses. Jack Pine trees cannot reproduce without fire and the cones will not open without the trigger of fire. As a result, when fire is suppressed, propagated saplings must be planted by hand or mechanically.

Development pressure in this area has been relatively low, with human population declining slightly in both counties from 2000 to 2010. Outside of Grayling and Mio, most properties are rural and generally contain forest or prairie habitat. There is little agricultural activity in the area, and it is mostly concentrated in central Oscoda County north of Mio. Approximately 1% of the landscape is covered in open water, including lakes and streams, and wetlands make up the remaining 2% of our landscape. Land use and land cover conditions across Crawford and Oscoda counties are depicted in Map 6, Appendix 9 (National Land Cover Database, 2011).

There are many herbaceous plants (grasses, wildflowers, ferns and shrubs) found in our area. Notable plant species include fiddlehead ferns and blueberries, which people collect for food, and a variety of rare prairie species including rough fescue, pale agoseris and Hill’s thistle. Common herbaceous plants include little bluestem, sweet fern and several species of sedges.

Every location has a unique combination of specific soil conditions, topography, microclimate, land cover and land use history. For practical purposes, there are classification systems (such as the one developed by Michigan Natural Features Inventory) for identifying which “natural community” type best describes a certain area. In Crawford and Oscoda counties, there are 16 prevalent community types and an additional 4 infrequent community types (Table 3.2). Many wildlife species move between different community types to fulfill different needs— foraging, reproducing, nursing, refuge, etc. Detailed information about each of the community types listed below can be found online at <https://mnfi.anr.msu.edu/communities/index.cfm>.

Table 3.2 Natural Community Types Found in Crawford and Oscoda Counties

Natural Community Type	Crawford County	Oscoda County
Bog	Prevalent	Prevalent
Dry Northern Forest	Prevalent	Prevalent
Dry Sand Prairie	Prevalent	Infrequent
Dry-mesic Northern Forest	Prevalent	Prevalent
Emergent Marsh	Prevalent	Prevalent
Floodplain Forest	Prevalent	Prevalent
Hardwood-conifer Swamp	Prevalent	Prevalent
Intermittent Wetland	Prevalent	Prevalent
Mesic Northern Forest	Infrequent	Infrequent
Mesic Sand Prairie	Infrequent	-
Muskeg	Infrequent	-
Northern Fen	Infrequent	Infrequent
Northern Hardwood Swamp	Infrequent	Infrequent
Northern Shrub Thicket	Prevalent	Prevalent
Northern Wet Meadow	Prevalent	Prevalent
Oak-pine Barrens	Prevalent	Infrequent

Pine Barrens	Prevalent	Prevalent
Poor Conifer Swamp	Prevalent	Prevalent
Poor Fen	Prevalent	Prevalent
Rich Conifer Swamp	Prevalent	Prevalent
Sinkhole	-	Infrequent
Submergent Marsh	Prevalent	Prevalent
Wet-mesic Sand Prairie	Infrequent	-

3.3.2 Wildlife

This landscape provides year-round and seasonal habitat to a diverse collection of mammals, birds, reptiles, amphibians and other animals. There are around 50 species of mammal found in this area. Iconic examples include black bear, white-tailed deer, snowshoe hare, American marten, porcupine, beaver and bobcat. Bats, shrews, mice, foxes, weasels, coyote, opossum, river otter, raccoon and other mammals also reside here. Many of the mammal species in our region are of historical or current significance for hunting, trapping and wildlife viewing.

Our forests, fields and waterways also harbor a great diversity of birds. Of these, the Kirtland’s warbler probably has the largest management impact on our landscape and is discussed in more detail in Section 3.3.4. Other upland birds found in Crawford and Oscoda counties include a variety of songbirds, sandpiper, woodpecker, wild turkey, Brewer’s blackbird, spruce grouse and ruffed grouse. More than 50 bird species occur along our riparian and wetland habitats, including several species of ducks, mergansers, bitterns, swallows, songbirds and raptors. Some of our iconic bird species of special conservation concern include the common loon, bald eagle, osprey and red-shouldered hawk.

Our reptile and amphibian fauna includes 10 species of frogs and toads, seven salamander species, eleven species of snakes, one lizard and six turtle species. Of special conservation concern are the eastern massasauga rattlesnake, the wood turtle and the Blanding’s turtle. Frogs and toads, often heard on spring and summer evenings wherever water is near, are a familiar part of our region’s ecological “soundscape.” Reptiles and amphibians rely on high quality and well-connected wetlands, riparian corridors and upland habitats for their long-term survival.

There is also a plethora of insects and other invertebrate animals. Many of these insects live as aquatic nymphs before emerging as terrestrial adults. Insects form a base for both our aquatic and terrestrial food webs. Many insect species depend on clean, well-oxygenated water during their aquatic phase and then require specific plant species as adults. In addition to their importance as food for larger animals, insects play a very important role in pollinating a variety of plants, including agricultural crops. Species of particular concern include the dusted skipper

(a butterfly) and secretive locust, which is endemic to Michigan. Monarch butterfly are a species of international concern and are also found seasonally in Crawford and Oscoda counties.

3.3.3 Fish

The Au Sable River is famous for its brown, brook and rainbow trout but it is also home to more than 70 other species of fish. The upper Au Sable and Manistee river watersheds are premier angling destinations and are particularly popular with fly fishermen trying to match the hatch. Fish found in our rivers and streams include the round whitefish, northern pike, northern hog sucker, rock bass, creek chub, rainbow darter, and many others. Bass, sunfish, crappie, pike, bowfin, walleye and shiners occupy area lakes, which are also popular fishing destinations. Due to infusions of cold groundwater throughout the river valley, streams of the Au Sable River Watershed stay cold all year. However, degradation of the river from historical logging and development, overfishing, and the introduction of brown and rainbow trout led to the extirpation of the once abundant arctic grayling from Michigan waters. We have learned lessons but current threats to coldwater species such as brook trout include excessive inputs of sediment and nutrients to waterways, fragmentation of aquatic habitat by dams and undersized road/stream crossings, invasive species, development pressure and climate change.

3.3.4 The Kirtland's Warbler

The Kirtland's warbler is an endangered songbird that absolutely requires large stands of young jack pine for successful breeding. A ground nesting species, the Kirtland's warbler only uses jack pine stands that are 5-22 years of age with trees less than about 18 feet tall. Older stands fail to provide suitable nesting habitat. On top of all that, the Kirtland's warbler will generally refuse to nest in jack pine stands that are less than about 80 acres in size.



Breeding habitat and nest parasitism are the two major issues that require ongoing management in Northeast Michigan if this species is to survive. Historically, wildfire regularly burned large areas of the landscape, which cleared the land of competing hardwoods and triggered jack pine cones to open and spread seed. Expansive stands of young jack pine were naturally regenerated thanks to catastrophic fires, and Kirtland's warbler evolved to use the specific habitat conditions created by this fire disturbance pattern. Over the past century, humans have intentionally suppressed wildfire for the safety of people and property. This pushed the Kirtland's warbler to the brink of extinction. Now, maintaining suitable habitat for Kirtland's warbler requires active management that involves regular clearing of mature jack pine stands coupled with very labor-intensive jack pine replanting operations. Prescribed burns are also used, where appropriate. If it were not for these management efforts and the people working hard to complete them, our

jack pine stands would eventually mature beyond their use to the Kirtland's warbler and this species would most likely go extinct. The brown-headed cowbird, an invasive brood parasite for which the Kirtland's warbler has no natural defense, also negatively impacts the population. Trapping and removing brown-headed cowbird is another element of the Kirtland's warbler conservation strategy.

Despite the logistical difficulties and investment of resources required to manage jack pine habitat this way, many members of the local community have supported efforts to save the Kirtland's warbler, which draws birders from across the nation and even from around the world. The impact of this bird on the local economy is measurable, with thousands of visitors from around the world traveling here to see the Kirtland's warbler and spending money on lodging and food and participating in other outdoor recreation activities. However, public perception of jack pine management has sometimes been negative. Concerns include opposition to clear cutting, fire and fire management, impacts of Kirtland's warbler management on other wildlife species, and restrictions to certain public land during the Kirtland's warbler breeding season. Jack pine management and stewardship goals, as well as resource management activities in general, are discussed in greater detail in Section 3.5.

Management efforts have so far been successful. The Kirtland's warbler has recovered from the brink of extinction, meeting the recovery goal of 1,000 pairs in 2001 and continuing to exceed its recovery goal every year since. The Kirtland's warbler is now being considered for delisting from the Endangered Species List, which is a great success story yet presents an all-new challenge. Once the species is delisted, funding for habitat management and brown-headed cowbird management will likely become much more limited. To address this issue, the Kirtland's warbler Alliance (huronpines.org/alliance) and partners are developing a sustainable management plan, raising funding and educating stakeholders to ensure that we continue to collaboratively protect the Kirtland's warbler once it is delisted as an endangered species.

3.3.5 Invasive Species, Forest Pests and Diseases

A number of non-native species have been introduced to the jack pine ecosystem, including plants, insects and other organisms. We call them invasive species when they pose threats to native plants and wildlife, or to human property. A prominent example is the emerald ash borer, which is largely responsible for the widespread die-off of ash trees across northern Michigan. The brown-headed cowbird, a nest parasite of the Kirtland's warbler and other native birds, is an example of an invasive species that is important yet costly to manage. Invasive plants like phragmites, Japanese barberry, purple loosestrife and autumn olive displace or outcompete native plants and impair wildlife habitat. Significant resources are allocated each year in an effort to manage these and other invasive plants. Oak wilt, a fungal disease, is an

emerging threat for our regional forests and has been confirmed in Crawford and Oscoda counties (see Figure 3.1 below).

Invasive species and tree disease are often spread by humans, including outdoor recreationists and via transportation networks. Unfortunately, climate change and habitat fragmentation due to development may be making native plants and animals more susceptible to disease and negative impacts of invasive species. Coordinated stewardship of all land owners and managers in the area will be crucial for mitigating risks and managing established invasive species and diseases and for preventing new introductions. This includes federal, state, corporate, municipal and private landowners working in concert at the landscape-scale.

More information about invasive species, including how to report observations and information about managing them and preventing their spread can be found online at: huronpines.org, www.michigan.gov/invasives/, www.misin.msu.edu/, and at mnfi.anr.msu.edu/invasive-species/factsheets.cfm. A list of invasive plant and animal species that have been observed in Crawford and/or Oscoda counties is shown in Appendix 5, Table 3.

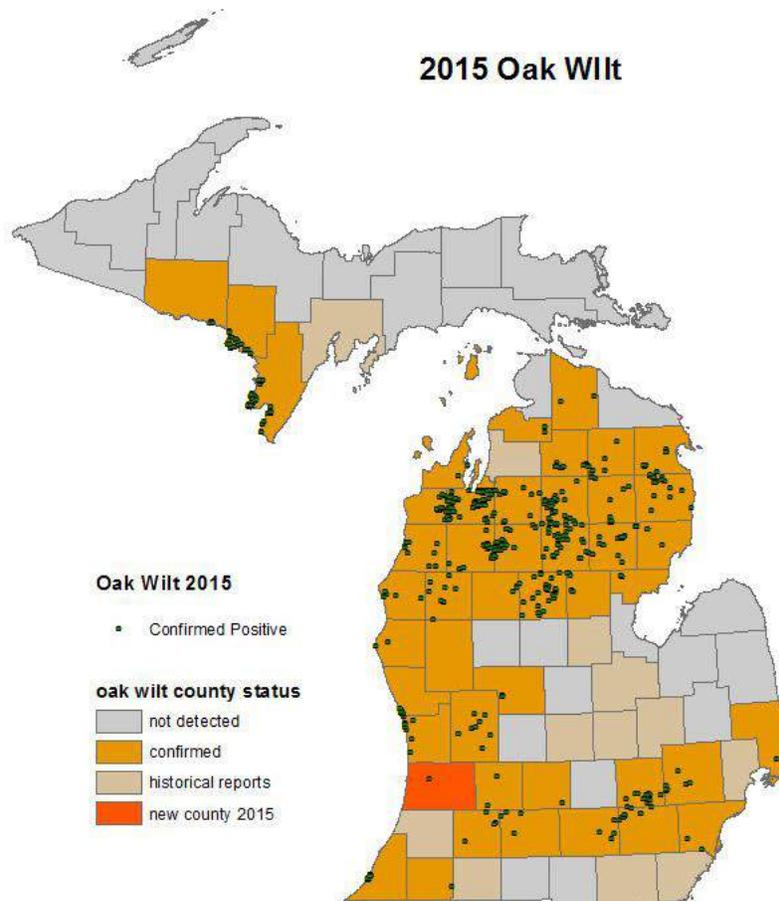


Figure 3.1 Map of confirmed oak wilt in Michigan (Map source: MDNR, 2015)

3.4 The Cultural Landscape

3.4.1 Human History

The people of this region have always had a close relationship with our forests, waters and wildlife. The Au Sable River was used by Native Americans for transportation and its waters fished and the surrounding forests hunted since well before European settlers arrived and developed a modest fur industry in the area in the early 1800s. There are nearly 4,000 known archaeological sites scattered throughout Crawford and Oscoda counties, which are identified, evaluated, registered, interpreted and protected by the Michigan State Historical Preservation Office (SHPO). Visit michigan.gov/mshda/0,4641,7-141-54317-53069--,00.html to learn more about historical sites in this region. A SHPO review is required before certain earth excavation activities may begin to ensure such sites are protected, so if working on an excavation project be sure to contact SHPO to find out if this applies.

In the latter half of that century an extensive lumbering boom cleared this landscape. More than a billion board feet of logs were floated down the Au Sable River to downstream mills. After the lumber boom, attempts to farm this region's sandy soils were mostly unsuccessful and large portions of the land, deemed then to have little value, were eventually transferred to federal and state ownership.

Today, people are using the landscape of Crawford and Oscoda for various purposes including permanent or seasonal residences, outdoor recreation, wildlife management, timber harvest and other forest products, oil and gas development and tourism. Our popular outdoor recreation activities include fly fishing, hunting, hiking, camping, canoeing, kayaking, wildlife viewing, foraging for mushrooms, cross-country skiing, snowshoeing, riding ORVs and snowmobiling.

3.4.2 Demographics

The cultural landscape of Crawford and Oscoda counties, which have a combined population of only 23,691 (2010 census), is primarily rural in character. Its largest communities are Grayling, in Crawford County (1,884 people) and Mio in Oscoda County (2,016 people). Population trends in both counties are similar: fairly steady growth from the 1940s through about 2000 resulting in an approximate tripling in population size over that period, followed by slowing down or even slightly declining since the turn of the century. The trend in age distribution for residents in this area has been in the direction of an increasing proportion of people older than 25 years.

Accounting for seasonal residents, however, the area population between summer and winter can vary by more than 15,000. The number of people also swells during summer weekends, holidays and special events (e.g., Au Sable River Canoe Marathon) as a result of tourism.

The average income in Crawford and Oscoda counties is lower than the state and national averages. Most jobs in the area are in the service, retail or government sectors. However, there has been recent growth in employment and wages in the manufacturing sector, particularly in relation to the forest products industry. In fact, three of the six largest employers in Crawford County deal directly with forest products—Georgia-Pacific, Weyerhaeuser, and AJD Forest Products (the other three are Mercy Hospital, Camp Grayling, and Air Way Automation). Many campgrounds, canoe liveries, fly shops, sporting goods stores, hotels and other small businesses rely on this area’s unique natural resources, and the tourism they attract, to stay in business.

3.4.3 Land Ownership

About 37% of the land in Crawford and Oscoda counties is privately owned by a combination of private individuals (permanent and seasonal residents), hunt clubs, utility companies and other corporations. The remaining land areas (63%) are publicly owned. The Huron-Manistee National Forest (USFS) covers 191,605 acres or 26.4% of Crawford and Oscoda counties. The State of Michigan owns and manages an additional 262,424 acres (36.2%), including Camp Grayling and the Au Sable State Forest, Hartwick Pines State Park and Higgins Lake State Park. The extent of federal, state, and private land ownership in Crawford and Oscoda Counties is shown in Map 7 in Appendix 9.

The Huron National Forest, which is now part of Huron-Manistee National Forest, was formed in 1909 and covers most of the southern half of Oscoda County as well as the southeast corner of Crawford County. After the lumber boom and the generally unsuccessful attempts to farm our sandy soils, large tracts of land in Crawford and Oscoda County were also transferred to the Michigan DNR and to Camp Grayling, which is the largest U.S. National Guard training facility in the country. Camp Grayling was founded in 1913 and is located partly in Crawford County. Activities at Camp Grayling generate more than \$30 million annually for the local economy.

Most of these publicly owned areas have become reforested since the logging area and many are now being managed under a multi-use concept that includes outdoor recreation, timber resources and wildlife habitat (including specific Kirtland’s warbler Management Areas – see Map 8 in Appendix 9).

3.4.4 Tourism and Recreation

This landscape is dominated by two interrelated physical features that define our region’s sense of place and support its tourism and outdoor recreation based economy—Michigan’s Jack Pine Ecosystem and the upper Au Sable River. Drive through Grayling or Mio and you’ll see images of the Kirtland’s warbler and of trout and grayling, forest motifs, morel mushroom and black

bear wood carvings and, of course, plenty of canoes and kayaks. Our “up-north” identity is irrefutably intertwined with the unique natural resources of Crawford and Oscoda counties.

Tourism and outdoor recreation have become significant economic drivers in this region. Major festivals and events are centered around natural resources, such as the annual Au Sable River Canoe Marathon (which draws as many as 50,000 visitors annually) and the Kirtland’s warbler Festival. Thousands of visitors also come here to participate in Kirtland’s warbler viewing tours, to fish for trout on the Au Sable River, and to participate in many other fun outdoor activities. Those visitors spend money on meals, lodging, services and merchandise during their stay, providing a very tangible positive impact on the local economy. Beyond special events, hunting, hiking, camping, wildlife viewing and winter sports draw thousands of people to the area during different seasons and are also popular recreational pursuits for local residents.

Hartwick Pines State Park, containing 9,672 acres including rare old-growth white pine forest, is the largest state park in Michigan’s Lower Peninsula. Higgins Lake State Park, partly within Crawford County, contains the Civilian Conservation Corps museum and also offers excellent camping, boating and fishing opportunities. The Mason Tract, part of Au Sable State Forest and covering nearly 4,500 acres, offers a scenic 11.5 mile hiking and skiing trail that traces the South Branch of the Au Sable River. Many parts of Camp Grayling are also open for public hunting, fishing, snowmobiling and many other outdoor recreational uses when military training is not taking place.



Au Sable River Canoe Marathon (Photo Credit: 98.5 UPS Radio Station)

3.4.5 Forest Products and Economics

Significant amounts of timber are harvested from Crawford and Oscoda counties each year. Mature jack pine are clear cut as part of Kirtland’s warbler management efforts and commonly used in forest products including oriented strand board, pulp and paper, studs and pallets. Jack pine can also be burned to produce energy. The commercial value of this harvested jack pine partially offsets the cost of jack pine management for Kirtland’s warbler and other wildlife. See Figure 3.2 for a map of forest product mills throughout Michigan.

