Landscape Stewardship Plan for Michigan's Northern Hardwoods Ecosystem

Cheboygan & Otsego Counties

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Contents

1. Executive Summary

This landscape stewardship plan, which covers Michigan's Northern Hardwoods Ecosystem centered in Cheboygan and Otsego 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 the people and organizations to each other and 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 Cheboygan and Otsego 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, coldwater fisheries and unique wildlife including elk, which roam the Pigeon River Country State Forest. 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 Northern Hardwoods 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 Northern Hardwoods Ecosystem—an important first step in alleviating many of the other 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 landowners 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, can be viewed as a forest stewardship plan across the Cheboygan and Otsego counties landscape. 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 Cheboygan/Black River Watershed Initiative (2003), Cheboygan County Master Plan (2014), Otsego County Master Plan (2009), and MDNR Wildlife Action Plans (2015 drafts). 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 Northern Hardwoods Ecosystem include management of forests for tree health and wildlife 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, 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.

Children enjoy the sites, smells and sounds of a hardwood forest during a Kids Outdoors Otsego hike in Otsego County, MI.

2. Project Introduction

This landscape stewardship plan focuses on Michigan's Northern Hardwoods Ecosystem, with particular emphasis on Cheboygan and Otsego 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 Northern Hardwoods plan and a plan covering Michigan's Jack Pine Ecosystem, focused on Crawford and Oscoda counties. Both of these northern Lower Peninsula landscapes contain fairly large tracts of forest land under a mixture of private and public 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.

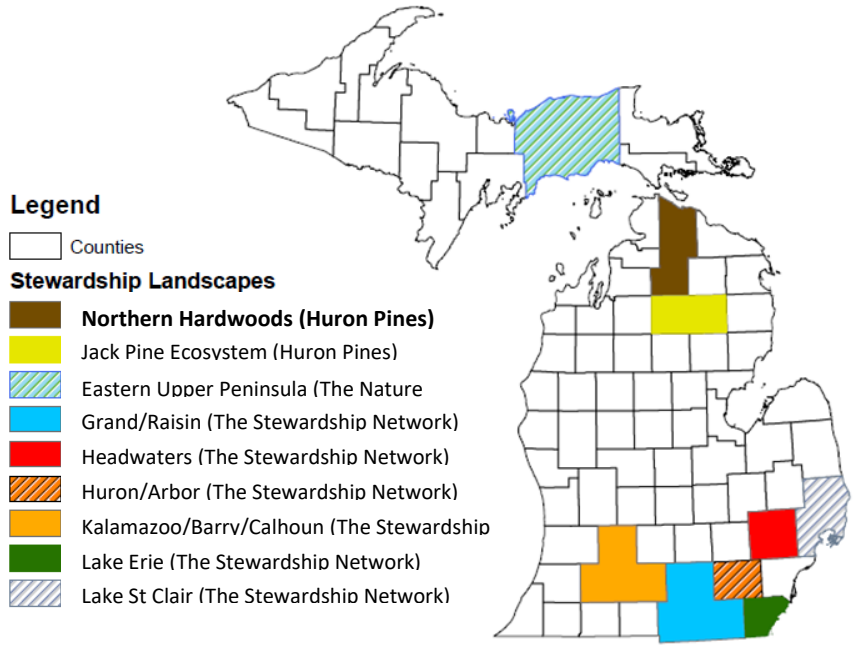


Figure 2.1 Map – areas covered by the nine landscape stewardship plans.

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

Autumn colors show in this northern hardwoods forest in Otsego County, Michigan.

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 (or even upstream, 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 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 3.1.

While the collection of features in a particular landscape gives a region its character and shapes a sense of identify 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. The Northern Hardwoods landscape, therefore, is not a homogeneous hardwood forest but rather a mosaic of different forest types, prairies, wetlands, urban areas and water bodies. However, the hardwood forests of Cheboygan and Otsego counties play an important role in defining or shaping our regional sense of place, recreational activities, forest products, history and culture.

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 a localized audience.

To complete each plan, project partners collaborated to develop project goals and methods, as well as to compile information about statewide and regional assistance opportunities applicable to all nine landscapes (Sections 2 and 4). Section 3 of this plan is specific to Michigan's Northern Hardwoods Ecosystem and were completed by Huron Pines through a review of existing resources and with significant input from various stakeholders in Cheboygan and Otsego counties. Agencies, organizations, private landowners and businesses all also shared their stewardship stories to help explain and promote the various land stewardship opportunities that are available.

These stewardship stories form a unique part of this landscape stewardship plans project. The stories, told by local landowners and land managers, are included at the end of this document and serve to illustrate some of the land stewardship practices that people are engaging in right here in Cheboygan and Otsego counties. In addition to providing contact information and

summaries of existing program opportunities, the inclusion of stories is meant to inspire others to increase their level of land stewardship activity.

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 Cheboygan and Otsego counties. The stewardship stories included in this plan were shared voluntarily for inclusion in this plan and with intent to distribute them 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 overall project is the installation of acoustic monitoring devices in several of the landscape areas. Huron Pines installed an acoustic monitoring device in a Kirtland's Warbler Management Area located on state land as part of the Jack Pine Landscape Plan. 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 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 Northern Hardwoods Ecosystem is home to approximately 50,000 people and is fondly referred to as "up north" by many others. Our landscape is characterized by expansive forests, clean and cold streams, and large inland lakes. It is a destination for golfing, fishing, boating, and practically all winter sports. The communities of this area—including Cheboygan, Gaylord, Indian River, Vanderbilt, Wolverine—depend on the surrounding natural assets for their livelihood. In turn, our forests, lakes, streams and wildlife rely on active, sustainable and collaborative stewardship practices if they are to remain healthy. This section summarizes the natural resources of our region.

3.1 Geographic Scope

This landscape stewardship plan covers Cheboygan and Otsego counties in northern Michigan. While the landscape features discussed in Section 3 are specific to this geography, most of this content is also applicable to other hardwood forest landscapes throughout northern Michigan.

Together, Cheboygan and Otsego counties contain a combined 1,411 square miles (903,040 acres) of land, most of which is sparsely populated and heavily forested. About one third of this land area is publicly owned (MDNR), and most rural private properties are also well forested. There are no tracts of federally-owned land in Cheboygan or Otsego counties, although we are not a far drive from the large tracts of federal land found in surrounding counties.

Figure 3.1 Location of Cheboygan and Otsego Counties in Michigan

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 Cheboygan and Otsego 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 Northern Hardwoods Ecosystem.

3.2.1 Climate

Cheboygan and Otsego 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 harsh climate helps determine the vegetation and wildlife found here and affects people, too. Many landowners brave the elements year-round, while others own seasonal or recreational properties in the area but maintain permanent residences elsewhere. Tourism and outdoor recreation activities are also seasonal and closely tied to our region's climate and natural features. Our snowy winters and topography bring people to the region in the winter months for skiing, snowmobiling and ice fishing. During our mild summers visitors enjoy camping, fishing, boating, hiking, golfing and more. Cheboygan and Otsego counties also offer great hunting throughout the year.

3.2.2 Geology and Topography

The geology of this landscape is a result of glacial activity, ending about 10,000 years ago, and subsequent processes related to postglacial lakes in the area. The landscape features lots of rolling hills, particularly in Otsego County and the southern half of Cheboygan County. These areas generally feature well-drained sandy soils. The northern portion of Cheboygan County is a bit flatter in relief, and the soils are less permeable, leading to a higher prevalence of wetlands.

Antrim Shale, a bedrock geology formation, covers most of Otsego County and is economically significant for oil and gas production. There are thousands of gas wells in Otsego County, found on both private and public lands – including the southern portion of the Pigeon River Country State Forest. The soils of this area are of limited use for agriculture, with corn and hay being the dominant crops grown in flatter areas with suitable soils. Steeper areas are generally left covered in forest.

Maximum elevation in the landscape stewardship plan focal area is 1,516 feet above sea level (Otsego County, southwest of the City of Gaylord) and the minimum elevation is 577 feet above sea level (Cheboygan County, Lake Huron Coast) (Appendix 9, Map 3).

3.2.3 Water & Wetlands

A large portion Cheboygan and Otsego counties lies within the Cheboygan River Watershed, which includes the Pigeon, Sturgeon, Indian, Cheboygan, and Black rivers as well as Burt Lake, Mullet Lake and Black Lake. The Cheboygan River drains this watershed, entering Lake Huron in the City of Cheboygan. Portions of Otsego County also fall within the Manistee River, which drains west into Lake Michigan, and the upper Au Sable River, which flows east on its way to Lake Huron.

Three of Michigan's ten largest inland lakes are found in or partially within Cheboygan County—Burt Lake (4th largest with 17,120 surface acres), Mullet Lake (5th largest with 16,630 acres) and Black Lake (8th largest with 10,130 acres). These lakes are popular for water sports, and support a variety of fish species including walleye, northern pike, burbot, yellow perch, muskellunge and many others.

Sinkhole lakes are a unique surface water feature dotting northeast Michigan, from Otsego County northeast through Presque Isle County. Sinkholes were formed through dissolution of underground limestone, dolomite or gypsum, leaving a cavity that eventually collapsed. There are several scenic sinkhole lakes in the Pigeon River Country State Forest. While not boasting much in terms of aquatic wildlife diversity, many of these sinkhole lakes have been stocked with trout by the Michigan DNR, offering quiet places to cast a fly.

Area streams are popular with fly-anglers, offering great opportunities to catch brook trout, brown trout and steelhead. Lake sturgeon also inhabit some of our rivers and lakes, particularly in the Black River Watershed, where Sturgeon for Tomorrow volunteers watch over spawning sturgeon to discourage illegal harvest. There are enough adult lake sturgeon, however, to support the annual Black Lake Sturgeon Shivaree – a weekend event which draws large crowds of folks interested in a chance to harvest one of the giant fish. There is a strict limit of only a few fish that can be harvested each year, which is carefully monitored, and as soon as that limit is met officials declare the season closed.

Northern Michigan's Inland Waterway is a unique recreation feature running through the heart of Cheboygan County. Linking Pickerel Lake in Emmet County with Lake Huron at the City of Cheboygan, this navigable chain of lakes and rivers stretches approximately 40 miles. Visit the Indian River Chamber of Commerce website for more information about the Inland Waterway: http://irchamber.com/our-community/inland-waterway-michigan/.

There are approximately 1,638 total miles of rivers and streams within Cheboygan and Otsego counties, many of which are formally recognized for their high water quality, productive fisheries and scenic beauty by state designations including:

- 104 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.trailstotrout.com/blueribbon.html). This includes the designated portions of the Pigeon River, Sturgeon River and West Branch Sturgeon River, and designated portions of the Black River and North Branch Au Sable River located within Cheboygan and/or Otsego counties.

- 120 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). This includes the Pigeon River (80 designated miles), Au Sable River (32 miles in Otsego County) and the upper Manistee River (8 designated miles in Otsego County).

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 wetland habitats. 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 Cheboygan and Otsego counties is shown in Appendix 9, Map 5 covering approximately 4% of this area–primarily as forested wetlands.

Sinkhole lakes, like this one in the Pigeon River Country State Forest, were formed by dissolution of underground limestone, dolomite or gypsum and subsequent collapse of the ground. The Michigan DNR stocks some of these sinkhole lakes with trout to provide angling opportunities.

3.3 The Ecological Landscape

3.3.1 Land Cover

Prior to Michigan's logging boom in the late 1800s, most of Cheboygan and Otsego counties were blanketed in forest land, with tree composition tied to soil conditions and topography. Upland areas generally featured northern hardwoods, or red and white pines in drier areas, while spruce and cedar were found in lowland swamps. As with much of Michigan, loggers cleared most of the trees from our landscape more than a century ago. Now, the forest cover has returned to a similar composition as in pre-settlement times.

Areas like the Pigeon River Country State Forest, which covers 105,695 acres, were acquired by the State of Michigan starting in 1919. There, Civilian Conservation Corps volunteers helped clear wood from streams and began planting trees, including large numbers of red pine. Natural growth also replenished the forest after the end of the logging boom.

Table 3.1 highlights the composition of the landscape for Cheboygan and Otsego counties.

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

Land Cover Type	% of Total Area (Cheboygan)	% of Total Area (Otsego)
Forested	63.8	63.9
Developed	4.3	9.5
Agriculture	6.3	7.6
Wetlands	5.2	2.9
Open Water	9.8	2.1
Other (prairie, open, etc.)	10.6	14.0

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. Well-drained soils support a variety of conifers including red pine, white pine and jack pine. Moderately drained upland forests support a mix of northern hardwoods including beech, maple, birch, aspen, and oak.

Apart from small cities and surface waters, most areas of Cheboygan and Otsego counties are rural and generally contain forest or wetland habitat. There is little agricultural activity in the area, and it is mostly concentrated in northern Cheboygan County. Primary crops include hay

and corn. Approximately 6% of the landscape is covered in open water, including lakes and streams, and wetlands make up the remaining 4% of our landscape. Land use and land cover conditions across Cheboygan and Otsego counties are depicted in Map 6, Appendix 9 (National Land Cover Database, 2011).

There are also 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, wetland and beach species including Pitcher's thistle, Hill's thistle, dwarf lake iris, Houghton's goldenrod and Michigan monkey flower. Other, more common, herbaceous plants include little bluestem, sweet fern, and a variety of sedges. Morel mushrooms, an edible fungus, are fervently sought each spring by those knowing where to look.

