

## 4 - MANAGEMENT AREA DIRECTION

### 4.1 – Introduction

This section builds upon the discussions in the previous sections on forest history and current conditions and trends and provides specific management direction for each of the 33 state forest management areas in the eastern Upper Peninsula ecoregion (Figure 4.1). Management areas are groupings of forest compartments that range in size from approximately 1,400 to 148,000 acres. The boundaries of management units are based upon common attributes.

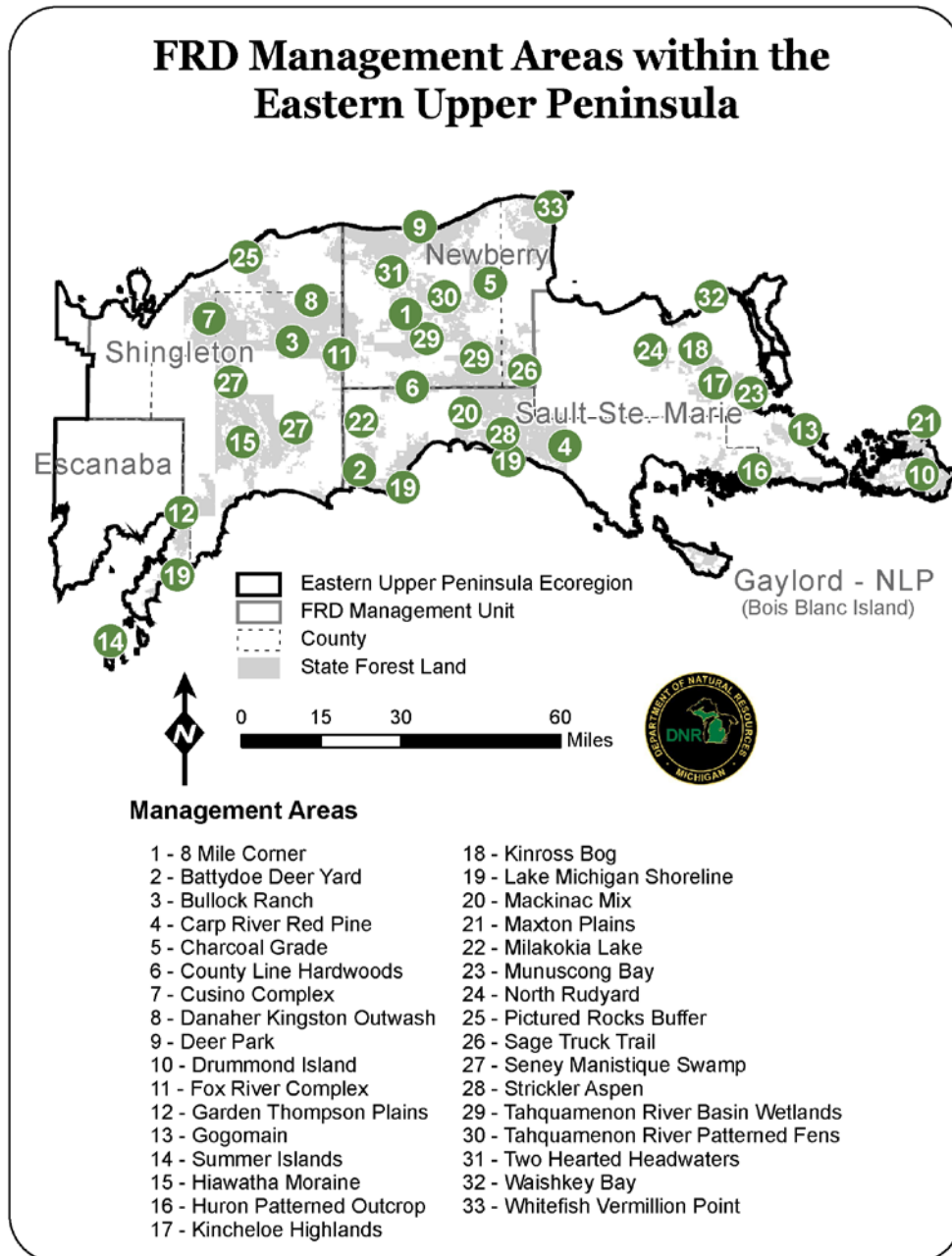


Figure 4.1. A map of the eastern Upper Peninsula ecoregion showing the management areas.

## Each management area section contains:

- A summary of use and management;
- An introduction which includes a projection of harvest acres in this 10-year period planning period;
- Management direction for each of the major and some of the minor forest cover types in the management area, including a description of the current condition, desired future condition, 10-year vegetation management objectives and long-term management issues;
- Featured wildlife species and habitat specifications; and
- Discussions of rare fish, wildlife, plant management; forest health management; aquatic resources; fire management; recreation; access; and other regional-specific issues, such as oil and gas development.

Michigan state forest timber management is largely predicated upon a sophisticated and continually updated forest inventory that enables the use of a modified area control method and the associated balancing of age classes, rather than volume control. Area regulation is an indirect method of controlling the amount of timber to be annually harvested on the basis of an equal (balanced) number of acres in each of several age classes (up to a set rotation age) of stocked trees, in order to meet management objectives and as a means of ensuring sustained yields over time. Most public forestry agencies employ an area regulation approach to achieve sustainable, even flows of timber (Leak, 2011). For the Michigan state forest system, area control is used for management of even-aged stands in the aspen, jack pine and some oak forest types. Management of uneven-aged stands such as northern hardwoods is based upon a basal area/stocking approach and a combination of basal area and age class is used in management of red and white pine stands. Most lowland cover types are also managed as even-aged stands using the area control method. It is important to understand that balancing age classes for a forest type is a long-term management objective that can only be achieved over the course of time (typically 50-80 years). During this period, harvest levels in any given year-of-entry can be higher or lower than the desired long-term, area-regulated harvest level, as unbalanced age classes (resulting from past over- or under-harvesting) are rectified through additional harvest prescriptions. Application of the modified area control method to the effective base of timberland in the state forest ensures that harvest levels are sustainable and comply with forest certification standard requirements.

The calculation of projected harvest levels is a key component of each management area section in the regional state forest management plan and is framed in terms of projected harvests (in acres) for the major and minor cover types for the following decade. These projections are based upon several factors:

- The desired future condition for the forest type, which include area regulated (balanced) age-class distributions and the perpetuation or transition of dominant forest types based upon Kotar habitat classification (Burger and Kotar, 2003);
- The present acreage and age-class and/or stocking condition of forest types, based upon inventory data;
- Areas that are reserved from harvest due to treatment limiting factors or other management goals (including special conservation areas, high conservation value areas and ecological reference areas); and
- The type of silvicultural practices that are typically employed for different cover types, age classes and means of forest regeneration.

Other variable factors such as disease, insect, wind or fire mortality may also impact harvest levels. Where disease, insect or fire mortality problems are known in advance to apply to a management area (e.g., beech mortality due to beech bark disease) they are taken into consideration when establishing harvest levels for that management area. These factors cannot always be predicted with sufficient accuracy or certainty to allow them to be integrated into operational landscape level planning. So when they do occur, harvest schedules are often adjusted in the compartment review process to address them. Where there are occurrences of disease or insect outbreaks or large wind throws or wildfires, they are usually quite localized and may lead to unanticipated temporary increases in salvage harvests to avoid major losses in timber value. These unanticipated harvests are taken into account in subsequent annual planning analyses and processes.

All the above factors are integrated into Department of Natural Resources (DNR) planning processes at the strategic level (2008 Michigan State Forest Management Plan), operational landscape level (regional state forest management plans), and the tactical level (through the compartment review process). In particular, they are considered in formulating the management direction for each management area in the regional state forest management plan, which provide specific estimates of harvest levels for this 10-year compartment review cycle.

The management direction contained within each management area section of the plan is used with appropriate standards and guidelines and professional judgment in the compartment review process to plan tactical prescriptions for timber harvest. Whereas, standards originate from higher authority, they retain higher precedence than the contents of this plan. Standards and guidelines that are used for the operational management of the state forest include:

#### **Standards:**

1. Natural Resource Commission Policy 2204, Reforestation, issued January 1, 1977.
2. Natural Resource Commission Policy 2207, Management of State Forests, issued May 11, 1979.
3. DNR Policy and Procedure 32.22-06, Forest Type Mapping Instructions and Type Symbols, issued July 11, 2005.
4. DNR Policy and Procedure 32.22-07, Forest Management, issued July 11, 2005.
5. DNR Policy and Procedure 39.21-20, Beaver Management, issued July 11, 2005.
6. DNR Forest Management, Fire and Minerals Division Policy and Procedure 241, Reforestation, issued October 26, 1999.
7. DNR Forest Management, Fire and Minerals Division Policy and Procedure 251, Sale and Removals of Timber, issued March 1, 2000.
8. DNR Forest Management, Fire and Minerals Division Policy and Procedure 251a, Sale and Removals of Timber, Visual Management, issued February 28, 2002.
9. DNR Forest Management, Fire and Minerals Division Policy and Procedure 441, Operations Inventory and Compartment Review Procedures, issued January 19, 2000.
10. DNR Forest Certification Work Instruction 1.4 – Biodiversity Management on State Forest Lands.
11. DNR Forest Certification Work Instruction 1.5 – Social Impact Considerations and Public Involvement Processes.
12. DNR Forest Certification Work Instruction 1.6 – Forest Management Unit Analysis.
13. DNR Forest Certification Work Instruction 2.1 – Reforestation.
14. DNR Forest Certification Work Instruction 2.3 – Integrated Pest Management and Forest Health.
15. DNR Forest Certification Work Instruction 7.1 – Timber Sale Preparation and Administration Procedures.

#### **Guidelines:**

1. DNR Silvicultural Guidelines.
2. Within-Stand Retention Guidance (Michigan Department of Natural Resources, 2011).
3. Michigan Woody Biomass Harvesting Guidance (Michigan Department of Natural Resources, 2010).
4. Sustainable Soil and Water Quality Practices on Forest Land (Michigan Department of Natural Resources and Michigan Department of Environmental Quality, 2009).
5. Evaluating Riparian Management Zones on State Lands (Michigan Department of Natural Resources, 2004).
6. Forest Certification Green-Up Guidelines (Michigan Department of Natural Resources, 2006).
7. Guidelines for Red Pine Management (Michigan Department of Natural Resources, 2006).
8. American Beech Management: Beech Bark Disease (Michigan Department of Natural Resources, 2012).
9. Ash Management: Emerald Ash Borer (Michigan Department of Natural Resources, 2012).
10. Rare Species Protection Approach and Assessment Guidelines (Michigan Department of Natural Resources, 2008).
11. Interim Management Guidance for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands (Michigan Department of Natural Resources, 2012).
12. Strategy for Kirtland's Warbler Habitat Management (Michigan Department of Natural Resources et al., 2001).
13. The average size of clearcut harvests over the state forest system should not exceed 120 acres, except where necessary to meet regulatory requirements or to respond to forest health emergencies or other natural catastrophes (The Sustainable Forestry Initiative, Inc., 2010).
14. Deer Winter Range Guidelines (Michigan Department of Natural Resources et al., 2013)

This forest plan is based upon 2012 DNR state forest inventory data. A model was used to analyze the inventory data and to generate the tables and figures presented in this plan section. Metadata describing the design elements and functions of this model is provided in Appendix D.

The state forest inventory in the eastern Upper Peninsula ecoregion totals 1,068,956 acres, of which 807,145 acres (76%) are forested (Table 3.1). The dominant cover types are northern hardwood (12%), aspen (11%), cedar (11%), jack pine (9%), red pine (7%) and lowland conifer (7%) (Table 3.1). Non-forest conditions are dominated by lowland open/semi-open lands which make up 19% of the state forest land. There are 91,300 acres (9%) of forested land with hard limiting factors, resulting in 715,845 acres (91%) of manageable forested land.

Some broad trends on forest acreages merit a brief discussion here and are discussed in further detail in the management area sections that follow. The total forested area is expected to remain unchanged and individual cover type acreage is also expected to remain similar to the current acres. Beech bark disease will result in heavy mortality of beech trees and emerald ash borer damaged areas are expected to expand. Therefore, stands containing high percentages of beech, ash or both are not likely to be available for harvest for many years after salvage harvests are completed.

Management of lowland cover types (mixed lowland conifers, lowland deciduous, lowland spruce/fir, tamarack and cedar) are expected to increase over this planning period. This is due to a number of factors, including an abundance of mature and over-mature acres in these lowland forest types; emerging forest health issues associated with some mature forest types; and a current DNR project to digitize, review and update old hard copy maps of deer wintering complexes (comprised predominantly lowland conifer cover types) into a unified GIS shape file.

The modeled DNR inventory data projects a prescribed harvest level of 135,470 acres over this 10-year planning period for the state forest in the eastern Upper Peninsula ecoregion, which is the summation of the projected 10-year final harvest area and the projected 10-year partial harvest area levels for both major and minor cover types in each management area (Table 4.1). These projections should be considered to be prescribed inventory acres. Proposed timber sale acres are consistently 10% less than prescribed inventory acres, due to site-specific conditions (such as access issues or survey needs). Considering this, the acreage of proposed timber sales the state forest in the eastern Upper Peninsula ecoregion is projected to be about 122,000 acres over this 10-year period (an average of about 12,200 acres per year). This does not mean that 12,200 acres of timber will be harvested during every year in this 10-year planning period. Harvest levels in any given year may actually be lower or higher than 12,200 acres due to several reasons, including variability in the proportion of different forest types and their age/size classes in any given year-of-entry, variability in the timing of actual harvests during the 3-4 year timber sale preparation and contract process and variability in the number of unanticipated salvage harvests (due to forest health or fire occurrences). Likewise and for the same reasons, there is variability in the annual harvest levels in any given forest management unit. Harvest levels in each cover type will also be variable due to reclassification of cover types as the transition from the Operations Inventory to Integrated Forest Monitoring Assessment and Prescription forest inventory systems progresses during the planning period. Harvest levels in lowland cover types may be higher or lower, as available acres are quantified by collection of site condition (limited factor) data for all forest stands during the planning period. However, over the full 10-year planning period it is anticipated that about 122,000 acres of timber will be harvested from the eastern Upper Peninsula ecoregion.



Table 4.1. Projected harvest level by cover type aggregated over all management areas over the next decade for the state forest in the eastern Upper Peninsula ecoregion (unpublished Department of Natural Resources inventory data).

Species	Percentage of State Forest Land	Current Acreage	Hard Factor Limited Acres	Manageable Acres	Projected 10-Year Final Harvest	Projected 10-Year Partial Harvest	Projected Acreage in 10 Years
Lowland Open/Semi-Open Lands	19%	197,964	0	197,964	0	0	197,964
Northern Hardwood	12%	123,444	5,279	118,165	0	49,640	123,444
Aspen	11%	117,222	9,481	107,741	4,666	0	117,222
Cedar	11%	112,721	4,075	108,646	1,896	0	112,721
Jack Pine	9%	99,341	5,933	93,408	4,464	0	99,341
Red Pine	7%	76,278	6,582	69,696	4,827	20,446	76,278
Lowland Conifers	7%	71,264	20,364	50,900	7,511	0	71,264
Upland Open/Semi-Open Lands	4%	43,040	0	43,040	0	0	43,040
Lowland Spruce/Fir	3%	37,079	9,003	28,076	3,579	0	37,079
White Pine	3%	30,569	3,006	27,563	4,029	7,390	30,569
Lowland Deciduous	3%	28,640	5,927	22,713	2,443	0	28,640
Misc Other (Water, Local, Urban)	2%	20,807	5	20,802	0	0	20,807
Lowland Aspen/Balsam Poplar	2%	16,269	3,932	12,337	1,322	0	16,269
Upland Spruce/Fir	1%	13,861	2,791	11,070	1,631	0	13,861
Upland Conifers	1%	11,043	195	10,848	2,475	3,099	11,043
Upland Mixed Forest	1%	10,843	292	10,551	1,498	2,694	10,843
Paper Birch	1%	10,425	5,883	4,542	437	0	10,425
Tamarack	1%	9,580	5,375	4,205	730	0	9,580
Natural Mixed Pines	1%	9,523	553	8,970	929	2,715	9,523
Lowland Mixed Forest	1%	9,001	625	8,376	1,387	0	9,001
Mixed Upland Deciduous	1%	8,952	191	8,761	1,680	2,282	8,952
Hemlock	1%	6,936	1,292	5,644	0	425	6,936
Oak	0%	3,690	518	3,172	283	793	3,690
Planted Mixed Pines	0%	464	0	464	87	114	464
<b>Totals</b>	<b>100%</b>	<b>1,068,956</b>	<b>91,300</b>	<b>977,656</b>	<b>45,873</b>	<b>89,597</b>	<b>1,068,956</b>

### Climate Change Considerations

As the climate continues to change, the effects of these changes may present forest managers with challenges to achieving the desired future conditions outlined in this plan and exploration of additional strategies for adapting to these changes may be warranted. Within the scope of this plan, forest managers may consider management actions that help to put forests in a better position to respond to a range of future conditions. Millar et al. (2007) described an adaptation framework with actions that fit into three broad categories:

- Resistance Actions – These help a forest ecosystem build its defenses, both against the direct impacts of a changing climate and the indirect impacts of other threats that are aggravated by climatic changes. These are for situations where there is a goal of keeping the ecosystem in a relatively unchanged condition. Examples of actions include creating a complete fire-break around a unique, vulnerable area or intensive removal of all invasive species from an area. For many areas, these actions may only make sense in the short-term, as ultimately, the climatic changes may simply go beyond the physical limits of the species or system and will likely get more expensive with greater climate changes.
- Resilience Actions – These help a forest ecosystem rebound and return to a prior condition following a disturbance and are for situations where a small-degree of change is acceptable. Resilience actions are similar to resistance actions, but are applied more broadly and focus on helping a system cope with disturbance. An example would be actions that help to increase the diversity of species in an ecosystem. Again, these actions may not be long-term solutions, if the climate becomes completely unsuitable for that ecosystem.
- Response Actions – These help a forest ecosystem change and move to a different condition that is suitable for a changing and new climate. These actions include assisted migration (intentionally moving a species to a location outside of its current range) and promoting connected landscapes.

Decisions about what types of adaptation actions are most appropriate for an area will need to consider the implications of climate changes to that area and recognize that they will be influenced by differences in ecosystem, ownership and management objectives. Section 3 includes an overview of some regional differences that may affect which kinds of actions are most appropriate.

Many of the special resource areas described by management area in this section have characteristics that may make them more vulnerable to climate change, as well as characteristics that may make them good candidates as refugia for species threatened by climate changes. Refugia are “locations and habitats that support populations of organisms that are limited to small fragments of their previous range” (Handler et al., In Press). In addition to their potential for providing

some protection for vulnerable species and ecosystems, refugia may also be valuable for their potential to protect water supplies and functions as they fluctuate across the landscape (Handler et al., In Press).

Some special resource areas are examples of natural communities that are already rare – either have very specific hydrologic/climatic/disturbance requirements or are already threatened in other ways; regardless, this will make them more vulnerable to additional threats/stresses. However, those special resource areas that are already in good condition and include diverse species and few invasives will have a higher adaptive capacity than other lower quality places, making them good potential refugia. High-quality natural communities are more likely to support rare species – this is an additional characteristic that will make some special resource areas valuable as refugia. Additionally, management objectives already in place in many special resource areas focus on promoting high-quality natural communities, thus are already in line with the best adaptation strategies.

### **Special Resource Area Management Direction**

The Department of Natural Resources has used many mechanisms to identify areas that may have particular or special biological/ecological, social or economic conservation objectives or values. For example, some state natural areas have been dedicated by Natural Resource Commission resolutions and the Simmons Woods Area was established using a land use order under the authority of the director. Some areas are managed through memorandums of understanding and statute, and there are also areas that have been noted for their biodiversity potential through less formal mechanisms.

Over time it has become challenging to sift through naming conventions and designations to understand the broad range of conservation values within the state forest system. The special resource area management direction section of this plan begins the process of collating and organizing these areas and their associated designations.

This section provides a description of areas of the state forest that have been identified as having specific or special resource attributes that are considered in management planning and activities. The majority of these areas are noted for renewable resource conservation values; however, some social and non-renewable categories (e.g., concentrated recreation areas and mineral resource areas) have also been included in order to document and track their purposes.

Areas with specific conservation values have been sorted into three primary categories: special conservation areas, high conservation value areas and ecological reference areas. Each category has a conservation value trait and a 'level of recognition' trait. Combined, the two traits determine whether an area is identified as a special conservation area, a high conservation value area or an ecological reference area. It is anticipated that over time, areas will be moved between, added and/or removed from these categories based on conservation values and level of recognition.

**Special Conservation Areas:** Special conservation areas are areas of state forest land that have one or more identified special conservation objectives, interests or natural community (Kost et al., 2007) element occurrences. They are a broad assemblage of areas that possess some inherent ecological, social or economic value. Conservation objectives listed in the special conservation area category have been identified through a variety of methods and mechanisms. The type and strength of recognition (and possible management options) will vary depending on the process used to identify the conservation value. For example, some objectives are detailed in the land use orders of the director (force of law) while other may be identified through cooperative agreements (administrative recognition). Areas formerly identified through administrative recognition that have not had that recognition superseded by another formal designation will have administrative recognition re-affirmed by this plan. There are also objectives developed through department process or agreement (e.g., deer wintering areas, potential old growth or riparian buffers). The special conservation area category may also be used to document areas identified by an external group or organization, such as National Audubon Society's Important Bird Areas Program.

**High Conservation Value Areas:** High conservation value areas are areas of state forest lands that have been recognized for their contribution to specific conservation objectives or ecological attributes through a public process. Examples of these formal processes include: legislation, administrative rule or director's or Natural Resource Commission orders. High conservation value areas include dedicated natural, wilderness and wild areas; natural rivers; species recovery plan areas such as piping plover habitat areas; and critical dune areas.

Designated high conservation value areas are located only upon state forest land, but within a landscape context, conservation efforts of equivalent high conservation value area resources should be coordinated with other private and agency landowners. The high conservation value area category is intended to address the Forest Stewardship Council, U.S. Forest Management Standard (v1.0) Principle 9, which requires the maintenance of high conservation value forests.

**Ecological Reference Areas:** Ecological reference areas are areas that serve as models of ecological reference within the state. They are high-quality examples of ecosystems that are primarily influenced by natural ecological processes and

they can be located upon any land ownership. High-quality natural communities recognized by NatureServe (an internet based international network of biological inventories) and the Michigan Natural Features Inventory as global (G) or state (S) endangered (1), threatened (2) or rare (3) and with an element of occurrence (EO) rank of A or B in the Michigan Natural Features Inventory database serve as an initial set of ecological reference areas. This ecological classification system was selected as a baseline because it is nationally and internationally acknowledged and is based on a sound scientific system. The ecological reference area category is intended to address the Forest Stewardship Council, U.S. Forest Management Standard (v1.0) Criterion 6.4, which requires the establishment of a system of protected representative ecosystems across the landscape of all ownerships.

Identified ecological reference areas, high conservation value areas and special conservation areas will be managed to conserve, protect and/or enhance the defined conservation objective or value. The methods used will vary depending upon the objective and type of designation. Methods can include active management or just the provision of access. Either method must be compatible with the defined conservation objective or value. Land managers, field staff and stand examiners use technical materials, program staff and/or other references when assessing management options that are suitable for the specific conservation objective. All areas will be managed to protect the immediate natural resource values with consideration of human health and safety.

Areas that are designated as ecological reference areas, high conservation value areas and special conservation areas may overlap one another and are not mutually exclusive. The Department of Natural Resources has developed maps that show the spatial extent of these areas across the landscape of the eastern Upper Peninsula ecoregion.

The starting point for reviewing special conservation areas is the operations inventory and compartment review process. The starting point for reviewing high conservation value areas and ecological reference areas is the Biodiversity Conservation Planning Process. Both processes include public participation and consider nominations for inclusion, removal or other changes to designations. Additional information regarding these areas can be found in the Conservation Area Management Guidelines and the standards and guidelines applicable to the management directions for each type of special resource area can be found in Section 5 of the Michigan State Forest Management Plan, 2008.

### **Cultural and Customary Use Areas**

Cultural and customary use areas include areas that possess and provide significant values and purposes for Native American tribes and other various ethnic or religious groups; or, sites that have been traditionally used by tribes and the public for specific purposes. Cultural use areas include those that possess spiritual and cultural values and traditional gathering of non-timber forest products by Native American tribes and other people. Customary use areas are those that are used seasonally and may include such uses as maple syrup, wild fruit and other plant gathering areas and placement of traditional hunting camps.

The eastern Upper Peninsula offers an abundance of areas that produce gathering opportunities for specific ceremonial, medicinal, craft and edible items under appropriate permits where applicable. There are at least 138 products documented in over 54 botanical families and 87 genera, including more than 100 separate species in the eastern Upper Peninsula.

The maintenance and preservation of cultural and customary use areas for future generations is important to our society. Use of these areas to conduct natural resource gathering and harvesting activities are important for economic reasons, recreation and social ties and for the values of self-sufficiency, independence, work ethic and relationship with nature.

Land use permits for non-tribal customary and cultural uses are coordinated by each forest management unit. Permits for cultural and customary uses of state forest resources by tribal members who are exercising their gathering rights in areas that are under the 2007 Inland Consent Decree for the 1836 Treaty of Washington (Figure 4.2) are issued by their respective tribal government.

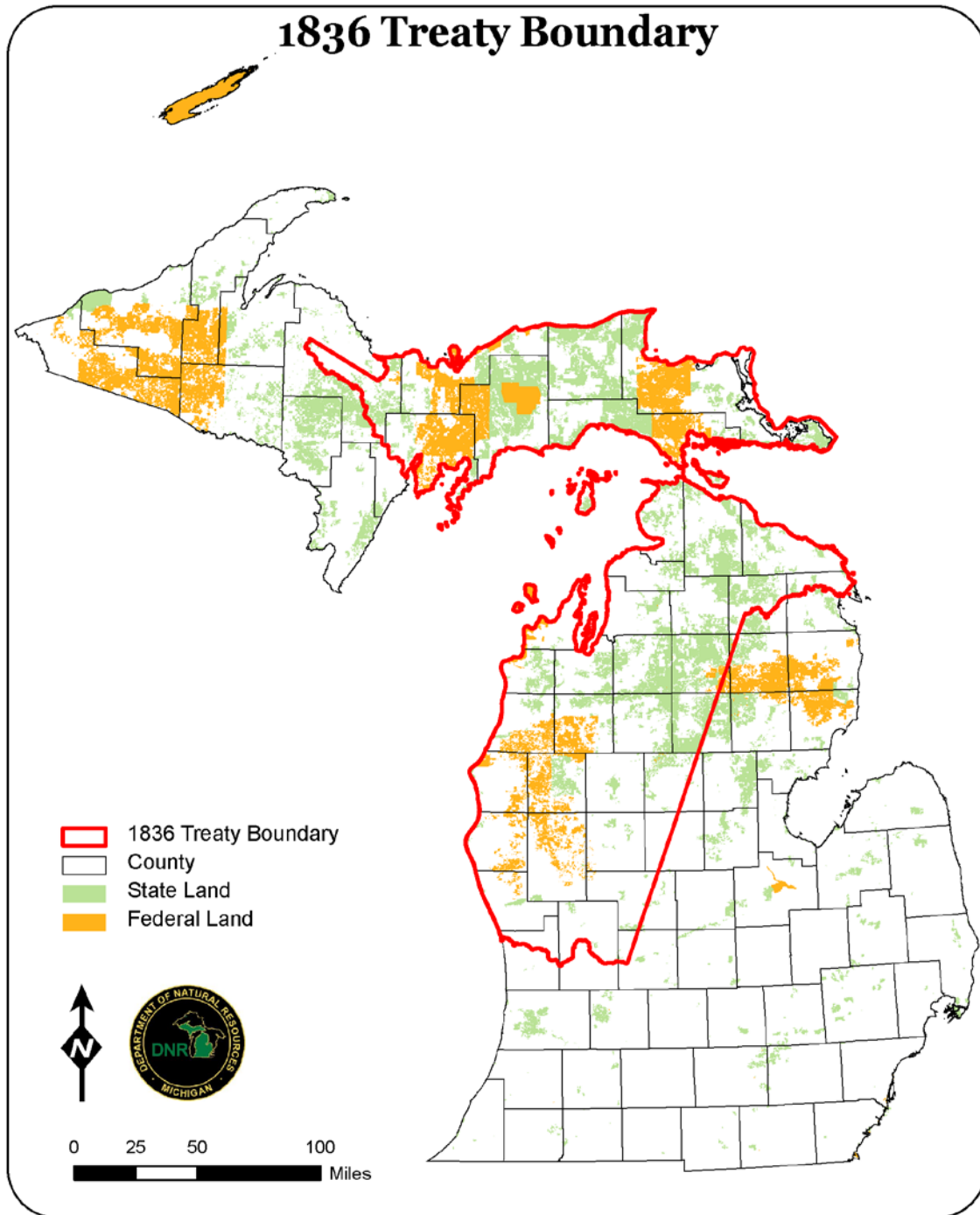


Figure 4.2. Boundary for the 1836 Treaty of Washington (Department of Natural Resources, 2007).

### Archaeological Sites

Archaeological sites have intrinsic social value and require protection in the eastern Upper Peninsula ecoregion. There are two types of archaeological sites. First, there are the pre-historic sites that existed before the arrival of Europeans. Examples of pre-historic sites are camp sites, village sites, quarries, mortuary mounds and other areas used by early natives. The second type of archaeological site is the historic site. These are sites that may be part of the written record, including cemeteries, town sites, logging camps and homesteads. In the ecoregion, most historic sites are from the early 1800s to the mid-20th century.

Sites may be identified by natural heritage data from the State Historical Preservation Office and Office of the State Archaeologist. Sites or possible sites may be discovered in the course of normal field work. These sites should be reported to the Office of the State Archaeologist if they are not already in the database. To protect archaeological sites it is necessary to safeguard location information. This information is sensitive and will be protected from public disclosure and as such, is exempted from the Freedom of Information Act.

Tribal governments should be contacted when working in areas where Native American use may have occurred. Tribal governments should receive notification of open house meetings to enable review of treatment proposals for any possible disruption to archeological sites.

## 4.2 MA 2 – Battydoe Deer Yard Management Area

### Summary of Use and Management

Management in the Battydoe Deer Yard management area (MA) (Figure 4.2.1) will emphasize critical wintering deer habitat, timber production and forest-based recreation. Deer travel long distances to this area to winter in the dense cedar near Lake Michigan. Timber harvesting activities are generally conducted in the winter to benefit the deer. Expected issues in this 10-year planning period include: difficulty of regenerating cedar and other tree species, introduced pests and diseases and illegal off-road vehicle use.

### Introduction

The Battydoe Deer Yard management area is located in the central part of the eastern Upper Peninsula in Mackinac County. It has 16,689 acres of state-owned land. The primary attribute for this management area is the critical habitat for wintering deer. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of extensive conifer-dominated wetlands on sandy lake plain. Upland sites feature northern hardwoods and aspen. Dune and swale landforms are found along the southern edge of the management area.
- Recreational opportunities including hunting, trapping and fishing.
- A large, active limestone quarry is adjacent to the west and north of the management area.

The state forest land in this management area is concentrated, with a few private in-holdings. The Battydoe Deer Yard management area falls within the Sault Ste. Marie Forest Management Unit. The predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.2.1.

Table 4.2.1. Current cover types, acreages, projected harvest acres and projected 10-year cover type acreage for the Battydoe Deer Yard management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Cedar	34%	5,665	86	5,579	50	0	5,665	349	0
Northern Hardwood	20%	3,368	254	3,114	0	1,327	3,368	0	1,327
Aspen	12%	2,012	48	1,964	100	0	2,012	327	0
Lowland Conifers	5%	831	35	796	108	0	831	88	0
Mixed Upland Deciduous	5%	803	12	791	115	195	803	113	195
Lowland Deciduous	5%	763	108	655	0	0	763	73	0
Lowland Open/Semi-Open Lands	4%	720	0	720	0	0	720	0	0
Lowland Aspen/Balsam Poplar	3%	455	92	363	0	0	455	61	0
Paper Birch	2%	328	50	278	0	0	328	46	0
Upland Spruce/Fir	2%	319	66	253	36	0	319	36	0
Upland Open/Semi-Open Lands	2%	277		277			277		
Misc Other (Water, Local, Urban)	2%	291	0	291	0	0	291	0	0
Others	5%	857	164	693	189	113	857	76	125
<b>Total</b>	<b>100%</b>	<b>16,689</b>	<b>913</b>	<b>15,775</b>	<b>598</b>	<b>1,635</b>	<b>16,689</b>	<b>1,169</b>	<b>1,647</b>

Other Types include: lowland spruce/fir, upland mixed forest, lowland mixed forest, upland conifers, white pine and tamarack.

## Battydoe Deer Yard

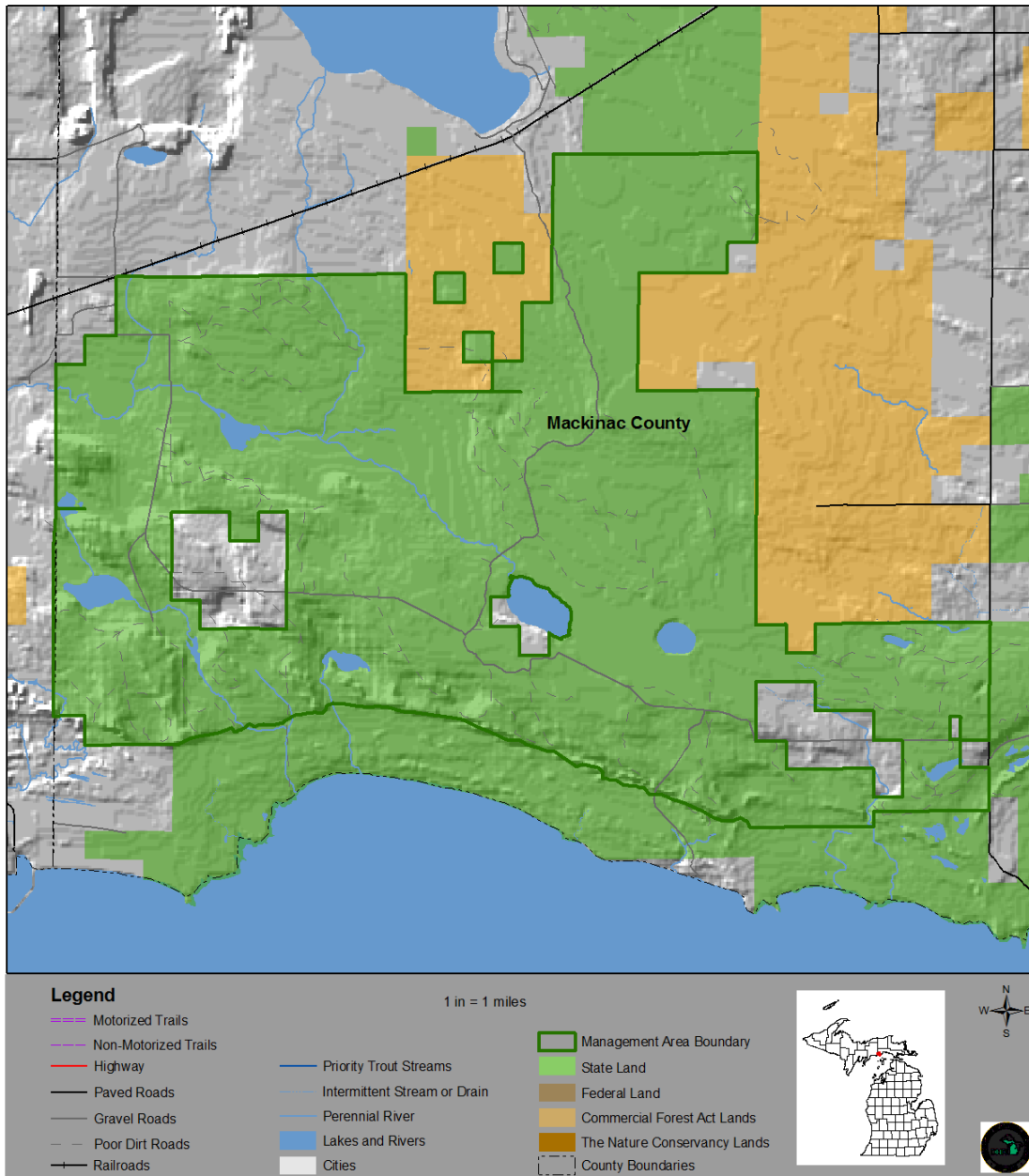


Figure 4.2.1. Location of the Battydoe Deer Yard management area (dark green boundary) in relation to the surrounding state forest lands and other ownerships.

### 4.2.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (e.g., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.



The following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

#### **Section 4.2.1.1 Forest Cover Type Management - Cedar**

##### Current Condition

Cedar occurs on approximately 5,762 acres (34%) of the management area (Table 4.2.1). All of the cedar stands in this management area are within an important deer wintering habitat special conservation area; therefore, the primary management for cedar in this management area will be to maintain closed canopy conditions. Maintaining a closed canopy structure provides important cover for deer, reducing snow depths within the stands. The majority of cedar stands are over 100 years of age (Figure 4.2.2). Cedar harvesting in this area has been limited by the combined effect of high deer numbers and low snowfall on cedar regeneration. Cedar strip cut harvesting was done on an experimental basis and resulted in cedar regeneration. There is a need to address future cedar cover within the deer wintering complexes. Reliable and timely regeneration of cedar is a concern from both wildlife and forest management perspectives, making it important to ensure that cedar and/or hemlock recruitment/regeneration is reliable, if harvesting in this cover type.

Currently, there are no cedar stands prescribed for harvest. While a regulated harvest would allow approximately 349 acres to be harvested per decade (red line in Figure 4.2.2), this is currently not a focus of cedar management in this management area due to the deer wintering area.

There are 86 acres of cedar that have site conditions limiting their harvest this 10-year planning period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

##### Desired Future Condition

- Cedar trees are very long lived and generally provide excellent closed canopy habitat for wildlife. In areas where deer browse is a concern, these stands may not be actively harvested at this time.

##### 10-Year Management Objectives

- The 10-year projected harvest of cedar is approximately 50 acres. This is lower than the regulated amount of 349 acres per decade due to the use of cedar stands by wintering deer; and
- Harvest of this type, if it occurs, may vary widely from the projected harvest, in order to meet the long-term wildlife management objectives.

##### Long-Term Management Objectives

- Cedar stands will be managed to maintain habitat for deer in the wintering areas and to retain this forest type in the landscape; and
- Look for opportunities to test different methods of regenerating cedar.

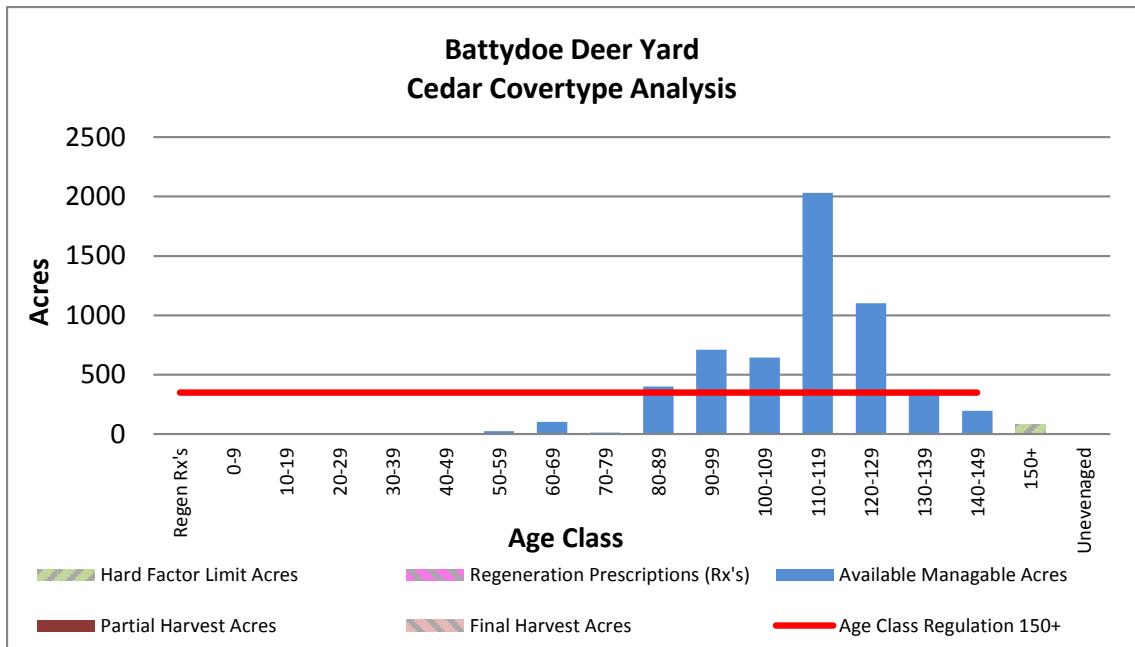


Figure 4.2.2. Age class distribution of cedar in the Battydoe Deer Yard management area (2012 Department of Natural Resources inventory data).

### Section 4.2.1.2 Forest Cover Type Management – Northern Hardwoods

#### Current Condition

Northern hardwood cover types occur on 3,368 acres (20%) of the management area (Table 4.2.1). Northern hardwoods are distributed throughout the management area on mesic medium to rich nutrient loam soils (Kotar habitat classes: AFPO, AFOAs and ATFD (see Appendix E). Approximately 20% of the hardwood stands have been classified as uneven-aged, with trees of varying ages and sizes. While the majority of stands will be managed through individual tree selection to work toward an uneven-aged state, poor quality stands have been managed using even-aged harvesting systems and just over 10% of the stands are currently coded as immature (Figure 4.2.3). Regeneration of hardwood stands in this management area has been impacted by high deer numbers and a large percentage of the regeneration is beech, as it is not a preferred food source of deer.

Beech bark disease has impacted the management area, resulting in high beech mortality. This management area is past the killing front of beech bark disease, and salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed, due to resultant lower than normal residual basal area.

Currently, 662 acres have a partial harvest method of cut assigned. In addition, there are 27 acres of poor-quality hardwoods that have a final harvest prescribed. There are 254 acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

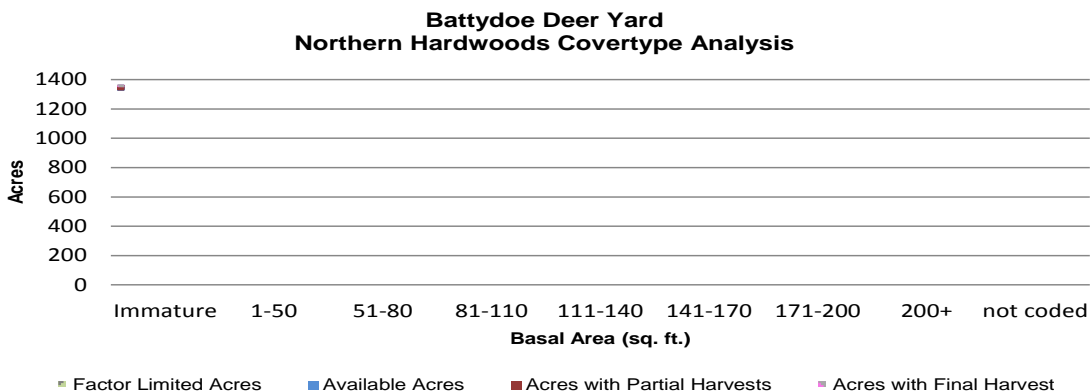


Figure 4.2.3. Basal area distribution of northern hardwoods in the Battydoe Deer Yard management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwoods will be maintained on operable sites, generally by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands; and
- This will provide for a continuous supply of timber, available wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year harvest is for 1,327 acres of partial or selection harvest;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands; and
- Favor regeneration of hardwood other than beech; consider herbicide applications of beech regeneration and planting of hard mast producing trees, including disease resistant beech and oak.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.2.1.3 Forest Cover Type Management – Aspen**

Current Condition

Aspen occurs on 2,012 acres (12%) of the management area (Table 4.2.1). Aspen is distributed throughout the management area on mesic poor- to medium- to rich-nutrient sandy loam soils with ATFD, AFPO and AFOAs Kotar habitat classes. Accessible aspen has been consistently harvested over the last 30 years, resulting in approximately 80% of the aspen stands being in the 0-29 year age classes (Figure 4.2.4).

Currently, there are 28 acres prescribed for final harvest. There are 24 acres prescribed for harvest in other cover types that are expected to convert to aspen after harvest. These acres are shown in Figure 4.2.3 in the regeneration prescriptions column and were removed from the manageable acres in the other types. There are 48 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible aspen will eventually succeed to late successional species.

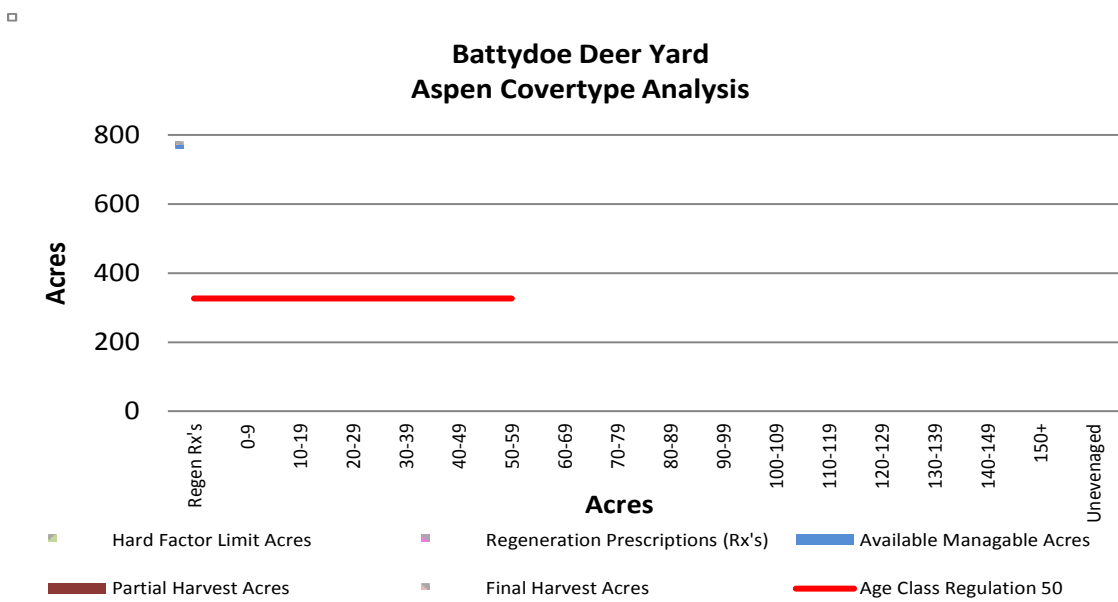


Figure 4.2.4. Age-class distribution of aspen in the Battydoe Deer Yard management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Aspen stands will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age. This will provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- Due to the current age-class structure, the projected 10-year final harvest of aspen is 100 acres. This is less than the regulated amount due to the current age-class structure. To achieve this projected harvest level, some stands will be harvested before reaching rotation age.

Long-Term Management Objectives

- Balance the age-class structure of aspen by harvesting and regenerating the regulated amount of approximately 327 acres per decade (red line in Figure 4.2.4).

**Section 4.2.1.4 Forest Cover Type Management – Lowland Conifers**

Current Condition

Lowland conifers occur on approximately 831 acres (5%) of the management area (Table 4.2.1). Lowland conifer stands have been successfully harvested and regenerated in this area, resulting in many age classes (Figure 4.2.5). Many of the lowland conifer stands in this management area will be managed for deer wintering habitat. While deer may affect the regeneration of cedar, natural regeneration consisting of other species currently on site is expected after harvesting. Some of the stands in older age classes may be inaccessible for harvest at this time due to access.

Currently, there are 23 acres with a final harvest prescription, and 46 acres with a partial harvest prescription. There are 35 acres of lowland conifer that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in inaccessible areas will be subject to natural processes, resulting in a range of successional stages.

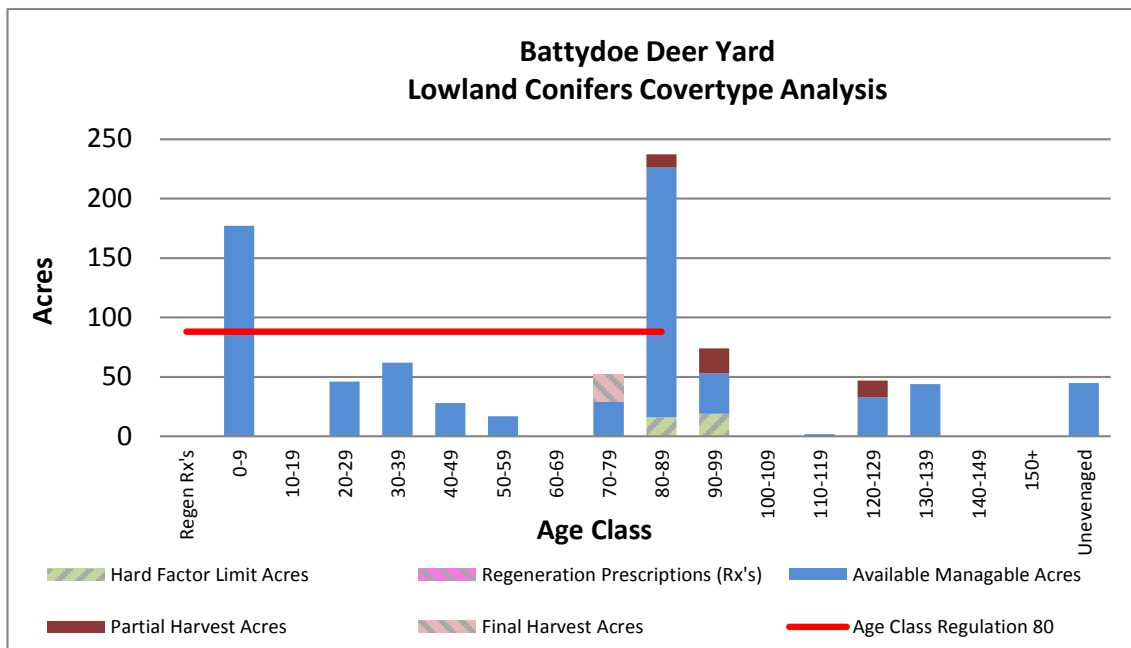


Figure 4.2.5. Age-class distribution of lowland conifers in the Battydoe Deer Yard management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management, with acres balanced between 0-89 years of age. This will provide for a continuous supply of timber, available wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest for lowland conifers is 108 acres. The 10-year projected harvest is slightly higher than the regulated harvest amount, due to the current age class structure where there are a lot of acres in the 80-89 year age class.

Long-Term Management Objectives

- Balance the age-class structure of available lowland conifer stands providing a regulated harvest of approximately 88 acres to be harvested per decade; and
- Minimize the impact of high deer numbers on the species composition of regeneration.

**Section 4.2.5 Forest Cover Type Management – Mixed Upland Deciduous**

Current Condition

Mixed upland deciduous stands occur on 803 acres (5%) of the management area (Table 4.2.1). As the name suggests, these stands occur on upland sites and contain a variety of tree species. The species composition varies from stand to stand, but normally includes hardwood species such as aspen, birch, maple, beech and cherry. Conifer species may also be present, but normally compose less than 20% of the crown closure. Depending upon their species mix, mixed upland deciduous stands with high basal area may be thinned before reaching rotation age where final harvest normally occurs. Natural regeneration has been successful in mixed upland deciduous stands in this management area.

Currently, there are 66 acres prescribed for final harvest (Figure 4.2.6). There are 12 acres of mixed upland deciduous that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Mixed upland deciduous stands in inaccessible areas will be subject to natural processes, resulting in a range of successional stages.

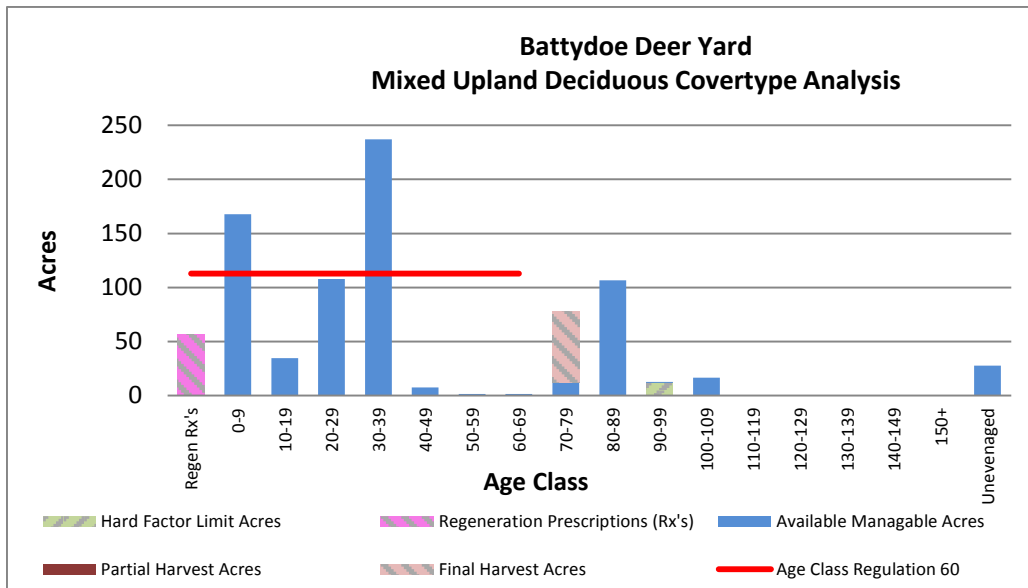


Figure 4.2.6. Age-class distribution of mixed upland deciduous in the Battydoe Deer Yard management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Mixed upland deciduous stands will be maintained on operable sites through even-aged management, with acres balanced between 0-69 years of age. This will provide for a continuous supply of timber, available wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest for mixed upland deciduous stands is 115 acres; and
- The projected 10-year partial harvest or thinning of stands with high basal area is 195 acres.

## Long-Term Management Objectives

- Balance the age-class structure of available mixed upland deciduous stands producing a regulated harvest of approximately 113 acres to be final harvested per decade; and
- Prior to final harvest at rotation age and dependent upon species composition, periodically thin stands with high basal area.

### **Section 4.2.6 Forest Cover Type Management – Lowland Deciduous**

#### Current Condition

Lowland deciduous cover types occur on 763 acres (5%) of the management area (Table 4.2.1). Lowland deciduous stands have been successfully harvested and regenerated in this area, resulting in many age classes (Figure 4.2.7). These stands are generally managed using even-aged systems, followed by natural regeneration.

Currently there are 67 acres with a partial harvest method of cut prescribed. In addition, there are approximately 33 acres in other cover types that are currently prescribed for harvest, that are expected to convert to lowland deciduous after harvest. These acres are shown in Figure 4.2.7 in the regeneration prescriptions column. There are 108 acres of lowland deciduous that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland deciduous stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

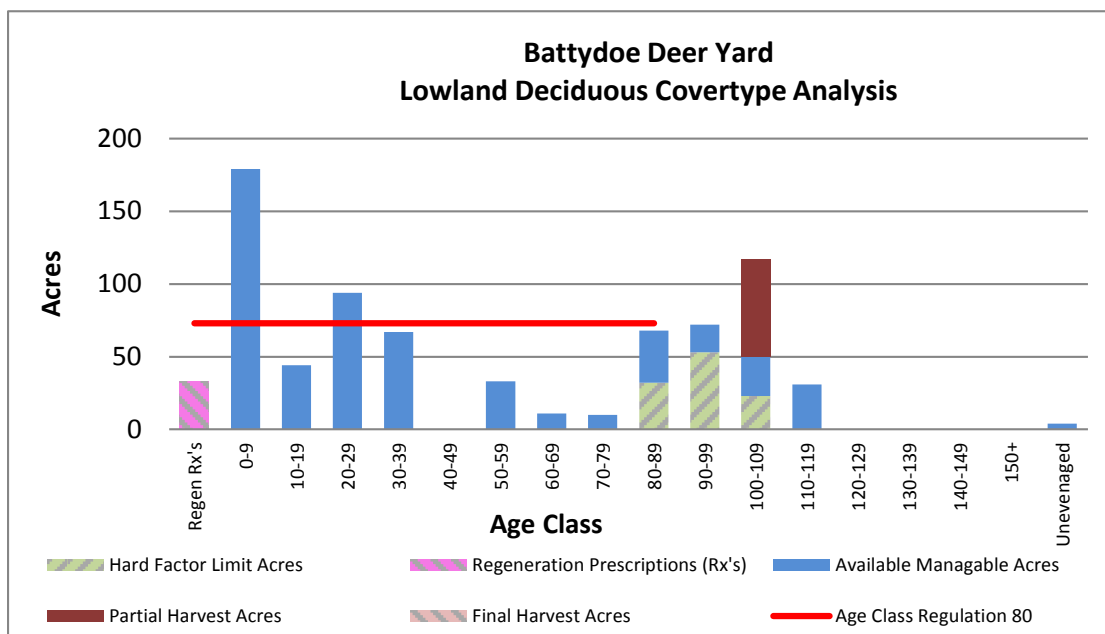


Figure 4.2.7. Age-class distribution of lowland deciduous in the Battydoe Deer Yard management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland deciduous stands will be maintained on operable sites through even-aged management, with acres balanced between 0-89 years of age, to provide for continual harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected harvest is zero acres due to the large number of acres in the 0-9 year age class.

#### Long-Term Management Objectives

- Balance the age-class structure of accessible stands providing a regulated harvest of approximately 73 acres to be harvested per decade.

## Section 4.2.1.7 Forest Cover Type Management – Other Types

### Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acres (Table 4.2.1). Lowland open/semi-open lands (720 acres or 4%) is made up of lowland shrub (566 acres), bog (59 acres), marsh (55 acres) and treed bog (40 acres). Paper birch (328 acres) and upland spruce/fir (318 acres) each contain about 2% of the total acres. Upland open/semi-open lands (277 acres or 2%) is made up of herbaceous open land (124 acres), low-density trees (113 acres), upland shrub (24 acres) and bare/sparsely vegetated (1 acre).

The “others” category with 857 acres (5%) includes cover types with less than 2% of the total acres: lowland spruce/fir, upland mixed forest, lowland mixed forest, upland conifers, white pine and tamarack. In addition, there are 291 acres (2%) of “miscellaneous other” stands, which include water, sand/soil and roads.

In general, most of these cover types are managed as even-aged stands, using natural regeneration after harvest. Some of the mixed cover types with high basal area may be thinned, depending upon their species composition, prior to final harvest. Approximately 371 acres of these other minor cover types have site conditions limiting harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Early successional cover types found in inaccessible areas will move toward mid and late successional cover types.

### Desired Future Condition

- These cover types will be maintained on suitable sites and will contribute to the compositional diversity of the landscape while providing forest products and wildlife habitat.

### 10-Year Management Objectives

- The projected 10-year final harvest includes: 36 acres of upland spruce/fir and 189 acres of other types; and
- The projected 10-year partial harvest is 113 acres of other types.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## 4.2.2 Featured Species Management

This is a key area for wintering deer in the Lake Michigan watershed. The primary wildlife value of this management area is provided by cedar and lowland conifer stands. The vast majority of these cover types are in mature age classes and are used by approximately 80 species of wildlife. The spatial arrangement of other forest cover types, northern hardwoods in particular, make this management area biologically diverse.

### **Red-shouldered Hawk**

The goal for red-shouldered hawk is to maintain or improve suitable habitat in the ecoregion. Management activities should focus on the maintenance of large blocks of mesic northern forest with the appropriate level of large diameter trees in priority landscapes.

### Wildlife habitat specifications:

- All known woodland raptor nests should be reported to local wildlife staff and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. Confirmed red-shouldered hawk nests are to be documented in accordance with the “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172) and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. For red-shouldered hawks, the wildlife habitat specifications contained within Michigan DNR’s *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August 2012) will be followed until the workgroup has completed the guidance that will permanently replace the interim guidelines.



## **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age-class distribution for aspen in priority landscapes within this management area.

### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Move to balance the age-class distribution of aspen and birch cover type to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation.
- Larger harvest units should have irregular boundaries and include one or two 1-3 acre unharvested inclusions for every 40 acres exceeding 40 acres in size.
- Evaluate the conifer component in aspen stands, holding or increasing where desirable. Leave conifer under four-inch in diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

## **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining coarse woody debris, increasing mesic conifer components and increasing beaver abundance.

### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under four-inch diameter at breast height.
- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris slash already present and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance, retaining the maximum residues.

## **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR procedure 32.22-07 states, "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration of tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the DNR and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas, and within ¼-mile of severe winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.

- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring breakout areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### 4.2.3 Rare Species and Special Resource Area Management

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “Rare Species Protection Approach and Assessment Guidelines for DNR Staff on State Forest Lands (IC 4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region. Past surveys have noted and confirmed three listed species and one natural community as shown in Table 4.2.2. Any established management guidelines will be followed.

Table 4.2.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Battydoe Deer Yard management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Wooded dune and swale complex		S3/G3	Confirmed				Upland open/semi-open	N/A
<b>Birds</b>								
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

This entire management area provides winter habitat for white-tailed deer and is designated as an obligate winter deer range special conservation area. Other special conservation areas within the management area are possible Type 1 or Type 2 old growth areas and the Milakokia River cold water stream.

There are currently no identified high conservation value areas in this management area.

There are two wooded dune and swale complex ecological reference areas of 145 and 11 acres within the management area. The majority of the wooded dune and swale complex ecological reference areas are in the Lake Michigan Shoreline management area to the south. Ecological reference areas will be managed to enhance and protect their natural vegetative and associated wildlife communities by an ecological reference area-specific management plan. Figure 4.2.8 shows the special conservation areas and ecological reference areas for this management area.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1 and potential Type 2 old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

### Battydoe Deer Yard

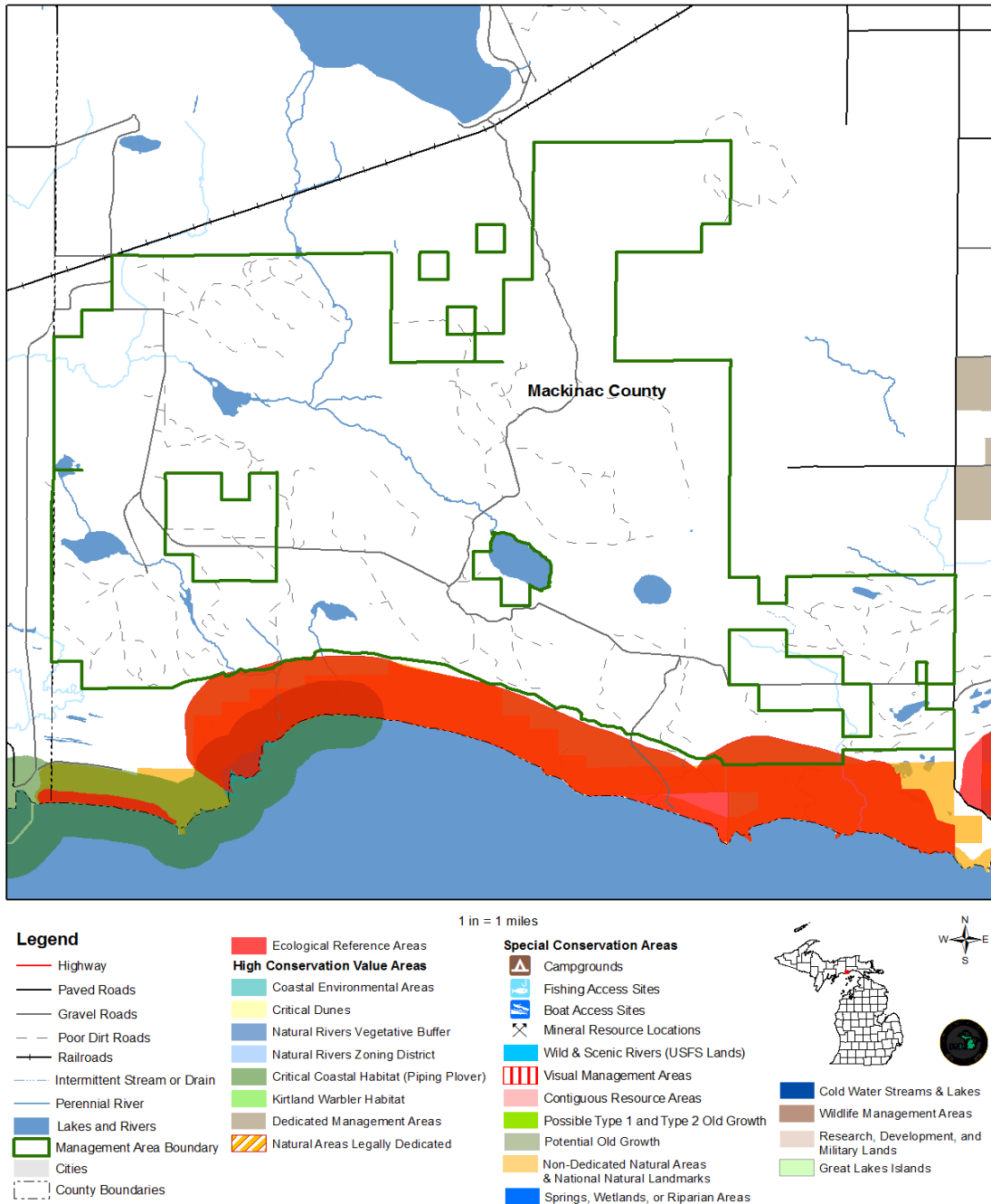


Figure 4.2.8. A map of the Battydoe Deer Yard management area showing the special resource areas.

#### 4.2.4 Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Northern hardwoods: beech bark disease
- Aspen and lowland aspen/balsam poplar: white trunk rot and *Hypoxyylon* canker
- Upland and lowland conifers: spruce budworm, eastern larch beetle and larch casebearer
- Lowland deciduous: emerald ash borer

Further information on forest health can be found in Section 3.

#### Invasive Plant Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. No invasive plant species have yet been documented within the management area, but garlic mustard has been documented within a five mile buffer of the management area (Table 4.2.3), and monitoring efforts should specifically look for new populations of this species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

While it is not yet listed in the Michigan Invasive Plant database, there have been sightings of wild parsnip (*Pastinaca sativa*) in the management area.

Table 4.2.3. Invasive plant species within or near the Battydoe Deer Yard management area (Data from the Michigan Invasive Plant Identification Network database).

Battydoe Deer Yard - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	4	4	1
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer		Occurrences
-	-	Garlic Mustard <i>Alliaria petiolata</i>		4

#### 4.2.5 Fire Management

Much of the land area, being wetland, is of uncertain fire frequency. Sites dominated by northern white cedar and hardwood islands probably will not be significantly impacted by wildland fire. Black spruce, treed bogs and marshes may be more receptive to fire ignition and spread with lower water levels. The following fire management concepts should be applied in the management area:

- Fire may be used as a management tool in these lowland conifer stands under appropriate conditions.

#### 4.2.6 Public Access and Recreation

Access to portions of the management area is limited by lack of roads, and streams and small lakes.

There are no established recreational facilities in this management area.

Snowshoe hare, deer, bear and bobcat hunting and trapping are important forms of recreation in this management area.

#### 4.2.7 Aquatic Resource Management

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process, and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. There are no designated high priority trout streams identified in this management area.

#### **4.2.8 Minerals**

Surface sediments consist of an coarse-textured till, peat and muck and lacustrine (lake) sand and gravel. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the area, but there is potential.