Private and public landowners also collaborate with resource agency professionals and private sector foresters to selectively harvest timber. Private landowners can, and are strongly encouraged to, develop a Forest Stewardship Plan and participate in a variety of conservation practices that include selective timber harvests, invasive species management and many other stewardship activities. Selective timber harvest helps maintain healthy forests, and there are financial incentives for private landowners—a win-win scenario for individuals and for the greater community.

In Crawford and Oscoda counties there 72 landowners enrolled in a Forest Stewardship Plan, covering are 22,497 acres of land. Visit www.michigan.gov/foreststewardship to enroll your own property in the Forest Stewardship Program.

3.4.6 Forests of Recognized Importance

Certain forest areas that contain a combination of extraordinary ecological, biological, social or cultural importance are designated in the American Tree Farm certification process as Forests of Recognized Importance (FORI). FORIs are regarded as being globally, regionally and nationally significant forest areas. The Michigan DNR uses a similar concept in recognizing “High Value Conservation Areas (HVCAs). These designations are made when a forest, at the landscape level, contains a combination of the special characteristics listed below (for more information see: <https://www.treefarmssystem.org/fori> and http://www.michigan.gov/dnr/0,4570,7-153-30301_30505_33360_41834_68707-331538--00.html).

- Protected, rare, sensitive or representative forest ecosystems such as riparian areas and wetland biotopes
- Areas containing endemic species and critical habitats of multiple threatened or endangered plant and animal species, as identified under the Endangered Species Act (ESA) or other recognized listings
- Recognized large-scale cultural or archeological sites including sites of human habitation, cities, burial grounds and *in situ* artifacts
- Areas containing identified and protected water resources upon which large metropolitan populations are dependent

- Areas containing identified unique or geologic features including geysers, waterfalls, lava beds, caves or craters

The Michigan DNR recognizes High Conservation Value Areas upon certified State Forest lands when any of the following are present:

- Ecological Reference Areas
- Dedicated Natural Areas, Wilderness and Wild Areas
- Natural and Wild and Scenic Rivers
- Critical Dunes
- Dedicated Habitat Areas
- Dedicated Management Areas
- Coastal Environmental Areas

In Crawford and Oscoda counties, HCVA's are found along the upper Manistee (designated Natural River) and Au Sable rivers (Wild and Scenic River and designated Natural River), as well as dedicated Kirtland's Warbler Management Areas. There are also 25 Ecological Reference Areas in our region (24 units in Crawford County and 1 unit in Oscoda County).

See: www.michigan.gov/documents/dnr/FINAL_ERAs_listByNaturalCommunity_477323_7.pdf

Michigan Forest Product Primary Mills Active in 2014

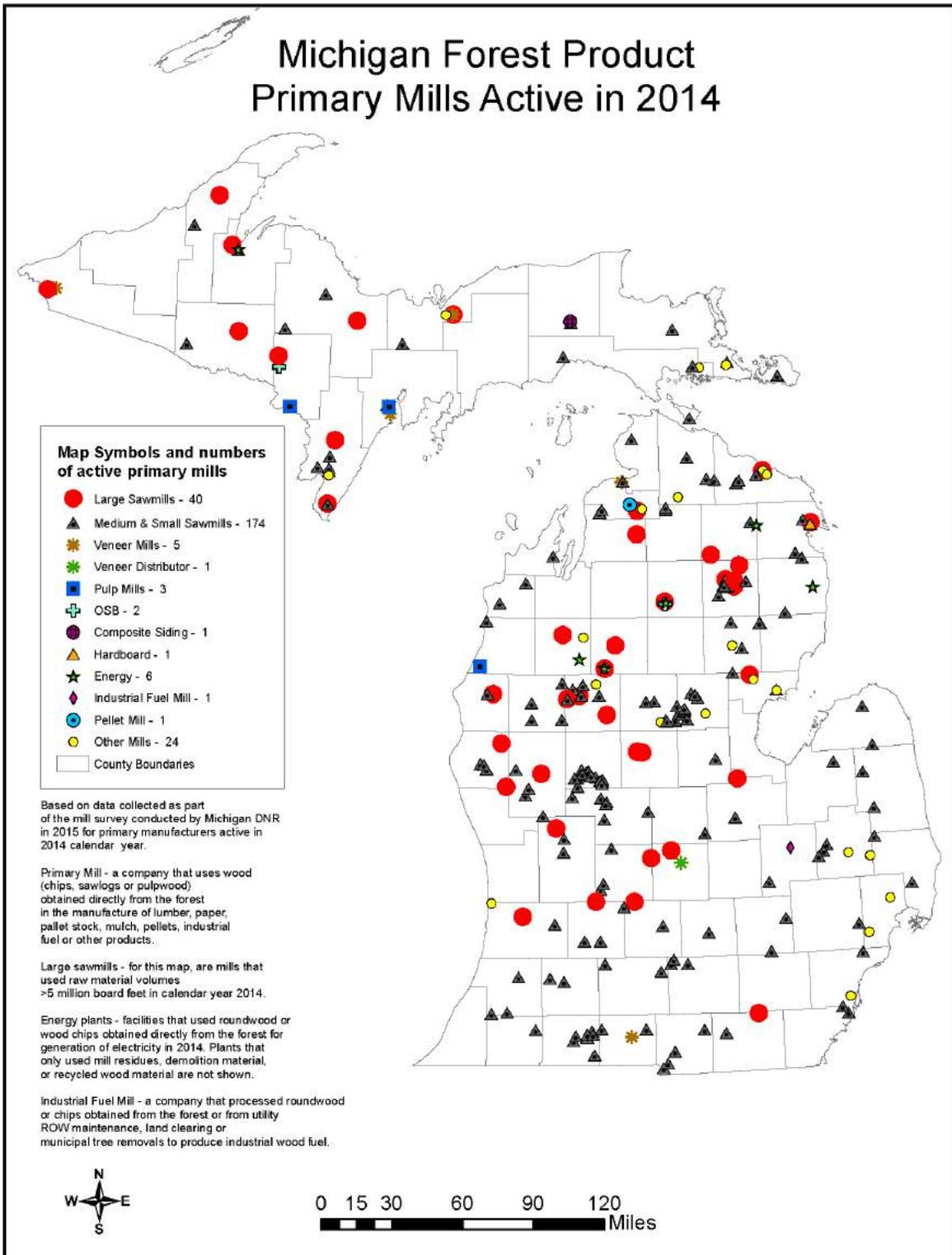


Figure 3.2 Active Forest Product Mills in Michigan (2014)

3.5 Landscape Stewardship Action

This section summarizes the current resource management context of the Jack Pine Ecosystem:

- 1) Significant threats and challenges to successful forest management
- 2) Shared stakeholder goals, plans and recommendations for addressing those significant threats and challenges in order to sustainably manage a healthy jack pine ecosystem

3.5.1 Threats and Challenges

Significant threats to healthy ecosystems that we face today include invasive species, diseases, development and other land use change, energy production and natural resources extraction, and climate change. All of these factors are interconnected in one way or another.

Non-native invasive species are problematic plants and animals that often out-compete, prey upon or otherwise harm native species and alter natural ecosystems. These invasive species often cause economic harm, either through negative impact on valuable native species or by causing direct damage to human property. Invasive species that are already a problem here include the emerald ash borer, which has decimated our ash trees, and the brown-headed cowbird, a brood parasite that is a major threat to the Kirtland's warbler. Others, like the mountain pine beetle have not been found here yet but have the potential to cause significant damage should they be introduced. Diseases, such as oak wilt disease, also threaten our region's forest ecosystems and there are many other insect pests and diseases that may reach our region in the near future. The negative effects of invasive species and diseases are usually exacerbated by other factors such as climate change and land use change, which reduce the resilience of native species and ecological communities against pests and disease.

Development and land use change, such as the expansion of agricultural land, growth of urban areas, and the development of new gas and oil pads and transportation networks, can directly reduce the amount of forest land cover. Land use change can also fragment habitat, making it more difficult for wildlife to find and utilize the different habitat types needed to fulfill their life cycles. Transportation networks including roadways, railroads, and marinas also act as vectors for the introduction of invasive plants and animals.

There are also threats and challenges specific to jack pine ecosystem. Because of the risk to people and property we can no longer allow wildfire to burn through the landscape unchecked. Fire suppression leads to modifications of the native ecosystem such as conversion of jack pine to red pine or hardwoods. In order to maintain jack pine barrens and the species they support, like the Kirtland's warbler, we now invest in emulating the natural process of fire disturbance through clearcutting and replanting operations and with controlled burns where appropriate.

Public perception about management practices, particularly in regard to clearcutting and fire management practices, can also be a challenge for land managers. These practices are necessary to protect Kirtland’s warbler and the overall health of Michigan’s Jack Pine Ecosystem, but there are always tradeoffs. Some people raise concerns about the aesthetics of clear-cutting, risk of using fire as a management technique, financial investment in jack pine management and more. There are pros and cons to any approach, but resource managers and the community generally support these efforts and believe that the benefits of protecting native ecosystems and species—our natural heritage—is a worthwhile endeavor. That said, individuals are encouraged to share their ideas and opinions so that we can all work together to define and refine our shared goals and work toward achieving those goals here in Crawford and Oscoda counties.

Successfully addressing these challenges—that is, at least mitigating the negative impacts and protecting the places, species, recreation opportunities and intangible values that we care about most—will require landscape-scale management. Because land ownership varies across the landscape, this will also require land managers and individual land owners to work collaboratively and strategically to implement active land stewardship actions.

3.5.2 Recommended Actions for Achieving Goals and Addressing Threats and Challenges

Many stewardship goals have already been developed by resource professionals, based on the advice of resource professionals from diverse backgrounds and input from the community, and stakeholders have already been actively involved in implementing stewardship actions for a long time. Stewardship strategies have evolved and will continue to evolve over time as new challenges arise and as we evaluate past actions to see what works well and where we need to adapt to improve practices. The Michigan DNR Pine Barrens and Dry Northern Forests Wildlife Action Plan (www.michigan.gov/documents/dnr/16_dry_forests_pine_barrens_500077_7.pdf, 2015-2025 draft) includes a review of stewardship goals and recommendations for Michigan’s jack pine ecosystem. A modified version of these goals and actions are included below. For a bibliography of the references used to compile these goals and recommendations please see page 18 of the Michigan DNR’s Pine Barrens and Dry Northern Forests Wildlife Action Plan.

Land and Water Management Goals and Recommendations for the Jack Pine Landscape in General

- Where feasible, restore or mimic natural disturbance regimes to maintain habitat for focal species; focus on larger blocks of habitat.
- Manage habitats for a diverse landscape of Dry Northern Forests and Pine Barrens.
- Implement invasive species decontamination and prevention protocols.
- Implement the Michigan Terrestrial Invasive Species State Management Plan.
- Continue early detection and response efforts for invasive species.

Goals and Recommendations for Specific Threatened and Endangered Species of the Jack Pine Landscape

- Implement the Kirtland's warbler Conservation Plan.
- Maintain or increase pine barrens acreage and quality.
- Maintain or increase native prairie acreage and quality
- Establish an average of 3,830 acres of breeding habitat annually for Kirtland's warbler.
- Sustain Kirtland's warbler population throughout its breeding range above 1,000 breeding pairs using an adaptive management framework.
- Establish sufficient funds to ensure continued management of Kirtland's warbler threats to allow this species to be delisted.
- Maintain known populations and continue to identify additional populations of the eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*). Identify and conserve important habitats for eastern massasauga.
- Implement and promote the Eastern Massasauga Candidate Conservation Agreement with Assurances practices, which provides guidance for habitat management to limit negative impacts on massasauga.
- Conduct studies to better understand habitat needs of rare plant and animal species during different life stages, including effects of timber and fire management.



Jack Pine Landscape near Grayling, MI (Image: Google Maps, 2017). In the left half of the image, jack pine was planted by the Michigan DNR in a weave pattern to optimize habitat for the Kirtland's warbler. This is part of a Kirtland's warbler Management Area. The openings, connected by two-tracks, in the right side of this image are oil wells. The geology and soils of the region are responsible for the presence and type of both our fossil fuel resources and our biological resources.

Education, Outreach, Partnership and Planning Goals for Successful Jack Pine Landscape Management

- Engage private timber companies to better understand future markets for wood products and the potential impacts and opportunities for wildlife and their habitats.
- Develop contingency plans for diseases, pests, and climate change that could significantly alter the forest and create biome shifts.
- As climate shifts, allow some southern areas to move towards oak-pine barrens where they overlap with savanna prairies.
- Identify priority areas for conservation and priority areas for agriculture, and strategize with the agricultural sector to avoid conflict where there is overlap.
- Quantify economic benefits of ecosystem services and wildlife-based recreation; tie to particular areas/regions within the state when possible.
- Establish a public-private collaborative working group for conservation across the landscape.
- Educate land managers, local communities, and the public on the value of intensive management practices such as fire and clear-cutting.
- Increase communication between biologists and fire professionals
- Promote voluntary best management practices for stopping the introduction and spread of invasive species for recreational users, researchers and industry.
- Work with land use planners and local governments to encourage conservation of northern dry forest and pine barrens and the wildlife that rely on them, and provide resources to aid them in considering these values in their decisions.
- Identify high-quality dry northern forests and pine barrens in climate resilient landscapes and incorporate these into conservation planning and management.
- Conduct scenario planning workshops with land managers to better incorporate climate change uncertainty into management.
- Incorporate wildland fire use into fire management plans to include modified fire suppression options.
- Keep prohibited species list (NREPA Part 413) current and implement enforcement.
- Assess cost-efficiency of alternative management strategies to inform management.
- Monitor for Mountain Pine Beetle, a direct threat to jack pine.
- Use and promote the Midwest Invasive Species Information Network (MISIN) to monitor invasive species.

Another useful resource is the Au Sable River Watershed Assessment (MDNR 2001), which covers specific stewardship goals and recommendations for the Au Sable River and other aquatic systems. Stakeholder goals and recommendations specific to the Au Sable River include:

Protect the stability of stream flow and water temperature

- Manage runoff from developed areas, construction sites, roadways, agricultural lands, and lawns to minimize inputs of chemical, sediment, and thermal pollution
- Remove dams and lake level control structures when feasible, operate existing dams at run-of-river
- Protect and rehabilitate wetlands, headwater streams, floodplains and riparian areas

Protect aquatic resources by managing adjacent lands

- Protect intact riparian areas through zoning restrictions and incentive programs to prevent development pressure along river corridors
- Restore degraded riparian areas by stabilizing erosion sites, restoring native vegetation buffers and addressing issues like runoff and non-native species
- Install Best Management Practices at road/stream crossings to reduce pollutant inputs from roadways and ditches and to protect or restore natural river function

Restore and protect water quality and habitat for fish and aquatic wildlife

- Preserve existing large wood structure, and install large wood where appropriate, to provide cover for wildlife and increase aquatic habitat diversity
- Protect and restore high gradient stream reach by removing non-essential dams
- Remove dams and replace perched or undersized road/stream crossings to restore aquatic habitat connectivity and passage of fish, other native wildlife, and floodwater

Protect river resources for human recreation, including fisheries and paddle sports

- Provide education to riparian landowners and recreation users about values of healthy riparian zones, Best Management Practices that can be implemented, and available programs and organizations that can offer technical and/or financial assistance
- Build community support for land and river stewardship activities and increase public participation in the watershed planning process
- Develop funding sustainable mechanisms to facilitate implementation of restoration activities by agencies, nonprofit organizations, private landowners and businesses

Table 3.3 below includes a summary of activities that individual landowners can do to help achieve the goals listed above. If you want to share your own ideas, goals or concerns, we encourage you to contact the Michigan DNR or Huron Pines. Section 4 lists the agencies and organizations active in Crawford and Oscoda counties and provides an overview of programs, assistance opportunities, additional resources and contact information to help you take the next steps in managing your land and helping to forward the goals listed above.

Table 3.3: Ways Individual Landowners Can Help Achieve Landscape Stewardship Goals

Stewardship Goal	Easy Opportunities for Individuals to Take Action
Reduce negative impacts of exotic invasive species	<p>Learn to recognize exotic invasive plants and report them on misin.msu.edu wherever you observe them</p> <p>Clean boots, waders, vehicles and equipment after use, especially when traveling long distances or moving among watersheds. Use local firewood instead of transporting it.</p> <p>Select and plant native species for landscaping projects</p> <p>Reach out for information on treating invasive plants on your property. Huron Pines offers cost-share opportunities and can assist private landowners with invasive species treatment and management.</p>
Actively manage private forest lands for forest health and wildlife habitat	<p>Manage your trees to promote growth and regeneration through selective cutting or other techniques. Contact a consulting forester to help you develop a Forest Stewardship Plan for your property.</p> <p>Visit www.michigan.gov/foreststewardship or contact the DNR Forest Stewardship Program to get started.</p> <p>Manage your forest to provide appropriate food, water, shelter and breeding/rearing areas for your favorite wildlife.</p> <p>Participate in the programs listed in Section 4 of this plan. Identify exotic invasive species and signs of plant disease and seek technical assistance to help manage them well.</p>
Protect clean water, shoreline property, and aquatic habitat with good land stewardship practices	<p>Maintain/restore native vegetation along streams and lakeshores to filter runoff, reduce erosion and provide cover for aquatic and terrestrial wildlife.</p> <p>Limit or eliminate application of fertilizers, pesticides and other chemicals on land adjacent to surface waters</p> <p>Contact Huron Pines to learn about technical/financial assistance opportunities for streambank stabilization, instream habitat, small dam removal, invasive species treatments and other restoration projects.</p>
Develop shared vision and goals for our region and collaborate to achieve them more efficiently	<p>Share ideas with neighbors, state and federal agency staff, nonprofit conservation organizations and others by mail, email, phone or participating in planning meetings.</p> <p>Tell your story to inspire others (see Section 4 of this plan)</p> <p>Volunteer on a restoration project. Contact Huron Pines or visit www.huronpines.org to find an event in your area.</p> <p>Make a financial gift to an organization you support</p>

4. Opportunities for Landowners

A variety of programs and informational resources are offered by state and federal resource agencies and nonprofit conservation organizations to help you take the next steps toward meeting your own land stewardship goals. Additional resources are included in appendices.

4.1 Forest Management Plans

A written plan is the foundation for good forest management and accomplishing your unique goals for your forest. There are two programs in Michigan that offer financial assistance to help pay for a portion of the total cost of developing a forest management plan. Plan writers are allowed to set their own prices, so interview several foresters before hiring one to develop a forest management plan with you.

The **Forest Stewardship Program (FSP)** encourages long-term stewardship of family forest land by connecting landowners with professional foresters to develop a Forest Stewardship Plan that helps landowners manage, protect, and enjoy their forests. The DNR has trained and certified 150 private sector foresters and 20 wildlife biologists, and there are at least several foresters available in every county. Funding from the U.S. Forest Service (USFS) helps lower the total cost, and this partial cost share is made available through grants to the Plan Writer to minimize payment hassles for landowners. The cost share is \$225 per plan plus \$0.50 per acre up to \$2,500 per landowner. Landowners can easily enroll in the program any time of the year by completing an easy two page form with their Plan Writer. A DNR Service Forester reviews the plan for meeting USFS standards for a simple yet comprehensive Forest Stewardship Plan. Since 1990, more than 5,700 landowners in Michigan have used their Forest Stewardship Plan to help them manage, protect, and enjoy over 900,000 acres of forest land. More information about the Forest Stewardship Program is available online at www.Michigan.gov/ForestStewardship and <http://www.fs.fed.us/spf/coop/programs/loa/fsp.shtml/>.