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 Cheboygan and Otsego counties, there are 20 prevalent community types and an additional 5 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	Cheboygan County	Otsego County
Bog	Prevalent	Prevalent
Boreal Forest	Prevalent	-
Coastal Fen	Infrequent	-
Dry Northern Forest	Prevalent	Infrequent
Dry Sand Prairie	-	Infrequent
Dry-mesic Northern Forest	Prevalent	Prevalent
Emergent Marsh	Prevalent	Prevalent
Floodplain Forest	Prevalent	Infrequent
Great Lakes Marsh	Prevalent	-
Hardwood-conifer Swamp	Prevalent	Prevalent
Interdunal Wetland	Prevalent	-
Intermittent Wetland	Prevalent	Prevalent
Mesic Northern Forest	Prevalent	Prevalent
Muskeg	Infrequent	-
Northern Fen	Prevalent	Infrequent
Northern Hardwood Swamp	Prevalent	Infrequent

Northern Shrub Thicket	Prevalent	Prevalent
Northern Wet Meadow	Prevalent	Prevalent
Oak-pine Barrens	Infrequent	-
Open Dunes	Prevalent	-
Pine Barrens	Infrequent	Infrequent
Poor Conifer Swamp	Prevalent	Prevalent
Poor Fen	Infrequent	Infrequent
Rich Conifer Swamp	Prevalent	Prevalent
Sand and Gravel Beach	Prevalent	-
Sinkhole	Infrequent	Infrequent
Submergent Marsh	Prevalent	Prevalent
Wooded Dune and Swale Complex	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 fifty species of mammal found in this area. Iconic examples include black bear, elk, 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 mammals in our region are of historical or current significance for hunting, trapping and wildlife viewing. In fact, French fur traders were active in the Cheboygan area as early as the 1600's and Chippewa Indians have utilized many of these species, as well as fish, for centuries. Enthusiasm for deer, elk and bear hunting remains high today.

Our forests, fields and waterways also harbor a great diversity of birds. Popular game species include ruffed grouse, wild turkey and woodcock. Dozens of song bird species live in or pass through Cheboygan and Otsego counties, which are also home to many ducks and other water fowl. Some of our iconic bird species that are of special conservation concern include common loon, bald eagle, Caspian tern, piping plover, osprey and red-shouldered hawk.

Our reptile and amphibian fauna includes a variety of frogs and toads, salamanders, snakes and turtles. Of special conservation concern are the eastern massasauga rattlesnake, the wood turtle and the Blanding's turtle. Frogs and toads, heard on spring and summer evenings wherever water is near, are a familiar part of our region's ecological "soundscape." Amphibians and reptiles rely on high quality and well-connected wetlands, vernal pools, riparian corridors and upland habitats for their long-term survival.

There are 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 and native wildflowers. Species of particular concern in our area include the dusted skipper (a butterfly) and secretive locust, which can be found only in Michigan. Monarch butterfly are a species of international concern and can be seen migrating through Cheboygan and Otsego counties in the summer.

3.3.3 Fish

The Northern Hardwoods landscape of northern Lower Michigan is a place of coldwater streams and large inland lakes. The headwaters of the Pigeon and Black rivers contain healthy populations of native brook trout, while the Sturgeon River is known for its large brown trout. Steelhead run the lower reaches of the Cheboygan and Black rivers, and other coastal streams along the Lake Huron shoreline. The big lakes – including Burt, Mullet, and Black – are all popular boating and angling destinations hosting a variety of warmwater fish such as walleye, northern pike, panfish, burbot and lake sturgeon. The Black River system, including Black Lake, contains what is likely the healthiest Lake Sturgeon population in Michigan. On Black Lake, anglers set out on the frozen water in February to spear a limited number of sturgeon during the annual Shivaree event. Harvest of Lake Sturgeon is prohibited the remainder of the year, and from most other water bodies in northern Michigan. A slow-growing species, Lake Sturgeon do not begin reproducing until they are 15 to 20 years old, so are vulnerable to over-exploitation. There are hundreds of smaller lakes throughout Cheboygan and Otsego counties where outdoor enthusiasts can find fish, view wildlife, and paddle peacefully on these often very picturesque waters. Threats to our native fish fauna, which are related to the stewardship of surrounding lands, include invasive species, sediment and nutrient pollution, and fragmentation of stream habitat by dams and road/stream crossings.

This burbot (*Lota lota*), caught in Burt Lake, Cheboygan County, is a freshwater relative of the cod. They inhabit the Great Lakes and several of northern Michigan's larger inland lakes. Burbot are also known as eelpout, lawyer, ling, lingcod, cusk, lush, loche, and poor-man's-lobster. Burbot spawn in the dead of night, under the ice toward the end of winter, in large spawning aggregations.

Other notable fish in our area include walleye, northern pike, perch, bluegill, largemouth bass, and brook, brown and rainbow trout. There are also dozens of minnows, darters and other small fish species in our waterways.

3.3.4 Elk

In the heart of northern Lower Michigan is a unique herd of wild elk, centered in Michigan's "Big Wild" – the Pigeon River Country State Forest. According to the Michigan DNR, elk naturally occurred in northern Michigan until they were extirpated in 1875. The existing elk herd is descended from a group of seven elk that reintroduced to Michigan in 1918. Since then, our elk population has fluctuated from a few hundred to as many as about 1,500 animals. Today, the herd is managed for a target population of 500-900. Elk management, which aims to keep a healthy elk herd centered on the public lands of the Pigeon River Country State Forest, where potential conflicts with local farmers and vehicular traffic is reduced, includes techniques such as habitat restoration and elk hunting seasons. It is difficult to keep an exact tally of the elk in northern Michigan, but aerial surveys are regularly conducted to estimate population size.

3.3.5 Invasive Species, Forest Pests and Diseases

A number of non-native species have been introduced to the Northern Hardwoods 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. 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, see Figure 3.2) and hemlock woolly adelgid (an insect pest) are emerging threats to the health of our region's forests.

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 develop 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.

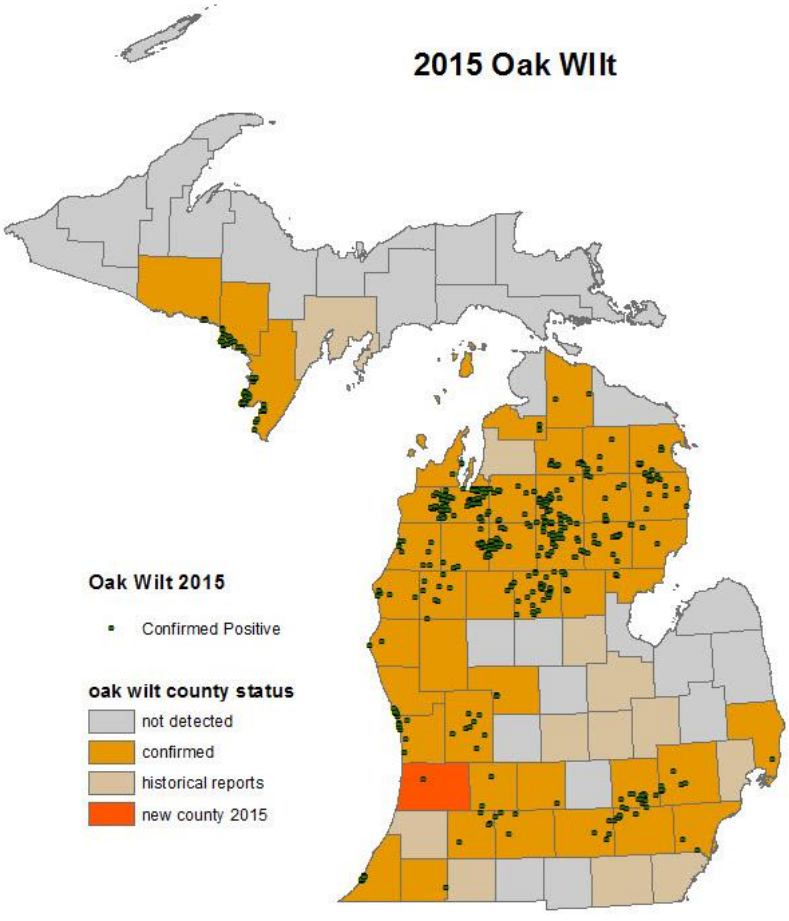


Figure 3.2 Map of confirmed oak wilt in Michigan (Map source: MDNR, 2015)

More information about invasive species, including how to report observations and information about managing them, can be found at: huronpines.org, www.michigan.gov/invasives/, www.misin.msu.edu/, and mnfi.anr.msu.edu/invasive-species/factsheets.cfm. A list of invasive plant and animal species that have been observed in Cheboygan and/or Otsego counties is shown in Appendix 8, Table 3.

Japanese barberry is one of the invasive plants established in Cheboygan and Otsego counties. Huron Pines is working with the Michigan DNR to treat invasive barberry in order to protect native plants and enhance wildlife habitat in the Pigeon River Country State Forest.

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 Inland Waterway has been used for transportation, its waters fished and the forests that surround it hunted since well before European settlers arrived and developed a modest fur industry in the area as early as the 1600s. There are nearly 1,800 archaeological sites scattered throughout Cheboygan and Otsego 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 1800s an extensive lumbering boom cleared the landscape. In fact, the earliest industrial site in the upper Great Lakes Region is the Campbell Saw Mill in Cheboygan County, which was built in 1784 and has been reconstructed and is now on display through historical tours. After the lumber boom, many folks moved away from the region seeking work. However, since World War II tourism and recreation have been economic drivers for the region, which has slowly increased in population since then.

Today, people are using the landscape of Cheboygan and Otsego counties for various purposes including permanent or seasonal residences, outdoor recreation, wildlife management, timber harvest and other forest products, oil and gas development and tourism. Some of 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 Cheboygan and Otsego counties, which have a combined population of only 50,676 (2010 census), is primarily rural in character. Its largest communities are Gaylord, in Otsego County (3,636 people) and Cheboygan in Cheboygan County (4,867 people). Population has risen fairly steadily in both counties in recent decades, and is project to continue to increase, with a higher proportion of people living in rural areas than within incorporated communities. 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, which appears will continue in the foreseeable future. There are approximately 20,000 additional seasonal residents, not including tourists, so the amount of people in the area increases dramatically during the summer and on

weekends and special events. Check out the Otsego County Master Plan (2009) and Cheboygan County Master Plan (2014) for more information on demographics in our region.

3.4.3 Land Ownership

About 66% of the land in Cheboygan and Otsego counties is privately owned by a combination of private individuals (permanent and seasonal residents), hunt clubs, utility companies and other corporations. The remaining land area (34%) is State of Michigan property, owned and managed by the Department of Natural Resources. State and private land ownership within Cheboygan and Otsego counties is depicted by Map 7 in Appendix 9. Adjacent counties have large tracts of federal land, such as Huron-Manistee National Forest, but there are no federal lands held in Cheboygan or Otsego counties. However, the Michigan DNR-managed Pigeon River Country State Forest is the largest tract of public land in Michigan's lower peninsula. It covers 105,695 acres. Designated as a special management area in 1919, the property that makes up the Pigeon River Country State Forest was acquired in pieces over time through the Game and Fish Fund, Michigan Natural Resources Trust Fund, tax reversion, private and government exchanges and through various grants. Stewardship of the Pigeon River Country follows a regularly updated "concept of management" plan with input from a special advisory council.

Aside from the small cities scattered throughout our region, most of our private and public lands have become reforested since the logging era and most public land is managed under a multi-use concept that facilitates outdoor recreation, use of timber resources and habitat for a variety of wildlife species. Oil and gas extraction is also prevalent in our region, on both private and public lands, including the southern portion of the Pigeon River Country State Forest. Oil and gas revenues generated from state land help support the Michigan Natural Resources Trust Fund, which allocates funding to projects around the state including land acquisition and the development or improvement of public recreation sites such as parks, access points and trails.

3.4.4 Tourism and Recreation

The Pigeon River Country State Forest is the largest tract of state land in Michigan's Lower Peninsula. As such, it offers outdoor recreationists a variety of opportunities including hiking, camping, cycling, horse-back riding, fishing, hunting, snow-shoeing, wildlife viewing, photography, morel mushroom hunting and more. These activities are popular throughout Cheboygan and Otsego counties, along with seasonal sports like snowmobiling, downhill skiing, and golf.

Tourism and outdoor recreation are significant economic drivers in this region. In addition to direct outdoor recreation purchase such as sporting goods and guided tours, visitors spend money on food, lodging and other activities during their stay. Our regional economy depends

heavily on high quality forests, water resources and wildlife that draw people to visit. And to keep these natural features healthy, we must work together to protect them.

3.4.5 Forest Products and Economics

Significant amounts of timber are harvested from Cheboygan and Otsego counties each year, from both private and public lands. Timber cuts, done strategically, provide forest products while simultaneously improving forest health and diversifying wildlife habitat. Timber sales on public lands help fund government stewardship activities and programs, while private individuals can realize tax breaks and generate income through timber sales. Figure 3.2 shows a map of active forest product mills throughout Michigan.

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. Northern hardwood forests also provide maple syrup, morel mushrooms, and a variety of fish and game species. See Section 4 and appendices for forest stewardship opportunities, resources and contact information.

In Cheboygan and Otsego counties there 110 landowners enrolled in a Forest Stewardship Plan, covering are 30,091 acres of land. Visit www.michigan.gov/foreststewardship to enroll your own property in the Forest Stewardship Program.