The Silurian Engadine and Manistique Groups subcrop below the glacial drift. The Engadine is quarried for stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula. (two in western Mackinac County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.3 MA 3 – Bullock Ranch Management Area

### Summary of Use and Management

The Bullock Ranch opening is one of several large openings within the eastern Upper Peninsula (EUP) that are managed for a suite of open-land species including sharp-tailed grouse, merlin and upland sandpiper. Vegetative management in the Bullock Ranch management area (MA) (Figure 4.3.1) will emphasize maintaining the large opening complex; producing sustainable yields of various timber products; protecting unique areas and threatened, endangered and special concern species; and providing for forest-based recreational uses. Timber management objectives include improving the age-class balance of jack pine and red pine. Wildlife habitat management objectives include enhancing the large opening complexes, and hunting and other wildlife related recreation opportunities. Management activities may be constrained by poor access throughout much of the area. Expected issues in this 10-year planning period include the introduction and spread of spotted knapweed and other invasive plants and the difficulty in regenerating natural red pine ridges within the marshes.

### Introduction

The Bullock Ranch management area is located in the eastern Upper Peninsula in Schoolcraft County, along the “Seney Stretch” of M-28. The area is bounded by the Seney National Wildlife Refuge on the south, the Driggs River on the west and the Fox River on the east. The town of Seney is in the southeast part of the management area. There are 29,710 acres of state-owned land. The primary attribute for this management area is the large Bullock Ranch open land complex. Additional attributes which are important in identifying this management area include:

- The majority of the management area falls within the Luce Subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of ancient lake plain, with wet organic soils.
- Current forest communities are dominated by jack pine, red pine and open land.
- Special features include: cold water stream special conservation areas, a natural river high conservation value area and an ecological reference area.
- Recreational facilities include hiking trails, snowmobile trails and campgrounds.

This is a highly altered landscape. Historically, marshes, peatlands and low productivity swamps were the predominant vegetation on the very poorly drained topography. Much of this area was drained by ditching during the early 1900's in a failed effort to convert the area to farmland. The altered hydrology resulted in organic soils that are hydrophobic or unable to hold water, which makes prescribed burning difficult to control.

The state land in this management area is concentrated with a few private parcels. The Bullock Ranch management area is within the Shingleton Forest Management Unit. The predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.3.1.

# Bullock Ranch

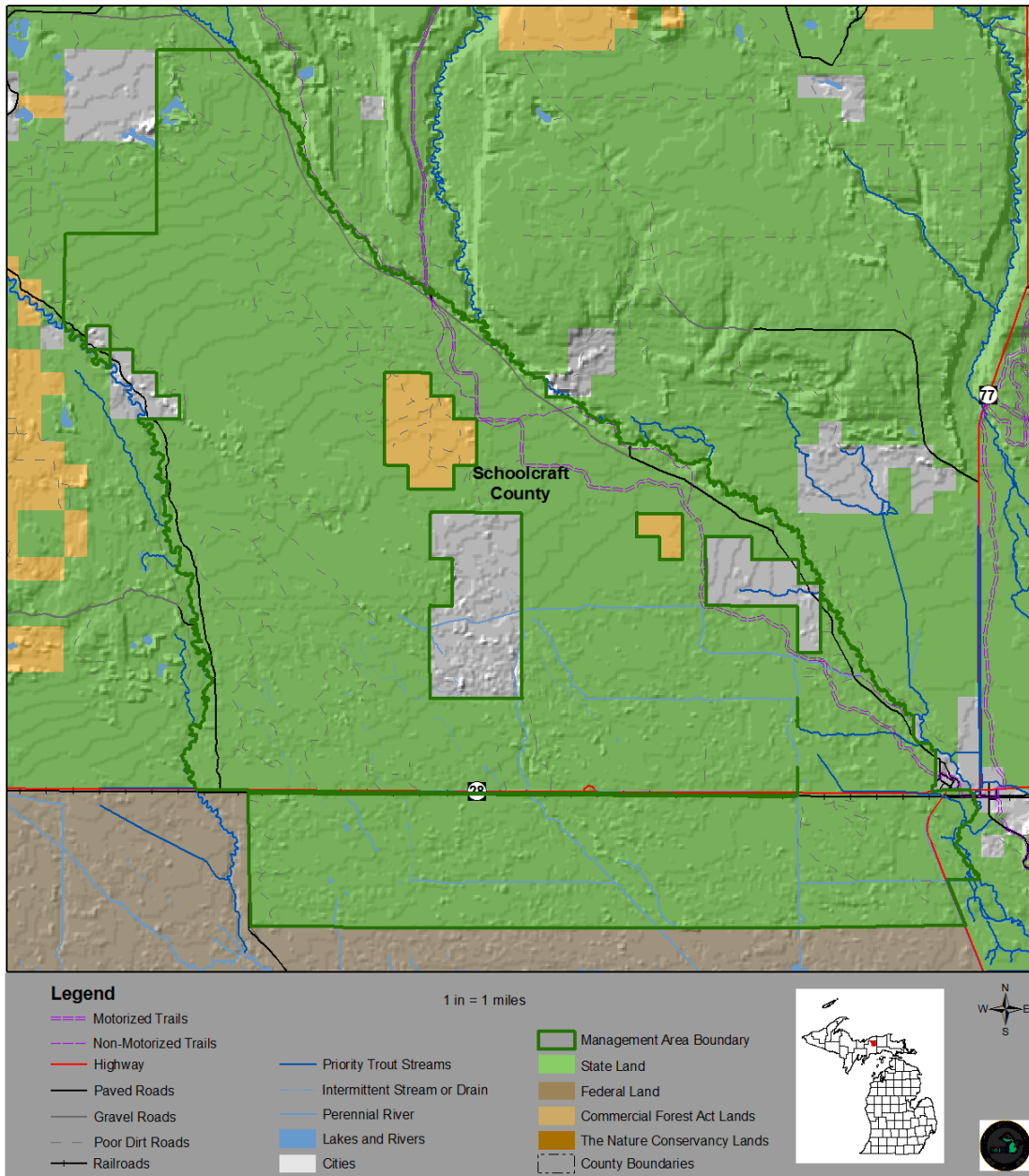


Figure 4.3.1. Location of the Bullock Ranch management area (dark green boundary) in relation to surrounding state forest lands and private ownerships.



Table 4.3.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Bullock Ranch management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Lowland Open/Semi-Open Lands	31%	9,320	0	9,320	0	0	9,320	0	0
Jack Pine	27%	8,071	162	7,909	177	0	8,071	1,130	0
Red Pine	18%	5,206	474	4,732	442	1,101	5,206	526	1,871
Upland Open/Semi-Open Lands	7%	2,211	0	2,211	0	0	2,211	0	0
Lowland Spruce/Fir	4%	1,185	112	1,073	0	0	1,185	119	0
Aspen	3%	999	0	999	104	0	999	167	0
White Pine	2%	509	130	379	102	40	509	34	111
Natural Mixed Pines	2%	461	7	454	0	25	461	41	52
Misc Other (Water, Local, Urban)	1%	190	0	190	0	0	190	0	0
Others	5%	1,558	166	1,392	210	39	1,558	170	89
<b>Total</b>	<b>100%</b>	<b>29,710</b>	<b>1,050</b>	<b>28,660</b>	<b>1,035</b>	<b>1,205</b>	<b>29,710</b>	<b>2,187</b>	<b>2,123</b>

Others include: lowland aspen/balsam poplar, tamarack, lowland conifers, lowland deciduous, northern hardwood, upland conifers, oak, upland spruce/fir, planted mixed pines and lowland mixed forest.

### 4.3.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (e.g., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species. Management areas consist of compartments and stands that are defined by their predominant vegetative cover type.

The following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting and regenerating these cover types will provide for a continuous flow of forest products and values.

#### Section 4.3.1.1 Forest Cover Type Management – Lowland Open/Semi-Open Lands

##### Current Condition

The management area contains a large amount of lowland open/semi-open lands totaling approximately 9,320 acres (31%) (Table 4.3.1) This category is a combination of lowland shrub (5,028 acres), marsh (4,268 acres), treed bog (17 acres) and bog (three acres). These cover types function ecologically as sources of habitat for numerous species of wildlife, including sharp-tailed grouse which is a featured species. The lowland shrub and marsh stands contain many ridges and islands of pine. A large portion of these cover types in the center of the management area are roadless.

##### Desired Future Condition

- Lowland open/semi-open lands will be retained in their large, roadless state to ensure an adequate level of wildlife habitat and recreational opportunity.

##### Long-Term Management Objectives

- Within marshes, treed bogs and bogs, allow natural processes to occur while protecting the ecological values from man-made disturbances; and
- Lowland shrub stands will generally remain unmanaged, with the possible exceptions of management for wildlife habitat and/or for biomass, if markets materialize.

#### Section 4.3.1.2 Forest Cover Type Management – Jack Pine

##### Current Condition

Jack pine occurs on 8,071 acres (27%) of this management area (Table 4.3.1). Jack pine is distributed throughout the management area on lake plains, outwash plains and depressions on outwash plains. The upland sites have Kotar habitat types of PVE and PArV (See Appendix E). The greater proportion of the jack pine stands in this management area are on Eastern Upper Peninsula Regional State Forest Management Plan MA 3 Bullock Ranch

low, wet ground. The majority of the jack pine stands are of natural origin. Many of the stands in the older age classes are found on islands within the large wetland matrix. Jack pine stands have been consistently harvested and regenerated in this area. Most of the young jack pine stands were regenerated through prescribed burning or scarification after harvesting, followed by planting where necessary.

Currently, there are 764 acres prescribed with a final harvest method of cut (Figure 4.3.2). There are acres in other cover types that are expected to be converted to jack pine following harvest, and some stands of jack pine may be converted to other cover types after final harvest. These acres are shown in Figure 4.3.2 in the regeneration prescriptions column. This is being done to take advantage of site conditions. The total acres of jack pine are expected to remain similar to what they are now. There are 162 acres of jack pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible islands of jack pine will eventually convert to other climax species.

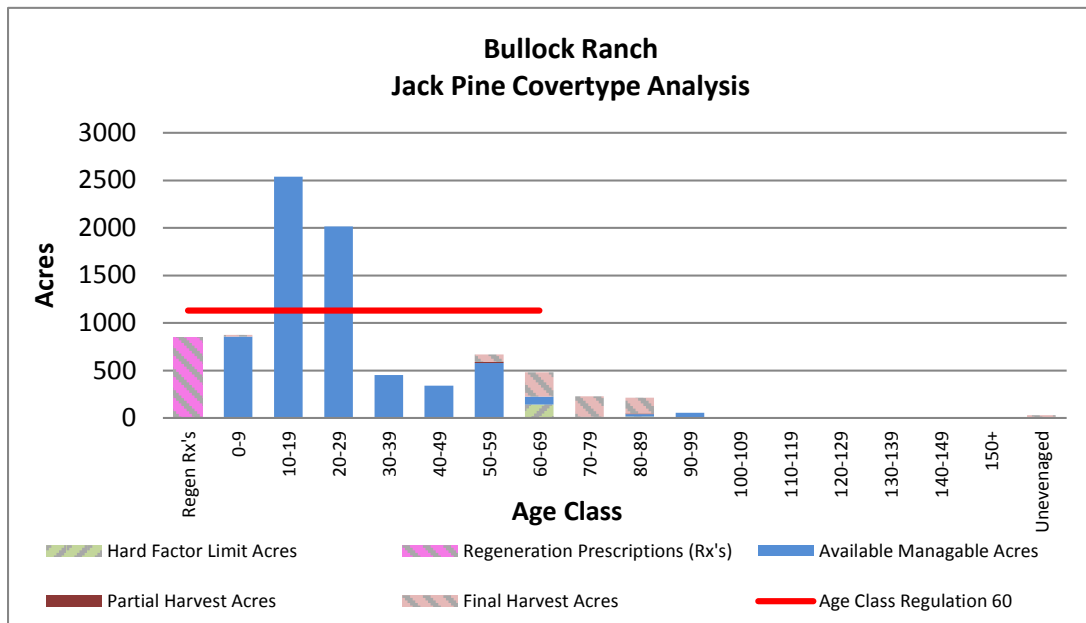


Figure 4.3.2. Age-class distribution of jack pine in the Bullock Ranch management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Jack pine stands will be maintained on operable sites through even-aged management with acres balanced between 0-69 years of age to provide for regulated harvest, wildlife management and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year harvest projection is for 177 acres of jack pine final harvest. This is lower than the regulated amount due to the current age-class structure where the majority of stands are found in the 10-29 year age classes.

#### Long-Term Management Objectives

- Maintain a lower acreage of over-mature stands to lessen the prevalence and severity of jack pine budworm outbreaks; and
- Balance the age-class structure of jack pine providing a regulated harvest of approximately 1,130 acres to be harvested per decade (red line in Figure 4.3.2).

### **Section 4.3.1.3 Forest Cover Type Management – Red Pine**

#### Current Condition

Red pine occurs on 5,206 acres (18%) of the management area (Table 4.3.1). Red pine is distributed throughout the management area on outwash plains, lake plains and stream terraces, with Kotar habitat types of PVE, PArV and PArVAa (See Appendix E). While the majority of the red pine stands in this management area are of natural origin, there are a

number of planted stands along the Fox River Road north of Seney. Red pine has been successfully harvested and regenerated in this area. In general, the planted stands will continue to be thinned approximately every 10 years until economic maturity at age 80, then harvested and replanted.

Many of the natural red pine stands have had shelterwood or seed tree harvests, followed by natural regeneration, which has resulted in some two-aged and uneven-aged stands. Where natural regeneration is low due to competition, trenching and planting has been used. In areas with aspen competition on sandy soils, consider reintroducing fire in the red pine stands to encourage red pine regeneration. Most of the older acres of red pine are natural stands on islands within large roadless marshes, and may not be accessible. A portion of the inaccessible islands of red pine north of M-28 are within a dry northern forest ecological reference area.

Currently, there are 74 acres prescribed for final harvest, and 229 acres prescribed for partial harvest (Figure 4.3.3). There are stands prescribed for harvest in other cover types that are prescribed to be converted to red pine after harvest, and red pine acres that are prescribed to be converted to other cover types to take advantage of site conditions. These acres have been accounted for in the totals and are shown in Figure 4.3.3 in the regeneration prescriptions column. While this may slightly change the red pine acreage, the total acres of red pine in the management area is expected to remain similar to what it is now.

There are 474 acres of red pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Small inaccessible islands of red pine in the large marsh complexes may never have access for harvesting and will remain until natural senescence.

Desired Future Condition

- Red pine will be maintained and managed through thinning until stand replacement harvest at economic maturity with acres balanced between 0-89 years of age to provide for continual harvest, available wildlife habitat and recreational opportunity. Small islands of red pine dispersed in marsh areas may never have access for harvesting and will be allowed to reach biological maturity (over 200 years).

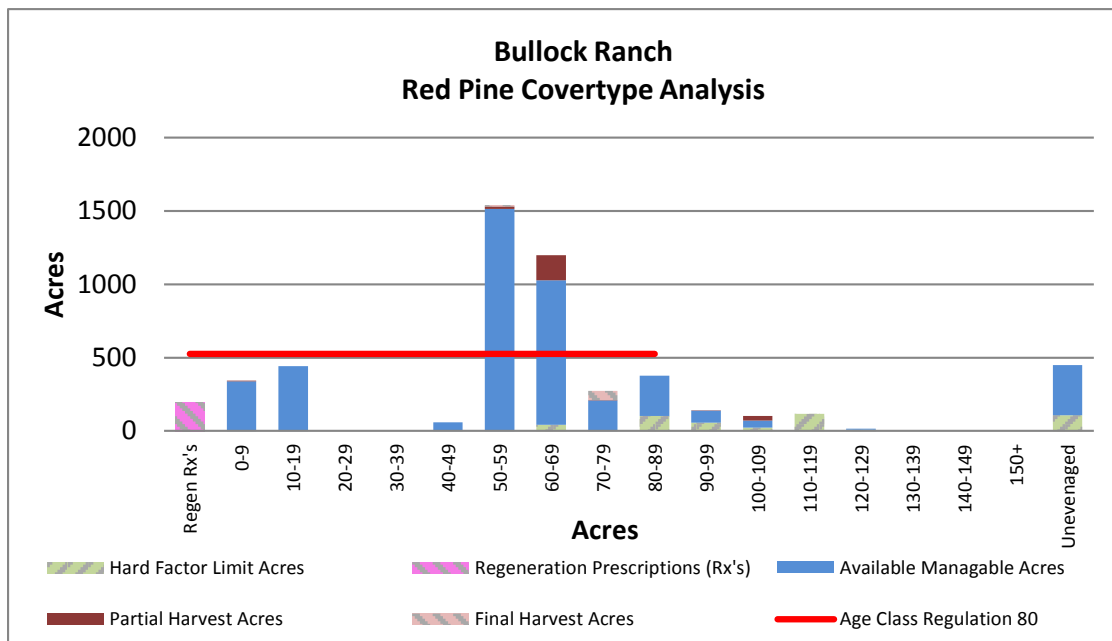


Figure 4.3.3. Age-class distribution of red pine in the Bullock Ranch management area (2012 Department of Natural Resources inventory data).

10-Year Management Objectives

- The 10-year projected final harvest of red pine is for approximately 442 acres to work toward balancing the age classes of red pine. This is less than the regulated amount due to the current age class structure, where the majority of stands is in the 50-69 year classes and is available for thinning.
- The 10-year projected partial harvest, or thinning, of red pine is 1,101 acres.

## Long-Term Management Objectives

- Balance the age-class structure of available red pine providing a regulated harvest of approximately 526 acres for final harvest per decade;
- Stands will be periodically thinned until they meet silvicultural criteria; and
- Protect the ecological values in the dry northern forest ecological reference area.

### **Section 4.3.1.4 Forest Cover Type Management – Upland Open/Semi-Open Lands**

#### Current Condition

Upland open/semi-open lands occur on approximately 2,211 acres (7%) of the management area (Table 4.3.1). This category is a combination of the following non-forested land cover types: herbaceous open land (1,843 acres), bare/sparsely vegetated (197 acres), upland shrub (90 acres) and low-density trees (48 acres). These communities are valued ecologically as sources of open land habitat for numerous species of wildlife. The large grass openings contain sharp-tail grouse leks and wildlife management goals in these cover types will focus on open land species, such as sharp-tailed grouse. The large Bullock Ranch opening has been historically managed through planting, mowing, prescribed burning, herbicide spraying and the removal of competing vegetation using both hand tools and timber sales where volume is sufficient.

Mechanical and biological control measures have been used in this area to reduce the amount of spotted knapweed in the core large Bullock Ranch herbaceous opening.

#### Desired Future Condition

- The large upland openings will be maintained to benefit a variety of wildlife species and to provide recreational opportunities.

#### 10-Year Management Objectives

- Maintain large upland openings through timber sales and forest treatment proposals; and
- Decrease the amount of spotted knapweed and other invasive plants in the large opening complexes, using biological, chemical and mechanical treatments.

## Long-Term Management Objectives

- Consolidate or link large opening complexes across the landscape to provide habitat.

### **Section 4.3.1.5 Forest Cover Type Management – Other Types**

#### Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acreage (Table 4.3.1). Lowland spruce/fir (1,185 or 4%), aspen (999 acres or 3%), white pine (509 acres or 2%) and natural mixed pines (461 acres or 1%) are the largest. The “others” category contains 1,558 acres (5%) and is a sum of cover types with less than 1% of the total management area acres, including: lowland aspen/balsam poplar, tamarack, lowland conifers, lowland deciduous, northern hardwood, upland conifers, oak, upland spruce/fir, planted mixed pines and lowland mixed forest. In addition, there are 190 acres (1%) of “miscellaneous other” stands, which includes water, sand/soil and roads.

With the exception of northern hardwood and natural mixed pines, these cover types have been managed as even-aged stands, using general timber management guidelines regarding harvest. Natural regeneration of species currently on site has been effective. Depending upon species composition, mixed cover types with high basal area may be thinned prior to final harvest at rotation age.

Just over 300 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Where stands are inaccessible, early successional cover types will be changed through natural succession, thus slightly changing the cover type distribution.

## Desired Future Condition

- These cover types will be maintained on suitable sites and will contribute to the compositional diversity of the landscape while providing forest products and wildlife habitat.

## 10-Year Management Objectives

- The projected 10-year final harvest acres include: 104 acres of aspen, 102 acres of white pine and 210 acres of other types; and
- The projected 10-year partial harvest (thinning) acres include: 40 acres of white pine, 25 acres of natural mixed pines and 39 acres of other types.

## Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat; and
- In cover types with sufficient acreage, work towards balancing the age classes.

### **4.3.2 – Featured Species Management**

Historical land use has created a wildlife management opportunity in this management area. The large herbaceous openings, which are peatlands that were drained in the early 1900's, provide habitat for open-land species and provide connectivity to other open lands across the eastern Upper Peninsula landscape. Other dominant forest cover types including high-quality examples of dry northern forest and lowland conifers allow for a diversity of wildlife management options. This management area borders the Seney National Wildlife Refuge so collaboration with the U.S. Fish and Wildlife Service across ownerships is desirable and does occur on a regular basis.

#### **Beaver**

The goal for beaver in the eastern Upper Peninsula is to maintain suitable habitat for beaver. Management should focus on providing favorable food within 100 feet of streams that are not designated as high priority trout streams. Consideration will be given to best management practices, trout stream management and trends in beaver nuisance permits issued.

#### Wildlife habitat specifications:

- Maintain or promote alder, aspen, birch, maple or willow within 100 feet of non-high priority trout streams with gradients of less than 15% and other inland bodies of water.

#### **Gray Jay**

The goal for gray jay in the eastern Upper Peninsula is to maintain or increase suitable habitat. Management should focus on maintaining representation of older age classes of appropriate cover types, as well as retention of important structural features within harvested stands in priority areas.

#### Wildlife habitat specifications:

- The primary goal is to maintain appropriate forest types (birch, lowland deciduous, fir, lowland conifer, lowland spruce/fir, tamarack and bogs) in the management area, in a variety of age classes. Maintain 15% of the total acres in relevant cover types in older age classes (at least 20 years beyond "normal" rotation length for the cover type).
  - This can be accomplished either with stands that are already factor limited or by extending the rotation age. In this management area, older age classes (greater than 100 years) for gray jay habitat are being met by the large number of stands with site conditions that limit harvesting.
- Patches are preferred over single trees within timber harvest sale boundaries, though it is beneficial to have both.
- Offset salvage harvests deemed necessary due to insect, disease or fire within the same cover type and age class (within the compartment, management area or eastern Upper Peninsula ecoregion), to minimize impacts on gray jay habitat. Total allowable harvest in these situations will be evaluated on a case-by-case basis.

## Sharp-tailed Grouse

In the eastern Upper Peninsula, the goal for sharp-tailed grouse is to maintain or increase suitable habitat resulting in a harvestable surplus across the ecoregion. Management should focus on enhancing large opening complexes so there is an increase of available habitat.

Higher densities of sharp-tail grouse are present within the Bullock Ranch management area, due to the heterogeneous nature of the cover type assemblages.

### Wildlife habitat specifications:

- Maintain or expand herbaceous open lands where existing leks occur.
- Manage adjacent forest to maintain young regenerating forest adjacent to permanent openings to maximize use by sharp-tailed grouse.
- Use prescribed fire where appropriate to maintain openings and manage pine types.
- Within open land complexes maintain connectivity across the landscape.

### 4.3.3 – Rare Species and Special Resource Area Management

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “*Rare Species Protection Approach and Assessment Guidelines for DNR Staff on State Forest Lands*” (IC 4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed two listed species and one natural community of note occurring in the management area as shown in Table 4.3.2. Any established management guidelines will be followed.

Table 4.3.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Bullock Ranch management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Dry northern forest		S3/G3?	Confirmed				Jack Pine, Red Pine	Late
<b>Birds</b>								
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	SC/G5/S4	Confirmed	PS	Moderate	Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Dry sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Upland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A
<b>Plants</b>								
Vasey's rush	<i>Juncus vaseyi</i>	T/G5?/S1S2	Confirmed			Intermittent wetland	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

The Bullock Ranch is a large open complex that is recognized as a state wildlife area special conservation area. Other special conservation areas in this management area are potential old growth areas, the Fox River high priority trout stream and the Driggs River cold water stream and high priority trout stream (Figure 4.3.1).

The Fox River system is a state designated natural river and along with its corridor is a high conservation value area as shown in Figure 4.3.4. The Fox River Natural River Plan (DNR, Nov. 3, 1988) contains specific requirements for management in this area.

There is also a dry northern forest natural community ecological reference area of 109 acres within the management area. The ecological reference area will be managed to protect and enhance the natural vegetative and wildlife communities by an ecological reference area-specific management plan. The special resource areas are shown in Figure 4.3.4.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type-1, potential Type-2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

#### **4.3.4 – Forest Health Management**

Although forest health issues span the entire landscape, some specific threats are more important in this management area, due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Red and jack pine: jack pine budworm, pine engraver and *Scleroderris* canker.

Further information on forest health can be found in Section 3.

#### Invasive Plant Species

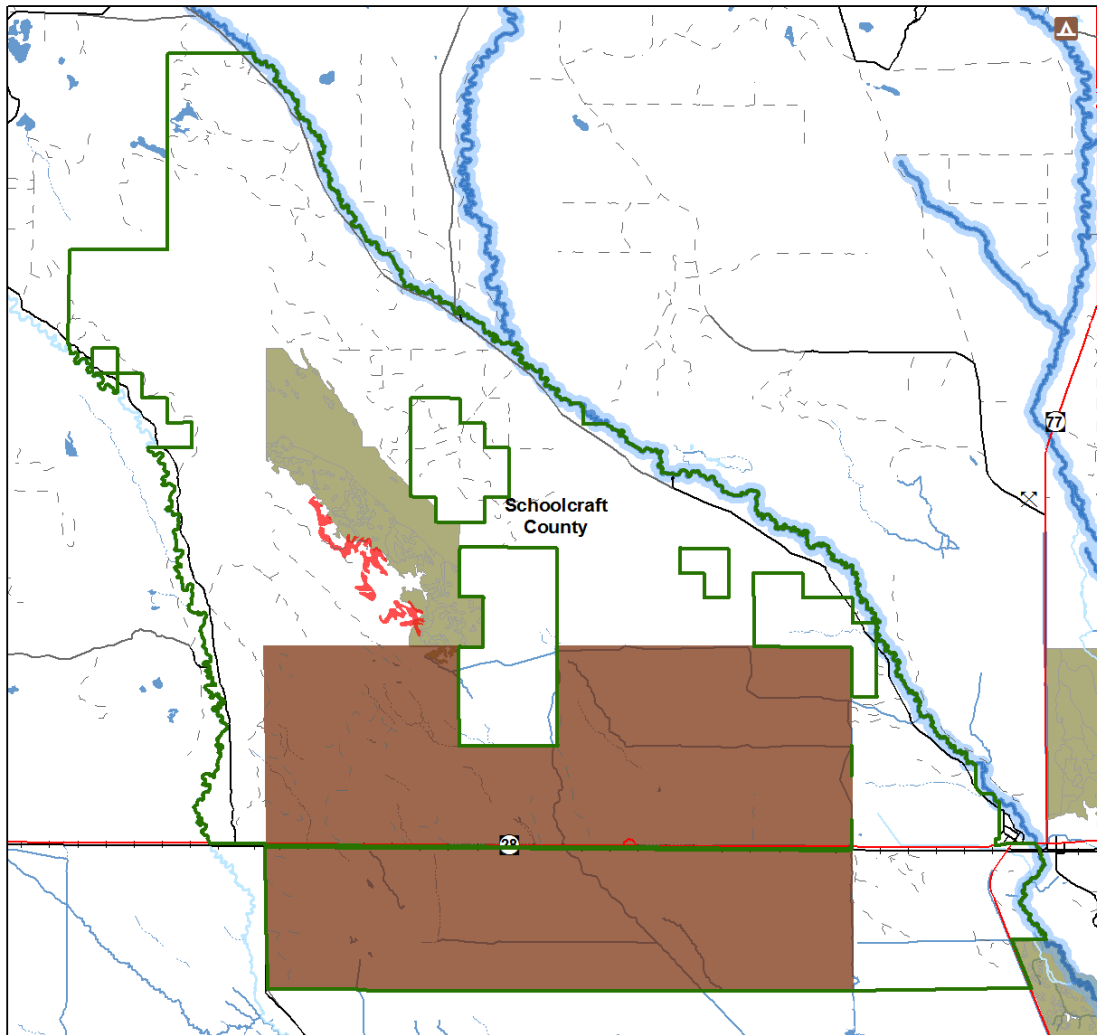
Glossy buckthorn has been documented within a five mile buffer of the management area (Table 4.3.3), and monitoring efforts should specifically look for new populations of this species. Control efforts, including herbicide and burning, in conjunction with the Seney National Wildlife Refuge, have helped reduce the amount of glossy buckthorn in the area. Wild parsnip is found within the management area along M-28.

An invasive plant species of concern within this management area is spotted knapweed. Mechanical and biological control measures have been used in this area to reduce the amount of spotted knapweed in the large herbaceous openings. As resources allow, continue work on decreasing the amount of spotted knapweed and other invasive plants in the large opening complexes.

Invasive species that merit eradication efforts are those species that threaten sensitive sites, due to their location or growth characteristics and have population levels that may be successfully controlled.



# Bullock Ranch



## Legend

- Highway
- Paved Roads
- Gravel Roads
- - - Poor Dirt Roads
- Railroads
- - - Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- Management Area Boundary
- Cities
- - - County Boundaries

- Ecological Reference Areas
- High Conservation Value Areas**
- Coastal Environmental Areas
- Critical Dunes
- Natural Rivers Vegetative Buffer
- Natural Rivers Zoning District
- Critical Coastal Habitat (Piping Plover)
- Kirtland Warbler Habitat
- Dedicated Management Areas
- Natural Areas Legally Dedicated

1 in = 1 miles

## Special Conservation Areas

- Campgrounds
- Fishing Access Sites
- Boat Access Sites
- Mineral Resource Locations
- Wild & Scenic Rivers (USFS Lands)
- Visual Management Areas
- Contiguous Resource Areas
- Possible Type 1 and Type 2 Old Growth
- Potential Old Growth
- Non-Dedicated Natural Areas & National Natural Landmarks
- Springs, Wetlands, or Riparian Areas



- Cold Water Streams & Lakes
- Wildlife Management Areas
- Research, Development, and Military Lands
- Great Lakes Islands

Figure 4.3.4. A map of the Bullock Ranch management area showing the special resource areas.

Table 4.3.3. Invasive plant species within or near the Bullock Ranch management area (Data from the Michigan Invasive Plant Identification Network database).

Bullock Ranch - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	1	12	12	1
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
Wild Parsnip	1	Glossy Buckthorn <i>Rhamnus frangula</i>	12	

#### 4.3.5 – Fire Management

Interspersed dry forests and wetland communities probably supported a natural fire regime much like dry and dry-mesic forest communities. Stand replacement fires probably occurred with drought conditions that occur periodically. Recent examples of such extreme widespread drought are 1976 and 2007.

Fire suppression in this management area is often difficult, due to the organic soils found here.

The following fire management concepts will be used in this management area:

- Where appropriate, re-introduce fire in the red pine stands to encourage red pine regeneration and to discourage competition, particularly from aspen. Generally, this will not occur on organic soils.
- This management area falls within the DNR Seney protection area. All wildfires are subject to appropriate initial attack response.

#### 4.3.6 – Public Access and Recreation

The state land in this management area is concentrated with few private parcels. A large portion of the management area is without roads. Access for management and/or recreation is generally very limited due to the large areas of marsh and lowland brush. The Wisconsin Central Railroad along the south side of M-28 limits access to the south to the existing crossings.

Recreational facilities include: the Fox River pathway and snowmobile trails (Figure 4.3.1). The Fox River state forest campground and Fox River boat access site are close to but outside the state forest land.

Other recreational opportunities include: dispersed camping, fishing, canoeing and kayaking along the Fox and Driggs Rivers. The area is also heavily used for deer, bear and grouse hunting.

#### 4.3.7 – Aquatic Resource Management

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. A portion of the Manistique River system is designated as high priority trout stream in this management area and the details are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment.

#### **4.3.8 - Minerals**

Surface sediments consist of peat and muck and lacustrine (lake) sand and gravel. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are not located in the area, and potential for additional pits appears to be limited.

The Ordovician Utica and Collingwood Shales and Trenton and Black River Formations subcrop below the glacial drift. The Trenton and Black River are quarried for stone/dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula. (five in Schoolcraft County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

#### 4.4 MA 4 – Carp River Red Pine Management Area

##### Summary of Use and Management

Vegetative management in the Carp River Red Pine management area (MA) (Figure 4.4.1) will emphasize management of the red pine resource, balancing the age classes of aspen and selective management of northern hardwoods. Management will strive to produce sustainable yields of various timber products, enhance wildlife habitat, protect areas of unique character and provide for forest-based recreational uses. Expected issues within this 10-year planning period include introduced pests and diseases and increased recreational pressure.

##### Introduction

The Carp River Red Pine management area is located in the south central portion of the eastern Upper Peninsula, in Mackinac and Chippewa Counties. It has 20,718 acres of state-owned land. The intensively managed red pine is the primary attribute of this management area. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula ecoregion (Albert, 1995);
- Various landforms of glacial lacustrine origin characterize the sub-subsection, including flat lake bed, deltaic deposits of sand, cold water trout streams, parabolic dune fields and shallow embayments containing transverse dunes;
- Current cover types of red pine, aspen and northern hardwood are a result of disturbance after the 1800's logging era. Mixed pine stands were planted by members of the Rexton Civilian Conservation Corps camp, after the failure of pre-depression era farms;
- Recreation including snowmobiling, motorcycling, hunting and fishing; and
- Special features include three natural community ecological reference areas.

The Carp River system was used as a pre-historic transportation route and historically for log transportation.

State-owned land in this management area is consolidated and falls within the Sault Ste. Marie Forest Management Unit. The Hiawatha National Forest borders the east side of the management area. The predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.4.1.

Table 4.4.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Carp River management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Red Pine	23%	4,809	25	4,784	0	1,437	4,809	532	1,615
Aspen	15%	3,034	161	2,873	137	0	3,034	479	0
Northern Hardwood	11%	2,377	4	2,373	0	1,002	2,377	0	1,002
Lowland Open/Semi-Open Lands	11%	2,210	0	2,210	0	0	2,210	0	0
Upland Open/Semi-Open Lands	7%	1,380	0	1,380	0	0	1,380	0	0
Lowland Conifers	5%	1,057	406	651	72	0	1,057	72	0
Cedar	4%	920	0	920	58	0	920	58	0
Jack Pine	4%	851	0	851	83	0	851	122	0
Lowland Spruce/Fir	3%	641	285	356	14	0	641	40	0
Mixed Upland Deciduous	3%	622	10	612	206	241	622	87	241
Misc Other (Water, Local, Urban)	0%	79	0	79	0	0	79	0	0
Others	13%	2,738	421	2,317	305	306	2,738	242	471
<b>Total</b>	<b>100%</b>	<b>20,718</b>	<b>1,312</b>	<b>19,406</b>	<b>875</b>	<b>2,986</b>	<b>20,718</b>	<b>1,632</b>	<b>3,329</b>

Others include: upland conifers, upland spruce/fir, upland mixed forest, hemlock, white pine, lowland aspen/balsam poplar, natural mixed pines, lowland deciduous, tamarack, lowland mixed forest, paper birch and planted mixed pines.

# Carp River Red Pine

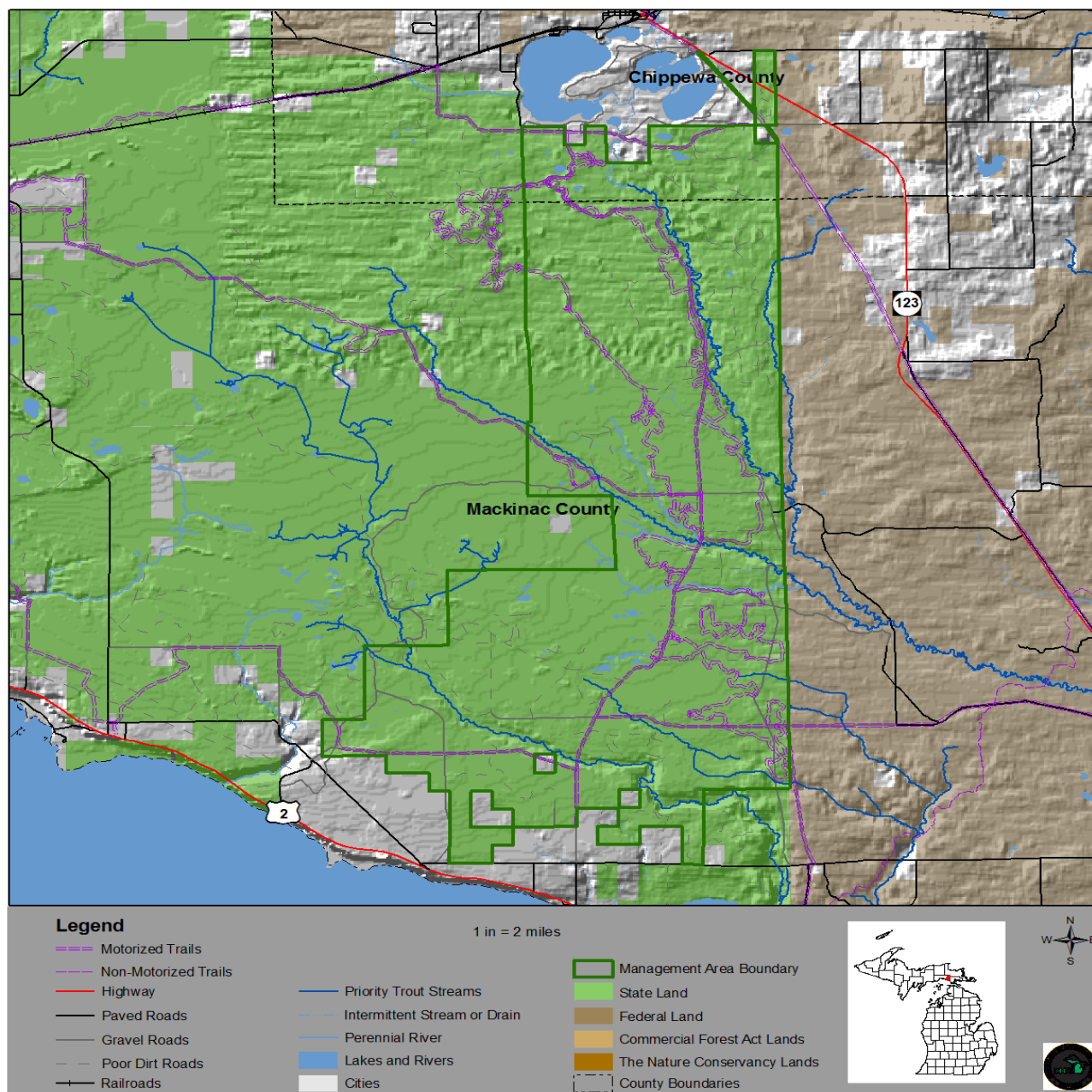


Figure 4.4.1. Location of the Carp River management area (dark green boundary) in relation to surrounding state forest lands other ownerships and Lake Michigan.

## 4.4.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (e.g., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.

The following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

#### **Section 4.4.1.1 Forest Cover Type Management – Red Pine**

##### Current Condition

Red pine occurs on 4,809 acres (23%) of the management area (Table 4.4.1). Red pine stands are distributed throughout the management area on sandy and loamy soils of outwash plains and moraines with Kotar habitat types of PARVAa, ATFD and AFPO (see Appendix E). These are dry to mesic sites with high potential to grow quality stems. The majority of the red pine stands within the management area were planted in the 1930s by Civilian Conservation Corps workers. Red pine stands on these high-quality sites are usually thinned every 10 years, reducing basal area to approximately 120 square feet per acre, until replacement harvest age at 80. Regeneration harvests in many of these stands, followed by re-planting, have resulted in a large number of stands in younger age classes. As most of the planted red pine stands are on very productive sites, prescribed burning or the use of herbicide may be necessary to control competing vegetation, thus ensuring successful regeneration.

Currently, there are 465 acres prescribed with for final harvest and 997 acres are prescribed for partial harvest or thinning (Figure 4.4.2). There are 25 acres of red pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Red pine in inaccessible or sensitive areas may remain through biological maturity.

##### Desired Future Condition

- Red pine stands will be maintained and managed through thinning until stand replacement harvest at approximately age 80. Balancing acres between 0-89 years of age will provide for continual harvesting, wildlife habitat represented by the featured species and recreational opportunities.

##### 10-Year Management Objectives

- The 10-year projected harvest is for approximately 1,437 acres of partial harvest or thinning; and
- Due to the current age-class structure of red pine with no stands between 50 and 69 years of age, there are no final harvests projected this decade.

##### Long-Term Management Objectives

- Balance the age-class distribution of red pine providing a regulated rotation harvest of approximately 532 acres of red pine for final harvest per decade (red line on Figure 4.4.2); and
- Stands will be periodically thinned until final harvest when they meet silvicultural criteria.

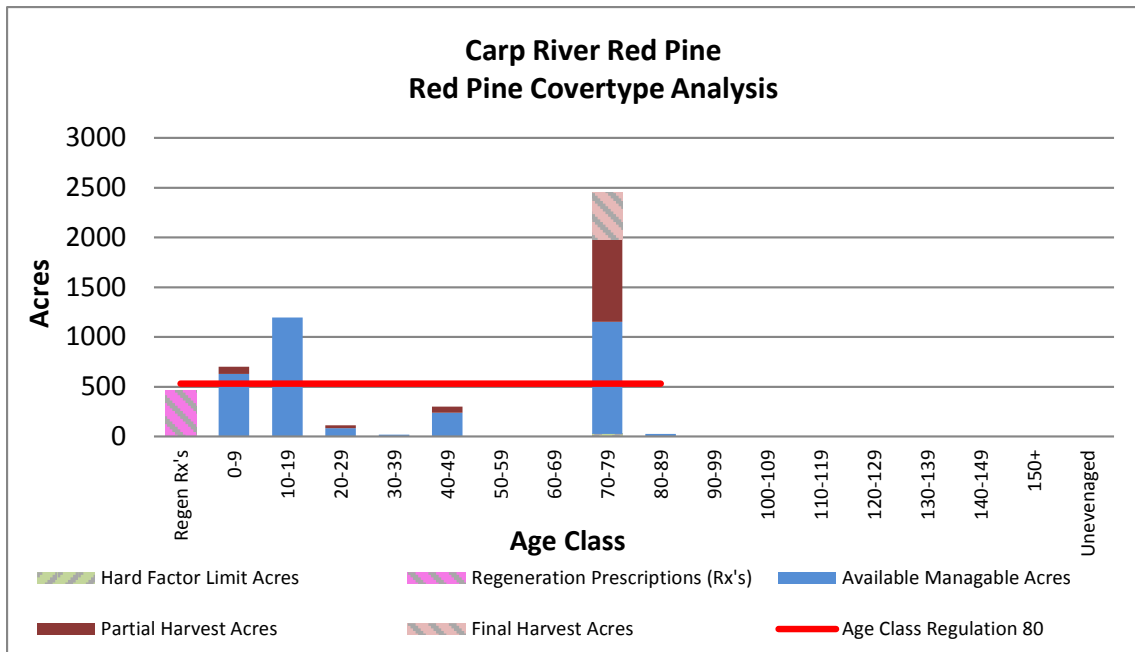


Figure 4.4.2. Age-class distribution of red pine in the Carp River management area (2012 Department of Natural Resources inventory data).

### Section 4.4.1.2 Forest Cover Type Management - Aspen

#### Current Condition

Aspen occurs on approximately 3,034 acres (15%) of the management area (Table 4.4.1). Aspen stands are distributed across the management area on sandy soils with a range of Kotar habitat types including: PVE, PArV, PArVAa, ATFD and AFPo (see Appendix E). Aspen has been consistently harvested and regenerated in recent years, resulting in about 68% of the aspen acreage being in the 0-29 year age classes (Figure 4.4.3).

There are currently 214 acres prescribed for regeneration harvest. In addition, there are 56 acres prescribed for harvest in other cover types that are expected to convert to aspen after harvest. These acres are shown in Figure 4.4.3 in the regeneration prescriptions column. There are 161 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations. Inaccessible stands of aspen will eventually succeed to late successional species.

#### Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for regulated harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The projected 10-year final harvest of aspen is 137 acres. Due to the current age-class structure where the majority of the aspen is in the 10-29 year age classes, the projected 10-year final harvest is considerably less than the regulated amount.

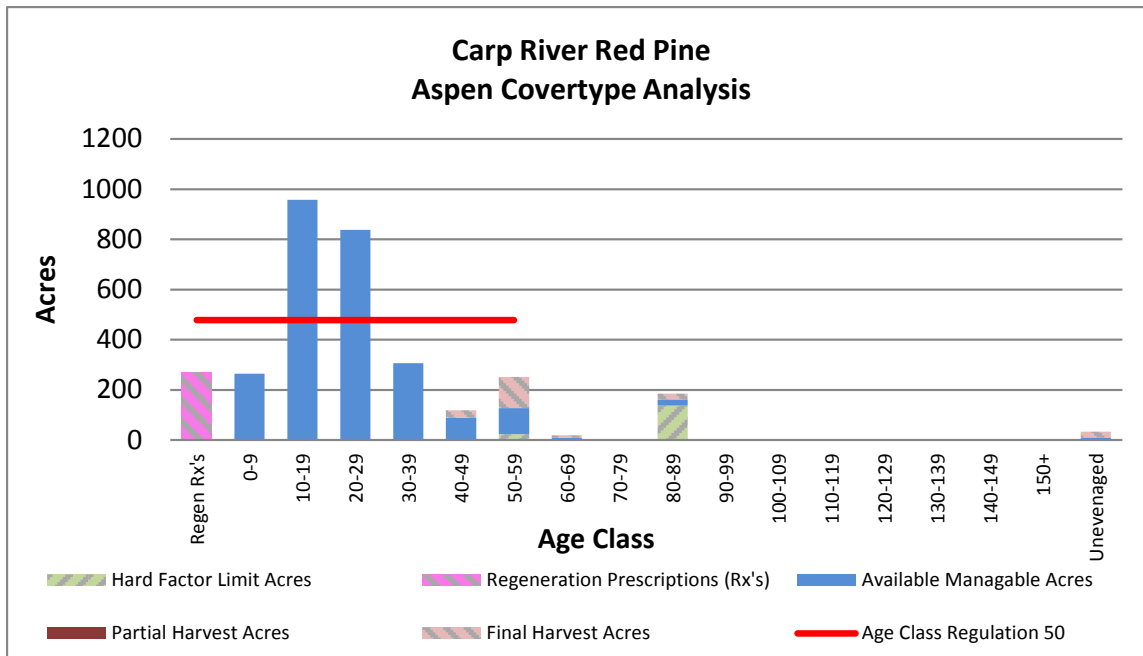


Figure 4.4.3. Age-class distribution of aspen in the Carp River management area (2012 Department of Natural Resources inventory data).

Long-Term Management Objectives

- Balance the age-class structure of accessible aspen stands providing a regulated harvest of approximately 479 acres for harvest per decade.

**Section 4.4.1.3 Forest Cover Type Management – Northern Hardwoods**

Current Condition

Northern hardwood stands occur on approximately 2,377 acres (11%) of the management area (Table 4.4.1). Northern hardwoods are distributed on loam and sand soils of moraines and outwash plains with Kotar habitat types of PARVAa, ATFD and AFPo (see Appendix E). These dry to mesic sites have high potential to grow quality stems. The majority of the stands have been managed using single tree selection to work toward an uneven-aged state, thereby having trees of varying ages and sizes. In most stands where basal area is 120 square feet per acre or higher, individual tree selection harvests are prescribed that will decrease stocking levels to a basal area of approximately 80 square feet per acre.

The northern hardwood stands on poor soils are generally of lower quality, and some of these stands are being managed using even-aged systems. Recent regeneration harvests are shown as immature in Figure 4.4.4. Where site quality is poor, shelterwood and other even-aged harvesting systems will be considered.

Beech bark disease is prevalent in this management area. The killing front of beech bark disease has been through this area, and salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed, due to resultant lower than normal residual basal area.

Currently, 292 acres have a partial harvest or selection cut assigned (Figure 4.4.4). In addition, 39 acres currently are prescribed for final harvest. There are four acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations.



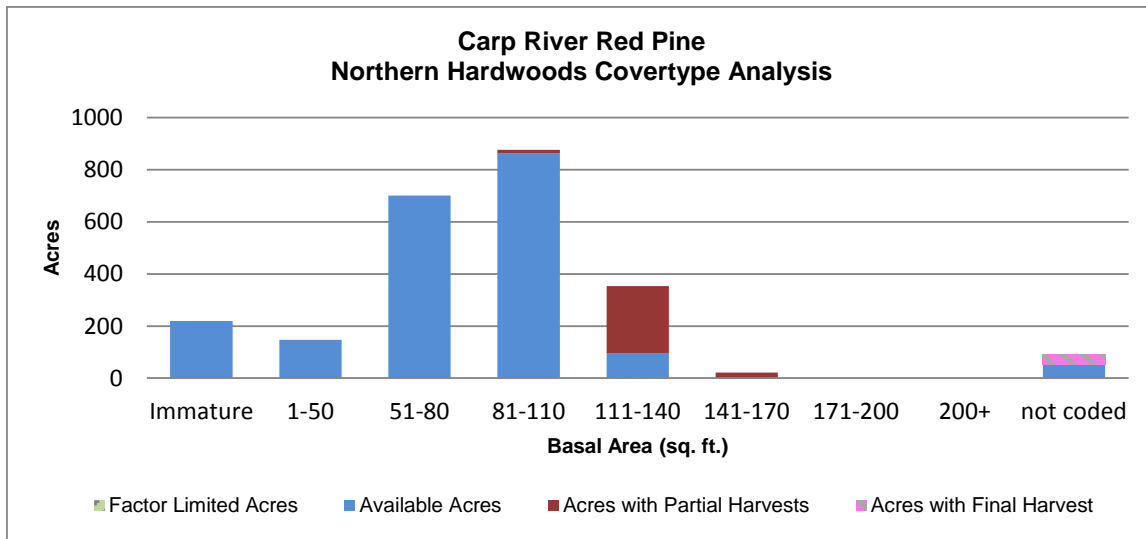


Figure 4.4.4. Basal area distribution of northern hardwood in the Carp River management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwood will be maintained on operable sites, generally by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands. This will provide for a continuous supply of timber, available wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected harvest is for 1,002 acres of partial or selection harvest of northern hardwoods;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands;
- Consider herbicide applications on beech regeneration to promote regeneration of other species; and
- In areas that have lost beech to beech bark disease, consider planting disease resistant beech or oak to increase the availability of hard mast.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.4.1.4 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

Current Condition

Lowland open/semi-open lands occur on approximately 2,210 acres (11%). This category is a combination of lowland shrub (1,699), marsh (392 acres), bog (56 acres) and treed bog (63 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. Lowland open/semi-open lands generally occur in association with creeks, rivers and lowland forested stands. Some of the ecological reference areas and communities of note in this management area are found within these cover types.

Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity. Maintain and protect the ecological reference area values found in these cover types.

Long-Term Year Management Objectives

- Within these stands allow natural processes to occur while protecting their ecological values from man-made disturbances.

### Section 4.4.1.5 Forest Cover Type Management – Upland Open/Semi-Open Lands

#### Current Condition

Upland open/semi-open lands occur on approximately 1,380 acres (7%) of the management area. This category is a combination of the following non-forested land cover types: herbaceous open land (841 acres), low-density trees (393 acres) and upland shrub (146 acres). These communities are valued ecologically as sources of open land habitat for numerous species of wildlife.

#### Desired Future Condition

- Maintain the herbaceous openland, low-density trees and upland shrub communities in the area to provide wildlife habitat and recreational opportunities.

#### Long-Term Management Objectives

- Within herbaceous open land stands, conduct opening maintenance as necessary to maintain this cover type.

### Section 4.4.1.6 Forest Cover Type Management – Lowland Conifer

#### Current Condition

Lowland conifer stands occur on 1,057 acres (5%) of this management area (Table 4.4.1). Lowland conifer stands in the management area have been successfully harvested and regenerated in recent years, resulting in a large number of acres in the 0-9 age classes. Some of the lowland conifer stands are found in riparian zones and are unavailable for harvest at this time. Access to some stands is limited due to the wet sites and the small creeks that are often found in these cover types.

Currently, there are 69 acres with a final harvest prescribed (Figure 4.4.5). There are 18 acres in a different cover type prescribed for final harvest that are expected to convert to lowland conifers upon harvest. These acres are shown in Figure 4.4.5 in the regeneration prescriptions column. There are 406 acres of lowland conifer that have site conditions limiting their harvest at this time. Lowland conifer stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

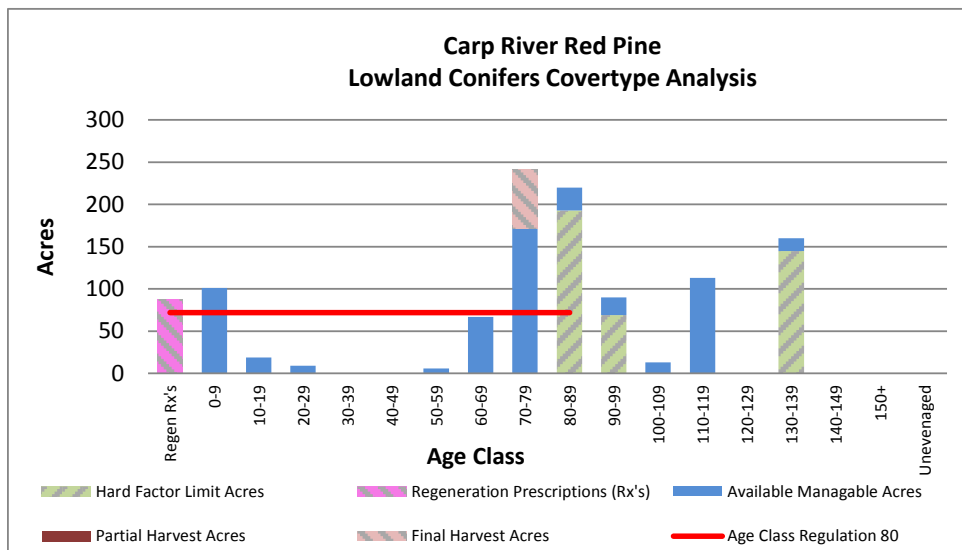


Figure 4.4.5. Age-class distribution of lowland conifers in the Carp River management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management, balancing the acres between 0-89 years of age providing for a continuous supply of timber, available wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 72 acres.

### Long-Term Management Objectives

- Balance the age-class distribution of accessible lowland conifers providing a regulated harvest of approximately 72 acres of lowland conifers for harvest each decade.

## **Section 4.4.1.7 Forest Cover Type Management – Other Types**

### Current Condition

There are many other forest cover types spread across the management area (Table 4.4.1) that have less than 5% of the total management area acres. Cedar (920 acres or 4%), lowland spruce/fir (641 acres or 3%), mixed upland deciduous (622 acres or 3%), upland conifers (595 acres or 3%) and upland spruce/fir (553 acres or 3%) are the largest types. The “others” category totals approximately 2,441 acres (12%) and includes: upland mixed forest, hemlock, white pine, lowland aspen/balsam poplar, natural mixed pines, lowland deciduous, tamarack, lowland mixed forest, paper birch and planted mixed pines. Each of the other types has less than 2% of the total acres. The management area also has 79 acres of “miscellaneous other” types, which includes water, sand/soil and roads.

Following general timber management guidelines, the majority of these cover types have been managed as even-aged stands, using natural regeneration after harvest. Attempt to balance the age classes where possible. Some of the mixed cover types with high basal areas may be thinned, depending on their species composition, prior to final harvest.

Over 700 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Where stands are inaccessible, early successional cover types will be changed through natural succession.

### Desired Future Condition

- These cover types will be maintained on suitable sites and will contribute to the compositional diversity of the landscape while providing forest products, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The projected 10-year final harvest is 58 acres of cedar, 206 acres of mixed upland deciduous, 50 acres of upland conifers and 305 acres of other types; and
- The projected 10-year partial harvest is 241 acres of mixed upland deciduous, 131 acres of upland conifers and 306 acres of other types.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## **4.4.2 – Featured Wildlife Species**

While planted red pine is generally low quality wildlife habitat, those stands with a hardwood understory tend to provide more desirable habitat elements and some of the more mature stands occasionally provide breeding sites for woodland raptors. The majority of wildlife management in this management area will focus on the aspen and northern hardwood cover types for this next 10-year period. Increasing and/or maintaining mesic conifers and forest structure will be important for the featured and other associated wildlife species in this management area.

### **Blackburnian Warbler**

The goal for blackburnian warbler is to maintain suitable habitat in priority landscapes. Management should focus on within-stand diversity, habitat fragmentation and conifer components in this management area.

#### Wildlife habitat specifications:

- Increase the mesic conifer (e.g., hemlock, white pine, red pine and upland spruce-fir) component on state forests by: a) Retaining a larger percentage of mesic conifer during harvests; b) Using silvicultural practices that encourage the regeneration of mesic conifer; and c) Where desired/feasible, underplanting hemlock, white pine and white spruce in hardwood-dominated stands on suitable sites without a seed source.
- Provide more older mesic conifers, particularly hemlock, in the landscape by: a) Allowing some actively managed stands of mesic conifer to grow beyond standard rotation ages; b) Including mature mesic conifers as within-stand structure retained during harvests by following Within-Stand Retention Guidance during harvests; and c) Maintaining mature mesic conifer stands within travel corridors and riparian zones or Type 1 or Type 2 old growth special conservation areas.
- Use silvicultural practices that retain, recruit, and expand multi-story hemlock stands and hemlock inclusions within hardwood complexes through group selection, scarification and/or direct planting.

#### **Red-shouldered Hawk**

The goal for red-shouldered hawk is to maintain or improve suitable habitat in the ecoregion. Management activities should focus on the maintenance of large blocks (>385 acres) of mesic northern forest with the appropriate level of large diameter trees in priority landscapes.

#### Wildlife habitat specifications:

- All known woodland raptor nests should be reported to local wildlife staff and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. Confirmed red-shouldered hawk nests are to be documented in accordance with the “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172) and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. For red-shouldered hawk nests, the wildlife habitat specifications contained within Michigan DNR’s *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August 2012) will be followed, until the workgroup has completed the guidance that will permanently replace the interim guidelines.

#### **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain and improve habitat. Management should focus on maintaining and balancing the age class distribution for aspen in priority landscapes.

#### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Move to balance the age-class distribution of aspen and birch cover types to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation with aspen in at least four age classes in close proximity to one another.
- Larger harvest units should have irregular boundaries and include one or two, 1-3-acre unharvested inclusions, with the largest cuts having more inclusions following the Within Stand Retention Guidance.
- Hold or increase the conifer component in aspen stands. Leave conifer under four inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

#### **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash, increasing mesic conifer components and increasing beaver abundance.

#### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under four inches in diameter at breast height.

- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- Maintain young dense jack pine stands.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris already present (before cutting) and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance, retaining the maximum residues.
- When using herbicide treatments to prepare sites for planting red and jack pine in snowshoe hare habitat, encourage more diverse stands of pine and aspen by using application skips in pockets or along stand edges.

#### 4.4.3 – Rare Species and Special Resource Area Management

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC 4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed one listed species and six natural community types of note occurring in the management area as shown in Table 4.4.2. Any established management guidelines will be followed.

Special conservation areas in the management area include: potential old growth areas (Figure 4.4.6), several cold water lakes and streams and several high priority trout streams (Figure 4.4.1), including the Brevort and Carp Rivers.

There are currently no identified high conservation value areas in this management area.

There are three ecological reference areas (Figure 4.4.6) for three natural community types. These are the rich conifer swamp (25 acres), poor fen (44 acres) and intermittent wetland (80 acres). The ecological reference areas will be managed to protect and enhance their natural vegetative and wildlife communities as directed by ecological reference area-specific management plans.

Table 4.4.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Carp River Red Pine management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Intermittent wetland		S3/G2	Confirmed				Lowland open/semi-open	N/A
Muskeg		S3/G4G5	Confirmed				Lowland open/semi-open	N/A
Northern wet meadow		S4/G4	Confirmed				Lowland open/semi-open	N/A
Poor fen		S3/G3	Confirmed				Lowland open/semi-open	N/A
Rich conifer swamp		S3/G4	Confirmed				Tamarack	Late
<b>Birds</b>								
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

#### 4.4.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area, due to the species composition, site quality or other factors.

Some of the more important forest health pests in this management area by major cover type include:

- Red pine: red-headed pine sawfly, pine engraver;
- Aspen: white trunk rot, *Hypoxylon* canker ; and
- Northern hardwoods: beech bark disease.

Further information on forest health can be found in Section 3.

#### Invasive Plant Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. While no invasive plant species have yet been documented within or near the management area in the Michigan Invasive Plant Identification Network database, garlic mustard has been observed here. When invasive species are detected, they should be assessed for control measures. Invasive species that merit eradication efforts are those species that threaten sensitive sites, due to their location or growth characteristics and have population levels that may be successfully controlled.

## Carp River Red Pine

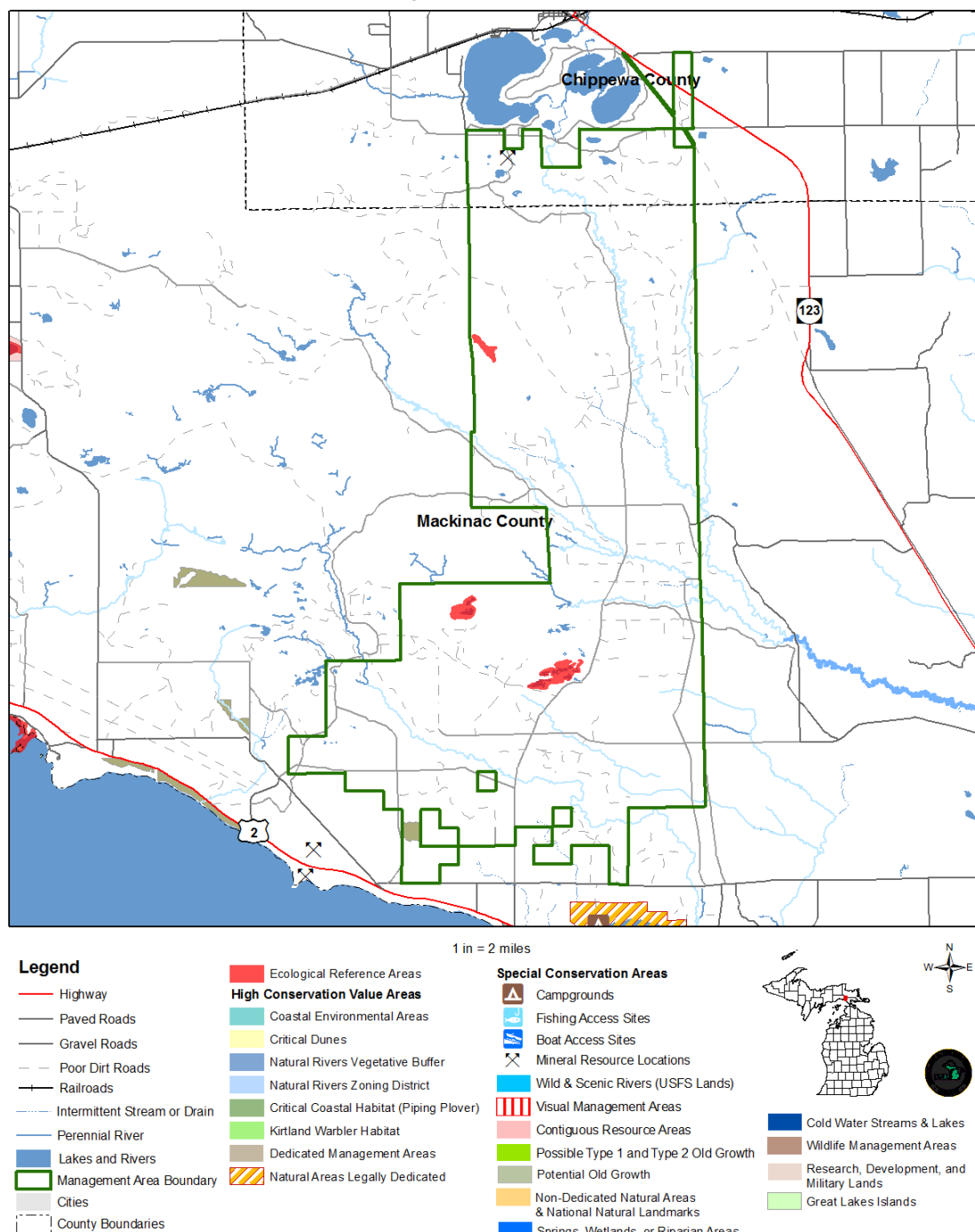


Figure 4.4.6. A map of the Carp River Red Pine management area showing the special resource areas.

### 4.4.5 – Fire Management

In pre-settlement times, these areas were subjected to periodic high intensity stand replacement fires. Fire return intervals were probably between 75 and 250 years, supporting development into long-lived pine communities. Fire management concepts to be used in this management area include:

- Use of prescribed fire to maintain pine communities and encourage natural regeneration; and
- Use of prescribed fire to reduce fuel loading and/or preparatory to planting.

#### **4.4.6 – Public Access and Recreation**

Access for management and recreation is generally good throughout this management area, with the majority of the area accessible by gravel and dirt two-track roads.

Recreational facilities in this management area consist of motorized trails (Figure 4.4.1) and include snowmobile trails the Brevort-Trout Lake Motorcycle Trail and the Brevort-Trout Lake Motorcycle Trailhead. The Brevort-Trout Lake Motorcycle Trail is designated motorcycle use only by Director's Order. Any damage to the 24-inch trail bed must be repaired.

Additional forms of recreation include: blueberry picking, deer, snowshoe hare and ruffed grouse hunting and brook trout fishing.

#### **4.4.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. Portions of the Brevort and Carp River systems are designated as high priority trout streams in this management area and the details are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.4.1.

#### **4.4.8 – Minerals**

Surface sediments consist of lacustrine (lake) sand and gravel and peat and muck, in place thin and discontinuous. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the general area and there may be some potential for additional pits.

The Silurian Engadine, Manistique and Burnt Bluff Groups subcrop below the glacial drift. The Engadine and Burnt Bluff are quarried for stone/limestone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula. (primarily in Mackinac and Chippewa Counties). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.



## 4.5 MA 5 – Charcoal Grade Management Area

### Summary of Use and Management

Management in the Charcoal Grade management area (MA) (Figure 4.5.1) will strive to improve the quality of the hardwoods and balance the age classes of aspen; enhance wildlife habitat; protect areas of unique character; and provide for forest-based recreational uses. Management activities may be constrained by poor access in low, wet areas. Expected issues in this 10-year planning period include: maintenance of culverts and bridges; introduced pests and diseases; and increased recreational pressure.

#### Introduction

The Charcoal Grade management area is located in the central portion of the eastern Upper Peninsula in Luce County, north of Newberry. It has 16,456 acres of state-owned land. The primary attribute in this management area is the influence of the Newberry charcoal kiln and associated railroad system on the area. Additional attributes which were important in identifying this management area include:

- The management area falls within the Luce subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of sandy ridges of end moraine and pitted outwash. The poorly drained deposits are concentrated in northern Luce County.
- Moraine features support northern hardwood and aspen types, excessively drained sand ridges are dominated by white and red pine. Peat lands are dominated by spruce, northern white cedar and tamarack.
- Recreational opportunities including: snowmobiling, fishing, trapping and hunting.
- This management area contains one of the eastern Upper Peninsula Grouse Enhanced Management Systems (GEMS) areas. This area plan will emphasize balanced age classes of aspen for timber production which will have habitat benefits for a number of the featured species including ruffed grouse and deer. The boundaries of Grouse Enhanced Management Systems areas will be delineated and an operational plan will be developed during this planning period by the local biologist in collaboration with the Forest Resources Division unit manager and integrated into the plan through the revision process.

Hardwoods in this management area were historically cut to support a charcoal kiln in the Newberry area. This cutting altered the composition and structure of the hardwood stands. Currently, the timber throughout much of the area is even-aged and of poor quality. There are historic logging camps within the management area, and other known archeological sites.