The **Natural Resources Conservation Service (NRCS)** also administers a financial assistance program to develop a forest management plan. The financial assistance from the NRCS is much higher than the Forest Stewardship Program, but the landowner must apply at their local NRCS office for a contract with the NRCS for a “conservation activity plan” (CAP 106). Applications for funding are accepted year round, but there is usually a “sign-up cutoff date” in the winter, and contracts are usually funded in the summer. After getting a contract, the landowner then hires one of 50 Technical Service Providers (professional foresters certified by the NRCS) to write the plan. The NRCS District Conservationist in each county reviews the forest management plan to verify that it meets program guidelines. The Michigan NRCS has more information about forestry and financial assistance programs on its website.

Fees, plan quality, and plan contents can vary widely so it is a good practice to call at least three professional foresters to ask about prices and the contents of their plans. Feel free to ask for references and an example plan to read one of their previous forest management plans before you hire them. Consulting foresters frequently travel several counties away from their office, so do not feel obligated to hire the closest forester. Very low prices or very high prices are not always accurate indicators of plan quality. You do not have to use either of these two financial assistance programs to develop a forest management plan, but they are helpful to ensure consistent quality of the plan and also to lower your costs.

4.2 American Tree Farm System

The American Tree Farm System is a certification program of the American Forest Foundation that acknowledges land management practices meeting certain Standards of Sustainability. As part of this program, a network of more than 82,000 family forest owners sustainably managing 24 million acres of forestland across the country. Please consider joining the American Tree Farm System to certify your exemplary and sustainable forest management. A free inspection from one of the 138 Tree Farm Inspecting Foresters is required to enroll. This Forest Stewardship Plan complies with the Farm System's eight Standards of Sustainability listed below. There is no additional cost to be enrolled in the American Tree Farm System certification program. For more information about the program, forest certification, and the full Standards of Sustainability, please visit www.treefarmssystem.org.

- **Commitment to Practicing Sustainable Forestry.** Forest owner demonstrates commitment to forest vitality by developing and implementing a sustainable forest management plan.
- **Compliance with Laws.** Forest management activities comply with all relevant federal, state and local laws, regulations and ordinances.
- **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.
- **Air, Water, and Soil Protection.** Forest management practices maintain or enhance the environment and ecosystems, including air, water, soil and site quality.
- **Fish, Wildlife and Biodiversity.** Forest management activities contribute to the conservation of biodiversity.
- **Forest Aesthetics.** Forest management plans and management activities recognize the value of forest aesthetics.
- **Protect Special Sites.** Special sites are managed in ways that recognize their unique historical, archeological, cultural, geological, biological or ecological characteristics.

- **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.

4.3 Qualified Forest Program

The **Qualified Forest (QF)** program reduces property taxes by up to 18 mills for landowners with parcels between 20 and 640 acres and who comply with their forest management plan to optimize their forest resources. Landowners do not have to allow the public on their land to hunt or fish, so this program is more attractive to family forest owners who own land for their own recreation. There is a \$50 application fee and an annual fee equivalent to 2 mills to help fund the operation of the program. The MDARD administers the Qualified Forest program and more information is available at www.michigan.gov/qfp, including the minimum requirements for a QF forest management plan and a list of about 190 “Qualified Foresters” who can write plans for the Qualified Forest program. Rich Harlow is the program administrator, and the phone number for the Qualified Forest program is 517-284-5630.

4.4 Commercial Forest Program

The **Commercial Forest (CF)** program provides a specific property tax of \$1.25 per acre for landowners that have at least 40 acres of forest and are engaged in sustainable timber production in support of Michigan’s forest products industry. Participating landowners must make their land open to the public for foot access for hunting and fishing, so this program is usually more attractive to corporate forest owners who own large forests in the Upper Peninsula. The application fee is \$1 per acre with a minimum fee of \$200 and a maximum fee of \$1,000. The DNR administers the Commercial Forest program and more information is available at www.michigan.gov/commercialforest, including the application forms and the required components of a CF forest management plan. Any of the 225 Registered Foresters in Michigan can write a forest management plan for the Commercial Forest program. Shirley Businski is the program administrator for the Commercial Forest program, and her phone number is 517-284-5849.

4.5 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 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 (see www.nrcs.usda.gov/wps/portal/nrcs/main/mi/contact/local).

4.6 Timber Sales

One of the primary benefits of investing in a forest management plan is that it helps you prepare for a timber sale. A well-planned timber sale should have both economic benefits for you and ecological benefits for your forest. A forest management plan will help you to determine what trees to sell, and more importantly, what trees to keep so that you can improve your forest when you harvest your timber. All timber sales should be conducted to accomplish your stated goals for your forest, whether those are improving wildlife habitat, increasing access for recreation, removing diseased trees, modifying the species composition, improving “crop trees” for future harvest, or just generating some current income.

Timber sales can be a long and complicated process so it is often a good investment to hire a consulting forester to help you administer your timber sale. A consulting forester will help you decide what trees to sell and market the sale to multiple buyers to get the best price for your trees. Your forester will also ensure that the loggers follow “Best Management Practices” to protect your soil and water resources. Consulting foresters also provide customized timber sale contracts which are often more detailed than the typical contract that a timber buyer provides. Foresters can also help you reduce the taxes on the profits of your sale by calculating your “basis” and “depletion” for capital gains. Consulting foresters may charge hourly rates, set fees, or a percentage of the sale price for their services in administering your sale.

Most timber sales in Michigan are either a “lump sum” sale where the buyer pays in full for the marked trees before the harvest begins or a “mill tally” sale where the buyer pays an agreed price for a unit of wood (cords, boardfeet, tons, etc.) when it is cut and delivered to the sawmill. Most selection harvests in hardwoods forests (oak, maple, beech, cherry, etc.) are sold in a lump sum sale. If you are thinning a pine plantation or clearcutting an aspen stand, those types of large volume harvests are often sold in a mill tally sale. Mill tally sales require a higher level of trust and usually some extra oversight.

Whether you hire a consulting forester or not, be sure that you have a clearly written contract that describes exactly what will occur and when it will occur during your timber sale. The seasonal timing of the harvest is important to protect your soil and to reduce the potential to spread diseases like oak wilt. A detailed contract will protect both the seller (you, the landowner) and the buyer (logger or sawmill) in a timber harvest. It is the landowner's responsibility to know the location of their property corners and property lines so investing in a survey conducted by a licensed land surveyor can be a good investment.

There are many excellent loggers in Michigan so be sure that you are working with a "Qualified Logging Professional." Look for loggers that have been trained by the **Michigan Sustainable Forestry Initiative** or are members of the **Michigan Association of Timbermen** or are certified as a **Master Logger**.

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

4.7 Best Management Practices, Forest Health and Wildlife Habitat

Best Management Practices (BMPs) are guidelines for implementing projects and managing land in a sustainable manner. Some BMPs are published by the State of Michigan to protect Michigan's water resources from non-point source pollution and erosion while working on forest land. BMPs are now called "Sustainable Soil and Water Quality Practices on Forest Land" and the document is online at www.Michigan.gov/PrivateForestLand. BMPs include proper location and construction of logging roads, the use of riparian management zones, installation of culverts and other stream crossings, proper use of pesticides and other chemicals, and site preparation for planting. BMPs also include the proper seasonal timing of activities to minimize the spread of insects or disease. Any forest management activities should minimize soil erosion near wetlands and surface water. Tree Farm certification requires compliance with best management practices. Also see www.fs.fed.us/biology/watershed/BMP.html.

The DNR publishes the annual "Forest Health Highlights" that has information about the forest insect and disease problems in Michigan. See www.Michigan.gov/ForestHealth for a pdf of the most recent edition. To report an unusual insect or disease in your forest, please email several photos to DNR-FRD-Forest-Health@Michigan.gov. Additional Forest Health resources include:

- DNR Forest Health—www.Michigan.gov/ForestHealth
- DNR Invasive Species Info—www.Michigan.gov/InvasiveSpecies

- MDARD Exotic Forest Pests—www.Michigan.gov/ExoticPests
- USFS Forest Health—<http://fhm.fs.fed.us/>

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

Good sources of information about managing wildlife habitat include:

- DNR Wildlife Division—www.Michigan.gov/Wildlife
- Michigan United Conservation Clubs—<https://mucc.org>
- Quality Deer Management Association—www.qdma.com
- Audubon Society—www.MichiganAudubon.org
- Foresters for the Birds—<http://vt.audubon.org/foresters-birds>
- Ruffed Grouse Society—www.RuffedGrouseSociety.org
- National Wild Turkey Federation—www.nwtf.org
- Michigan Trout Unlimited—www.MichiganTU.org
- US Fish and Wildlife Service—www.fws.gov/partners

4.8 Fun!

Landowners purchase forests and spend many hours every year working in their woods for a variety of reasons. For some landowners, forests are an economic investment to secure future income. For others, owning a forest is an ethical choice to improve the world by slowing urban sprawl or providing other environmental services. But for many landowners, the primary motive for owning forest land is the enjoyment that they receive by spending time in their woods. *Forest owners do a lot of activities in their woods because it is just plain fun!* So as you work with your forester to navigate these programs and choose the best ones for you and your property, don't forget that most family forest owners in Michigan own their forest because they simply enjoy being out in their own woods. Good forest management should not only improve the ecology and economics of your forest, but also your enjoyment of your land.

4.9 Huron Pines

Huron Pines is a 501(c)(3) nonprofit organization founded in 1973 with a mission to *protect the Great Lakes by conserving the forests, lakes and streams of Northeast Michigan*. We work toward this mission by 1) providing leadership to develop private-public sector partnerships in a collaborative approach to solving natural resource challenges, 2) implementing large-scale, high-impact and long-term habitat restoration and enhancement strategies that protect healthy forests and clean water and 3) integrating a conservation ethic into all aspects of our communities, including local decision making, land use, schools, business and households.

Huron Pines can provide technical guidance and often cost-share assistance to help private landowners across northeast Michigan complete stewardship projects including streambank stabilization, invasive species management, fish and wildlife habitat enhancement and more. Please visit huronpines.org, email info@huronpines.org or call us at 989-448-2293 for more information about our programs and assistance opportunities.

5. Landscape Stewardship Stories

In addition to providing information on stewardship practices and opportunities, we reached out to people in our area to find out what inspires them to be engaged stewards of their land. We hope these personal stewardship stories inspire others to seek opportunities and to become as actively engaged with their own properties as possible. To facilitate easy printing, sharing and distribution of the stewardship stories we have included them at the end of this document.

Appendix 1: References

Au Sable River Assessment (2001)

<http://michiganlakes.msue.msu.edu/uploads/files/Zorn%20and%20Sendek%202001.pdf>

Wildlife Action Plan: Dry Northern Forests & Pine Barrens (MDNR, Draft 2015).

https://www.michigan.gov/documents/dnr/16_dry_forests_pine_barrens_500077_7.pdf

Kirtland's warbler Breeding Range Conservation Plan (2014):

https://www.michigan.gov/documents/dnr/Kirtlands_Warbler_CP_457727_7.pdf

Crawford County Master Plan (2008):

www.crawfordco.org/pdfs/Crawford%20County%20Master%20Plan%20Draft%202008.pdf

Michigan Terrestrial Invasive Species State Management Plan (2016)

www.michigan.gov/documents/invasives/TIS_SMP_Complete_Draft_5.3.16_523636_7.pdf

Michigan DNR – Forest Resources Division Guiding Documents (multiple):

- Michigan.gov/forestmanagement
 - michigan.gov/documents/dnr/FRD_Strategic_Plan_513006_7.pdf
 - michigan.gov/documents/dnr/Strategic_457570_7.pdf?20140530081757
 - michigan.gov/documents/dnr/MISateForestMgmtPlan_Amended_471244_7.pdf
 - michigan.gov/dnr/0,4570,7-153-30301_30505_62551-284919--,00.html

Appendix 2: Forestry Programs and Resources for Private Landowners

General Forestry Information

1. Forestry Assistance Program – MACD/MDARD/DNR – www.michigan.gov/mifap
2. MSU Extension – MSU – <http://msue.anr.msu.edu/topic/info/forestry>
3. Michigan Forest Association – MFA – www.michiganforests.org



Forest Management Plans

4. Forest Stewardship Program – DNR/USFS – www.Michigan.gov/ForestStewardship
5. Conservation Activity Plans – NRCS – www.nrcs.usda.gov



Property Tax Incentives

6. Qualified Forest Program – MDARD – www.Michigan.gov/qfp
7. Commercial Forest Program – DNR – www.Michigan.gov/CommercialForest



Financial Assistance

8. Environmental Quality Incentives Program – NRCS – www.nrcs.usda.gov
9. Conservation Stewardship Program – NRCS – www.nrcs.usda.gov



Forest Certification

10. American Tree Farm System – AFF – www.TreeFarmSystem.org
11. Forest Stewardship Council – FSC – www.us.fsc.org



Working Forest Easements

12. Forest Legacy Program – DNR/USFS – www.Michigan.gov/PrivateForestLand
13. Thirty Michigan Land Conservancies – www.heartofthelakes.org
14. Healthy Forest Reserve Program – NRCS – www.nrcs.usda.gov
15. Farmland and Open Space Preservation – MDARD – www.Michigan.gov/Farmland



Wildlife Habitat

16. Landowner Incentive Program – DNR – www.Michigan.gov/dnr/1ip
17. Hunter Access Program – DNR – www.Michigan.gov/hap
18. Partners for Fish and Wildlife – USFWS – www.fws.gov/midwest/partners/getinvolved.html
19. Trout Unlimited – www.michigantu.org
20. Ruffed Grouse Society – www.ruffedgrousesociety.org
21. Quality Deer Management Association – www.qdma.com
22. Michigan United Conservation Clubs – www.mucc.org
23. Many other game advocacy groups



Appendix 3: Professional Foresters to Help Private Forest Landowners

Consulting Foresters

Consulting foresters are independent businesses that work directly for the landowner, their only client.

Consulting foresters administer timber sales, write Forest Stewardship Plans, manage wildlife habitat, plant trees, and offer other services for forest landowners.

There are about 125 consulting foresters in Michigan.

Association of Consulting Foresters - www.acf-foresters.org

Forest Stewardship Plan Writers – www.Michigan.gov/ForestStewardship



Industry Foresters

Industry foresters work for local forest products companies to buy timber from private landowners or to manage forest land owned by their company.

Industry foresters buy timber from private landowners and write forest management plans.

There are about 100 industry foresters in Michigan.

Michigan Association of Timbermen - www.timbermen.org

Michigan Forest Products Council - www.michiganforest.com

Great Lakes Timber Professionals Association - <http://gltpa.org>



Government Foresters

Government foresters, funded by your tax dollars, provide general forestry information to landowners.

Government foresters hold workshops, field days, write articles, and provide information to landowners.

There are ~35 government foresters who help private landowners (and another 200 working on public land).

Conservation Districts – 20 foresters in the Forestry Assistance Program – www.Michigan.gov/mifap

MSU Extension – 5 educators statewide - <http://msue.anr.msu.edu/topic/info/forestry>

DNR – 5 foresters statewide – www.Michigan.gov/PrivateForestLand

USFS - www.fs.fed.us/spf



Credentials and Programs

“Registered Foresters” are recognized by the State of Michigan – www.Michigan.gov/Foresters

“Certified Foresters” are certified by the Society of American Foresters - www.safnet.org

“ACF Foresters” are members of the Association of Consulting Foresters - www.acf-foresters.org

“Forest Stewardship Plan Writers” write Forest Stewardship Plans – www.Michigan.gov/ForestStewardship

“Technical Service Providers” write plans for the Environmental Quality Incentives Program - www.nrcs.usda.gov

“Qualified Foresters” write plans for the Qualified Forest Program – www.Michigan.gov/qfp

“Qualified Logging Professionals” are loggers trained by the Sustainable Forestry Initiative - <http://sfimi.org>

“Master Loggers” are trained, audited and certified by other professional loggers - www.mimlc.com

“Timber Buyers” may or may not be foresters or loggers, and they buy timber from landowners to sell to sawmills.

Appendix 4: Internet Resources for Forest Landowners

<p>DNR Forest Resources Division – www.Michigan.gov/Forestry DNR Forest Stewardship Program – www.Michigan.gov/ForestStewardship DNR Private Forest Land – www.Michigan.gov/PrivateForestLand DNR Urban and Community Forestry - www.michigan.gov/ucf</p>
<p>Qualified Forest Program - www.Michigan.gov/qfp Commercial Forest Program – www.Michigan.gov/CommercialForest</p>
<p>NRCS Financial Assistance – www.nrcs.usda.gov/wps/portal/nrcs/main/mi/technical/landuse/forestry Forest Stewardship Plan Writers - www.Michigan.gov/ForestStewardship NRCS Technical Service Providers - www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/tsp/ Michigan Forest Association Foresters List - www.michiganforests.com/forester.htm Michigan Society of American Foresters - http://michigansaf.org Association of Consulting Foresters – www.acf-foresters.org</p>
<p>Conservation District Foresters – www.michigan.gov/mifap Michigan Association of Conservation Districts - http://macd.org Tree Sales - http://michigan.gov/documents/dnr/DirectoryOfMichiganSeedlingNurseries-IC4175_258828_7.pdf?20141113140132</p>
<p>DNR Hunting Access Program - www.michigan.gov/hap DNR Wildlife Landowner Incentive Program - www.michigan.gov/dnr/ipl DNR Wildlife - www.michigandnr.com/publications/pdfs/huntingwildlifehabitat/Landowners_Guide/index.htm Michigan United Conservation Clubs – www.mucc.org Quality Deer Management Association – www.qdma.com National Wild Turkey Federation - www.nwtf.org Foresters for the Birds - http://vt.audubon.org/foresters-birds</p>
<p>DNR Forest Health - www.Michigan.gov/ForestHealth MDARD Forest Pests – www.Michigan.gov/ExoticPests USFS National Forest Health - http://fhm.fs.fed.us DNR Invasive Species – www.Michigan.gov/InvasiveSpecies Midwest Invasive Species Network - www.misin.msu.edu MSU Diagnostics Laboratory - www.pestid.msu.edu</p>
<p>Michigan Association of Timbermen - www.timbermen.org Michigan Sustainable Forestry Initiative - http://sfimi.org Michigan Master Loggers - www.mimlc.com Michigan Forest Products Council - www.michiganforest.com Forestry Taxes - www.timbertax.org Sample Timber Sale Contract - www.nhdf.org/library/pdf/Forest%20Protection/timbersaleagreement.pdf</p>
<p>Project Learning Tree - www.michiganplt.org Project WILD - www.michigan.gov/michiganprojectwild Michigan Environmental Education Curriculum Support – www.michigan.gov/meecs Michigan Forest Pathways - http://miforestpathways.net</p>
<p>Michigan Forest Association - www.michiganforests.com American Tree Farm System - www.treefarmssystem.org My Land Plan - http://mylandplan.org National Woodland Owners Association - www.woodlandowners.org Ties to the Land (succession planning to pass forest to next generation) - http://tiestotheLand.org Conservation Easements – http://landtrust.org/Links/linksTABLE.htm</p>
<p>MTU School of Forest Resources & Environmental Science - www.mtu.edu/forest MSU Department of Forestry – www.for.msu.edu MSU Extension Forestry - http://msue.anr.msu.edu/topic/info/forestry MSU Soil Testing Laboratory - www.spnl.msu.edu USDA Soil Web Survey - http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm</p>
<p>USFS Private Woodland Owners - http://na.fs.fed.us/pubs/misc/flg USFS Ecosystem Services - www.fs.fed.us/ecosystemservices/index.shtml USFS State and Private Forestry - www.fs.fed.us/spf</p>