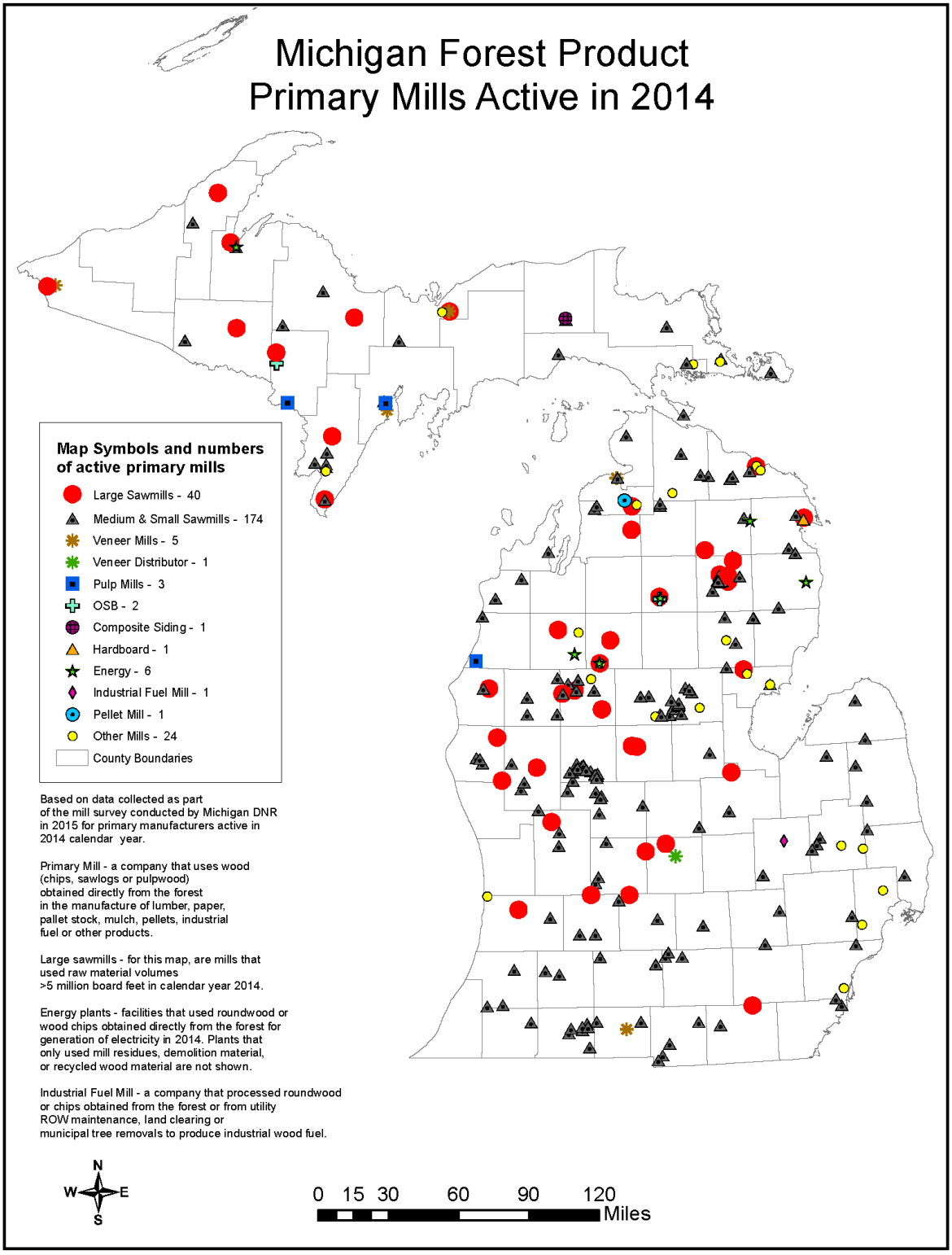


Figure 3.2 Active Forest Product Mills in Michigan (2014)

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.treefarmsystem.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 Cheboygan and Otsego counties, HCVAs are found along the Pigeon and upper Au Sable rivers (designated Natural River). There are also 22 Ecological Reference Areas in our region (16 units in Cheboygan County and 6 units in Otsego County).
See: www.michigan.gov/documents/dnr/FINAL_ERAs_listByNaturalCommunity_477323_7.pdf

3.5 Landscape Stewardship Action

This section summarizes the resource management context in Cheboygan and Otsego counties:

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.

Invasive species are problematic plants and animals that often out-compete, prey upon or otherwise harm native species and alter natural ecosystems. Invasive species often cause economic harm, either through negative impact on valuable native species or by causing direct damage to human property. Some invasive species are already causing problems here, such as the emerald ash borer that has decimated our ash trees. Others, like the mountain pine beetle and hemlock woolly adelgid have not been found in Cheboygan or Otsego counties yet but have the potential to cause significant damage should they be introduced. Diseases, such as oak wilt disease, also threaten our region's tree species and 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 fragments 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.

Public perception about management practices, particularly in regard to clearcutting and public land ownership, can also be a challenge for those charged with sustainably managing our lands. These practices are necessary to protect the overall health of our forest ecosystems and to secure opportunities for future generations to use and enjoy these resources. There are pros and cons to any approach, but resource managers and the community generally support these efforts when clear communication and opportunity for collaboration are provided. Most people believe that the benefits of protecting native ecosystems and species—our natural heritage—is a

worthwhile endeavor. 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 Cheboygan and Otsego counties.

Successfully addressing these challenges—at the very 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 advise 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's 2015-2025 draft Pine Barrens & Dry Northern Forests Wildlife Action Plan (www.michigan.gov/documents/dnr/16_dry_forests_pine_barrens_500077_7.pdf, and Young Forests Plan (www.michigan.gov/documents/dnr/15_young_forests_500076_7.pdf) include reviews of stewardship goals and recommendations covering or relevant for Michigan's Northern Hardwoods Landscape. Young forests include species like aspen, birch, alder, willow and dogwood and composed of young trees growing in relatively high densities. In northern Michigan, the area covered by young forest has increased from pre-settlement conditions as a result of management practices – often to attract and maintain game species like deer, bear, grouse and woodcock. Young forests are also important for rare species like the wood turtle and golden-winged warbler. The maintenance of this forest type depends on active stewardship that may include practices such as clear-cutting and prescribed burns.

An additional Wildlife Action Plan for Open Dunes and Sand-Cobble Beaches may also be of interest (www.michigan.gov/documents/dnr/10_dunes_beach_500071_7.pdf) to Cheboygan County residents and visitors.

A condensed version of these goals and actions related to stewardship of Michigan's Northern Hardwoods are included below. For a full bibliography of the references used to compile these goals and recommendations please see page 18 of the Pine Barrens and Dry Northern Forests Wildlife Action Plan and pages 14-15 of the Young Forests Wildlife Action Plan.

Land and Water Management Goals and Recommendations 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.
- Look for opportunities to create Young Forests to address forest health issues.
- Promote tree and shrub diversity in forest management.

Goals and Recommendations for Specific Threatened and Endangered Species

- Work with private landowners to implement Golden-winged Warbler BMPs
- Integrate the Golden-winged Warbler Conservation Plan into other planning and management efforts. Consider current and future projected range shifts of Golden-winged Warbler when prioritizing efforts.
- Implement the Golden-winged Warbler Conservation Plan.
- Use existing monitoring efforts for other species as indicators for quality Young Forest habitat creation and trends, including: American Woodcock singing ground surveys, Ruffed Grouse surveys, and North American breeding bird surveys.
- Establish baseline status and distribution of dusted skipper (*Atrytonopsis hianna*).
- At known sites where dusted skipper occur, conduct prescribed burns in late spring and include refuge areas to avoid significant impacts to dusted skipper populations.
- 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.
- Establish baseline status and distribution of the secretive locust (*Appalachia arcana*). Conduct studies to better understand habitat needs during different life stages, and effects of timber and fire management.
- When feasible, leave tops of trees and drumming logs on the forest floor; also leave mast producing trees and shrubs after harvest

Education, Outreach, Partnership and Planning Goals for Successful Northern Hardwoods 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.

Aquatic ecosystem goals include meeting EPA-designated uses and desired uses for our water resources identified by local stakeholders through the development of the Cheboygan River/Lower Black River Watershed Initiative (2003) and other plans and steering committee and public watershed meetings. Surface waters of the state of Michigan must be of sufficient quality to meet the following designated uses. Water bodies failing to meet quality standards for any of these designated uses requirements are considered to be "impaired."

- Agriculture
- Industrial Water Supply
- Public Water Supply at the Point of Intake
- Navigation
- Warm or Cold Water Fisheries
- Other indigenous aquatic life and wildlife
- Partial or Total Body Contact Recreation
- Fish Consumption

Desired uses for this watershed, defined by stakeholders during the development of the Initiative, include:

- Greenbelts in-place along the river and lake corridors
- Open-space protected through conservation easements
- Recreational trails along Cheboygan River corridor (as identified in City of Cheboygan Recreation Plan).
- Public and handicapped accessible sites along river for fishing and river access

Additional goals and objectives for protecting aquatic resources throughout northern Michigan:

- 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 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
- 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
- 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 panning 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	Learn to recognize exotic invasive plants and report them on misin.msu.edu wherever you observe them
	Clean boots, waders, vehicles and equipment after use, especially when traveling long distances or moving among watersheds. Use local firewood instead of transporting it.
	Select and plant native species for landscaping projects
	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.
Actively manage private forest lands for forest health and wildlife habitat	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. Visit www.michigan.gov/foreststewardship or contact the DNR Forest Stewardship Program to get started.
	Manage your forest to provide appropriate food, water, shelter and breeding/rearing areas for your favorite wildlife.
	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.
Protect clean water, shoreline property, and aquatic habitat with good land stewardship practices	Maintain/restore native vegetation along streams and lakeshores to filter runoff, reduce erosion and provide cover for aquatic and terrestrial wildlife.
	Limit or eliminate application of fertilizers, pesticides and other chemicals on land adjacent to surface waters
	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.
Develop shared vision and goals for our region and collaborate to achieve them more efficiently	Share ideas with neighbors, state and federal agency staff, nonprofit conservation organizations and others by mail, email, phone or participating in planning meetings.
	Tell your story to inspire others (see Section 4 of this plan)
	Volunteer on a restoration project. Contact Huron Pines or visit www.huronpines.org to find an event in your area.
	Make a financial gift to an organization you support

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.treefarmsystem.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 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 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

Cheboygan River/Black River Watershed Initiative (2003).
www.michigan.gov/documents/deq/wb-nps-cheboygan_Lower_Black_wmp_293393_7.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

Wildlife Action Plan: Young Forests (MDNR, Draft 2015).
www.michigan.gov/documents/dnr/15_young_forests_500076_7.pdf

Cheboygan County Master Plan (2014).
http://is0.gaslightmedia.com/cheboygancounty/_ORIGINAL_/fs44-1398713251-33637.pdf

Otsego County Master Plan (2009).
http://www.otsegocountymi.gov/wp-content/uploads/2015/12/Master-Plan-w-Resolution.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/MIStateForestMgmtPlan_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/dnrlip
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. Huron Pines – www.huronpines.org

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

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
Qualified Forest Program - www.Michigan.gov/qfp Commercial Forest Program – www.Michigan.gov/CommercialForest
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
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
DNR Hunting Access Program - www.michigan.gov/hap DNR Wildlife Landowner Incentive Program - www.michigan.gov/dnrlip 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
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
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.nhdfl.org/library/pdf/Forest%20Protection/timbersaleagreement.pdf
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
Michigan Forest Association - www.michiganforests.com American Tree Farm System - www.treefarmsystem.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
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
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

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 landowne
r, 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 about 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 dominate 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: Cheboygan County rare species

Table 2: Otsego County rare species

Table 3: Invasive species that have been reported in Cheboygan and/or Otsego counties

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

All plants and animals located in Cheboygan County

66 species

Scientific Name	Common Name	Taxonomic Group
Accipiter gentilis	Northern goshawk	Birds
Acipenser fulvescens	Lake sturgeon	Fish
Ammodramus savannarum	Grasshopper sparrow	Birds
Appalachia arcana	Secretive locust	Insects
Appalachina sayanus	Spike-lip crater	Snails
Atrytonopsis hianna	Dusted skipper	Insects
Botaurus lentiginosus	American bittern	Birds
Botrychium mormo	Goblin moonwort	Ferns and Fern Allies
Buteo lineatus	Red-shouldered hawk	Birds
Calypso bulbosa	Calypso or fairy-slipper	Flowering Plants
Charadrius melodus	Piping plover	Birds
Chlidonias niger	Black tern	Birds
Cincinnatia cincinnatiensis	Campeloma spire snail	Snails
Cirsium hillii	Hill's thistle	Flowering Plants
Cirsium pitcheri	Pitcher's thistle	Flowering Plants
Coregonus artedi	Lake herring or Cisco	Fish
Cypripedium arietinum	Ram's head lady's-slipper	Flowering Plants
Drosera anglica	English sundew	Flowering Plants
Eleocharis compressa	Flattened spike rush	Flowering Plants
Emydoidea blandingii	Blanding's turtle	Reptiles
Fossaria galbana	Boreal fossaria	Snails
Gavia immer	Common loon	Birds
Glyptemys insculpta	Wood turtle	Reptiles
Gomphus lineatifrons	Splendid clubtail	Insects
Gymnocarpium robertianum	Limestone oak fern	Ferns and Fern Allies
Haliaeetus leucocephalus	Bald eagle	Birds
Helianthus hirsutus	Whiskered sunflower	Flowering Plants
Huperzia selago	Fir clubmoss	Ferns and Fern Allies
Hydroprogne caspia	Caspian tern	Birds
Iris lacustris	Dwarf lake iris	Flowering Plants
Juncus militaris	Bayonet rush	Flowering Plants
Juncus vaseyi	Vasey's rush	Flowering Plants
Ligumia nasuta	Eastern pondmussel	Mussels
Lyogyrus walkeri	Canadian duskysnail	Snails