The state land in this management area is concentrated, with few private parcels. The Tahquamenon River forms the eastern border of the management area. The Charcoal Grade management area falls within the Newberry Forest Management Unit. The current predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.5.1.

Table 4.5.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Charcoal Grade management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory Data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Northern Hardwood	37%	6,100	411	5,689	0	1,821	6,100	0	2,707
Lowland Conifers	17%	2,842	865	1,977	220	0	2,842	220	0
Aspen	15%	2,498	45	2,453	78	0	2,498	409	0
Lowland Open/Semi-Open Lands	8%	1,356	0	1,356	0	0	1,356	0	0
Lowland Deciduous	5%	887	363	524	58	0	887	58	0
Upland Spruce/Fir	5%	768	35	733	60	0	768	105	0
Cedar	4%	587	67	520	33	0	587	33	0
White Pine	2%	274	17	257	71	22	274	23	77
Upland Open/Semi-Open Lands	1%	163	0	163	0	0	163	0	0
Misc Other (Water, Local, Urban)	1%	151	0	151	0	0	151	0	0
Others	5%	830	195	635	115	86	830	56	149
<b>Total</b>	<b>100%</b>	<b>16,456</b>	<b>1,998</b>	<b>14,458</b>	<b>635</b>	<b>1,929</b>	<b>16,456</b>	<b>904</b>	<b>2,933</b>

Others include: lowland spruce/fir, hemlock, upland conifers, natural mixed pine, lowland aspen/balsam poplar, red pine, mixed upland deciduous, paper birch and lowland mixed forest.

# Charcoal Grade

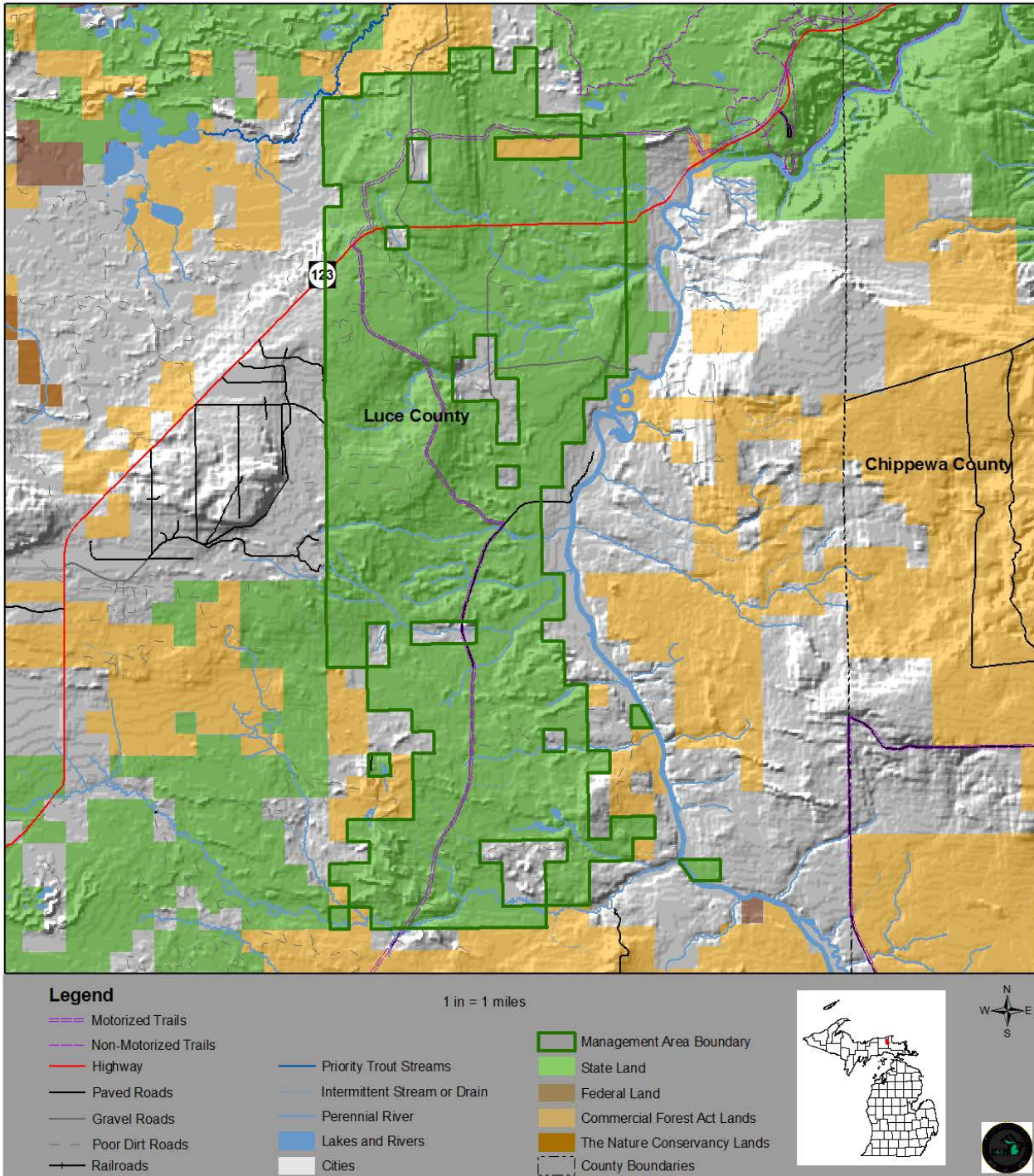


Figure 4.5.1. Location of the Charcoal Grade management area (dark green boundary) in relation to surrounding state forest lands and other ownerships.

#### 4.5.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types and some of the minor cover types within the management area. This information applies to those portions of the forest where active management (e.g., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### Section 4.5.1.1 Forest Cover Type Management – Northern Hardwood

###### Current Condition

Northern hardwood occurs on 6,100 acres (37%) of the management area (Table 4.5.1). Northern hardwoods are distributed throughout the management area on outwash plains, lake plains and ground moraines with Kotar habitat classes including PARVAa, ATFD and AFPo (see Appendix E). The sites range from dry poor nutrient to mesic medium nutrient, with better quality stands in the west and north part of the management area. Many of the northern hardwood stands in this management area contain sugar and red maple, paper birch and aspen, and often have balsam fir and hemlock in the understory. The majority of the stands, approximately 90%, have been managed using single tree selection to work toward an uneven-aged state with trees of varying ages and sizes. In most stands in the management area, selection harvests are prescribed when the basal area is over 120 square feet per acre. In general, this will allow most hardwood stands to be selectively harvested every 20 years. Where site quality is poor, consider shelterwood and other even-aged harvesting systems. A small portion of the hardwood stands here were harvested using even-aged systems and these acres are shown in the immature column in Figure 4.5.2.

The killing front of beech bark disease has gone through this management area, and salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed, due to resultant lower than normal residual basal area.

Currently, 1,360 acres have a partial harvest or selection cut assigned (Figure 4.5.2). There are 411 acres of northern hardwood that have site conditions limiting their harvest and have been removed from the total number of manageable acres available for harvest calculations.

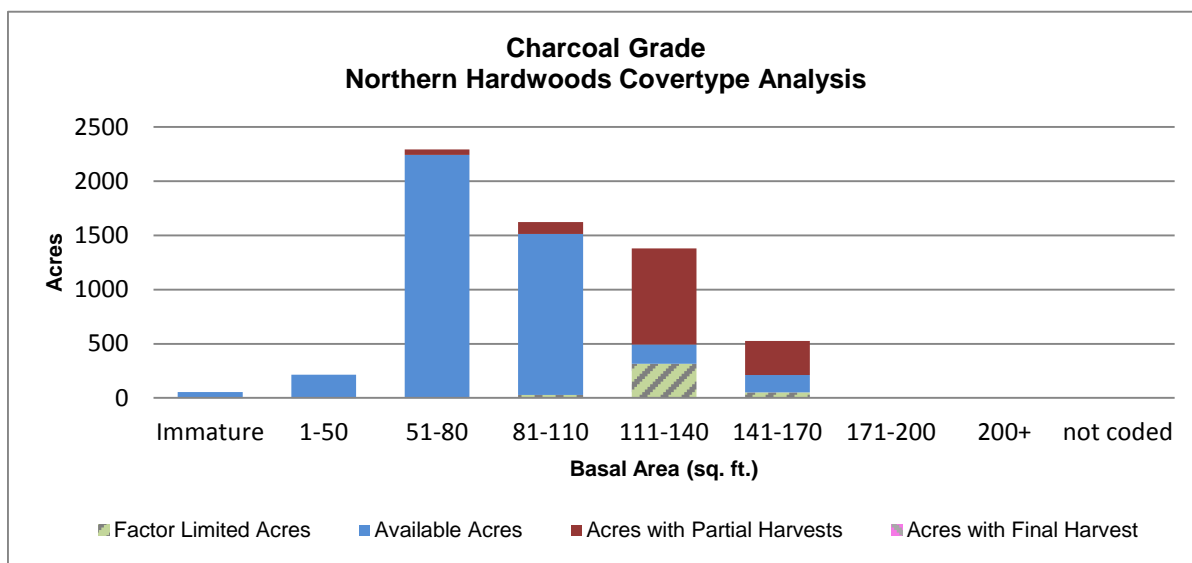


Figure 4.5.2. Basal area distribution of northern hardwood in the Charcoal Grade management area (2012 Department of Natural Resources inventory data).



Desired Future Condition

- Northern hardwoods will be maintained on operable sites, generally by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands. Even-aged management systems may be used on poor quality sites providing for a continuous supply of timber, available wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected harvest is 1,821 acres of partial or selection harvest.
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration.
- Track beech regeneration in these stands.
- Consider herbicide application on beech regeneration to promote regeneration of other species.
- In areas that are losing beech to beech bark disease, consider planting disease resistant beech or oak to increase the availability of hard mast producing trees.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.5.1.2 Forest Cover Type Management – Lowland Conifers**

Current Condition

Lowland conifers occur on 2,842 acres (17%) of the management area (Table 4.5.1). Many of the lowland conifer stands in this area have low basal areas and are on poor sites. Approximately 36% of the stands have been classified as uneven aged, having trees of all sizes and ages, mainly due to natural processes and generally have not been harvested in many decades. Younger age classes are not well represented in this cover type in this management area. Access to some stands is limited due to the wet sites and the small creeks that are often found in these cover types.

Currently, there are 13 acres with a final harvest prescribed (Figure 4.5.3). There are 865 acres of lowland conifer that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in inaccessible areas will be subject to natural processes (fire, windthrow, insect defoliation and beaver flooding) resulting in a range of successional stages.

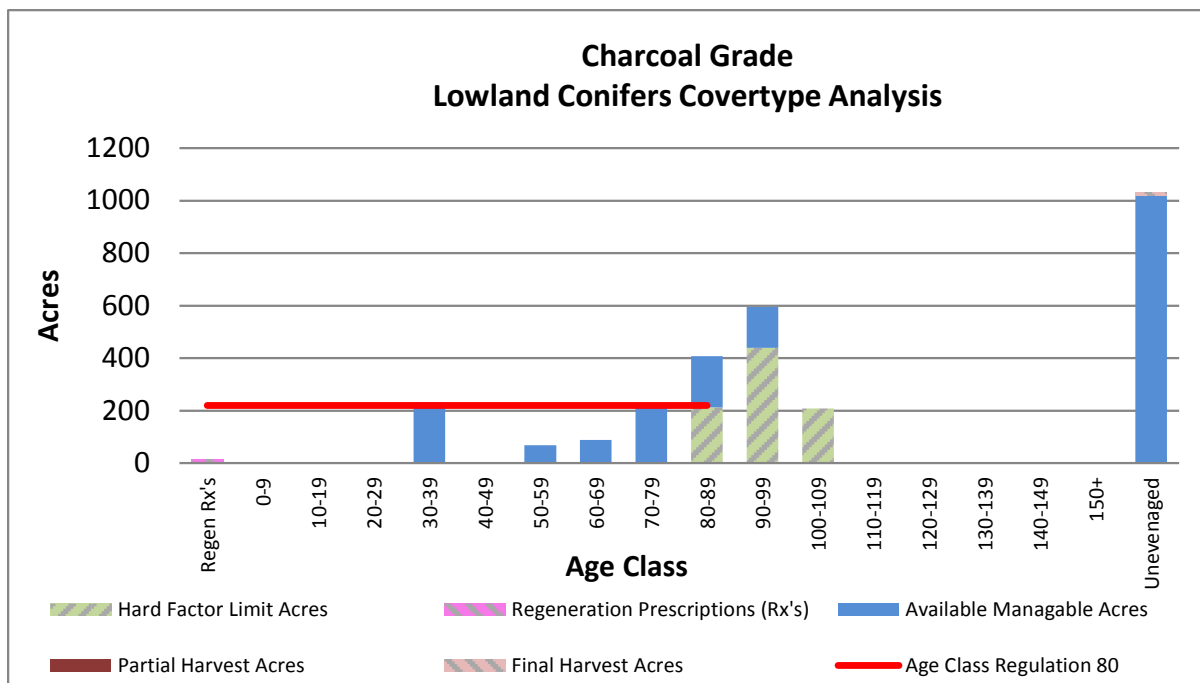


Figure 4.5.3. Age-class distribution of lowland conifers in the Charcoal Grade management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management, with acres balanced between 0-89 years of age providing for a continuous supply of timber, available wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected harvest is 220 acres of lowland conifers. Natural regeneration consisting of species currently on site is expected.

Long-Term Management Objectives

- Balance the age-class distribution of accessible lowland conifers providing a regulated harvest of approximately 220 acres to be harvested every decade (red line in Figure 4.5.3).

**Section 4.5.1.3 Forest Cover Type Management - Aspen**

Current Condition

Aspen occurs on 2,498 acres (15%) of the management area (Table 4.5.1). Aspen stands are distributed throughout the management area on lake plains and ground moraines with Kotar habitat classes of PARVAa and ATFD (see Appendix E). This encompasses a range of sites on sandy to loamy soils, from very-dry very-poor nutrient, to mesic-poor to medium-nutrient sites. In this area, aspen is often mixed with hardwood, white pine, paper birch, balsam fir and other species. Aspen stands have been consistently harvested and regenerated in recent years, resulting in the majority of the aspen acreage (approximately 73%) being less than 30 years old (Figure 4.5.4). Aspen within the Charcoal Grade Grouse Enhanced Management Systems area may be managed slightly different than the rest of the aspen within the management area, with a lower rotation age and smaller harvest areas.

There are currently 438 acres that have a final or regeneration harvest prescribed. Approximately 16 acres that are prescribed for harvest in another cover type are expected to convert to aspen upon harvest. These acres are shown in Figure 4.5.4 in the regeneration prescriptions column. There are 45 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Without intervention, inaccessible stands of aspen will eventually succeed to late successional species.

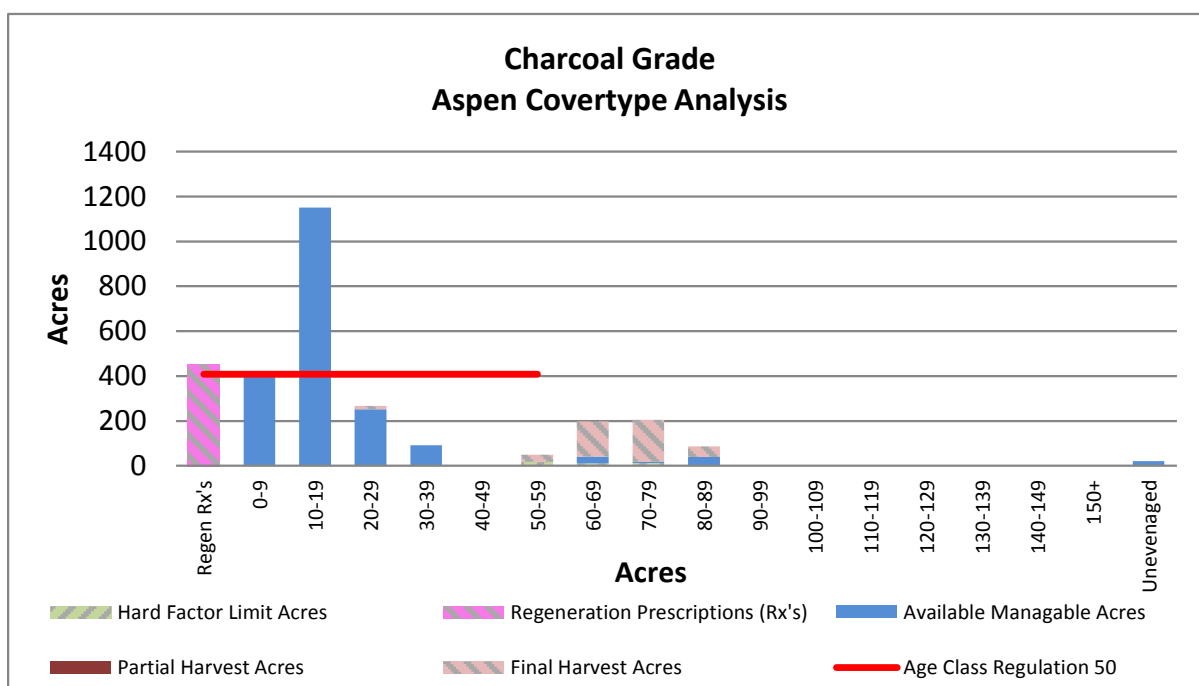


Figure 4.5.4. Age-class distribution of aspen in the Charcoal Grade management area (2012 Department of Natural Resources inventory data).

### Desired Future Condition

- Aspen stands will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The 10-year projected harvest of aspen is 78 acres of final harvest with the reduction from the regulated harvest amount due to the current age-class structure where a large number of acres are in the 0-19 year age classes; and
- Aspen within the identified Grouse Enhanced Management Systems area may be managed differently than the rest of the aspen within the management area, with a shorter rotation age, small patch cuts and carefully considered stand adjacency.

### Long-Term Management Objectives

- Balance the age-class structure of accessible aspen stands providing a regulated harvest of approximately 409 acres per decade.

## **Section 4.5.1.4 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

### Current Condition

Lowland open/semi-open lands occur on 1,356 acres (8%) of the management area. This category is a combination of lowland shrub (923 acres), treed bog (176 acres), bog (141 acres) and marsh (116 acres). These stands are valued ecologically as sources of habitat for numerous species of wildlife, including moose. Most of the lowland shrub stands are found in association with streams and rivers and contribute to access issues within the management area.

### Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity.

### Long-Term Year Management Objectives

- Within these stands allow natural processes to occur while protecting their ecological values from man-made disturbances.

## **Section 4.5.1.5 Forest Cover Type Management – Lowland Deciduous**

### Current Condition

Lowland deciduous stands occur on 887 acres (5%) of the management area (Table 4.5.1). Lowland deciduous stands are found throughout the management area on lake plains and outwash plains. Many of the stands are found in association with streams and drainages. Younger age classes in this cover type are non-existent (Figure 4.5.5). Almost one-half of the lowland deciduous stands have been classified as uneven-aged, mainly due to natural processes, having trees of all ages and sizes. Lowland deciduous stands are generally managed through even-aged harvests, though depending on species composition some stands may be thinned prior to final harvest.

Currently, while there are not any acres of lowland deciduous with a final harvest prescribed and 26 acres of partial harvest or thinning are prescribed. There are 363 acres of lowland deciduous that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland deciduous stands in inaccessible areas will be subject to natural processes (fire, windthrow, insect defoliation and beaver flooding) resulting in a range of successional stages.

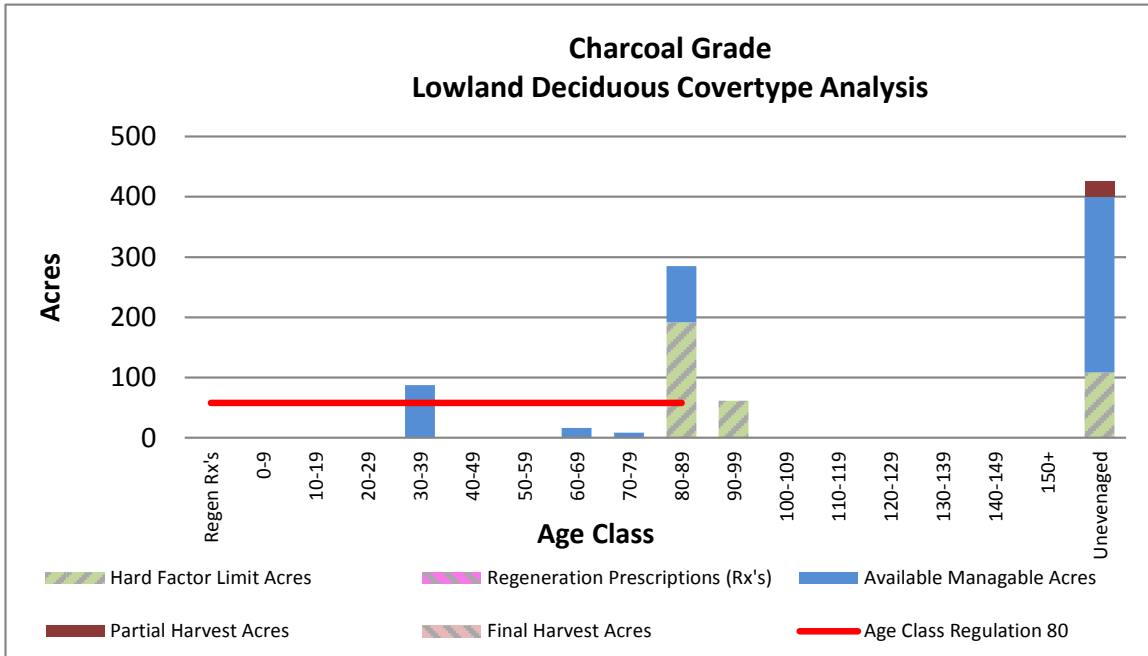


Figure 4.5.5. Age-class distribution of lowland deciduous in the Charcoal Grade management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland deciduous stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age providing for a regulated harvest, available wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected harvest is 58 acres of lowland deciduous with natural regeneration consisting of species currently on site is expected.
- Monitor stands with a black ash component for emerald ash borer. Follow Emerald Ash Borer Guidelines for harvesting in stands with ash trees.

Long-Term Management Objectives

**Section 4.5.1.6 Forest Cover Type Management – Upland Spruce/Fir**

Current Condition

Upland spruce/fir stands occur on 768 acres (5%) of the management area (Table 4.5.1). Upland spruce/fir stands are distributed throughout the management area on lake plains and outwash plains with Kotar habitat classes of PARVAa, ATFD and AFPo (see Appendix E). These stands have been successfully harvested and regenerated, resulting in a range of age classes (Figure 4.5.6). Natural regeneration consisting of species currently on site has worked well here.

Currently, there are no acres of upland spruce/fir with a harvest prescribed. There are 207 acres of other cover types that are expected to convert to upland spruce/fir after harvest. These acres are shown in Figure 4.5.6 in the regeneration prescriptions column. There are 35 acres of upland spruce/fir that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Upland spruce/fir stands that are unavailable for harvest will be subject to natural processes, eventually succeeding to late successional species.

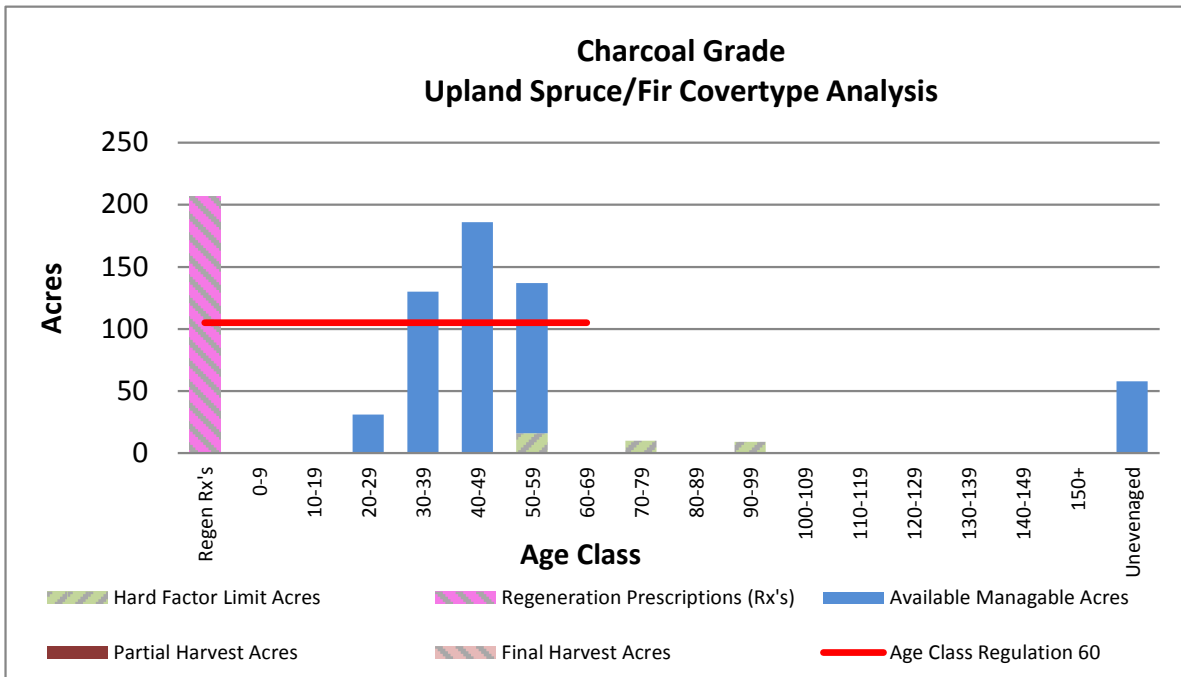


Figure 4.5.6. Age-class distribution of upland spruce/fir in the Charcoal Grade management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Upland spruce/fir will be maintained on operable sites through even-aged management, balancing acres between 0-69 years of age providing a regulated harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected harvest is 60 acres of upland spruce/fir. The projected harvest is lower than the regulated amount due to the current age-class structure where there are a large number of acres in the regeneration prescriptions column.

#### Long-Term Management Objectives

- Balance the age classes of available upland spruce/fir stands providing a regulated harvest of approximately 105 acres to be harvested every decade.

### **Section 4.5.1.7 Forest Cover Type Management – Other Types**

#### Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acres (Table 4.5.1). Cedar with 587 acres (4%) and white pine with 274 acres (2%) are the only ones with over 2% of the total acres. Other types total 830 acres (5%) and include: upland open/semi-open lands, lowland spruce/fir, hemlock, upland conifers, natural mixed pines, lowland aspen/balsam poplar, red pine, mixed upland deciduous, paper birch and lowland mixed forest. With the exception of red pine, white pine and hemlock, these cover types are generally managed as even-aged. Following general timber management guidelines, look for opportunities to perform regeneration harvests in even-aged forested cover types, attempting to balance the age classes where possible. Natural regeneration of species currently on site is expected. Mixed cover types with high basal area may be thinned prior to final regeneration harvest depending on their species composition.

Approximately 279 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands will be subject to natural processes and may succeed to late successional species, thus slightly changing the cover type distribution.



### Desired Future Condition

- These cover types may be managed on operable sites, contributing to the compositional diversity of the landscape while providing for continual harvest, available wildlife habitat and recreation opportunity.

### 10-Year Management Objectives

- The projected 10-year final harvest is 33 acres of cedar, 71 acres of white pine and 115 acres of other types; and
- The projected 10-year partial harvest is 22 acres of white pine and 86 acres of other types.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## **4.5.2 – Featured Species Management**

The landforms in this management area consist of sandy ridges that grade to lower, flatter topography. This results in high vegetative diversity and high wildlife species diversity. Important management concepts include the retention of mesic conifers, coarse woody debris, large diameter hardwoods, soft mast and browse availability.

This management area will include one or more eastern Upper Peninsula Grouse Enhanced Management System areas. The boundaries will be delineated during this planning period by the local biologist in collaboration with the Forest Resources Division unit manager. Aspen stands that fall within the boundary may be managed to enhance habitat and hunting opportunities for ruffed grouse and deer. Habitat treatments may include managing aspen on a shortened rotation with multiple age classes and smaller stand sizes.

### **American Marten**

The goal for marten in the eastern Upper Peninsula is to maintain or increase suitable habitat and strive to identify, maintain and connect known populations to facilitate genetic exchange. Management should address the maintenance and improvement of corridors, dead wood and conifer components in priority landscapes.

#### Wildlife habitat specifications:

- Maintain a minimum of 30% canopy cover in key even-aged managed stands of northern hardwood and conifer stands as marten tend to avoid stands with less canopy cover. Write prescriptions to minimize potential blow down.
- Discourage land transactions and management activities that facilitate further fragmenting of marten habitat within the management area by identifying and maintaining corridors between large forested tracts.
- Provide older forest conditions in this management area.
- Retain and limit disturbance to existing downed coarse woody debris and exceed Within-Stand Retention Guidance for its maintenance. Where coarse woody debris is lacking, increase both standing dead and down dead wood by leaving at least three secure large diameter (>14 inches in diameter at breast height) live trees to serve as future den trees, snags and coarse woody debris logs on the ground per acre in harvested stands.
- Increase the within-stand component of mesic conifers in mixed stands and enhance mesic conifer forest types by group or gap selective harvest. Consider under-planting on suitable sites where a seed source is absent.
- Limit firewood permits, biomass harvesting and whole tree harvesting and retain the maximum residues in the Woody Biomass Harvesting Guidelines.

### **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land use.

#### Wildlife habitat specifications:

- Maintain or increase tree species that provide mast including beech, oak, black cherry and ironwood.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.
- Retain some large diameter white pine or hemlock as refuge trees.
- Plant disease resistant beech and red oak where appropriate.
- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource.
- Discourage land transactions and management activities that facilitate further fragmenting state lands within the management area.

#### **Moose**

The goal for moose in the eastern Upper Peninsula is to maintain or increase suitable habitat. Management for moose should focus on providing early successional browse adjacent to lowland conifer complexes, the maintenance of hemlock within stands, and protecting willow, a valuable food source, along riparian and wetland edges.

#### Wildlife habitat specifications:

- Encourage early successional hardwood browse (in the 0-9 and 10-19 year-old age class) in close proximity to closed canopy lowland conifer swamps.
- Balance aspen age-class distribution to ensure a more sustainable supply of browse.
- Maintain or enhance thermal refugia in harvested stands by retaining hemlock and other conifers.
- Increase mesic conifer (e.g., hemlock, white pine, red pine and upland spruce-fir) component on state forests by:  
a) Retaining a larger percentage of mesic conifer during harvests; b) Using silvicultural practices that encourage the regeneration of mesic conifer; and c) Where desired and feasible, under planting hemlock, white pine and white spruce in hardwood-dominated stands on suitable sites without a seed source. Increase the percentage of mesic conifers, where suitable, across the landscape by 10% during this planning cycle.

#### **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age-class distribution for aspen in priority landscapes during this planning cycle.

#### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Balance the age-class distribution of aspen and birch cover type to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation. Larger harvest units should have irregular boundaries and include one or two 1-3 acre unharvested inclusions for every 40 acres exceeding 40 acres in size.
- Manage the aspen cover type for smaller patch size, a shorter rotation and a more deliberate habitat configuration within the designated Grouse Enhanced Management Systems areas where appropriate.
- Evaluate the conifer component in aspen stands, holding or increasing where desirable. Leave conifer under four inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

#### **Spruce Grouse**

The goal for spruce grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on retention of mixed conifers on riparian/lowland edges, increasing within stand plant species diversity and landscape level planning to ensure populations are not isolated.

Wildlife habitat specifications:

- In jack pine harvests, leave mixed conifer and/or jack pine retention strips of mature trees along riparian corridors and lowland margins, as well as along upland edges.
- Maintain spruce seed trees through retention, especially at lowland margins.
- Maintain or increase diversity of conifer stands by implementing seed tree/shelterwood prescriptions and limiting the use of herbicides, especially along lowland edges.
- Large clearcuts may isolate populations of spruce grouse so landscape level planning must take into account this species' need for low-density mixed-conifer travel corridors to connect suitable stands.
- Ensure black spruce recruitment and regeneration is reliable where harvested. Monitoring should be required to ensure desired results from management are achieved.

**4.5.3 - Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present, when past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed one listed species as well as one natural community of note occurring in the management area as shown in Table 4.5.2. Any established management guidelines will be followed.

The portion of M-123 that runs through the management area has been designated as a scenic heritage route special conservation area (Figure 4.5.7).

Linton, Baird and Savage Creeks are listed as cold water stream special conservation areas.

A very small portion of the Little Two Hearted River zone high conservation value area is in the northwest part of the management area with the majority in the adjoining Deer Park management area.

Table 4.5.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Charcoal Grade management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Community</b>								
Muskeg		S3/G4G5	Confirmed				Lowland open/semi-open	N/A
<b>Birds</b>								
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Late
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late

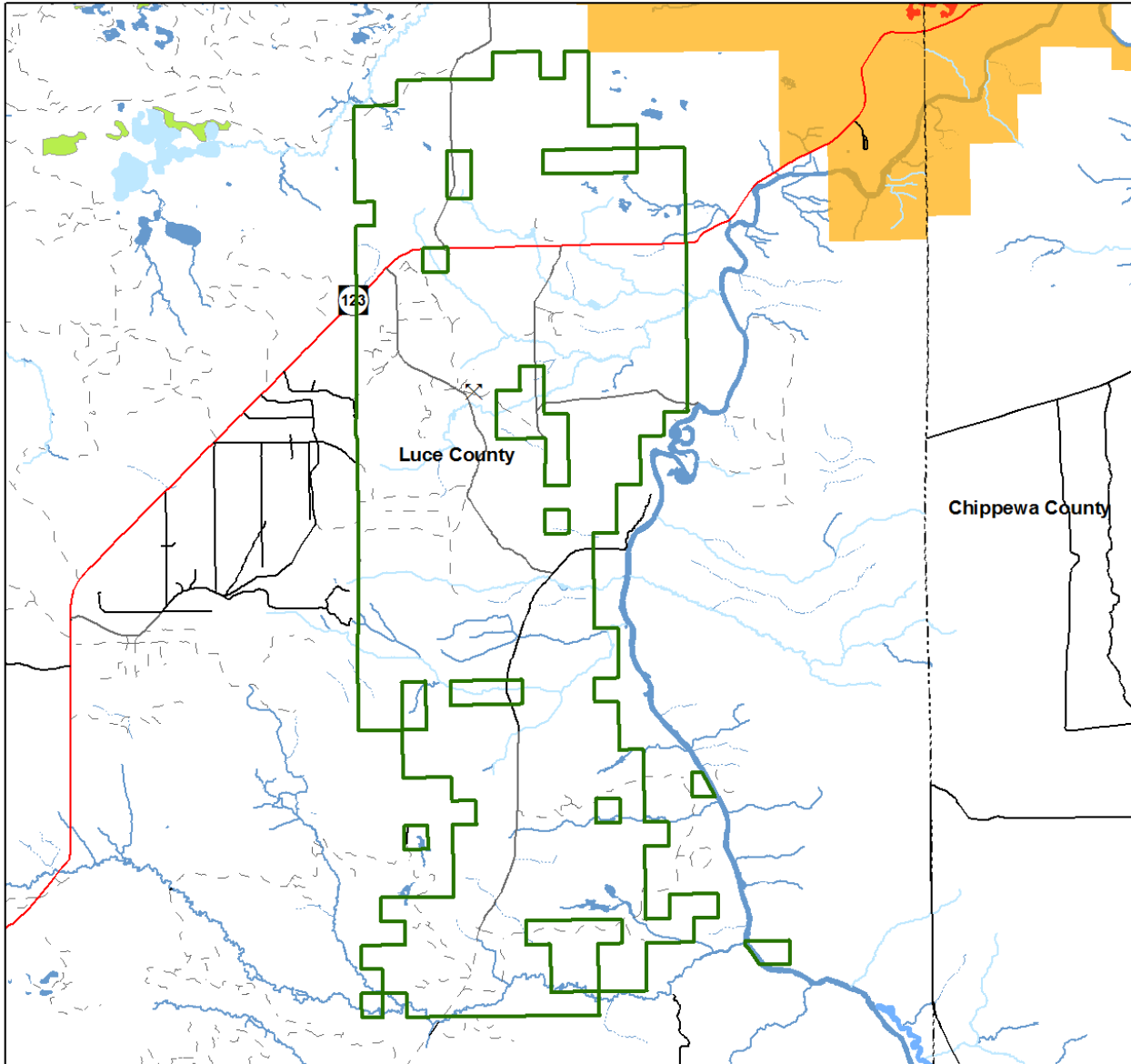
Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

No ecological reference areas have been identified in the Charcoal Grade management area.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

# Charcoal Grade



1 in = 1 miles

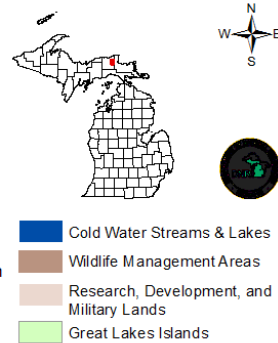
### Legend

- Highway
- Paved Roads
- Gravel Roads
- - - Poor Dirt Roads
- Railroads
- · - · - Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- Management Area Boundary
- Cities
- - - County Boundaries

- Ecological Reference Areas
- High Conservation Value Areas**
- Coastal Environmental Areas
- Critical Dunes
- Natural Rivers Vegetative Buffer
- Natural Rivers Zoning District
- Critical Coastal Habitat (Piping Plover)
- Kirtland Warbler Habitat
- Dedicated Management Areas
- Natural Areas Legally Dedicated

### Special Conservation Areas

- ▲ Campgrounds
- Fishing Access Sites
- Boat Access Sites
- ⛏ Mineral Resource Locations
- Wild & Scenic Rivers (USFS Lands)
- Visual Management Areas
- Contiguous Resource Areas
- Possible Type 1 and Type 2 Old Growth
- Potential Old Growth
- Non-Dedicated Natural Areas & National Natural Landmarks
- Springs, Wetlands, or Riparian Areas



- Cold Water Streams & Lakes
- Wildlife Management Areas
- Research, Development, and Military Lands
- Great Lakes Islands

Figure 4.5.7. A map of the Charcoal Grade management area showing the special resource areas.

#### 4.5.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area, due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Northern hardwoods: beech bark disease and emerald ash borer
- Aspen: white trunk rot and *Hypoxylon* canker
- Lowland conifers and upland spruce/fir: spruce budworm, eastern larch beetle and larch casebearer

Further information on forest health can be found in Section 3.

#### Invasive Plant Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. No invasive plant species have yet been documented within the management area, but garlic mustard has been documented within a five-mile buffer of the management area (Table 4.5.3) and monitoring efforts should specifically look for new populations of this species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites, due to their location or growth characteristics and have population levels that may be successfully controlled.

Table 4.5.3. Invasive plant species within or near the Charcoal Grade management area. (Data from the Michigan Invasive Plant Identification Network database).

Charcoal Grade - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	1	1	1
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
-	-	Garlic Mustard <i>Alliaria petiolata</i>	1	

#### 4.5.5 – Fire Management

This management area is dominated by mesic northern forest and lowland conifer forest. Fire impacts were rare, resulting in very long fire return intervals. The following fire management concepts will be used in this management area:

- Use of prescribed fire on the drier soils may be considered to maintain pine communities and encourage natural regeneration.
- Prescribed fire use is not anticipated in lowland stands, due to concerns about risks and costs associated with fire on organic soils.

#### 4.5.6 – Public Access and Recreation

Highway 123 runs through the north part of the management area and there are two-track roads throughout. Access is somewhat restricted by creeks and wetland cover types in the southern portion of the management area. The quality of the forest roads in this area is generally poor, especially in the spring.

Recreational facilities include a major snowmobile route (Figure 4.5.1) that goes south through the village of Newberry.

Hunting is a popular form of recreation here. Specific hunting recreation improvements such as parking lots, gates, trail planting and trail establishment, as well as the preparation and dissemination of specific promotional material, may be made as a result of Grouse Enhanced Management Systems areas planning in this management area.

#### **4.5.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed in accordance with DNR Policy 39.21-20 Beaver Management. There are no designated high priority trout streams that have been identified for this management area.

#### **4.5.8 – Minerals**

Surface sediments consist of an end moraine of coarse-textured till, lacustrine (lake) sand and gravel, peat and muck and coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in this management area and there is good potential for additional pits.

The Ordovician Trenton, Black River and Prairie du Chien Formations and Cambrian Trempealeau and Munising Formations subcrop below the glacial drift. The Trenton and Black River are quarried for stone and dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (two in Luce County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

The Camp 7 gravel pit is within the management area and is shown in Figure 4.5.7.

## 4.6 MA 6 – County Line Hardwoods Management Area

### Summary of Use and Management

Management in the County Line Hardwoods management area (MA) (Figure 4.6.1) will strive to sustainably produce various timber products, enhance wildlife habitat and provide for forest-based recreational uses. The area is noted for high quality hardwood and red pine sawlogs; intensive management of these stands will continue. Joint fisheries and wildlife management occurs in conjunction with the Black Creek flooding and Millecoquins trout pond. As this management area is located between Newberry and Curtis, recreation use is very high. Expected issues in this 10-year planning period include: increased recreational pressure, introduced pests and diseases and the difficulty of regenerating cedar stands.

#### Introduction

The County Line Hardwoods management area is located in the central portion of the eastern Upper Peninsula in Luce and west Mackinac Counties. It has 26,833 acres of state-owned land. The primary attribute for this management area is the intensive timber production, particularly for hardwoods and red pine. Additional attributes which were important in identifying this management area include:

- The management area falls within St. Ignace Lake Plain sub-section of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of moraine lake bed complex, outwash plain and moraine.
- The dominant species in both the historic and current northern hardwoods are sugar maple and American beech. Hemlock was a more common component circa 1800 than it is today.
- In some areas of the management area, there remains evidence of old farms on former homesteads after the logging era.
- Recreational opportunities include: snowmobiling, motorcycle riding, horse riding, boating and cross country skiing. Deer hunting, waterfowl hunting, bird watching, trapping and fishing are other common uses of the resources in this management area.
- Special conservation areas within this management area include the Black Creek Flooding Wildlife Management Area and deer critical wintering habitat areas.

The ownership is in a relatively contiguous block of state forest land, with good proximity to wood product markets for intensive hardwood management. The management area is within both the Sault Ste. Marie and Newberry Forest Management Units. The predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.6.1.

Table 4.6.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the County Line Hardwoods management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory Data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Northern Hardwood	43%	11,412	842	10,570	0	5,408	11,412	0	5,068
Aspen	19%	5,150	527	4,623	224	0	5,150	771	0
Cedar	7%	2,007	0	2,007	0	0	2,007	125	0
Lowland Open/Semi-Open Lands	6%	1,736	0	1,736	0	0	1,736	0	0
Red Pine	4%	1,150	0	1,150	128	720	1,150	128	720
Upland Open/Semi-Open Lands	3%	866	0	866	0	0	866	0	0
Lowland Conifers	3%	804	309	495	153	0	804	55	0
Lowland Spruce/Fir	3%	796	127	669	174	0	796	74	0
Lowland Aspen/Balsam Poplar	2%	436	72	364	48	0	436	61	0
Misc Other (Water, Local, Urban)	1%	271	0	271	0	0	271	0	0
Others	8%	2,205	292	1,913	271	211	2,205	223	281
<b>Total</b>	<b>100%</b>	<b>26,833</b>	<b>2,168</b>	<b>24,665</b>	<b>998</b>	<b>6,339</b>	<b>26,833</b>	<b>1,437</b>	<b>6,069</b>

Others include: lowland mixed forest, lowland deciduous, upland mixed forest, white pine, upland conifers, mixed upland deciduous, tamarack, paper birch, hemlock, jack pine, natural mixed pines and planted mixed pines.



# County Line Hardwoods

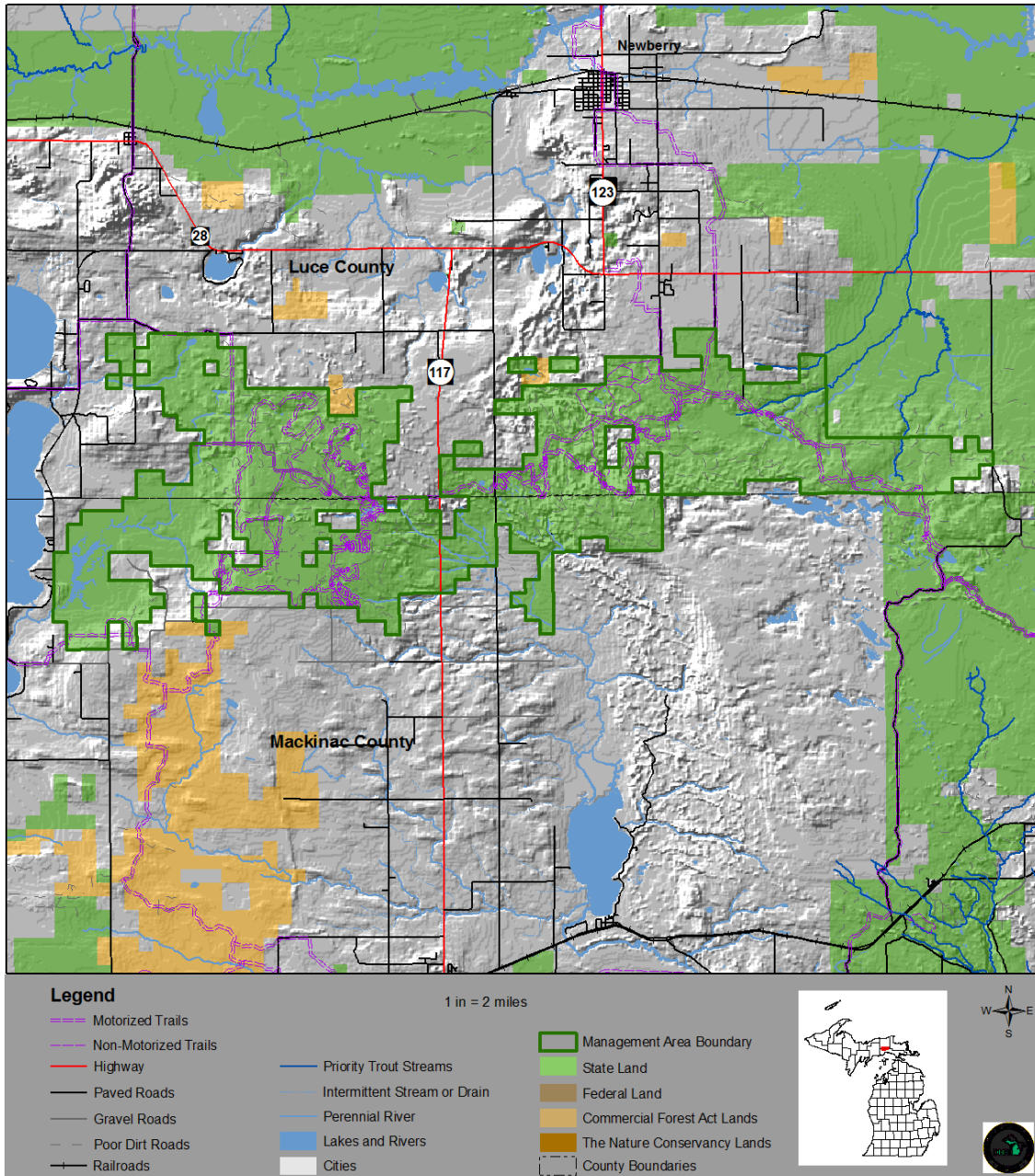


Figure 4.6.1. Location of the County Line Hardwoods management area (dark green boundary) in relation to surrounding state forest lands and other ownerships.

## 4.6.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (e.g., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.



All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

**Section 4.6.1.1 Forest Cover Type Management – Northern Hardwoods**

Current Condition

Northern hardwoods occur on 11,412 acres (43%) of the management area (Table 4.6.1). Northern hardwoods are distributed throughout the management area on outwash plains, disintegration moraines and ground moraines with Kotar habitat classes of ATFD, AFPo and AFOAs (see Appendix E). These are mesic poor to medium rich nutrient sites with high potential to grow quality trees. The majority of the stands have been managed as uneven-aged, with trees of varying ages and sizes. Sugar maple is most common, with a variety of other trees species including red maple, basswood, black cherry and beech. Hardwood stands in this management area will continue to be intensively managed as uneven-aged stands, with selection harvests where basal area is over 120 square feet per acre. In general, this will allow most hardwood stands to be select harvested every 20 years. Where site quality is poor, consider shelterwood and other even-aged harvesting systems. A small portion of the northern hardwood stands have been harvested using even-aged management and those acres are shown in the immature column in Figure 4.6.2.

Beech bark disease is found throughout the management area, and has resulted in loss of beech trees. Many stands have had or will have salvage harvests. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed, due to resultant lower than normal residual basal area.

Currently, there are 1,775 acres of northern hardwood with a partial harvest prescription assigned (Figure 4.6.2), and 13 acres with a final harvest prescribed. There are 842 acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

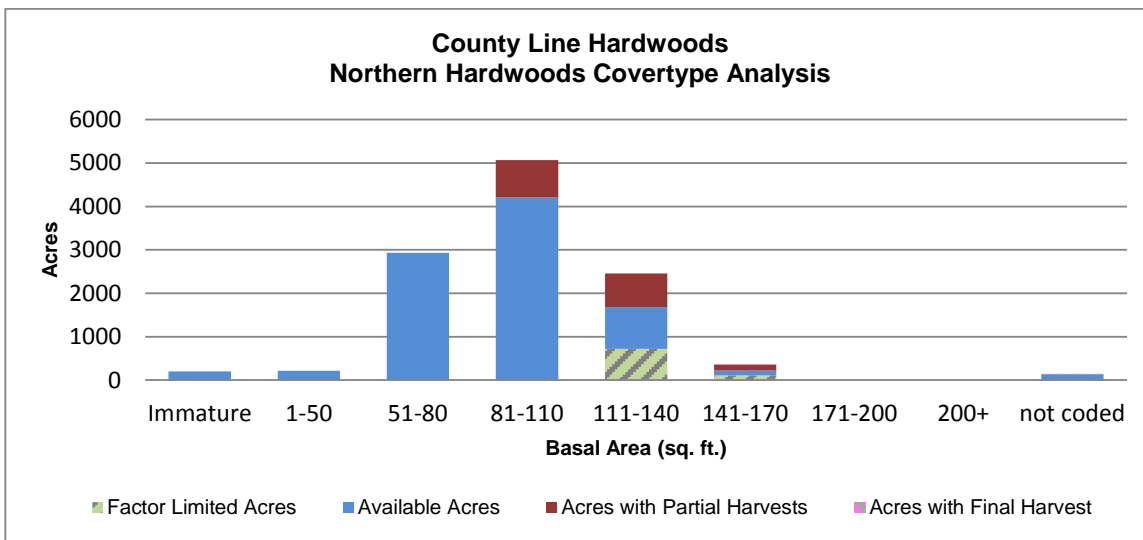


Figure 4.6.2. Basal area distribution of northern hardwood in the County Line Hardwoods management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwoods will be maintained on operable sites, generally by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands. Harvesting will provide for a continuous flow of timber products and a variety of wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected harvest of northern hardwood is 5,408 acres of partial or selection harvest;
- Evaluate stands that had a component of beech to determine the impact of beech bark disease on regeneration;

- Track beech regeneration in these stands;
- Consider herbicide application of beech regeneration to promote regeneration of other species; and
- In areas that are losing beech to beech bark disease, consider planting oak or disease resistant beech to increase the availability of hard mast producing trees.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.6.1.2 Forest Cover Type Management - Aspen**

Current Condition

Aspen occurs on 5,150 acres (19%) of the management area (Table 4.6.1). Aspen stands are distributed throughout the management area on outwash plains, disintegration moraines and ground moraines with Kotar habitat classes of ATFD, AFPo, AFOAs and PARVAa (see Appendix E). These sites have sandy, loamy soils of dry-mesic to mesic-poor to medium-rich nutrient, with good potential to grow quality trees. Accessible aspen has been consistently harvested, resulting in stands in all age classes (Figure 4.6.3).

Currently, there are 419 acres with a final or regeneration harvest prescribed. There are 35 acres prescribed for harvest in a different cover type that are expected to convert to aspen. These acres are included in Figure 4.6.3 in the regeneration prescriptions column. There are 527 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres provide mature aspen for ruffed grouse. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

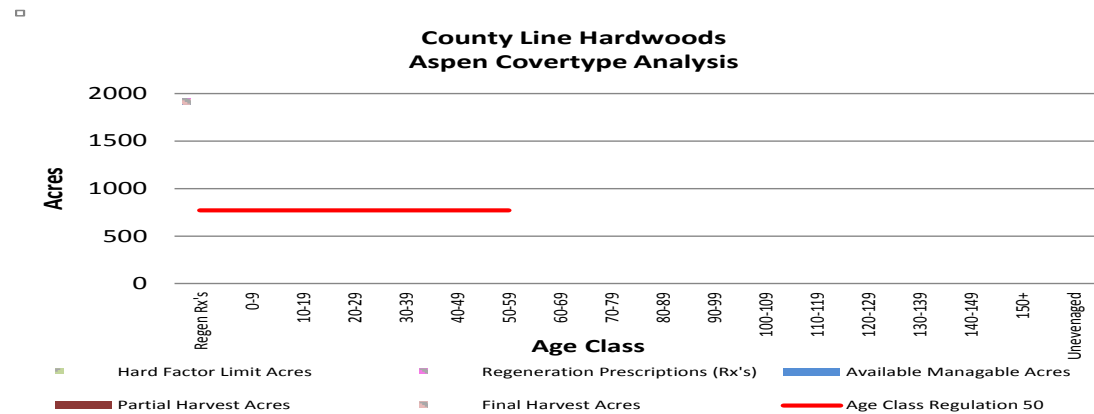


Figure 4.6.3. Age-class distribution of aspen in the County Line Hardwoods management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest of aspen is 224 acres. The decrease from the regulated harvest amount is due to the current age-class structure where there are not many available acres over 40 years of age.

Long-Term Management Objectives

- Balance the age-class structure of accessible aspen stands. A regulated harvest would allow approximately 771 acres to be harvested per decade (red line in Figure 4.6.3).

### Section 4.6.1.3 Forest Cover Type Management – Cedar

#### Current Condition

Cedar dominated communities occur on 2,007 acres (7%) of the management area (Table 4.6.1). Young age classes of cedar are non-existent in this management area (Figure 4.6.4). Cedar stands within the deer wintering special conservation areas will be managed to maintain wintering habitat for deer and to retain this forest type in the landscape. Maintaining a closed canopy structure provides important cover for deer, reducing snow depths within the stands.

Although there may not be harvesting of cedar within deer wintering complexes, there is a need to address future cedar cover. Limited cedar harvests may occur outside the deer wintering complexes. Reliable and timely regeneration of cedar is a concern from both wildlife and forest management perspectives.

Currently, there are no acres prescribed for harvest. Also, there are no hard factor limited acres at this time. Cedar stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

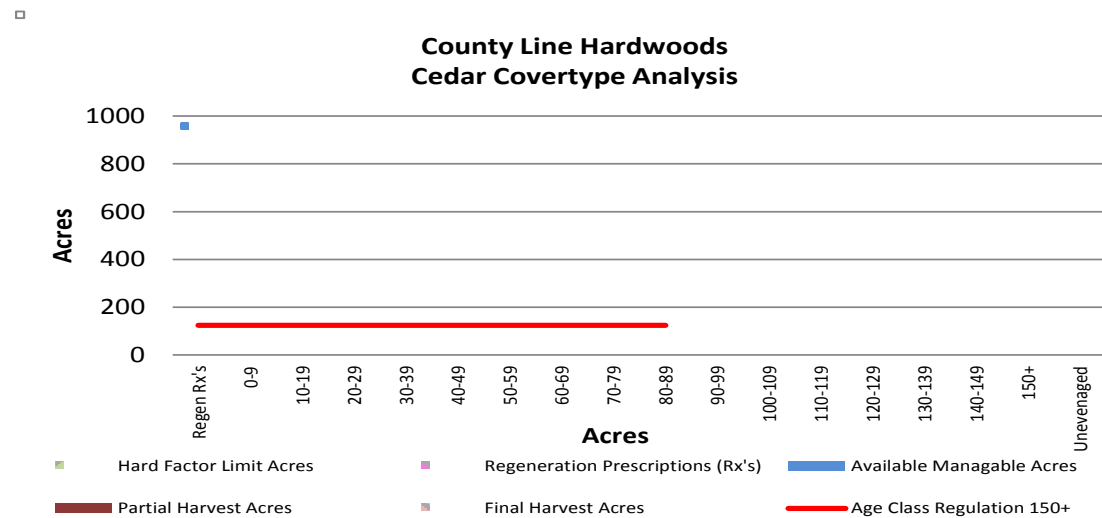


Figure 4.6.4. Age-class distribution of cedar in the County Line Hardwoods (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Cedar trees are very long lived and generally provide excellent closed canopy habitat for wildlife. Where deer wintering activities are not a concern, cedar may be maintained on operable sites through even-aged management.

#### 10-Year Management Objectives

- The 10-year projected harvest is zero acres of cedar due to the use of cedar stands by wintering deer; and
- Outside of the deer wintering complexes, consider harvesting of cedar and ensure that cedar and/or hemlock recruitment/regeneration is reliable, if harvesting in this cover type.

#### Long-Term Management Objectives

- Develop a comprehensive deer wintering area management plan focusing cedar management on winter habitat for deer;
- Look for opportunities to test different methods of regenerating cedar, especially outside of the deer wintering areas; and
- Consider harvest of cedar before rotation age to begin to diversify the age classes. Using a 150-year regulated rotation would allow approximately 125 acres to be final harvested per decade.

#### **Section 4.6.1.4 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

##### Current Condition

Lowland open/semi-open lands occur on 1,736 acres (6%) of the management area (Table 4.6.1). This category is a combination of treed bog (624 acres), lowland shrub (631 acres), marsh (324 acres) and bog (157 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. Most of these stands are found in association with streams, rivers and lowland forested stands.

##### Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity.

##### Long-Term Year Management Objectives

- Continue to maintain this habitat type for wildlife and other ecological concerns, primarily through passive management, allowing natural processes to occur.

#### **Section 4.6.1.5 Forest Cover Type Management – Other Types**

##### Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total acres (Table 4.6.1). Red pine (1,150 acres or 4%), lowland conifers (804 acres or 3%), lowland spruce/fir (796 acres or 3%) and lowland aspen/balsam poplar (436 acres or 2%) are the larger ones. Upland open/semi-open lands (866 acres or 3%) is made up of herbaceous openland, upland shrub, low-density trees and bare/sparsely vegetated lands.

The “other types” category (2,205 acres or 8%) is made up of cover types with less than 2% of the total management area acres, including: lowland mixed forest (337 acres), lowland deciduous (249 acres), white pine (226 acres), upland conifers (117 acres), mixed upland deciduous (110 acres), tamarack, paper birch, hemlock, jack pine, natural mixed pines and planted mixed pines. There are also 271 acres (1%) of “miscellaneous other” which includes water, roads and sand/soil.

With the exception of red pine and white pine, following general timber management guidelines, these cover types are managed as even-aged. Attempt to balance the age classes where possible. Natural regeneration of species currently on site is expected. Mixed cover types with high basal area may be thinned, depending on the species composition, before final regeneration harvest.

For planted red pine, thinning occurs approximately every 10 years starting about age 40, continuing until stand replacement harvest at economic maturity. Maintain red pine after final harvest through replanting. Prescribed fire or herbicides may be necessary for site preparation to control competition. For natural red pine stands, try to encourage natural regeneration, and retain some large trees to improve structural diversity. Red pine stands in this management area are generally of high quality with high site indexes.

Approximately 800 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Stands that are inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages, thus slightly changing the cover type distribution.

##### Desired Future Condition

- Harvesting and regenerating these cover types will contribute to the compositional diversity of the landscape while providing for continual harvest, available wildlife habitat and recreational opportunity.

##### 10-Year Management Objectives

- The projected 10-year final harvest is 128 acres of red pine, 153 acres of lowland conifers, 174 acres of lowland spruce/fir, 48 acres of lowland aspen/balsam poplar and 271 acres of other types; and
- The projected 10-year partial harvest is 720 acres of red pine and 211 acres of other types.

## Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.6.2 – Featured Species Management**

Within this management area, there are very high biodiversity values which should be a primary focus for wildlife management. The maintenance of mature forest conditions, soft mast and forest structure are important in the northern hardwoods cover type. Important key management concepts are the retention of mesic conifers and woody debris in aspen and woody debris and dense understory in some lowland conifer stands. The Black Creek Wildlife Flooding is primarily passively managed for waterfowl, marsh birds and aquatic furbearers. White-tailed deer use some stand of cedar and lowland conifers adjacent to the flooding as critical deer wintering areas.

#### **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land use.

#### Wildlife habitat specifications:

- Maintain or increase tree species that provide mast including beech, oak, black cherry and ironwood;
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible;
- Retain some large diameter white pine or hemlock as refuge trees;
- Plant disease resistant beech and red oak where appropriate;
- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource;
- Discourage land transactions and management activities that facilitate further fragmenting state lands within the management area.

#### **Northern Goshawk**

The goal for northern goshawk in the eastern Upper Peninsula is to maintain or improve suitable habitat. Management should focus on maintaining contiguous blocks of suitable habitat, providing structural diversity within stands and limiting disturbance to nesting birds in priority areas.

#### Wildlife habitat specifications:

- All known woodland raptor nests should be reported to local wildlife staff and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. For northern goshawk nests, the wildlife habitat specifications contained within Michigan DNR's *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August 2012) will be followed until the workgroup has completed the guidance that will permanently replace the interim guidelines.

#### **Red-shouldered Hawk**

The goal for red-shouldered hawk is to maintain or improve suitable habitat in the ecoregion. Management activities should focus on the maintenance of large blocks of mesic northern forest with the appropriate level of large diameter trees in priority landscapes.

#### Wildlife habitat specifications:

- All known woodland raptor nests should be reported to local wildlife staff and included in Integrated Forest Monitoring Assessment and Prescription. Confirmed red-shouldered hawk nests are to be documented in accordance with the DNR Approach to the Protection of Rare Species on State Forest Lands (IC 4172) and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support System.

For red-shouldered hawk nests, the wildlife habitat specifications contained within Michigan DNR's *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August, 2012) will be followed until the workgroup has completed the guidance that will permanently replace the interim guidelines.

## **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age-class distribution for aspen in priority landscapes.

### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area;
- Move to balance the age-class distribution of aspen and birch cover types to maintain young forests across the management area;
- Ideal aspen stands will be of 40-160 acres under a 50-60 year;
- Larger harvest units should have irregular boundaries and include one or two, 1-3-acre un-harvested inclusions for every 40 acres exceeding 40 acres in size;
- Evaluate the conifer component in aspen stands, holding or increasing where desirable. Leave conifer under four inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors; and
- Maintain cherry production for soft mast.

## **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash, increasing mesic conifer components and increasing beaver abundance.

### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under four inch diameter at breast height.
- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- When using herbicide treatments to prepare sites for planting red and jack pine in snowshoe hare habitat, encourage more diverse stands of pine and aspen by using application skips in pockets or along stand edges.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris slash already present (before cutting) and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply the Michigan Biomass Harvesting Guidance and retain the maximum residuals.

## **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR procedure 32.22-07 states "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance, available summer and winter habitat, timber management, and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the DNR and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### **4.6.3 - Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed four listed species occurring in the management area as shown in Table 4.6.2. A colony of great blue herons has also been identified. Any established management guidelines will be followed.

Special conservation areas include the Black Creek wildlife flooding (a large wetland complex), obligate deer winter range near the flooding and in the northeast part of the management area, several cold water lakes and cold water streams (all shown in Figure 4.6.5) and high priority trout streams as shown in Figure 4.6.1.

There have been no high conservation value areas or ecological reference areas identified in this management area.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.

Table 4.6.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the County Line Hardwoods management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Birds</b>								
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
<b>Plants</b>								
Goblin moonwort	<i>Botrychium mormo</i>	T/G3/S2	Confirmed			Mesic northern forest	Northern Hardwood	Late
						Boreal forest	Upland & Lowland Sp/F	Mid

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

#### 4.6.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area, due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Northern hardwoods: beech bark disease;
- Aspen: white trunk rot, *Hypoxylon* canker;
- Lowland conifers: spruce budworm, eastern larch beetle and larch casebearer; and
- Red pine: pine engraver.

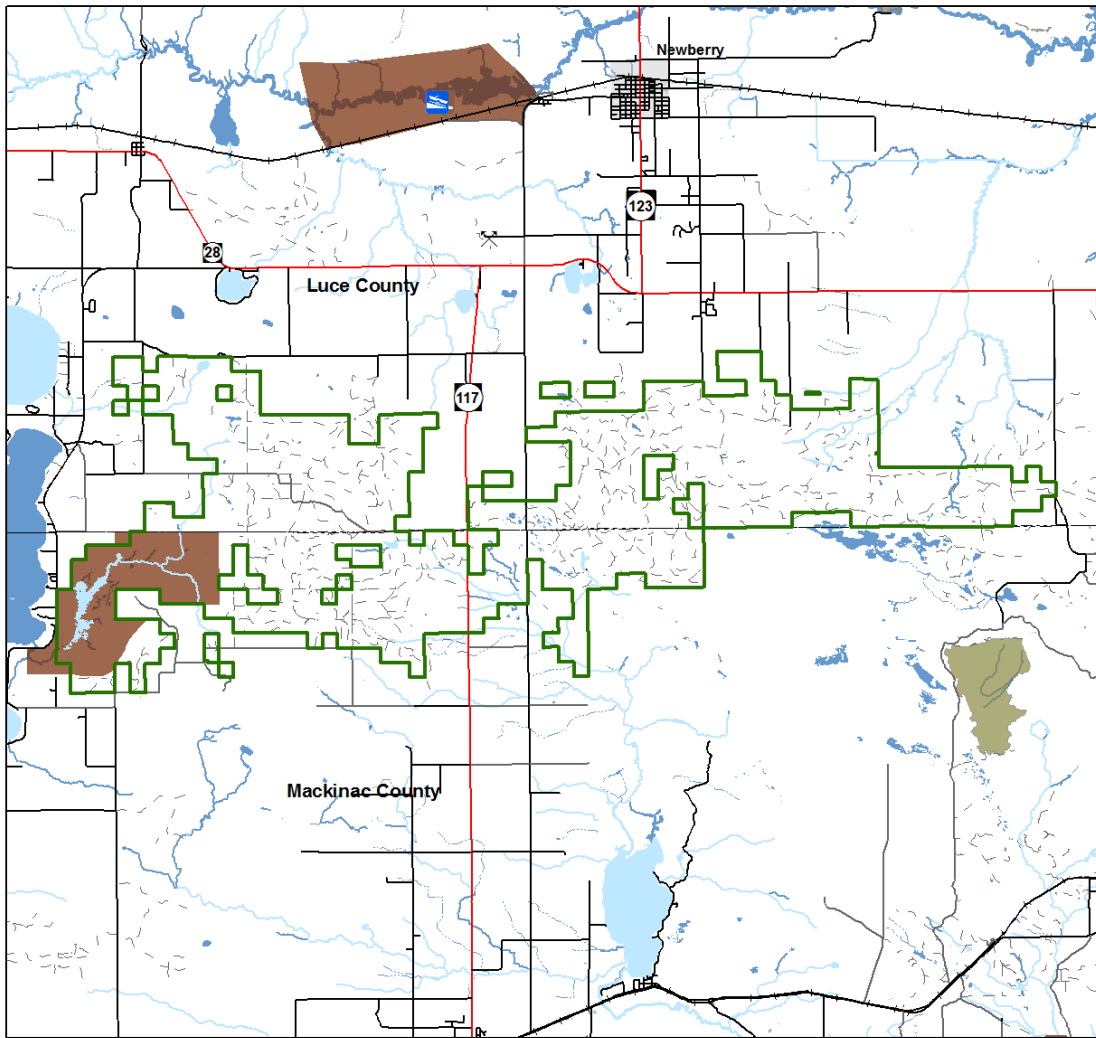
Further information on forest health can be found in Section 3.