Appendix 5: Book Recommendations for a Forest Landowner's Library

- 1. Woodland Stewardship: A Practical Guide for Midwestern Landowners.** 2nd Edition, 2009. This book, written by a team of educators and foresters from Minnesota, Wisconsin, and Michigan is an excellent manual on how to manage your forest for a wide variety of goals. It is only \$16 and is available at www.bookstores.umn.edu. A free pdf of the entire book is online at <http://woodlandstewardship.org>.
- 2. Owning and Managing Forest: A Guide to Legal, Financial, and Practical Matters.** Revised, 2005. This book is written by Thomas McEvoy, an Extension Professor at the University of Vermont. It contains excellent advice on the legal and financial issues of owning and managing a family forest. Cost: \$33
- 3. A Landowner's Guide to Managing Your Woods.** 2011. This book is authored by a landowner, forester, and logger to give a balanced view of forest management and how to maintain a small forest for long-term health, biodiversity, and high-quality timber production. Cost: \$15
- 4. Michigan Trees: A Guide to the Trees of the Great Lakes Region.** Revised, 2004. This book is the classic text on tree identification in Michigan authored by two professors at UofM. It has drawings instead of photos, but the book has more complete information than the ID books with prettier photos. Cost: \$15
- 5. Michigan Forest Communities: A Field Guide and Reference.** 2004. This book, authored by Dr. Don Dickmann at MSU, describes 23 forest communities in Michigan. The book is available from MSU Extension for \$15, or a free pdf is at <http://web2.msue.msu.edu/bulletins/Bulletin/PDF/E3000.pdf>.
- 6. Positive Impact Forestry: A Sustainable Approach to Managing Woodlands.** 2004. This book is written by Thomas McEvoy, an Extension Professor at the University of Vermont. It is a great introduction to silviculture, the science and art of growing and managing forests. Cost: \$33
- 7. Managing Michigan's Wildlife: A Landowner's Guide.** 2001. This book, edited by two biologists for the Michigan Department of Natural Resources, is the classic text in Michigan for landowners on wildlife habitat and managing forests for preferred game species. This book is only available at www.michigandnr.com/publications/pdfs/huntingwildlifehabitat/Landowners_Guide/index.htm.
- 8. Estate Planning for Forest Landowners: What Will Become of Your Timberland?** 2009. Nothing is more dreadful than death and taxes, but this book helps landowners prepare for both. To ease your pain, it is free at http://www.srs.fs.usda.gov/pubs/gtr/gtr_srs112.pdf. See also www.timbertax.org for related resources about taxes related to owning forest land and harvesting timber.
- 9. Trees Are the Answer.** Revised, 2010. This book is written by Dr. Patrick Moore, one of the founders of Greenpeace. His perspective on forestry will appeal to both tree huggers and loggers. Cost: \$16
- 10. A Sand County Almanac.** 1949. This book by Aldo Leopold is one of the foundations for environmental ethics that continues to inform forest stewardship of both private and public lands. This book will help you to articulate your own ethical approach to managing your forest. Cost: \$10.
- 11. Last Child in the Woods.** 2008. This book by Richard Louv is a strong argument that our nation's children are suffering from "nature deficit disorder." This book will give you great ideas about how you can bring school groups, scout groups, church groups, or even your own children out into your forest to experience and enjoy nature. Cost: \$10.
- 12. The Forests of Michigan.** Revised in 2016. This book by two MSU forestry professors is an interesting history of Michigan's forests over the last few centuries. The new edition is available at the University of Michigan press for \$50.

Appendix 6: Glossary of Common Forestry Terms

The following glossary is adapted from www.dnr.state.md.us/forests/gloss.html.

- Agroforestry:** A land-use system that combines both agriculture and forestry in one location.
- Alley Cropping:** Widely spaced rows of trees with annual crops growing in between the rows.
- Basal Area (Tree):** Cross-sectional area of a tree at 4.5 feet off ground in square feet.
- Basal Area (Forest):** Basal area of all trees per acre summed up, in units of square feet/acre; measure of density.
- Biomass:** Harvesting and using whole trees or parts of trees for energy production.
- Board Foot:** A measure of volume 1 foot by 1 foot by 1 inch or 144 cubic inches of wood.
- Bolt:** 8 foot long log.
- Browse:** Parts of woody plants, including twigs, shoots, and leaves, eaten by forest animals.
- Carbon Cycle:** The biogeochemical cycle to exchange carbon between the biosphere and atmosphere by means of photosynthesis, respiration and combustion.
- Clearcut:** The harvest of all the trees in an area to reproduce trees that require full sunlight.
- Cord:** A unit of wood cut for fuel that is equal to a stack 4 x 4 by 8 feet or 128 cubic feet
- Cordwood:** small diameter or low quality wood suitable for firewood, pulp, or chips.
- Crop Tree:** A young tree of a desirable species with certain desired characteristics.
- Crown:** The uppermost branches and foliage of a tree.
- Cruise:** A forest survey used to obtain inventory information and develop a management plan.
- Cull:** A sawtimber size tree that has no timber value as a result of poor shape or damage.
- Diameter at Breast Height (DBH):** Diameter of a tree trunk taken at 4.5 feet off the ground.
- Diameter-Limit Sale:** A timber sale in which all trees over a specified DBH may be cut. Diameter-limit sales often result in high grading and is a very poor forestry practice.
- Endangered Species:** A species in danger of extinction.
- Even-Aged Stand:** Stand with minimal age difference between the oldest and youngest trees (e.g. <10 years).
- Forestland:** Land at least one acre in size that is at least 10 percent stocked with trees.
- Forest Farming:** Cultivating high value specialty crops in the shade of natural forests.
- Forest Stand Improvement (FSI):** Any practice that increases the health, composition, value or rate of growth in a stand. Called Timber Stand Improvement when focused on timber.
- Group Selection:** Harvesting groups of trees to open the canopy and encourage development of uneven aged stands.
- Habitat:** The ecosystem in which a plant or animal lives and obtains food and water.
- Hardwoods:** A general term encompassing broadleaf, deciduous trees.
- High Grading:** To remove all good quality trees from a stand and leave only inferior trees.
- Landing:** Cleared area where logs are processed, piled, and loaded for transport to a sawmill.
- Log Rule:** A method for calculating wood volume in a tree or log by using its diameter and length. Scribner, Doyle and the International 1/4-inch rule are common log rules.
- Lump-Sum Sale:** A timber sale in which an agreed-on price for marked standing trees is set before the wood is removed (as opposed to a mill tally or unit sale).
- Mast:** Nuts and seeds such as acorns, beechnuts, and chestnuts that serve as food for wildlife.
- Overmature:** Trees that have declined in growth rate because of old age and loss of vigor.
- Overstocked:** Trees are so closely spaced that they do not reach full growth potential.
- Pole Timber:** Trees ranging from 4 to 10 inches Diameter at Breast Height.
- Pre-Commercial Operations:** Cutting to remove wood too small to be sold.
- Prescribed Fire:** An intentional and controlled fire used as a management tool used to reduce hazardous fuels or unwanted understory plants (invasive, undesirable species, etc.).
- Pulpwood:** Wood suitable for use in paper manufacturing.

Range: Cattle grazing in natural landscapes.

Regeneration: The process by which a forest is reseeded and renewed.

Riparian Forest Buffers: Strips of land along stream banks where trees, shrubs and other vegetation are planted and managed to capture erosion from agricultural fields.

Salvage Cut: The removal of dead, damaged, or diseased trees to recover value.

Sapling: A tree at least 4.5 feet tall and between 1 inch and 4 inches in diameter.

Sawlog: Log large enough to be sawed economically, usually >10" diameter and 16' long.

Sawtimber stand: A stand of trees whose average DBH is greater than 11 inches.

Sealed-Bid Sale: A timber sale in which buyers submit secret bids.

Seed-Tree Harvest: Felling all trees except for a few desirable trees that provide seed for the next forest.

Selection Harvest: Harvesting single trees or groups of trees at regular intervals to maintain uneven-aged forest.

Shade-Intolerance: Characteristic of certain tree species that does not permit them to survive in the shade of other trees. Shade-intolerant trees require full sunlight.

Shade-Tolerance: The capacity of a tree species to grow in shade.

Shelterwood Harvest: Harvesting all mature trees in two or more cuts, leaving trees to protect seedlings.

Silvopasture: Growing trees and forages to provide suitable pasture for grazing livestock.

Silviculture: The art and science of growing forest trees.

Site Index: Measure of quality of a site based on the height of a dominant tree species at 50 years old.

Site Preparation: Treatment of an area prior to reestablishment of a forest stand.

Skidder: A rubber-tired machine with a cable winch or grapple to drag logs out of the forest.

Slash: Branches and other woody material left on a site after logging.

Snag: A dead tree that is still standing and providing food and cover for a variety of wildlife.

Softwood: Any gymnosperm tree such as pines, hemlocks, larches, spruces, firs, junipers, etc.

Species of Special Concern: Not a designated threatened or endangered species yet, but has low or declining populations.

Stand: A group of forest trees of sufficiently uniform species composition, age, and condition to be considered a homogeneous unit for management purposes.

Stand Density: The quantity of trees per unit area, evaluated in basal area, crown cover or stocking.

Stocking: The number and density of trees in a forest stand. Classified as under-, over-, or well-stocked.

Stumpage Price: The price paid for standing forest trees and paid prior to harvest.

Succession: the replacement of one plant community by another over time in the absence of disturbance.

Sustained Yield: Ideal forest management where growth equals or exceeds removals and mortality.

Thinning: Partial cut in an immature, overstocked stand of trees to increase the stand's value and growth.

Threatened Species: A species whose population is so small that it may become endangered.

Timberland: Forest capable of producing 20 cubic feet of timber per acre per year.

Under-stocked: Trees so widely spaced, that even with full growth, crown closure will not occur.

Understory: The level of forest vegetation beneath the canopy.

Uneven-Aged Stand: Three or more age classes of trees represented in a single stand.

Unit Sale: A timber sale in which the buyer makes regular payments based on mill tally and receipts.

Veneer Log: A high-quality log of a desirable species suitable for conversion to veneer.

Well-Stocked: Stands where growing space is effectively occupied but there is still room for growth.

Windbreaks: Rows of trees to provide shelter for crops, animals or farm buildings.

Appendix 7: Laws Related to Forestry

Notable 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

This is not an exhaustive list of all laws that apply to forest management.

Appendix 8: Rare Species and Invasive Species Tables

Table 1: Crawford County rare species

Table 2: Oscoda County rare species

Table 3: Invasive species that have been reported in Crawford and/or Oscoda counties

Table 1 – Rare Species in Crawford County, MI (Source: Michigan Natural Features Inventory, 2016)

All plants and animals located in Crawford County

37 species

Scientific Name	Common Name	Taxonomic Group
Accipiter gentilis	Northern goshawk	Birds
Agoseris glauca	Prairie or pale agoseris	Flowering Plants
Alasmidonta viridis	Slippershell	Mussels
Appalachia arcana	Secretive locust	Insects
Atrytonopsis hianna	Dusted skipper	Insects
Botrychium mormo	Goblin moonwort	Ferns and Fern Allies
Brachionycha borealis	Boreal brachionyncha	Insects
Buteo lineatus	Red-shouldered hawk	Birds
Calypso bulbosa	Calypso or fairy-slipper	Flowering Plants
Cirsium hillii	Hill's thistle	Flowering Plants
Coregonus artedi	Lake herring or Cisco	Fish
Dalibarda repens	False violet	Flowering Plants
Dendroica kirtlandii	Kirtland's warbler	Birds
Emydoidea blandingii	Blanding's turtle	Reptiles
Falcipennis canadensis	Spruce grouse	Birds
Festuca scabrella	Rough fescue	Flowering Plants
Gavia immer	Common loon	Birds
Glyptemys insculpta	Wood turtle	Reptiles
Haliaeetus leucocephalus	Bald eagle	Birds
Incisalia henrici	Henry's elfin	Insects
Juncus vaseyi	Vasey's rush	Flowering Plants
Lycopodiella subappressa	Northern appressed dubmoss	Ferns and Fern Allies
Panax quinquefolius	Ginseng	Flowering Plants
Pandion haliaetus	Osprey	Birds
Physella magnalacustris	Great Lakes physa	Snails
Physella parkeri	Broadshoulder physa	Snails
Prosapia ignipectus	Red-legged spittlebug	Insects
Prunus alleghaniensis var. davisii	Alleghany or Sloe plum	Flowering Plants
Pyrgus wyandot	Grizzled skipper	Insects
Scirpus clintonii	Clinton's bulrush	Flowering Plants
Sistrurus catenatus catenatus	Eastern massasauga	Reptiles
Solidago houghtonii	Houghton's goldenrod	Flowering Plants
Sphaerium fabale	River fingernail clam	Fingernail and Pea Clams
Sporobolus heterolepis	Prairie dropseed	Flowering Plants
Stagnicola contracta	Deepwater pondsnail	Snails
Stellaria crassifolia	Fleshy stitchwort	Flowering Plants
Viola novae-angliae	New England violet	Flowering Plants

These species are state and/or federally listed as endangered, threatened or of special concern. See <https://mnfi.anr.msu.edu/explorer/search.cfm> for more information.

Table 2 – Rare Species in Oscoda County, MI (Source: Michigan Natural Features Inventory, 2016)

All plants and animals located in Oscoda County

30 species

Scientific Name	Common Name	Taxonomic Group
<i>Accipiter gentilis</i>	Northern goshawk	Birds
<i>Agoseris glauca</i>	Prairie or pale agoseris	Flowering Plants
<i>Alasmidonta viridis</i>	Slippershell	Mussels
<i>Amerorchis rotundifolia</i>	Small round-leaved orchis	Flowering Plants
<i>Ammodramus savannarum</i>	Grasshopper sparrow	Birds
<i>Appalachia arcana</i>	Secretive locust	Insects
<i>Appalachina sayanus</i>	Spike-lip crater	Snails
<i>Astragalus canadensis</i>	Canadian milk vetch	Flowering Plants
<i>Atrytonopsis hianna</i>	Dusted skipper	Insects
<i>Brychius hungerfordi</i>	Hungerford's crawling water beetle	Insects
<i>Buteo lineatus</i>	Red-shouldered hawk	Birds
<i>Chlosyne gorgone carlota</i>	Gorgone checkerspot	Insects
<i>Cirsium hillii</i>	Hill's thistle	Flowering Plants
<i>Cygnus buccinator</i>	Trumpeter swan	Birds
<i>Cypripedium arietinum</i>	Ram's head lady's-slipper	Flowering Plants
<i>Dendroica cerulea</i>	Cerulean warbler	Birds
<i>Dendroica discolor</i>	Prairie warbler	Birds
<i>Dendroica kirtlandii</i>	Kirtland's warbler	Birds
<i>Emydoidea blandingii</i>	Blanding's turtle	Reptiles
<i>Falci pennis canadensis</i>	Spruce grouse	Birds
<i>Festuca scabrella</i>	Rough fescue	Flowering Plants
<i>Gavia immer</i>	Common loon	Birds
<i>Glyptemys insculpta</i>	Wood turtle	Reptiles
<i>Haliaeetus leucocephalus</i>	Bald eagle	Birds
<i>Huperzia selago</i>	Fir clubmoss	Ferns and Fern Allies
<i>Incisalia henrici</i>	Henry's elfin	Insects
<i>Picoides arcticus</i>	Black-backed woodpecker	Birds
<i>Prunus alleghaniensis</i> var. <i>davisii</i>	Alleghany or Sloe plum	Flowering Plants
<i>Pyrgus wyandot</i>	Grizzled skipper	Insects
<i>Sistrurus catenatus catenatus</i>	Eastern massasauga	Reptiles

These species are state and/or federally listed as endangered, threatened or of special concern. See <https://mnfi.anr.msu.edu/explorer/search.cfm> for more information.

Table 3 Invasive Species Reported in Crawford and Oscoda Counties (<http://www.misin.msu.edu/>)

Invasive Species Reported in Crawford and Oscoda Counties (http://www.misin.msu.edu/)		
Brown-headed cowbird	Perennial sow thistle	Bull thistle
Emerald Ash Borer	Phragmites	Bristly Locust
Oak Wilt Disease	Purple Loosestrife	Coltsfoot
Reed canary grass	Quackgrass	Common Lilac
White sweet clover	Redtop	Crown vetch
Perennial Pea	Scots Pine	Cypress spurge
Leafy Spurge	Spotted Knapweed	European swamp thistle
Autumn Olive	Tatarian honeysuckle	Garlic Mustard
Canada Bluegrass	Timothy	Queen Anne's lace
Common Buckthorn	True forget-me-not	Lesser burdock
Common Mullein	Water Mint	Morrow's honeysuckle
Common St. Johnswort	Watercress	Orchardgrass
Japanese Barberry	White Poplar	Oxeye daisy
Hoary alyssum	Yellow Sweet Clover	Rusty crayfish
European speedwell	Zebra Mussel (Lake Margrethe)	Spearmint
Smooth Brome	Amur honeysuckle	New Zealand Mudsnaill
Onerow yellowcress	Bird's-foot trefoil	