(continued on next page)

Microtus pinetorum	Woodland vole	Mammals
Mimulus michiganensis	Michigan monkey flower	Flowering Plants
Myotis lucifugus	Little brown bat	Mammals
Myotis septentrionalis	Northern long-eared bat	Mammals
Notropis anogenus	Pugnose shiner	Fish
Oncocnemis piffardi	3-striped oncocnemis	Insects
Pachypolia atricornis	Three-horned moth	Insects
Pandion haliaetus	Osprey	Birds
Percina copelandi	Channel darter	Fish
Philomycus carolinianus	Carolina mantleslug	Snails
Physella parkeri	Broadshoulder physa	Snails
Pisidium idahoense	Giant northern pea clam	Fingernail and Pea Clams
Planogyra asteriscus	Eastern flat-whorl	Snails
Planorbella smithi	An aquatic snail (no common name)	Snails
Platanthera leucophaea	Prairie white-fringed orchid	Flowering Plants
Poa paludigena	Bog bluegrass	Flowering Plants
Potamogeton hillii	Hill's pondweed	Flowering Plants
Potamogeton pulcher	Spotted pondweed	Flowering Plants
Prosapia ignipectus	Red-legged spittlebug	Insects
Prunus umbellata	Alleghany or Sloe plum	Flowering Plants
Ptychobranchus fasciolaris	Kidney shell	Mussels
Pyrgus wyandot	Grizzled skipper	Insects
Rorippa aquatica	Lake cress	Flowering Plants
Schoenoplectus torreyi	Torrey's bulrush	Flowering Plants
Setophaga discolor	Prairie warbler	Birds
Sistrurus catenatus	Eastern massasauga	Reptiles
Solidago houghtonii	Houghton's goldenrod	Flowering Plants
Stenelmis douglasensis	Douglas stenelmis riffle beetle	Insects
Sterna hirundo	Common tern	Birds
Tanacetum huronense	Lake Huron tansy	Flowering Plants
Trimerotropis huroniana	Lake Huron locust	Insects
Vertigo elatior	Tapered vertigo	Snails

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 Otsego County, MI (Source: Michigan Natural Features Inventory, 2016)

All plants and animals located in Otsego County

24 species

Scientific Name	Common Name	Taxonomic Group
Accipiter gentilis	Northern goshawk	Birds
Agoseris glauca	Prairie or pale agoseris	Flowering Plants
Ammodramus savannarum	Grasshopper sparrow	Birds
Appalachia arcana	Secretive locust	Insects
Appalachina sayanus	Spike-lip crater	Snails
Atrytonopsis hianna	Dusted skipper	Insects
Botrychium mormo	Goblin moonwort	Ferns and Fern Allies
Brachionycha borealis	Boreal brachionyncha	Insects
Buteo lineatus	Red-shouldered hawk	Birds
Cirsium hillii	Hill's thistle	Flowering Plants
Cypripedium arietinum	Ram's head lady's-slipper	Flowering Plants
Gavia immer	Common loon	Birds
Glyptemys insculpta	Wood turtle	Reptiles
Haliaeetus leucocephalus	Bald eagle	Birds
Merolonche dolli	Doll's merolonche	Insects
Myotis lucifugus	Little brown bat	Mammals
Pachypolia atricornis	Three-horned moth	Insects
Papaipema beeriana	Blazing star borer	Insects
Potamogeton hillii	Hill's pondweed	Flowering Plants
Prosapia ignipectus	Red-legged spittlebug	Insects
Prunus umbellata	Alleghany or Sloe plum	Flowering Plants
Pyrgus wyandot	Grizzled skipper	Insects
Sarracenia purpurea f. heterophylla	Yellow pitcher plant	Flowering Plants
Setophaga kirtlandii	Kirtland's warbler	Birds

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 Cheboygan and Otsego Counties (http://www.misin.msu.edu/)

Invasive Species Reported in Crawford and/or Oscoda Counties (http://www.misin.msu.edu/)		
Amur Honeysuckle	Autumn Olive	Baby's Breath
Barnyardgrass	Bird's-foot Trefoil	Bitter Dock
Bittersweet Nightshade	Black Locust	Black Swallow-wort
Bluegrass	Bull Thistle	Canada Thistle
Common Mullien	Crack Willow	Curly Pondweed
Eurasian Watermilfoil	European Firewood	European Speedwell
European Swamp Thistle	Faucet Snail	Garlic Mustard
Himalayan Balsam	Hybrid Cattail	Japanese Barberry
Japanese Knotweed	Moneywort	Narrowleaf Cattail
Oak Wilt	Oakleaf Goosefoot	Onerow Yellowcress
Oriental Bittersweet	Perennial Sow Thistle	Phragmites
Poison Hemlock	Purple Loosestrife	Purpleosier Willow
Quagga mussel	Queen Anne's Lace	Redtop
Reed Canarygrass	Round Goby	Spearmint
Spotted Knapweed	Spotted Ladysthumb	Tatarian Honeysuckle
True Forget-me-not	Water Mint	Watercress
White Sweet Clover	White Willow	Wild Parsnip
Zebra Mussel	English Ivy	Scots Pine