#### Invasive Plant Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. Reed canary grass, spotted knapweed and wild parsnip have been documented within the management area. Purple loosestrife has been documented within a five-mile buffer of the management area (Table 4.6.2) and monitoring efforts should specifically look for new populations of these species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites, due to their location or growth characteristics and have population levels that may be successfully controlled.



# County Line Hardwoods



### Legend

- Highway
- Paved Roads
- Gravel Roads
- - - Poor Dirt Roads
- Railroads
- - - Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- ▭ Management Area Boundary
- ▭ Cities
- - - County Boundaries

- ▭ Ecological Reference Areas
- High Conservation Value Areas**
- ▭ Coastal Environmental Areas
- ▭ Critical Dunes
- ▭ Natural Rivers Vegetative Buffer
- ▭ Natural Rivers Zoning District
- ▭ Critical Coastal Habitat (Piping Plover)
- ▭ Kirtland Warbler Habitat
- ▭ Dedicated Management Areas
- ▭ Natural Areas Legally Dedicated

- Special Conservation Areas**
- ▭ Campgrounds
- ▭ Fishing Access Sites
- ▭ Boat Access Sites
- ▭ Mineral Resource Locations
- ▭ Wild & Scenic Rivers (USFS Lands)
- ▭ Visual Management Areas
- ▭ Contiguous Resource Areas
- ▭ Possible Type 1 and Type 2 Old Growth
- ▭ Potential Old Growth
- ▭ Non-Dedicated Natural Areas & National Natural Landmarks
- ▭ Springs, Wetlands, or Riparian Areas

- ▭ Cold Water Streams & Lakes
- ▭ Wildlife Management Areas
- ▭ Research, Development, and Military Lands
- ▭ Great Lakes Islands

Figure 4.6.5. A map of the County Line Hardwoods management area showing the special resource areas.

Table 4.6.2. Invasive plant species within or near the County Line Hardwoods management area (Data from the Michigan Invasive Plant Identification Network database).

County Line Hardwoods - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	6	1	7	4
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
Reed Canary Grass <i>Phalaris arundinacea</i>	2	Purple Loosestrife <i>Lythrum salicaria</i>	1	
Spotted Knapweed <i>Centaurea stoebe</i>	2	-	-	
Wild Parsnip <i>Pastinaca sativa</i>	2	-	-	

#### 4.6.5 – Fire Management

With hardwood and lowland conifer communities dominating, significant stand replacement fire disturbance would have been very rare. There is a significant area of dry northern forest where most of the red pine is located. This portion of the management area is much more adapted to periodic fire. The following fire management concepts will be applied to this management area:

- Prescribed fire may be used to maintain pine, encourage natural pine regeneration and discourage competing hardwoods; and
- When conditions allow lowland stands to dry out enough to burn, using fire as a management tool may be considered to accomplish objectives.

#### 4.6.6 – Public Access and Recreation

Access for management and recreation is generally good throughout a large portion of this management area . Due to proximity to local communities, there are some areas with trash dumping problems.

Recreational facilities consist of motorized trails (Figure 4.6.1) that include: a snowmobile trail, the Sandtown motorcycle trail and trailhead and parts of the Newberry-Rexton motorcycle trail. The Canada Lake Ski trail/pathway is a non-motorized trail within the management area (Figure 4.6.1). There is a boat access site on the Upper Millecoquins River just north of the management area (Figure 4.6.5).

The Sandtown and Newberry-Rexton motorcycle trails are designated motorcycle use only by Director's Order. Any damage to the 24-inch trail bed must be repaired. Boat access sites on East Lake and Big Manistique Lake are nearby.

Horse riding, waterfowl hunting, bird watching, mushroom picking, deer and grouse hunting, trapping and fishing are common uses of the resources in this management area. As this management area is close to Newberry, and several other communities, recreation use is very high.

#### 4.6.7 – Aquatic Resource Management

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. High priority trout stream in this management area are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support System and in Figure 4.6.1.

#### **4.6.8 – Minerals**

Surface sediments consist of lacustrine (lake) sand and gravel and clay and silt, peat and muck and coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in this management area, and there is good potential for additional pits.

The Silurian Manistique, Burnt Bluff Groups and Cabothead Shale subcrop below the glacial drift. The Burnt Bluff is quarried for stone/limestone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (two in Luce and four in Mackinac). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology, given the depth to known metallic bearing formations.

## 4.7 MA 7 – Cusino Complex Management Area

### Summary of Use and Management

Vegetative management in the Cusino Complex management area (MA) (Figure 4.7.1) will provide various timber products; maintain or enhance wildlife habitat; protect unique areas and threatened, endangered, and special concern species; and provide many recreational opportunities. Uneven-aged management of the high quality hardwood stands in this management area provides valuable veneer and sawlog products. The Petrel Deer Wintering Complex is managed for winter habitat for deer using the Petrel Deer Wintering Complex Plan. This management area also contains an intensive ruffed grouse management area.

### Cusino Complex

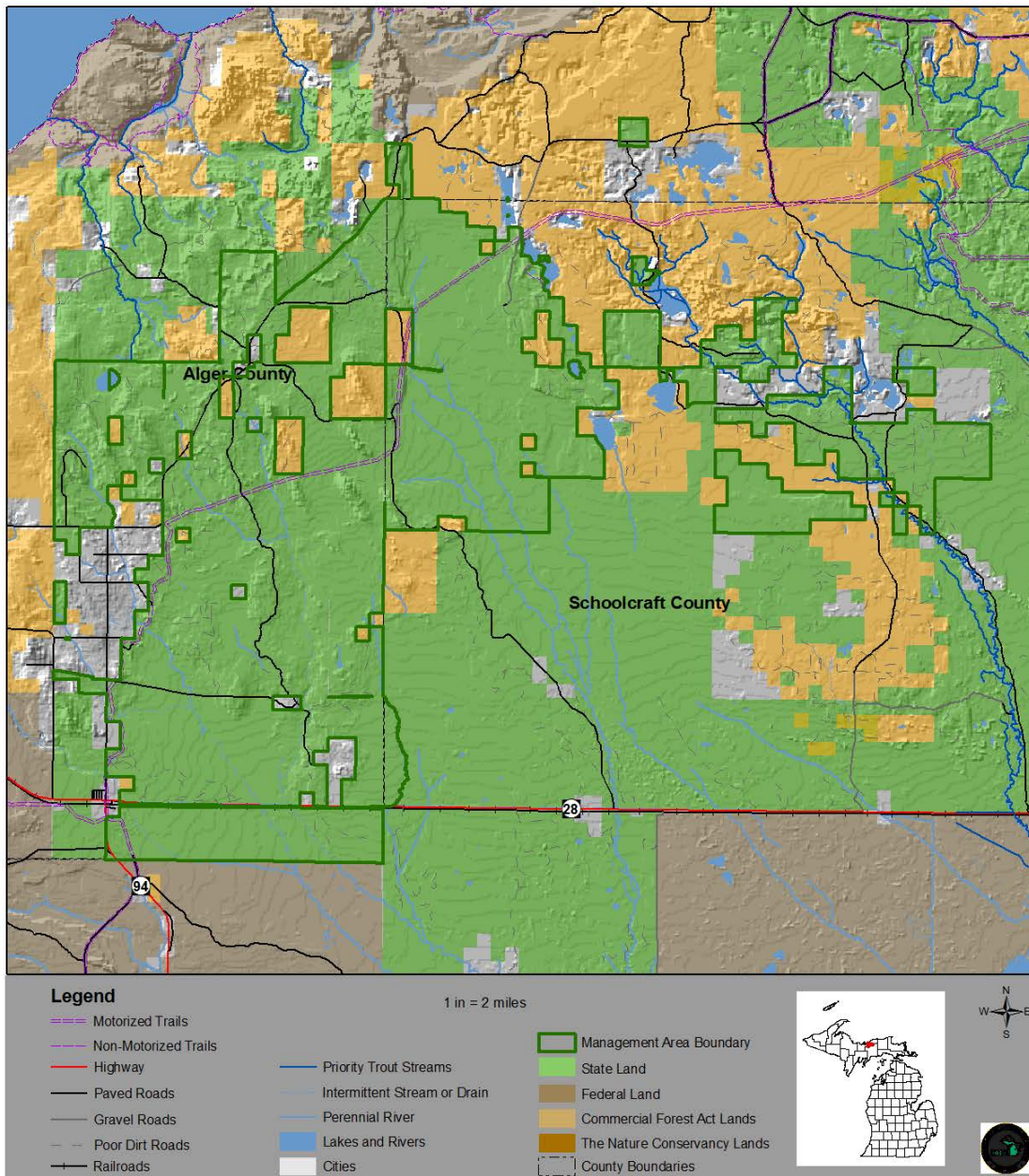


Figure 4.7.1. Location of the Cusino Complex management area (dark green boundary) in relation to surrounding state forest lands other ownerships and the town of Shingleton within Alger and Schoolcraft counties.

## Introduction

The Cusino Complex management area is located in the western part of the eastern Upper Peninsula in Alger and Schoolcraft Counties. It includes 49,336 acres of state-owned land. Timber management of northern hardwoods and winter deer habitat management are the primary attributes in this management area. Additional attributes which were important in identifying this management area include:

- The management area falls within the Luce subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of end moraines of medium textured till, glacial outwash sand and peat and muck.
- This management area is intensively managed for northern hardwoods. There are also large blocks of cedar and other lowland conifers.
- Significant recreational activities include: camping, snowmobiling, hunting and fishing.
- This management area contains one of the eastern Upper Peninsula Grouse Enhanced Management Systems areas near Melstrand. This area plan will emphasize balanced age classes of aspen for timber production which will have habitat benefits for a number of the featured species including ruffed grouse and deer. The boundaries of Grouse Enhanced Management Systems areas will be delineated and an operational plan will be developed during this planning period by the local biologist in collaboration with the Forest Resources Division unit manager and integrated into the plan through the revision process.
- Special features including: a patterned fen ecological reference area and a special conservation area deer wintering area.

The management area includes the former site of Cusino Civilian Conservation Corps camp. The Cusino Wildlife Research Station and former Cusino Correctional Facility sit adjacent to the management area. The site of the pens used during the moose translocation from Isle Royal is in this management area.

This management area has a long history of management for research in the Petrel and the Old Cusino deer wintering areas. The former old Cusino deer wintering area was at one time very large. The Petrel Deer Wintering Complex, which is a remnant of the old Cusino complex, still holds significant numbers of deer in this deep snow area. The Petrel Wintering Complex is now the area of focus for management to sustain deer wintering habitat. The Petrel Wintering Complex consists of approximately 29,000 acres of primarily state owned land.

The foundation of a former one room schoolhouse is located on land owned and managed by Munising Public Schools near Melstrand. Remains of several old logging camps are also found in this management area.

The state land in this management area is fairly concentrated, though interspersed with private parcels. The Cusino Complex management area is within the Shingleton Forest Management Unit. The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.7.1.

Table 4.7.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Cusino Complex management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Northern Hardwood	37%	18,230	95	18,135	0	5,942	18,230	0	8,633
Cedar	21%	10,332	199	10,133	633	0	10,332	633	0
Lowland Conifers	11%	5,653	1,145	4,508	501	0	5,653	501	0
Lowland Open/Semi-Open Lands	11%	5,237	0	5,237	0	0	5,237	0	0
Aspen	4%	1,855	2	1,853	52	0	1,855	309	0
Lowland Deciduous	4%	1,855	290	1,565	174	0	1,855	174	0
Lowland Spruce/Fir	3%	1,523	249	1,274	81	0	1,523	142	0
Upland Open/Semi-Open Lands	2%	1,200	0	1,200	0	0	1,200	0	0
Misc Other (Water, Local, Urban)	1%	450	0	450	0	0	450	0	0
Others	6%	3,001	347	2,654	373	258	3,001	296	369
<b>Total</b>	<b>100%</b>	<b>49,336</b>	<b>2,327</b>	<b>47,009</b>	<b>1,814</b>	<b>6,200</b>	<b>49,336</b>	<b>2,055</b>	<b>9,002</b>

Others include: lowland spruce/fir, jack pine, lowland mixed forest, upland spruce/fir, white pine, hemlock, upland mixed forest, paper birch, lowland aspen/balsam poplar, red pine, mixed upland deciduous, upland conifers and tamarack.



### 4.7.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities. Harvesting these cover types will provide for a continuous flow of forest products, a variety of wildlife habitat and numerous recreational opportunities.

#### Section 4.7.1.1 Forest Cover Type Management – Northern Hardwoods

##### Current Condition

Northern hardwoods occur on 18,230 acres (37%) of the management area (Table 4.7.1). Northern hardwoods are distributed throughout the management area on ground moraines, disintegration moraines, outwash plains, and pitted outwash plains with Kotar habitat types of AFOAs, AFPo and ATFD (see Appendix E). These mesic medium to rich sites have high potential to grow quality trees and include some of the best sites in the area. The majority of the stands are composed of high-quality sugar maple, with lesser amounts of other species including beech, ironwood, red maple, basswood and black cherry. Most of the stands have been managed since the 1930s as uneven-aged, with trees of varying ages and sizes. Selection harvests are scheduled when basal area is over 120 square feet per acre. Where site quality is poor, shelterwood and other even-aged harvesting systems are considered. There is a small amount of acres that were harvested using even-aged systems and are shown in the immature column in figure 4.7.2. Hardwood stands that are within the Petrel Wintering Complex will be harvested primarily in the winter as an ancillary benefit to deer management.

Beech bark disease is found throughout the management area, and salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed, due to resultant lower than normal residual basal area.

Currently, 5,666 acres have a partial harvest cut assigned, and 37 acres of northern hardwood have a final harvest prescribed (Figure 4.7.2). There are 95 acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations.

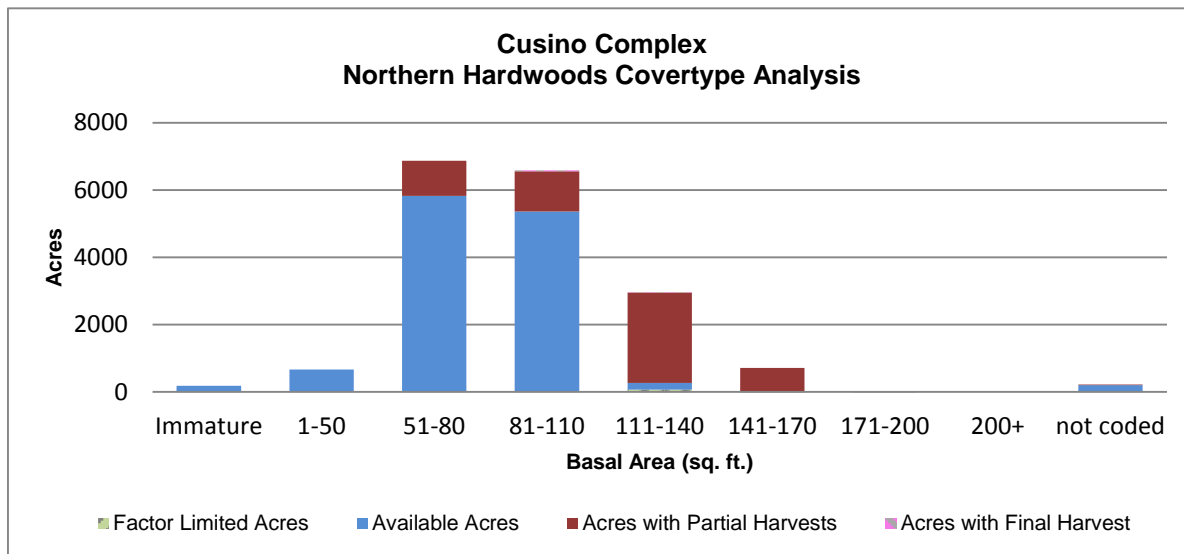


Figure 4.7.2. Basal area distribution of northern hardwood in the Cusino Complex management area (2012 Department of Natural Resources inventory data).

### Desired Future Condition

- Northern hardwoods will be maintained on operable sites generally using selection harvests to provide uneven-aged compositionally and structurally diverse stands. This will provide for a continuous supply of timber, available wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The 10-year projected partial or selection harvest is 5,942 acres of northern hardwood.
- Continue salvage harvests of beech affected by beech bark disease using Beech Bark Disease Management Guidelines.
- Track beech regeneration in these stands and evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration.
- To favor regeneration of hardwood other than beech, consider herbicide applications on beech regeneration and the planting of hard mast producing trees, including oak and disease resistant beech.

### Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

## **Section 4.7.1.2 Forest Cover Type Management - Cedar**

### Current Condition

Cedar stands cover 10,322 acres (21%) of the management area (Table 4.7.1). Of this 2,174 acres are located within the Petrel Wintering Complex and will be managed for thermal refugia and food availability, in accordance with the Petrel Wintering Complex Plan. Following a deer management strategy, winter harvesting of approximately 20 acres of cedar per year will occur in the Petrel Deer Wintering Complex. This cutting regime and management strategy encourages deer to browse on cedar tops within the active harvest area. The deep snows that occur at this location discourage browsing on nearby cedar seedlings and saplings allowing regeneration to be successful (Figure 4.7.3). This management strategy has also allowed the deer wintering habitat to be sustained. Cedar is being regenerated using combinations of prescribed burning, seeding and natural regeneration. Outside of the Petrel Wintering Complex, cedar management is more traditional with less of an emphasis on wintering deer. Two cedar stands in this management area have been identified as rich conifer swamps by Michigan Natural Features Inventory.

Currently, there are 283 acres prescribed for final harvest. In addition, there are 33 acres prescribed in a different cover type that are expected to convert to cedar after harvest. There are 199 acres with site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

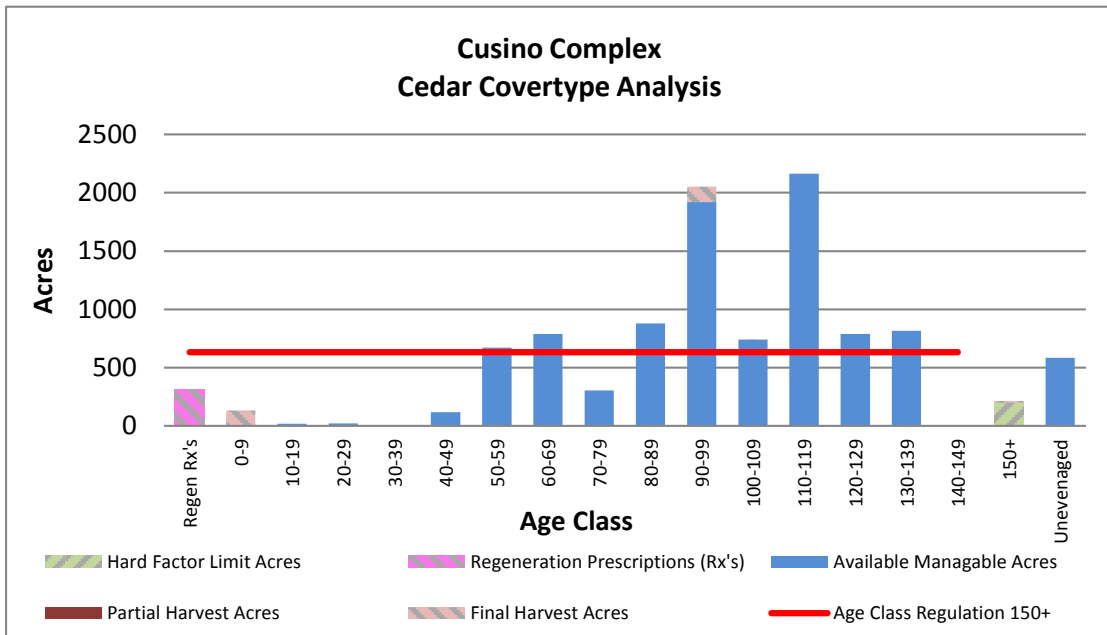


Figure 4.7.3. Age-class distribution of cedar in the Cusino Complex management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Cedar trees are very long lived and generally provide excellent closed canopy habitat for wildlife. Where deer wintering activities are not a concern, cedar will be maintained on operable sites through even-aged management where recruitment exists.

10-Year Management Objectives

- The 10-year projected harvest of cedar is approximately 633 acres representing approximately 200 acres of harvest within the Petrel Wintering Complex, and the remainder outside of the Petrel Wintering Complex.

Long Term-Management Objectives

- Focus cedar management within the Petrel Wintering Complex on winter habitat for deer.
- Outside of the current Petrel Wintering Complex boundary, management strategies should maintain the option of expanding winter deer habitat.
- Strive toward maintaining the cedar cover type through establishment of younger age classes where recruitment is expected. A regulated harvest using a 150-year rotation age would allow 633 acres to be harvested and regenerated per decade (red line in Figure 4.7.3).

**Section 4.7.1.3 Forest Cover Type Management – Lowland Conifer**

Current Condition

Lowland conifer stands occur on 5,653 acres (11%) of this management area (Table 4.7.1). Lowland conifer stands in the management area have been successfully harvested and regenerated, through natural regeneration, resulting in stands in all age classes (Figure 4.7.4). Lowland conifer stands that are within deer wintering areas will be managed according to the Petrel Wintering Complex plan. Access to some stands is limited due to the wet sites and the small creeks that are often found in these cover types.

Currently, there are 181 acres with a final harvest prescribed and 77 acres with a partial harvest prescribed. There are 1,145 acres of lowland conifer that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from harvest calculations. Lowland conifer stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.



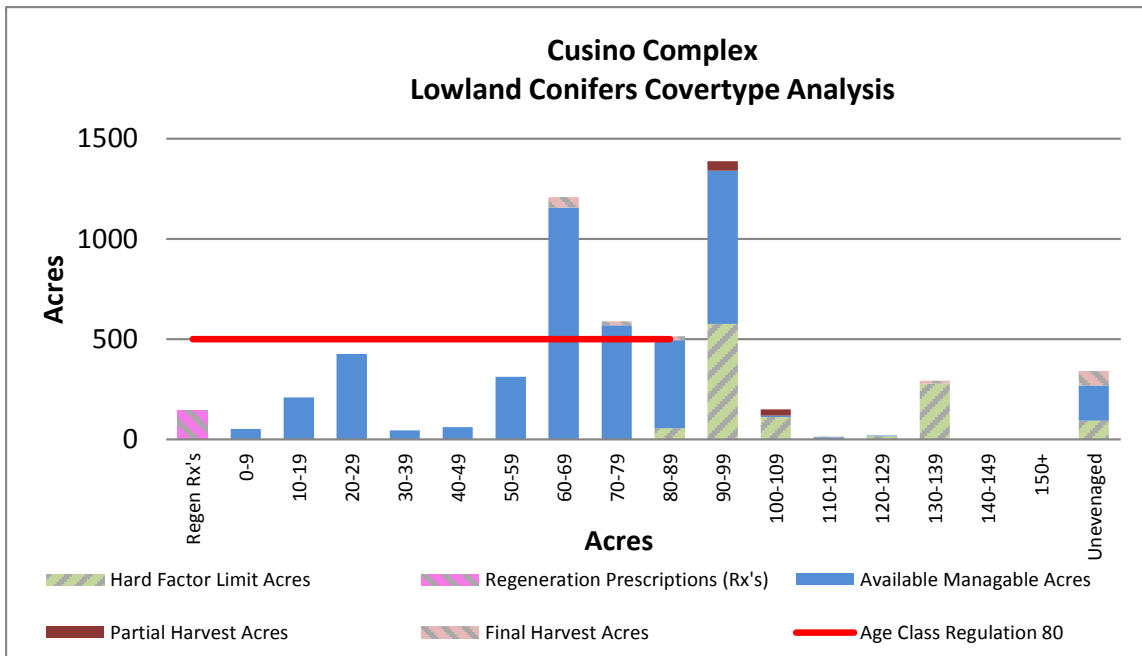


Figure 4.7.4. Age-class distribution of lowland conifers in the Cusino Complex management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management, balancing the acres between 0-89 years of age. This will provide a continuous supply of timber, available wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland conifer is 501 acres.

Long-Term Management Objectives

- Within lower quality stands, where applicable bolster cedar regeneration through harvest and seeding.
- Within deer wintering areas, manage lowland conifer stands in conjunction with the Petrel Wintering Complex management plan.
- Balance the age-class distribution of accessible lowland conifers providing a regulated harvest of approximately 501 acres of lowland conifer to be harvested each decade.

**Section 4.7.1.4 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

Current Condition

Lowland open/semi-open lands occur on 5,237 acres (11%) (Table 4.7.1) This category is a combination of lowland shrub (3,783 acres), marsh (756 acres), treed bog (520 acres) and bog (178 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. Many of these stands are found in association with creeks, rivers and lowland forested stands.

Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity.

## Long-Term Management Objectives

- Within these stands allow natural processes to occur while protecting their ecological values from man-made disturbances.
- Lowland shrub stands may be managed for wildlife habitat and/or for biomass, if markets materialize.

### **Section 4.7.1.5 Forest Cover Type Management – Other Types**

#### Current Condition

There are many other cover types spread across the management area that have less than 5% of the total acres (Table 4.7.1). Aspen (1,855 acres or 4%), lowland deciduous (1,855 acres or 4%) and lowland spruce/fir (1,523 acres or 3%) are the largest forested types. Upland open/semi-open lands (1,200 acres or 2%) is composed of herbaceous openland, low-density trees, bare/sparsely vegetated and upland shrub.

The “other types” category (3,001 acres or 6%) is composed of forested cover types with less than 2% of the total acres, and includes: jack pine, lowland mixed forest, upland spruce/fir, white pine, hemlock, upland mixed forest, paper birch, lowland aspen/balsam poplar, red pine, mixed upland deciduous, upland conifers and tamarack. In addition, there are 450 acres (1%) of “miscellaneous other” which includes water, roads and sand/soil.

With the exception of white pine and red pine these cover types will be managed as even-aged. Natural regeneration of species currently on site is expected. Mixed cover types with high basal area may be thinned, depending on the species composition, before final regeneration harvest.

Within the grouse management area the rotation age of aspen may be reduced to provide optimum habitat for grouse.

Approximately 888 acres of these other minor cover types have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

#### Desired Future Condition

- These cover types may be managed on operable sites, contributing to the compositional diversity of the landscape while providing for continual harvest, available wildlife habitat and recreational opportunity.

#### 10-Year Management Objectives

- The projected 10-year final harvest is 52 acres of aspen, 174 acres of lowland deciduous, 81 acres of lowland spruce/fir and 373 acres of other types.
- The projected 10-year partial harvest is 258 acres of other types.

## Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.
- Upland open land within the Petrel Wintering Complex will be intensively managed as breakout areas (forage areas available to deer in early spring).
- Follow guidelines to minimize the risk of beech bark disease, jack pine budworm and emerald ash borer in these stands.

### **4.7.2 – Featured Species Management**

Cusino Complex management area has high biodiversity values whose maintenance should be a primary focus. Within the large northern hardwood stands, the maintenance of mature trees, coarse woody debris, forest structure, hard and soft mast and mesic conifers for the multiple species that depend upon them should be a priority. The Petrel deer wintering complex is within this management area, and is managed for thermal refugia and food availability. Regeneration of young aspen stands for browse and within-stand retention of boreal forest types will be a focus within this planning period.

This management area will include one of the eastern Upper Peninsula Grouse Enhanced Management System areas. The boundaries will be delineated during this planning period by the local biologist in collaboration with the Forest Eastern Upper Peninsula Regional State Forest Management Plan MA 7 Cusino Complex

Resources Division unit manager. Aspen stands that fall within the boundary may be managed to enhance habitat and hunting opportunities for ruffed grouse and deer. Habitat treatments may include managing aspen on a shortened rotation with multiple age classes and smaller stand sizes.

### **American Marten**

The goal for marten in the eastern Upper Peninsula is to maintain or increase suitable habitat and strive to identify, maintain and connect known populations to facilitate genetic exchange. Management should address the maintenance and improvement of corridors, dead wood and conifer components in priority landscapes.

#### Wildlife habitat specifications:

- Identify key stands that provide linkages between habitat areas. In these stands, maintain a minimum of 30% canopy cover, as marten tend to avoid stands with less canopy cover.
- Identifying and maintaining corridors between large forested tracts.
- Where coarse woody debris is lacking, increase both standing dead and down dead wood, by leaving at least three secure large diameter (>14 inches in diameter at breast height) live trees to serve as future den trees, snags and coarse woody debris logs on the ground per acre in harvested stands.
- Increase the within-stand component of mesic conifers in mixed stands. Consider under-planting on suitable sites where a seed source is absent.
- Limit biomass harvesting and whole tree harvesting in key marten areas.

### **Moose**

The goal for moose in the eastern Upper Peninsula is to maintain or increase suitable habitat. Management for moose should focus on providing early successional browse adjacent to lowland conifer complexes, the maintenance of within-stand hemlock and protecting willow, a valuable food source, along riparian and wetland edges.

#### Wildlife habitat specifications:

- Encourage early successional hardwood browse (in the 0-9 and 10-19 year-old age classes) in close proximity to closed canopy lowland conifer swamps.
- Balance aspen age-class distribution to ensure a more sustainable supply of browse.
- Maintain or promote thermal refugia in harvested stands by retaining hemlock and other conifers.

### **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land use.

#### Wildlife habitat specifications:

- Attempt to replace the hard mast component of hardwood forests in this management area, to offset the loss of beech due to beech bark disease, by planting disease resistant beech and red oak where appropriate.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.
- Retain some representation of black cherry and ironwood. Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry.

### **Gray Jay**

The goal for gray jay in the eastern Upper Peninsula is to maintain or increase suitable habitat. Management should focus on maintaining representation of older age classes of appropriate cover types, as well as retention of important structural features within harvested stands in priority areas.

#### Wildlife habitat specifications:

- The primary goal is to maintain appropriate cover types (birch, lowland deciduous, fir, lowland conifer, lowland spruce/fir, tamarack and bogs) in the management area in a variety of age classes. Maintain 15% of the total acres in relevant cover types in older age classes (at least 20 years beyond “normal” rotation length for the cover type).
  - This can be accomplished either with stands that are already factor limited or by extending the rotation age. In this management area, older age classes (greater than 100 years) for gray jay habitat are being met by the large number of stands with site conditions that limiting harvesting.
- Patches are preferred over single trees within timber harvest sale boundaries, though it is beneficial to have both.
- Offset salvage harvests deemed necessary due to insect, disease or fire within the same cover type and age class (within the compartment, management area or eastern Upper Peninsula ecoregion), to minimize impacts on gray jay habitat. Total allowable harvest in these situations will be evaluated on a case-by-case basis.

#### **Northern Goshawk**

The goal for northern goshawk in the eastern Upper Peninsula is to maintain or improve suitable habitat. Management should focus on maintaining contiguous blocks of suitable habitat, providing structural diversity within stands and limiting disturbance to nesting birds in priority areas.

#### Wildlife habitat specifications:

- All known woodland raptor nests should be reported to local wildlife staff and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. For northern goshawk nests, the wildlife habitat specifications contained within Michigan DNR’s *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August 2012) will be followed until the workgroup has completed the guidance that will permanently replace the interim guidelines.

#### **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age-class distribution for aspen in priority landscapes during this planning cycle.

#### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Balance the age-class distribution of aspen and birch cover type to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation. Larger harvest units should have irregular boundaries and include one or two 1-3 acre unharvested inclusions for every 40 acres exceeding 40 acres in size.
- Manage the aspen cover type for smaller patch size, a shorter rotation and a more deliberate habitat configuration within the designated Grouse Enhanced Management Systems areas where appropriate.
- Evaluate the conifer component in aspen stands, holding or increasing where desirable. Leave conifer under four inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

#### **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR procedure 32.22-07 states “Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer.” There is a complex relationship between deer abundance, available summer and winter habitat, timber management, and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the DNR and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

#### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within the Petrel Wintering Complex in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months, and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush, and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### **4.7.3 – Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts with rare species, in accordance with guidance found in the DNR's *Approach to the Protection of Rare Species on State Forest Lands* (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed twelve listed species as well as three natural communities of note occurring in the management area as listed in Table 4.7.2. Any established management guidelines will be followed.

The Petrel Deer Wintering Complex is a special conservation area (obligate deer winter range). Other special conservation areas include potential old growth areas and several cold water streams (Figure 4.7.5) and high priority trout streams (Figure 4.7.1).

There are two large patterned fen natural communities (one of 871 acres and one of 330 acres) that are ecological reference areas shown in Figure 4.7.5. Both of these extend south into the Seney Manistique Swamp management area. These ecological reference areas will be managed to protect and enhance their natural vegetative and wildlife communities as directed by an ecological reference area-specific management plan.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

#### 4.7.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Northern hardwoods: beech bark disease (BBD);
- Aspen: white trunk rot, *Hypoxylon* canker; and
- Lowland conifers: spruce budworm, eastern larch beetle and larch casebearer.

Further information on forest health can be found in Section 3.

#### Invasive Species

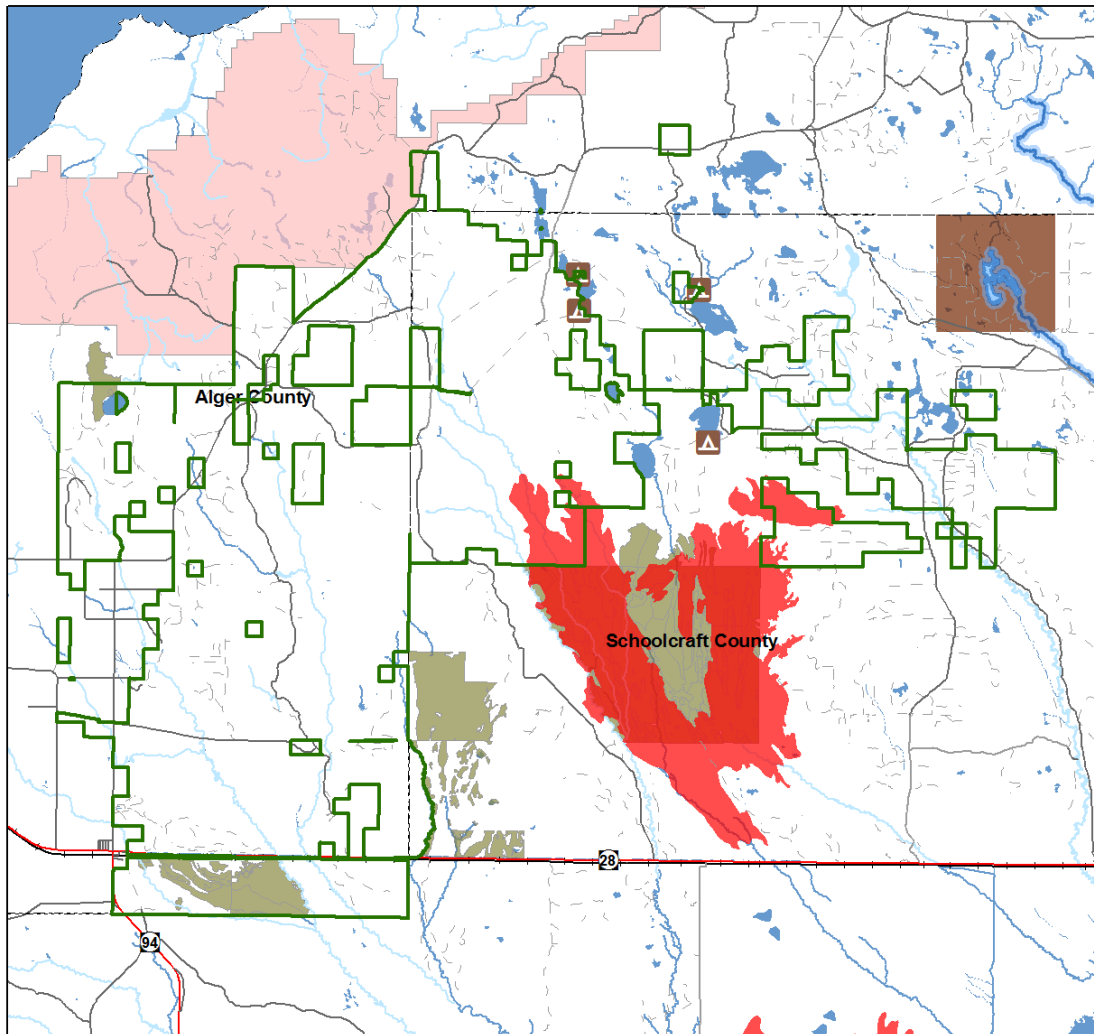
Invasive exotic species, specifically plants, may pose a forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

Table 4.7.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Cusino Complex management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Dry-mesic northern forest		S3/G4	Confirmed				White Pine	Late
Patterned fen		S2/GU	Confirmed				Lowland open/semi-open	N/A
Rich conifer swamp		S3/G4	Confirmed				Tamarack	Late
<b>Birds</b>								
American bittern	<i>Botaurus lentiginosus</i>	SC/G4/S3-4	Confirmed	MV	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Southern wet meadow	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Yellow rail	<i>Coturnicops noveboracensis</i>	T/G4/S1S2	Confirmed	MV	Moderate	Northern wet meadow	Lowland open/semi-open	N/A
Common loon	<i>Gavia immer</i>	T/G5/S3-4	Confirmed	HV	Very High	Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	SC/G5/S4	Confirmed	PS	Moderate	Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Dry sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Upland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A
<b>Butterflies</b>								
Northern blue	<i>Lycaeides idas nabakovi</i>	T/G5TU/S2	Confirmed	HV	Very High	Dry northern forest	Jack Pine, Red Pine	Late
						Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
Tawny crescent	<i>Phyciodes batesii</i>	SC/G4/S4	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Dry sand prairie	Upland open/semi-open	N/A
						Oak-pine barrens	Oak	Mid
						Mesic sand prairie	Upland open/semi-open	N/A
						Mesic prairie	Upland open/semi-open	N/A
<b>Plants</b>								
American shore-grass	<i>Littorella uniflora</i>	SC/G5/S2S3	Confirmed			Submergent marsh	Lowland open/semi-open	N/A
Farwell's water milfoil	<i>Myriophyllum farwellii</i>	T/G5/S2	Confirmed			Emergent marsh	Lowland open/semi-open	N/A
Alga pondweed	<i>Potamogeton confervoides</i>	SC/G4/S3	Confirmed			Submergent marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
Dwarf raspberry	<i>Rubus acaulis</i>	E/G5T5/S1	Confirmed			Northern fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
Dwarf bilberry	<i>Vaccinium cespitosum</i>	T/G5/S1S2	Confirmed			Dry sand prairie	Upland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Sandstone lakeshore cliff	Upland open/semi-open	N/A
						Sandstone cliff	Upland open/semi-open	N/A
						Dry northern forest	Jack Pine, Red Pine	Late

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

# Cusino Complex



## Legend

- Highway
- Paved Roads
- Gravel Roads
- Poor Dirt Roads
- Railroads
- Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- Management Area Boundary
- Cities
- County Boundaries

## Ecological Reference Areas

- High Conservation Value Areas
- Coastal Environmental Areas
- Critical Dunes
- Natural Rivers Vegetative Buffer
- Natural Rivers Zoning District
- Critical Coastal Habitat (Piping Plover)
- Kirtland Warbler Habitat
- Dedicated Management Areas
- Natural Areas Legally Dedicated

## Special Conservation Areas

- Campgrounds
- Fishing Access Sites
- Boat Access Sites
- Mineral Resource Locations
- Wild & Scenic Rivers (USFS Lands)
- Visual Management Areas
- Contiguous Resource Areas
- Possible Type 1 and Type 2 Old Growth
- Potential Old Growth
- Non-Dedicated Natural Areas & National Natural Landmarks
- Springs, Wetlands, or Riparian Areas



- Cold Water Streams & Lakes
- Wildlife Management Areas
- Research, Development, and Military Lands
- Great Lakes Islands

Figure 4.7.5. A map of the Cusino Complex management area showing the special resource areas.



#### 4.7.5 – Fire Management

Much of the area is comprised of mesic and lowland soils, which were only very rarely influenced by fire disturbance under natural disturbance regimes. Since 1973, 10 burns including approximately 115 acres have been conducted to prepare seedbed for cedar regeneration.

- Use of prescribed fire to prepare seedbed for regeneration of northern white cedar may be planned for areas as they are harvested.
- No specific fire problems are identified in the management area, due to cedar and hardwood cover types.
- Five Campgrounds within the management area provide opportunities for general fire prevention education.
- Increased fragmentation of private lands in close proximity and within the management area will present more wildland/urban interface challenges to wildfire suppression.

#### 4.7.6 – Public Access and Recreation

State owned land in this management area is interspersed with private parcels and commercial forest act land. The majority of the management area has gravel county and dirt two-track access roads. The large swamp and marsh areas are generally without roads. The town of Shingleton, and communities of Van Meer and Melstrand are within the management area.

The management area includes snowmobile trails (Figure 4.7.1), Gemini Lake Pathway, and five state forest campgrounds (Cusino Lake, Canoe Lake, Ross Lake, North Gemini Lake and South Gemini Lake) that are in or near the management area (Figure 4.7.5). In addition, there are the following boating access sites: North Gemini Lake, South Gemini Lake and Ross Lake.

Specific hunting recreation improvements such as parking lots, gates, trail planting and trail establishment, as well as the preparation and dissemination of specific promotional material, may be made as a result of Grouse Enhanced Management Systems areas planning in this management area.

Deer, grouse and bear hunting, as well as trapping, fishing and mushroom picking are popular within this management area.

#### 4.7.7 - Aquatic Resource Management

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. High priority trout streams in this management area are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support System and in Figure 4.7.1.

#### 4.7.8 – Minerals

Surface sediments consist of glacial outwash sand and gravel and postglacial alluvium, peat and muck, an end moraine of medium-textured till and medium and coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in this management area and there is good potential for additional pits on the uplands.

The Ordovician Black River Formation and Prairie du Chien Group subcrop below the glacial drift. The Black River is quarried for stone/dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (five in Schoolcraft and one mineral well in Alger). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology, given the depth to known metallic bearing formations.

## 4.8 MA 8 – Danaher Kingston Outwash Management Area

### Summary of Use and Management

The Kingston Plains and the Danaher Plains are large openings that are managed for a suite of open-land species including sharp-tailed grouse, merlin and upland sandpiper. Vegetative management in the Danaher Kingston Outwash management area (MA) (Figure 4.1.1) will emphasize maintaining these large opening complexes; providing timber products; protecting unique areas and threatened, endangered and special concern species; and providing for forest based recreational uses. Wildlife habitat management objectives include enhancing the large opening complexes and providing opportunities for hunting and other wildlife related recreation. Timber management objectives include improving the age-class distribution of jack pine and red pine; and consolidating smaller plantations and openings into larger stands to better suit management objectives. Expected issues in this 10-year planning period include illegal use of off-road vehicles, introduced pests and diseases such as jack pine budworm and beech bark disease, and introduction and spread of invasive species.

#### Introduction

The Danaher Kingston Outwash management area is located in the northwest part of the eastern Upper Peninsula in Alger, Luce and Schoolcraft counties. It has 58,804 acres of state-owned land. Production of pine for timber and management of open-lands for wildlife are the primary attributes of this management area. Additional attributes which were important in identifying this management area include:

- The management area falls within the Luce subsection (8.2) of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of sandy outwash plains, with corridors associated with streams.
- Recreational opportunities include: hiking, camping, fishing, berry picking and hunting, and motorized recreation.
- Special features include the Stanley Lake Wildlife Flooding, natural rivers and a pine barrens natural community.

The original forests of hemlock, northern hardwoods and mixed pine were altered by 1800s logging, and subsequent forest fires. Many of the large openings that were created by the historic logging and fires are maintained as habitat for open-land dependent wildlife species. During the 1950s, it was decided to divide the Kingston plains area into three sections where the west portion along the Adam's Trail would emphasize timber production, the center part would be a control area and the east portion would emphasize wildlife management.

In the 1960s, throughout the management area, some of the large openings were planted to jack pine and red pine in a checker board fashion with grassy openings in between planted stands. The current vegetative cover for this management area is mainly grass, red pine, jack pine and white pine, with smaller amounts of aspen and hardwoods.

Remains of old railroad grades and pine camps can still be found. The Kingston Plains is a well-known large opening with pine stumps from the historic logging days; as it is relatively close to Pictured Rocks National Lakeshore, many people stop to view the large fields of stumps. The Danaher Plains and other old logging openings are also found within this management area. A Civilian Conservation Corps camp was located north of Seney near M-77.

State-owned land in this management area is concentrated, with very few private parcels. The majority of the management area falls within the Shingleton Forest Management Unit, with the east portion in the Newberry Forest Management Unit. The current predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.8.1.

Table 4.8.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Danaher Kingston management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Upland Open/Semi-Open Lands	24%	14,104	0	14,104	0	0	14,104	0	0
Red Pine	20%	11,655	73	11,582	436	3,856	11,655	1,287	5,809
Jack Pine	16%	9,397	0	9,397	425	0	9,397	1,342	0
White Pine	11%	6,737	336	6,401	1,383	536	6,737	582	1,430
Aspen	10%	5,960	121	5,839	413	0	5,960	973	0
Northern Hardwood	7%	4,085	19	4,066	0	1,461	4,085	0	1,512
Lowland Open/Semi-Open Lands	3%	2,042	0	2,042	0	0	2,042	0	0
Lowland Spruce/Fir	2%	1,137	103	1,034	165	0	1,137	115	0
Misc Other (Water, Local, Urban)	1%	518	0	518	0	0	518	0	0
Others	5%	3,169	239	2,930	537	440	3,169	309	527
<b>Total</b>	<b>100%</b>	<b>58,804</b>	<b>892</b>	<b>57,912</b>	<b>3,359</b>	<b>6,293</b>	<b>58,804</b>	<b>4,608</b>	<b>9,278</b>

Others include: natural mixed pines, upland mixed forest, upland conifers, lowland conifers, upland spruce/fir, hemlock, mixed upland deciduous, planted mixed pines, paper birch, lowland deciduous, cedar, oak, lowland aspen/balsam poplar and tamarack.

#### 4.8.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (e.g., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.

All of the following cover types are valued commercially for their forest products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide.

##### Section 4.8.1.1 Forest Cover Type Management – Upland Open/Semi-Open Lands

###### Current Condition

Upland open/semi-open lands occur on 14,104 acres (24%) of the management area (Table 4.8.1). This category is a combination of the following non-forested land cover types: herbaceous open land (11,764 acres), upland shrub (1,119 acres), low-density trees (1,080 acres) and bare/sparsely vegetated (141 acres). These communities are valued ecologically as sources of open land habitat for numerous species of wildlife. A large portion of these non-forested areas are a result of turn of the century logging and subsequent fires; the most well-known are the historical stump fields of the Kingston Plains. The majority of these open areas are on Kalkaska and Rubicon sands with low productivity. Herbaceous open land is a general term and in this area represents the low vegetation consisting of bracken fern, blueberry, reindeer moss, blue *Cladonia* and black huckleberry. Grasses and sedges have very little ground coverage in most of these openings. While opening maintenance occurs in the Kingston Plains, prescribed burning has not been used, as it would eliminate the historic stumps for which the area is known.

# Danaher Kingston Outwash

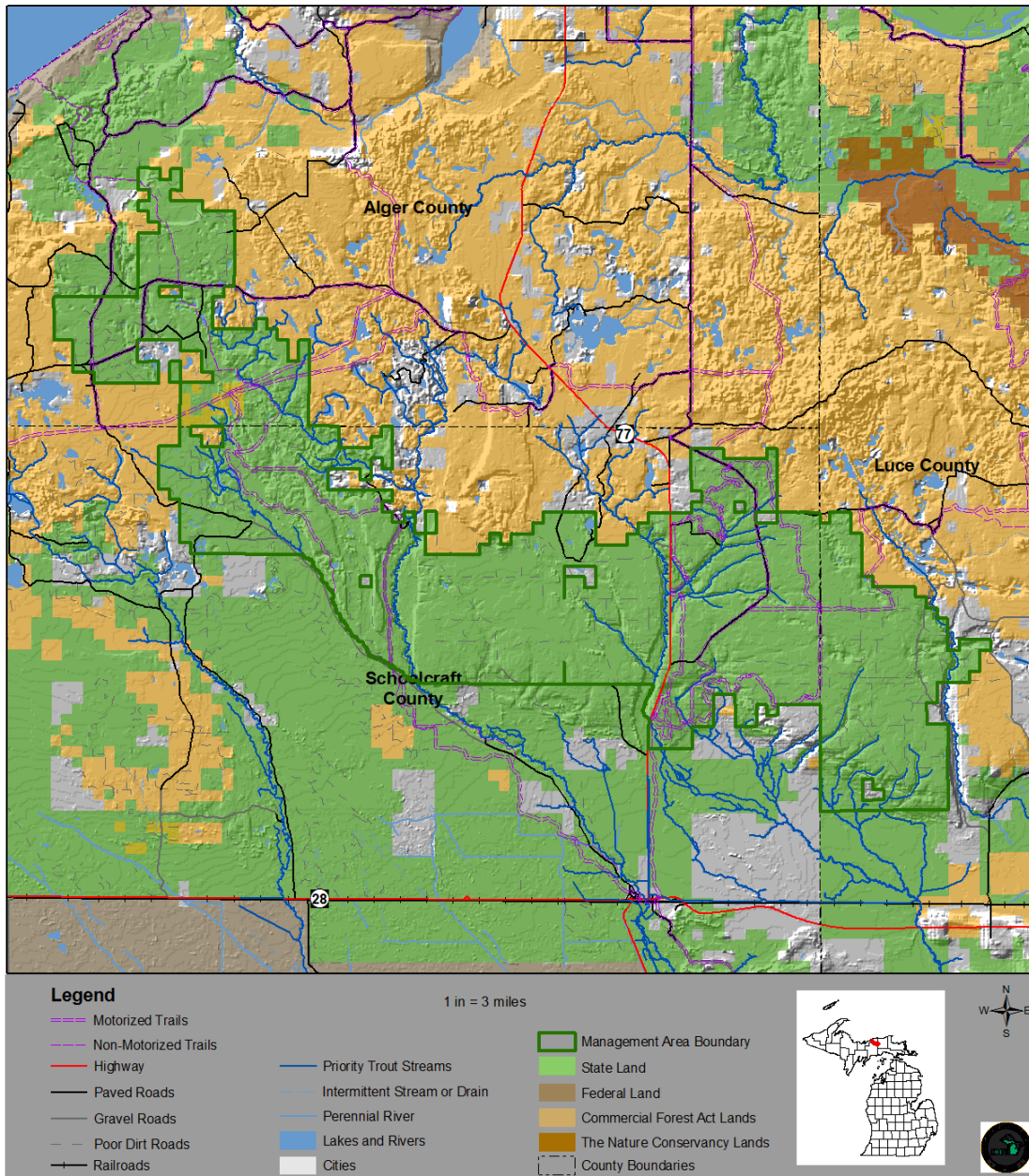


Figure 4.8.1. Location of the Danaher Kingston Outwash management area (dark green boundary) in relation to surrounding state forest lands and other ownerships within Alger, Luce and Schoolcraft Counties.

## Desired Future Condition

- Maintain the historic value of the Kingston Plains stump fields through opening maintenance in key areas, thus benefiting open land wildlife species. Continue opening maintenance programs in other large openings, such as the Danaher Plains, within the management area.

## 10-Year Management Objectives

- Continue with opening maintenance projects where appropriate; and

- Consolidate small grass openings into larger blocks to enhance landscape values for open land species. This will be accomplished by planting some grass stands to red or jack pine, and converting some red or jack pine stands to grass, depending on site productivity.

#### Long-Term Management Objectives

- Maintain the large herbaceous open lands to provide habitat.
- Consider natural succession of small grass stands to white pine where site conditions favor quality white pine and they are outside of the large wildlife openings.

### **Section 4.8.1.2 Forest Cover Type Management – Red Pine**

#### Current Condition

Red pine grows on 11,655 acres (20%) of this management area (Table 4.8.1). Most of the red pine stands in the 40-59 year age classes were planted in the 1950-60's, and are interspersed with openings (Figure 4.8.2). Red pine stands in older age classes in this management area are of natural origin. Rubicon and Kalkaska sands are dominant and the majority of red pine stands are on outwash plains with Kotar habitat types of PArVAa, PArV and PVE (see Appendix E). Large fires that occurred after early 1900s logging severely depleted the soils throughout much of the area. Many of the planted red pine stands on these depleted soils (PVE) have a low site index. The planted red pine stands only recently became large and dense enough to thin, making red pine timber production an important focus in this area. Red pine can be expected to persist in climax stands due to their longevity and ability to thrive on the sandy soils here.

Red pine stands are thinned as soon as products can be harvested, generally once they reach age 40. Thinning on good sites occur approximately every 10 years, with longer intervals on poor sites, until stand replacement harvest at economic maturity at approximately age 80. Natural stands will be regenerated naturally through shelterwood and seed tree harvesting when possible. As planted red pine stands become available for final harvest, they may be consolidated when replanted or even moved to higher-quality sites.

Currently, there are 63 acres of red pine with a final harvest prescribed and 1,610 acres prescribed for partial harvest or thinning. There are some stands of red pine that are prescribed to be converted to other types after harvest and other cover types that are expected to convert to red pine through harvest and planting. These acres are already accounted for in the regeneration prescriptions column in Figure 4.8.2. The total acres of red pine are intended to remain similar to what they are now. There are 73 acres of red pine that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

#### Desired Future Condition

- Red pine will be maintained and managed with a thinning regime until stand replacement harvest at economic maturity with acres balanced between 0-89 years of age to provide for continual harvest, available wildlife habitat and recreational opportunities; and
- Inaccessible natural red pine acres may be managed for an extended rotation to allow stands to reach a biological maturity of 200+ years.

#### 10-Year Management Objectives

- The 10-year projected final harvest of red pine is 436 acres, to work toward balancing the age classes. The decrease from the regulated amount is due to the lack of acres in older age classes, and the large number of acres in the 50-59 age class where they are available for thinning; and
- The 10-year projected partial harvest or thinning of red pine is 3,856 acres.

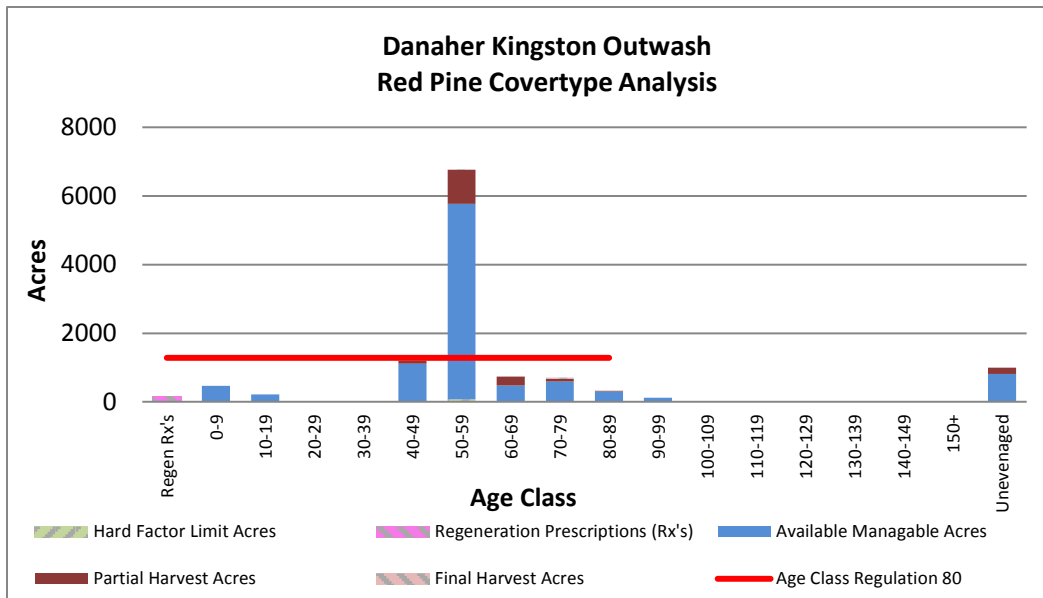


Figure 4.8.2. Age-class distribution of red pine in the Danaher Kingston Outwash management area (2012 Department of Natural Resources inventory data).

Long-Term Management Objectives

- Balance the age-class structure of red pine, providing a regulated harvest, using an 80-year rotation age, of 1,287 acres of final harvest per decade (red line in Figure 4.8.2); and
- Consolidate the smaller blocks of planted red pine and the herbaceous openings in between to provide larger acreages of contiguous habitat (the total acreage of red pine is expected to remain similar to the current amount, though the actual location of the stands may be moved to reflect site conditions).

**Section 4.8.1.3 Forest Cover Type Management – Jack Pine**

Current Condition

Jack pine occurs on 9,397 acres (16%) of the management area (Table 4.8.1). Nearly all of the jack pine stands in this management area are found on Rubicon and Kalkaska sands, with Kotar habitat classes of PVE and PArV (see Appendix E). These outwash plains are very dry to dry-poor nutrient sites which jack pine grows well on. In recent years, jack pine budworm outbreaks have adversely affected some stands. Jack pine has been consistently harvested and regenerated over the past 40 years (Figure 4.8.3). While most of the stands were regenerated naturally through scarification or prescribed fire, some were replanted. Many of the planted stands of jack pine are in 10, 20 and 40 acre blocks and are interspersed with open areas of the same size.

Currently, there are 1,038 acres of jack pine with a final harvest prescription assigned. Some jack pine stands that are currently prescribed for harvest will be converted to other types and some other types that are currently prescribed will be converted to jack pine after harvest. This has already been included in the total acreage and is shown in the regeneration prescriptions column in Figure 4.8.3. The total number of jack pine acres is expected to remain similar. There are 425 acres of jack pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Jack pine stands that are inaccessible for commercial harvest will eventually succeed to mid- or late-successional species.



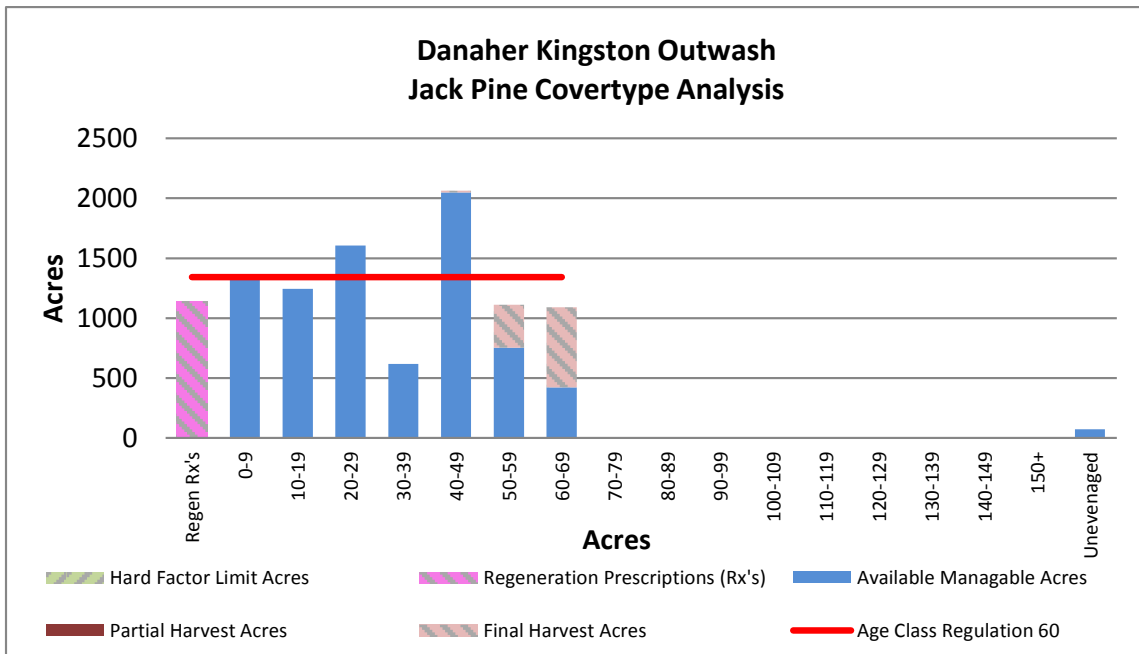


Figure 4.8.3. Age-class distribution of jack pine in the Danaher Kingston Outwash management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Jack pine will be maintained on operable sites through even-aged management with acres balanced between 0-69 years of age to provide for continual harvesting, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year final harvest projection is 425 acres of jack pine. This is significantly lower than the regulated amount due to the current age-class structure where the amount of mature acres is low and the acres in the process of regenerating is already close to the regulated amount.

#### Long-Term Management Objectives

- Maintain a lower acreage of over-mature stands to lessen the prevalence and severity of jack pine budworm outbreaks; and
- Balance the age classes of jack pine providing a regulated harvest of approximately 1,342 acres every decade based on a 60-year rotation.

### **Section 4.8.1.4 Forest Cover Type Management – White Pine**

#### Current Condition

White pine occurs on 6,737 (11%) of the management area (Table 4.8.1). White pine stands in this management area are found on sandy soils of outwash plains and lake plains, with Kotar habitat types of PVE, PArV and PArVAa (see Appendix E). White pine in this area grows in association with aspen, northern hardwood and other pine species. White pine regeneration grows well here and stands that have been thinned may have several ages of white pine. Approximately 40% of the white pine stands have been classified as uneven-aged stands (Figure 4.8.4). These are generally stands that have had thinning and/or shelterwood harvesting in the past and many have widespread larger diameter trees with seedlings and saplings throughout. Because of the large number of stands in the uneven-aged category from selection harvesting, there are not many stands in the younger age classes.

As mixed pine stands are harvested through thinning and shelterwood treatments, white pine will increase in proportion to other pines due to its prolific seeding and shade tolerance. Many of the openings created by logging and subsequent fires in the early 1900s are being naturally reforested by white pine trees. This is more apparent in smaller openings, and near the edges of the large openings. Without opening maintenance some of the acres of herbaceous openings will eventually be reforested and reclassified as white pine.

At this time there are no white pine stands with harvest prescriptions. There are 142 acres prescribed for harvest in other cover types that are expected to convert to white pine after harvest. These acres are shown in the regeneration prescriptions column in Figure 4.8.4. There are 337 acres of white pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

Desired Future Condition

- White pine stands will be maintained on operable sites with acres balanced between 0-109 years of age to provide for continual harvesting, wildlife habitat and recreational opportunities; and
- White pine stands will be managed through thinning up until rotation age followed by shelterwood or seed tree regeneration harvests.

10-Year Management Objectives

- The 10-year projected final or regeneration harvest is 1,383 acres of white pine to work toward balancing the age classes; and
- The 10-year projected partial harvest of white pine is 536 acres.

Long-Term Management Objectives

- A regulated harvest would allow approximately 582 acres of white pine to be harvested per decade.

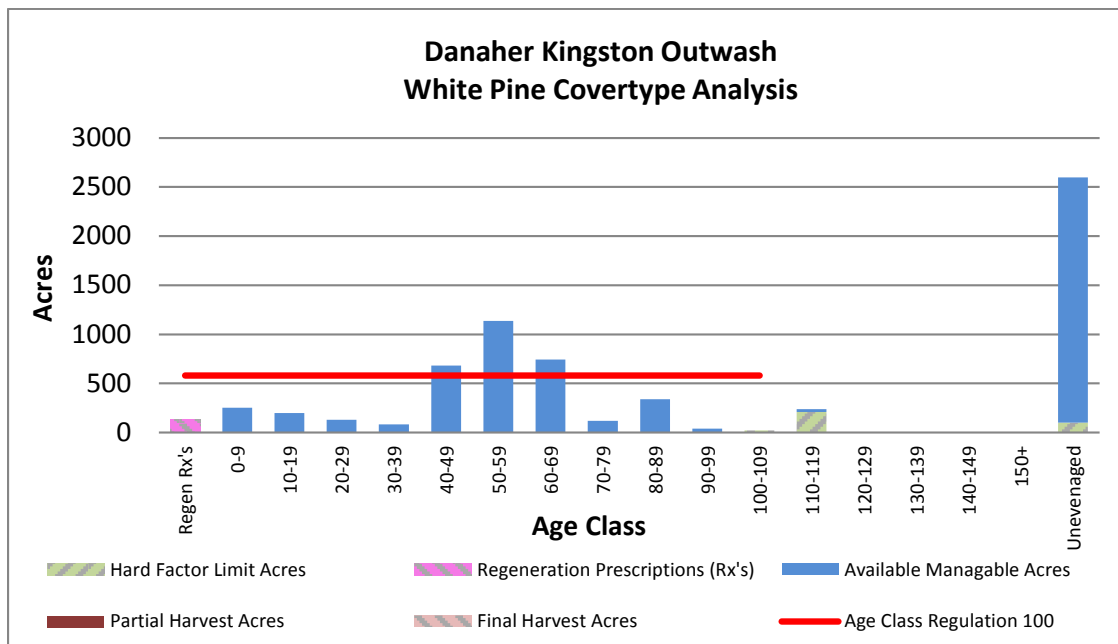


Figure 4.8.4. Basal area distribution of white pine in the Danaher Kingston Outwash management area (2012 Department of Natural Resources inventory data).

**Section 4.8.1.5 Forest Cover Type Management - Aspen**

Current Condition

Aspen occurs on 5,960 acres (10%) of the management area (Table 4.8.1). Aspen stands are distributed mainly on Rubicon and Kalkaska sands of outwash plains with Kotar habitat types of PVE and PARv (see Appendix E). Aspen in this management area tends to grow slowly due to the dry poor nutrient sites. Aspen has been consistently harvested and



regenerated in recent years, resulting in over 60% of the aspen acres occurring in the 0-29 year age classes (Figure 4.8.5). Over 10% of the aspen acres have been classified as uneven-aged stands. These aspen stands are generally old open areas that are regenerating with different aged aspen clones. As these stands are harvested, the amount of uneven-aged aspen here will decrease.

Currently, there are 221 acres of aspen with a final harvest prescribed. There are 121 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations. Inaccessible aspen areas will eventually succeed to late successional species.

Desired Future Condition

- Aspen stands will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreation opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of aspen is 413 acres. The reduction in acres from the regulated amount is due to the current age-class structure where the majority of stands are under 30 years of age.

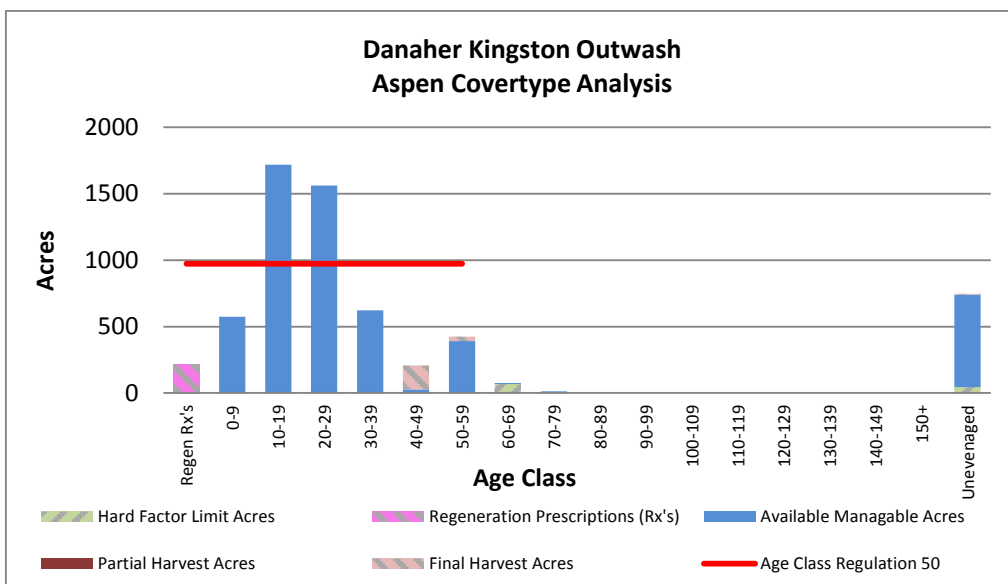


Figure 4.8.5. Age-class distribution of aspen in the Danaher Kingston Outwash management area (2012 Department of Natural Resources inventory data).