Appendix 9: Maps

Map 1: General Reference Map

Map 2: Soils by Drainage Classification

Map 3: Topography

Map 4: Hydrography

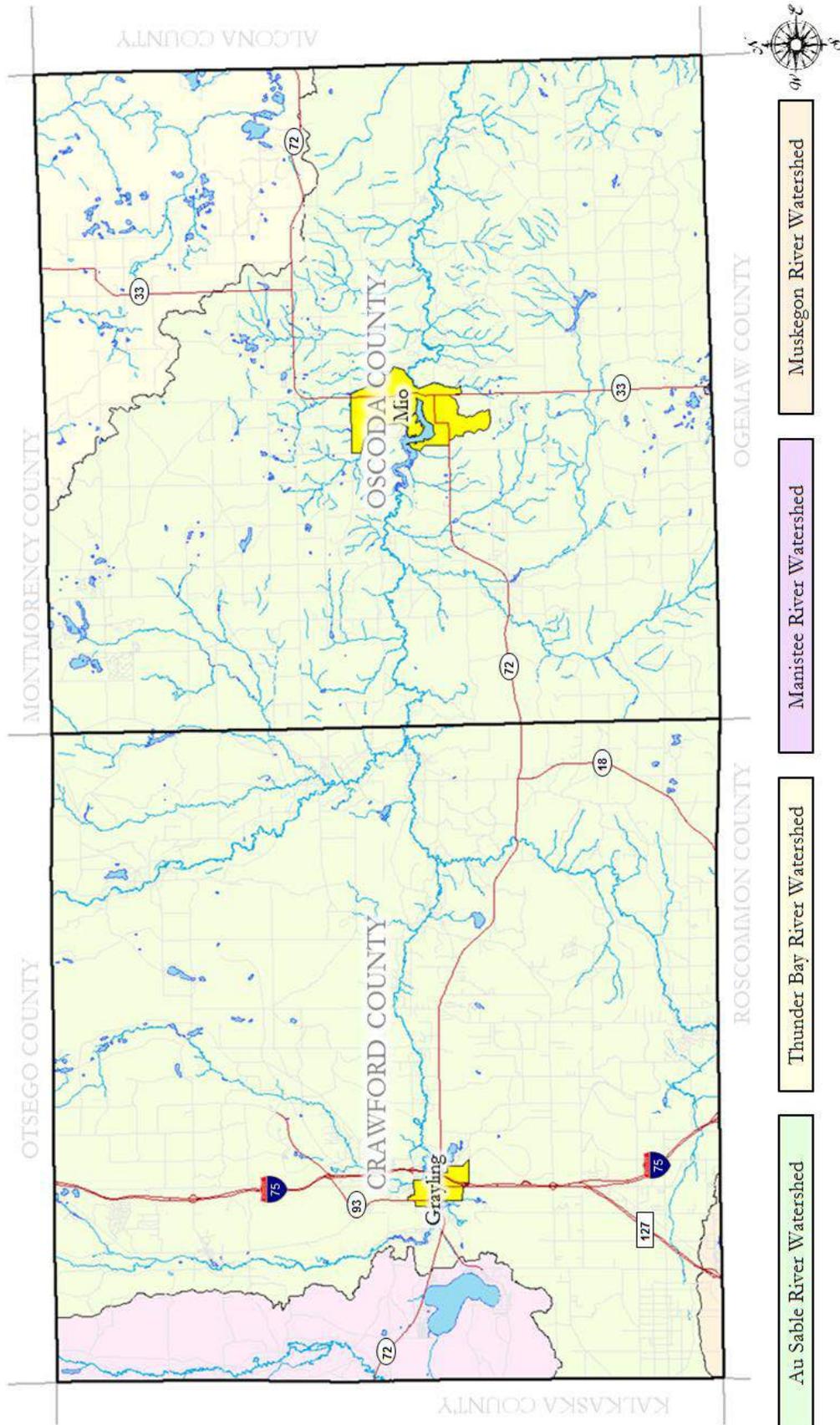
Map 5: Wetlands

Map 6: Land Use/Land Cover

Map 7: Land Ownership

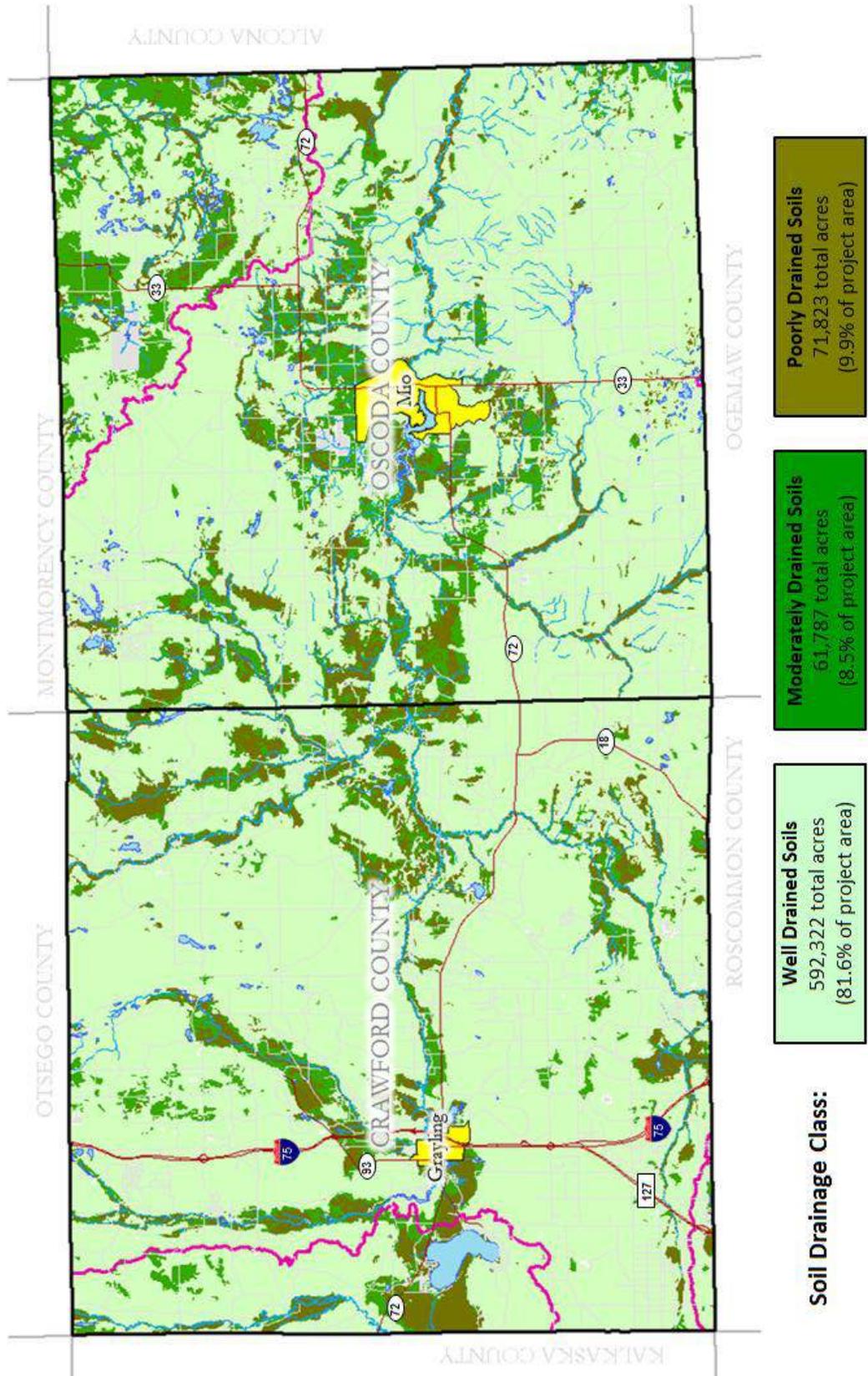
Map 8: Forest Stewardship Properties

Crawford and Oscoda Counties – General Reference Map



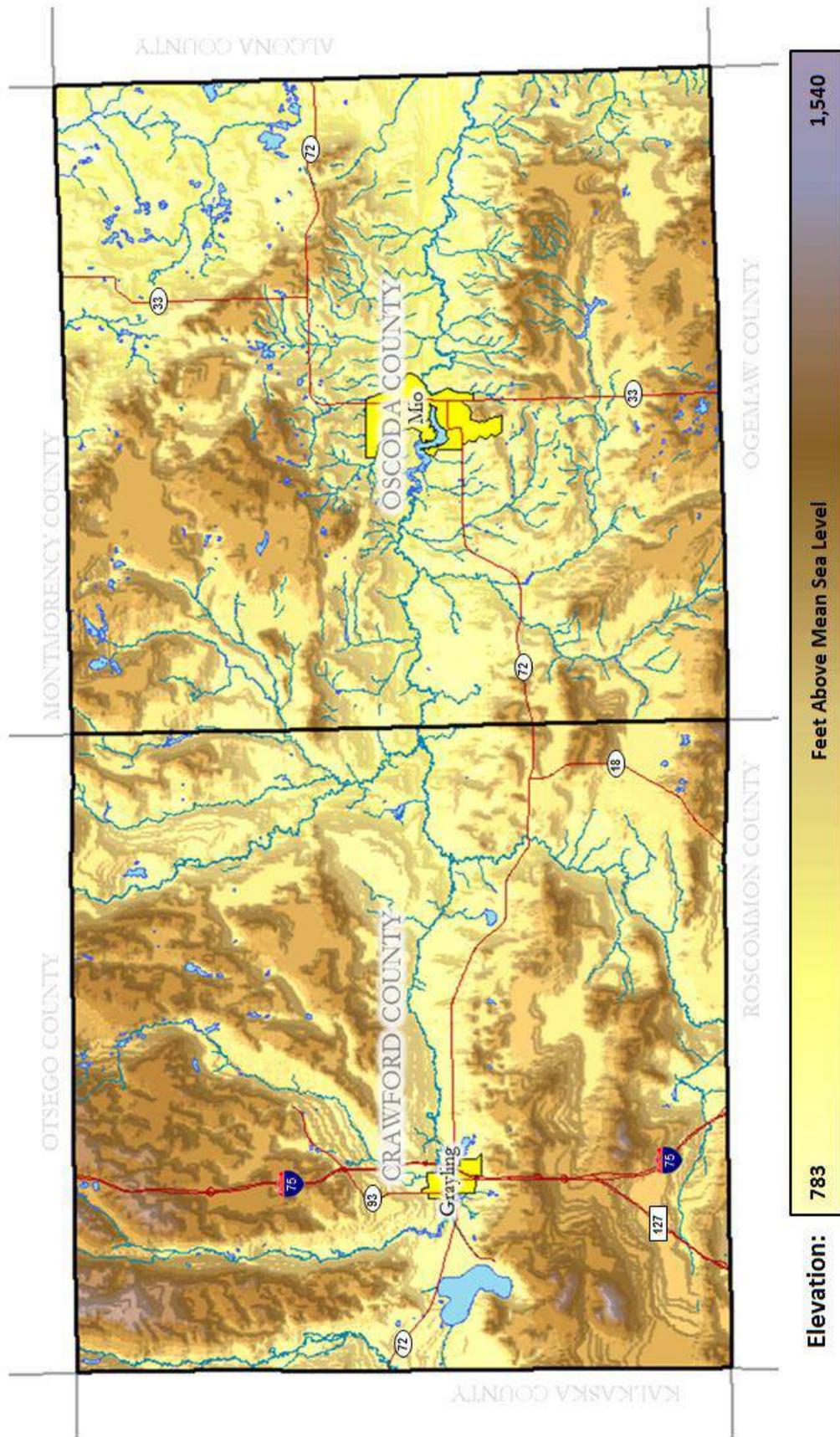
Map 1 – General Reference

Crawford and Oscoda Counties – Soil Drainage Classification



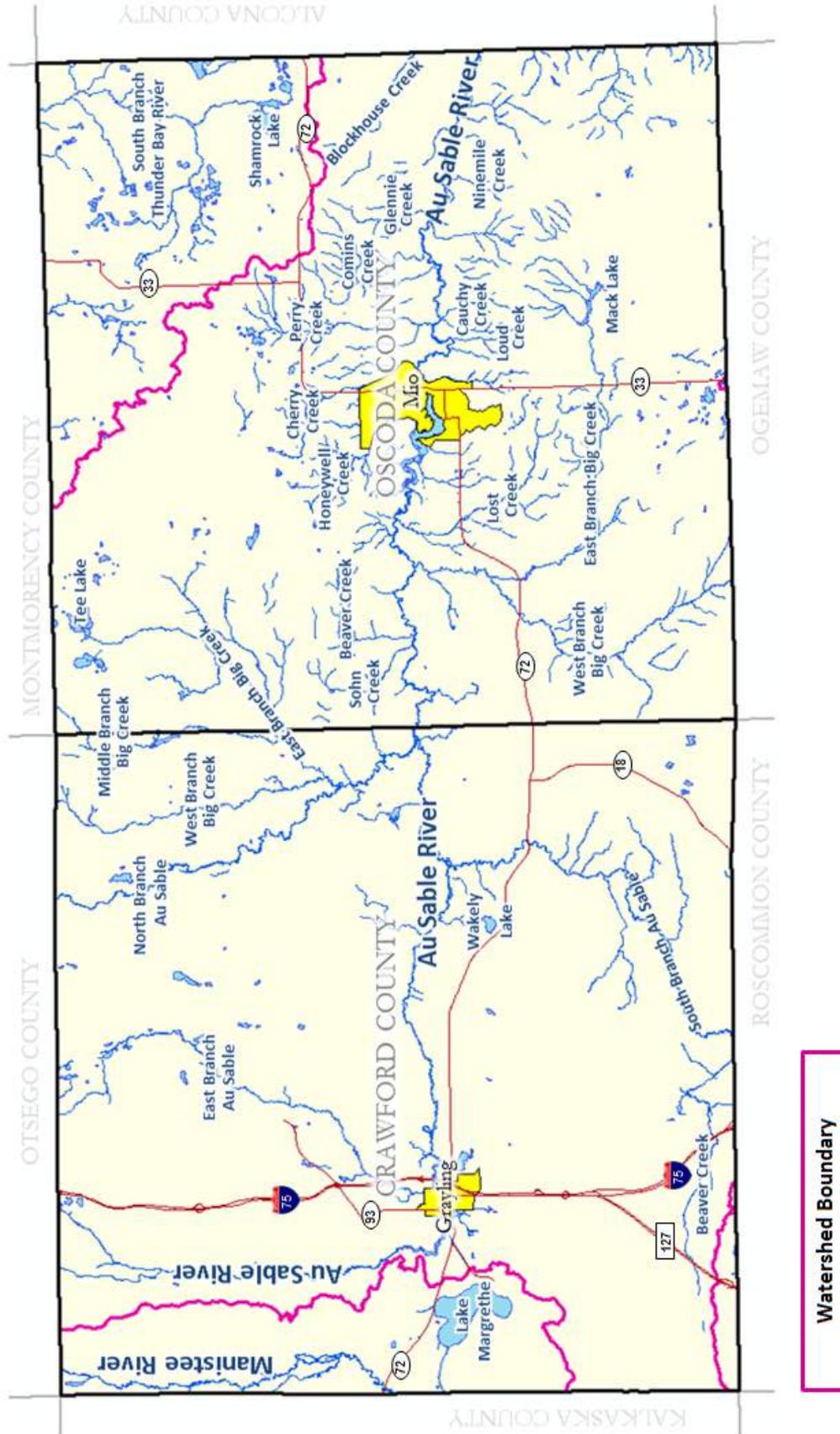
Map 2 – Soil Drainage

Crawford and Oscoda Counties – Digital Elevation Model



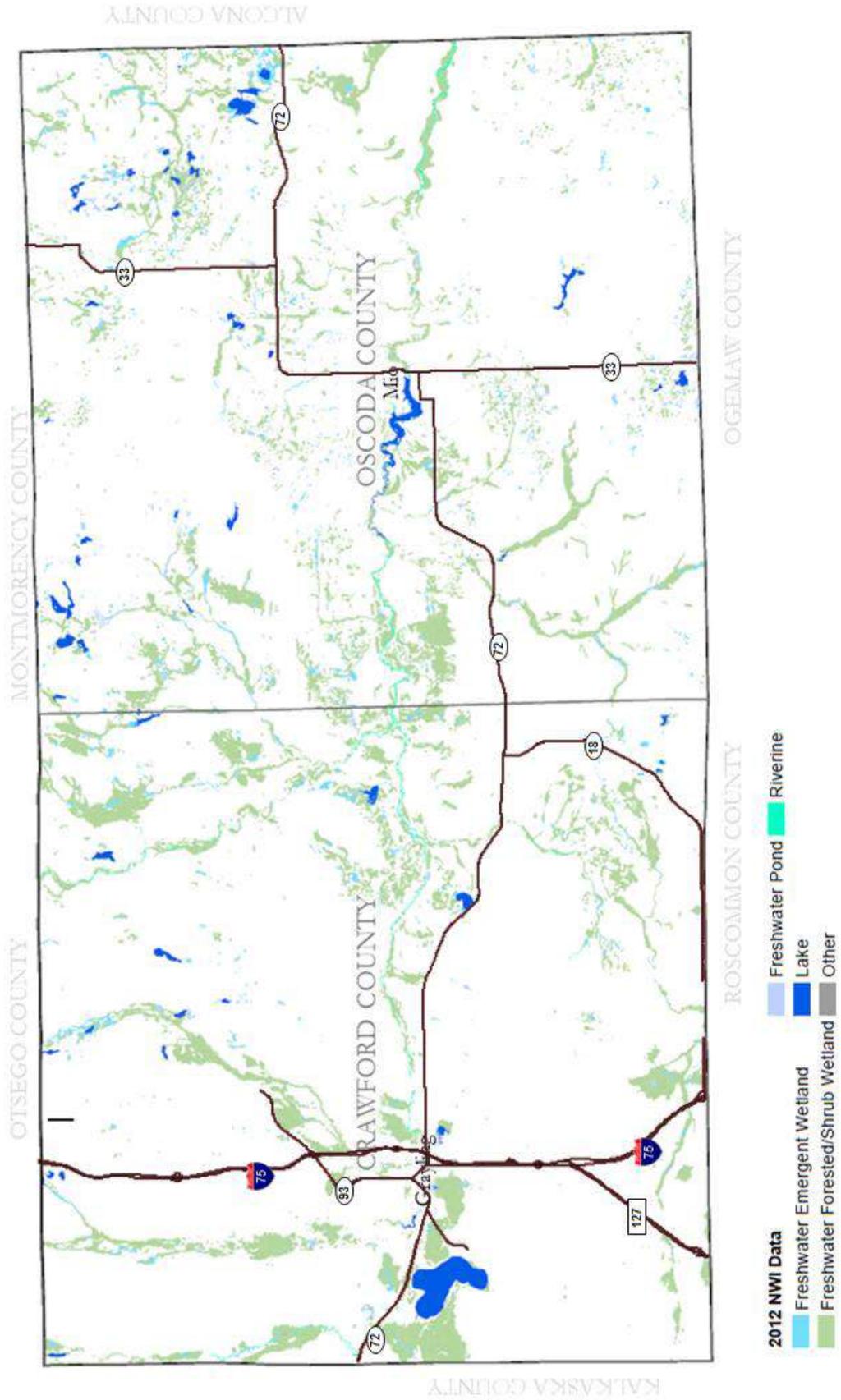
Map 3 – Elevation

Crawford and Oscoda Counties – Hydrography



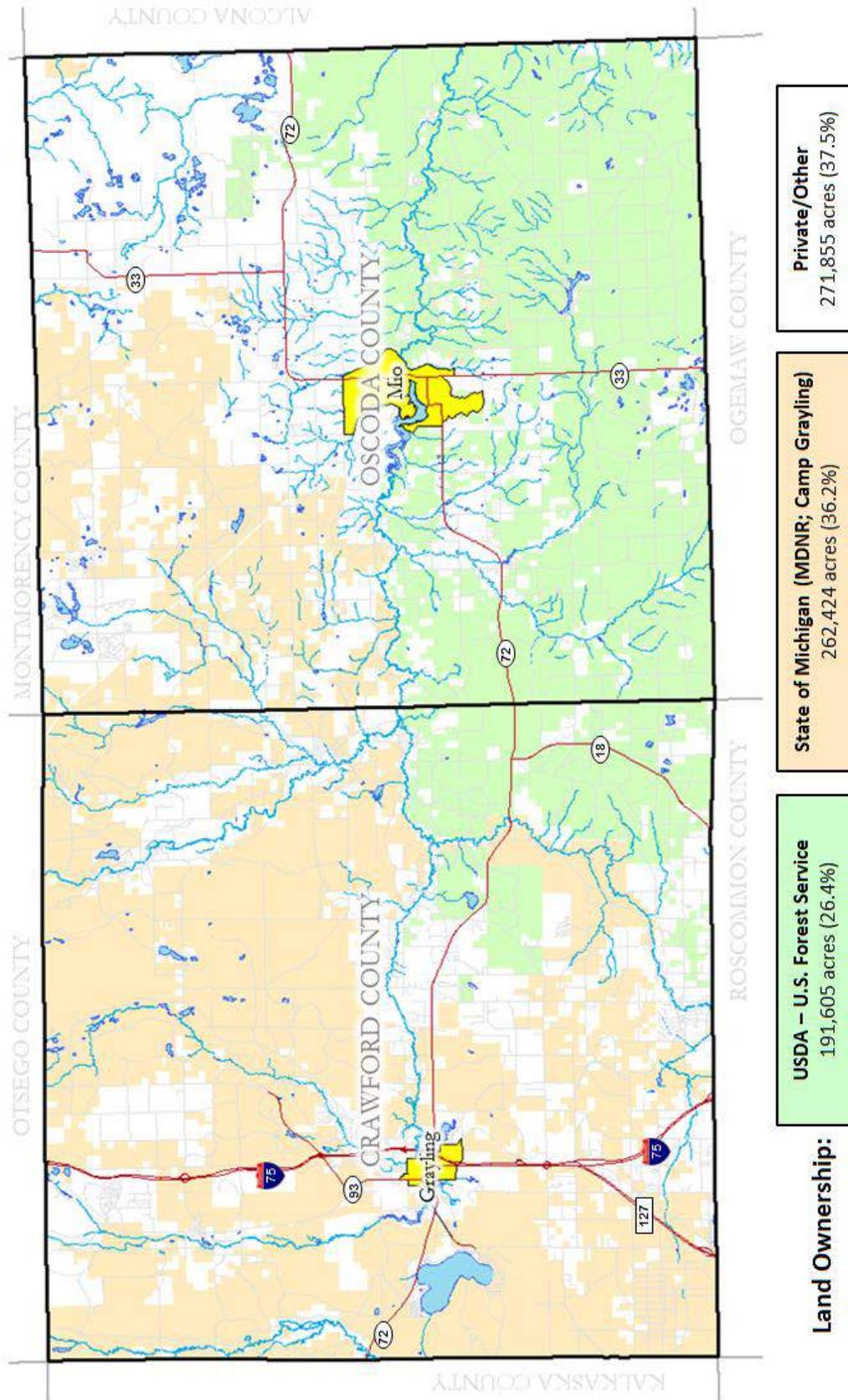
Map 4 - Hydrography

Crawford and Oscoda Counties – Wetlands



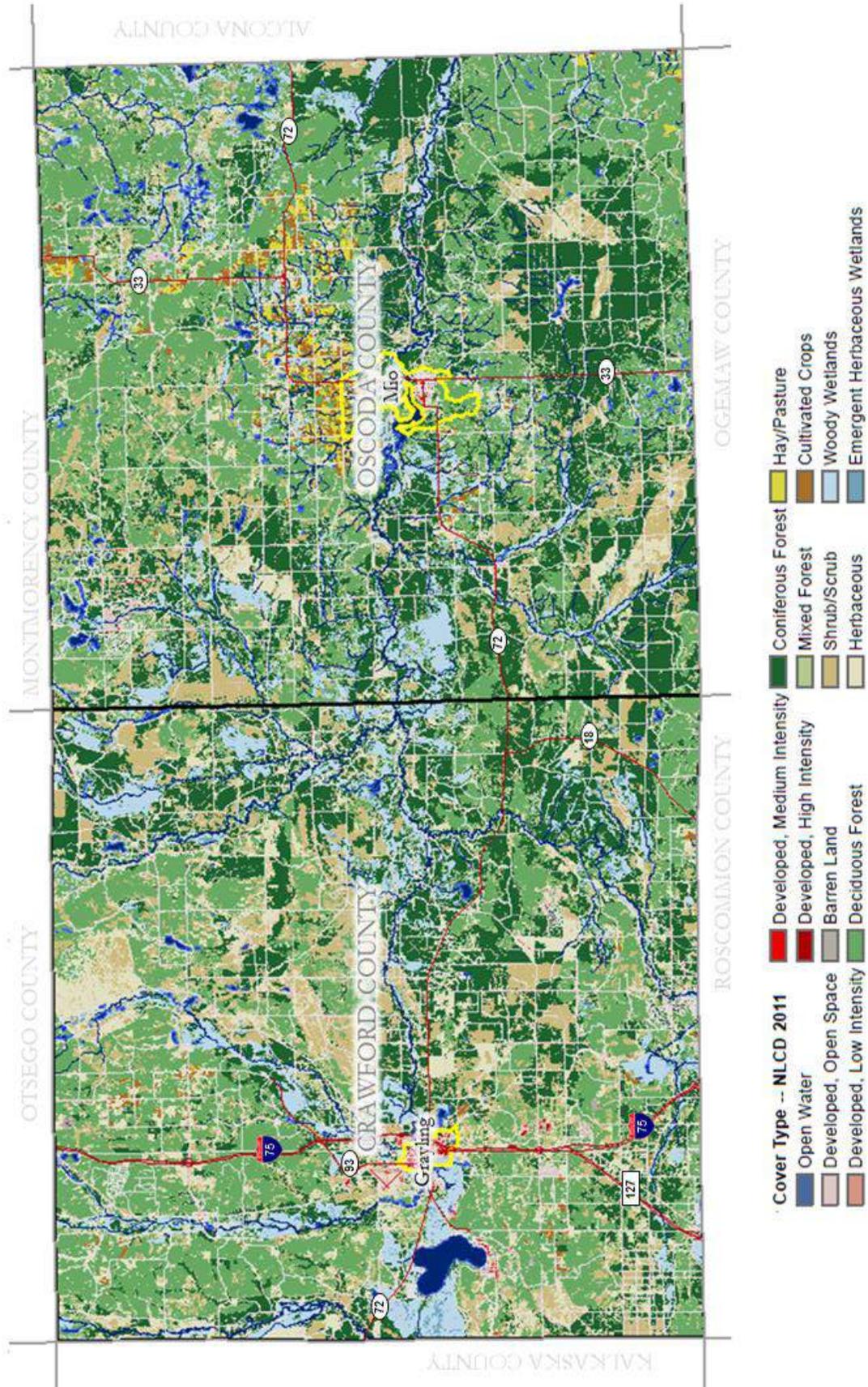
Map 5 - Wetlands

Crawford and Oscoda Counties – General Land Ownership



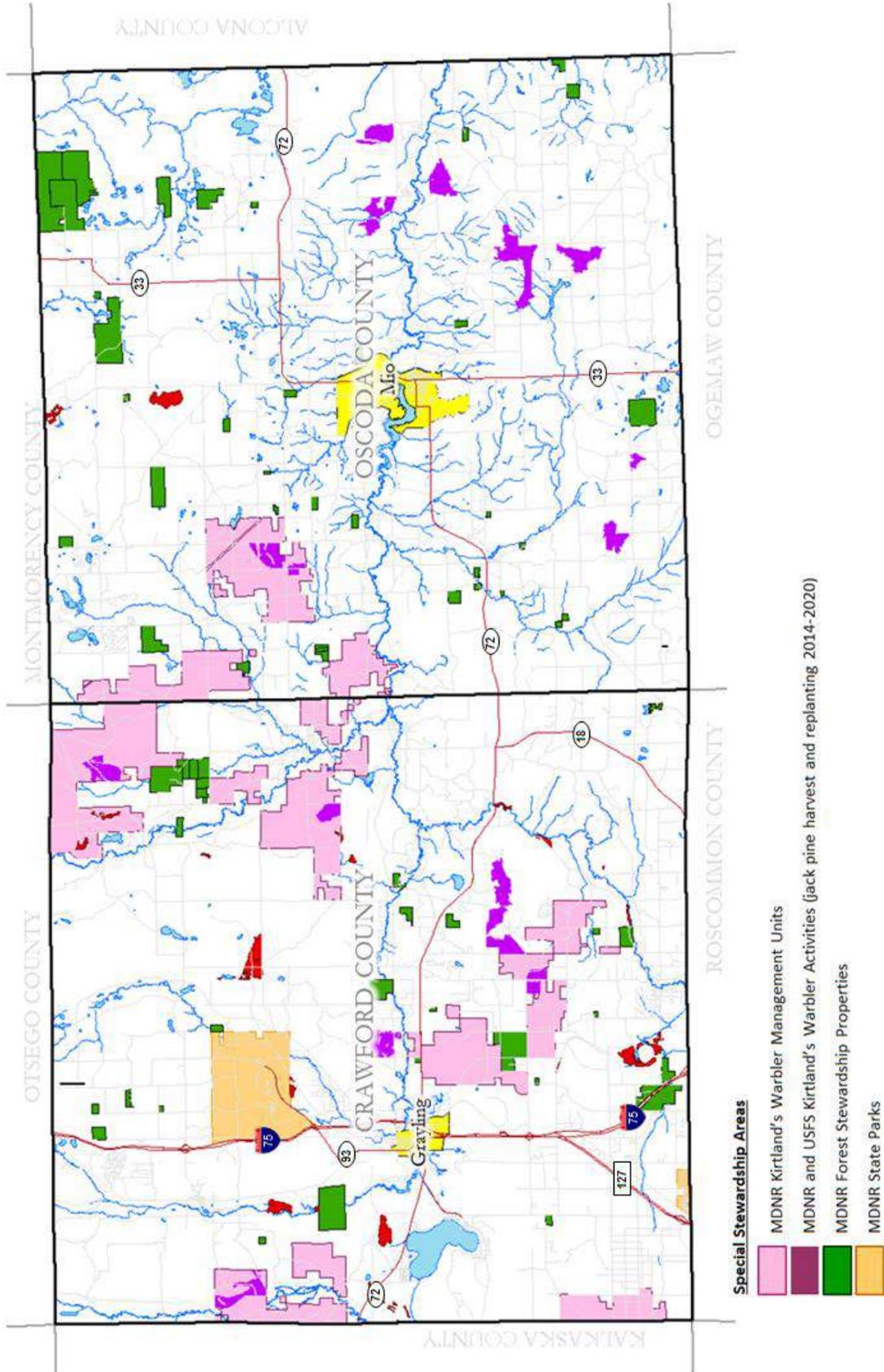
Map 6 – Land Ownership

Crawford and Oscoda Counties – Land Cover/Use (2011)



Map 7 – Land Cover/Land Use (2011)

Crawford and Oscoda Counties – Special Stewardship Areas



Map 8 – Special Stewardship Areas

MAGHIELSE TRACT

1,000-ACRE MAGHIELSE ACQUISITION PART OF LARGER DNR LAND STRATEGY

'IT MAKES SENSE FOR US TO HAVE A FOOTPRINT IN THE RIGHT AREAS'



The state's planned purchase of the Maghielse Tract, prized for its upper reaches of the Au Sable River and rare, old-growth forest, comes on the heels of a 600-acre sale of public land destined to become the site of a particle-board manufacturing plant near Grayling.

The move is part of an effort by the Department of Natural Resources to consolidate its land holdings, swapping areas with little use in favor of property with high recreational value – in this case, 1,020 private acres of forest and stream sandwiched between two popular public tracts flanking the Au Sable River.

Kerry Wieber, forest land administrator for the Department of Natural Resources' Forest Resources Division, is overseeing the pending \$3 million acquisition with the state's Natural Resources Trust Fund.

Just a year ago, the state sold 600 acres of land abutting Grayling's industrial park to ARAUCO, a manufacturer of sustainable particleboard, which is building a new plant on the site. Wieber said that parcel was identified as surplus property in a Memorandum of Understanding with Grayling Township and the Crawford County Economic Development Partnership in 2000.

"We're still selling parcels that were identified in that process," Wieber said. "It makes sense for us to have a footprint in the right areas."

Trust Fund acquisitions use royalties from the sale or lease of state mineral rights. They favor private parcels adjoining or surrounded by public land – called "inholdings" -- or areas that offer access to rivers, lakes or unique natural features.

Revenue from the sale of public lands goes into the Land Exchange Facilitation Fund which, according to the DNR website, is used to acquire additional lands to replace those sold. Most public lands were tax reverted at the turn of the century or during the Great Depression era. Proceeds from the sale of land initially bought with the Trust Fund go back into the Trust Fund.

Ahead of buying the Maghielse Tract, Wieber made a strong push to inform the local governments of Crawford County and Frederic Township of the acquisition. Both the county and township boards backed the purchase with letters of unanimous support.

David Stephenson chairs the Crawford County Board of Commissioners. "In our discussion with the DNR they were very upfront with us, met with the county and township several times to explain the process and what the outcome would be," he said. "The key parts were that it would open that 1,000-acre parcel to the public with the restrictions of any state property and they assured us the county and township would receive the same amount of taxes as we would if it were purchased by a private individual. It's a win-win for everyone."

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“MORE LAND FOR PEOPLE TO ENJOY IS A GOOD THING.”

The Maghielse Tract, also known locally as the Upper Au Sable River Property, is split into two halves by more than a mile of the upper Au Sable River. Wieber said the eastern half has a stand of old-growth trees which rival those of nearby Hartwick Pines State Park.

To the immediate north of the tract is the 1,640-acre MacArthur property; to the south lies the 737-acre Williams tract, both of which are publicly owned with river access.