Appendix 9: Maps

Map 1: General Reference

Map 2: Soils by Drainage Classification

Map 3: Topography

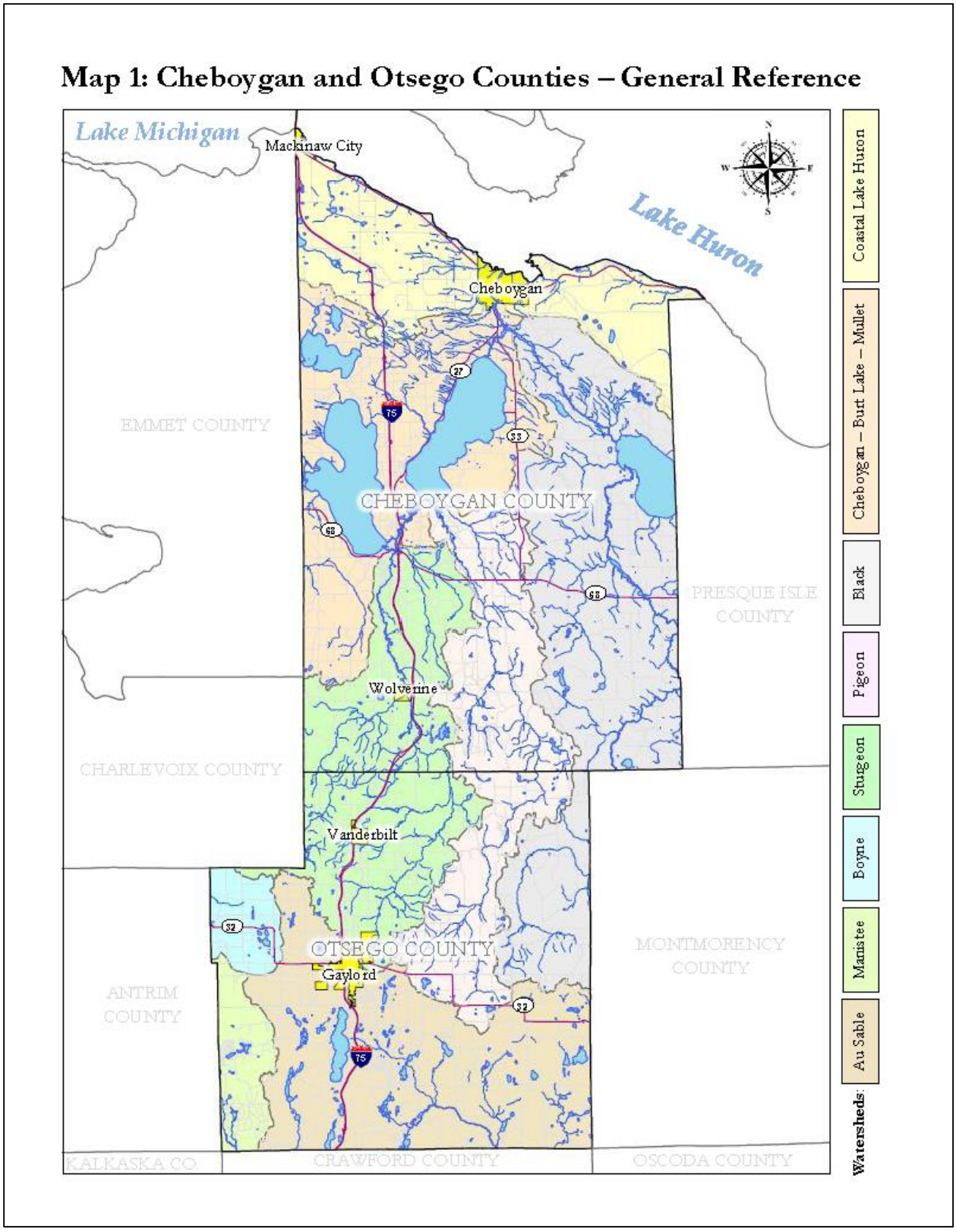
Map 4: Hydrography

Map 5: Wetlands

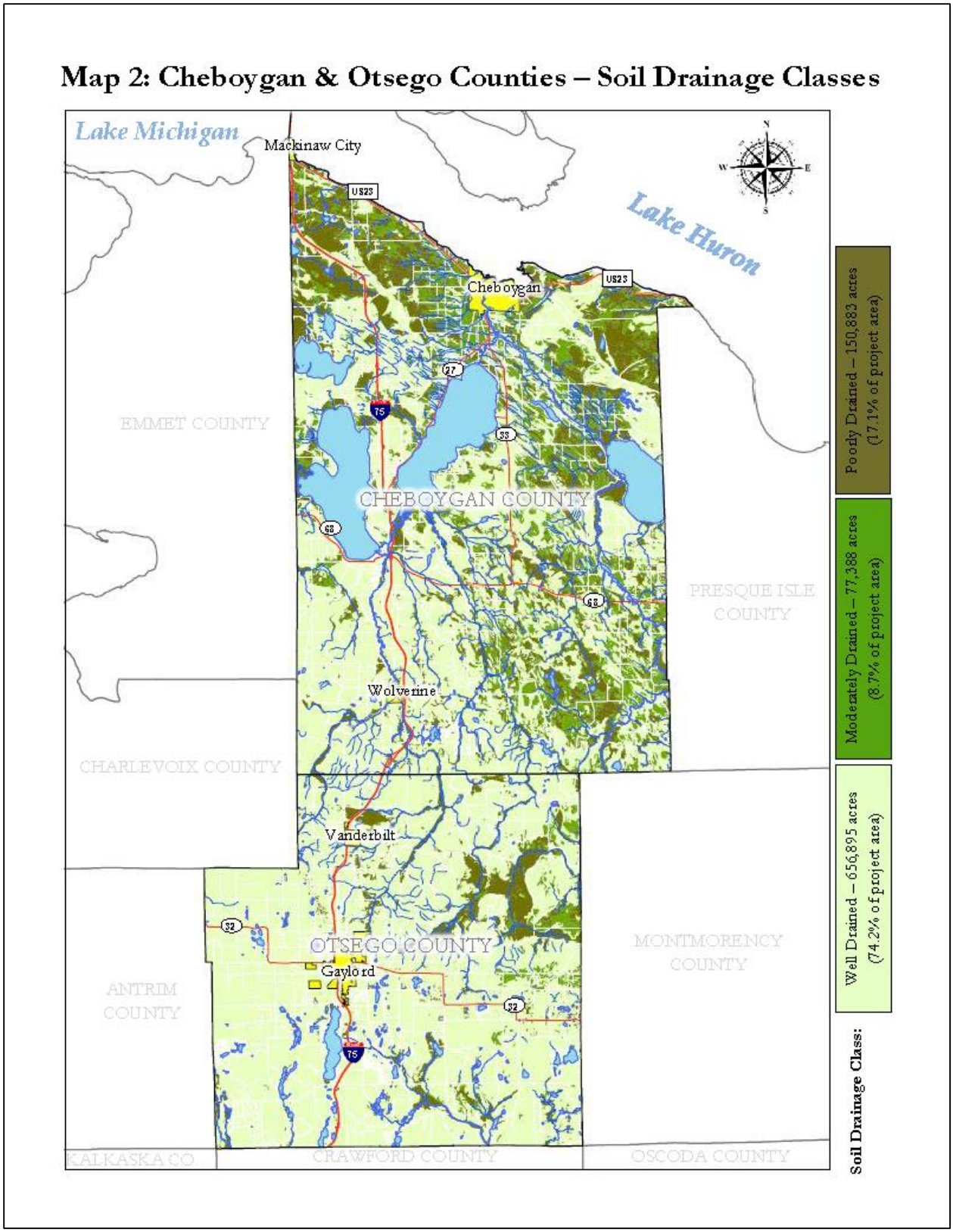
Map 6: Land Cover

Map 7: Land Ownership

Map 8: Special Stewardship Areas

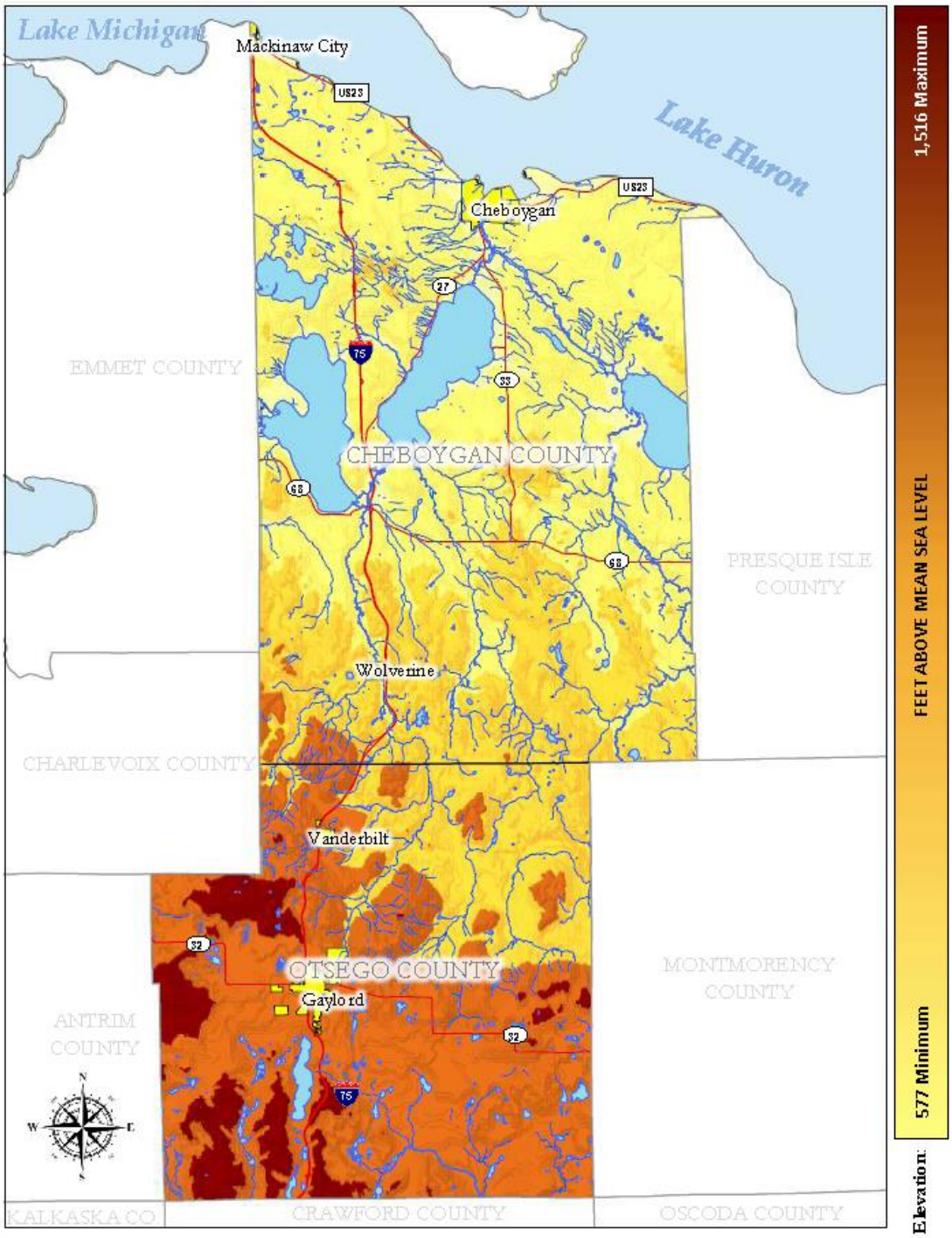


Map 1: General Reference


Map 2: Cheboygan & Otsego Counties – Soil Drainage Classes
Lake Michigan
Lake Huron
Mackinaw City
Cheboygan
Wolverine
Vanderbilt
Gaylord
EMMET COUNTY
CHEBOYGAN COUNTY
PRESQUE ISLE COUNTY
CHARLEVOIX COUNTY
OTSEGO COUNTY
MONTMORENCY COUNTY
ANTRIM COUNTY
KALKASKA CO
CRAWFORD COUNTY
OSCODA COUNTY
US23
27
75
33
68
32
Soil Drainage Class:
Poorly Drained – 150,883 acres (17.1% of project area)
Moderately Drained – 77,388 acres (8.7% of project area)
Well Drained – 656,895 acres (74.2% of project area)

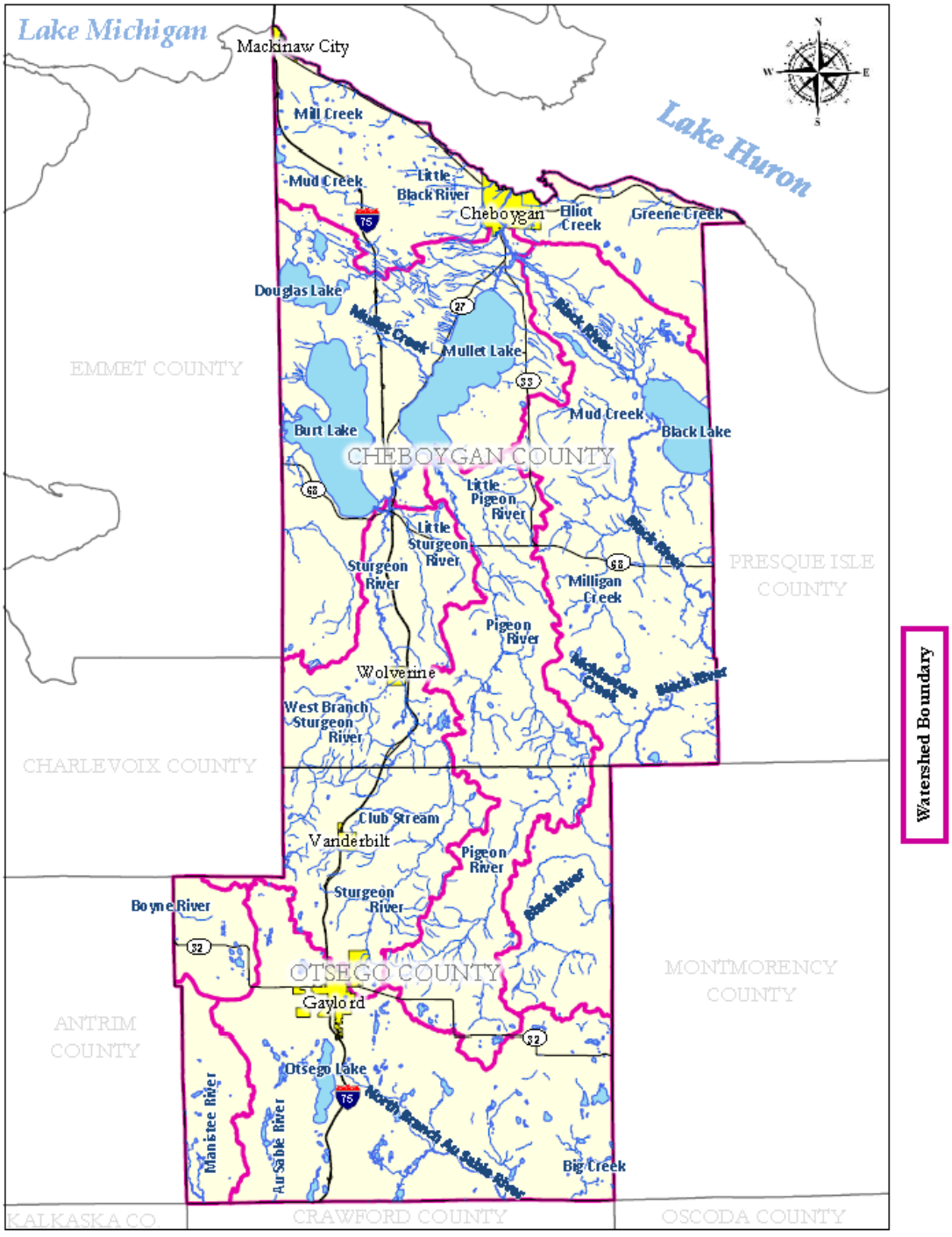
Map 2: Soils

Map 3: Cheboygan & Otsego Counties – Topography

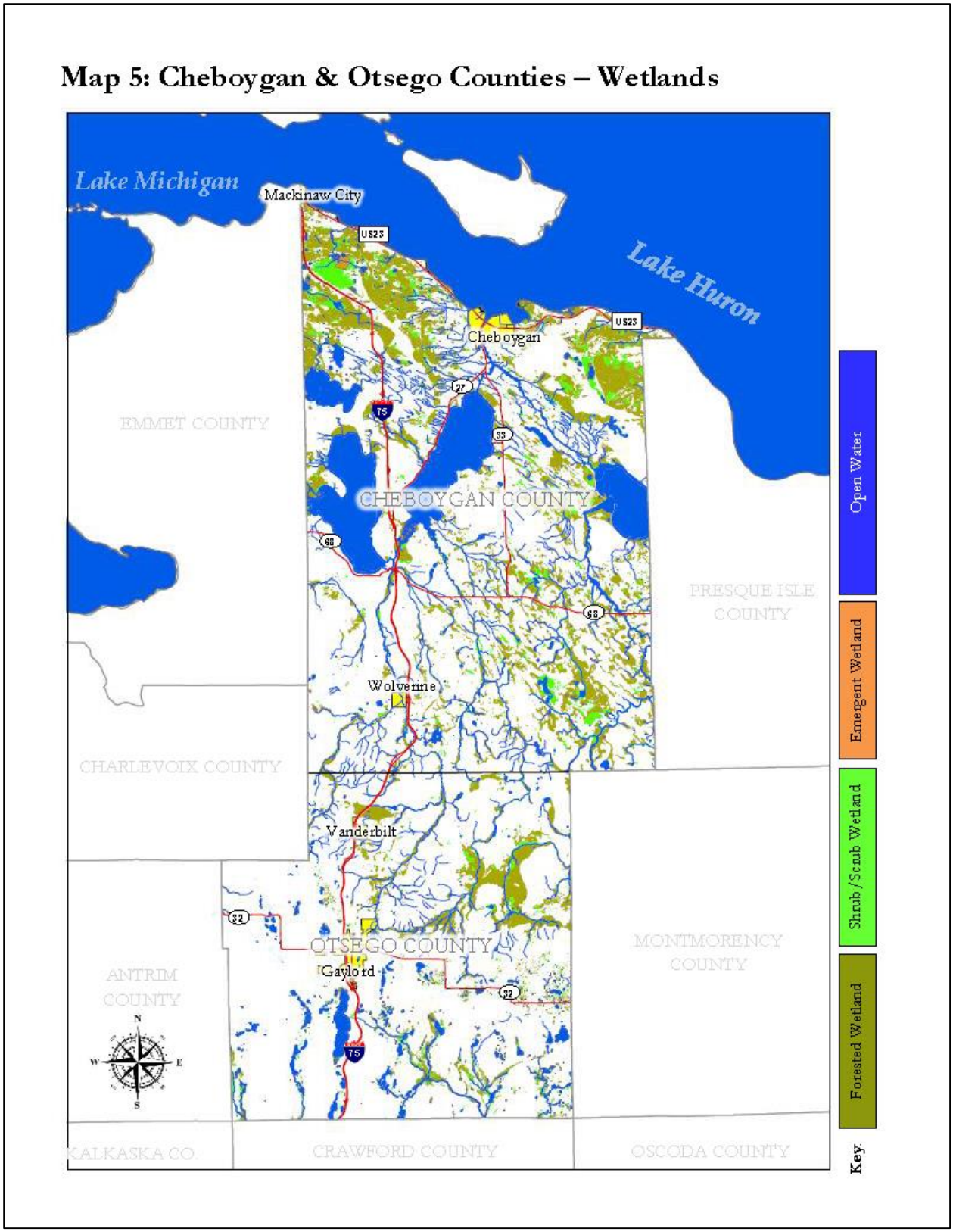


Map 3: Elevation

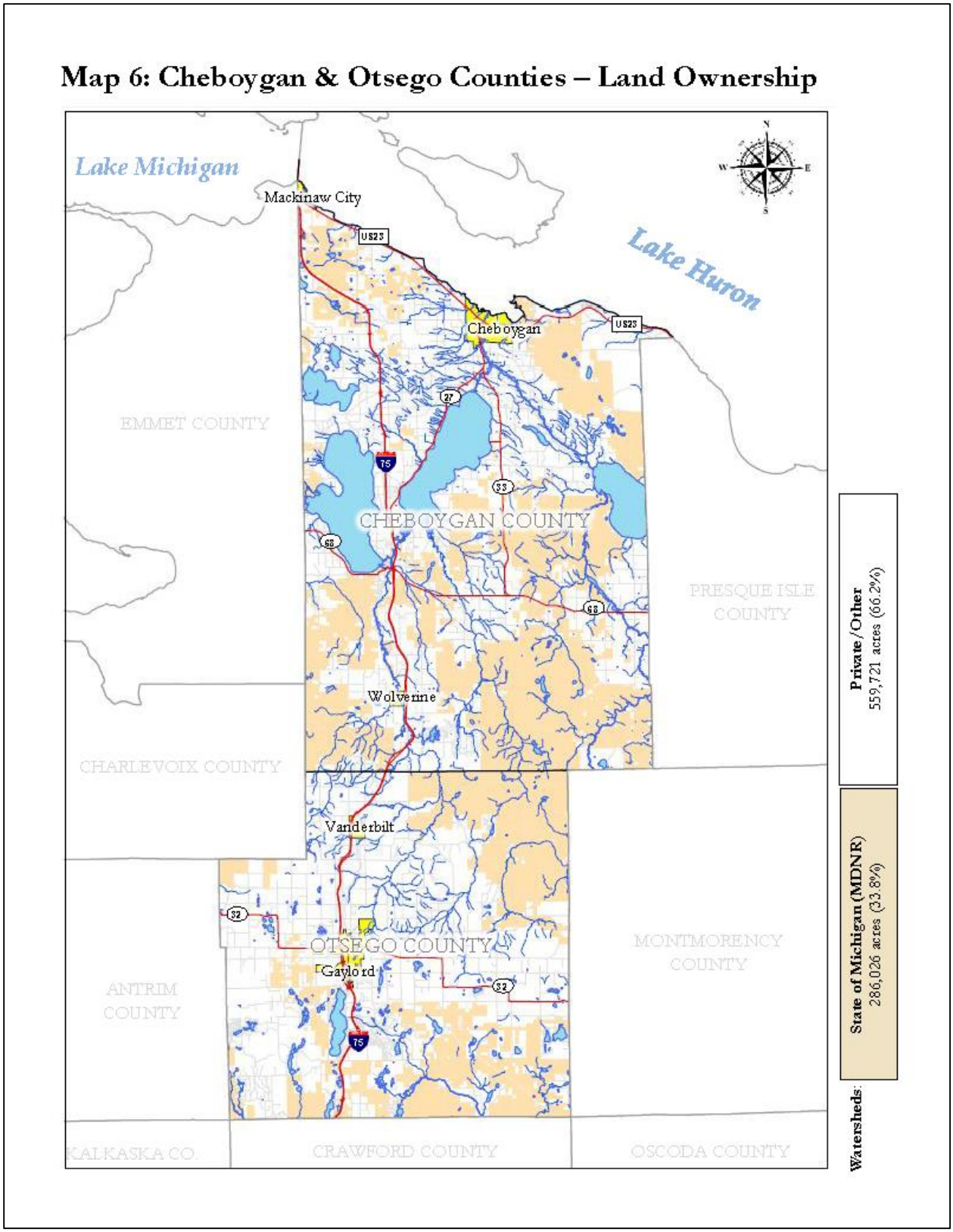
Map 4: Cheboygan and Otsego Counties – Hydrography