Long-Term Management Objectives

- Balance the age-class structure of accessible aspen stands providing a regulated harvest of approximately 973 acres of aspen per decade based on a 50-year rotation.

**Section 4.8.1.6 Forest Cover Type Management – Northern Hardwoods**

Current Condition

Northern hardwoods occur on 4,085 acres (7%) of the management area (Table 4.8.1). Most of the hardwood stands in this management area are composed of red maple and beech, with white pine and hemlock scattered throughout. These stands are found on Rubicon and Kalkaska sands, with Kotar habitat classes of PARVAa and ATFD (see Appendix E). These are dry to mesic, poor to medium nutrient sites. In general, hardwood stands in this management area do not provide high-quality timber products. Where stand quality warrants stands will have selection harvests when the basal area is over 120 square feet per acres, decreasing stocking levels to approximately 80 square feet per acre. In general, this will allow most hardwood stands to be selectively harvested every 20 years. Where site quality is poor, shelterwood and other even-aged harvesting systems will be considered. A portion of the hardwood stands have been managed using even-aged systems and these acres are represented in the immature column of Figure 4.8.6.

Beech bark disease is prevalent throughout the management area, and salvage of beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and Eastern Upper Peninsula Regional State Forest Management Plan MA 8 Danaher Kingston Outwash

salvage harvesting. Further selection harvesting in these stands will be delayed, due to resultant lower than normal residual basal area.

Currently, there are 394 acres with a partial harvest assigned (Figure 4.8.6). There are some northern hardwood stands prescribed for harvest that are expected to convert to other types after harvest and some other types are expected to convert to northern hardwood after harvest. The total acreage of northern hardwoods is expected to remain similar.

Desired Future Condition

- Northern hardwoods will be maintained on operable sites by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands. Harvesting will provide for a continuous flow of timber products, and a variety of wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected partial harvest is 1,461 acres of northern hardwoods;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands; and
- To favor regeneration of other hardwood species, consider herbicide applications and planting of hard mast producing trees, including oak and disease resistant beech.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

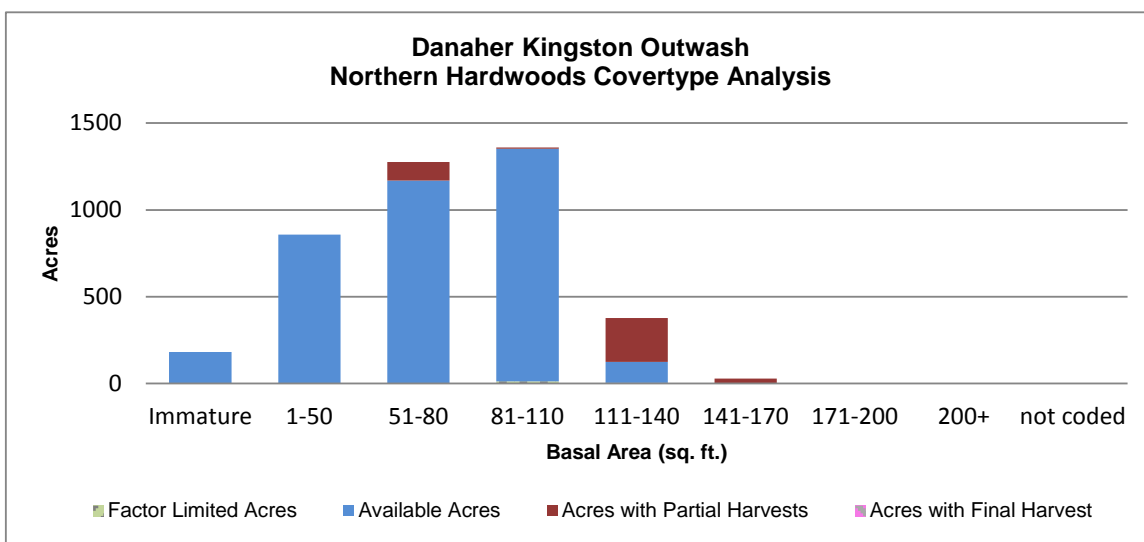


Figure 4.8.6. Basal area distribution of northern hardwood in the Danaher Kingston Outwash management area (2012 Department of Natural Resources inventory data).

**Section 4.8.1.7 Forest Cover Type Management – Other Types**

Current Condition

Lowland spruce/fir occurs on 1,137 acres (2%) and other types occur on 3,169 acres (5%) of the management area. The “other types” category is made up of all the rest of the cover types that are individually less than 5% of the management area. They include: natural mixed pines, upland mixed forest, upland conifers, lowland conifers, upland spruce/fir, hemlock, mixed upland deciduous, planted mixed pines, paper birch, lowland deciduous, cedar, oak, lowland aspen/balsam poplar and tamarack. The miscellaneous other category (518 acres or 1%) includes water, roads and sand/soil.

The majority of these forested cover types are managed using even-aged harvesting systems and will be reforested by natural regeneration. Following general timber management guidelines, perform regeneration harvests in even-aged forested cover types, attempting to balance the age classes where possible. Mixed cover types with high basal area may be thinned, depending on their species composition, prior to final harvest.

There are 342 acres of these other minor cover types that have site conditions limiting their harvest this planning cycle. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Stands that are inaccessible for harvesting will be subject to natural succession.

#### Desired Future Condition

- Harvesting and regenerating these cover types will contribute to the compositional diversity of the landscape, in addition to providing wood products, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The projected 10-year final harvest is 165 acres of lowland spruce/fir and 537 acres of other types with natural regeneration of species currently on site is expected; and
- The projected 10-year partial harvest is 440 acres of other types.

#### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.8.2 Featured Wildlife Species**

The management of large open-land complexes is the primary wildlife focus for this management area. Another key wildlife value is the management of large blocks of jack pine forest for early successional wildlife including Kirtland's warbler, snowshoe hare and associated species. In mixed pine and white pine stands, species that depend upon mature seed bearing trees will be a focus. Connectivity and structure are also important concepts in older jack pine stands and lowland conifer stands in this landscape.

#### **Eastern Bluebird**

The goal for eastern bluebird in the eastern Upper Peninsula is to maintain suitable habitat in occupied opening complexes and to encourage re-occupancy of openings where they have not been in recent history. Management should focus on the maintenance of opening complexes and manage for the production and maintenance of snags.

#### Wildlife habitat specifications:

- Maintain herbaceous open-land complexes within the management area.
- Protect snags or dying standing trees within the open-lands.
- If nest cavities are not present, consider planting scattered oak to serve as future cavity trees.
- Maintain scattered live trees within open-land complexes so they will provide future nest cavities.
- Manage for the production and maintenance of snags by retaining live trees in final harvest timber sales.
- The use of prescribed fire to maintain open-land complexes is desirable.

#### **Kirtland's Warbler**

The statewide goal for Kirtland's warbler is to maintain a population of at least 1,000 breeding pairs, as indexed by the annual breeding survey. In the Upper Peninsula, it is desirable to have available habitat for birds outside the "core" range in the northern Lower Peninsula. Management should focus on maintaining breeding habitat in selected management areas, while providing a sustainable supply of wood to the timber market. These two goals are compatible with only minor changes to timber harvest specifications. The eastern Upper Peninsula goal for Kirtland's warbler during this planning period is to provide suitable breeding and foraging habitat within this management area.

#### Wildlife habitat specifications:

- Jack pine should be harvested using techniques that mimic both the size of a natural disturbance event and the structure of the stands that such an event would leave. Large scale harvest of jack pine is ecologically appropriate, given the catastrophic nature of historic fires.

- Regenerate one treatment block of jack pine in patches of 300 to 500 acres for Kirtland's warbler this planning period. Patch size, age-class distribution and distance to other jack pine stands should be taken into consideration when managing jack pine. Stands that are currently sold and scheduled to be cut during this time frame are contributing toward this habitat goal.
- Post-disturbance legacies include simulated skips or fingers of jack pine; snags; and larger diameter, fire-tolerant trees such as red pine. These features should be left in stands of harvested jack pine as retention to benefit Kirtland's warbler.
- Large blocks of regenerating jack pine that are adjacent to herbaceous openings are desirable as they function as open-lands until the trees are 3-4 feet in height and benefit open-land species as well.
- Use prescribed fire where feasible to maintain jack pine, or scarify stands quickly after stands are harvested to ensure maximum stem density.

### **Red Crossbill**

In the eastern Upper Peninsula, the goal for red crossbill is to maintain or increase suitable habitat. Management should focus on maintaining mature and over-mature seed producing trees in priority areas.

#### Wildlife habitat specifications:

- Identify and maintain a minimum of 15% of the total acres of appropriate cover types (upland spruce/fir, upland conifers, natural mixed pine and natural red and white pine) in the management area for red crossbill in a mature forest condition (e.g., >150 years for red pine, > 130 years for white pine and > 80 years for white spruce). This can be accomplished with existing factor-limited stands, or alternatively by extending the rotation length of these types to 150, 130 and 80 years respectively. Current forestry practices in this management area provide sufficient habitat for red crossbills. Habitat is specifically located in the Fox River high value conservation area and within the stands with hard factor limits.
- Retain large mature and over-mature red pine, white pine and white spruce in shelter-wood and seed tree cuts.
- Evaluate the management area for the establishment of core tracts of old (>100 years old) pine stands in special resource areas or Type 1 or Type 2 old growth.

### **Sharp-tailed Grouse**

In the eastern Upper Peninsula, the goal for sharp-tailed grouse is to maintain or improve suitable habitat. Management should focus on enhancing large opening complexes so there is an increase of available habitat.

#### Wildlife habitat specifications:

- Maintain or expand herbaceous open-lands where existing leks occur.
- Manage adjacent forest to maintain young regenerating forest adjacent to permanent openings to maximize use by sharp-tailed grouse.
- Consolidate grass openings and planted red pine to increase the stand size of both cover types.
- Use prescribed fire where appropriate to maintain openings and manage pine types.
- Within open-land complexes maintain connectivity across the landscape.

### **Spruce Grouse**

The goal for spruce grouse in the eastern Upper Peninsula is to maintain or improve suitable habitat. Management should focus on retention of mixed conifers on riparian/lowland edges, the increase of within-stand species diversity and landscape level planning to ensure populations are not isolated.

#### Wildlife habitat specifications:

- In jack pine harvests, leave mixed conifer and/or jack pine retention strips of mature trees along riparian corridors and lowland margins, as well as along upland edges.
- Maintain spruce seed trees through retention, especially at lowland margins.
- Maintain or increase diversity of conifer stands especially along lowland edges.
- Large clearcuts may isolate populations of spruce grouse, so landscape level planning must take into account this species' need for low-density mixed-conifer travel corridors to connect suitable stands.
- Ensure black spruce recruitment/ regeneration is reliable where harvested.

## Upland Sandpiper

The eastern Upper Peninsula goal is to provide suitable breeding habitat for upland sandpiper. State forest management should focus on the maintenance of permanent large opening complexes.

### Wildlife habitat specifications:

- Maintain opening complexes of 250 acres or larger.
- Open blocks within complexes should be within one mile of each other.
- Where possible, strive to consolidate patches into larger opening complexes by creating temporary openings associated with permanent openings. This could be accomplished by scheduling jack pine clearcuts associated with permanent openings on a sustainable rotation, scheduling harvests adjacent to burns or scheduling similarly-aged jack pine treatments in close proximity to each other.
- Mow or burn patches every 3-5 years to eliminate woody vegetation succession.

### 4.8.3 – Rare Species and Special Conservation Area Management

All forest operations must be reviewed for potential conflicts with rare species following the guidance in DNR's *Approach to the Protection of Rare Species on State Forest Lands* (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed two listed species as well as one natural community of note occurring in the management area as listed in Table 4.8.2. Any established management guidelines will be followed.

Table 4.8.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Danaher Kingston Outwash management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Community</b>								
Pine barrens		S2/G3	Confirmed				Jack Pine	Early
<b>Birds</b>								
Kirtland's warbler	<i>Dendroica kirtlandii</i>	LE/E/G1/S1	Confirmed	PS	Very High	Pine barrens	Jack Pine	Early
						Dry northern forest	Jack Pine, Red Pine	Early
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	SC/G5/S4	Confirmed	PS	Moderate	Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Dry sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Upland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Stanley, Dutch Fred Lake and Spring Lakes have been identified as cold water lake special conservation areas. The area surrounding the Stanley Lake flooding is identified as a special conservation area for wildlife management. Other special conservation areas include several creeks and rivers that are special conservation areas as cold water streams and high priority trout streams (Figure 4.8.1).

The Fox River and the East Branch Fox River are designated natural rivers, and along with their respective river corridors are high conservation value areas. The Fox River Natural River Plan (DNR, Nov. 3, 1988) contains specific requirements for management in this area. The special conservation areas and high conservation value areas are shown in Figure 4.8.7.

There are currently no identified ecological reference areas in the management area.

# Danaher Kingston Outwash

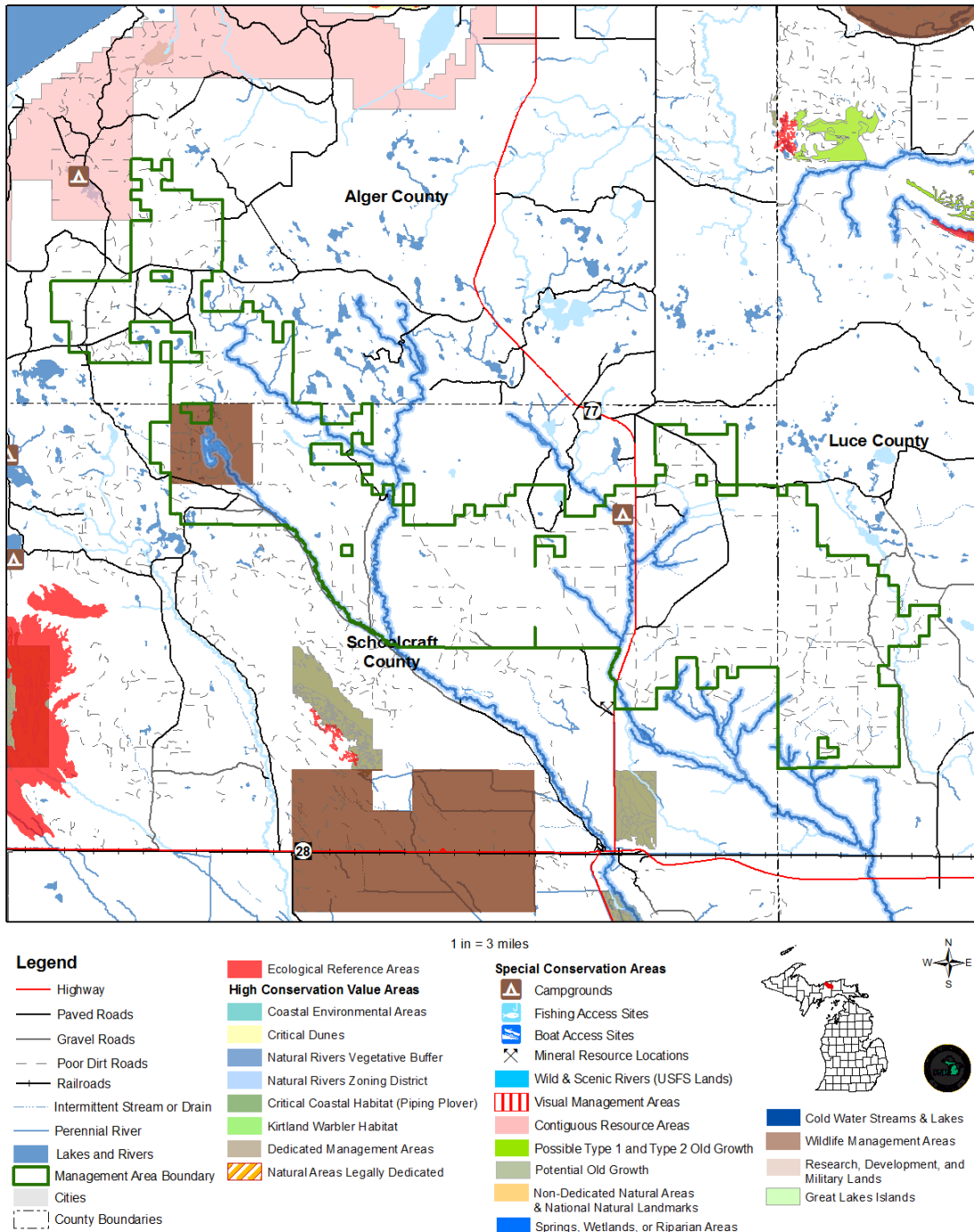


Figure 4.8.7. A map of the Danaher Kingston Outwash management area showing the special resource areas.

Management goals during this planning period:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.

#### 4.8.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors.

Some of the more important forest health pests in this management area by major cover type include:

- Red and jack pine: jack pine budworm, white grubs (Danaher and Kingston Plains), red-headed pine sawfly, pine engraver and *Scleroderris* canker;
- White pine: white pine blister rust; and
- Northern hardwoods: beech bark disease.

Further information on forest health can be found in Section 3.

#### Invasive Plant Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. No invasive plant species have yet been documented within the management area, but leafy spurge has been documented within a five-mile buffer of the management area (Table 4.8.2) and monitoring efforts should specifically look for new populations of this species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

Table 4.8.2. Invasive plant species within or near the Danaher Kingston management area (Data from the Michigan Invasive Plant Identification Network database).

Danaher Kingston Outwash - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	1	1	1
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
-	-	Leafy Spurge <i>Euphorbia esula</i>	1	

#### 4.8.5 – Fire Management

This area is predominantly fire adapted communities, dominated by barrens at its heart, under natural disturbance regimes. Dry and dry mesic northern forest communities make up the bulk of the land area that remains.

This area was probably subject to periodic stand replacement fires that spread rapidly over large areas, frequently in single events. Since 1981, six fires larger than 50 acres have been suppressed. The largest among these was the Fox River fire that burned 878 acres on May 8, 1987. Since 1974, 18 prescribed burns for 4,500 acres have been conducted, covering at least 2,000 acres.

- Management objectives for maintaining large openings and promoting natural pine regeneration may be considered in this management area.
- Due to the public use of the management area for camping, hiking, off-road vehicle use, and berry picking, prevention information relating to these uses could be posted at trailheads, campground bulletin boards, and local vendors in Seney.
- Included here is the Fox River Zone Dispatch Area, which provides for aggressive initial attack, based on current fire danger.

#### 4.8.6 – Public Access and Recreation

The state forest lands in this management area are contiguous, with few private in-holdings. The majority of this management area is accessible to vehicles on gravel county roads, and sandy two-track roads.

This management area includes the Fox River Pathway, the Danaher Off-Road Vehicle trail and trailhead and various snowmobile trails (Figure 4.8.1).

The East Branch Fox River state forest campground is in the management area (Figure 4.8.7). There are boating access sites in the vicinity as well Clear Creek Pond, Dutch Fred Lake, Wagner Dam, Stanley Lake and Spring Creek Trout Pond.

Blueberry picking, hunting, trapping and wildlife viewing are popular here.

#### **4.8.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. High priority trout streams in this management area are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.8.1.

#### **4.8.8 – Minerals**

Surface sediments consist of primarily glacial outwash sand and gravel, postglacial alluvium, minor peat and muck, and an end moraine of coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the general area and there is good potential for additional pits on the uplands.

The Ordovician Utica and Collingwood Shales, Trenton and Black River Formations, Prairie du Chien Group and Cambrian Trempealeau Formation subcrop below the glacial drift. The Trenton and Black River are quarried for stone/dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (five in Schoolcraft, two in Luce and one mineral well in Alger). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology, given the depth to known metallic bearing formations.



## 4.9 MA 9 – Deer Park Management Area

### Summary of Use and Management

Vegetative management in the Deer Park management area (MA) (Figure 4.9.1) will emphasize balancing the age classes of jack pine and red pine and will provide various timber products. Management will maintain or enhance wildlife habitat and protect areas of special concern such as: the Two-Hearted River (a natural river) and the surrounding riparian zone, the critical dunes/barrier dunes, critical coastal piping plover habitat and listed species and communities of note. There are many trails and campgrounds within the management area and recreation and aesthetics are important in this area. Expected issues in this 10-year planning period are increased recreational pressure, especially illegal off-road vehicle activity; increased fragmentation of adjacent private ownerships; and pests and diseases, such as jack pine budworm and beech bark disease.

### Introduction

The Deer Park management area is located in the center of the eastern Upper Peninsula, east of Grand Marais, along the Lake Superior shoreline. It is in Alger and Luce Counties and has 92,380 acres of state-owned land. Timber harvesting is the primary attribute in this management area, with recreation as an important secondary attribute. Additional attributes which were important in identifying this management area include:

- The management area falls within the Luce Subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The major landforms consist of lacustrine sand and gravel.
- Current forest communities are dominated by both planted and natural red and jack pine. Natural mixed pine stands are also common.
- The Duck Lake wildfire burned approximately 22,000 acres in the eastern part of this management area in May 2012.
- Large number of special features including: high conservation value areas, ecological reference areas and special conservation areas.
- In addition to all of the recreational facilities, the area is highly used for other forms of recreation including: blueberry picking, site-seeing along the Lake Superior shoreline and dispersed camping especially during hunting and fishing seasons.
- Historical points of interest include the Crisp Point Lighthouse site, the site of the Perch Lake Civilian Conservation Corps camp and several known archeological sites.

The state-owned land within the management area is fairly concentrated, with some private parcels. The majority of the management area is in Luce County within the Newberry Forest Management Unit; the portion in Alger County is within the Shingleton Forest Management Unit. The current predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.9.1.

# Deer Park

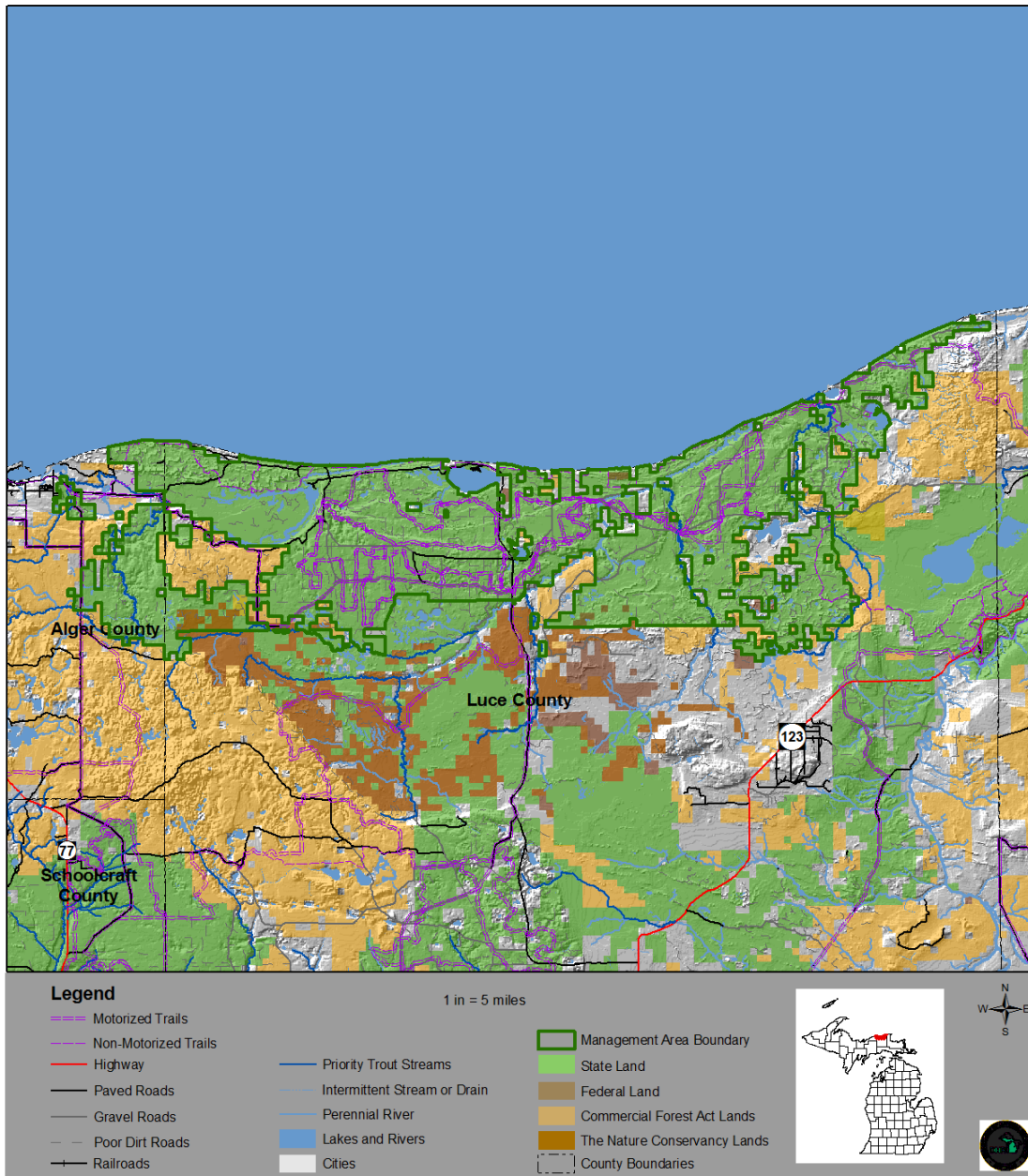


Figure 4.9.1. Location of the Deer Park management area (dark green boundary) in relation to surrounding state forest lands private lands Lake Superior and the town of Grand Marais within Alger and Luce Counties.

Table 4.9.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Deer Perk management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Jack Pine	35%	32,033	1,654	30,379	1,187	0	32,033	4,340	0
Red Pine	20%	18,509	3,190	15,319	1,496	3,212	18,509	1,702	5,226
White Pine	7%	6,920	448	6,472	588	2,427	6,920	588	2,773
Lowland Open/Semi-Open Lands	7%	6,375	0	6,375	0	0	6,375	0	0
Northern Hardwood	7%	6,064	421	5,643	0	2,285	6,064	0	2,398
Aspen	4%	3,350	229	3,121	128	0	3,350	520	0
Natural Mixed Pines	3%	2,368	38	2,330	212	924	2,368	212	924
Upland Open/Semi-Open Lands	2%	2,294	0	2,294	0	0	2,294	0	0
Lowland Conifers	2%	2,276	703	1,573	175	0	2,276	175	0
Cedar	2%	1,438	17	1,421	89	0	1,438	89	0
Hemlock	2%	1,386	351	1,035	0	50	1,386	0	186
Misc Other (Water, Local, Urban)	3%	2,569	5	2,564	0	0	2,569	0	0
Others	7%	6,798	1,444	5,354	657	925	6,798	679	969
<b>Total</b>	<b>100%</b>	<b>92,380</b>	<b>8,499</b>	<b>83,881</b>	<b>4,531</b>	<b>9,823</b>	<b>92,380</b>	<b>8,305</b>	<b>12,476</b>

Other Types include: upland conifers, paper birch, upland spruce/fir, lowland spruce/fir, oak, upland mixed forest, lowland deciduous, lowland aspen/ balsam poplar, tamarack and planted mixed pines.

#### 4.9.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### Section 4.9.1.1 Forest Cover Type Management – Jack Pine

###### Current Condition

Natural and planted jack pine stands occur on 32,033 acres (35%) of the management area (Table 4.9.1). Many of the planted jack pine stands are from the late 1930's and early 1940s when the Civilian Conservation Corps crews were working. Some of the planted stands are mixed with white and red pine. The jack pine stands near Lake Superior are primarily of natural origin. Most of the jack pine occurs on the dry, sandy soils of outwash plains and beach ridges, with a PVE Kotar habitat type (see Appendix E). Jack pine is well suited to these very dry, very nutrient-poor sites and provides a valuable timber resource here. Jack pine in this management area has been consistently harvested and regenerated, providing stands in all age classes. Due to site conditions near Lake Superior some natural jack pine stands may be managed on longer rotations. Jack pine regeneration is generally through scarification though stands may be planted if scarification fails. In recent years jack pine budworm has been a problem resulting in many standing dead trees.

Approximately 9,500 acres of jack pine were burned in the 2012 Duck Lake fire. Salvage of burned timber is scheduled in accessible areas. The fire dramatically changed the age-class distribution of jack pine in the management area, placing a large number of acres in the regeneration prescriptions age class column (Figure 4.9.2). This column is for stands that are in the process of harvest and regeneration.

Currently, there are 6,578 acres of jack pine with a regeneration harvest pending, and 24 acres with a partial harvest scheduled. This includes the salvage sales resulting from the Duck Lake fire.

There are 1,654 acres of jack pine that have site conditions limiting their harvest, some of which are found in high conservation value areas, ecological reference areas and special conservation areas. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Jack pine stands that are unavailable for harvest will remain until biological maturity before succeeding to late successional species such as white pine.

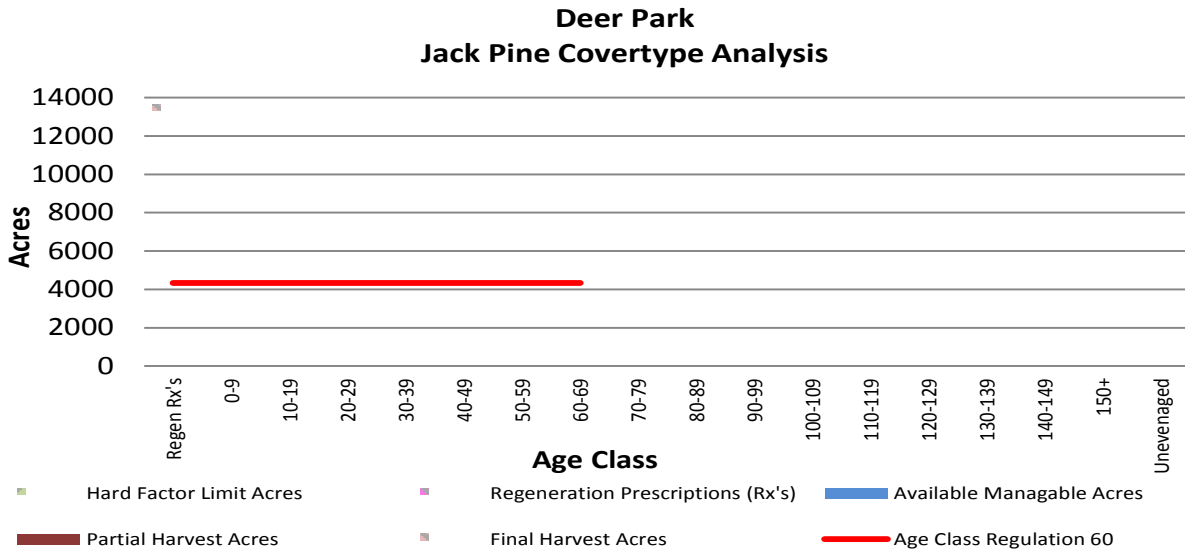


Figure 4.9.2. Age-class distribution of jack pine in the Deer Park management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Jack pine will be maintained on operable sites through even-aged management with acres balanced between 0-69 years of age to provide for continual harvest, available wildlife habitat and recreation opportunities.

10-Year Management Objectives

- The projected 10-year final harvest of jack pine is 1,187 acres which is significantly lower than the regulated amount due to the Duck Lake fire and the resultant age-class distribution.

Long-Term Management Objectives

- Maintain a lower acreage of over-mature stands to lessen the prevalence and severity of jack pine budworm outbreaks; and
- Balance the age classes of jack pine providing a regulated harvest of approximately 4,340 acres of jack pine every decade (red line in Figure 4.9.2).

**Section 4.9.1.2 Forest Cover Type Management – Red Pine**

Current Condition

Red pine occurs on 18,509 acres (20%) of the management area (Table 4.9.1). Red pine is distributed on sandy soils of dunes, beach ridges and outwash plains with Kotar habitat classes of PVE, PArV and PArVAa. Red pine is well suited to these very dry, very poor nutrient sites and provides a valuable timber resource in this management area. While a large portion of this red pine was planted by Civilian Conservation Corps camp workers 65-75 years ago, much of the red pine is of natural origin. Many of the natural red pine stands have a mix of other pine species and are managed to maintain that mixed composition. Red pine communities in this management area receive a lot of recreational use via trails and campgrounds and visual considerations are important.

Most of the natural red pine stands have been managed by thinning, followed by shelterwood or seed tree harvesting. This has resulted in some of the red pine stands being classified as uneven-aged stands. As natural regeneration becomes established, stand focus will shift from the retention trees to the regeneration and stands will be reclassified into the younger age classes.

Approximately 2,800 acres of red pine were burned in the 2012 Duck Lake fire. Salvage of burned timber in accessible areas is scheduled. The fire dramatically changed the age-class distribution of red pine in the management area, placing a large number of acres in the regeneration prescription age class column (Figure 4.9.3).

Currently, there are approximately 629 acres of red pine with a final harvest prescribed and 2,977 acres with a partial harvest or thinning prescribed. This includes the salvage sales associated with the Duck Lake fire.

There are 3,190 acres of red pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Red pine unavailable for harvest will remain until natural senescence. Some of these stands are found within the high conservation value areas and special conservation areas found in the management area.

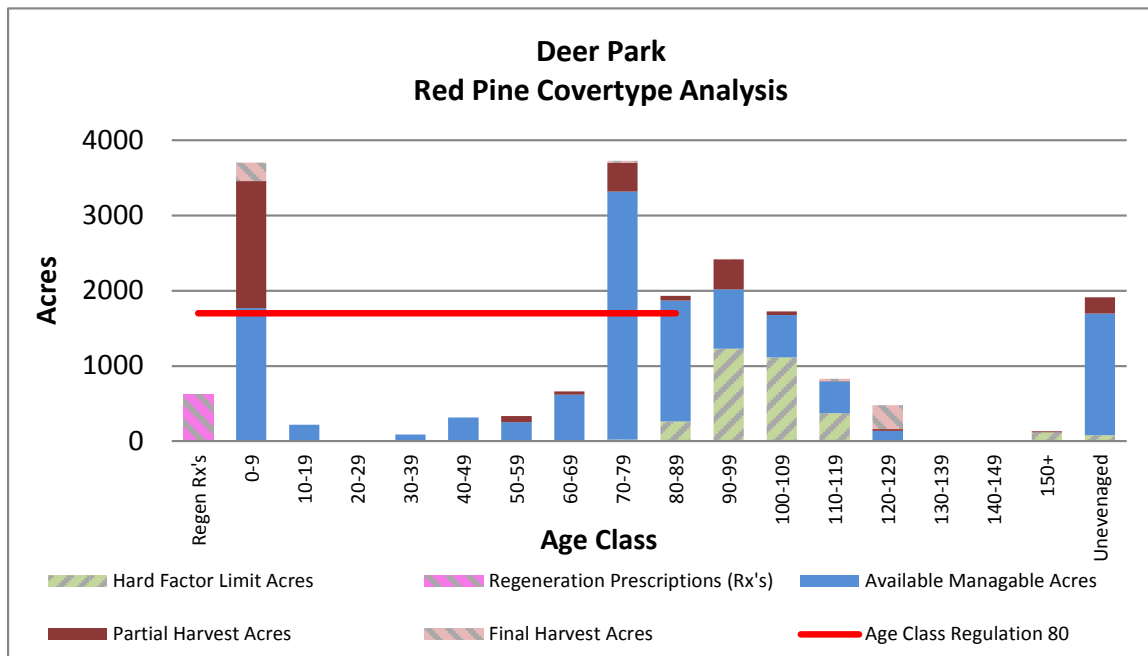


Figure 4.9.3. Age-class distribution of red pine in the Deer Park management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Red pine will be maintained and managed on operable sites through thinning until stand replacement harvest at economic maturity with acres balanced between 0–89 years of age to provide for continual harvest, wildlife habitat and recreational opportunities; and
- Red pine growing within high conservation value areas or special conservation areas may be left until biological maturity at over 200 years of age.

10-Year Management Objectives

- The projected 10-year final harvest is 1,496 acres of red pine with the reduction from the regulated amount due to the Duck Lake Fire and the resultant age-class structure; and
- The projected 10-year partial harvest (thinning) of red pine is 3,212 acres.

Long-Term Management Objectives

- Balance the age-class distribution of red pine providing a regulated final harvest of 1,702 acres per decade based on an 80-year rotation age;
- Stands will be periodically thinned until they meet silvicultural criteria; and
- Protect the ecological values in the high conservation value areas and special conservation areas.

**Section 4.9.1.3 Forest Cover Type Management – White Pine**

Current Condition

White pine occurs on 6,920 acres (7%) of the management area (Table 4.9.1). White pine stands are found on sandy soils of outwash plains and lake plains with PARV and PVE (see Appendix E) Kotar habitat types. These sites are very dry to dry, very poor to poor nutrient sites. White pine in this area is often found in association with other pine species and

northern hardwoods. Mixed pine stands will be managed to retain their varied composition. White pine regeneration grows well here and stands that have had partial harvests have several ages of white pine. Because of this, approximately 60% of the white pine stands here have been classified as uneven-aged stands (Figure 4.9.4). Using general white pine harvest guidelines, stands with high basal area undergo periodic thinning followed by regeneration harvests in stands that are economically mature. Use shelterwood or seed tree harvests to promote natural regeneration where possible.

As with red pine, some white pine stands in this management area receive a great deal of recreational use and visual considerations are necessary.

Approximately 770 acres of white pine were burned in the 2012 Duck Lake fire. As many of these stands were in relatively inaccessible areas, salvage harvest will be minimal.

Currently, there are nine acres with a final harvest prescribed and 141 acres with a partial cut prescribed. There are 448 acres of white pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Many of these stands are found within high conservation value areas and special conservation areas.

Desired Future Condition

- White pine stands will be maintained on operable sites with acres balanced between 0-109 years of age through thinning and selection cuts until rotation age, followed by shelterwood or seed tree regeneration harvests (due to high conservation value areas and special conservation areas, some stands of white pine may remain through biological maturity).

10-Year Management Objectives

- The 10-year projected final or regeneration harvest of white pine is 588 acres to work toward balancing the age classes; and
- The 10-year projected partial harvest is 2,427 acres of white pine.

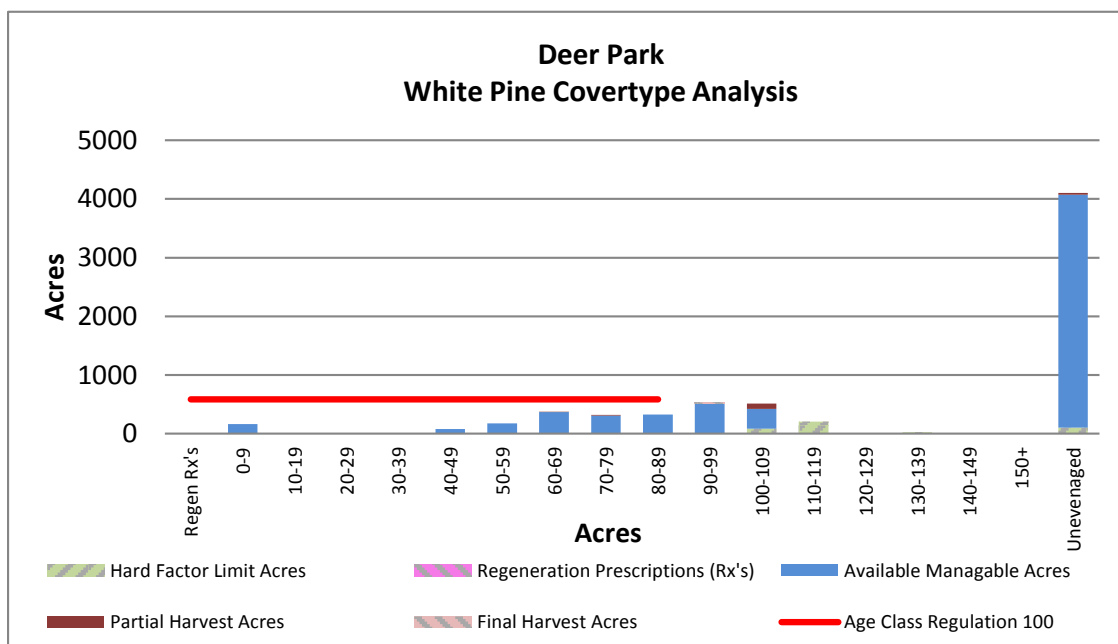


Figure 4.9.4. Age class distribution of white pine in the Deer Park management area (2012 Department of Natural Resources inventory data).

Long-Term Management Objectives

- A regulated harvest would allow 588 acres for final harvest per decade.

#### **Section 4.9.1.4 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

##### Current Condition

Lowland open/semi-open lands occur on 6,375 acres (7%) of the management area (Table 4.9.1). This category is a combination of treed bog (1,573 acres), marsh (1,561 acres), lowland shrub (1,882 acres) and bog (1,359 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. Intermittent wetland and bog ecological reference areas are found within these cover types here. Approximately 1,700 acres of treed bog, 465 acres of marsh and 170 acres of lowland shrub were burned in the 2012 Duck Lake fire.

##### Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity.

##### Long-Term Management Objectives

- In general, these stands will be maintained without active management to protect their ecological values.

#### **Section 4.9.1.5 Forest Cover Type Management – Northern Hardwood**

##### Current Condition

Northern hardwoods occur on 6,064 acres (7%) of the management area (Table 4.9.1). Most of the hardwood stands are composed of red maple, sugar maple and beech, with white pine, hemlock and a mix of various other hardwood species. The stands generally fall into the Kotar habitat types of PArVAa and ATFD (see Appendix E). Northern hardwood stands are distributed on lake plains and outwash plains and are dry to mesic, poor- to medium-nutrient sites. The majority (80%) of the stands have been managed using single tree selection, generally every 20 years, maintaining structural and species diversity while working towards an uneven-aged state. Where site quality is poor, shelterwood and other even-aged harvesting systems are considered. Stands that have been managed through even-aged systems are shown in the immature column in Figure 4.9.5.

Approximately 300 acres of northern hardwood burned in the 2012 Duck Lake fire.

Beech bark disease is prevalent throughout the management area and many stands have had or will have salvage harvests. Beech mortality and salvage harvesting has resulted in decreased stocking levels. Further selection harvesting in these stands will be delayed due to resultant lower than normal residual basal area.

Currently, there are 576 acres with a partial harvest assigned and 93 acres with a final harvest prescribed. There are 421 acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.



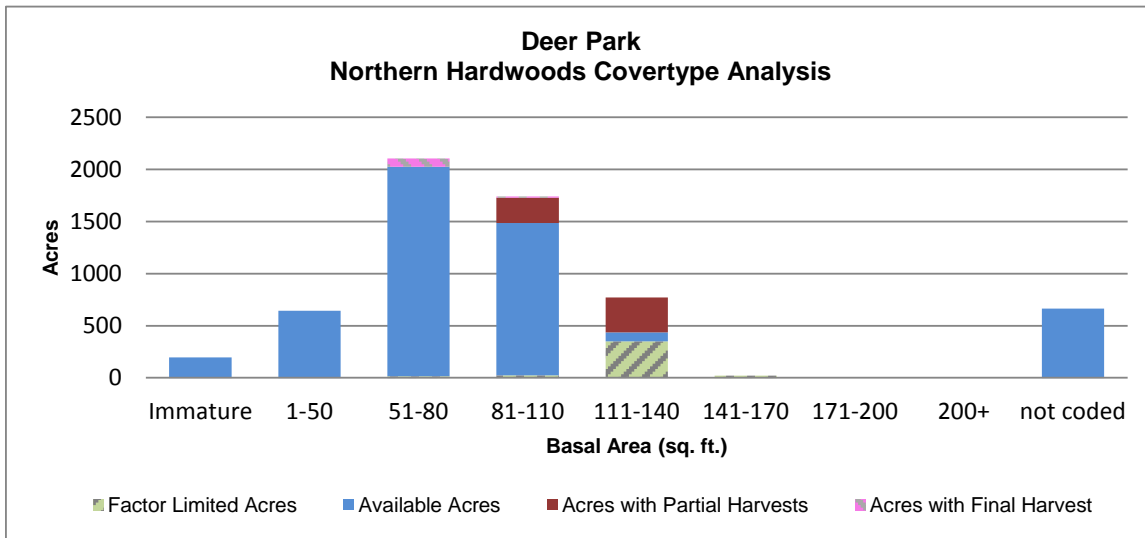


Figure 4.9.5. Basal area distribution of northern hardwood in the Deer Park management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwoods will be maintained on operable sites by using individual tree selection harvesting resulting in an uneven-aged composition and structurally diverse stands.

10-Year Management Objectives

- The 10-year projected partial harvest is 2,285 acres of northern hardwoods;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands; and
- To favor regeneration of other hardwood species, consider herbicide applications of beech regeneration and planting of hard mast producing trees, including oak and disease resistant beech.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.9.1.6 Forest Cover Type Management – Other Types**

Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total acres (Table 4.9.1). The largest cover types in this category are: aspen (3,350 acres or 4%), natural mixed pines (2,368 acres or 3%). Upland open/semi-open lands (2,294 acres), lowland conifers (2,276 acres), cedar (1,438 acres) and hemlock (1,386 acres) all with 2% of the total acres.

“Other types” includes all cover types with less than 2% of the total acres and are comprised of: upland conifers, paper birch, upland spruce/fir, lowland spruce/fir, oak, upland mixed forest, mixed upland deciduous, lowland deciduous, lowland aspen/balsam poplar, tamarack, planted mixed pines and lowland mixed forest. Approximately 1,450 acres of these other cover types burned in the 2012 Duck Lake fire.

Using general timber management guidelines most of these stands will be harvested using even-aged management. Attempt to balance the cover type acres using standard rotation ages. Natural regeneration of species currently on site is expected in most cover types. Some of the mixed cover types with high basal area may be thinned, depending on the species composition.

There are 2,787 acres of these other minor cover types that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Stands that are inaccessible for harvesting will be subject to natural succession. Miscellaneous other (2,569 acres or 3%) includes roads, water and sand/soil.



### Desired Future Condition

- These cover types may be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The projected 10-year final harvest is 128 acres of aspen, 212 acres of natural mixed pines, 175 acres of lowland conifers, 89 acres of cedar and 657 acres of other types; and
- The projected 10-year partial harvest is 924 acres of natural mixed pines, 50 acres of hemlock and 925 acres of other types.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## **4.9.2 – Featured Species**

Mixed pine and red pine stands of natural origin have high biodiversity values which should be maintained. Large stands of jack pine are prevalent. Key wildlife management strategies in these types would include the retention of large diameter red and white pine, retention of under-represented species, coarse woody debris and snags (particularly in the jack pine stands) and maintaining some larger than average jack pine cuts. The 2012 Duck Lake fire set back succession on a significant number of acres in pine cover types which will impact wildlife habitat in this management area. The northern hardwood forest is also represented and contributes to the overall landscape diversity and is important habitat for many wildlife species. In addition, the Lake Superior shoreline is part of the critical habitat unit for piping plover and Great Lakes endemic plant and animal species occur here as well.

### **American Marten**

The goal for marten in the eastern Upper Peninsula is to maintain or increase suitable habitat and strive to identify, maintain and connect known populations to facilitate genetic exchange. Management should address the maintenance and improvement of corridors, dead wood and conifer components in priority landscapes.

#### Wildlife habitat specifications:

- Identify key stands that provide linkages between habitat areas. Maintain a minimum of 30% canopy cover in key even-aged managed stands of northern hardwood and conifer stands, as marten tend to avoid stands with less canopy cover. Write prescriptions to minimize potential blowdown.
- Identify and maintain corridors between large forested tracts.
- Provide mature forest conditions in this management area: Retain and limit disturbance to existing downed coarse woody debris. Where coarse woody debris is lacking, exceed Within-Stand Retention Guidance for its maintenance by increasing both standing dead and down dead wood, by leaving at least three secure large diameter (>14 inches in diameter at breast height) live trees to serve as future den trees, snags coarse woody debris and logs on the ground per acre in harvested stands.
- Increase the within-stand component of mesic conifers in mixed stands and enhance mesic conifer forest types by group or gap selective harvest. Consider underplanting on suitable sites where a seed source is absent.
- Limit biomass harvesting and whole tree harvesting in this management area considering retaining the maximum residues in the Woody Biomass Harvesting Guidelines in key marten areas.

### **Kirtland's Warbler**

The state-wide goal for Kirtland's warbler is to maintain a population of at least 1,000 breeding pairs, as indexed by the annual breeding survey. In the Upper Peninsula it is desirable to have habitat available for birds outside the "core" range of the northern Lower Peninsula. Management should focus on maintaining breeding habitat in selected management areas while providing a sustainable supply of wood to the timber market. These two goals are compatible with only minor changes to timber harvest specifications. The eastern Upper Peninsula goal for Kirtland's warbler during this planning period is to provide suitable breeding and foraging habitat within this management area.

#### Wildlife habitat specifications:

The 2012 Duck Lake fire burned approximately 9,500 acres of jack pine effectively creating a large block of potential habitat for Kirtland's warbler and other early successional jack pine dependent species. Natural fire events within this forest type have been historically large and catastrophic leaving variable structural retention.

- Post-disturbance fire legacies including fire skips or fingers of jack pine; snags; and larger diameter, fire-tolerant trees such as red pine should be left in stands of burned jack pine as retention to benefit Kirtland's warbler.
- Ensure that jack pine stands regenerate to dense stands (optimal 1,600 stems per acre). If stands are planted, retain some small openings (< 2 acres) within stands.

### **Piping Plover**

The state-wide goal for the Great Lakes piping plover is to maintain a breeding population of a minimum of 100 nesting pairs. In the eastern Upper Peninsula, management should focus on protecting and improving critical habitat on occupied shoreline and throughout designated critical habitat.

#### Wildlife habitat specifications:

- At known breeding sites, work with partners to:
  - Limit human activity near nests;
  - Construct predator exclosures around nests; and
  - Control avian and mammalian predators as needed.
- In other critical habitat, support land acquisitions and conservation easements.
- At active sites, support public education and increased awareness to help avoid disturbance to nesting birds.
- Address/discourage illegal off-road vehicle activity on Great Lakes shorelines.

### **Red Crossbill**

In the eastern Upper Peninsula, the goal for red crossbill is to maintain or increase suitable habitat. Management should focus on maintaining mature and over-mature seed producing trees in priority areas.

#### Wildlife habitat specifications:

- Maintain a minimum of 15% of the total acres of appropriate cover types (upland spruce/fir, upland conifers, natural mixed pine and natural red and white pine) in the management area for red crossbill in a mature forest condition (e.g., >150 years for red pine, > 130 years for white pine and > 80 years for white spruce). This can be accomplished with existing factor-limited stands, or alternatively by extending the rotation length of these types to 150, 130 and 80 years respectively. Older age classes for red crossbill habitat are being met by a large number of stands with site conditions that limit harvesting.
- Retain large mature and over-mature red pine, white pine and white spruce in shelter-wood and seed tree cuts
- Evaluate the management area for the establishment of core tracts of old (>100 years old) pine stands in special resource areas or Type 1 or Type 2 old growth.

### **4.9.3 – Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed twenty-two listed species as well as eight natural communities of note occurring in the management area as listed in Table 4.9.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

As shown in Figure 4.9.6 there are five special conservation areas within the Deer Park management area. Both the Crisp Point (102 acres) and the Deer Park (100 acres) areas are non-dedicated natural areas. Both areas will be managed as if they were dedicated natural areas. There are three other special conservation areas and they are the Blind Sucker Flooding State Wildlife Management Area, a deer wintering area and the Old Seney Road (south of H-58) which is a natural beauty road (Figure 4.9.6).

Areas that might meet the definition of Type 1 and Type 2 old growth have been identified in a special conservation area layer in the Geographic Decision Support Environment and are shown in Figure 4.9.6. This set of areas originated from a subset of forested natural communities within some state natural areas and all A/AB-ranked natural heritage database element occurrences. Within the Deer Park management area there are 47 acres of potential Type 1 dry-mesic northern forest and three patches (Figure 4.9.6) of potential Type 2 identified as dry-mesic northern forest (100 acres), mesic northern forest (152 acres) and rich conifer swamp (812 acres). Approximately 1,000 acres of potential old growth have been identified within the Deer Park management area. These stands were identified for a broad range of reasons and were coded in the Operations Inventory database as Stand Condition 8.

High conservation value areas include critical dunes/barrier dunes and the critical coastal habitat of piping plovers (Figure 4.9.5). There is a Director's Order to protect nesting shorebirds in this management area. The Two Hearted River is a state designated natural river and along with its buffer is a high conservation value area. The Two Hearted River Natural River Plan (DNR, Dec. 1973) contains specific requirements for management in this area.

Ecological reference areas in the Deer Park management area include two bog natural communities (139 and 27 acres) and an intermittent wetland (46 acres on state land) as shown in Figure 4.9.6. These ecological reference areas will be managed to enhance and protect their natural vegetative and associated wildlife communities as directed by an ecological reference area-specific management plan.

Table 4.9.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Deer Park management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Bog		S4/G3G5	Confirmed				Lowland open/semi-open	N/A
Dry northern forest		S3/G37	Confirmed				Jack Pine, Red Pine	Late
Dry-mesic northern forest		S3/G4	Confirmed				White Pine	Late
Intermittent wetland		S3/G2	Confirmed				Lowland open/semi-open	N/A
Mesic northern forest		S3/G4	Confirmed				Northern Hardwood	Late
Muskeg		S3/G4G5	Confirmed				Lowland open/semi-open	N/A
Poor conifer swamp		S4/G4	Confirmed				Tamarack	Late
Rich conifer swamp		S3/G4	Confirmed				Tamarack	Late
<b>Birds</b>								
Northern Goshawk	<i>Accipiter gentilis</i>	SC/G5/S3	Confirmed	PS	Very High	Mesic northern Forest	Northern Hardwood	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Late
						Dry-mesic northern forest	White Pine	Late
						Boreal forest	Upland & Lowland Sp/F	Mid
Piping plover	<i>Charadrius melodus</i>	LE/E/G3/S1	Confirmed	MV	Moderate	Open dunes	Upland open/semi-open	N/A
Common loon	<i>Gavia immer</i>	T/G5/S3-4	Confirmed	HV	Very High	Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
<b>Insect</b>								
Lake Huron locust	<i>Trimerotropis huroniana</i>	T/S2S3/G2G3	Confirmed	MV	Very High	Great Lakes barrens	Upland open/semi-open	N/A
						Open dunes	Upland open/semi-open	N/A
<b>Mollusk</b>								
Slippershell mussel	<i>Alasmodonta viridis</i>	T/G4G5/S2S3	Confirmed	EV	Very High	Headwater Stream	Aquatic	N/A
						Mainstem streams	Aquatic	N/A
						Inland lake	Aquatic	N/A
<b>Plants</b>								
Douglas's hawthorn	<i>Crataegus douglasii</i>	SC/G5/S3S4	Confirmed			Volcanic bedrock glade	Upland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Mesic northern forest	Northern Hardwood	Late
						Northern bald	Upland open/semi-open	N/A
						Open dunes	Upland open/semi-open	N/A
						Sand and gravel beach	Upland open/semi-open	N/A
						Sandstone bedrock lakeshore	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A
						Volcanic cobble shore	Upland open/semi-open	N/A
						Volcanic lakeshore cliff	Upland open/semi-open	N/A
English sundew	<i>Drosera anglica</i>	SC/G5/S3	Confirmed			Prairie fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Interdunal wetland	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
Blue wild rye	<i>Elymus glaucus</i>	SC/G5/S3	Confirmed			Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Wooded dune & swale complex	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
						Open dunes	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A
Black crowberry	<i>Empetrum nigrum</i>	T/G5/S2	Confirmed			Limestone cobble shore	Upland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Sandstone cliff	Upland open/semi-open	N/A
						Sandstone lakeshore cliff	Upland open/semi-open	N/A
						Dry northern forest	Jack Pine, Red Pine	Late
Moor rush	<i>Juncus stygius</i>	T/G5/S1S2	Confirmed			Northern fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
American dune wild-rye	<i>Leymus mollis</i>	SC/G5/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
Auricled twayblade	<i>Listera auriculata</i>	SC/G3G4/S2S3	Confirmed			Northern shrub thicket	Upland open/semi-open	N/A
American shore-grass	<i>Littorella uniflora</i>	SC/G5/S2S3	Confirmed			Submergent marsh	Lowland open/semi-open	N/A
Northern prostrate clubmoss	<i>Lycopodiella marquetiae</i>	T/G2/S2	Confirmed			Intermittent wetland	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
Northern appressed clubmoss	<i>Lycopodiella subappressa</i>	SC/G2/S2	Confirmed			Intermittent wetland	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Interdunal wetland	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
Alternate-leaved water-milfoil	<i>Myriophyllum alterniflorum</i>	SC/G5/S2S3	Confirmed			Submergent marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
Satin willow	<i>Salix pellita</i>	SC/G5/S2S3	Confirmed			Sand and gravel beach	Upland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
Fleshy stitchwort	<i>Stellaria crossifolia</i>	E/G5/S1	Confirmed			Northern shrub thicket	Upland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
Stitchwort	<i>Stellaria longipes</i>	SC/G5/S2S3	Confirmed			Northern shrub thicket	Upland open/semi-open	N/A
						Open dunes	Upland open/semi-open	N/A
Lake Huron pansy	<i>Tanacetum huronense</i>	T/G5T4T5/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Wooded dune & swale complex	Upland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

# Deer Park

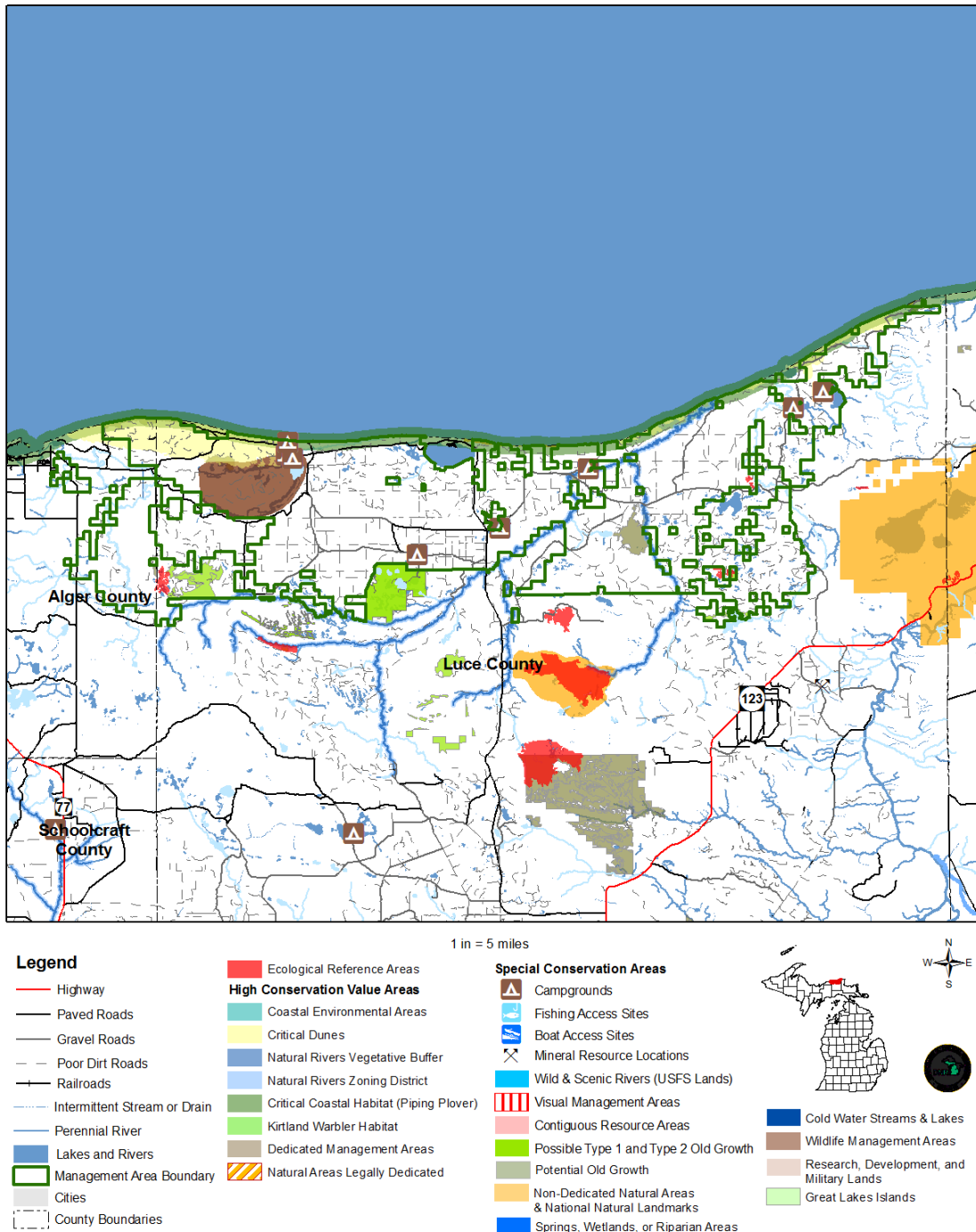


Figure 4.9.6. A map of the Deer Park management area showing special conservation areas.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

#### 4.9.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area, due to the species composition, site quality or other factors.

Some of the more important forest health pests in this management area by major cover type include:

- Red and jack pine: jack pine budworm, white grubs, red-headed pine sawfly, pine engraver and *Scleroderris* canker;
- White pine: white pine blister rust;
- Aspen: white trunk rot, *Hypoxyylon* canker; and
- Northern hardwoods: beech bark disease.

For further information on forest health, refer to Section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

While there are no invasive species documented in the database for this area, garlic mustard has been sighted in Muskallonge State Park.

Within this management area, there have been ongoing efforts to remove Scotch pine through timber sales and forest treatment proposals, followed by planting of native trees. Continue efforts to remove Scotch pine.

#### 4.9.5 – Fire Management

Although these soils produce barrens communities in other parts of the state, the proximity of this area to Lake Superior produced humidity regimes and winter snows that encouraged higher forest densities. This management area is dominated by dry northern forest communities. Significant stand-replacement fires probably occurred with a frequency of 75 to 150 years.

- Prescribed fire may be used to maintain natural pine communities.
- Muskallonge Lake State Park and most of the Newberry Forest Management Unit's campgrounds are in this management area, providing numerous opportunities for targeted prevention messages.
- The Two-Hearted Zone Dispatch Plan covers most of the management area. This plan calls for aggressive initial attack, based upon current fire danger.

#### 4.9.6 – Public Access and Recreation

Although most of the area is accessible by vehicles on gravel county roads, or sandy dirt two-track forest roads, there are large lowland areas with limited number of roads.

Recreational facilities in this management area include: the North Country National Scenic Trail and trailhead and the Bodi Lake pathway are located within this management area (Figure 4.9.1). Motorized trails include the Pine Ridge and Two-heart off-road vehicle trails and trailheads and several snowmobile trails (Figure 4.9.1).

Additional recreational facilities include: State forest campgrounds (Figure 4.9.3) include Bodi Lake, Culhane Lake, Highbridge, Holland Lake, Mouth of the Two-Hearted River, Reed and Green, Pike Lake, Perch Lake, Headquarters Lake, Lake Superior and Blind Sucker 1 and 2. The Headquarters Lake State Forest Campground, which has been closed since 2008, is also within this management area. Boating access sites (Figure 4.9.3) include Bodi Lake, Blind Sucker No.1 and No.2, Perch Lake, Mouth of Two Hearted River, Culhane Lake and Little Lake Harbor.

Bear hunting, trapping of furbearing species, canoeing, kayaking and wildlife viewing are popular in this management area. There are many areas that are popular for dispersed camping, especially along the Sucker River in fishing and hunting (deer, bear) seasons.

#### **4.8.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. High priority trout streams in this management area are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.9.1.

#### **4.9.8 – Minerals**

Surface sediments consist of primarily lacustrine (lake) sand and gravel and minor peat and muck, lacustrine (lake) clay and silt, coarse-textured till and an end moraine of coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the general area, and there is good potential for additional pits on the uplands.

The Cambrian Trempealeau Formation and Munising Group and Precambrian Jacobsville Sandstone subcrop below the glacial drift. The Trempealeau Formation could be quarried for stone.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (two in Luce and one mineral well in Alger). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology, given the depth to known metallic bearing formations.

## 4.10 MA 10 – Drummond Island MA

### Summary of Use and Management

Vegetative management in the Drummond Island management area (MA) (Figure 4.10.1) will emphasize protecting the unique character of the area and the threatened, endangered and special concern species found within while providing timber products, recreational opportunities and wildlife habitat. Timber management objectives will include improving the age-class diversity of aspen, lowland poplar and other species managed through even-aged harvesting; and providing for regeneration of cedar. The management area contains several ecological reference areas and provides habitat for several rare and threatened plants and animals. Many forms of recreation are popular here and management reflects these uses. The DNR is working with Drummond Island stakeholders on a management planning process for the island. Recommendations have been formed based on stakeholder input and were presented to the Natural Resource Commission. The purpose of the process is to create a comprehensive plan for the island which will provide for the wise use and enjoyment of the island's wildlife, forests and related natural resources while preserving and protecting the values of the resources including the island's rare and unique features.

### Introduction

The Drummond Island management area, located in Chippewa County, consists of 43,771 acres of state-owned land. The primary attribute of this management area is the social and economic considerations associated with the island landform. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection of the eastern Upper Peninsula ecoregion (Albert, 1995).
- Drummond Island is part of the Niagaran Escarpment spanning Lake Michigan and Lake Huron. Karst features include sinkholes, rock bluffs and alvar. Underlying limestone bedrock is typically less than 50 feet below the surface and is exposed in many places, especially along the coastline. This southern portion of Drummond Island has deeper soil over the limestone substrate and less area of alvar as compared to the north part of the island known as Maxton Plains.
- Recreational opportunities are numerous and include: hunting, trapping, fishing, boating, kayaking and snowmobiling and off-road vehicle (ORV) riding.
- There are several ecological reference areas, high conservation value areas and special conservation area in the management area. The coastal zone is habitat for several rare, threatened and endangered Great Lakes endemic species. Use by neotropical migratory birds is heavy along the southern coast.
- The Potagannissing Wildlife Flooding Area lies within the management area. It is managed primarily for waterfowl, marsh birds and aquatic furbearing species.
- This management area contains one of the eastern Upper Peninsula Grouse Enhanced Management Systems (GEMS) areas. This area plan will emphasize balanced age classes of aspen for timber production which will have habitat benefits for a number of the featured species including ruffed grouse and deer. The boundaries of Grouse Enhanced Management Systems areas will be delineated and an operational plan will be developed during this planning period by the local biologist in collaboration with the Forest Resources Division unit manager and integrated into the plan through the revision process.

Drummond Island is the site of historic Fort Drummond, used by British Forces, circa 1812. There was a large Indian village on the island before the fort was built and there are many additional known archeological sites within this management area.

The state forest land is confined to Drummond Island, in both small and large parcels, interspersed with private ownerships. A large portion of this ownership was purchased using state game fund dollars. The Drummond Island management area falls within the Sault Ste. Marie Forest Management Unit. The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.10.1.



Table 4.10.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Drummond Island management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Aspen	26%	11,215	3,773	7,442	81	0	11,215	1,240	0
Cedar	17%	7,554	274	7,280	30	0	7,554	455	0
Northern Hardwood	15%	6,624	113	6,511	0	2,739	6,624	0	3,026
Lowland Open/Semi-Open Lands	6%	2,787	0	2,787	0	0	2,787	0	0
Upland Open/Semi-Open Lands	5%	2,347	0	2,347	0	0	2,347	0	0
Lowland Aspen/Balsam Poplar	4%	1,966	1,104	862	0	0	1,966	144	0
Lowland Deciduous	4%	1,759	906	853	42	0	1,759	95	0
Upland Conifers	4%	1,541	0	1,541	483	200	1,541	171	717
Lowland Conifers	3%	1,371	325	1,046	116	0	1,371	116	0
Upland Mixed Forest	3%	1,234	0	1,234	137	365	1,234	137	365
Misc Other (Water, Local, Urban)	5%	2,105	0	2,105	0	0	2,105	0	0
Others	7%	3,268	565	2,703	386	357	3,268	342	375
<b>Total</b>	<b>100%</b>	<b>43,771</b>	<b>7,061</b>	<b>36,710</b>	<b>1,275</b>	<b>3,661</b>	<b>43,771</b>	<b>2,700</b>	<b>4,483</b>

Others include: lowland deciduous, lowland conifers, upland conifers, upland mixed forest, upland spruce/fir, lowland mixed forest, paper birch, mixed upland deciduous, white pine, tamarack, red pine, natural mixed pines, lowland spruce/fir and oak.