Karen Harrison is president of the Mason-Griffith chapter of Trout Unlimited and lives upstream from the Maghielse property. She said the stretch is canoed regularly by locals and will tell you – with a wink and a nod – that there are no fish in this part of the river.



“We have done some surveys looking at where fish are spawning and it is a spawning area,” Harrison said. “It’s as diverse as a lot of other parts of the river.” She feels the acquisition will improve access to the river and benefit the economy of Grayling as a whole.

“The economy here is based on recreation,” Harrison said. “More land for people to enjoy is a good thing.”

That idea was shared by Traci Cook, executive director of the Grayling Regional Chamber of Commerce, who said more recreational opportunities for residents and visitors to the area leads to more dollars spent on overnight stays, meals at restaurants, shopping at retailers and patronage of local businesses. Outside of the numerous canoe liveries and fly shops, many of Grayling’s businesses pay homage to the river by name, signage and décor.

“The more opportunities that are available to our community, the healthier and more active we will be as a whole,” Cook said, noting she plans to hike the property when it opens to the public, which is expected to happen in late 2017 or early 2018.



MAGHIELSE TRACT

FAMILY RECOUNTS 70-YEAR HISTORY OF GRAYLING GETAWAY



It was Labor Day weekend of 1977 and Karen and Tom Fiebig were having a cookout with friends at their family camp on the Au Sable River. As the men stood around the grill watching chicken cook, Tom's eyes fell on the darkening sky.

"It formed over Sand Hill Lake a mile north of us," Tom recalled of the storm. "I'm watching the rain go straight sideways. All of a sudden, a big oak tree landed on my car. It was like a tornado outside – the noise, the black, the water."

In two terrifying minutes the storm was over and the group, huddled in the cabin for shelter, stepped out the door to survey the damage. "When I came back outside the chicken was still cooking so we got to eat it," Tom joked.

For the rest of the property, the storm was no laughing matter. Of the Maghielse family's 1,020 wooded acres, almost half of its trees were leveled, including dozens of giant white pines whose roots were torn from the earth by the brief but punishing wind shear. "You couldn't walk on the ground," Karen said of the windswept areas where toppled trees resembled jungle gyms. "If you wanted to get through you were 15 feet off the ground walking on the trunks of trees."

Even if all three cars parked at the cabin hadn't been smashed by fallen trees – which they were – the road out was impassable. Karen's father called for help on their citizens-band radio and the National Guard responded with a firefighting bulldozer to get them out. "You could hear the trees snapping under its tracks," she said of the giant military vehicle coming to their rescue. "It looked like a house on tank treads."

In the 70-some years the Maghielse family owned the property there would be more tragedy, including at least one more destructive wind storm and a blaze that would claim the original cabin, but it's the good memories that will be the hardest to give up as the family hands the property over to the state this year.

Karen's grandfather, Peter C. Maghielse, bought the land from the Strong family in 1947, the year she was born. The Strongs owned three large, consecutive tracts on the upper AuSable River near Grayling.

"He looked all over the state for a large piece of property for hunting," she said of her grandfather. "When the Strongs decided to sell they gave my grandfather the choice of what section he liked, and he chose the center one because it was more affordable and protected by private property on both sides."



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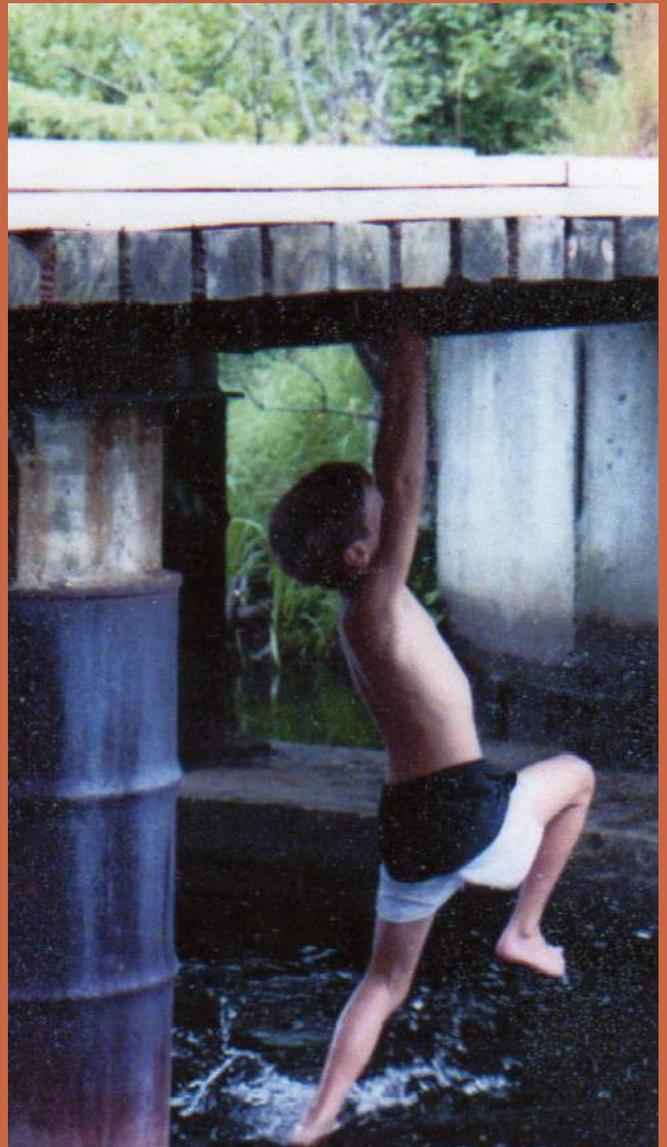
**“A DEER COULD ACTUALLY BE BORN THERE AND LIVE ITS ENTIRE LIFE WITHOUT HAVING TO LEAVE, THAT’S HOW DIVERSE THE FORAGE IS,”
KAREN SAID.**

From then on, the property was a popular retreat for Maghielse’s children, grandchildren and great-grandkids who hunted, fished and explored the land on four-wheelers. Karen said the head mounts of several big bucks taken off the property adorned the knotty-pine interior of the original cabin, and remembers her granddad hoisting her up to the mounts so she could pet them as a kid.