Map 4: Hydrology

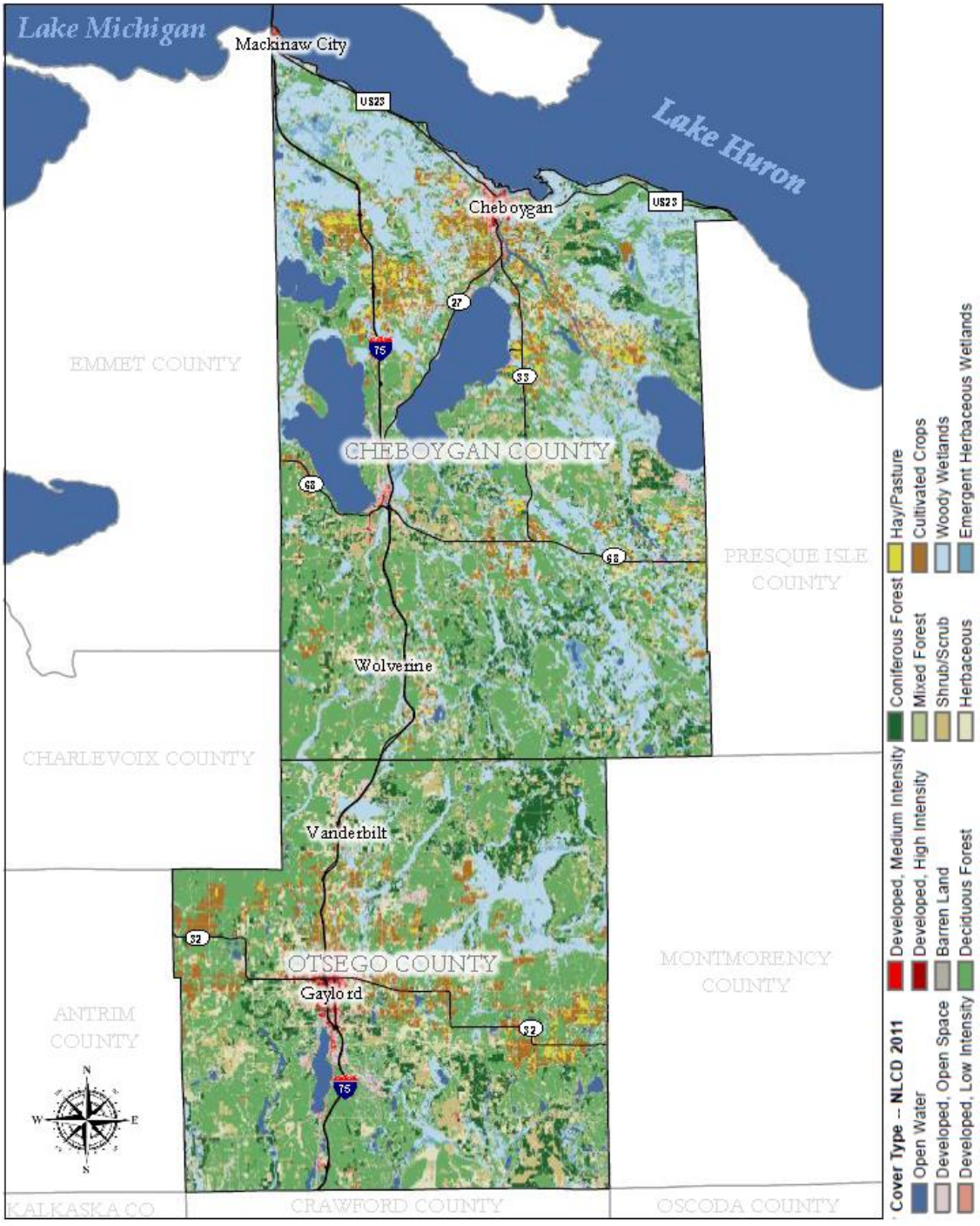


Map 5: Wetlands

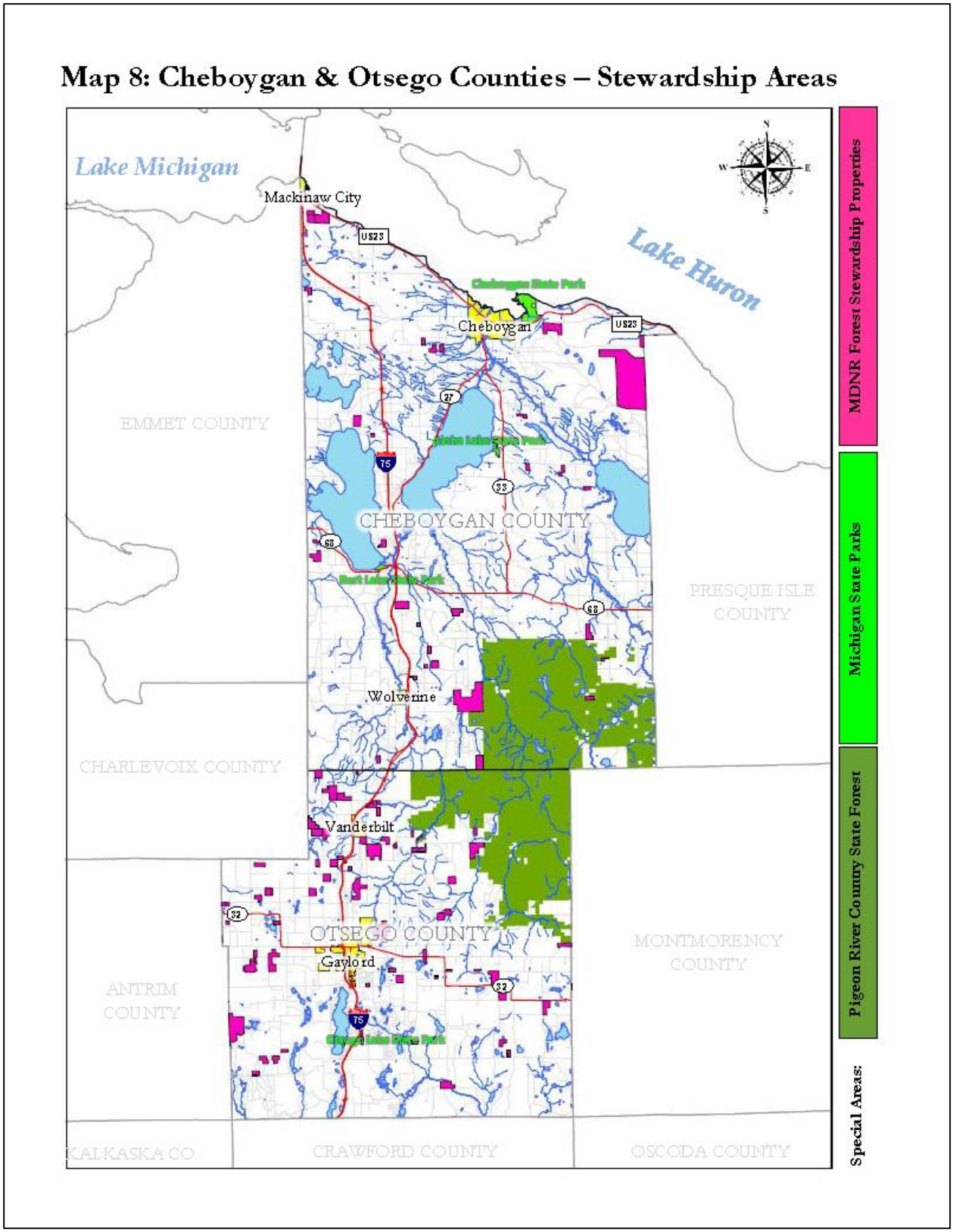


Map 6: Land Ownership

Map 7: Cheboygan and Otsego Counties – Land Cover (2011)



Map 7: Land Cover



Map 8: Special Stewardship Areas

LITTLE TRAVERSE CONSERVANCY

PROTECTING LAND 'THE OLD-FASHIONED WAY' THROUGH OWNERSHIP

On top of already abundant public land, the people of Northern Michigan have access to 17,000 acres of scenic places owned and protected by Little Traverse Conservancy, thanks in part to forest management and logging on some of those lands.

Founded in 1972, the conservancy serves the tip of the Lower Peninsula, the eastern half of the Upper, and three island chains in lakes Michigan and Huron. Among its preserves are vistas overlooking Petoskey and Charlevoix, and secluded creeks that wander freely among snow-laden trees.

"The McCune Nature Preserve east of Petoskey is my favorite," said Tom Bailey, executive director and 32-year veteran of Little Traverse Conservancy. "I love to get on my snowshoes and go down to Minnehaha Creek where the water is babbling through the forest and there's snow on the hemlock trees. It's just beautiful."

Those 170 acres were donated in 1984, but other lands owned by the conservancy were bought partly with funds from timber sales on its working forest reserves – conservancy-held lands whose forests are managed for the benefit of wildlife and as a revenue stream for future land acquisitions.

Kieran Fleming, 17-year director of land protection, draws a distinction between the two kinds of properties owned by the conservancy. "Nature preserves are typically what people think of when they hear we own property," Fleming said. "For the most part we let nature take its course." Those preserves are denoted with brown signs bearing the name and establishment date of the preserve.

Working forest reserves, on the other hand, undergo carefully-designed timber harvests to improve wildlife habitat or facilitate certain uses by the public. Small clearcuts or thinnings, Fleming said, mimic natural events and create diversity in the landscape. Their signs are green. "Some of our reserves have the same age class of trees," he said. "We want to diversify it so a wider range of wildlife is benefited."

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"We'll continually forsake financial gain for something that's going to benefit the wildlife. We're doing this with thought and a plan and a purpose."

Planned logging projects, called prescriptions, are written by professional foresters and scrutinized by a wildlife biologist before going forward. Most cuttings are done in the winter to minimize disturbance to the soil and to visitors, though Fleming said loggers the conservancy hires do an excellent job of explaining their work to passers-by who stop and ask questions.

Revenue from timber sales are used in conjunction with donated funds to buy lands with the most value in terms of recreation, geographic location, or proximity to other conservancy-held lands.

Among these is the Offield Family Nature Preserve, 390 acres of woods and meadows a few miles away from Harbor Springs. The preserve came into the hands of Little Traverse Conservancy enrolled in the state's Commercial Forest Program, meaning it had an ongoing forestry plan. The conservancy carried on the logging plan with a hardwood and red-pine thinning in December 2016, but with its own guidelines.

"We drew a 300-foot circle around a goshawk nest in a pine plantation and left those trees alone," Bailey said. "What we're trying to convey to people is that there's a right way to do this," Fleming added about logging at the Offield preserve. "We'll continually forsake financial gain for something that's going to benefit the wildlife. We're doing this with thought and a plan and a purpose."

An informative sign was placed at the preserve entrance to advise visitors of the active logging operation. Fleming said the sign, along with newsletters, mailings to neighboring residents, news releases, online media and public field trips have all helped educate the public on the operation, which wrapped up in early January.

"I had some concerns up front," said Terry DeBlaay, forester for Potlach, the logging company hired for what he thought may be a controversial timber harvest at the preserve. "Frankly, it's been smooth. Metcalfe (forestry consultants) and Little Traverse Conservancy did a good job of communicating it to the users."

The conservancy also spreads its message of land conservation through field trips for local schools and hosts thousands of students annually for hikes at its preserves. Conservation easements, where development rights on private lands are given to the conservancy as a form of land protection, total in the tens of thousands of acres. For more information about Little Traverse Conservancy, visit their website at www.landtrust.org.

WHERE WOODS AND WATERS MEET

RIPARIAN STEWARDSHIP PROTECTS CLEAN WATER AND WILDLIFE IN THE PIGEON RIVER

Standing on a streambank overlooking the Pigeon River, landowner Travis Piper shares his desire to improve fishing opportunities and enhance wildlife habitat with a restoration project manager from Huron Pines, a nonprofit organization working to conserve the forests, lakes and streams of Northeast Michigan. Together, they identify concerns on the property—streambank erosion and a lack of instream cover—and sketch out a project plan to meet the landowners goals while doing right by the river.