#### 4.10.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

# Drummond Island

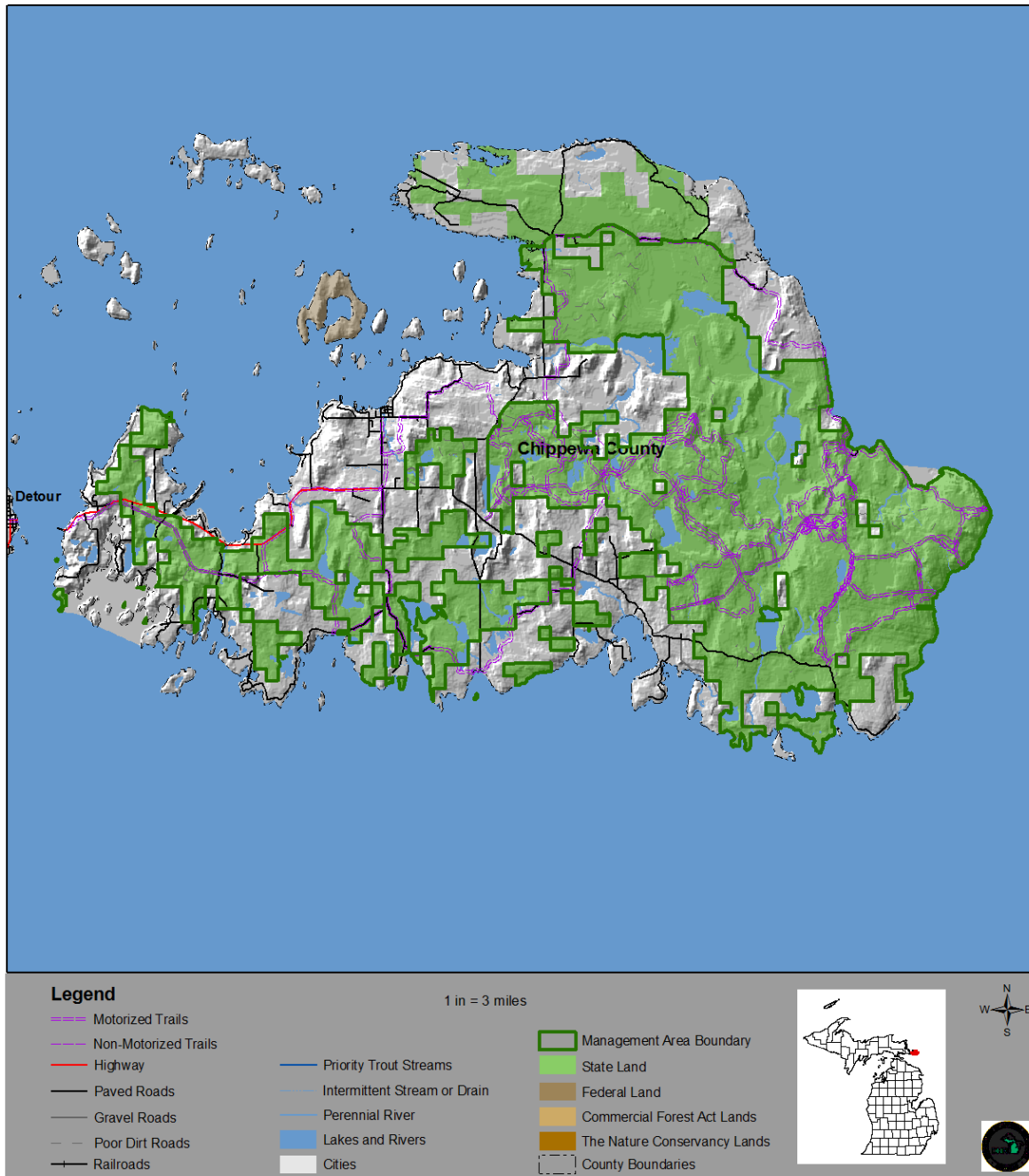


Figure 4.10.1. Location of the Drummond Island management area (dark green boundary) in relation to surrounding state forest lands other ownerships and Lake Huron.

## Section 4.10.1.1 Forest Cover Type Management - Aspen

### Current Condition

Aspen occurs on 11,772 acres (27%) of the management area (Table 4.10.1). Aspen stands are distributed on sites with Kotar habitat types of PARVAa, ATFD and AFPO (see Appendix E). These are dry-mesic to mesic sites with high potential to grow quality trees. Aspen has been consistently harvested and regenerated since markets improved on the mainland and ferry service was improved. Much of the aspen is growing in association with northern white cedar. Aspen within the Drummond Grouse Enhanced Management System area may be managed slightly different than the rest of the aspen within the management area through shorter rotations and smaller harvest block size.

Currently, there are 1,039 acres prescribed for final harvest (Figure 4.10.2). There are some stands in other cover types with harvest prescriptions that are expected to convert to aspen after harvest. These acres are shown in Figure 4.10.2 in the regeneration prescriptions column.

There are 3,774 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of aspen will eventually succeed to late successional species.

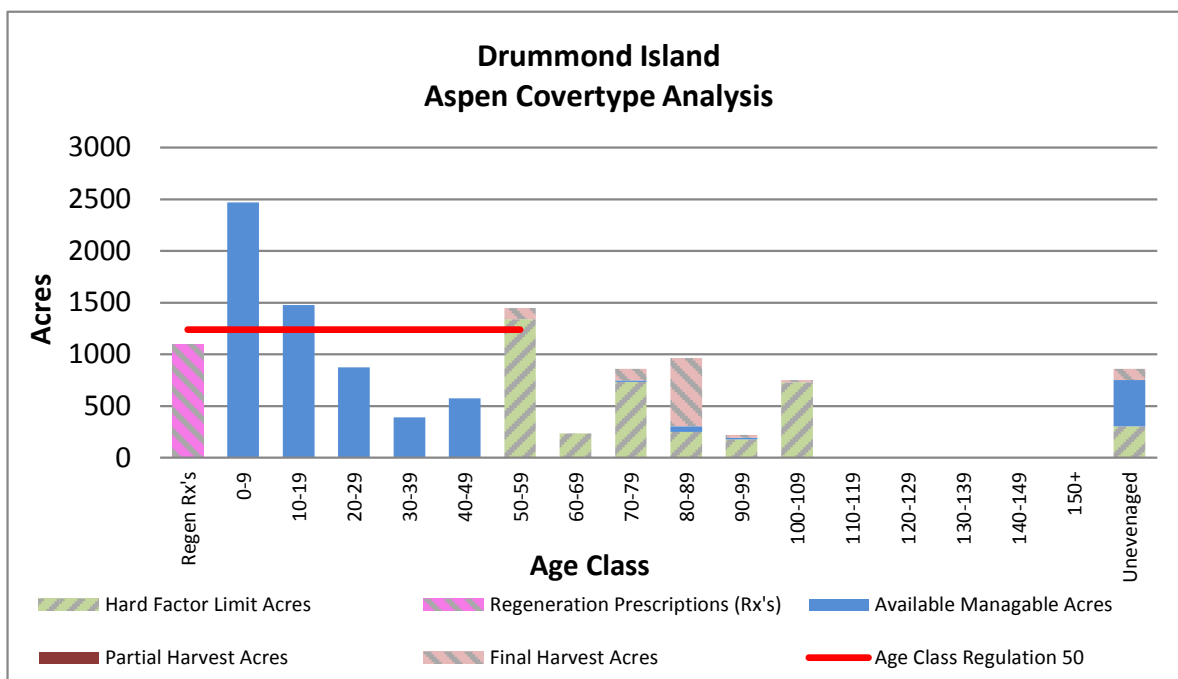


Figure 4.10.2. Age-class distribution of aspen in the Drummond Island management area (2012 Department of Natural Resources inventory data).

### Desired Future Condition

- Aspen stands will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

### 10-year Management Objectives

- The 10-year projected final harvest is 81 acres of aspen, which is lower than the regulated amount due to the current age-class structure having a large number of stands in the 0-9 age class and the regeneration prescriptions column; and
- Aspen within the identified Grouse Enhanced Management Systems area may be managed differently than the rest of the aspen within the management area, with a shorter rotation age, small patch cuts and carefully considered stand adjacency.

## Long-Term Management Objectives

- Balance the age classes of available aspen providing a regulated harvest of approximately 1,140 acres for final harvest per decade (red line in Figure 4.10.2).

### Section 4.10.1.2 Forest Cover Type Management - Cedar

#### Current Condition

Cedar stands occur on 7,554 acres (17%) of the management area (Table 4.10.1). Cedar stands in this area often have a component of large, old super-canopy aspen. A large number of cedar stands in this management area have been coded as uneven-aged, having trees of various sizes and ages (Figure 4.10.1). Some of these stands are within deer wintering areas. Maintaining a closed canopy provides important cover for deer and reduces snow depth within the stands. Cedar is a preferred winter food species of deer and deer browsing has limited cedar regeneration in some areas. There is a need to address future cedar cover within deer wintering complexes. Timely regeneration of cedar is a concern from both wildlife and forest management perspectives. It is important to ensure that cedar and/or hemlock recruitment/regeneration is reliable when harvesting in this cover type.

Currently, there are no acres prescribed for harvest (Figure 4.10.3). There are 274 acres with site conditions limiting harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

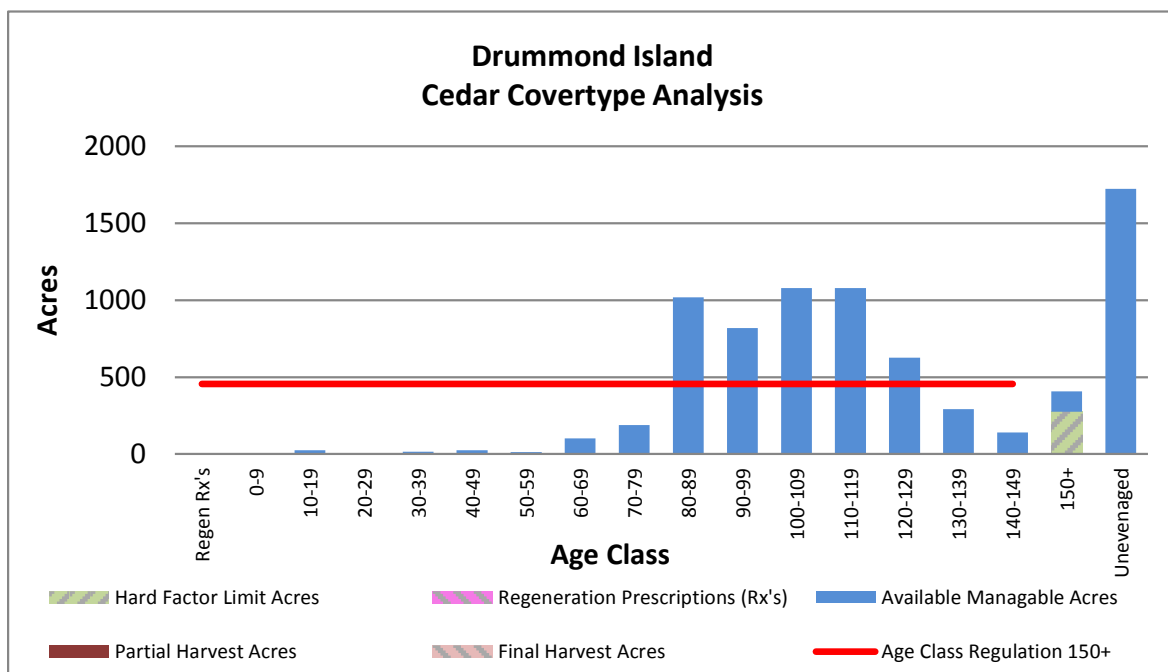


Figure 4.10.3. Age-class distribution of cedar in the Drummond Island management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Where deer wintering activities are not a concern, cedar will be maintained on operable sites through even-aged management.

#### 10-year Management Objectives

- The 10-year projected harvest of cedar is approximately 30 acres with the projected harvest amount being significantly lower than the regulated amount due to deer wintering habitat. However, harvest of this type, if it occurs, may vary widely from the projected harvest, in order to meet the long-term management objectives.

## Long-Term Management Objectives

- Develop a comprehensive deer wintering complex management plan focusing on cedar management for winter deer habitat.
- Look for opportunities to test different methods of regenerating cedar, especially outside of the deer wintering areas.
- A regulated harvest provides approximately 455 acres of cedar for final harvest per decade.

### **Section 4.10.1.3 Forest Cover Type Management – Northern Hardwoods**

#### Current Condition

Northern hardwood occurs on 6,624 acres (15%) of the management area (Table 4.10.1). Northern hardwood stands in this area have a range of Kotar habitat classes including PARVAa, ATFD, AFPO and AFOAs (see Appendix E). Much of the hardwood was cut over in the 1920s. Since then, the majority of the stands have been managed using single tree selection harvesting to work toward an uneven-aged state thereby having trees of varying ages and sizes. Hardwoods are somewhat slow growing on the shallow soils found here. Maple regeneration is sparse in some areas and beech regeneration has become predominant in the understory. Where stand quality warrants, selection harvests will occur in stands with a basal area over 120 square feet per acres, decreasing stocking levels to approximately 80 square feet per acre. In general this will allow most hardwood stands to be select harvested every 20 years. Where site quality is poor shelterwood and other even-aged harvesting systems will be considered.

Beech bark disease is found throughout the management area and salvage of beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to the lower than normal residual basal area.

Currently, there are 1,177 acres with a partial or selection harvest prescribed (Figure 4.10.4). There are 113 acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

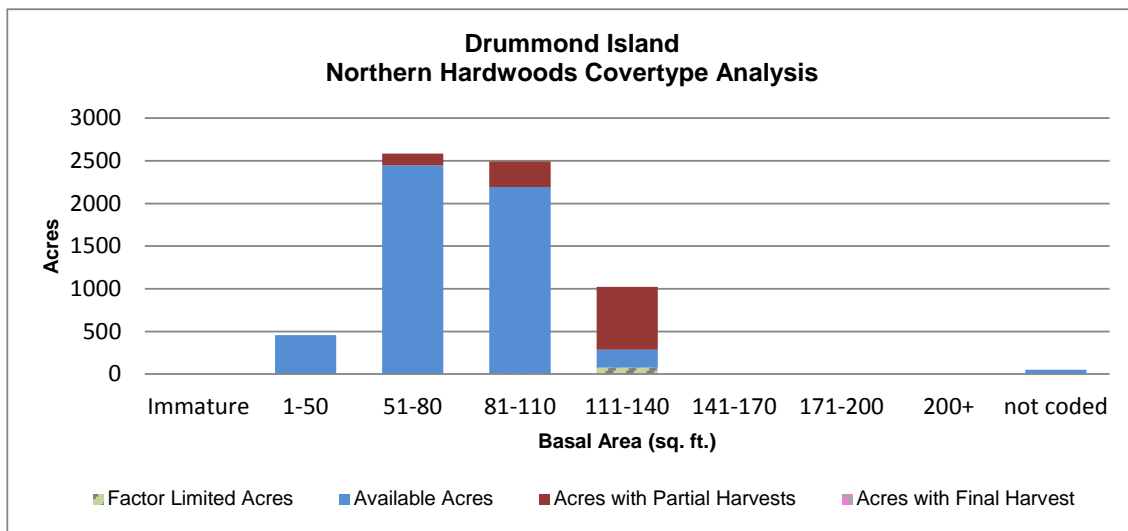


Figure 4.10.4. Basal area distribution of northern hardwood in the Drummond Island management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Northern hardwood stands will be maintained on operable sites, generally using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands.
- Harvesting will provide for a continuous flow of timber products and a variety of wildlife habitat and recreational opportunities.

### 10-year Management Objectives

- The 10-year projected harvest is 2,739 acres of partial or selection harvest in northern hardwoods.
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration.
- Track beech regeneration in these stands.
- Consider herbicide applications on beech regeneration to promote regeneration of other species.
- In areas that are losing beech to beech bark disease, consider planting of hard mast producing trees, including oak and disease resistant beech.

### Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

## **Section 4.10.1.4 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

### Current Condition

The management area contains a large amount of lowland open/semi-open lands totaling 2,787 acres (6%) (Table 4.10.1). This category is a combination of marsh (1,362 acres), lowland shrub (1,425 acres), treed bog (zero acres) and bog (zero acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. In this management area, several ecological reference areas and natural communities of note are found within these cover types (see sub-section 4.10.3).

### Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity.

### Long-Term Management Objectives

- In general, these stands will be maintained without active management to protect their ecological values.

## **Section 4.10.1.5 Forest Cover Type Management – Upland Open/Semi-Open Lands**

### Current Condition

Upland open/semi-open lands occur on 2,347 acres (5%) of the management area (Table 4.10.1). This category is a combination of the following non-forested land cover types: herbaceous open land (1,572 acres), upland shrub (437 acres), low-density trees (336 acres) and bare/sparsely vegetated (two acres). These communities are valued ecologically as sources of open land habitat for numerous species of wildlife. Several ecological reference areas and natural communities of note are found within these cover types (see sub-section 4.10.3).

### Desired Future Condition

- The large upland openings will be maintained to benefit a variety of wildlife species, provide recreational opportunities and protect and maintain ecological values.

### Long-Term Management Objectives

- Continue to maintain large upland openings through timber sales and forest treatment proposals.
- Work on decreasing the amount of spotted knapweed and other invasive plants in the large opening complexes using biological and mechanical treatments.

## **Section 4.10.1.6 Forest Cover Type Management – Other Types**

### Current Condition

There are many cover types that make up less than 5% of the total management area acres (Table 4.10.1), including: lowland aspen/balsam poplar (1,966 acres or 4%), lowland deciduous (1,759 acres or 4%), upland conifers (1,541 acres or 4%), lowland conifers (1,371 acres or 3%) and upland mixed forest (1,234 acres or 3%).

The “other types” category (3,268 acres or 7%) is a combination of the forested cover types in the management area with 2% or less of the total acres and includes: lowland mixed forest, upland spruce/fir, paper birch, mixed upland deciduous, white pine, tamarack, red pine, natural mixed pines, lowland spruce/fir and oak. The “miscellaneous other” category is a combination of non-forested stands including water, roads, rock and sand/soil.

Following general timber management guidelines, most of these cover types will be managed as even-aged stands balancing age classes where possible. Natural regeneration is expected after harvest. Mixed cover types with high basal area may be thinned depending on the species composition prior to final harvest.

Many of these minor cover types currently have harvests prescribed. Approximately 2,900 acres of these other minor cover types have site conditions limiting harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Some stands may be inaccessible for harvesting, and will be subject to succession.

#### Desired Future Condition

- These cover types may be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, available wildlife habitat and recreation opportunity.

#### 10-year Management Objectives

- The projected 10-year final harvest is 483 acres of upland conifers, 116 acres of lowland conifers, 137 acres of upland mixed forest and 386 acres of other types.
- The projected 10-year partial harvest is 200 acres of upland conifers, 365 acres of upland mixed forest and 357 acres of other types.

#### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.10.2 – Featured Species Management**

Much of the land in this management area was purchased specifically for the purpose of wildlife restoration. Within the aspen and northern hardwood cover types, regeneration of aspen for game species, and maintaining within-stand vegetative structure, are key goals, especially adjacent to lowland conifer and cedar cover types. Closed canopy cedar stands in the southern half of the island are critical wintering habitat for white-tailed deer. Trees along the edge of the shoreline are important foraging areas for neotropical migrants.

This management area will include one of the eastern Upper Peninsula Grouse Enhanced Management System areas. The boundaries will be delineated during this planning period by the local biologist in collaboration with the Forest Resources Division unit manager. Aspen stands that fall within the boundary may be managed to enhance habitat and hunting opportunities for ruffed grouse, deer and hare. Habitat treatments may include managing aspen on a shortened rotation with multiple age classes and smaller stand sizes.

#### **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improve habitat. Bear on Drummond Island are closely monitored and very few bears are allowed to be harvested each season. Hard mast is critical in the fall for bears to achieve adequate weight gains before denning. Management for bear should focus on improving existing habitat (minimizing fragmentation and maintaining both hard and soft mast) in this management area.

#### Wildlife habitat specifications:

- Maintain or increase tree species that provide mast including beech, oak, black cherry and ironwood.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.
- Retain some large diameter white pine and hemlock for bear refuge trees.
- Plant disease resistant beech and red oak where appropriate.

- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource.
- Discourage land transactions, use and management activities that facilitate fragmenting state lands within the management area.

### **Northern Goshawk**

The goal for northern goshawk in the eastern Upper Peninsula is to maintain or improve suitable habitat. Management should focus on maintaining contiguous blocks of suitable habitat, providing structural diversity within stands and limiting disturbance to nesting birds in priority areas.

#### Wildlife habitat specifications:

- All known woodland raptor nests should be reported to local wildlife staff and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. For northern goshawk nests, the wildlife habitat specifications contained within Michigan DNR's *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August 2012) will be followed until the workgroup has completed the guidance that will permanently replace the interim guidelines.

### **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age-class distribution for aspen in priority landscapes.

#### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Move to balance the age-class distribution of aspen and birch cover types to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres, under a 50-60-year rotation.
- Larger harvest units should have irregular boundaries and include one or two, 1-3-acre unharvested inclusions for every 40 acres exceeding 40 acres in size.
- Manage the aspen cover type for smaller patch size, a shorter rotation and a more deliberate habitat configuration within the designated Grouse Enhanced Management Systems areas where appropriate.
- Evaluate the conifer component in aspen stands, holding or increasing where desirable. Leave conifer under four-inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

### **Sharp-tailed Grouse**

In the eastern Upper Peninsula, the goal for sharp-tailed grouse is to maintain or improve suitable habitat. Management should focus on enhancing large opening complexes so there is an increase of available habitat.

#### Wildlife habitat specifications:

- Maintain or expand herbaceous open lands where existing leks occur.
- Manage adjacent forest to maintain young regenerating forest adjacent to permanent openings to maximize use by sharp-tailed grouse.
- Consolidate grass openings and planted red pine to increase the stand size of both cover types.
- Use prescribed fire where appropriate to maintain openings and manage pine types.
- Within open land complexes, maintain connectivity across the landscape.

### **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash, increasing mesic conifer components and increasing beaver abundance.



### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under 4 inch diameter at breast height.
- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris slash already present (before cutting) and slash resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales apply Michigan Biomass Harvesting Guidance and retain the maximum residuals.

### **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR procedure 32.22-07 states, "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the DNR and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months, and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### **4.10.3 – Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “*DNR’s Approach to the Protection of Rare Species on State Forest Lands*” (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed forty-one listed species as well as nine natural communities of note occurring in the management area as listed in Table 4.10.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Table 4.10.2 Occurrence information for special concern, rare, threatened and endangered communities and species for the Drummond Island management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Alvar		S1/G2?	Confirmed				Upland open/semi-open	N/A
Boreal forest		S3/GU	Confirmed				Upland & Lowland Sp/F	Mid
Great Lakes marsh		S3/G2	Confirmed				Lowland open/semi-open	N/A
Limestone bedrock glade		S2/G2G4	Confirmed				Upland open/semi-open	N/A
Limestone bedrock lakeshore		S2/G3	Confirmed				Upland open/semi-open	N/A
Limestone cliff		S2/G4G5	Confirmed				Upland open/semi-open	N/A
Limestone cobble shore		S3/G2G3	Confirmed				Upland open/semi-open	N/A
Northern shrub thicket		S5/G4	Confirmed				Upland open/semi-open	N/A
Sinkhole		S2/G3G5	Confirmed				Special Feature	N/A
<b>Birds</b>								
American bittern	<i>Botaurus lentiginosus</i>	SC/G4/S3-4	Confirmed	MV	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Southern wet meadow	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Black tern	<i>Chlidonias niger</i>	SC/G4/S3	Confirmed	MV	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Emergent Marsh	Lowland open/semi-open	N/A
Northern harrier	<i>Circus cyaneus</i>	SC/G5/S3	Confirmed	MV	Moderate	Emergent marsh	Lowland open/semi-open	N/A
						Great Lakes marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Mesic prairie	Lowland open/semi-open	N/A
Marsh wren	<i>Cistothorus palustris</i>	SC/G5/S3S4	Confirmed	PS	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Emergent Marsh	Lowland open/semi-open	N/A
Yellow rail	<i>Coturnicops noveboracensis</i>	T/G4/S1S2	Confirmed	MV	Moderate	Northern wet meadow	Lowland open/semi-open	N/A
Merlin	<i>Falco columbarius</i>	T/G5/S1S2	Confirmed	PS	Very High	Boreal forest	Upland & Lowland Sp/F	Mid
Common loon	<i>Gavia immer</i>	T/G5/S3-4	Confirmed	HV	Very High	Great Lakes barrens	Upland open/semi-open	N/A
						Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
Common tern	<i>Sterna hirundo</i>	T/G5/S2	Confirmed	MV	Moderate	Sand & gravel beach	Upland open/semi-open	N/A
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	SC/G5/S4	Confirmed	PS	Moderate	Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Dry sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Upland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A
<b>Insect</b>								
Leafhopper	<i>Flexamia delongi</i>	SC/GNR/S1S2	Confirmed	PS	Very High	Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Alvar	Upland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
						Dry sand prairie	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Mesic prairie	Upland open/semi-open	N/A
						Pine barrens	Jack Pine	Early
<b>Dragonfly</b>								
Ebony boghaunter	<i>Williamsonia fletcheri</i>	SC/G4/S1S2	Confirmed	MV	Low	Inland lake	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Prairie fen	Lowland open/semi-open	N/A
						Muskeg	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Inundated shrub swamp	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Table 4.10.2 Occurrence information for special concern, rare, threatened and endangered communities and species for the Drummond Island management area (Continued).

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Snails</b>								
Pleistocene catinella	<i>Catinella exile</i>	T/G2/SU	Confirmed	EV	Moderate	Northern fen	Lowland open/semi-open	N/A
						Limestone cobble shore	Lowland open/semi-open	N/A
						Prairie fen	Lowland open/semi-open	N/A
						Interdunal wetland	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Land snail	<i>Valloria gracilicosta albula</i>	E/G4Q/S1	Confirmed	HV	Moderate	Limestone cliff	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
Delicate vertigo	<i>Vertigo bollesiana</i>	T/G4/S2	Confirmed	HV	Moderate	Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone lakeshore cliff	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A
						Limestone cliff	Upland open/semi-open	N/A
Tapered vertigo	<i>Vertigo elatior</i>	SC/G5/S3	Confirmed	HV	Moderate	Northern fen	Lowland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Prairie fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Hubricht's vertigo	<i>Vertigo hubrichti</i>	E/G3/S2	Confirmed	EV	Moderate	Alvar	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
Mystery vertigo	<i>Vertigo paradoxa</i>	SC/G4G5Q/S3	Confirmed	HV	Low	Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Volcanic bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Northern fen	Lowland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
						Dry-mesic northern forest	White Pine	Late
						Limestone lakeshore cliff	Upland open/semi-open	N/A
Crested vertigo	<i>Vertigo pygmaea</i>	SC/G5/S3	Confirmed	MV	Low	Limestone cliff	Upland open/semi-open	N/A
						Granite bedrock lakeshore	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A
						Limestone lakeshore cliff	Upland open/semi-open	N/A
						Volcanic lakeshore cliff	Upland open/semi-open	N/A
						Volcanic bedrock cliff	Upland open/semi-open	N/A
<b>Plants</b>								
Climbing fumitory	<i>Adlumia fungosa</i>	SC/G4/S3	Confirmed			Sand and gravel beach	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Open dunes	Upland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Granite bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Limestone cliff	Upland open/semi-open	N/A
						Limestone lakeshore cliff	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
						Northern bald	Upland open/semi-open	N/A
						Volcanic bedrock glade	Upland open/semi-open	N/A
Wall-rue	<i>Asplenium ruta-muraria</i>	E/G5/S1	Confirmed			Limestone cliff	Upland open/semi-open	N/A
						Limestone lakeshore cliff	Upland open/semi-open	N/A
Cooper's milk vetch	<i>Astragalus neglectus</i>	SC/G4/S3	Confirmed			Alvar	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Hillside prairie	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Mesic sand prairie	Upland open/semi-open	N/A
						Oak-pine barrens	Oak	Mid
Green spleenwort	<i>Asplenium trichomanes-ramo</i>	SC/G4/S3	Confirmed			Mesic northern forest	Northern Hardwood	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Rich conifer swamp	Tamarack	Late
						Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone cliff	Upland open/semi-open	N/A
						Limestone lakeshore cliff	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A
Calypso or fairy-slipper	<i>Calypso bulbosa</i>	T/G5/S2	Confirmed			Rich conifer swamp	Tamarack	Late
						Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone bedrock glade	Upland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Wooded dune & swale complex	Upland open/semi-open	N/A
						Dry northern forest	Jack Pine, Red Pine	Late
						Dry-mesic northern forest	White Pine	Late
						Great Lakes barrens	Upland open/semi-open	N/A
						Volcanic bedrock glade	Upland open/semi-open	N/A
Richardson's sedge	<i>Carex richardsonii</i>	SC/G4/S3S4	Confirmed			Alvar	Upland open/semi-open	N/A
						Oak barrens	Oak	Mid
						Northern fen	Lowland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Dry-mesic prairie	Upland open/semi-open	N/A
						Dry-mesic northern forest	White Pine	Late
						Hillside prairie	Upland open/semi-open	N/A
						Lakeplain oak openings	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A
						Volcanic lakeshore cliff	Upland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Table 4.10.2 Occurrence information for special concern, rare, threatened and endangered communities and species for the Drummond Island management area (Continued).

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Plants (Cont'd)</b>								
Bulrush sedge	<i>Carex scirpoidea</i>	T/G5/S2	Confirmed			Alvar	Upland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone cobble shore	Upland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Alvar	Upland open/semi-open	N/A
						Oak barrens	Oak	Mid
Hill's thistle	<i>Cirsium hillii</i>	SC/G3/S3	Confirmed			Oak-pine barrens	Oak	Mid
						Pine barrens	Jack Pine	Early
						Boreal forest	Upland open/semi-open	N/A
						Dry northern forest	Upland open/semi-open	N/A
						Dry sand prairie	Upland open/semi-open	N/A
						Dry-mesic northern forest	Upland open/semi-open	N/A
						Dry-mesic prairie	Upland open/semi-open	N/A
						Lakeplain oak openings	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Mesic prairie	Upland open/semi-open	N/A
Ram's head lady's-slipper	<i>Cypripedium arietinum</i>	SC/G3/S3	Confirmed			Mesic sand prairie	Upland open/semi-open	N/A
						Oak openings	Upland open/semi-open	N/A
						Open dunes	Upland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Boreal forest	Upland & Lowland Sp/F	Mid
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Poor fen	Lowland open/semi-open	N/A
						Rich tamarack swamp	Tamarack	Late
						Wooded dune & swale complex	Upland open/semi-open	N/A
Tennessee bladder fern	<i>Cystopteris tennesseensis</i>	T/G5/S2	Confirmed			Dry northern forest	Jack Pine, Red Pine	Late
						Dry-mesic northern forest	White Pine	Late
						Great Lakes barrens	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Volcanic bedrock glade	Upland open/semi-open	N/A
						Granite bedrock glade	Upland open/semi-open	N/A
						Limestone cliff	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
						Limestone bedrock glade	Upland open/semi-open	N/A
Flattened spike rush	<i>Eleocharis compressa</i>	T/G4/S2	Confirmed			Coastal plain marsh	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
Limestone oak fern	<i>Gymnocarpium robertianum</i>	T/G5/S2	Confirmed			Rich conifer swamp	Tamarack	Late
						Limestone bedrock glade	Upland open/semi-open	N/A
Dwarf lake iris	<i>Iris lacustris</i>	LT/T/G3/S3	Confirmed			Limestone lakeshore cliff	Upland open/semi-open	N/A
						Open dunes	Upland open/semi-open	N/A
						Alvar	Upland open/semi-open	N/A
						Wooded dune & swale complex	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
Purple cliff brake	<i>Pellaea atropurpurea</i>	T/G5/S2	Confirmed			Alvar	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A
						Limestone cliff	Upland open/semi-open	N/A
						Limestone lakeshore cliff	Upland open/semi-open	N/A
Alaska orchid	<i>Piperia unalascensis</i>	SC/G5/S2S3	Confirmed			Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
Pine-drops	<i>Pterospora andromedea</i>	T/G5/S2	Confirmed			Boreal forest	Upland & Lowland Sp/F	Mid
						Dry-mesic northern forest	White Pine	Late
						Dry northern forest	Jack Pine, Red Pine	Late
						Granite bedrock glade	Upland open/semi-open	N/A
Small skullcap	<i>Scutellaria parvula</i>	T/G4/S2	Confirmed			Wooded dune & swale complex	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Alvar	Upland open/semi-open	N/A
						Hillside prairie	Upland open/semi-open	N/A
Houghton's goldenrod	<i>Solidago houghtonii</i>	LT/T/G3/S3	Confirmed			Limestone bedrock glade	Upland open/semi-open	N/A
						Open dunes	Upland open/semi-open	N/A
						Alvar	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Interdunal wetland	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
Prairie dropseed	<i>Sporobolus heterolepis</i>	SC/G5/S3	Confirmed			Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Alvar	Upland open/semi-open	N/A
						Prairie fen	Lowland open/semi-open	N/A
						Mesic sand prairie	Upland open/semi-open	N/A
Stitchwort	<i>Stellaria longipes</i>	SC/G5/S2S3	Confirmed			Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Open dunes	Upland open/semi-open	N/A
						Alvar	Upland open/semi-open	N/A
Downy oat-grass	<i>Trisetum spicatum</i>	SC/G5/S2S3	Confirmed			Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Volcanic cobble shore	Upland open/semi-open	N/A
						Volcanic lakeshore cliff	Upland open/semi-open	N/A
						Sandstone lakeshore cliff	Upland open/semi-open	N/A
						Granite bedrock lakeshore	Upland open/semi-open	N/A
						Granite lakeshore cliff	Upland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

# Drummond Island

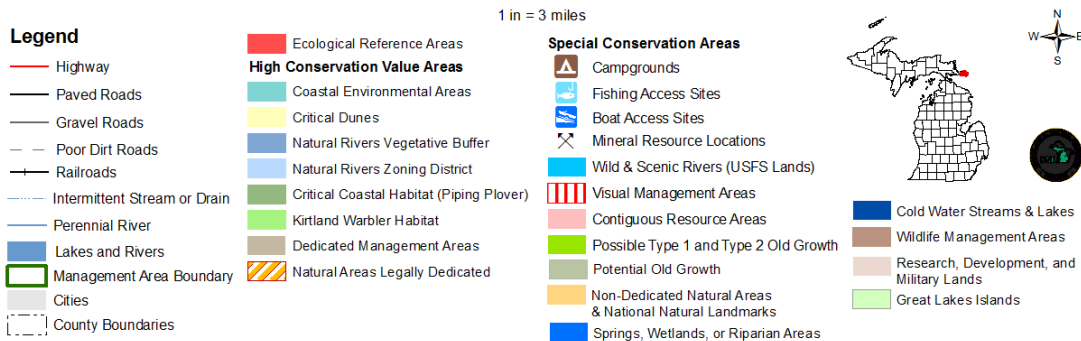
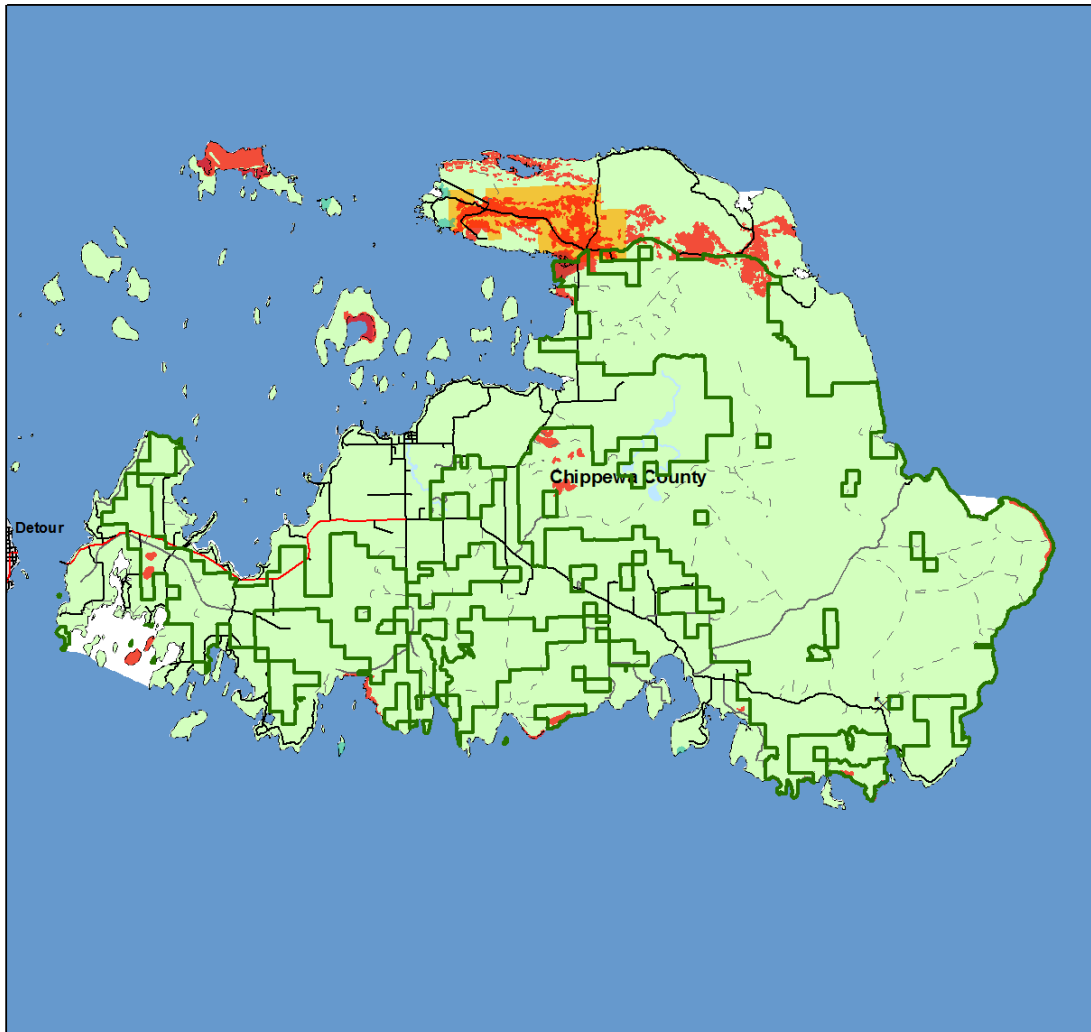


Figure 4.10.5. A map of the Drummond Island management area showing the special resource areas.

The entire Drummond Island management area is a Great Lakes Islands special conservation area. Other special conservation areas include the south edge of the Maxton Plains non-dedicated natural area (Figure 4.10.5), the Potagannissing Flooding which is a major wetland complex and cold water lakes and streams. In addition, approximately 2,000 acres were identified as potential old growth, and these stands are also special conservation areas until they are evaluated.

A coastal environmental area on the north edge of the management area represents the only high conservation value area in the management area (Figure 4.10.5).

There are ten ecological reference areas in the management area (Figure 4.10.5) representing the following natural communities: alvar (two – 245 acres and 39 acres); sinkhole (one at 69 acres); Great Lakes marsh (one at 122 acres); limestone cliff (one at 63 acres); limestone bedrock glade (two – 27 acres and 58 acres) and limestone bedrock lakeshore (three – 12 acres, 9 acres and 26 acres). All ecological reference areas will be managed to protect and enhance their natural vegetative and wildlife communities as directed by an ecological reference area-specific management plan.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

#### **4.10.4 – Forest Health Management**

Although forest health issues span the entire landscape, some specific threats are more important in this management area, due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Northern hardwood: beech bark disease
- Aspen and lowland poplar: white trunk rot, *Hypoxylon* canker
- Lowland conifers: spruce budworm, eastern larch beetle and larch casebearer

For further information on forest health, refer to Section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

#### **4.10.5 – Fire Management**

The shallow soils in this management area likely produced frequent fires, so that this management area is dominated by fire-adapted communities. Significant areas of alvar are present in this management area.

- Prescribed fire is frequently used in this management area to maintain the open character of these natural communities.
- Many of the natural communities in this management area are very sensitive, due to the shallow soils. Alternative suppression tactics which avoid the use of heavy equipment may be necessary in some portions of this management area.
- High recreation use in this management area provides opportunities for targeted fire prevention messages.

#### **4.10.6 – Public Access and Recreation**

Most of the island is accessible by roads and trails. The ferry system was upgraded to allow logging of pulpwood during the late 1980s and 90s.

Recreational facilities consist of motorized trails (Figure 4.10.1) which include snowmobile trails, off-road vehicle trails, an off-road vehicle route as well as the Potagannissing Flooding boat access site (Figure 4.10.3).

There are several full-sized vehicle off-road events held on the island each year under DNR permit. This area is popular for deer, grouse and bear hunting, trapping, fishing and kayaking.

Protect rare and unique resources from excessive or unauthorized use. Continue partnerships and collaborations with Drummond Island stakeholders to ensure recreational activities are compatible with wildlife habitat and resource protection.

Specific hunting recreation improvements such as parking lots, gates, trail planting and trail establishment, as well as the preparation and dissemination of specific promotional material, may be made as a result of Grouse Enhanced Management Systems areas planning in this management area.

#### **4.10.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. There are no designated high priority trout streams identified in this management area.

#### **4.10.8 – Minerals**

Surface sediments consist of primarily thin to discontinuous sediments lacustrine (lake) sand and gravel, clay and silt and peat and muck over bedrock. There is less than 100 feet of glacial drift on the island. Sand and gravel pits are located on the island, including one state lease and there is potential for additional pits.

The Silurian Engadine, Manistique and Burnt Bluff Groups, Cabothead Shale and Manitoulin Formation and Ordovician Queenston Shale subcrop below the glacial drift. The Engadine is quarried for stone on the island.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (14 in Chippewa County and several on the island). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology, given the depth to known metallic bearing formations.

There is a large limestone mine in this management area.



## 4.11 MA 11 – Fox River Complex MA

### Summary of Use and Management

Vegetative management in the Fox River Complex management area (MA) (Figure 4.11.1) will produce various timber products, maintain or enhance wildlife habitat, protect special conservation areas and high conservation value areas and provide for forest based recreational uses. The Fox River and the East Branch Fox River and their tributaries are natural rivers and have management plans associated with them. Management activities in some portions of this management area may be constrained by poor access due to the low, wet character of the landscape. Expected issues in this 10-year planning period include introduced pests, diseases and invasive species.

#### Introduction

The Fox River Complex management area is located in the west part of the eastern Upper Peninsula in Schoolcraft and Luce Counties. The Seney National Wildlife Refuge borders the southwest of the management area. It has 27,623 acres of state-owned land. Primary attributes include the low, wet forest cover types and the natural rivers and their associated high conservation value areas. Additional attributes which were important in identifying this management area include:

- The majority of the management area falls within the Luce subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995) with a very small portion extending into the Niagaran Escarpment and Lake Plain subsection 8.1.
- Landforms of lacustrine origin. Broad, poorly drained embayments contain beach ridges and depressions (swales), sand spits, transverse sand dunes and sand bars. Deltaic deposits occur along the northern margins of the embayments, where glacial meltwater streams carried massive amounts of sand into the shallow waters.
- Recreational opportunities include: snowmobiling, off-road vehicle (ORV) riding, boating, hiking, hunting and fishing.

The famous author, Ernest Hemmingway, fished the Fox River and wrote about his experiences in the story titled “*Big Two-Hearted River*”. The town of Seney, at the intersection of highways M-28 and M-77, was at one time a large logging community.

The state land in this management area is concentrated into large blocks with private holdings scattered throughout. The majority of this management area falls within the Shingleton Forest Management Unit with the east portion in the Newberry Forest Management Unit. The current predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.11.1.

Table 4.11.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Fox River Complex management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Lowland Open/Semi-Open Lands	26%	7,234	0	7,234	0	0	7,234	0	0
Lowland Conifers	20%	5,545	396	5,149	572	0	5,545	572	0
Lowland Spruce/Fir	9%	2,575	412	2,163	437	0	2,575	240	0
Cedar	7%	1,865	0	1,865	117	0	1,865	117	0
Aspen	6%	1,728	23	1,705	76	0	1,728	284	0
Northern Hardwood	6%	1,699	46	1,653	0	530	1,699	0	801
Red Pine	5%	1,477	167	1,310	145	381	1,477	145	541
Lowland Deciduous	4%	1,066	326	740	251	0	1,066	82	0
Upland Open/Semi-Open Lands	3%	801	0	801	0	0	801	0	0
Jack Pine	3%	792	56	736	8	0	792	105	0
Tamarack	3%	732	448	284	139	0	732	41	0
Misc Other (Water, Local, Urban)	0%	136	0	136	0	0	136	0	0
Others	7%	1,973	694	1,279	163	108	1,973	137	221
<b>Total</b>	<b>100%</b>	<b>27,623</b>	<b>2,568</b>	<b>25,055</b>	<b>1,908</b>	<b>1,019</b>	<b>27,623</b>	<b>1,723</b>	<b>1,563</b>

Others include: paper birch, natural mixed pines, lowland mixed forest, lowland aspen/balsam poplar, upland mixed forest, white pine, hemlock, upland conifers, upland spruce/fir, mixed upland deciduous and planted mixed pines.

# Fox River Complex

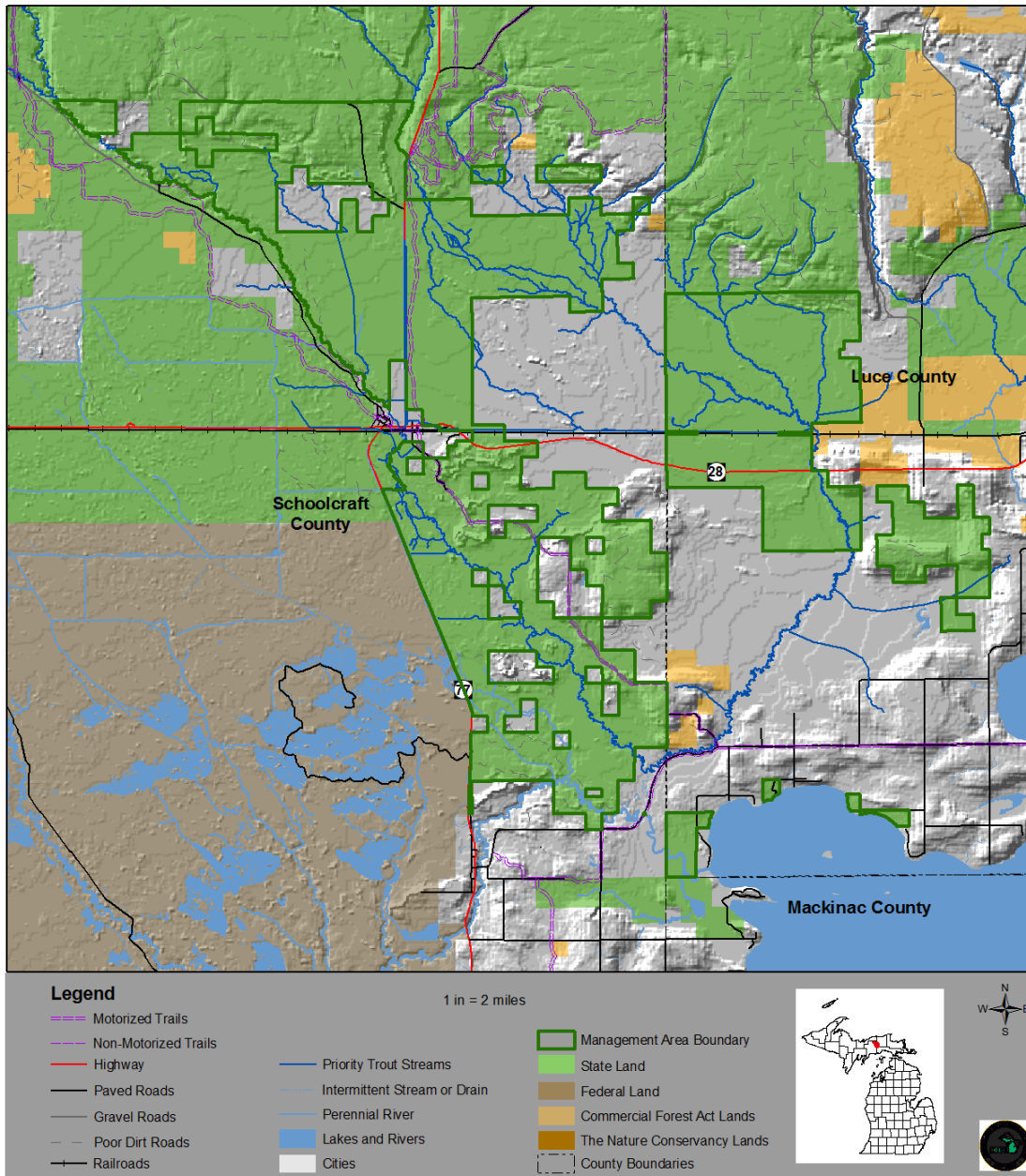


Figure 4.11.1. Location of the Fox River Complex management area (dark green boundary) in relation to surrounding state forest land other ownerships and the town of Seney.

## 4.11.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (e.g., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

#### **Section 4.11.1.1 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

##### Current Condition

The management area contains a large amount of lowland open/semi-open lands totaling approximately 7,234 acres (26%). This category is a combination of lowland shrub (3,598 acres), bog (1,704 acres), marsh (1,554 acres) and treed bog (378 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. The lowland shrub and marsh stands contain many ridges and islands of pine. These large wet cover types contribute to the access issues in the management area.

##### Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity.

##### Long-Term Management Objectives

- In general, these stands will be maintained without active management to protect their ecological values; and
- Lowland shrub stands may be managed for wildlife habitat and/or for biomass, if markets materialize.

#### **Section 4.11.1.2 Forest Cover Type Management – Lowland Conifers**

##### Current Condition

Lowland conifer occurs on 5,545 acres (20%) of the management area (Table 4.11.1). Lowland conifer stands in the management area have been successfully harvested and regenerated resulting in stands in all age classes (Figure 4.11.2). Access throughout most of this cover type is limited due to the wet sites. Approximately 14% of the stands have been classified as uneven-aged stands and have trees of all sizes and ages.

Currently, there are 171 acres with a final harvest prescribed. Approximately 32 acres that are prescribed for harvest in other cover types are expected to convert to lowland conifers after harvest. These acres are shown in Figure 4.11.2 in the regeneration prescriptions column. There are 396 acres of lowland conifers that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Conifer stands in inaccessible areas will be subject to natural processes (fire, windthrow, insect defoliation and beaver flooding) resulting in the formation of a broad range of successional stages.

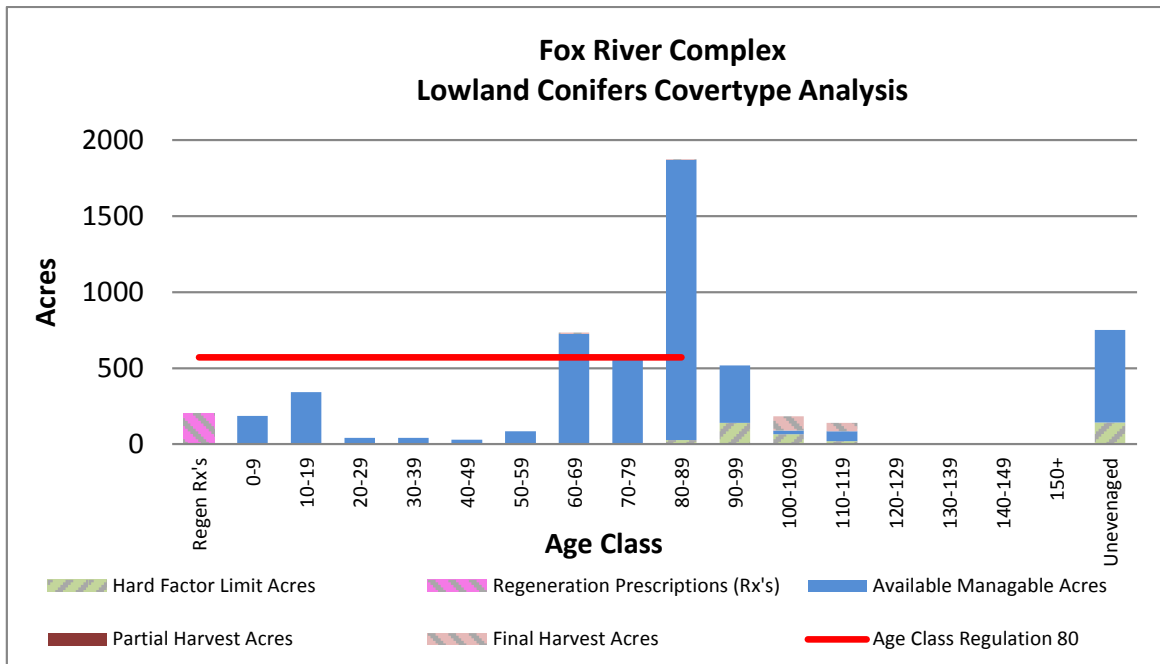


Figure 4.11.2. Age-class distribution of lowland conifers in the Fox River Complex management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age providing for a continuous supply of timber, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest is 572 acres of lowland conifers to work toward balancing age classes with natural regeneration of species currently on site expected.

Long-Term Management Objectives

- Balance the age-class distribution of accessible lowland conifers providing a regulated harvest of approximately 572 acres of lowland conifers per decade (red line in Figure 4.11.2).

**Section 4.11.1.3 Forest Cover Type Management – Lowland Spruce/Fir**

Current Condition

Lowland spruce/fir occurs on 2,575 acres (9%) of the management area (Table 4.11.1). Lowland spruce/fir stands have been successfully harvested and regenerated in this management area in the past (Figure 4.11.3). Many of these stands are a combination of black spruce and jack pine. Lowland spruce/fir stands are often found adjacent to lowland shrub and marsh stands and access is often difficult.

Currently, there are 245 acres with a final harvest prescribed. There are 412 acres of lowland spruce/fir that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Where harvest opportunities are limited by access issues, stands will be subject to natural succession.

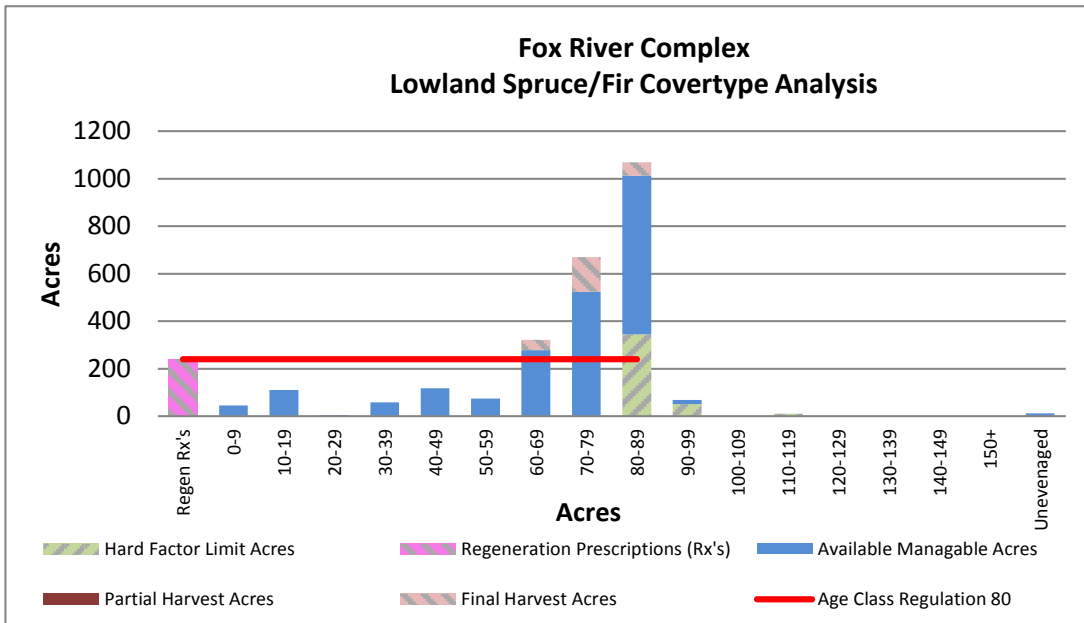


Figure 4.11.3. Age-class distribution of lowland spruce/fir in the Fox River Complex management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland spruce/fir will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age providing for a continuous supply of timber, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected final harvest is 437 acres of lowland spruce/fir. The increase from the regulated amount is due to the current age class structure where there are a large number of mature stands. Natural regeneration of species currently onsite is expected after harvest.

#### Long-Term Management Objectives

- Balance the age-class structure of available lowland spruce/fir providing a regulated harvest of approximately 240 acres each decade.

### **Section 4.11.1.4 Forest Cover Type Management – Northern White Cedar**

#### Current Condition

Cedar stands occur on 1,865 acres (7%) of the management area (Table 4.11.1). Cedar stands within the deer wintering special conservation areas will be managed for closed canopy winter habitat for deer. A small amount of cedar harvest and regeneration has successfully occurred in this management area in recent years (Figure 4.11.5). There is a need to address future cedar cover within the deer wintering complexes. Limited cedar harvests will occur outside the wintering complexes recognizing that cedar may take many years to regenerate. Reliable and timely regeneration of cedar is a concern from both wildlife and forest management perspectives.

Currently, there are 50 acres of cedar with a final harvest prescribed. At this time, there are no stands with site conditions limiting harvest.

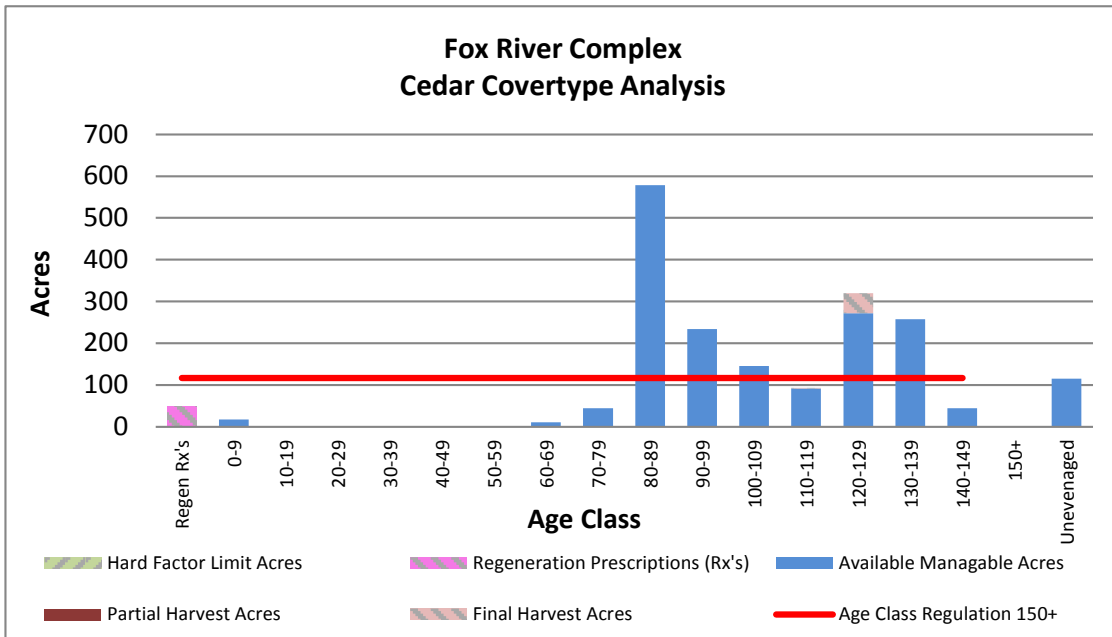


Figure 4.11.5. Age-class distribution of cedar in the Fox River Complex management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Where deer wintering activities are not a concern cedar will be maintained on operable sites through even-aged management with acres balanced between 0-159 years of age providing for a continuous supply of timber, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected final harvest is 117 acres of cedar. However, harvest of this type, if it occurs, may vary widely from the projected harvest, in order to meet the long-term management objectives; and
- Ensure that cedar and/or hemlock recruitment/regeneration is reliable where harvesting in this cover type occurs.

#### Long-Term Management Objectives

- Within deer wintering special conservation areas, focus cedar management on winter habitat for deer; and
- Outside deer wintering areas, look for opportunities to regenerate cedar providing a regulated harvest of approximately 117 acres of cedar per decade.

### **Section 4.11.1.5 Forest Cover Type Management – Aspen**

#### Current Condition

Aspen occurs on 1,728 acres (6%) of the management area (Table 4.11.1). Aspen stands are distributed on lake plains, outwash plains and moraines on a range of sites with Kotar habitat types of PARVAa, ATFD, AFPo and AFOAs (see Appendix E). Aspen has been consistently harvested and regenerated over the last 40 years, resulting in the majority of the aspen acreage now occurring in the younger age classes (Figure 4.11.6).

There are 36 acres that have a final harvest prescribed. There are some other cover types that are expected to convert to aspen after harvest and some aspen stands that are expected to convert to other cover types after harvest. These acres are shown in the regeneration prescriptions column of Figure 4.11.6. The total aspen acreage is expected to remain similar. There are 23 acres of aspen that have site conditions limiting their harvest this entry cycle. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible aspen areas will eventually succeed to late successional species.

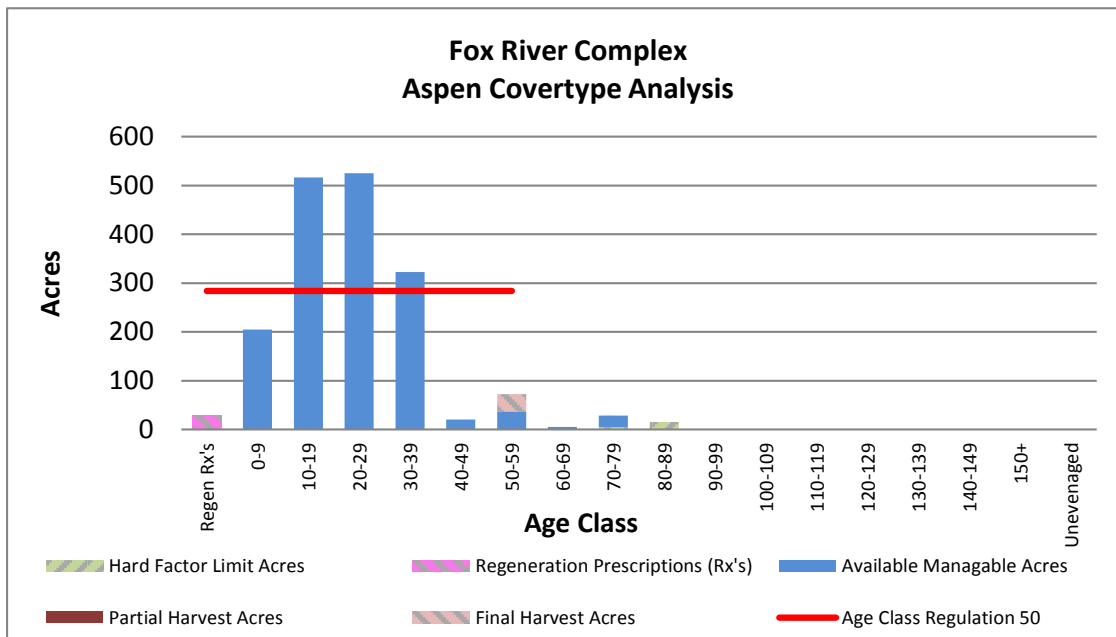


Figure 4.11.6. Age-class distribution of aspen in the Fox River Complex management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The projected 10-year final harvest of aspen is 76 acres which is less than the regulated amount due to the current age-class structure where the majority of stands are less than 40 years old.

#### Long-Term Management Objectives

- Balance the age-class structure of accessible aspen stands providing for a regulated final harvest of approximately 284 acres per decade.

### **Section 4.11.1.6 Forest Cover Type Management – Northern Hardwoods**

#### Current Condition

Northern hardwood stands occur on 1,699 acres (6%) of the management area (Table 4.11.1). Northern hardwoods are distributed throughout the management area on ground moraines, moraines and outwash plains with Kotar habitat types of ATFD, AFPO and AFOAs (see Appendix E). These mesic medium to rich sites have high potential to grow quality trees. The northern hardwood stands are composed of sugar maple and red maple in combination with beech, yellow birch, hemlock and black cherry in lesser amounts. In an effort to maximize tree quality the majority of the stands have been managed using single tree selection, generally every 20 years, maintaining structural and species diversity to work towards an uneven-aged state

Beech bark disease is found throughout the management area resulting in high beech mortality. Continue salvage harvests of beech affected by beech bark disease using Beech Bark Disease Management Guidelines. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

Currently, 32 acres have a partial harvest or selection assigned (Figure 4.11.7). There are 46 acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.



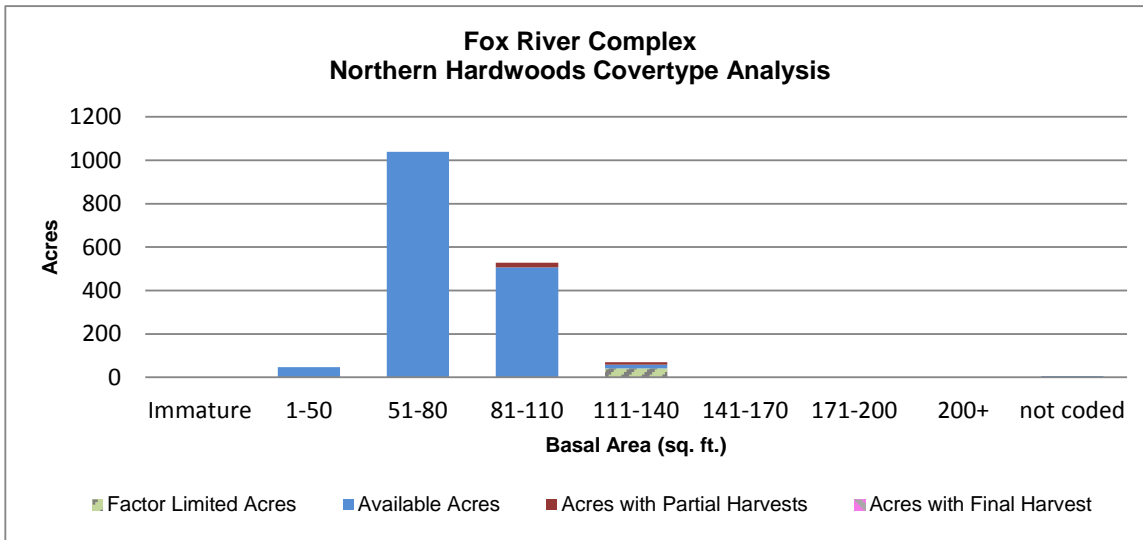


Figure 4.11.7. Basal area distribution of northern hardwoods in the Fox River Complex management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwoods will be maintained on operable sites using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands while providing for a continuous supply of timber, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected partial or selection harvest is 530 acres of northern hardwood;
- Evaluate beech dominated forests to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands;
- Consider herbicide application on beech regeneration to promote regeneration of other species; and
- In areas that are losing beech to beech bark disease, consider planting disease resistant beech or oak after harvesting to increase the availability of hard mast.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.11.1.7 Forest Cover Type Management – Red Pine**

Current Condition

Red pine occurs on 1,477 acres (5%) of the management area (Table 4.11.1). Red pine is distributed throughout the management area on outwash plains, dunes, and moraines with Kotar habitat types of PVE, PARv and PARVAa (see Appendix E). While most of the stands in the 40-59 year age classes (Figure 4.11.8) are planted red pine stands, the majority of the total red pine acres are in natural stands. Many of the natural red pine stands have had shelterwood or seed tree harvests, followed by natural regeneration, which has resulted in some two-aged and uneven-aged stands. For accessible stands over rotation age, conduct stand-replacement harvests using shelterwood/seed tree systems when possible to encourage natural regeneration. Where necessary, planting will be used to regenerate the stands. Natural red pine stands in older age classes may be found on small islands within marshes and are often difficult to access.