Forest-management plans on the property throughout the years have favored wildlife habitat, including cuts to regenerate aspen and, most recently, the planting of perennial rye and chicory food plots for deer and turkeys. “A deer could actually be born there and live its entire life without having to leave, that’s how diverse the forage is,” Karen said. Tom applies for a bear tag annually and said, four years ago, he was able to identify 12 different black bears in photos on his trail cameras. The land is also home to beaver, otter, porcupines, bobcats, rabbits and grouse.

The western half of the property boasts tall, rolling hills. To the east remains a grove of old-growth white pines that both Karen and the Department of Natural Resources say rival those of nearby Hartwick Pines State Park.

Along the river is about 40 acres of cedar trees so dense that it is inaccessible to deer which browse on tender, young cedars. The fortress of adult trees harbors naturally regenerating cedar, something that is incredibly rare in the Au Sable River region.



“IT’S BITTERSWEET SELLING IT, IT REALLY IS, BUT IT’S SO NICE THAT IT’S GOING TO STAY TOGETHER FOR EVERYONE TO APPRECIATE,” KAREN SAID.

Kerry Wieber, forest land administrator for the DNR’s Forest Resources Division, said the purchase of the Maghielse property was awarded a \$3 million grant from the Natural Resources Trust Fund in 2016.

The 1,600-acre MacArthur property to the north was purchased by the state in the late 1980s; and the 737-acre Williams tract to the south was bought in the early 1990s. Wieber said the state made a bid to buy the Maghielse tract around that time but the family decided not to sell. Now they’re ready, and the sale will finally reunite all three giant parcels under one owner – this time, the people of Michigan.

Once the sale goes through, the DNR will inventory and map the property before determining specific uses for the land, including the extent of motorized and non-motorized use. That process will likely include input from the public, according to DNR unit manager Susan Thiel, who said the MacArthur, Maghielse and Williams tracts could all be rolled into one management area.

As for the existing cabin, past acquisitions have usually involved the demolition of structures to reduce liability.

“It’s bittersweet selling it, it really is, but it’s so nice that it’s going to stay together for everyone to appreciate,” Karen said. “All the families (MacArthurs, Williams, Maghielsies) had the same idea for their lands. It was so nice to have it for hunting and fishing but, when we weren’t able to do it any longer, we wanted to let all people hunt and fish it. I guess we all believe in public land.”



CAMP GRAYLING

STEWARDSHIP PRACTICES FOR MEETING SHARED GOALS

CAMP GRAYLING JOINT MANEUVER TRAINING CENTER

John Hunt, Environmental Manager at Camp Grayling, takes pride in the proactive and collaborative stewardship activities going on in and around the largest National Guard installation in the country. Covering 147,000 acres across three counties, Camp Grayling offers a lot of space to carry out training activities but the forests, prairies, wetlands, lakes and streams found on the property are also a home for wildlife, including some rare plants and animals such as the eastern massasauga rattlesnake, Kirtland's warbler and Houghton's goldenrod. Many parts of the property are also open to the public for hunting, fishing, snowmobiling and other outdoor recreational uses when military training is not taking place.



COGNIZANT OF THEIR ROLE AND RESPONSIBILITY as part of the larger landscape and greater community, Camp Grayling strives to be a good neighbor by investing in practices that protect land, water, and biological resources. While Camp Grayling is held to the same environmental regulations as any other landowner, many of their stewardship activities are voluntary.

While the staff at Camp Grayling certainly values clean water, healthy habitat and rare species, there are also very practical reasons for being good land stewards. "It's about sustainability," says John Hunt. "If we destroy the land, we lose our training environments and can't carry out our activities anymore. Investing in resource inventories, habitat restoration projects, stormwater infrastructure, and renewable energy saves us money in the long run and helps us achieve self-sufficiency goals."



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LAND MANAGEMENT ACTIVITIES AT CAMP GRAYLING ARE EXCEPTIONALLY WELL PLANNED.



Camp Grayling staff actively collaborates with other stakeholders in the Grayling area and through the jack pine landscape, including resource professionals, economic planners and the public to develop stewardship goals and strategies for achieving them. The resulting plans help Camp Grayling and partners manage valuable forest and water resources, protect native wildlife species, prepare for the effects of climate change and increased risk of wildfire, eradicate invasive species, and achieve net-zero water, waste and energy goals.

Camp Grayling worked with the Michigan Natural Features Inventory to complete a survey of plants and animal species present on the property in the mid 1990s and plans to complete an updated survey in the near future, including installation of acoustic monitoring devices to determine whether the northern long-eared bat—a federally threatened species—occurs on the property. Camp Grayling contains significant amounts of jack pine, which is critical habitat for Kirtland's warbler, and their staff regularly participates in Kirtland's Warbler Conservation Team meetings.



Camp Grayling has also invested in eastern massasauga rattlesnake research for more than a decade and funded the recently developed Lake Margrethe Watershed Management Plan, which the local property owner's association is using to plan and implement restoration projects and raise additional funding. Camp Grayling just released a new climate adaptation strategy and is also partnering with the Northeast Michigan Council of Governments (NEMCOG) on a joint land use strategy to guide future development in a sustainable manner that minimizes potential land use conflicts between Camp Grayling and the greater Grayling community.

Many of the land management activities on Camp Grayling are carried out by the Michigan Department of Natural Resources or by private contractors or nonprofit conservation organizations. Lake Margrethe is treated for Eurasian milfoil, an invasive aquatic species, and various stakeholders are developing methods to deal with swimmer's itch. The Michigan DNR and Camp Grayling collaboratively operate timber harvests and maintain clearings that provide excellent habitat for turkey and other wildlife while providing open areas for small artillery training activities.

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A UNIQUE FUNDING SOURCE



Camp Grayling can also pull in funding for projects that other organizations or agencies may not have the capacity to fund. Camp Grayling sometimes funds projects off the property when there is a benefit for the installation, or if Camp Grayling activities are affecting natural resources or human communities. For example, Camp Grayling contributed significant funding for several road/stream crossing improvement projects led by Huron Pines and the Crawford County Road Commission to prevent excess sediment from entering the Au Sable River Watershed. Camp Grayling acknowledges that their vehicular traffic has an impact on the condition of these crossings, and that restoring them is a win-win scenario for everyone. It protects the resource while at the same time improving the local road infrastructure.

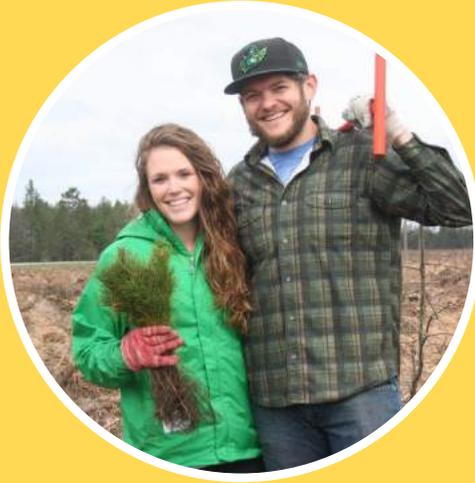
According to John Hunt, Camp Grayling anticipates having an increasing role in outreach and educational activities. Camp Grayling staff have given presentations to local k-12 students, including participating as exhibitors at the annual Higgins Lake - Lake Savers Day event. Camp Grayling also looks forward to partnering more with resource agencies and organizations to provide outreach on important topics ranging from invasive species to climate adaptation strategies.



CONNECTIONS TO HOME

A VOLUNTEER'S PERSPECTIVE ON STEWARDSHIP OF PUBLIC LANDS

“IT’S ABOUT TREADING LIGHTLY”



“When I think about the damage we do to the natural world as humans, it makes me want to give back with some good,” says Warren Zimosttrad. Warren and his wife Bryana make a great team, working together to leave behind a trail of life as they move ahead planting a line of trees in Northeast Michigan’s sandy soil.

Pausing from their work, they strike a pose—Bryana holding a bouquet-sized bunch of jack pine seedlings and Warren with a heavy iron planting tool called a dibble bar resting casually over his shoulder. This charming couple is as big-hearted as they are photogenic.

“I’VE ALWAYS HAD A DEEP CONNECTION TO PUBLIC LAND,” SAYS WARREN. “WHEN I THINK ABOUT IT, IT GOES RIGHT BACK TO FAMILY.”

For the third year in a row now, they’ve made a five-hour round trip pilgrimage to northern Michigan from their hometown of Grand Rapids. Their destination? To participate in Huron Pines’ annual Jack Pine Planting Day volunteer event, planting acres of the unique and scraggly jack pine tree for the rare Kirtland’s Warbler and other wildlife. They come every year to celebrate Warren’s birthday, which falls on the same weekend.

He grew up near Michigan’s Saginaw Bay, exploring areas near Bay City and Caseville alongside his father, an avid outdoorsman. Warren fondly recalls days spent discovering the Rifle River Recreation Area and being amazed at its vastness.

Later in his life, while spending time together at their family land in Rose City, Warren’s uncle brought up a topic that would light a new passion for him—the Kirtland’s Warbler, North America’s rarest songbird.

Warren was intrigued as he learned more about the Kirtland’s Warbler, the endangered species in his backyard. This charming black and yellow bird nests primarily in the jack pine forest of Northeast Michigan and sings its joyful song from the treetops, a beautiful sound that was almost lost forever.



Source: USFWS

“I GUESS YOU COULD SAY THE KIRTLAND’S WARBLER HAS DEFINITELY MADE AN IMPRESSION ON ME...”

Once nearly extinct, the Kirtland’s Warbler’s story is one of teamwork and decades of scientific collaboration to find out how to save the crashing population, recovered from as few as 167 singing males to over 2000 singing males in 2016. Inspired by this Michigan success story, Warren was hooked on the Kirtland’s Warbler.

“I kept learning all I could and started getting involved,” explains Warren. “Planting these jack pine trees on public land with Huron Pines and partners every year is a great way to give back.”

Warren wants people to understand that public forest lands are incredibly important for healthy waters and diverse wildlife like the Kirtland’s Warbler. Besides volunteering to plant jack pines, Warren and Bryana are also becoming Citizen Foresters in their hometown.

“I guess you could say the Kirtland’s Warbler has definitely made an impression on me,” he grins as he reveals the grapefruit-sized Kirtland’s Warbler tattoo on his forearm.

“I would encourage everyone to get outside, find some public land and find something that moves you—whether it’s bird watching, trail running, or just the peace and solitude of the forest. The next step is to work together with others to protect it.”



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FORESTRY AT PARMALEE BRIDGE STATE FOREST CAMPGROUND



THE DECISION TO CUT DOWN

large numbers of trees in a remote public campground is one that's not made lightly, no matter how necessary or common of a practice it is.

Staff with the Department of Natural Resources (DNR) announced in November that more than a third of the trees at Parmalee Bridge State Forest Campground near Luzerne would be removed during the winter of 2017 in an effort to thin a mature red-pine plantation and cull older hardwoods that are becoming increasingly hazardous to people who camp there.

Joan Charlebois is the forester for the Grayling DNR office overseeing the timber harvest at the rustic, 7-site campground on the AuSable River in Oscoda County. She's laid the groundwork for the project, including using orange paint to mark trees to be cut. As of late November, she was waiting for final review by her department before bidding the job out to local loggers. Cutting was expected to start after late December.

"We know harvesting (trees) at recreational sites is a challenge," she said, "but we want to have healthy, dominant trees in the campground for aesthetics and safety."

Sitting on land formerly owned by Consumers Energy, the campground area was acquired by the state several decades ago, Charlebois said. An 18-acre plantation of red pines in rows was planted by the power company in 1954, and the campground sits on about two acres of that plantation.

Charlebois explained how trees are initially planted close together in a plantation then, as the trees mature, regular thinnings ensure remaining trees have enough light and soil to thrive. This process hasn't happened at Parmalee Bridge campground, and trees in the plantation vary in size from a foot in diameter to just a few inches.



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“WE DID A THINNING YEARS AGO BUT COMPLETELY AVOIDED THE CAMPGROUND.”



“The plantation thinning ten years ago deliberately excluded the campground in order to not impact that recreational facility. Despite our good intentions, avoiding thinning around the campsites wasn’t good for the long-term tree health there. We’re going to have more and more of those trees become hazards unless we manage it.” One third of the trees in the pine plantation will be cut, Charlebois said. Cutting of red pines within the campground itself will be slightly more aggressive at 36 percent, though many of these trees are either stunted, riddled with “hardware” – nails, screws, wires or hooks used to secure tents or clothes lines – or severely hatchet-damaged.

In addition, numerous hardwood trees will be removed, including oak trees suffering from age-related oak decline, or very large trees leaning dangerously over campsites. In some cases, healthy trees will need to be cut to clear space for larger trees to fall and for logging equipment to get through. A canoe-in only portion of the campground nearer to the river will not be cut, according to Charlebois.



Susan Thiel is the Unit Manager for the DNR’s Grayling Forest Management Unit. She said much of the landscape around Grayling and to the east was disturbed via historical logging and wildfires during the late 1800’s and early 1900s, leaving new trees to sprout and creating much of the forests we see today. This means unless a subsequent disturbance or harvest has occurred, many of the mature trees on our current landscape are 100-110 years old, and are reaching their maximum life span on our typical poor sandy soils. Timber harvests help regenerate and renew these stands.

In addition, foot and vehicle traffic at campgrounds compacts the earth around roots, putting added stress on aging trees. “We’re starting to see high rates of mortality in our campgrounds and it’s something we expected,” Thiel said. A cutting at Jones Lake State Forest Campground in northeast Crawford County a few years ago removed all the old oaks but preserved the overstory pine and young understory. The equestrian campground on Four Mile Road near Grayling was “essentially clearcut” this winter, according to Thiel. In both cases, live oak stumps left behind will generate new oak shoots, and scattered replanting is planned. In addition to age-related decline, Thiel blames invasive insects and nonnative diseases for hastening the loss of Michigan’s trees at campgrounds and elsewhere.

“We are losing our tree diversity because of insects and diseases,” she said. “Diversity is how nature has responded and withstood (gradual changes), but invasives move so quickly that nature can’t adapt.” She said cooperative efforts between the DNR, Huron Pines and the U.S. Forest Service have helped with eradication efforts on private property abutting public lands, as well as informing the public on how to prevent the spread of diseases. “Invasives don’t respect property boundaries and that’s where the cooperative efforts have come in,” she said. Cutting at Parmalee Bridge will be completed in time for the opening of the campground spring 2017.



JACK PINE LANDSCAPE MANAGEMENT

RESTORING HABITAT WITH CHAINSAWS AND FIRE



An interesting relationship exists between humans, animals – including one endangered bird – and the scrubby jack pine landscape around Mio in inland Northern Michigan. Sculpted by a glacier millennia ago, the region was later dominated by frequent wildfires that regularly cleared away old and dead vegetation and opened the way for new growth. Native plants and animals adapted to life in this so-called fire-dependent landscape.

In modern times, mankind has mostly succeeded in preventing man-made wildfires and suppressing those naturally ignited by lightning. While this strategy spared the subdivisions and private property from fire, it hasn't done much good for the plants and animals that depend on periodic fires to survive.

The poster child of this unintended effect is Kirtland's warbler, a yellow-blue songbird that winters in the Bahamas but nests almost primarily in Northeast Michigan and particularly around the Mio area. Fifty years ago, the bird almost disappeared. "It's really the jack pine-dominated forest they use for breeding," Kim Piccolo, wildlife biologist for the U.S. Forest Service, said about the bird's particular nesting habits. "They're very specific on the size and age of trees they use – typically 5 to 20 feet tall – but it's also site specific and dependent on how large the forest is."

Trees in the warbler's preferred size range are about 6 to 16 years old, she said. After that, the warbler no longer nests that forest when its trees get too tall

The jack pine is special among trees in that its resin-laden cones are heat activated, releasing their seeds only when exposed to extreme temperatures like those found in a wildfire. However, when fires are prevented, so too is the natural process which produces new generations of jack pines and subsequent generations of Kirtland's warbler.



In order to regenerate new stands of young jack pine for Kirtland's warbler and the other animals that use similar open habitat, the U.S. Forest Service has used prescribed burning to mimic natural ecological processes.

Piccolo said the successful Maple Ridge prescribed burn in 2014 engulfed 40 acres adjacent to a 900-acre area that burned in a 2012 wildfire. She said it is the only burn that's been carried out primarily to improve Kirtland's warbler habitat. Another burn is planned in the near future near Mack Lake, south of Mio. Intentional fires, which are just one tool the Forest Service uses to manage jack pine landscape, are used sparingly and taken seriously, for good reason.

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“MANY PLANTS IN MICHIGAN HAVE EVOLVED WITH FIRE AND RESPOND POSITIVELY POST FIRE,”

In 1980, the Forest Service started a fire near Mack Lake to clear away brush for machinery to plant pines. The fire got out of control, burning 24,000 acres and numerous homes. A young wildlife technician who had been operating a dozer was caught in the fire and died. “It was tragic,” Piccolo said, noting how prescribed burns nowadays are considered only within a narrow range of acceptable conditions including temperature, humidity, wind speed and direction, needle moisture, fuel loads and extent of site preparation, including fire breaks bulldozed between forests. “We’re using the science and understanding we’ve gained in the last 40 years and trying to do the most on the landscape while taking the least amount of risk,” she said.



“The vast majority of Kirtland’s warbler habitat management is done through harvest and replanting and a large percentage of habitat is naturally regenerated jack pine from wildfires. But we do feel like there are benefits to burning and there might be advantages we don’t know about.”

Persephone Whelan is an assistant fire management officer for the Forest Service. She said fire, whether natural or manmade, performs “critical functions” like recycling nutrients back into the soil.

“Many plants in Michigan have evolved with fire and respond positively post fire,” Whelan said. “Many of these plants have adaptive measures to fire like thick bark and resprouting; others take advantage of the increase in sunlight conditions, a flush of soil nutrients, and low vegetative competition to sprout seedlings.



“Some animals like turkeys like the more open condition created by fire,” she continued, “and deer are often found shortly after a fire eating the sprouting vegetation.” Although wildlife and plants benefit from fires, the Forest Service suppresses all wildfires because the Huron-Manistee Forest interfaces with private property throughout the boundary. “In the last 20 years we’ve had 20,000 acres burn in wildfires on the Mio district within the Huron-Manistee National Forest,” Piccolo said.

The Forest Service offers a “Firewise” program in which it works with neighboring landowners to educate them and, in some cases, do on-the-ground work. Ahead of next year’s prescribed burn, crews have worked with private landowners to remove jack pines to reduce the possible spread of fire. The program encourages landowners to keep their yard and home, including gutters, free of fuel debris like dead branches, grass, shrubs and leaves. Online resources are available at firewise.org.

Even so, the majority of Kirtland Warbler habitat is maintained through cutting and replanting of jack pine forests – done not just for the bird but for all animals that dwell in the same setting.

As for the warbler, its numbers have rebounded dramatically. In June 2015, a total of 2,366 singing males were recorded, reflecting an overall population of almost 5,000 birds. The Kirtland's Warbler population had plummeted to as low as 167 singing males in 1987, before habitat management actions to improve, protect and maintain their habitat were prioritized.

“We have a responsibility to maintain habitat for endangered species and this is a species we’re going to have to continue managing for in order for them to have a sustainable population,” Piccolo said. “But Kirtland's Warbler is an indicator species for a healthy jack pine ecosystem and there are many other species that benefit from this ecosystem.”