In 2013 Huron Pines helped design a sod dock, instream habitat structures and a native plant greenbelt and prepared permit applications. Travis Piper and the Huron Pines field crew installed 30 whole trees along 600 feet of his streambank to provide fish cover and shield the bank from future erosion.

A variety of native wildflowers were also planted along Piper's eroding streambank to add additional stability and help attract birds, pollinating insects and other wildlife. To reduce erosion due to foot traffic, a sod dock was installed from which Piper now fishes and launches his kayaks.

"Hours after placing [trees] in the river we had turtles sunning themselves on the new logs and ducks hanging out in them." Piper said after the project was completed. "We had lots of dead and dying ash trees. Instead of these trees going to waste we used them for our log structures, re-purposing them where they can improve the trout habitat for years to come. We hope to continue to work with Huron Pines for our own habitat improvements, and would highly encourage private landowners to tap in to [Huron Pines'] resources to help them improve their own areas." Not long after the project was finished Piper also noted that he believes fishing has already improved.

The project incorporated several "bioengineering" techniques—practices for reducing erosion and enhancing wildlife habitat that use organic materials to help preserve the aesthetic appeal of the natural river corridor. Using trees for erosion control looks more natural than rock rip rap or other hard structures and is more effective at slowing the water and trapping eroding sediment. They also make it easy for turtles and amphibians to access streambanks and the tree trunks and branches provide valuable overhead cover for brook trout and other fish.

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SO WHY ARE WE INSTALLING INSTREAM HABITAT FOR FISH AND OTHER AQUATIC WILDLIFE IN NORTHERN MICHIGAN STREAMS?

Doesn't nature take care of that on its own? The short answer to these questions is that historical logging practices, land use change and clearing of woody material from stream channels for navigation have led to a scarcity of this key habitat feature compared to historical conditions. Large wood provides refuge for fish, substrate for aquatic insects, keeps streams cool by providing shade, benefits a wide variety of terrestrial animals, and promotes diversity of stream flows and depths.

Native plant greenbelts, tree revetments and sod docks help stabilize eroding streambanks and keep excess sand and soil out of the stream channel, where it can bury exposed gravel used by spawning fish and many aquatic invertebrates. Private land stewardship activities like those implemented by Travis Piper and Huron Pines will be critical for sustainable protection of our unique freshwater and forest resources in Northern Michigan, which we all rely on to provide clean water, support food production and provide world-class tourism and outdoor recreation opportunities.

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PRIVATE FOREST STEWARDSHIP

THROUGH COLLABORATIVE PARTNERSHIP

YOU DON'T HAVE TO RESIDE ON YOUR PROPERTY TO BE AN ACTIVE LAND STEWARD.

David and Maureen Sanders, owners of a beautiful 80-acre piece of land in Ogemaw County, can attest to that. David lives in southern Michigan but he frequently visits the property for recreation and allows friends and neighbors to use the land for hunting, bee keeping and tapping his sugar maple trees. There are no buildings on the property but that doesn't mean there isn't a lot going on there. David and Maureen happily bought the property in 1994 and immediately wanted to do their best to care for it well. David reached out to Mieka Rueger with the USDA-Natural Resources Conservation Service (NRCS) and district forester Laura Freer for advice.

THE NRCS PROVIDED COST-SHARE FUNDING

that allowed David to develop a Conservation Activity Plan for his land, in conjunction with Keith Martell of Martell Forestry, Inc. David's property is also certified under the American Tree Farm System, and by implementing his management plan David receives approximately $400 in tax incentives. He also makes some money by selling timber, harvested by Weyerhaeuser, of which about 30 acres has been selectively cut and 5 acres clear-cut with the goal of improving forest resilience and wildlife habitat in accordance with his forest stewardship plan. David has also reached out to Huron Pines for technical advice on streambank erosion and invasive plant issues.

"I've been very happy with the services I've received from everyone—the NRCS, the Conservation District, Martell Forestry, Inc., Weyerhaeuser, and Huron Pines," David says. "It's been a great opportunity to meet many really good people and I would recommend to any landowner to reach out to these folks for advice and assistance."

David says he and Maureen do not plan to build a house or live on their Ogemaw County property, which features open prairie, lots of maple-beech forest, a small stream and a fair amount of wetland and riparian habitat. He wants to leave the property in a natural condition in order to preserve the scenic views, quiet areas, and hunting and wildlife viewing opportunities it provides. His hope is to one day pass the property on to his children.

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CANADA CREEK RANCH

A THRIVING WILDLIFE HABITAT

DURING THE 2015 SEASON, HUNTERS AT CANADA CREEK RANCH IN NORTHERN MONTMORENCY COUNTY HAD ONE OF THE HIGHEST DEER HARVESTS IN THE RANCH'S 80-YEAR HISTORY, AND THOSE WHO OVERSEE THE PROPERTY ATTRIBUTE THAT MILESTONE TO EXTENSIVE TIMBER MANAGEMENT.

Jim Treadway has lived on the ranch since 1993 and focuses his energy on efforts to emphasize quality habitat for deer and other wildlife.

We have good records of deer harvest since 1934 and have really good data for more recent years," Treadway said in December 2016. "This year we have taken 160 deer and 178 in 2015 – that was the highest we've had in years and we had more 8-pointers than we've had in the history of the ranch," an achievement he also attributes partly to antler restrictions.

THE RANCH'S ROOTS DATE BACK TO THE EARLY 1900S, WHEN NEIGHBORING BLACK RIVER RANCH BOUGHT 13,000 ACRES OF MOSTLY CUTOVER LAND ON CANADA CREEK TO RUN CATTLE AND PRESERVE WILDLIFE.

After the Great Depression of 1929, the property was sold to an investor who blocked off 12,500 acres as hunting land and sold residential lots on the remaining acreage. In 1934, Canada Creek Ranch was born. That setup still exists today, and about 100 families live year-round on a relatively small chunk of land east of Canada Creek. Everything west of the creek is known to members as the Outback, a sprawl of forests, fields and two-track roads open entirely to hunting.

Aside from 1,300 acres of scattered lowlands, the Outback is open to cutting and is broken into six units for that purpose. "That leaves us with 11,200 acres we manage primarily for wildlife habitat," Treadway said.

A forest-management plan formed in 2001 GPS mapped the entire Outback by cover type, age, and date of last treatment. Under this plan, about 350 acres are treated every year, primarily with thinnings in hardwood and red pine stands and clearcuts to regenerate areas of predominantly aspen and jack pine. Treadway said revenue from timber sales pays for professional foresters to oversee and institute plans, as well as to fund the planting of trees and grasses. A total of 106 acres, including gas well pads, are planted in rye and clover as wildlife browse, and another 80 acres are mowed regularly.

"It makes for good viewing of wildlife for the members who like to go drive through the outback and see the animals grazing in the fields," said Nancy Thurston, board member for the ranch. "It all supplements the deer population and we try to get them going into winter in the best condition we can."

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Ranch general manager Eric Johnson said the membership's opinion of the cuttings is across the board. "It's a challenge to hold fast and do the right thing," Johnson said, "but the plan is for wildlife, not people or aesthetics." Timber harvests are done in winter, partly to minimize disturbance to members and partly to avoid the spread of oak-wilt disease, but mostly for the benefit of deer who feed on the freshly fallen tree tops.

"The cuttings are key to the deer's winter food supply," Treadway said. "Once we have six inches of snow the grasses are useless." Both Treadway and Thurston said the sound of chainsaws in the wintertime Outback attracts deer and elk, who wait in the wings to feed on the tender fallen tree tops.

The ranch's geographic location near the 105,000-acre Pigeon River Country State Forest puts it dead center in Michigan's wild elk range. This has been a unique challenge for the ranch's forestry efforts in terms of carrying capacity. "One of the major problems we have is elk," Treadway said. "Our aspen stands are safe from deer after two years of growth, but elk can reach 7 or 8 feet and break tops off and those trees die."

An aerial elk survey in the winter of 2015 by the Department of Natural Resources covered about two-thirds of the ranch property and counted 170 elk there.
"This is where the food is," Treadway said. "We like to see them but there are too many – for every elk we could carry 4 or 5 deer." A December hunt is held to control elk numbers and hunters are allowed onto the ranch with appointed guides. In December 2016, 25 elk were harvested on the ranch.

THE RANCH'S FORESTRY EFFORTS BENEFIT MORE THAN JUST DEER.

"In 2006, the ranch conducted a 19-acre burn of standing jackpine as an experiment for Kirtland's warbler habitat. Those trees were then cut and their fire-activated seeds were left to sprout naturally.
"We got good regeneration from that burn," Treadway said. "It looked really good, with more random spacing between trees."

The ranch is just a couple miles away from a state-owned Kirtland's warbler management area near Clear Lake. Strips of tag alder near the creek have also been clearcut, in collaboration with the U.S. Fish & Wildlife Service and Ruffed Grouse Society, to regenerate habitat for woodcock and grouse.
Every yearly forestry prescription goes through a 9-step process of approval, including two field tours for residents, before being implemented. The plans are also scrutinized by a conservation committee separate of the ranch board. Opinions of residents toward the forestry efforts are mixed, but emphasis remains on the animals.

"Generally speaking, our little community is a cross section of the entire state," Thurston said. We have just about everyone here as far as opinions go. But the conservation committee has always said that we'll cut as much as we can because the whole purpose is to benefit the animals. Every professional we've invited out here – and we've had them from all different areas of interest – say they wish we could do this across the rest of the state."

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KIDS OUTDOORS OTSEGO

Building 'future protectors' of the environment today

Something unusual happens when children step into the woods during a Kids Outdoors Otsego (KOO) hike: They slow down, fall silent, and let their senses guide them to new discoveries.

"We like small groups because we encourage kids to take their time and explore their world closely," said Sam Cornelius, KOO founder. "If they want to spend five minutes looking at mushrooms at one spot, we let them do it. To really appreciate and get to know the things you're seeing, smelling and touching takes a little time."

Since 2010, Cornelius and co-founder Nancie Kersey have organized a handful of KOO events annually in the Gaylord area, encouraging families to explore their local surroundings year round through short, guided nature hikes close to home.

Most recently, KOO hosted a hike at Leonard Jensen Nature Trail, a short circuit of trails that, in October, was blooming with all kinds of colorful mushrooms and fungi erupting from the forest floor.

On this and past hikes, kids make their own cardboard-tube binoculars and microscope-like "lookers" -- not necessarily to magnify anything but rather to frame a small piece of nature to focus on and admire up close, like bugs, moss and mushrooms.This particularly patient approach to outdoor adventure stems partly from Cornelius' day job: For 20 years he's worked with infants and toddlers with developmental delays, helping them and their parents address and overcome challenges associated with those disabilities.

"Following a child's lead and responding to what they do is good for child development in general and in nature," Cornelius said. "I encourage parents to be responsive to their kids' interests. It's not only what we do on hikes but it's a great way for parents to support their child's development, whether they have special needs or not."

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“We certainly hope kids who are enjoying the outdoors in Michigan will be active protectors of it when they get older.”

In his past job as a prevention consultant, he often used the outdoors as a therapeutic tool for clients undergoing substance-abuse treatment or weathering other rough patches in their personal lives. “They responded to it and that’s always resonated with me too,” he said. “Being outdoors is just good for us.”

The first KOO event was a snowshoe hike coinciding with Gaylord’s annual Family Fun Fair in 2010. Cornelius and Kersey put it together to offer an outdoor element to the indoor event. It was a hit. “After that, we started doing an activity every couple of months and people started asking us what our group was called,” he said.

“That’s when we finally came up with the name.” KOO follows in the shoes of groups like Boy Scouts, Girl Scouts and Outward Bound – all of which are on a much larger scale but were born from the realization that kids were spending more time indoors and skills were being lost.

“It’s not a new idea,” Cornelius said, “but Kids Outdoors Otsego is low tech, there’s no membership fee and no charges. If you have the right clothes on you’re good to go. It’s a very simple approach.”

Past KOO hikes have taken place on the shore of Pickerel Lake in the Pigeon River Country State Forest, HeadWaters Land Conservancy’s Sturgeon River Preserve, and at the Otsego Environmental Learning Site in Gaylord. At each one, KOO tries to leave the site better than it was found, and the kids often help by picking up trash they might find in the woods. Cornelius sees it as a way for them to take ownership of their environment.

“Kids who have a greater exposure to natural settings have a higher appreciation for it and tend to be more active in environmental and conservation activities as adults,” he said. “We certainly hope kids who are enjoying the outdoors in Michigan will be active protectors of it when they get older.”

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A VISION REALIZED

TWO DECADES OF FOREST MANAGEMENT PAYING OFF

FOR THE LANDOWNERS IVAN WITT WORKS WITH,

deciding whether to cut down trees in the name of profit or for the health of their woods is no decision at all.

His philosophy: Why not both?

Witt, of Gaylord, has been a forester for 21 years and is reaching a pivotal point in his career. Some of the forests where he works are seeing their third round of logging and his long-term visions for these forests, formed two decades ago, are just being realized.

"NORTHERN HARDWOOD FOREST MANAGEMENT, IF DONE WELL, IS SO LUCRATIVE IT'S REMARKABLE," Witt said. "At the same time it improves tree health and wildlife habitat. It's really a tremendous thing to do but you have to be patient and look at it with a long-term perspective."