Currently, there are 309 acres with a final harvest and 155 acres with a partial harvest or thinning prescribed. There are 167 acres of red pine that have site conditions limiting their harvest this entry cycle. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Small islands of red pine within the large marsh complexes may never have access for harvesting and will remain until natural senescence.



## Desired Future Condition

- Red pine will be maintained and managed on operable sites through thinning until stand replacement harvest at economic maturity with acres balanced between 0-89 years of age. This will provide for continual harvest, wildlife habitat and recreational opportunities. Inaccessible stands of red pine may be allowed to reach biological maturity (over 200 years).

## 10-Year Management Objectives

- The 10-year projected red pine final harvest is 145 acres to work toward balancing of age classes; and
- The 10-year projected red pine partial harvest (thinning) is 381 acres.

## Long-Term Management Objectives

- Balance the age-class structure of red pine providing for a regulated final harvest of approximately 145 acres per decade; and
- Stands will be periodically thinned until they meet silvicultural criteria.

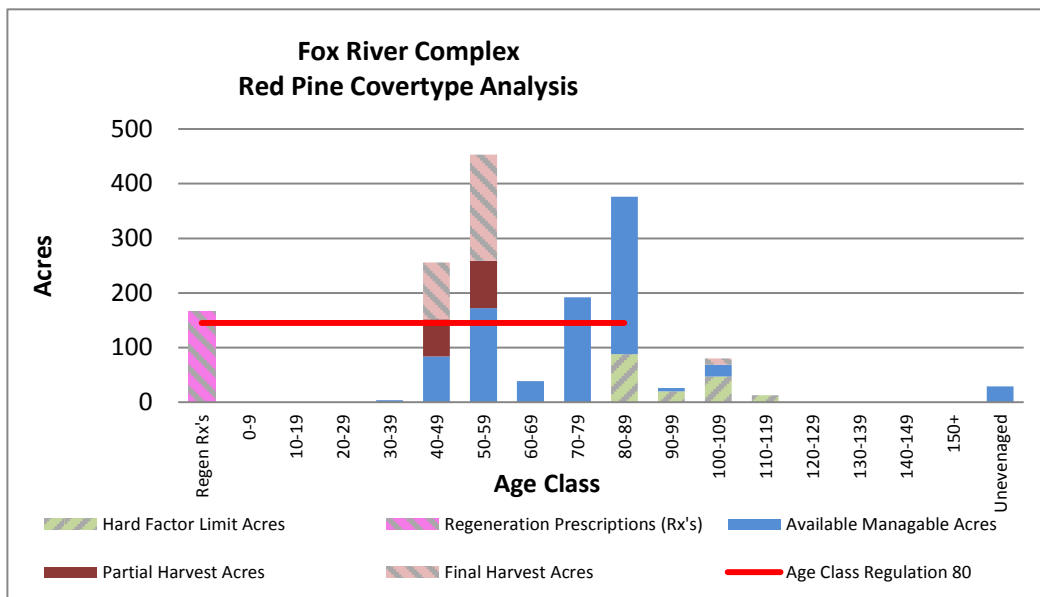


Figure 4.11.8. Age-class distribution of red pine in the Fox River Complex management area (2012 Department of Natural Resources inventory data).

## Section 4.11.1.8 Forest Cover Type Management – Other Types

### Current Condition

There are many other cover types that have less than 5% of the total management area acres (Table 4.11.1) including: lowland deciduous (1,066 acres or 4%), upland open/semi-open lands (801 acres or 3%), jack pine (792 acres or 3%) and tamarack (732 acres or 3%).

The “other types” category (1,973 acres or 7%) is a combination of forested types that have 2% or less of the total acres and includes: paper birch, natural mixed pines, lowland mixed forest, lowland aspen/balsam poplar, upland mixed forest, white pine, hemlock, upland conifers, upland spruce/fir, mixed upland deciduous and planted mixed pines. The majority of these cover types have been managed as even-aged stands. White pine and mixed cover types with high basal area may be thinned prior to final harvest. Following general timber management guidelines, perform regeneration harvests in even-aged forested cover types, attempting to balance the age classes where possible. Natural regeneration of species currently on site is expected.

Currently, there are 1,524 acres of these other minor cover types that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

### Desired Future Condition

- These cover types may be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreational opportunity.

### 10-Year Management Objectives

- The projected 10-year final harvest is 251 acres of lowland deciduous, 139 acres of tamarack and 163 acres of other types; and
- The projected 10-year partial harvest is 108 acres of other types.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## **4.11.2 – Featured Wildlife Species Management**

The primary wildlife management desire in this area is to maintain diversity in managed forest types, retain within stand diversity and structure and connectivity between forest types.

### **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improve habitat. Management for the species should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land use.

#### Wildlife habitat specifications:

- Maintain or increase tree species that provide mast including beech, oak, black cherry and ironwood.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.
- Retain some large diameter white pine or hemlock as refuge trees.
- Plant disease resistant beech and red oak where appropriate
- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource.
- Discourage land transactions, use and management activities that facilitate fragmenting state lands within the management area.

### **Northern Goshawk**

The goal for northern goshawk in the eastern Upper Peninsula is to maintain or improve suitable habitat. Management should focus on maintaining contiguous blocks of suitable habitat, providing structural diversity within stands and limiting disturbance to nesting birds in priority areas.

#### Wildlife habitat specifications:

- All known woodland raptor nests should be reported to local wildlife staff and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. For northern goshawk nests, the wildlife habitat specifications contained within Michigan DNR's *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August 2012) will be followed until the workgroup has completed the guidance that will permanently replace the interim guidelines.

### **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash, increasing mesic conifer components and increasing beaver abundance.

#### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under 4 inch diameter at breast height.
- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- Regenerate jack pine to dense, fully stocked stands.
- When using herbicide treatments to prepare sites for planting red and jack pine in snowshoe hare habitat, encourage more diverse stands of pine and aspen by using application skips in pockets or along stand edges.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris already present (before cutting), and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance and retain the maximum residual.

#### **Spruce Grouse**

The goal for spruce grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on retention of mixed conifers on riparian/lowland edges, the increase of in stand species diversity and landscape level planning to ensure populations are not isolated.

#### Wildlife habitat specifications:

- In jack pine harvests leave mixed conifer and/or jack pine retention strips of mature trees along riparian corridors and lowland margins as well as along upland edges.
- Maintain spruce seed trees through retention, especially at lowland margins.
- Maintain or increase diversity of conifer stands especially along lowland edges.
- Large clearcuts may isolate populations of spruce grouse so landscape level planning must take into account this species' need for low-density mixed-conifer travel corridors to connect suitable stands.
- Ensure black spruce recruitment/regeneration is reliable where harvested.

#### **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance, available summer and winter habitat, timber management and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the Department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

#### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.

- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### 4.11.3 – Rare Species and Special Resource Area Management

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed seven listed species occurring in the management area as listed in Table 4.11.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Table 4.11.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Fox River Complex management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Birds</b>								
Northern goshawk	<i>Accipiter gentilis</i>	SC/G5/S3	Confirmed	PS	Very High	Mesic northern Forest	Northern Hardwood	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Late
						Dry-mesic northern forest	White Pine	Late
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Boreal forest	Upland & Lowland Sp/F	Mid
						Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
						Pine barrens	Jack Pine	Early
						Dry northern forest	Jack Pine, Red Pine	Early
Common loon	<i>Gavia immer</i>	T/G5/S3-4	Confirmed	HV	Very High	Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
<b>Butterfly</b>								
Frigga fritillary	<i>Boloria frigga</i>	SC/G5/S3S4			Low	Bog	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
<b>Plants</b>								
Fir clubmoss	<i>Huperzia selago</i>	SC/G5/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
						Intermittent wetland	Lowland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Special conservation areas in this management area are potential old growth areas, cold water streams, high priority trout streams (Fox River) and a deer wintering complex in the southeast. Concentrated recreational area special conservation areas (boat access sites) are described in the recreation section 4.11.6 below. In addition, approximately 2,500 acres were identified as potential old growth and these stands are also special conservation areas until they are evaluated.

The Fox River system is a state designated natural river and along with its corridor is a high conservation value area. The Fox River Natural River Plan (DNR, Nov. 3, 1988) contains specific requirements for management in this area (Figure 4.11.9).

There have been no ecological reference areas identified in the Fox River Complex management area.

## Fox River Complex

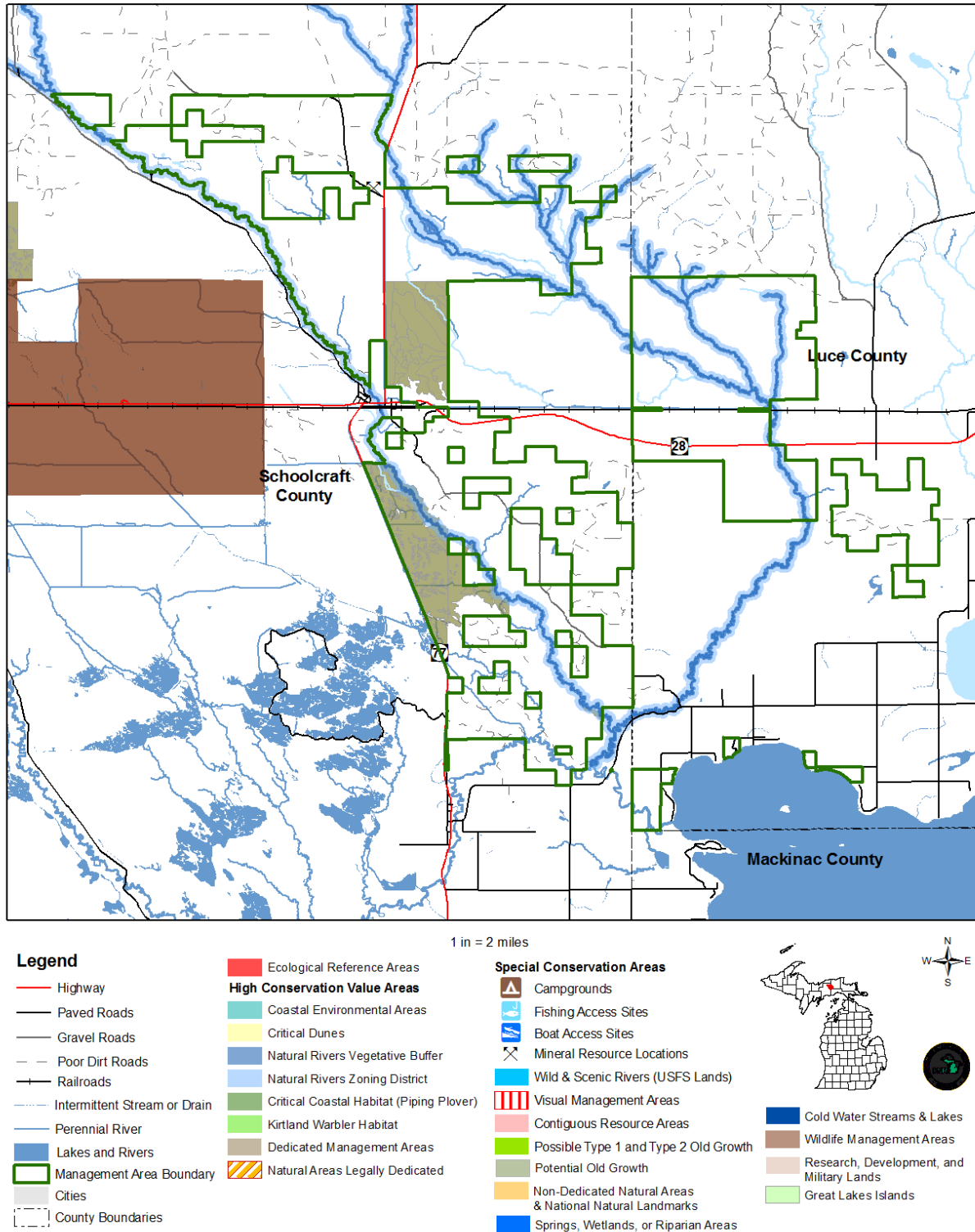


Figure 4.11.9. A map of the Fox River Complex management area showing the special resource areas.

Management goals during this planning period:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.

- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.

#### 4.11.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Northern hardwoods: beech bark disease;
- Aspen: white trunk rot and *Hypoxylon* canker;
- Lowland conifers and spruce: spruce budworm, eastern larch beetle and larch casebearer; and
- Red pine: red-headed pine, pine engraver and *Scleroderris*.

For further information on forest health refer to section 3.

#### Invasive Plant Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. Glossy buckthorn has been documented within the management area. Glossy buckthorn, leafy spurge, purple loosestrife, reed canary grass and wild parsnip have been documented within a five-mile buffer of the management area (Table 4.11.3). Monitoring efforts should specifically look for new populations of these species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

A cooperative program between the DNR and the Seney National Wildlife Refuge has reduced the amount of glossy buckthorn in this area through cutting, herbicide and burning. Continue with efforts to remove of glossy buckthorn in the area.

Table 4.11.3. Invasive plant species within or near the Fox River Complex management area (Data from the Michigan Invasive Plant Identification Network database).

Fox River Complex - FRD MAs	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	8	9	17	5
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
Glossy Buckthorn <i>Rhamnus frangula</i>	8	Glossy Buckthorn <i>Rhamnus frangula</i>	4	
-	-	Leafy Spurge <i>Euphorbia esula</i>	2	
-	-	Purple Loosestrife <i>Lythrum salicaria</i>	1	
-	-	Reed Canary Grass <i>Phalaris arundinacea</i>	1	
-	-	Wild Parsnip <i>Pastinaca sativa</i>	1	

#### **4.11.5 – Fire Management**

Dominated by lowland soils, this area may have been subject to a higher fire frequency than normally expected. There is evidence that lightning ignitions in these areas under summer drought could support large fire growth. Adjacent barrens and dry forests to the north also are sources of ignitions that may have brought fire into the management area.

- Though no prescribed burns have been planned or conducted within the management area, natural regeneration to maintain pine types may include burn prescriptions to discourage competing hardwoods and prepare seedbed.
- With fishing access sites for both Manistique Lake and the Fox River and the town of Seney centrally located, prevention messages concerning campfires and smoking source fires would be appropriate.
- The Fox River Zone Dispatch plan falls within the management area and calls for aggressive suppression response based on current fire danger.
- A large portion of the management area has limited access for firefighting equipment.

#### **4.11.6 – Public Access and Recreation**

Although M-28 and M-77 are in this management area, access for management is limited throughout much of this management area due to lack of trail roads because of rivers, creeks and low, wet ground.

Recreational facilities found here include snowmobile trails (Figure 4.11.1) and boat access sites on Manistique Lake and the Fox River.

Fishing and hunting are very popular forms of recreation in this management area. Dispersed camping is popular in certain areas along the Fox River.

#### **4.11.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. A part of the Manistique River system has been designated as high priority trout stream in this management area and the details are shown in the Integrated Forest Monitoring Assessment and Prescriptions Geographic Decision Support System and in Figure 4.11.1.

#### **4.11.8 – Minerals**

Surface sediments consist of primarily peat and muck with minor lacustrine (lake) sand and gravel. There is insufficient data to determine the glacial drift thickness. Potential for sand and gravel pits in the general area appears to be limited.

The Ordovician Queenston Shale, Big Hill Dolomite, Stonington Formation, Utica and Collingwood Shales and Trenton Formation subcrop below the glacial drift. The Trenton is quarried for stone/dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (two in Luce and five in Schoolcraft). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

There is a mineral lease for a sand pit on state owned land north of Seney.

## 4.12 MA 12 – Garden Thompson Plains Management Area

### Summary of Use and Management

Vegetative management in the Garden Thompson Plains management area (MA) (Figure 4.12.1) will emphasize the intensive timber management of the upland forest types within this area, such as the red pine management area along U.S.-2. The Thompson Plains, a large opening complex north of U.S.-2, is managed specifically for wildlife. Primary values associated with the plains are the maintenance of an herbaceous community suitable for species such as sharp-tailed grouse and upland sandpiper. Management will also protect unique areas and threatened, endangered and special concern species; and provide recreational opportunities. Timber management objectives include improving the age class distribution of aspen, red pine and jack pine; and increasing the proportion of young oak. Expected issues in this 10-year planning period are increased illegal off-road vehicle use; introduced pests and diseases, such as beech bark disease and emerald ash borer; and control of non-native species, such as autumn olive.

### Introduction

The Garden Thompson Plains management area is located in the western part of the eastern Upper Peninsula in Schoolcraft and Delta Counties. It has approximately 27,408 acres of state-owned land. The primary attributes are intensive timber production along the U.S.-2 corridor, and wildlife habitat management of a large open-land complex. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula Ecoregion (Albert, 1995).
- The dominant landform consists of sandy lake plain and limestone bedrock at or near the surface.
- Recreational activities for nearby towns, including: skiing, hunting and snowmobiling.
- This management area contains one of the eastern Upper Peninsula Grouse Enhanced Management Systems areas. This area plan will emphasize balanced age classes of aspen for timber production which will have habitat benefits for a number of the featured species including ruffed grouse and deer. The boundaries of Grouse Enhanced Management Systems areas will be delineated and an operational plan will be developed during this planning period by the local biologist in collaboration with the Forest Resources Division unit manager and integrated into the plan through the revision process.
- This management area contains several Michigan Natural Features Inventory recognized element occurrences, special conservation area deer wintering areas and four ecological reference areas.

This management area has a unique climate along Lake Michigan. Coniferous species and red maple near Lake Michigan have a high-value to neotropical migrating bird species.

A sesquicentennial pine stand was planted along U.S.-2 in 1987. Historic Fayette State Park is nearby. There are several known archeological sites within the management area.

The state land in this management area is concentrated. Most of the management area was acquired in a land exchange with the federal government for state in-holdings within the Hiawatha National Forest. The management area is within the Shingleton Forest Management Unit. The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.12.1.



# Garden Thompson Plains

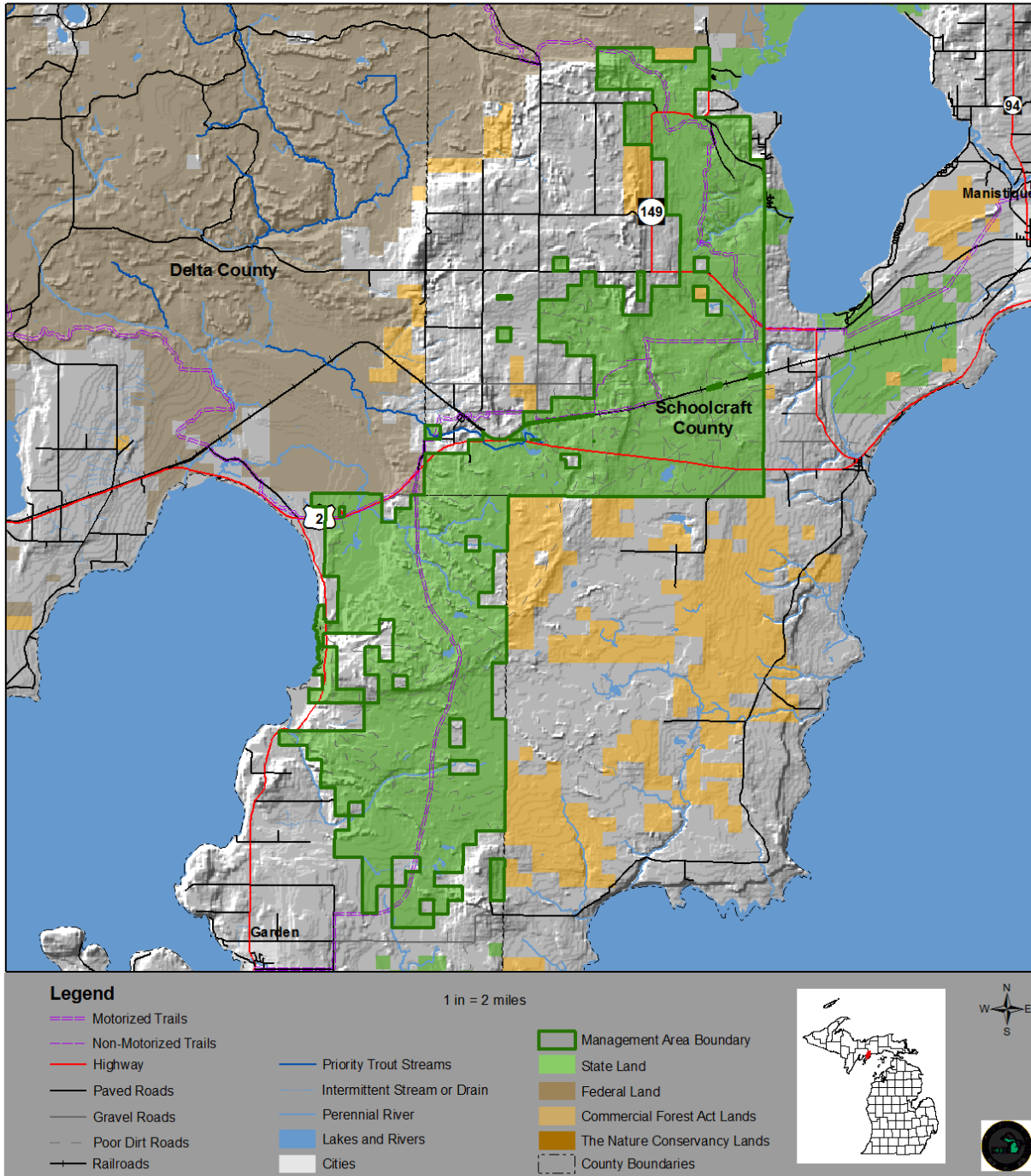


Figure 4.12.1. Location of the Garden Thompson Plains management area (dark green boundary) in relation to adjacent state forest lands other ownerships and Lake Michigan.

Table 4.12.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Garden Thompson Plains management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Aspen	30%	8,211	47	8,164	472	0	8,211	1,361	0
Northern Hardwood	11%	3,079	24	3,055	0	1,057	3,079	0	1,436
Red Pine	11%	2,932	0	2,932	112	266	2,932	326	1,264
Cedar	8%	2,181	0	2,181	136	0	2,181	136	0
Upland Open/Semi-Open Lands	7%	1,868	0	1,868	0	0	1,868	0	0
Lowland Conifers	5%	1,425	535	890	184	0	1,425	99	0
Lowland Open/Semi-Open Lands	5%	1,420	0	1,420	0	0	1,420	0	0
Oak	4%	979	52	927	103	251	979	103	292
Jack Pine	3%	948	0	948	0	0	948	135	0
Misc Other (Water, Local, Urban)	1%	343	0	343	0	0	343	0	0
Others	15%	4,022	375	3,647	259	372	4,022	409	382
<b>Total</b>	<b>100%</b>	<b>27,408</b>	<b>1,033</b>	<b>26,375</b>	<b>1,266</b>	<b>1,946</b>	<b>27,408</b>	<b>2,569</b>	<b>3,374</b>

Others include: upland conifers, upland spruce/fir, lowland aspen/balsam poplar, lowland deciduous, lowland mixed forest, lowland spruce/fir, upland mixed forest, hemlock, mixed upland deciduous, white pine, paper birch, natural mixed pines and tamarack.

#### 4.12.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### Section 4.12.1.1 Forest Cover Type Management - Aspen

###### Current Condition

Aspen occurs on 8,211 acres (30%) of the management area (Table 4.12.1). Aspen stands in this management area are most often found on sandy soils of outwash plains, lake plains and moraines with PARV, PARVAa and ATFD Kotar habitat types (see Appendix E). Aspen has been consistently harvested and regenerated in recent years, resulting in approximately 85% of the acreage being less than 40 years old (Figure 4.12.2). Aspen within the Garden Thompson Plains Grouse Enhanced Management System area may be managed slightly different than the rest of the aspen within the management area, through shorter rotations and smaller harvest areas.

There are currently 520 acres of aspen prescribed for final harvest. There are 47 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations. Inaccessible aspen areas will eventually succeed to late successional species.

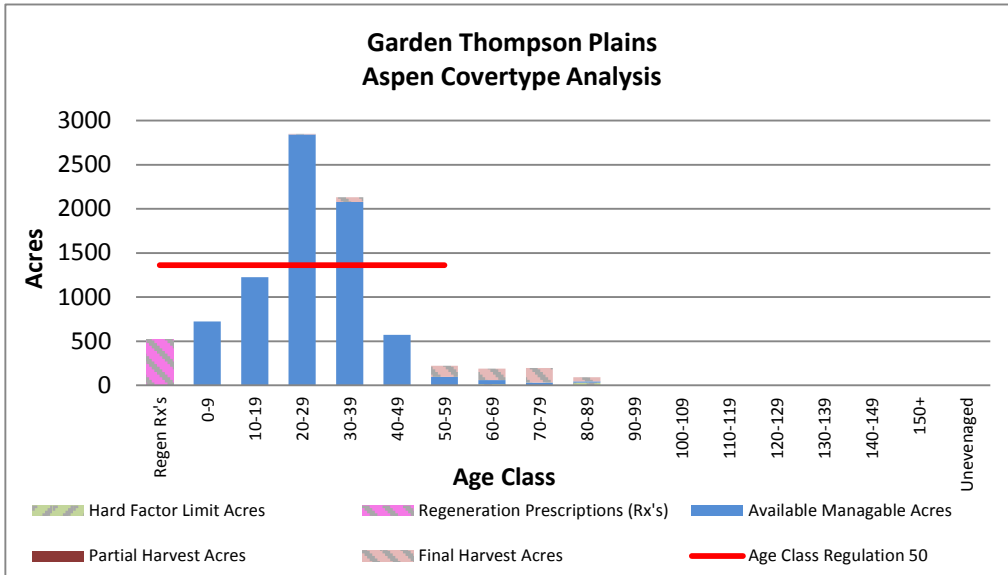


Figure 4.12.2. Age class distribution of aspen in the Garden Thompson Plains management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest is approximately 472 acres with the reduction in acres from the regulated amount being due to the current age-class structure where the majority of the stands are below 40 years of age; and
- Aspen within the identified Grouse Enhanced Management Systems area may be managed differently than the rest of the aspen within the management area, with a shorter rotation age, small patch cuts and carefully considered stand adjacency.

Long-Term Management Objectives

- Balance the age-class structure of accessible aspen stands providing for a regulated harvest of approximately 1,361 acres per decade (red line in Figure 4.12.2).

**Section 4.12.1.2 Forest Cover Type Management – Northern Hardwoods**

Current Condition

Northern hardwood occurs on 3,079 acres (11%) of the management area (Table 4.12.1). Northern hardwoods are distributed on loam and sand soils of moraines, ground moraines, disintegration moraines, outwash plains and lake plains with Kotar habitat types of AFPo, ATFD and PArVAa. The majority of the hardwood is found in the northern portion of the management area and is of good quality. In the Garden Peninsula, hardwood quality is generally poor, so not all stands are managed as uneven-aged. Where stand quality warrants, selection harvests will occur in stands with a basal area over 120 square feet per acre. In general, this will allow most hardwood stands to be selectively harvested every 20 years. Where site quality is poor, shelterwood and other even-aged harvesting systems will be considered. Stands that have been recently harvested through even-aged systems are shown in the immature column in Figure 4.12.3.

Beech is a major component in many of these hardwood stands and beech bark disease is prevalent throughout the management area. Many stands have had or will have salvage harvests due to beech bark disease. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

Currently there are 1,491 acres with a partial harvest method of cut assigned (Figure 4.12.3). There are 24 acres of northern hardwood that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from harvest calculations.

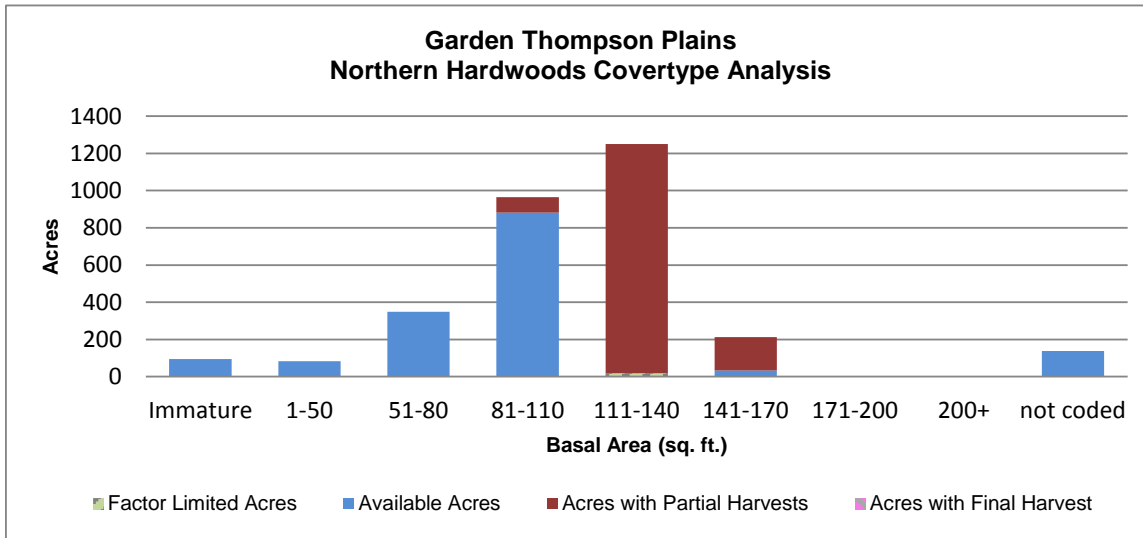


Figure 4.12.3. Basal area distribution of northern hardwoods in the Garden Thompson Plains management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwood stands will be maintained on operable sites using individual tree selection harvesting to provide all-aged composition and structurally diverse stands. Harvesting will provide for a continuous flow of timber products, a variety of wildlife habitats and recreational opportunities.

10-Year Management Objectives

- The ten-year projected partial or selection harvest is 1,057 acres of northern hardwood;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands;
- Consider herbicide application on beech regeneration to promote regeneration of other species; and
- In areas that are losing beech to beech bark disease, consider planting disease resistant beech or oak after harvesting to increase the availability of hard mast.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.12.1.3 Forest Cover Type Management – Red Pine**

Current Condition

Red pine stands occur on 2,932 acres (11%) of the management area (Table 4.12.1). Red pine stands throughout the management area are found on sandy soils of outwash plains and lake plains with Kotar habitat types of PARV, PARVAa and PVE. The majority of the red pine stands is of planted origin and is intensively managed. Red pine stands on these high-quality sites are usually thinned every ten years reducing basal area to approximately 120 square feet per acre, until replacement harvest age at 80. Most of the stands in this management area have been thinned more than once, and regeneration harvests followed by re-planting have started to diversify the age classes. Natural pine stands are generally harvested using shelterwood or seed tree methods resulting in natural regeneration intermixed with other species.

Currently there are 63 acres prescribed with a final harvest and 1,511 acres prescribed for partial harvest or thinning (Figure 4.12.4). At this time there are no stands that have site conditions limiting their harvest. Red pine in inaccessible or sensitive areas may remain through biological maturity.

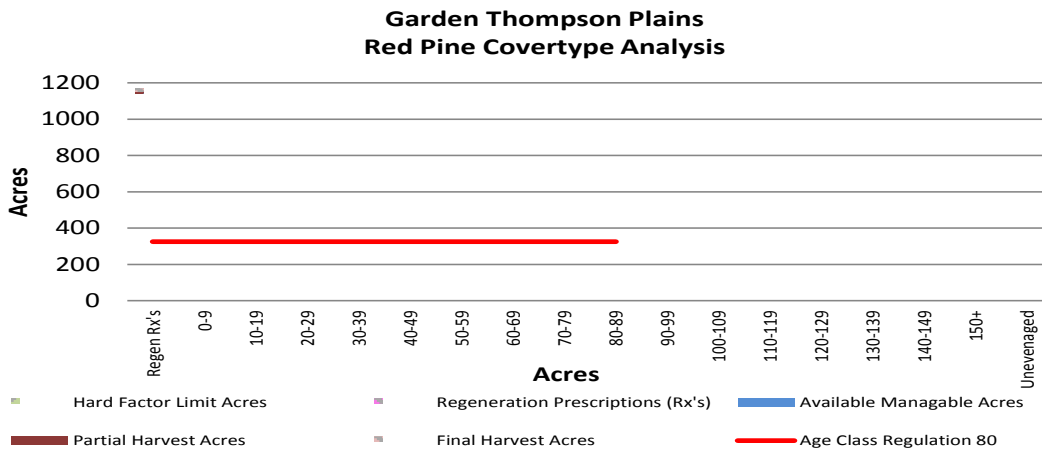


Figure 4.12.4. Age-class distribution of red pine in the Garden Thompson Plains management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Red pine stands will be maintained and managed through thinning until stand replacement harvest at approximately age 80;
- Balancing acres between 0-89 years of age will provide for continual harvesting, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected harvest is 112 acres of final harvest to work toward balancing the age classes of red pine. This is lower than the regulated amount due to the current age class structure where the majority of stands are not yet at rotation age; and
- The 10-year projected partial harvest or thinning of red pine is 266 acres of stands 40-80 years old.

Long-Term Management Objectives

- Balance the age class distribution of red pine providing for a regulated final harvest of approximately 326 acres per decade; and
- Stands will be periodically thinned until they meet silvicultural criteria.

**Section 4.12.1.4 Forest Cover Type Management – Cedar**

Current Condition

Northern white cedar occurs on 2,181 acres (8%) of the management area (Table 4.12.1). The majority of the cedar stands in the management area are found south of U.S.-2. Cedar stands provide important wintering habitat for deer and there are deer wintering habitat special conservation areas within the management area. Cedar stands will be managed to maintain wintering habitat for deer and to retain this forest type in the landscape. Maintaining a closed canopy provides cover for deer and reduces snow depth within the stands. Cedar is a preferred winter food species of deer. This complicates regeneration efforts in areas of winter deer concentrations.

There is a need to address future cedar cover within the deer wintering complexes. Limited cedar harvests will occur outside the wintering complexes recognizing that cedar may take many years to regenerate. Reliable and timely regeneration of cedar is a concern from both wildlife and forest management perspectives.

Currently there are no acres of cedar prescribed for harvest (Figure 4.12.5). At this time there are no cedar stands with site conditions limiting harvest.

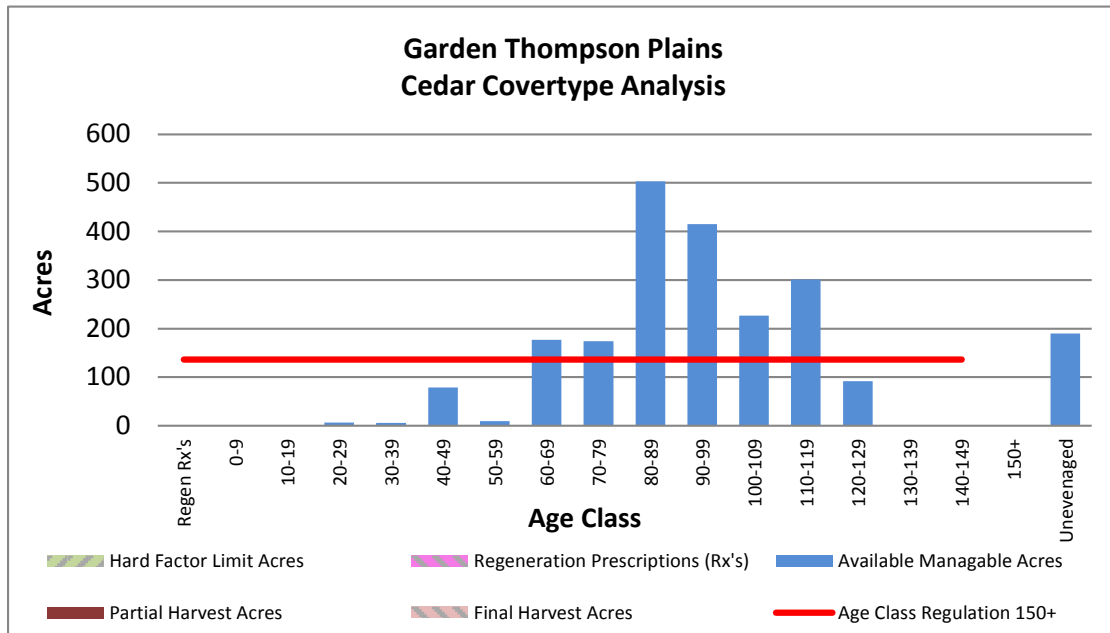


Figure 4.12.5. Age-class distribution of cedar in the Garden Thompson Plains management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Where deer wintering activities are not a concern cedar will be maintained on operable sites through even-aged management.

10-Year Management Objectives

- The ten-year projected final harvest of cedar is 136 acres.

Long-Term Management Objectives

- Develop a comprehensive deeryard management plan focusing on cedar management for winter deer habitat;
- Look for opportunities to test different methods of regenerating cedar, especially outside deer wintering areas;
- Consider harvest of cedar before rotation age to begin to diversify the age classes; and
- Using a 150 year regulated rotation would allow approximately 136 acres to be final harvested per decade.

**Section 4.12.1.5 Forest Cover Type Management – Upland Open/Semi-Open Lands**

Current Condition

Upland open/semi-open lands occur on 1,868 acres (7%) of the management area. This category is a combination of the following non-forested land cover types: herbaceous openland (1,632 acres), bare/sparsely vegetated (122 acres), upland shrub (87 acres) and low-density trees (27 acres). These communities are valued ecologically as sources of open land habitat for numerous species of wildlife. The Thompson Plains is the largest open-land complex in the management area. The Thompson Plains has been intensively managed through prescribed burning for open-land species such as sharp-tailed grouse and upland sandpiper.

Desired Future Condition

- The Thompson Plains and other open areas in the management area will be maintained to encourage early successional plants, to benefit open-land wildlife species and to provide for recreational opportunities.

Long-Term Management Objectives

- Continue opening maintenance using prescribed burning, timber sales and other treatments as needed.



### Section 4.12.1.6 Forest Cover Type Management – Lowland Conifer

#### Current Condition

Lowland conifer occurs on 1,425 acres (5%) of the management area (Table 4.12.1). The majority of the lowland conifer stands in the management area are south of U.S.-2, in the Garden Peninsula. Lowland conifer stands have been successfully harvested and regenerated in this area resulting in many age classes (Figure 4.12.6). Lowland conifer stands along the Lake Michigan shoreline provide valuable forage to many migrating neotropical bird species. Lowland conifer stands with a high proportion of cedar may be used by deer in the winter. Access to some stands is limited due to wet ground.

Currently there are 83 acres of lowland conifer with a final harvest prescribed. There are 535 acres of lowland conifer that have site conditions limiting their harvest this entry cycle. These hard factor limited acres have been removed from harvest calculations. Lowland conifer stands in areas inaccessible for harvest will be subject to natural processes resulting in a range of successional stages.

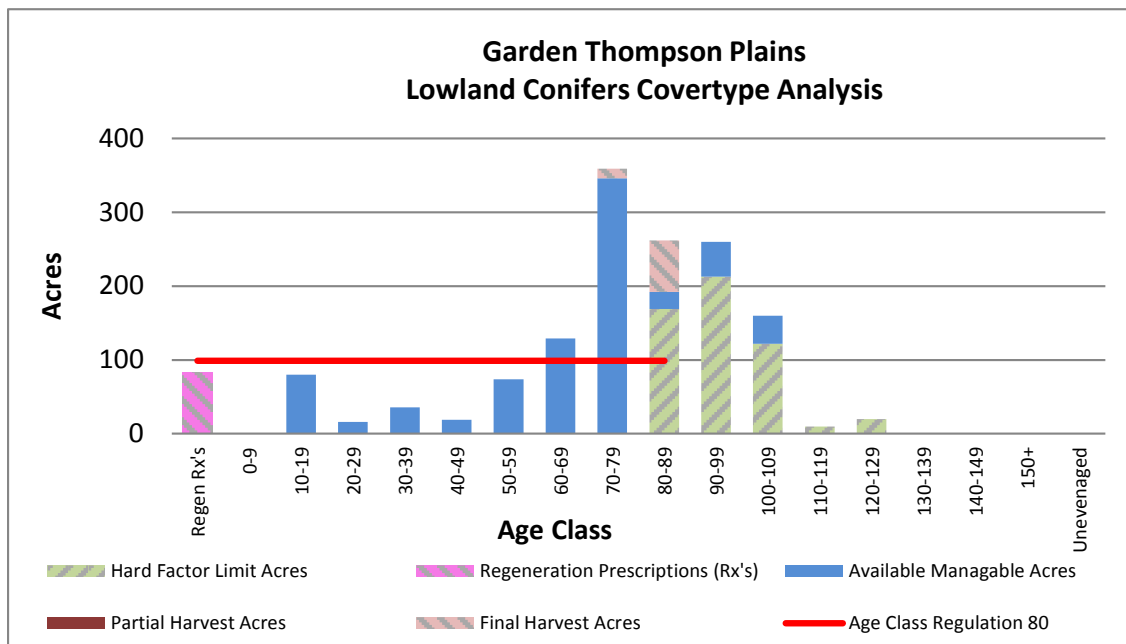


Figure 4.12.6. Age-class distribution of lowland conifers in the Garden Thompson Plains management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management, with acres balanced between 0-89 years of age providing for a continuous supply of timber, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected final harvest is 184 acres of lowland conifers which is higher than the regulated amount due to the current age class structure where the majority of the stands are in older classes.

#### Long-Term Management Objectives

- Balance the age-class structure of available stands providing for a regulated harvest of approximately 99 acres each decade.

### **Section 4.12.1.7 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

#### Current Condition

Lowland open/semi-open lands occur on 1,420 acres (5%). This category is a combination of lowland shrub (842 acres), treed bog (461 acres), bog (82 acres) and marsh (35 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. The majority of these stands are found in the southern portion of the management area in association with creeks, rivers and lowland forested stands.

#### Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity.

#### Long-Term Management Objectives

- In general, these stands will be maintained without active management to protect their ecological values.

### **Section 4.12.1.8 Forest Cover Type Management – Other Types**

#### Current Condition

There are many cover types spread across the management area that occur on less than 5% of the total management area acres (Table 4.12.1). Oak occurs on 979 acres (4%) and jack pine occurs on 948 acres (3%) of the management area. The “other types” category with 4,022 acres (15% of the management area) includes the following cover types, each with 2% or less of the total area: upland conifers (528 acres), upland spruce/fir (442 acres), lowland aspen/balsam poplar (433 acres), lowland deciduous (392 acres), lowland mixed forest (371 acres), lowland spruce/fir (365 acres), upland mixed forest (346 acres), hemlock (334 acres), mixed upland deciduous (270 acres), white pine (214 acres), paper birch (180 acres), natural mixed pines (116 acres) and tamarack (31 acres).

In general, most of these cover types will be managed as even-aged stands using natural regeneration after harvest. White pine, oak and hemlock may be managed using uneven-aged management. Mixed cover types with high basal area may be thinned, depending on the species composition, prior to final harvest. There are also 343 acres (1%) in the “miscellaneous other” category which includes, roads, water and sand/soil.

There are 426 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Some stands found on low, wet ground may be inaccessible for harvesting and will be subject to succession.

#### Desired Future Condition

- These cover types may be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The projected 10-year final harvest is 103 acres of oak and 259 acres of other types; and
- The projected 10-year partial harvest is 251 acres of oak and 372 acres of other types.

#### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.12.2 – Featured Wildlife Species**

Wildlife values in aspen and northern hardwoods vegetative communities are high and primarily oriented to game species management though other species benefit as well. In the southern portion of the management area there is good open land habitat that supports a sharp-tailed grouse population and there is a viable wild turkey population. In addition, there are many wildlife values associated with the Lake Michigan shoreline including neo-tropical migrants and woodcock.



This management area will include one of the eastern Upper Peninsula Grouse Enhanced Management System areas. The boundaries will be delineated during this planning period by the local biologist in collaboration with the Forest Resources Division unit manager. Aspen stands that fall within the boundary may be managed to enhance habitat and hunting opportunities for ruffed grouse, woodcock, deer, and turkey. Habitat treatments may include managing aspen on a shortened rotation with multiple age classes and smaller stand sizes.

### **American Woodcock**

The goal for woodcock in the eastern Upper Peninsula is to maintain or increase habitat. State forest management should address the maintenance of adequate early successional habitat to provide feeding, nesting and brood-rearing habitat and opportunity for hunting.

#### Wildlife habitat specifications:

- Balance aspen age-class distribution within the management area.
- Maintain or increase the aspen cover type within the management area. Where associated with alder riparian zones or forested wetlands use silvicultural practices that encourage the aspen component in mixed stands.
- Maintain rough openings associated with alder, riparian zones or forested wetlands.

### **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age-class distribution for aspen in priority landscapes.

#### Wildlife habitat specifications:

- Maintain and balance the aspen cover type and increase the aspen component in mixed stands within the management area.
- Move to balance the age-class distribution of aspen and birch cover types to maintain young forests across the management area.
- Manage the aspen cover type for smaller patch size, a shorter rotation and a more deliberate habitat configuration within the designated Grouse Enhanced Management Systems areas where appropriate.
- Larger harvest units should have irregular boundaries and retention patches are preferred.
- Promote a conifer component in aspen stands. Leave conifer under four-inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

### **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the Department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

#### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.

- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

## Wild Turkey

The goal for turkey in the eastern Upper Peninsula is to provide sufficient habitat in order to continue to provide recreational opportunities to view and harvest turkeys. In priority landscapes, management should focus on providing natural winter food, maintaining and regenerating the hard mast component and maintaining brood-rearing openings to improve brood-production and winter survival to offset anticipated habitat losses.

### Wildlife habitat specifications:

- Provide sources of winter food that are accessible above the snow, including both hard and soft mast tree and shrubs.
- Conserve the beech and oak component in forest stands, promote oak regeneration (use fire, reduce herbivory), and where absent, plant oak on appropriate sites and plant disease resistant beech.
- Maintain and increase the number of brood-rearing forest openings (forest openings, savannas, barrens, hayfields, etc.)
- Select for vegetation with open spaces between plants (warm season bunch grasses, row crops, and drill planted forages)
- Mow or burn patches every 3-5 years to eliminate woody vegetation succession.
- Promote or enhance small dense mature conifer stands for winter thermal cover and roosting sites.

### 4.12.3 – Rare Species and Special Resource Area Management

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “*DNR’s Approach to the Protection of Rare Species on State Forest Lands*” (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed seven listed species as well as three natural communities of note occurring in the management area as listed in Table 4.12.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

There are several special conservation area deer wintering areas within the management area. Other special conservation areas include cold water streams and high priority trout streams (Figure 4.12.1). In addition, approximately 1,700 acres were identified as potential old growth (Figure 4.12.7) and these stands are also special conservation areas until they are evaluated.

No high conservation value areas have been identified in this management area.

The following ecological reference areas are found within this management area (Figure 4.12.7): intermittent wetland (40 acres and 95 acres), bog (62 acres) and wooded dune and swale (126 acres). Ecological reference areas will be managed to enhance and protect their natural vegetative and associated wildlife communities, as directed by an ecological reference area-specific management plan.

Management goals during this planning period:

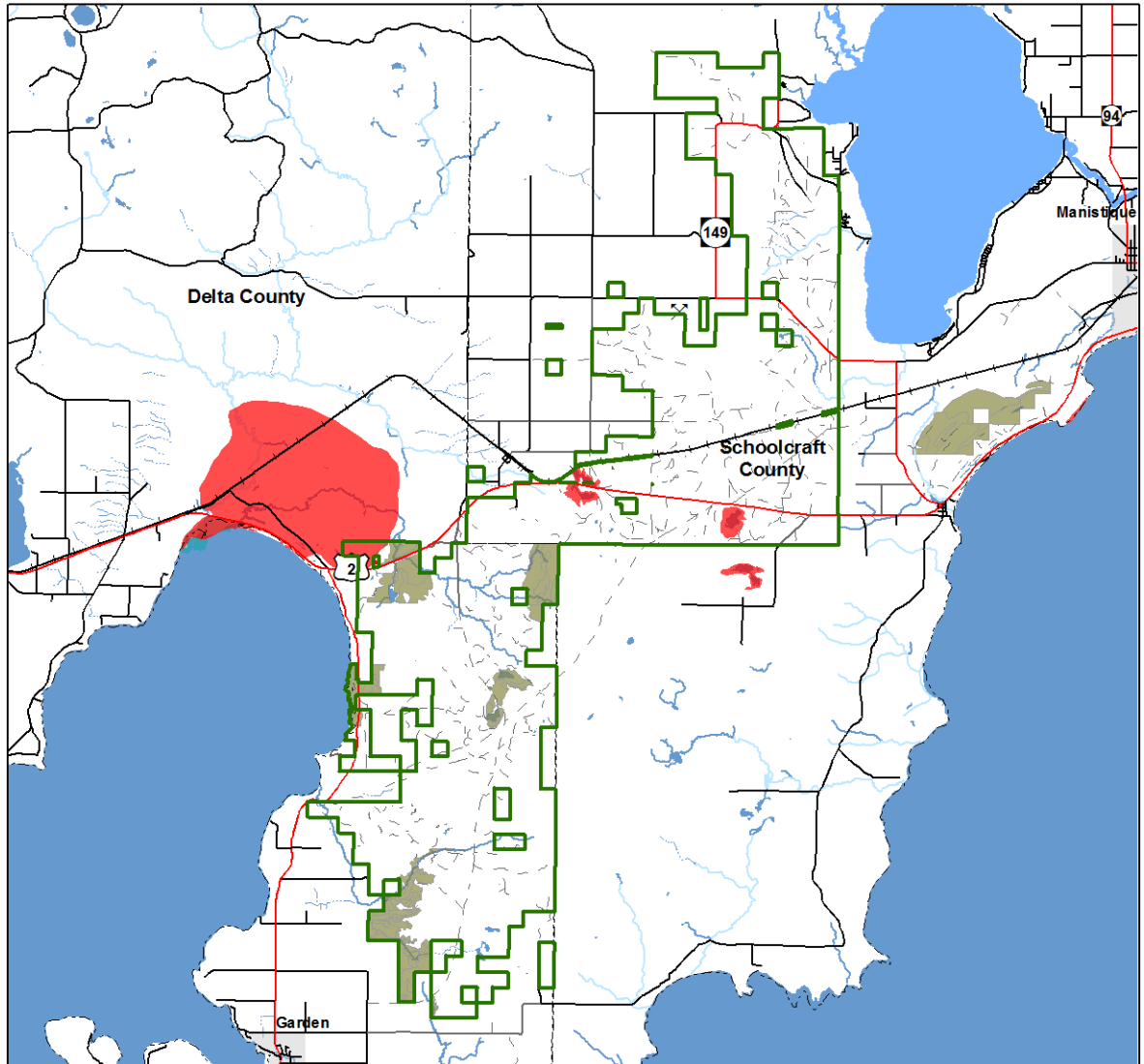
- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

Table 4.12.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Garden Thompson Plains management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Bog		S4/G3G5	Confirmed				Lowland open/semi-open	N/A
Intermittent wetland		S3/G2	Confirmed				Lowland open/semi-open	N/A
Wooded dune and swale complex		S3/G3	Confirmed				Upland open/semi-open	N/A
<b>Birds</b>								
Grasshopper sparrow	<i>Ammodramus savannarum</i>	SC/G5/S3S4	Confirmed	PS	Moderate	Dry sand prairie	Upland open/semi-open	N/A
						Mesic prairie	Upland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Hillside prairie	Upland open/semi-open	N/A
						Mesic sand prairie	Upland open/semi-open	N/A
Kirtland's warbler	<i>Dendroica kirtlandii</i>	LE/E/G1/S1	Confirmed	PS	Very High	Pine barrens	Jack Pine	Early
						Dry northern forest	Jack Pine, Red Pine	Early
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	SC/G5/S4	Confirmed	PS	Moderate	Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Dry sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Upland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A
<b>Snail</b>								
Eastern flat-whorl	<i>Planogyra asteriscus</i>	SC/G4/S3	Confirmed	EV	Low	Limestone cliff	Upland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Northern fen	Lowland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
<b>Plants</b>								
Torrey's bulrush	<i>Scripus torreyi</i>	SC/G5/S2S3	Confirmed			Intermittent wetland	Lowland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

# Garden Thompson Plains



1 in = 2 miles

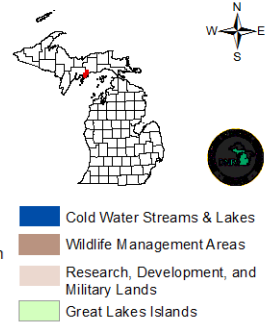
### Legend

- Highway
- Paved Roads
- Gravel Roads
- Poor Dirt Roads
- Railroads
- Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- Management Area Boundary
- Cities
- County Boundaries

- Ecological Reference Areas
- High Conservation Value Areas**
- Coastal Environmental Areas
- Critical Dunes
- Natural Rivers Vegetative Buffer
- Natural Rivers Zoning District
- Critical Coastal Habitat (Piping Plover)
- Kirtland Warbler Habitat
- Dedicated Management Areas
- Natural Areas Legally Dedicated

### Special Conservation Areas

- Campgrounds
- Fishing Access Sites
- Boat Access Sites
- Mineral Resource Locations
- Wild & Scenic Rivers (USFS Lands)
- Visual Management Areas
- Contiguous Resource Areas
- Possible Type 1 and Type 2 Old Growth
- Potential Old Growth
- Non-Dedicated Natural Areas & National Natural Landmarks
- Springs, Wetlands, or Riparian Areas



- Cold Water Streams & Lakes
- Wildlife Management Areas
- Research, Development, and Military Lands
- Great Lakes Islands

Figure 4.12.7. A map of the Garden Thompson Plains management area showing the special resource areas.

#### 4.12.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. The following forest health threats are present within this management area:

- Aspen: white trunk rot and *Hypoxylon* canker;
- Northern hardwoods: beech bark disease and emerald ash borer;
- Red pine: red-headed pine sawfly and pine engraver; and
- Lowland conifers: spruce budworm, eastern larch beetle and larch casebearer.

For further information on forest health refer to Section 3.

#### Invasive Plant Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. No invasive plant species have yet been documented within the management area, but Japanese knotweed and *Phragmites* have been documented within a five-mile buffer of the management area (Table 4.12.3) and monitoring efforts should specifically look for new populations of this species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

Autumn olive eradication efforts have been conducted in this management area.

Table 4.12.3 Invasive plant species within or near the Garden Thompson Plain management area (Data from the Michigan Invasive Plant Identification Network database).

Garden Thompson Plain - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	2	2	2
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
-	-	Japanese Knotweed <i>Fallopia japonica</i>	1	
-	-	Phragmites (Common Reed) <i>Phragmites australis</i>	1	

#### 4.12.5 – Fire Management

At least half of the management area is found on dry, sandy soils that once supported a mix of barrens and dry to dry-mesic northern forests. These systems were probably maintained by periodic high intensity stand replacement fires, perhaps as often as every 75-100 years.

Prescribed burns to maintain large openings in the management area have been conducted in 1975, 1978, 1983/84, 1988, 1997 and 2010.

- Prescribed fire is used to maintain the open nature of the natural communities in this management area.
- No specific prevention activities are anticipated in this management area. Nearby state parks provide opportunities for prevention messages.
- This management area falls entirely within the DNR Thompson protection area. The Thompson Plains Zone dispatch area was discontinued in 2010.

#### 4.12.6 – Public Access and Recreation

Access for management and recreation is good in this management area, with U.S.-2 going through and a well-developed two-track road system. Illegal off-road vehicle use and trash dumping are prevalent, due to proximity to population centers.

Recreational facilities include a snowmobile trail and a ski trail (Figure 4.12.1). Palms Book and Indian Lake State Parks are nearby.

Hunting, trapping, fishing, berry picking and off-road vehicle and horse riding are other important forms of recreation here. Specific hunting recreation improvements such as parking lots, gates, trail planting and trail establishment, as well as the preparation and dissemination of specific promotional material, may be made as a result of Grouse Enhanced Management Systems areas planning in this management area.

#### **4.12.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. Portions of the Fishdam River watershed have been designated as high priority trout stream in this management area and the details are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.12.1.

#### **4.12.8 – Minerals**

Surface sediments consist of lacustrine (lake) sand and gravel and medium-textured till with minor peat and muck. The glacial drift thickness varies between zero and 100 feet. Sand and gravel pits are located in the management area, and there is potential especially on the uplands for additional pits.

The Silurian Manistique and Burnt Bluff Groups, Cabothead Shale subcrop below the glacial drift. The Burnt Bluff is quarried for limestone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (four in Delta and five in Schoolcraft). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.13 MA 13 - Gogomain Management Area

### Summary of Use and Management

Vegetative management in the Gogomain Swamp management area (MA) Figure 4.13.1) will provide timber products; maintain or enhance wildlife habitat; protect areas of unique character, including rich conifer swamp, deer wintering area special conservation area and threatened, endangered and special concern species; and provide for forest based recreational uses. A large portion of this management area was recently purchased with wildlife funds for deer habitat. There are other lands in this area under consideration for purchase to enhance the deer wintering complex and wildlife use capability. Management of the Gogomain Swamp is focused on providing deer habitat. Timber management within the management area will occur in accessible areas and will focus on improving age class diversity. Expected issues in this 10-year planning period include illegal use of off-road vehicles, introduced pests and diseases and introduction and spread of invasive species.

### Introduction

The Gogomain management area is located in the far south-eastern portion of the eastern Upper Peninsula in Chippewa County. It has 7,226 acres of state-owned land. The large western block of this management area was recently purchased with wildlife funds and hence wildlife management is the primary purpose for ownership and for selection as a management area. Additional attributes which were important in identifying this management area include:

- The management area is within the Niagaran Escarpment and Lake Plain subsection VIII.1 (Albert, 1995).
- The dominant landform consists of clay lake plain modified by glacial outwash commonly known as the Rudyard clay flats. Due to the unique geology of the lakeshore, there is an exposed area of fossil beds along the St. Mary's River.
- Past history includes the location of lumber camps in the area.
- Love and Hart Islands, in the St. Mary's River, have historic and prehistoric values. Great Lakes Islands provide significant habitat for numerous species including many rare plants and animals, several of which are endemic or largely restricted to the Great Lakes region. Due to their isolation, islands provide good examples of many Great Lakes-associated natural communities and ecosystems. Specific wildlife values include their value to colonial nesting waterbirds, migratory waterfowl and neotropical migrants who rest and feed on islands on their migration through the Great Lakes. The primary management objectives for Great Lakes islands include the protection of ecological and natural functioning ecosystems and the above mentioned groups of species.
- Lime Island State Recreation Area is near Love and Hart islands.
- Special features including a special conservation area deer wintering area, a coastal environmental area high value conservation area, a rich conifer swamp and several threatened and endangered species.

The state owned land in this management area is concentrated into two larger parcels with smaller parcels to the south. It is surrounded by private ownerships. The Gogomain management area falls within the Sault Forest Management Unit. The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.13.1.

# Gogomain

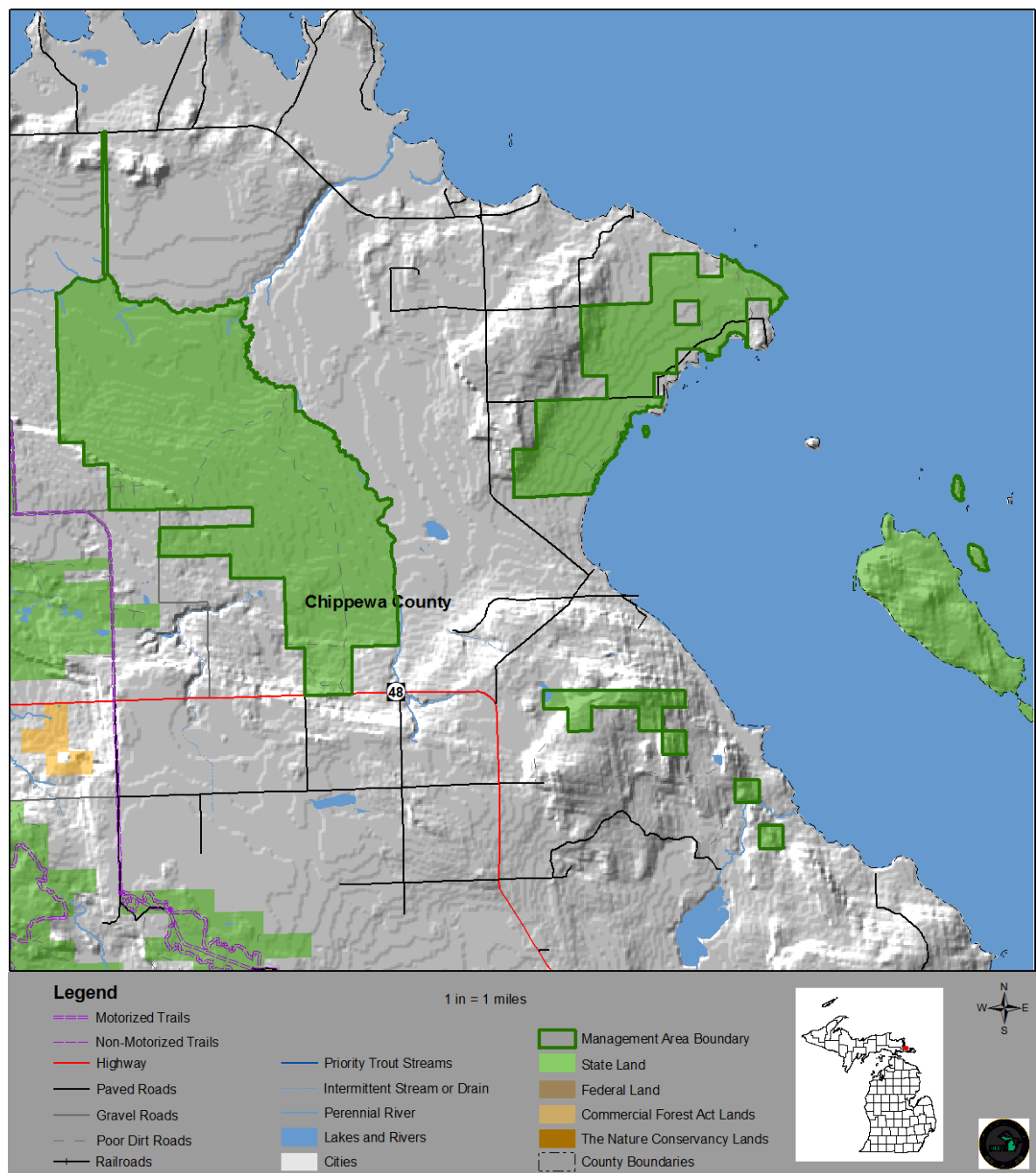


Figure 4.13.1. Location of the Gogomain management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and the St. Mary's River.



Table 4.13.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Gogomain management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Cedar	61%	4,394	0	4,394	0	0	4,394	275	0
Northern Hardwood	7%	495	0	495	0	203	495	0	203
Lowland Open/Semi-Open Lands	5%	369	0	369	0	0	369	0	0
Lowland Mixed Forest	5%	348	33	315	123	0	348	35	0
Lowland Conifers	5%	332	290	42	18	0	332	5	0
Lowland Deciduous	5%	326	41	285	32	0	326	32	0
Aspen	4%	262	140	122	0	0	262	20	0
Tamarack	4%	254	0	254	36	0	254	36	0
Upland Open/Semi-Open Lands	0%	20	0	20	0	0	20	0	0
Misc Other (Water, Local, Urban)	0%	10	0	10	0	0	10	0	0
Others	6%	416	70	346	68	23	416	49	33
<b>Total</b>	<b>100%</b>	<b>7,226</b>	<b>574</b>	<b>6,652</b>	<b>276</b>	<b>226</b>	<b>7,226</b>	<b>452</b>	<b>236</b>

Others include: paper birch, lowland aspen/balsam poplar, mixed upland deciduous, lowland spruce/fir, upland mixed forest, upland conifers, red pine and upland spruce/fir.

#### 4.13.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Issues for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species. Management areas consist of stands that are defined by their predominant vegetative cover type.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### Section 4.13.1.1 Forest Cover Type Management - Cedar

###### Current Condition

Cedar occurs on 4,394 acres (61%) of the management area (Table 4.13.1). Cedar is also found in other cover types as a minor species. Northern white cedar stands are most common in the basin portion of the management area. The majority of the management area is within an special conservation area for wintering deer. The Gogomain Swamp has been identified as a rich conifer swamp, with large areas of uneven-aged, old-growth cedar. Throughout the swamp, cedar regeneration is dense, and areas lacking regeneration are only found on the margins and within deer wintering areas. The closed canopy cedar provides winter thermal protection for white-tailed deer as well as cover for many other species of wildlife. Numerous streams and headwater streams occur throughout the swamp. While a regulated harvest balancing the acres from 0-159 years of age would allow approximately 275 acres to be harvested each decade (red line in Figure 4.13.2), this currently isn't an objective in this management area.

Currently there are not any acres of cedar with a final harvest prescribed (Figure 4.13.2). At this time there are no acres of cedar that have site conditions limiting their harvest. Cedar stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

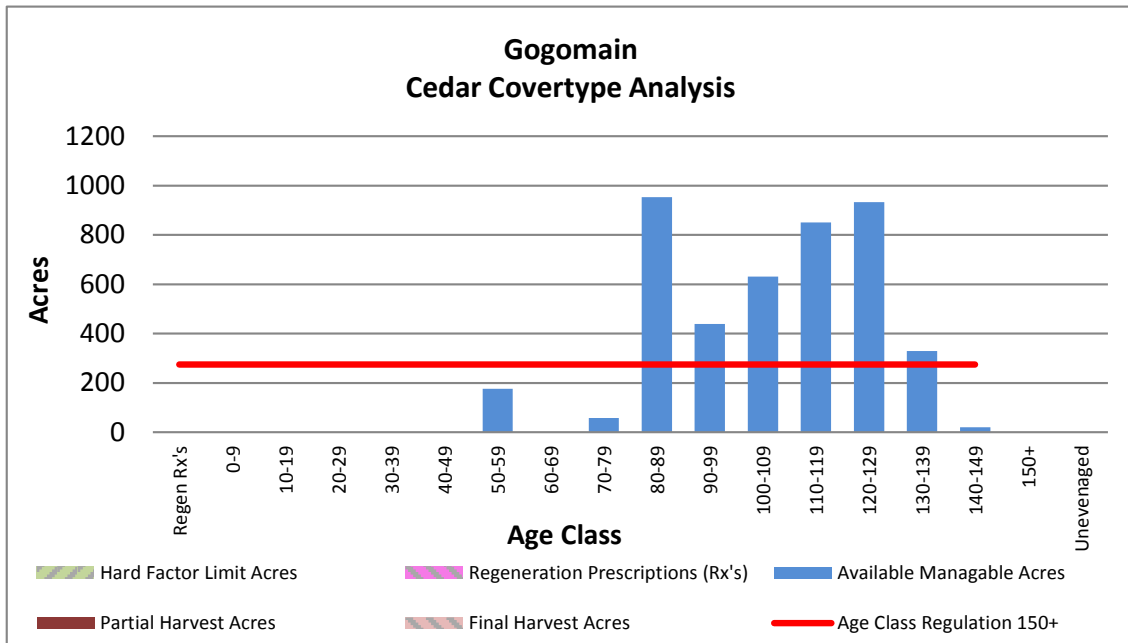


Figure 4.13.2. Age-class distribution of cedar in the Gogomain management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Cedar stands in this management area will be maintained primarily for deer habitat with lesser emphasis on timber management and recreation. Cedar will be harvested through even-aged management only in areas where deer populations are not likely to negatively impact regeneration.