HOLY WATERS

WHERE THE AU SABLE RIVER, JACK PINE BARRENS,
AND LOCAL ECONOMY MEET: CRAWFORD COUNTY, MI



Approaching Grayling from any direction, it can be hard to visualize a river existing in a landscape that so often resembles a desert of scrub and sand. It is this very terrain that gives the Au Sable River both its name and its renowned cold, clean water teeming with trout and the anglers who pursue them.

Josh Greenberg is the owner of Gates Au Sable Lodge, which sits in the middle of what fishermen call the “Holy Waters” for its trophy brown trout. Any given trout season, from April through October, Greenberg welcomes guests from 50 states and several countries who make the pilgrimage to Northern Michigan to stay at his lodge, eat in his restaurant, buy gear in his fly shop and fish the river.

The young businessman breathes trout fishing most of the year but spends winters writing about it. His recent book, “Rivers of Sand,” is part guidebook and part storytelling as it follows the river from its upper reaches to its confluence with Lake Huron in Oscoda. The book’s title is both a translation of the river’s name – “au sable” meaning “of sand” in French – and a reflection of the river’s unique geology.

“We have this giant, filtering sponge surrounding the river,” Greenberg said of the sandy soil. “It makes the Au Sable a stable river in terms of flow, and not much surface water makes its way into the river. It really is good, quality water that comes out of the ground.”

It’s this water that groups like Trout Unlimited and Anglers of the Au Sable aim to preserve. Coincidentally, TU – now a national organization – was founded on the banks of the river in 1959.

John Walters lives 40 miles north in Vanderbilt and is the former chairman of both Michigan TU and his local Headwaters chapter. He carries a fly rod and waders in his truck at all times.

“Most people come from a trout fishing background and their angling type doesn’t much matter,” he said of the group’s membership base. “Then there are others who recognize the importance of protecting cold ground water and know TU is heavily involved in that.”



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One project TU's Mason-Griffith Founders Chapter is working on through 2017 is the restoration of Big Creek, a tributary of the Au Sable's west branch where years of heavy beaver activity have impounded water, silt and sand. "Consequently, when that dam is removed and sediment is managed, gravel is exposed and trout then have the opportunity to spawn in those areas," Walters said, adding how water keeps much colder when allowed to flow freely.

The chapter is also working with the state and other conservation groups to identify and map potential projects on the river's north branch. Those plans include the addition of large woody debris -- strategic placement of logs and fallen trees in and along the river to make habitat for young trout and insect larvae, a significant food source for fish.



Anglers of the Au Sable has a mission similar to TU but focused almost exclusively on this river and its tributaries. Vice president Joe Hemming has been with the group for 7 years and has had a cabin on the river since 2001 as a retreat from life in metro Detroit. A history buff, Hemming credits fishermen for helping reverse damage caused by the timber industry more than a century ago.

"There was a lot of restorative work that needed to be done after the lumbermen passed through," Hemming said. "We had to replant our woods and provide cover for fish. The region woke up after the lumbering days and realized, 'Jeez, we have something valuable here – fish – and people will pay money to come here and fish.' The fishing industry came on the heels of the lumber industry and took over in keeping the economy going."



Hemming said his Anglers group has been "instrumental" in establishing catch-and-release sections of the river, one of those stretches being the world-famous Holy Waters where Greenberg's lodge resides. "Without those regulations we wouldn't have the fishery we have today," Hemming said. His group has also taken part in litigation involving the permitting of a fish farm at a former hatchery on the river and oil and gas activity within the watersheds of the Au Sable and Manistee rivers. Most recently Anglers has been developing a plan of attack against the invasive New Zealand mud snail, a tiny, nonnative mollusk which could disrupt the food chain. Hemming believes, "There's always going to be pressure on the river,"

"We've found that if it's not one thing, it's another. There are always threats to the river and we need to be vigilant as an organization," Hemming said. "A business that's completely reliant on the river wouldn't last long if the river's not healthy," Greenberg added. "This is a river town. You can catch trout in every state, including Hawaii, but you can't catch wild, rising trout just anywhere. It's more rare than people think."

Learn more

Gates AuSable Lodge: gateslodge.com

Trout Unlimited: MichiganTU.org

Anglers of the AuSable: ausableanglers.org



BRANCHING OUT

A LANDOWNER'S PERSPECTIVE ON LEARNING NEW WAYS TO PROTECT LAND, WATER AND WILDLIFE



THE OPPORTUNITY TO PURCHASE A BEAUTIFUL HOUSE

perched on a hillside overlooking a scenic bend of the North Branch Au Sable River was one that fly-fishing enthusiasts Jerry and Fran Rucker could not pass up. They bought the home in 1993, including five acres of land, and have been rewarded with plenty of great fishing over the years. But the decision to live here has led the Ruckers to discover additional benefits, as well as responsibilities, of living and owning property in Michigan's Jack Pine Ecosystem.

“THE RIVER WAS THE MAIN REASON WE BOUGHT THE PLACE, BUT OVER TIME OUR INTERESTS HAVE EXPANDED TO OUR FORESTS AND UPLAND WILDLIFE.” JERRY SAYS.

Most of the Rucker property is dry northern forest composed mostly of jack pine, mixed with a few poplar, spruce, oak and white pine. Jerry and Fran have observed an impressive list of bird and mammal species using their property. The Ruckers consider themselves casual birders, keeping a list of the more than 50 bird species they have observed on their property—many of these while drinking morning coffee on the porch overlooking the river. White-tailed deer, mink, otter, beaver, bobcat, wild turkey, barred owl, bald eagle, wild turkey and grouse are among the wildlife that Jerry and Fran have been observed on their land. For the Ruckers, living on the North Branch Au Sable River is about more than just watching. The Ruckers are active stewards of their land, part of the reason they are visited by such a rich diversity of wildlife. The previous owner had planted non-native blue spruce and other ornamental plants, most of which have been removed and replaced with native species. Jerry and Fran plan to rototill an area near the house and plant a variety of native wildflowers to help attract pollinating insects, which also draws various species of birds.



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JERRY AND FRAN HAD TREES STRATEGICALLY CUT FROM THE PROPERTY TO CREATE BRUSH PILES FOR UPLAND WILDLIFE HABITAT AND FOR USE IN A TREE REVETMENT, WHICH WAS INSTALLED BY HURON PINES TO HELP PROTECT THEIR STREAMBANK FROM EROSION WHILE ALSO PROVIDING COVER FOR FISH AND OTHER AQUATIC ORGANISMS.



IN THE EARLY 2000S,

Fran and Jerry bought seven adjacent acres of land, primarily out of a desire to preserve its natural condition.

Just as Jerry's interest in the property expanded from trout in the river to the forests and upland species, his interest in stewardship grew beyond the boundaries of his own property. Jerry has served on the board of directors for the Au Sable North Branch Area Foundation for nearly twenty years.

He says one of his goals serving in that capacity has been to educate other landowners about Michigan DNR Natural Rivers Zoning regulations, which, he says "...are in place to keep the river, and the fishery, healthy."

Jerry also currently chairs the board of directors for both Huron Pines and the Kirtland's Warbler Alliance. It's a lot of responsibility to take on. Asked why he felt compelled to become so involved in these regional conservation efforts and organizations Jerry summed it up with a simple statement: "It is a way to give back."



Jerry grew up fishing and hunting, and he says he recognized that "something needed to be done." It was not enough for him to simply observe and enjoy northern Michigan's fantastic natural resources. He also encourages other landowners and resource users to become more involved in stewardship and offers some advice, "Everyone arrives with a focus—fishing, hunting, et cetera. Don't just look at the fish, or the forest. Broaden your focus, and don't be afraid to help out with what other people like. It's all connected."



CEDARS FOR THE AU SABLE

HOW ONE TREE GAVE RISE TO 20,000

THE PLANTING OF 20,000 CEDAR TREES ALONG THE AU SABLE AND MANISTEE RIVERS



He began with a fruitless search 25 years ago for a single, surviving sapling.

Howard Johnson, whose century-old cabin overlooks the Au Sable River's south branch at the secluded Bay City Hunting & Fishing Club southeast of Grayling, came to notice decades ago that no young cedars were developing on his riverbank.

"I WENT DOWNSTREAM TO THE MASON TRACT TO FIND A COUPLE CEDAR TREES TO PLANT ON MY PROPERTY," said Johnson,

admitting the endeavor would've amounted to taking from state land had he succeeded. "I couldn't find any small ones, then I realized I couldn't find any cedar trees at all." The deer had beat him to the punch.

Whitetails browse succulent cedar growth within their reach, including the tender tops of saplings. Taller trees are able to survive as most of their growth is too high to eat. "The deer were preventing trees from maturing," Johnson said. "This phenomenon is happening in a lot of Northern states that have high deer populations." This was old news to the Crawford-Roscommon Conservation District, whose sale of cedar saplings to Johnson came with a word of caution: Cage the trees or risk losing them to deer. "So I spent \$100 getting materials for cages for my trees," Johnson said.

The cages worked and his trees survived.



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AT THAT TIME, JOHNSON WAS ON THE BOARD OF THE AU SABLE PROPERTY OWNERS ASSOCIATION, TO WHICH HE PROPOSED STARTING A PROGRAM TO OFFER CEDAR-TREE KITS TO RIVERSIDE RESIDENTS.



A package of 10 trees and cage materials, subsidized by many different river conservation groups, would cost landowners \$15. "It provided property owners with a convenient way of planting cedars on their property by gathering together everything they needed while making it affordable," Johnson said. "Without the support of these various groups the cost we'd have to charge property owners (\$45) would be prohibitive." Cedars for the Au Sable, as the effort was dubbed, was a hit its first year.

"We found out that people love to plant trees," he said. Since then, McLean's Ace Hardware has lent a hand by warehousing all the cage materials at its Grayling store. "My dad started working with (Johnson) a long time ago and I've carried on the tradition, doing what we can to help the community," said owner, Jason McLean. "We agree that it's still a good idea."

Aside from looking nice in a yard, cedars serve many vital roles in a river ecosystem. Mature trees shade the river from sunlight, keeping water cool. Roots stabilize the bank and prevent erosion. Old trees that topple into the river become valuable habitat for fish and macroinvertebrates, and rot-resistant cedar can linger in the current for decades.

"AS FLY FISHERMEN IT'S IMPORTANT TO US, LONG RANGE, THAT THESE TREES EVENTUALLY FALL IN THE RIVER AND BECOME FISH COVER," JOHNSON SAID.

Cedars for the Au Sable fulfills its mission on several fronts. Mailings are sent to river property owners with information about the program and, each year, about 40 or 50 residents pre-order kits totaling about 500 trees. About 20 percent of riparian property owners along the river have taken part.

The Department of Natural Resources goes through the program to acquire trees it plants at road ends and river-access points.

"We also have cooperative agreements with the DNR to plant on state land, including the Mason Tract where it all began," Johnson said. About 1,250 cedar saplings have been planted at the Mason Tract so far. Each year a crew of volunteers repair tree cages and install larger ones on trees that have grown. Trees stay in cages for about 15 years before they're tall enough – 6 feet or more – to survive unprotected.

DESPITE ALL THIS EFFORT, SOME TREES FAIL TO THRIVE.

JOHNSON WONDERS IF GENETICS ARE TO BLAME, AND PERHAPS CEDARS ARE SO SPECIFIC TO A REGION THAT ONLY LOCAL SEED STOCK WILL YIELD THE BEST RESULTS.

THE GROUP HAS BEEN COLLECTING

seed pods from mature trees in areas where they plan to plant saplings. Those pods – each containing about 10 tiny seeds – are sent to nurseries which grow them to two-year saplings before they are planted back in the same area with their parent trees.



“NO ONE HAS DONE A STUDY LIKE THIS TO SEE IF WE HAVE BETTER SURVIVABILITY BY USING THAT SAME RIVER’S SEED STOCK,” JOHNSON SAID. “WE HOPE WE CAN REDUCE THE NUMBER OF TREES THAT HAVE JUST STALLED.”

Regardless of genetic variation, Ivan Witt, the forester who’s worked with the hunting and fishing club where Johnson lives, feels the efforts of determined volunteers to plant and protect trees are most crucial to the success of the program.

“It is super high maintenance to keep up those cages but they’ve had some real success,” Witt said. “It really shows his long-term dedication to the success of this project.”



HARTWICK PINES STATE PARK

AN OLD-GROWTH TIME CAPSULE

HARTWICK PINES

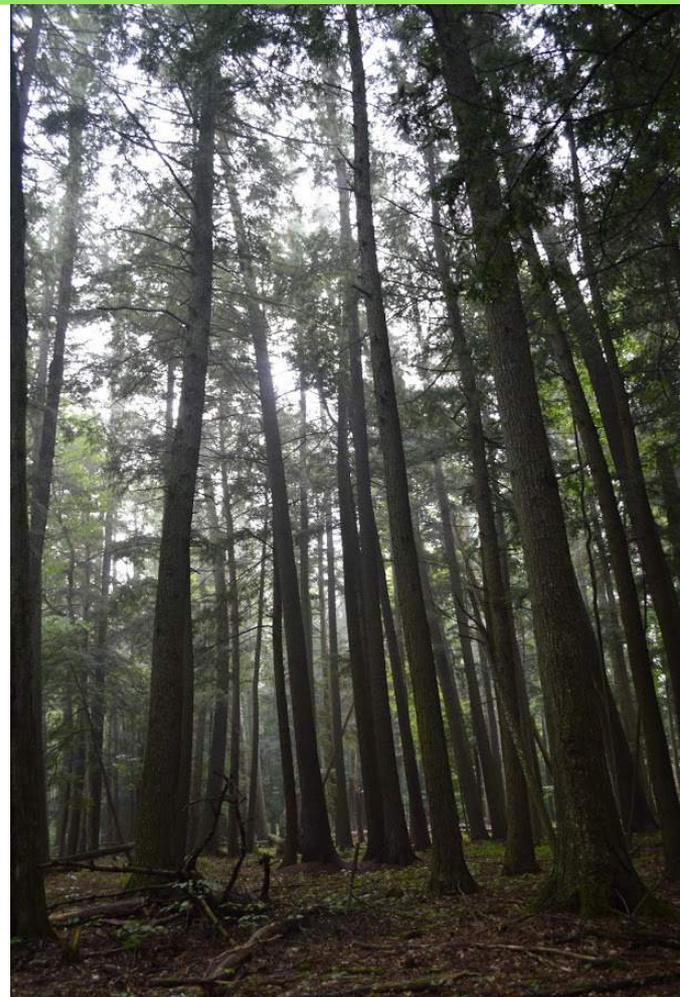
is a living reminder that Northern Michigan was once home to giants.

The giants were trees – white pines so massive they would dwarf lumberjack legend Paul Bunyan and his mighty axe. In the late-1800s, however, even the grandest of Michigan’s trees were no match for the hordes of lumbermen, their teams of powerful pulling horses, and their sharpened steel bits.



“WE HAVE REMNANTS OF WHITE PINES THAT DEPICT WHAT MICHIGAN USED TO LOOK LIKE BEFORE THE WHITE PINE LOGGING ERA,” said Craig Kasmer, park interpreter and 15-year veteran of the state park in Grayling that is home to the Lower Peninsula’s largest contiguous forest of old-growth white pine.

Michigan goes way back with the lumber industry and the roots of most northern towns are deeply embedded in it. Settlements sprang up around saw mills, rail yards and ports where the lumber was cut, carried and shipped to market. Those settlements became the towns of Grayling, Gaylord, Alpena, Vanderbilt, and so on.



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THE HISTORY OF HARTWICK PINES' OLD-GROWTH FOREST CAME TO A HEAD AT THE CRITICAL YEAR OF 1893



“SALLING-HANSON LUMBER COMPANY WAS HARVESTING PINES HERE,” KASMER SAID. “THAT YEAR THERE WAS AN ECONOMIC PANIC NATIONWIDE AND THEY STOPPED CUTTING.”

When the sawdust settled, only 86 acres of the once-sprawling old-growth forest remained.

Cutting resumed when the recession ended a few years later. Salling-Hanson had to decide whether to clear the remaining 86 acres or move their men northwest to a recently acquired 8,000 acres of standing white pine. They made their move, sparing what would become the state park. “If there had been no recession they would have continued clearing here,” Kasmer said.

The remaining grove of old-growth trees, along with thousands of surrounding acres, were given to the state in 1927 by Karen Hartwick in memory of her late husband, Major Edward Hartwick, with the stipulation the trees be protected. The area became a State Park July 19, 1935.

Much of the park’s 9,672 acres is northern hardwood forest boasting giant beech and maple trees more than 100 years old.

“When the pines were cut it opened up the canopy, giving more light to the sun-tolerable plants like hardwood trees,” said Abby McCutcheon, Seasonal Interpreter at the park.

Kasmer said the white pine make valuable habitat for porcupine, raccoon, opossum and the occasional bear. Deer use the area as a wintering grounds and the eastern hemlock intermingling with the pines attract evening grosbeaks and the birders who come to see them.

With the saws long silent, Mother Nature is the biggest threat to the forest. In September 1929 fire breaks and a crew of 300 halted a wildfire less than a mile from the pines. In 1940, hurricane-level winds took out 40 percent of the old growth stand, leaving a mere 49 acres today..

LIGHTNING STRIKES, THOUGH INFREQUENT, CAUSE THE WATER INSIDE THE TOWERING PINES TO INSTANTLY FLASH TO STEAM, TURNING THE TREES INTO 150-FOOT WOODEN BOMBS WHEN HIT.

SPLINTERED SHRAPNEL FROM A STRIKE 11 YEARS AGO

is still scattered far from its tree and another strike in September caused a fallen treetop to crush the paved pathway where it landed.

"This is why we don't let people leave the visitor's center in a thunderstorm," McCutcheon said as she stood on the patched asphalt.

In the areas of the park where northern hardwoods grow, an invasive insect infects the beech trees with a fatal fungus. The millions of insects look like white powder coating the bark of the beech trees. Not all of the beech trees are infected, yet...

"Just like the emerald ash borer took out the ash trees, beech scale will be the end of the beech trees," said McCutcheon.

Humans may also still damage the forest.



THE MONARCH,

once the park's biggest white pines at 155 feet tall, was topped by wind in 1992. Decades of park visitors circling or hugging the tree compacted the soil around its shallow roots and, in 1996, the Monarch Pine was pronounced dead. That tree was found to be 325 years old when it died, meaning it was a sapling when Isaac Newton was studying light, Louis XIV was king of France, and St. Ignace was founded by Father Marquette. "Now it's a lovely, 70-foot snag," McCutcheon said of the Monarch's, woodpecker-punched trunk.

The park urges visitors to stay on the trails. A 1 1/2-mile paved path winds through the old growth section. Another 3-mile trail crosses the East Branch of the AuSable River twice and cuts through an old-growth stand of eastern hemlock, a tree once valued for its tannic acid used by trappers to preserve animal hides.

"It's really spectacular through there," McCutcheon (pictured left) said of the river trail.



The park also does programs at area schools in the and hosts guided hikes throughout the year, along with numerous other programs. More information can be found online by visiting www.michigan.gov/dnr and searching "Hartwick Pines." Hartwick Pines State Park is located at 4216 Ranger Rd., Grayling.