His prime example is a private forest north of Gaylord. When a legendary thunderstorm in 1998 brought 80-mph winds and caused significant damage to the property, Witt was hired to oversee the cleanup and thinning of the woods in the storm's wake.

He did a second "weeding" of trees in 2006, giving the healthiest maple trees room to grow and mature. Speedy growth can increase a maple's timber value by 5 percent a year, according to Witt.

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"WHEN TREES GROW, THEIR CROWNS EXPAND OUTWARD," WITT SAID. "WHEN THEY'RE CROWDED THEIR GROWTH SLOWS DOWN AND THEY'RE REALLY COMPETING WITH EACH OTHER. A FOREST AS A WHOLE WILL SHADE OUT THE UNDERGROWTH AND THEN THERE'S NO WILDLIFE HABITAT EITHER."

In the fall of 2016, all of Witt's planning paid off. Loggers selectively cut the mightiest maples that Witt had previously marked with his orange paint gun. Logs were graded and stacked according to their quality, then trucked to a mill in Onaway. The finest logs, destined to become furniture or veneer, can fetch $500 to $1,000 each, and dozens were stacking up along the logging road. Large upper branches will be sold as firewood. "This will be a lot of money for the landowner," Witt said, gesturing to the towering stacks of logs, "but that's low on the list for most landowners."

The outermost branches that aren't mulched will be stacked in piles to become habitat for rabbits, red squirrels and chipmunks. Bark and other debris will decay and provide valuable nutrients for the new undergrowth that will arise beneath new openings in the canopy. This new growth means more food and cover for all kinds of wildlife – the ultimate goal for most landowners Witt works with.

Witt earned his bachelor's degree in forest management from MSU where he was taught the theories surrounding long-term forestry practices for sustainable harvest. "It was theoretical back then," he said. "Now it's coming together, now I see the actualization of it and it's right on target. It's a textbook example of crop-tree management."

Managing a forest for crop trees calls for selective thinnings or harvests every 8 to 12 years. Witt considers himself conservative, choosing to cut fewer trees more frequently. "It'll be another eight years before we do another harvest and it should keep going at that pace," he said. "In 16 years someone will thin the smaller trees that are just being established now and it will go on in perpetuity that way."

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UPPER BLACK RIVER COUNCIL

UPPER BLACK RUNS DEEP WITH CAROL ROSE

MANAGING THE UPPER BLACK RIVER MEANS DOING WHAT'S BEST FOR BROOK TROUT. IN 1993, AN ANGLER AND RIVER ENTHUSIAST NAMED BUD SLINGERLEND SAW DIMINISHING RETURNS IN HIS TROUT-FISHING TRIPS ON HIS FAVORITE STREAMS IN MONTMORENCY COUNTY.

"He fished the river for years and saw its condition deteriorating because of beavers and a lack of management," Carol Rose said of the late fisherman. Singerlend, a charter member of the Montmorency County Conservation Club, got some people together to turn things around for the Black. The Upper Black River Council (UBRC) was formed and Rose, who lives northwest of Hillman in Montmorency County with her husband, Paul, has chaired it since 2008. "I love this river," she said. "It's been a part of my history since before we moved here."

WITHOUT A MEMBERSHIP PER SE, THE UBRC INSTEAD FUNCTIONS AS A PARTNERSHIP BETWEEN GOVERNMENTAL AGENCIES, NONPROFITS, AND INDIVIDUALS THAT CAN PROVIDE RESOURCES AND MANPOWER TO RESTORATION PROJECTS IN THE WATERSHED.

Road commissions, fish biologists, private landowners and conservation groups have all gotten their feet wet – literally and figuratively – in projects on the Upper Black River.

"We've been able to fund a seasonal summer river crew to do instream habitat work – adding large woody debris and cutting pathways through blowdowns – to enhance angler satisfaction," Rose said. "Our focus has been doing what's best for the brookies and the habitats where they thrive." The Black differs from other area streams in that it is managed exclusively as a brook trout fishery. "There are no brown trout in Black Lake and, even if there were, there are two big dams on the Lower Black River that prevent fish passage (to the upper river) anyway," said Tim Cwalinski, fisheries biologist for the DNR. "It's been isolated in that way to only hold brook trout."

Cwalinski said the upper Black River supports a mostly daytime, high catch rate brook trout fishery for anglers. If brown trout were to be stocked there they would quickly outcompete and prey upon the native brook trout.

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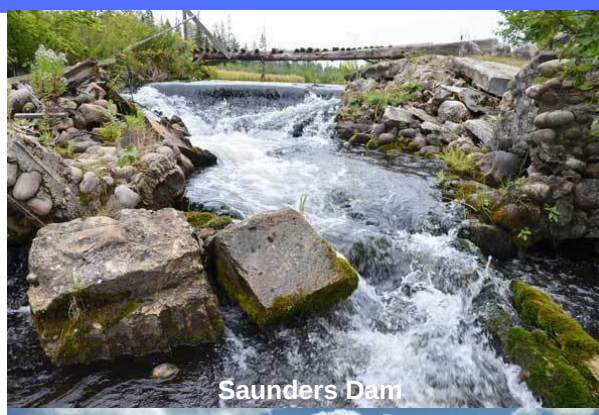
IN LATE OCTOBER, CWALINSKI TOURED A STRETCH OF THE RIVER AND MADE NOTES OF WHERE FUTURE IN-STREAM HABITAT WORK SHOULD BE CARRIED OUT BY UBRC'S SUMMER WORK CREW – IN PARTICULAR, THE AREA OF KING'S BRIDGE NORTH OF ATLANTA.

WHILE SOME PROJECTS HAVE CENTERED ON PUTTING TREES AND BRUSH IN THE RIVER, OTHERS ARE AIMED AT UNDOING WHAT THE BEAVERS HAVE DONE.


Saunders Dam


Saunders Dam site after Dam Removal

Second only to humans in their ecological impact, beavers can enact huge changes in their landscape by building dams that impede fish movement and cause cold upstream habitats to warm.

"This year we removed a huge beaver dam that reached a point where it was creating a large impoundment," Rose said. "A couple of our active volunteers took out part of it well in advance of our work bee day, when we removed the rest of the material. We weren't releasing a massive amount of sediment with it because the water had already had an opportunity to drain." Ongoing trapping keeps the beaver population in check.

In 2013, UBRC was part of a coalition to remove the concrete ruins of Saunders Dam that had obstructed the river for 60 years with its 5-foot cascade of fast-flowing water. The dam was first to go when the 517-acre property was bought by the state and numerous partners took part – including UBRC, Huron Pines, Treetops Resort, Jay's Sporting Goods, Headwaters chapter of Trout Unlimited, HeadWaters Land Conservancy and Little Traverse Conservancy, J&N Construction, Pigeon River Country Association, the DNR and U.S. Fish & Wildlife Service, and a dozen individuals. "That was an example of how empowering these projects can be and how everyone can share in the success," Rose said. "It's redeeming to see structures that no longer have a purpose being taken out. The river is still in the process of healing itself and rebuilding."

Rose said a recent effort on Rattlesnake Creek, an upstream tributary of the Black, created new riffles for fall brook trout spawning beds, called redds.

"We had mountains of cobble, stone and pea gravel and had three different work bees where we were schlepping rocks and gravel 75 yards from the piles to the creek," she said. "When I went back in October the year we did it, sure enough I saw brook trout on redds at two of the three riffles we'd made."

More information about UBRC can be found online, www.upperblack.org.

VANDERBILT STUDENTS FIND 'OUTDOOR CLASSROOM' ON SCHOOL PROPERTY

A NEW TEACHER AT VANDERBILT HIGH SCHOOL IS MAKING IT HIS MISSION TO PUT HIS STUDENTS TO WORK ON THE LAND.

Matthew Saunders has taught science at the small school with a little over 100 k-12 students since January 2016. He lives with his wife in Petoskey where he gardens and plants trees on the 16 acres where he grew up.

The school sits on 80 acres on the east side of Vanderbilt and the land has a long history of harvesting by loggers and replanting by students, including a hillside pine plantation in the spring of 2015 with the Otsego Wildlife Legacy Society.

Young stands of aspen and sprawling wild raspberry patches have also sprung up since the last clearing several years ago, making it a popular place for deer and other wildlife whose tracks litter the sandy soil all over the property.

"As a school we've made it a focus to get our students out in the woods more," Saunders said during a morning walk on the property in October 2016.

"MY GOAL IS TO GET THEM OUT HERE ONCE A WEEK."

Field trips on the property have been made easier since a work day this fall had students in all grades clearing old trails and planning new ones. Shorter and longer loops cover gently rolling terrain that alternates between young pine and deciduous forest, pockets of older trees, berry-choked cut-overs and grassland.

On their walk in late October, fourth- and fifth-grade students found flowers, identified deer and dog tracks, and poked scat with sticks as they debated what kind of animal it came from.

"We collect leaf specimens to identify later in the year and we've talked about having older kids do plaster casts of animal tracks, having math classes mapping the property on a grid, and making trail markers and interpretive signs in the wood shop here," Saunders said. "The kids really seem to like it and that's the main thing. We're trying to treat it as an outdoor classroom for them."

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"It's all centered around getting kids outside"

-Jennie Zoll, Program Manager for Huron Pines.

Huron Pines, a nonprofit conservation organization in Gaylord, has been assisting the school with a forest study to determine ways to fit the land into the curriculum there. They are working through the Northeast Michigan Great Lakes Stewardship Initiative (GLSI) which aims to help schools provide place-based environmental education for their students.

Zoll said a GLSI effort in Onaway had students identifying erosion sites on the Pigeon River, doing science experiments in the field, and ultimately finding solutions to the erosion problem.

"They really took over the problem, figured it out and solved it," Zoll said of that effort. "(In Vanderbilt) they have a lot of really great ideas for their forest."

The town of Vanderbilt is known as the gateway to the Pigeon River Country State Forest, a sprawling tract of more than 100,000 acres of contiguous public land that's home to three rivers and the state's wild elk herd of 1,000 animals.

This proximity to such wild country is reflected in the lifestyle of Vanderbilt students, many of whom are avid hunters.

"The acreage here gives us a great opportunity for some hands-on learning," said principal and superintendent Rick Heitmeyer. "It fits our students' lifestyle pretty well."

More information about Vanderbilt Area School and its activities can be found online, vanderbiltareaschool.org.

STURGEON IN THE CLASSROOM

BACK FROM THE BRINK, A FISH SPECIES FINDS A NEW PROTECTOR

Students of an environmental-science course at Onaway High School welcomed a new classmate in October: A young lake sturgeon who will serve as part research project, part class pet, and part ambassador for its species and the humans trying to save it.

For the last four years, the Black Lake-based conservation group Sturgeon for Tomorrow has headed Sturgeon in the Classroom, a unique exchange program with schools across the state that puts live, young sturgeon in the care of Michigan students. This year there are 11 classrooms taking part across the Lower Peninsula, according to Brenda Archambo, the president of Sturgeon for Tomorrow known fondly by her peers as Michigan's "Sturgeon General."

This partnership with schools is one major way for the organization to educate people about the plight of the lake sturgeon – a 136 million year old species that was nearly extirpated from Michigan a century ago by overfishing – and the ongoing conservation efforts to restore the local population.

Those endeavors include a streamside sturgeon-rearing facility on the lower Black River a few miles west of Onaway. There, tiny larval sturgeon that are captured from the river in spring are raised to about 10 inches in length, before being released back into the river with a better chance of survival.

The Sturgeon in the Classroom fish are part of the effort and Archambo brought one of those fish to Onaway High School in October (pictured at right).

"It's so cool to see students build a relationship with this animal then have to set it free," Archambo said. "There's a lot of emotion in the hearts and minds of students and they build a connection with the animal as a species and a relationship with the river."

To participate, teachers must first submit an application and meet strict criteria for how they will incorporate their fish into a lesson plan. Classrooms are responsible for providing a 55-gallon tank, and students have to maintain water quality and feed the growing fish with tiny blood worms.

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“WE DO EVERYTHING FOR THE FISH – WATER CHANGES, WATER QUALITY, AND FEEDING IT,”
- REBECCA POCHMARA

Onaway teacher Scott Steensma has taken part in the program every year and the juvenile sturgeon is a welcome addition to his zoo-like classroom that’s already home to a snake, tarantula, hedgehog, hamster, and numerous trout and turtles.

“Our students really benefit from taking care of (the sturgeon) and making sure it has everything it needs,” Steensma said. “They learn how to do water quality testing and make sure the nitrates and ammonia levels are where they need to be. We also do tours for other classes within our school as well as for people in our community.”

Steensma took the extra effort of collecting the aquarium water directly from the Black River, the sturgeon’s natal stream, with the idea that the fish will thrive best in an environment most like home.

This is the third year that junior Rebecca Pochmara has cared for a sturgeon at school. “We do everything for the fish – water changes, water quality, and feeding it,” she said. “The only time Mr. Steensma needs to worry about it is during school breaks when we’re off.” Cheyenne Doan is also a junior spending her third year caring for the fish. She said there’s an emotional attachment that forms between students and the fish after raising it for 9 months then releasing it into the wild.

In October, as the young sturgeon acclimated to its new tank, Archambo explained to the class the juxtaposition around the fish as it relates to the surrounding community.

“We’re trying to save the fish from extinction but, at the same time, fishing for them is so engrained in the local culture,” Archambo said, explaining the weekend in February when a handful of sturgeon are speared on Black Lake. “It seems like an oxymoron but this is the way it works.”

By the end of class the day the sturgeon arrived, “Glacier” was leading the polls in what the class would name their newest pet.

More information about Sturgeon for Tomorrow and its programs can be found online, www.sturgeonfortomorrow.org.

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