10-Year Management Objectives

- The ten-year projected harvest is zero acres with the reduction from the regulated amount due to the deer wintering area and potential Type 2 rich conifer swamp old growth area.

Long-Term Management Objectives

- Conserve and maintain the rich conifer swamp community; and
- In stands that will not be affected by deer and outside the rich conifer swamp, look for opportunities to test different methods of regenerating cedar.

**Section 4.13.1.2 Forest Cover Type Management – Northern Hardwoods**

Current Condition

Northern hardwood occurs on 495 acres (7%) of the management area (Table 4.13.1). Northern hardwoods are distributed throughout the management area on range of sites with Kotar habitat classes of PARVAa, ATFD, AFPo and AFOAs. Generally these stands are selectively harvested to work toward an uneven-aged, multi-storied structure. In most stands individual tree selection harvests are used when basal area is over 120 square feet per acre. Where site quality is poor shelterwood and other even-aged harvesting systems will be considered.

Beech bark disease is found throughout the management area. This management area is past the killing front of beech bark disease and salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

Currently, there are no northern hardwood stands prescribed for harvest (Figure 4.13.3). At this time, there are no northern hardwood stands with site conditions limiting harvest.

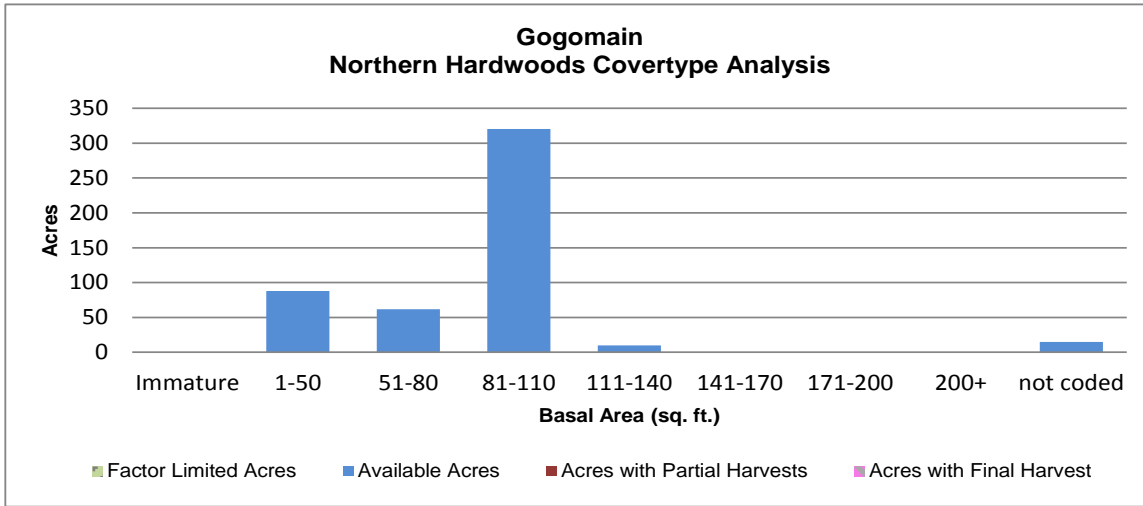


Figure 4.13.3. Basal area distribution of northern hardwoods in the Gogomain management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwood will be maintained on operable sites using selection harvests to provide uneven-aged composition and structurally diverse stands providing for a continuous supply of timber, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected partial or selection harvest is 203 acres of northern hardwood;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands;
- Consider herbicide application on beech regeneration to promote regeneration of other species; and
- In areas that are losing beech to beech bark disease, consider planting disease resistant beech or oak after harvesting to increase the availability of hard mast.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.13.1.3 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

Current Condition

Lowland open/semi-open lands occur on 369 acres (5%). This category is a combination of lowland shrub (324 acres), marsh (45 acres), bog (zero acres) and treed bog (zero acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. These stands are found in association with creeks, rivers and lowland forested stands.

Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity.

Long-Term Management Objectives

- Continue to maintain this habitat type for wildlife and other ecological concerns, primarily through passive management, allowing natural processes to occur.

### Section 4.13.1.4 Forest Cover Type Management – Lowland Mixed Forest

#### Current Condition

Lowland mixed forest occurs on 348 acres (5%) of the management area (Table 4.13.1). The lowland mixed cover type contains a mixture of deciduous and coniferous trees with neither type being dominant. There has not been any recent harvest work in this cover type. This is in part due to access and deer wintering area constraints. Some of these stands contain significant amounts of ash trees. Follow Emerald Ash Borer Management Guidelines for harvesting in stands with ash trees.

Currently there are not any acres of lowland mixed forest with a final harvest prescribed (Figure 4.13.4). There are 33 acres of lowland mixed forest that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of lowland mixed forest will gradually succeed to more shade tolerant species.

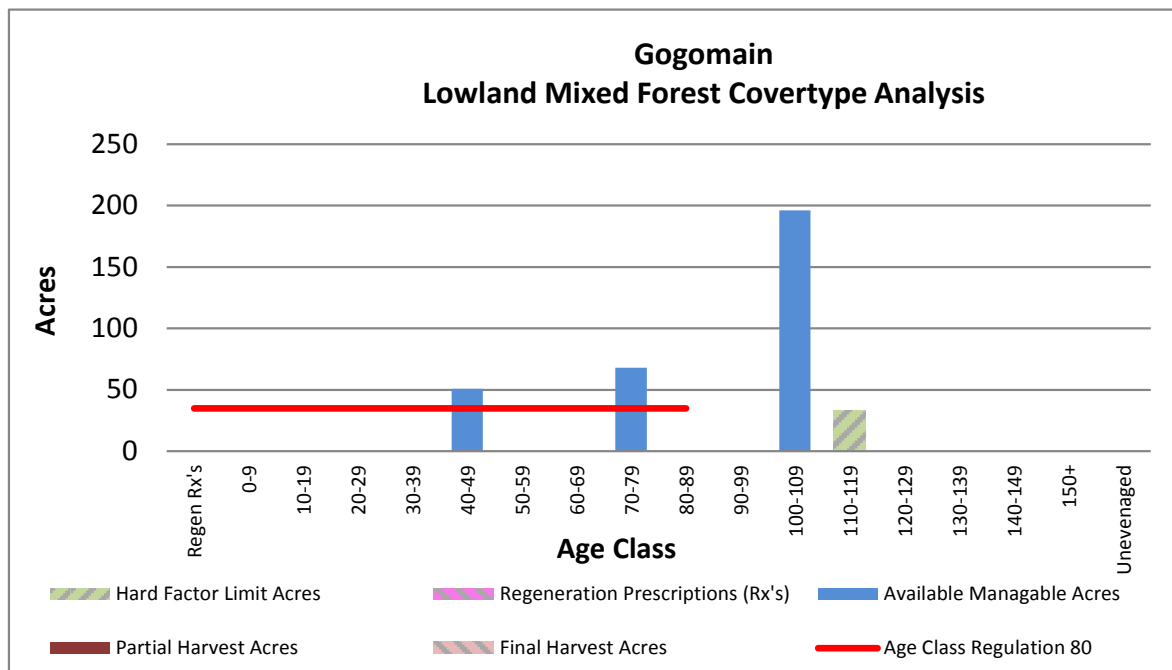


Figure 4.13.4. Age-class distribution of lowland mixed forest in the Gogomain management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland mixed forest stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- As emerald ash borer is expected to move in to this area, ash salvage may occur.
- The 10-year projected final harvest for lowland mixed forest is 123 acres. This is higher than the regulated amount due to the current age-class structure, and the need to start balancing age classes. Natural regeneration of species currently on site is expected.

#### Long-Term Management Objectives

- Balance the age classes of available lowland mixed forest stands providing a regulated harvest of approximately 35 acres per decade.

### Section 4.13.1.5 Forest Cover Type Management – Lowland Conifer

#### Current Condition

Lowland conifer stands are found on 332 acres (5%) of the management area (Table 4.13.1). The majority of these stands are found within the deer wintering special conservation area. Some of these stands may contain ash trees and salvage may occur following Emerald Ash Borer Management Guidelines.

Currently there are no stands prescribed for harvest within the lowland conifer stands (Figure 4.13.5). There are 290 acres of lowland conifers that have site conditions limiting their harvest at this time. These hard factor limited acres been removed from the total number of manageable acres available for harvest calculations. This leaves very few stands available for management. Stands in areas inaccessible for harvest will be subject to natural processes resulting in a range of successional stages.

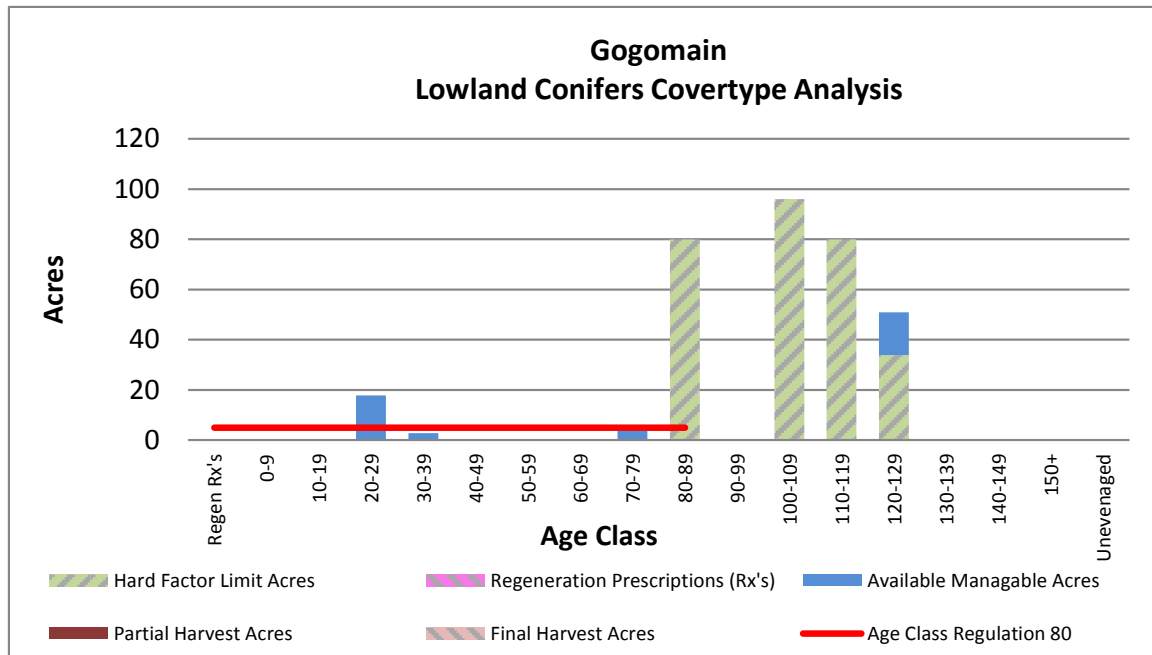


Figure 4.13.5. Age class distribution of lowland conifers in the Gogomain management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for continual harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 18 acres which is an increase from the regulated amount due to the current age class structure and the need to start balancing age classes.

#### Long-Term Management Objectives

- Balance the age-class structure of available stands providing a regulated harvest of approximately five acres every decade.

### Section 4.13.1.6 Forest Cover Type Management – Lowland Deciduous

#### Current Condition

Lowland deciduous stands occur on 326 acres (5%) of the management area (Table 4.13.1). Lowland deciduous stands are often found in association with streams and drainages. While there has been no recent harvesting, past harvesting and natural regeneration has somewhat diversified the age-class structure. Some stands contain black ash trees, though salvage of ash has not yet occurred. The Emerald Ash Borer Management Guidelines will be followed in stands with a component of ash.

Currently there are not any acres of lowland deciduous with a final harvest prescribed. There are 41 acres of lowland deciduous that have site conditions limiting their harvest this entry period. These hard factor limited acres (Figure 4.13.6) have been removed from the total number of manageable acres available for harvest calculations. Lowland deciduous stands in inaccessible areas will be subject to natural processes (fire, windthrow, insect defoliation and beaver flooding) resulting in a range of successional stages.

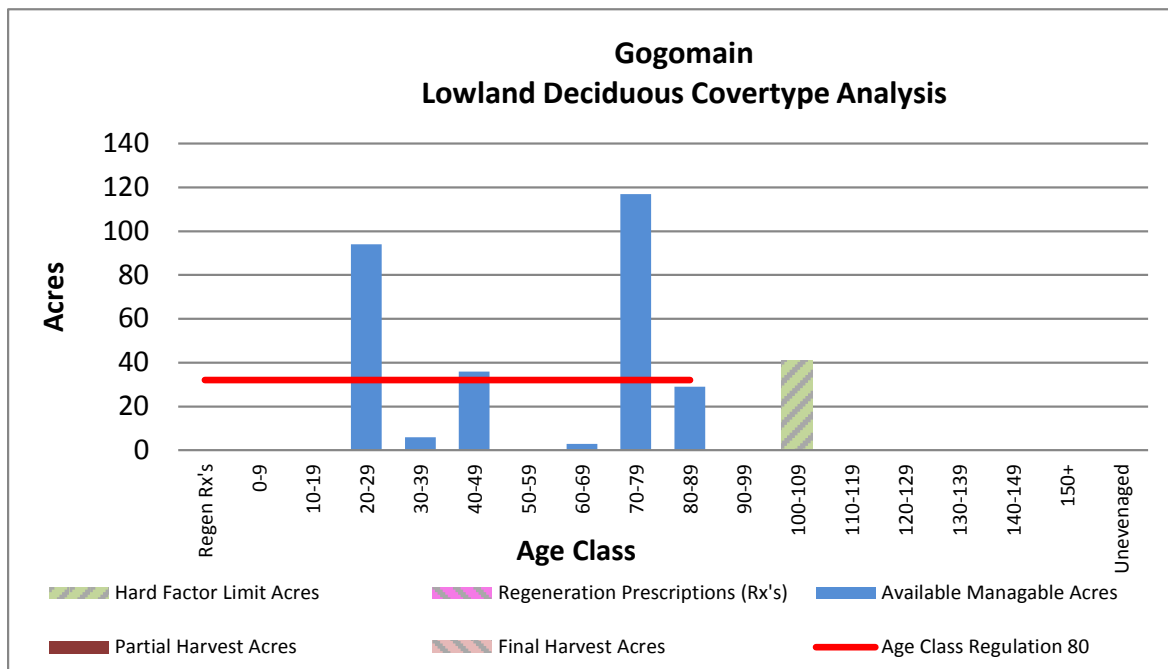


Figure 4.13.6. Age-class distribution of lowland deciduous in the Gogomain management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland deciduous stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected final harvest of lowland deciduous is 32 acres to begin diversifying the age classes.

#### Long-Term Management Objectives

- Balance the age-class structure of available stands providing a regulated harvest of approximately 32 acres every decade.

## Section 4.13.1.7 Forest Cover Type Management – Other Types

### Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area (Table 4.6.1). The two largest cover types are aspen (262 acres or 4%) and tamarack (254 acres or 4%). The “other types” category (416 acres or 6%) contains forested cover types with 2% or less of the total management area including: paper birch (132 acres), lowland aspen/balsam poplar (102 acres), mixed upland deciduous (65 acres), lowland spruce/fir (37 acres), upland mixed forest (30 acres), upland conifers (24 acres), red pine (13 acres) and upland spruce/fir (13 acres).

The majority of these cover types have been managed as even-aged stands and regeneration harvests will be carried out in those even-aged forested cover types. Natural regeneration of species currently on site is expected. Mixed cover types with high basal area may be thinned depending on the species composition before final harvest. The emerald ash borer and beech bark disease management guidelines will be followed where beech and/or ash salvage may be necessary.

Upland open/semi-open lands (20 acres) is composed of herbaceous openland (17 acres) and low-density trees (three acres). The “miscellaneous other” type (10 acres) is comprised of roads, water and sand/soil.

Approximately 210 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Where stands are inaccessible, natural processes will occur moving early successional cover types toward mid- and late-successional cover types.

### Desired Future Condition

- Management in these cover types will contribute to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The projected 10-year final harvest is 36 acres of tamarack and 68 acres of other types; and
- The projected 10-year partial harvest is 23 acres of other types.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## 4.13.2 – Featured Species Management

A large portion of this management area was purchased specifically for wildlife habitat. Much of the cedar type is multi-aged and has a significant amount of structural and floral diversity and is the largest high-quality example of rich conifer swamp in the state. Opportunities may exist to harvest some cedar in this management area. Structural diversity, closed canopy and mast are of high value to wildlife.

### **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improve habitat. Management for the species should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land-use.

### Wildlife habitat specifications:

- Maintain or increase tree species that provide mast including beech, oak, black cherry and ironwood.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.
- Retain some large diameter white pine and hemlock for bear refuge trees.
- Plant disease resistant beech and red oak where appropriate.

- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource.
- Discourage land transactions, use and management activities that facilitate fragmenting state lands within the management area.

## **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash, increasing mesic conifer components and increasing beaver abundance.

### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under 4 inch diameter at breast height.
- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris already present (before cutting) and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash and create brush piles within timber sales associated with hare habitat.

## **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer". There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:



- There is reasonable confidence of successful recruitment/regeneration of the cover types; or
- There is a forest health issue (e.g., hemlock wooly adelgid); or
- Part of an approved research project; or
- Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### 4.13.3 – Rare Species and Special Resource Area Management

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed five listed species as well as one natural community of note occurring in the management area as listed in Table 4.13.2. A detailed inventory of this recently acquired land was performed in 2008 and it was determined that a large portion of the acquisition is the largest high quality rich conifer swamp in the state. A colony of great blue herons has also been identified on Love Island. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Table 4.13.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Gogomain management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Community</b>								
Rich conifer swamp		S3/G4	Confirmed				Tamarack	Late
<b>Birds</b>								
American bittern	<i>Botaurus lentiginosus</i>	SC/G4/S3-4	Confirmed	MV	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Southern wet meadow	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
<b>Plants</b>								
Lapland buttercup	<i>Ranunculus lapponicus</i>	T/G5/S1S2	Confirmed			Rich conifer swamp	Tamarack	Late
						Wooded dune & swale complex	Upland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

A large portion of the historic Gogomain deer wintering area special conservation area is found within the management area. Love and Hart islands are Great Lakes island special conservation areas (Figure 4.13.7).

Areas that might meet the definition of Type 1 and Type 2 old growth have been identified in a special conservation area layer in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and area shown in Figure 4.13.7. This set of areas originated from a subset of forested natural communities within some state natural areas and all A/AB-ranked natural heritage database element occurrences. Within the Gogomain management area there are 4,323 acres identified as potential Type 2 rich conifer swamp (Figure 4.13.7).

There is also a coastal environmental area high conservation value area shown in Figure 4.13.7, where some fish spawning occurs. No ecological reference areas have been identified within the management area.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.

# Gogomain

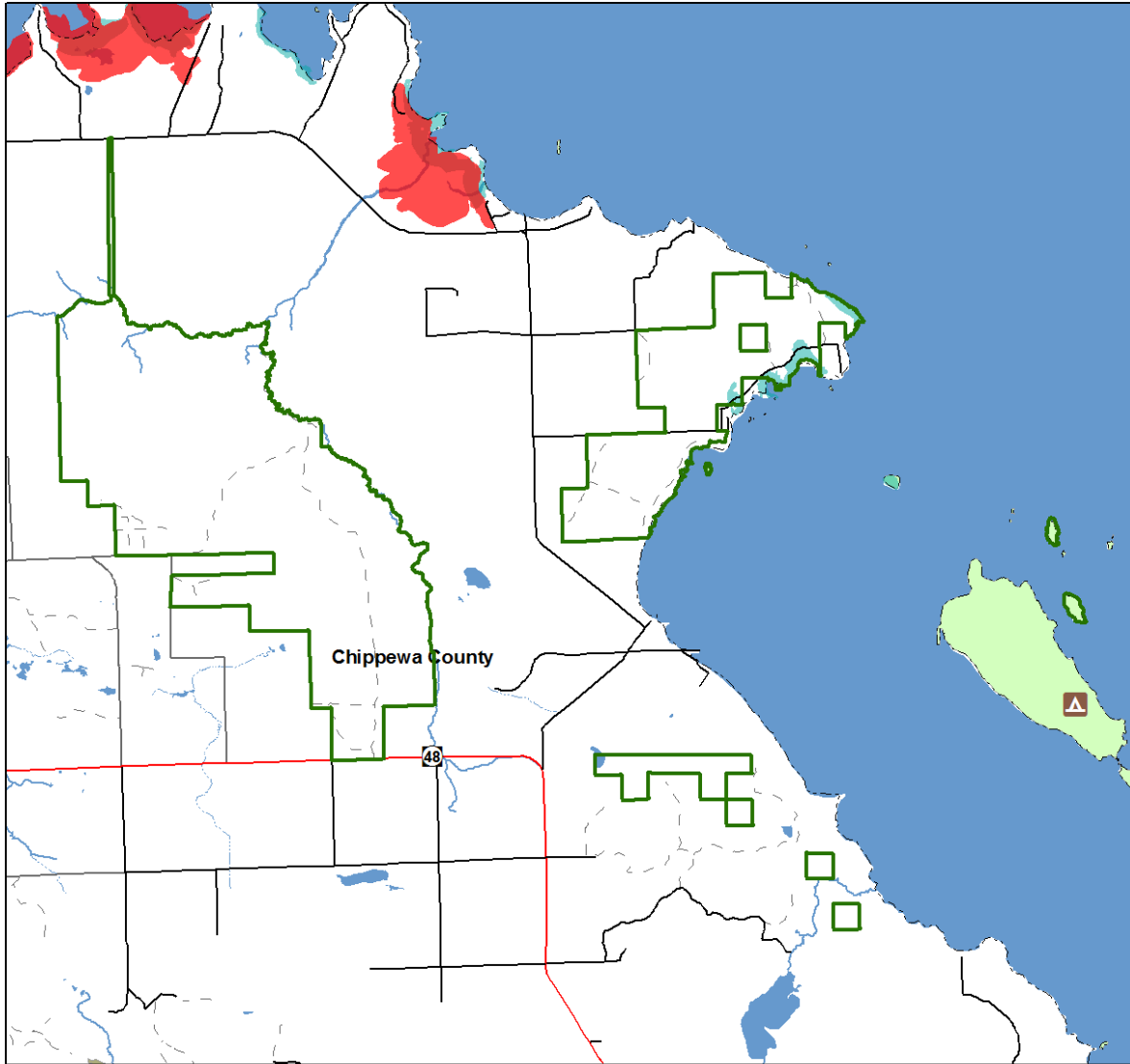


Figure 4.13.7. A map of the Drummond Island management area showing the special resource areas.

#### 4.13.4 – Forest Health Management

Although forest health issues span the entire landscape some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Lowland hardwoods: Emerald ash borer;
- Northern hardwoods: Beech bark disease; and
- Mixed conifers: Spruce budworm, eastern larch beetle and larch casebearer.

For further information on forest health refer to Section 3.

#### Invasive Plant Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. No invasive plant species have yet been documented within the management area, but leafy spurge and spotted knapweed have been documented within a five-mile buffer of the management area (Table 4.13.3) and monitoring efforts should specifically look for new populations of this species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

Table 4.13.3. Invasive plant species within or near the Gogomain management area (Data from the Michigan Invasive Plant Identification Network database).

Gogomain - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	3	3	2
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
-	-	Leafy Spurge <i>Euphorbia esula</i>	2	
-	-	Spotted Knapweed <i>Centaurea stoebe</i>	1	

#### 4.13.5 – Fire Management

Much of this management area is comprised clay lowland soils which may have been rarely influenced by fire disturbance.

- Prescribed fire may be used in this management area for northern white cedar regeneration.

#### 4.13.6 – Public Access and Recreation

M-48 is along the southern boundary of the management area and county roads access other portions of the management area. A large portion of this management area is without road access which facilitates preservation of the rich conifer swamp complex.

While there are no recreational facilities within the management area, a snowmobile trail passes to the southwest. Lime Island State Recreation area is also near the management area.

Deer hunting is very popular within the large swamp portion of the management area and there is a long history of waterfowl hunting along the St. Mary's River.

#### 4.13.7 – Aquatic Resource Management

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. There are no designated high priority trout streams in this management area.

#### **4.13.8 – Minerals**

Surface sediments consist of lacustrine (lake) sand and gravel, clay and silt, peat and muck and coarse-textured till. The glacial drift thickness varies between 50 and 200 feet. Sand and gravel pits are located in the management area and there is good potential for additional pits on the uplands.

The Silurian Engadine, Manistique and Burnt Bluff Groups, Cabothead Shale and Manitoulin Formation and Ordovician Queenston Shale, Big Hill Dolomite and Stonington Formation subcrop below the glacial drift. The Engadine and Burnt Bluff are quarried for stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (14 in Chippewa County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

#### 4.14 MA 14 – Summer Islands Management Area

##### Summary of Use and Management

Management in the Summer Islands management area (MA) (Figure 4.14.1) will focus on protection and enhancement of Great Lake Islands' special features and ecological functions. Since the state forest land is found on islands there will not be intensive vegetative management within this management area. Management will protect areas of unique habitat for threatened and endangered species and provide for recreational uses. Expected issues in this 10-year planning period include: increased recreational pressure, introduced pests and diseases, invasive species and fluctuating water levels.

##### Introduction

The Summer Islands management area includes Summer and Little Summer islands in Lake Michigan. These islands are located in the eastern Upper Peninsula in Delta County at the end of the Garden Peninsula. It has 1,377 acres of state-owned land. The primary attribute for this management area is that it consists of islands. Additional attributes which were important in identifying this management area include:

- The islands are found within the Niagaran Escarpment and Lake Plain subsection 8.1 (Albert, 1995).
- The landforms are characterized by limestone bedrock at or near the surface.
- All islands in the Great Lakes are designated as special conservation areas. Summer Island has a limestone pavement lakeshore ecological reference area.
- Recreational opportunities includes: kayaking, boating, camping, hiking, hunting and fishing. The area around the islands is one of the most popular Chinook salmon fisheries in the Upper Peninsula.

Coastline areas are important, since shallow near shore area of islands can provide important fish spawning and nursery habitat. Many plants and animals use unique habitats on these islands. Critical seasonal use occurs, such as spawning shoals and migration stops. In years of lower water levels small sand and gravel spits and bars are created. These are very important to nesting and migrating shorebirds.

The Summer Islands management area falls within Shingleton Forest Management Unit. The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.14.1.

Table 4.14.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Summer Islands management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Northern Hardwood	37%	507	0	507	0	0	507	0	253
Cedar	34%	462	0	462	0	0	462	29	0
Lowland Conifers	17%	229	114	115	0	0	229	13	0
Paper Birch	13%	179	179	0	0	0	179	0	0
Misc Other (Water, Local, Urban)	0%	0	0	0	0	0	0	0	0
Others	0%	0	0	0	0	0	0	0	0
<b>Total</b>	<b>100%</b>	<b>1,377</b>	<b>293</b>	<b>1,084</b>	<b>0</b>	<b>0</b>	<b>1,377</b>	<b>42</b>	<b>253</b>

## Summer Islands

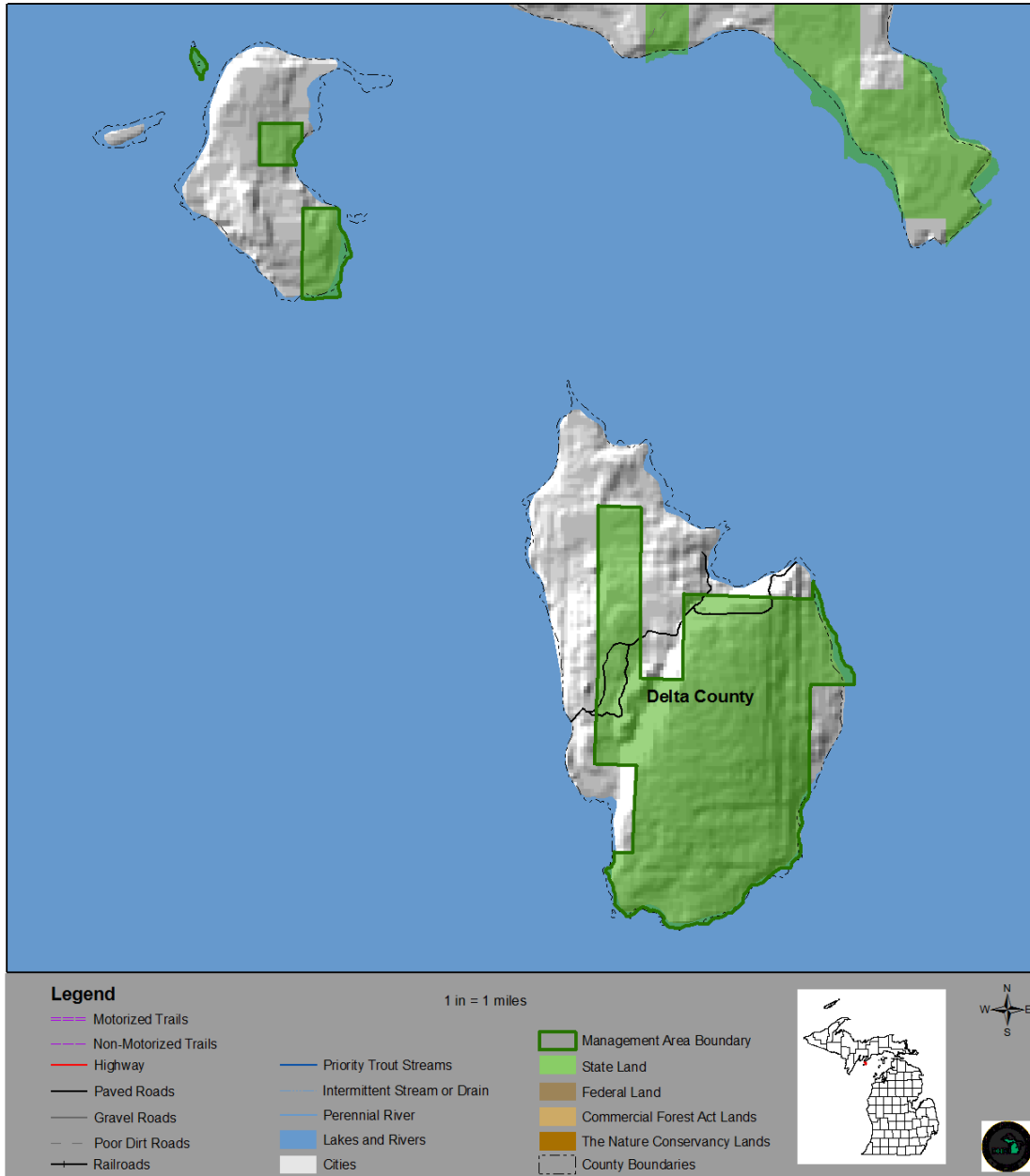


Figure 4.14.1. Location of Summer Islands management area (dark green boundary) in relation to state forest lands, other ownerships and Lake Michigan.

### 4.14.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Issues for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types would provide for a continuous flow of forest products and values.

**Section 4.14.1.1 Forest Cover Type Management – Northern Hardwood**

Current Condition

Northern hardwood occurs on 507 acres (37%) of the management area (Table 4.14.1). Northern hardwood stands are distributed on the islands on lake plains, moraines and outwash plains. Kotar habitat types include PArVAa, ATFD and AFOAs. Habitat types are not available for hardwood stands on the limestone rock. In the 1950s, bird’s eye maple veneer was harvested from state forest land on Big Summer Island. Since then, timber harvesting has not occurred. Most of the northern hardwood stands contain beech and loss is expected from beech bark disease.

Currently, there are no stands prescribed for harvest (Figure 4.14.2). At this time there are no acres of northern hardwood with site conditions limiting harvest. When coding is updated, these island stands will all be identified with hard factor limits.

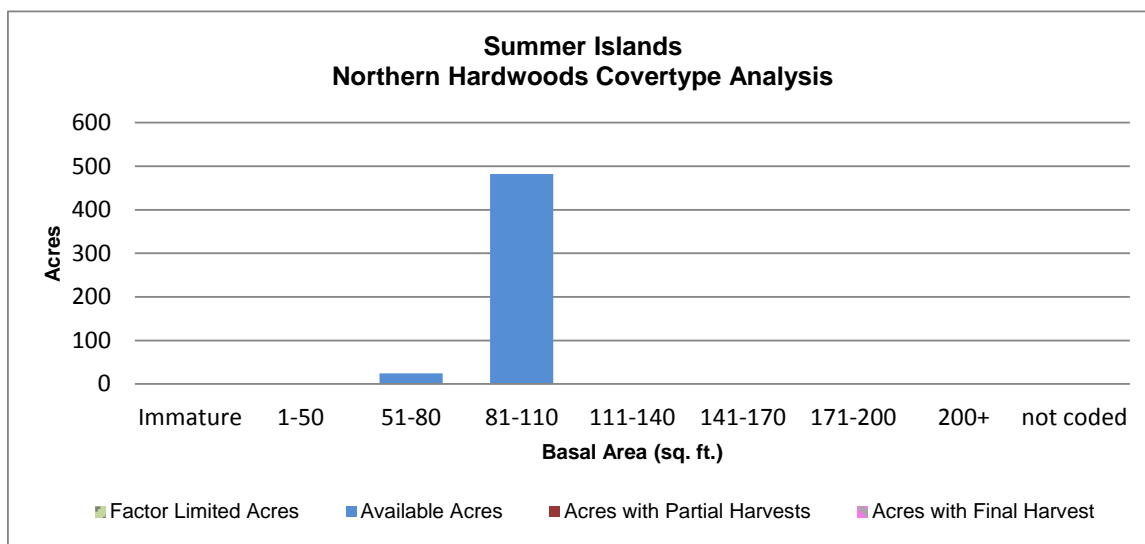


Figure 4.14.2. Basal area distribution of northern hardwood in the Summer Islands management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwood stands will remain through natural rotation, providing for wildlife habitat and recreational opportunities.

10-Year Management Objectives

- As the islands are generally inaccessible for timber harvesting, the 10-year projected partial harvest of northern hardwood is zero acres.

Long-Term Management Objectives

- Monitor use and condition of the northern hardwood communities following the 10-year forest inventory schedule.

**Section 4.14.1.2 Forest Cover Type Management – Cedar**

Current Condition

Cedar occurs on 462 acres (34%) of the management area (Table 4.14.1). Cedar provides important closed canopy habitat for wintering deer found on the islands. Figure 4.14.3 shows that a regulated harvest would allow approximately 29 acres of cedar to be harvested each decade.



There are no acres of cedar prescribed for harvest at this time (Figure 4.14.3). Currently, there are no acres of cedar identified with hard factor limits. When coding is updated, these island stands will all be identified with hard factor limits.

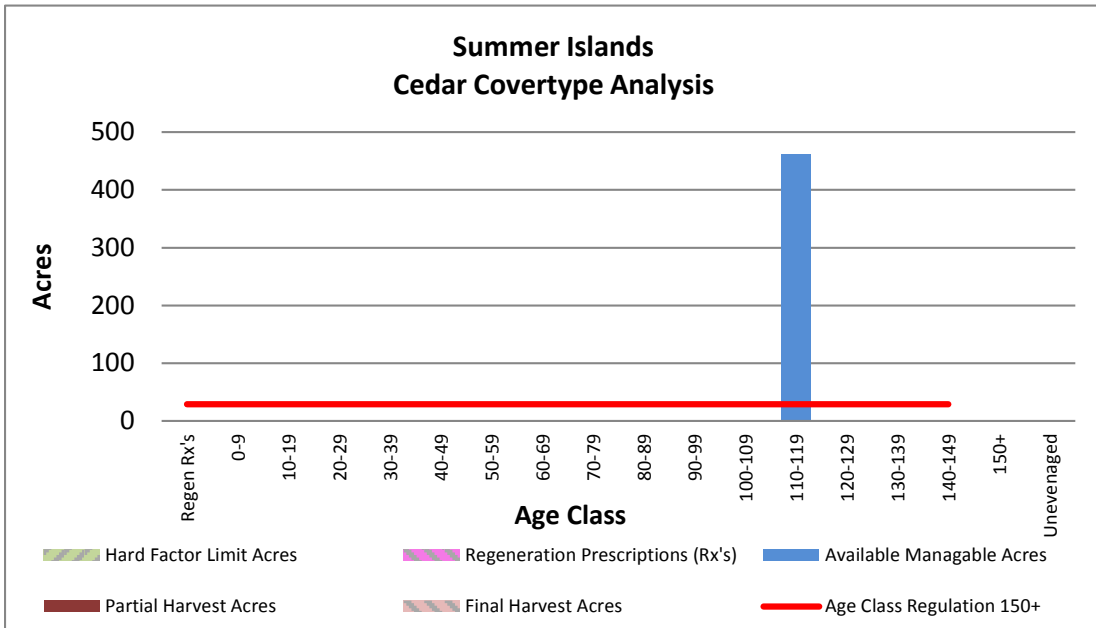


Figure 4.14.3. Age-class distribution of cedar in the Summer Islands management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Cedar will remain through natural rotation, providing for wildlife habitat and recreational opportunities.

10-Year Management Objectives

- As the islands are generally inaccessible for timber harvesting, the 10-year projected final harvest of cedar is zero acres.

Long-Term Management Objectives

- Focus cedar management on winter habitat for deer.

**Section 4.14.1.3 Forest Cover Type Management – Lowland Conifers**

Current Condition

Lowland conifers occur on 229 acres (17%) of the management area (Table 4.14.1). The lowland conifer stands in the management area fall into only two age classes (Figure 4.14.4). Figure 4.14.4 shows that a regulated harvest would allow approximately 25 acres of lowland conifers to be harvested each decade.

Currently there are not any acres of lowland conifers with a final harvest prescribed. There are 114 acres of lowland conifers with site conditions limiting harvest coded. As these stands are on islands, when site condition coding is updated all of the acres of lowland conifers will have hard factors limiting their harvest.

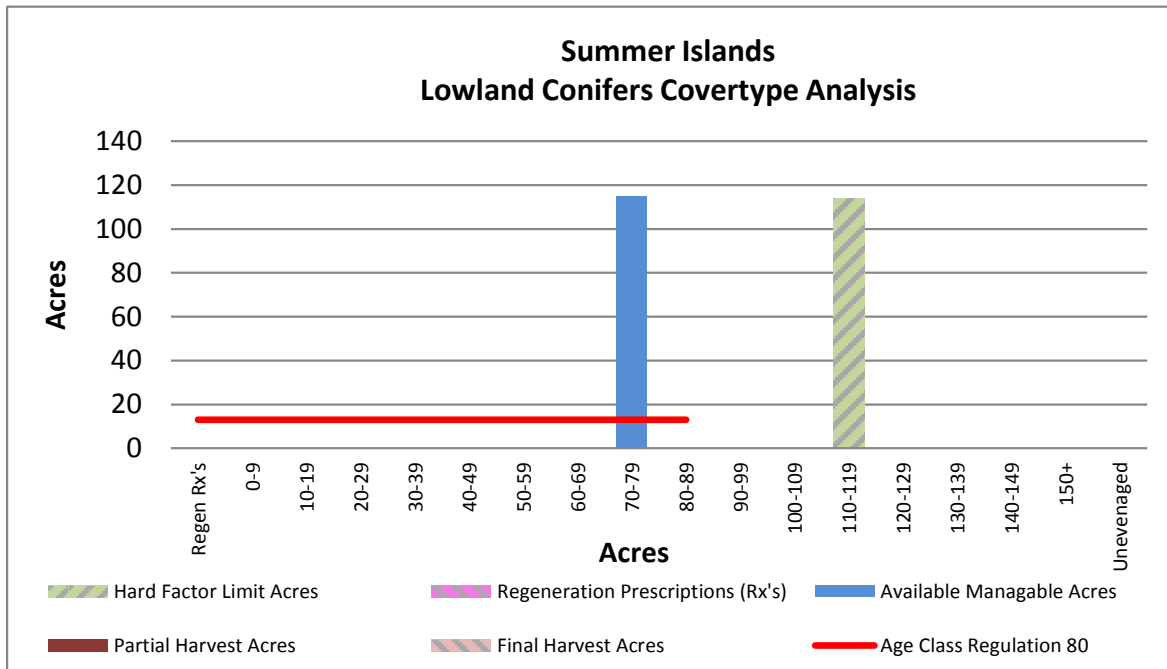


Figure 4.14.4. Age-class distribution of lowland conifers in the Summer Islands management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifers will remain through natural rotation, providing for wildlife habitat and recreational opportunities.

10-Year Management Objectives

- As the islands are generally inaccessible for timber harvesting, the 10-year projected final harvest of lowland conifers is zero acres.

Long-Term Management Issues

- Monitor use and condition of the lowland conifers during the 10-year forest inventory schedule.

**Section 4.14.1.4 Forest Cover Type Management – Paper Birch**

Current Condition

Paper birch occurs on 179 acres (13%) of the management area (Table 4.14.1). Currently all of the paper birch stands are over rotation age and are coded as unavailable for harvest due to their location on the islands (Figure 4.14.5). Using a 50-year rotation a regulated harvest would allow approximately 29 acres to be harvested each decade.

There are no acres of paper birch prescribed for harvest at this time. Paper birch stands that are inaccessible for commercial harvest will eventually succeed to mid- or late-successional species.

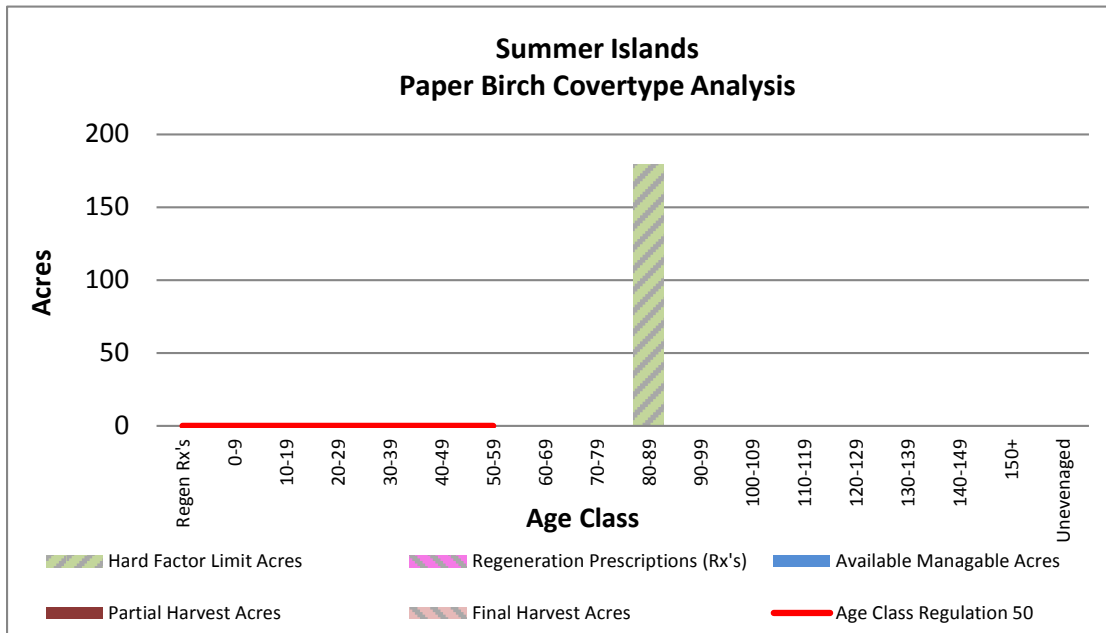


Figure 4.14.5. Age-class distribution of paper birch in the Summer Island management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Paper birch will remain through natural rotation, providing for wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of paper birch is zero acres due to the difficulty of logging on islands.

Long-Term Management Objectives

- Monitor use and condition of these stands during the 10-year inventory.

**4.14.2 – Featured Species Management**

A considerable portion of the biological diversity unique to Michigan is supported by the nearly 600 islands contained within Michigan’s borders. Great Lakes Islands provide significant habitat for numerous other species including many rare plants and animals, several of which are endemic or largely restricted to the Great Lakes region. Due to their isolation, islands provide good examples of many Great Lakes-associated natural communities and ecosystems and thus have potential to provide insights for understanding the consequences of human disturbance on the increasingly fragmented ecosystems of the mainland. Specific wildlife values include their value to colonial nesting waterbirds, migratory waterfowl and neotropical migrants who rest and feed on islands on their migration through the Great Lakes.

The primary management objectives for the Summer Islands include the protection of ecological and natural functioning ecosystems and of the above mentioned groups of species.

**4.14.3 – Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed four listed species as well as two natural communities of note occurring in the management area as listed in Table 4.14.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Table 4.14.2 Occurrence information for special concern, rare, threatened and endangered communities and species for the Summer Islands management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Limestone bedrock lakeshore		S2/G3	Confirmed				Upland open/semi-open	N/A
Limestone cliff		S2/G4G5	Confirmed				Upland open/semi-open	N/A
<b>Birds</b>								
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Late
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
<b>Plants</b>								
Climbing fumitory	<i>Adlumia fungosa</i>	SC/G4/S3	Confirmed			Sand and gravel beach	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Open dunes	Upland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Granite bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Limestone cliff	Upland open/semi-open	N/A
						Limestone lakeshore cliff	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
						Northern bald	Upland open/semi-open	N/A
						Volcanic bedrock glade	Upland open/semi-open	N/A
Dwarf lake iris	<i>Iris lacustris</i>	LT/T/G3/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
						Alvar	Upland open/semi-open	N/A
						Wooded dune & swale complex	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
Lake Huron pansy	<i>Tanacetum huronense</i>	T/G5T4T5/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Wooded dune & swale complex	Upland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

The Summer Islands management area is part of the special conservation area for Great Lakes islands (Figure 4.14.6).

Although there have been no high conservation value areas identified there is one ecological reference area. The limestone bedrock lakeshore ecological reference area (12 acres) is shown in Figure 4.14.6. This ecological reference area will be managed to protect and enhance the natural vegetative and wildlife communities as directed by an ecological reference area-specific management plan.

Management goals during this planning period:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

#### 4.14.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Northern hardwoods: beech bark disease

For further information on forest health refer to Section 3.

## Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

### **4.14.5 – Fire Management**

These islands contain private lands with some development. Fires on these islands will be monitored and appropriate suppression action taken as necessary. Use of prescribed fire is not anticipated.

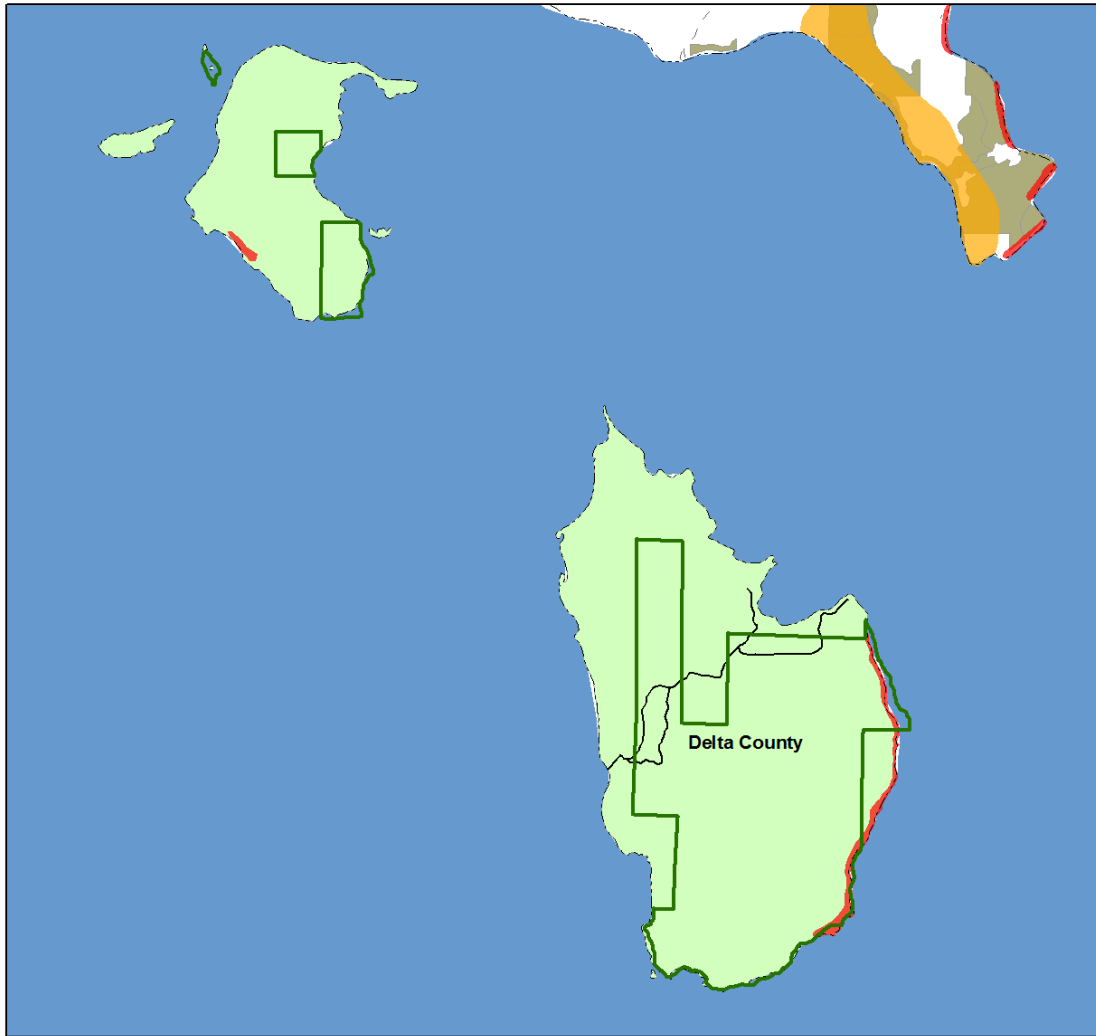
### **4.14.6 – Public Access and Recreation**

Summer Islands may be accessed by private boat, small plane (airfield on Little Summer) and depending on the weather off-road vehicles, snowmobiles and other vehicles that can access the islands across the ice. There are roads and trails on either island.

There are no recreational facilities on the islands.

These islands provide for recreational boating, camping, hunting, fishing and waterfowl hunting.

# Summer Islands



## Legend

- Highway
- Paved Roads
- Gravel Roads
- Poor Dirt Roads
- Railroads
- Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- Management Area Boundary
- Cities
- County Boundaries

## Ecological Reference Areas

## High Conservation Value Areas

- Ecological Reference Areas
- Coastal Environmental Areas
- Critical Dunes
- Natural Rivers Vegetative Buffer
- Natural Rivers Zoning District
- Critical Coastal Habitat (Piping Plover)
- Kirtland Warbler Habitat
- Dedicated Management Areas
- Natural Areas Legally Dedicated

1 in = 1 miles

## Special Conservation Areas

- Campgrounds
- Fishing Access Sites
- Boat Access Sites
- Mineral Resource Locations
- Wild & Scenic Rivers (USFS Lands)
- Visual Management Areas
- Contiguous Resource Areas
- Possible Type 1 and Type 2 Old Growth
- Potential Old Growth
- Non-Dedicated Natural Areas & National Natural Landmarks
- Springs, Wetlands, or Riparian Areas



- Cold Water Streams & Lakes
- Wildlife Management Areas
- Research, Development, and Military Lands
- Great Lakes Islands

Figure 4.14.6 A map of the Summer Islands management area showing the special resource areas.

#### **4.14.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. There are no designated high priority trout streams in this management area.

#### **4.14.8 – Minerals**

Surface sediments consist of thin to discontinuous sediments over bedrock. The glacial drift thickness is very thin. Sand and gravel pits are not located on the islands and potential for additional pits is limited.

The Silurian Engadine, Manistique and Burnt Bluff Groups outcrop on the islands. The Engadine and Burnt Bluff are quarried for stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (four in Delta County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.15 MA 15 – Hiawatha Moraine Management Area

### Summary of Use and Management

Management in the Hiawatha Moraine management area (MA) (Figure 4.15.1) will emphasize both timber and wildlife management; protecting unique areas and threatened, endangered and special concern species; and providing for forest based recreational uses. The area is intensively managed for timber production and objectives include improving the age class distribution of red pine, jack pine and aspen. This management area contains the High Rollways, which is part of an extensive open-land complex. Management of this site is focused on providing springtime break-out habitat for deer, which also benefits open-land wildlife species such as sharp-tailed grouse and upland sandpiper. Vegetative management here will emphasize maintaining these large opening complexes. Expected issues in this 10-year planning period include increased illegal use of off-road vehicles, introduced pests and diseases and introduction and spread of invasive species.

### Introduction

The Hiawatha Moraine management area is located in the west part of the eastern Upper Peninsula, north of the city of Manistique, in Schoolcraft County. It has 13,651 acres of state-owned land. The primary attributes are timber production and wildlife habitat management in the large open-land complex. Additional attributes which were important in identifying this management area include:

- The management area falls within the Luce subsection VIII.2 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landforms consist of lacustrine sand and gravel.
- Special features including a special conservation area deer wintering area.
- Recreational opportunities include snowmobiling and berry picking.
- This management area contains one of the eastern Upper Peninsula Grouse Enhanced Management Systems (GEMS) areas. This area plan will emphasize balanced age classes of aspen for timber production which will have habitat benefits for a number of the featured species including ruffed grouse and deer. The boundaries of Grouse Enhanced Management Systems areas will be delineated and an operational plan will be developed during this planning period by the local biologist in collaboration with the Forest Resources Division unit manager and integrated into the plan through the revision process.

This is a productive upland area, almost completely surrounded by the Seney Manistique Swamp management area. The High Rollways, a historic pine logging area along the Manistique River and the Smith Lake Civilian Conservation Core camp are within the management area.

The state land in this management area is fairly concentrated, though surrounded by private ownerships. The Hiawatha Moraine management area falls within the Shingleton Forest Management Unit. The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.15.1.

Table 4.15.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Hiawatha Moraine management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Aspen	23%	3,096	5	3,091	223	0	3,096	515	0
Red Pine	18%	2,432	34	2,398	29	1,172	2,432	266	1,200
Northern Hardwood	15%	2,112	21	2,091	0	1,019	2,112	0	1,019
Upland Open/Semi-Open Lands	10%	1,345	0	1,345	0	0	1,345	0	0
Cedar	6%	867	0	867	0	0	867	54	0
White Pine	6%	753	17	736	67	270	753	67	270
Lowland Open/Semi-Open Lands	5%	730	0	730	0	0	730	0	0
Jack Pine	5%	667	16	651	24	0	667	93	0
Lowland Conifers	4%	482	0	482	0	0	482	54	0
Misc Other (Water, Local, Urban)	1%	131	0	131	0	0	131	0	0
Others	8%	1,036	131	905	142	50	1,036	102	70
<b>Total</b>	<b>100%</b>	<b>13,651</b>	<b>224</b>	<b>13,427</b>	<b>485</b>	<b>2,511</b>	<b>13,651</b>	<b>1,151</b>	<b>2,559</b>

Others include: lowland spruce/fir, oak, tamarack, upland spruce/fir, lowland deciduous, upland conifers, hemlock, paper birch, lowland aspen/balsam poplar, upland mixed forest, and lowland mixed forest.



# Hiawatha Moraine

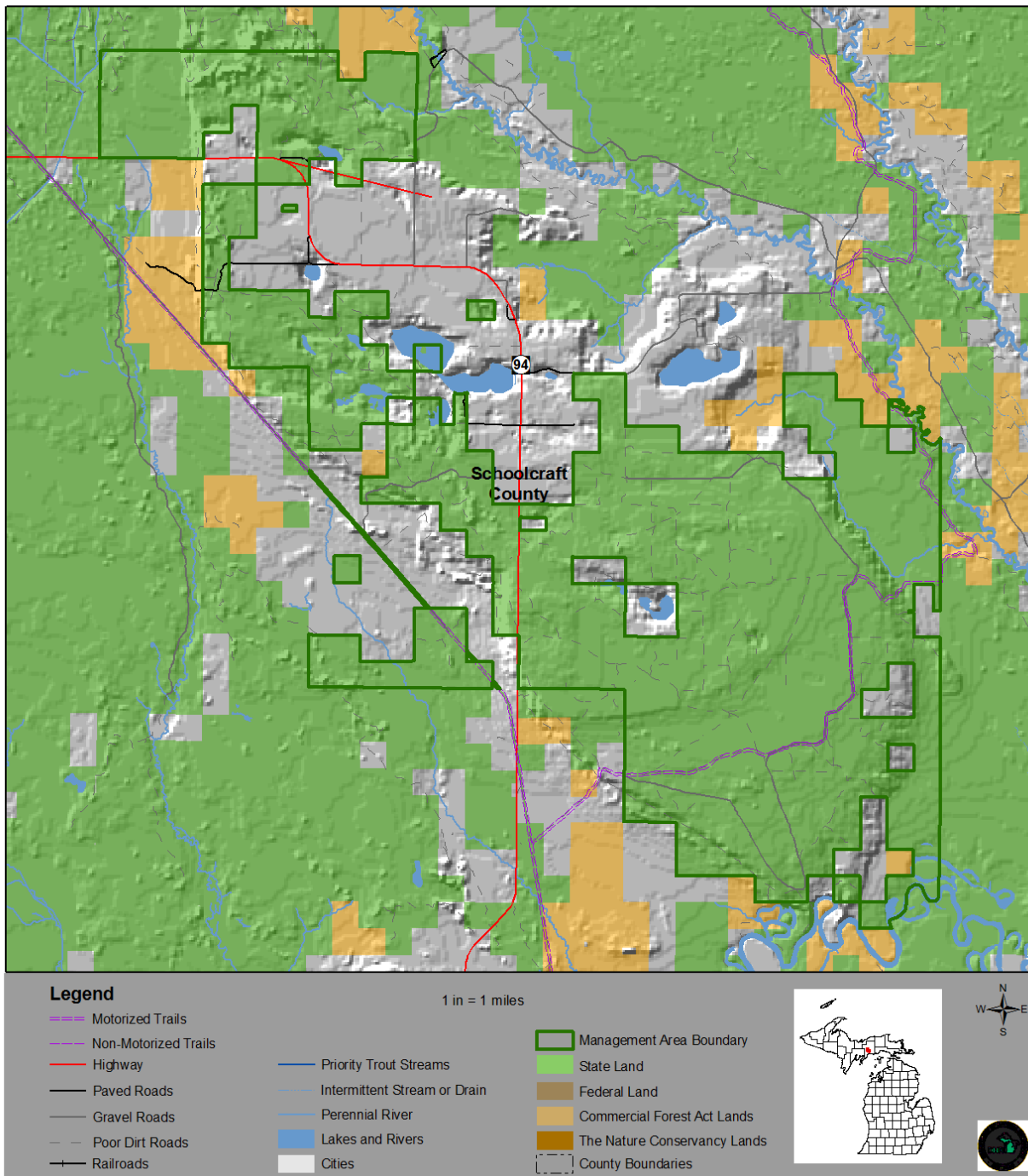


Figure 4.15.1. Location of Hiawatha Moraine management area (dark green boundary) in relation to surrounding state forest lands, and other ownerships in Schoolcraft County.

#### 4.15.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Issues for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### 4.15.1.1 Forest Cover Type Management - Aspen

###### Current Condition

Aspen occurs on 3,096 acres (23%) of the management area (Table 4.15.1). Aspen stands are distributed throughout the management area on sandy soils of outwash plains, dunes, disintegration moraines and kame terraces. These are generally dry to mesic, poor- to medium-nutrient sites with Kotar habitat types of PARVAa and ATFD. Aspen stands have been successfully harvested and regenerated in recent years resulting in the majority of the aspen acres being in the 0-39 year age classes (Figure 4.15.2). Aspen within the Mint Farm Grouse Enhanced Management System area may be managed slightly different than the rest of the aspen within the management area through shorter rotation ages and smaller harvest areas.

There are currently 129 acres of aspen prescribed for final harvest. Some stands of aspen are prescribed to be returned to herbaceous open land after harvest. These acres have already been removed from the manageable acres for aspen. There are five acres of aspen that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of aspen will eventually succeed to late successional species.

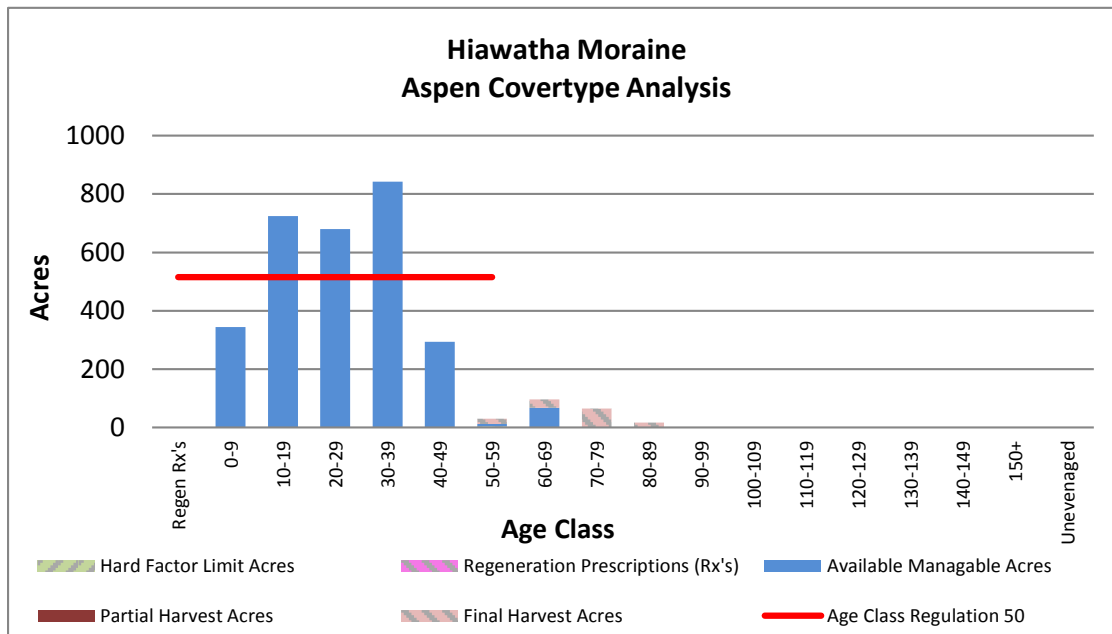


Figure 4.15.2. Age-class distribution of aspen in the Hiawatha Moraine management area (2012 Department of Natural Resources inventory data).

###### Desired Future Condition

- Aspen stands will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year harvest is approximately 223 acres which is significantly lower than the regulated amount due to the current age-class structure where the majority of stands are less than 40 years of age.
- Aspen within the identified Grouse Enhanced Management Systems area may be managed differently than the rest of the aspen within the management area, with a shorter rotation age, small patch cuts and carefully considered stand adjacency.

Long-Term Management Objectives

- Balance the age classes of accessible aspen providing for a regulated harvest of approximately 515 acres per decade (red line in Figure 4.15.2).

**4.15.1.2 Forest Cover Type Management – Red Pine**

Current Condition

Red pine stands are found on 2,432 acres (18%) of the management area (Table 4.15.1). Red pine is distributed throughout the management area mainly on Rubicon and Kalkaska sands of outwash plains with Kotar habitat types of PARv and PARVAa (see Appendix E). The majority of the red pine stands are of planted origin. These stands have been thinned approximately every 10 years since products became available. Over the last 20 years some of the red pine stands have had stand replacement harvests followed by re-planting, thus diversifying the age-class structure (Figure 4.15.3). Prescribed burning or the use of herbicide may be necessary to control competing vegetation thus ensuring successful regeneration. Red pine stands in older age classes are generally of natural origin and are often mixed with white pine, aspen and jack pine. Shelterwood harvests in these stands have resulted in mixed regeneration.

Some of these planted red pine stands are 10, 20 or 40 acre blocks with jack pine in between. It is desirable to consolidate the planted stands for ease of management and to provide larger acreages of contiguous habitat. The total acreage of red pine is expected to remain similar to the current amount, though the actual location of the stands may be moved to reflect site conditions.

Currently, there are 54 acres prescribed with a final harvest, and 392 acres of red pine prescribed for partial harvest or thinning. There are some acres prescribed for harvest in a different cover type that are expected to convert to red pine after harvest and some acres of red pine that are prescribed to convert to other types. These acres are shown in Figure 4.15.3 in the regeneration prescriptions column. There are 34 acres of red pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

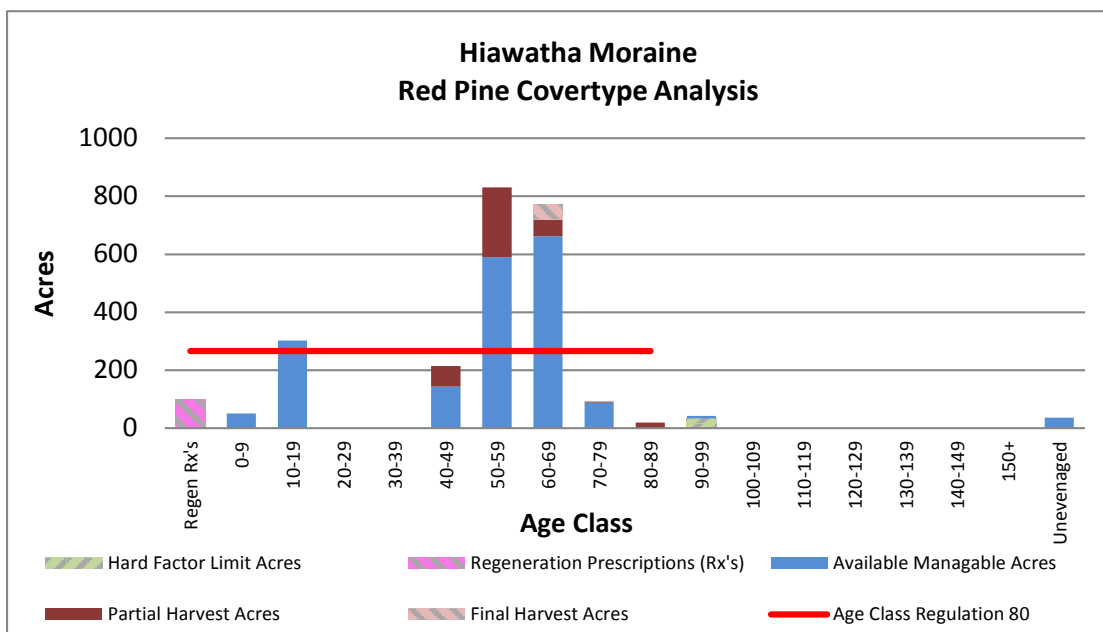


Figure 4.15.3. Age-class distribution of red pine in the Hiawatha Moraine management area (2012 Department of Natural Resources inventory data).

### Desired Future Condition

- Red pine stands will be maintained and managed through thinning until stand replacement harvest at economic maturity. Acres will be balanced between 0-89 years of age to provide for continual harvest, wildlife habitat and recreational opportunity. Red pine found in riparian buffers or other sensitive sites may remain until biological maturity.

### 10-Year Management Objectives

- The 10-year projected final harvest is 29 acres to work toward balancing the acres of red pine. This is less than the regulated amount due to the current age-class structure, where most stands are 50-70 years old and are available for thinning.
- The projected 10-year partial harvest is 1,155 acres of thinning of red pine stands 40-79 years old.

### Long-Term Management Objectives

- Balance the age-class structure of red pine to provide a regulated harvest of approximately 266 acres per decade.
- Stands will be periodically thinned until they meet silvicultural criteria.

## **4.15.1.3 Forest Cover Type Management – Northern Hardwood**

### Current Condition

Northern hardwood occurs on 2,112 acres (15%) of the management area (Table 4.15.1). Over 80% of the stands have been managed as uneven-aged, thereby having trees of varying ages and sizes. Stand density, described as basal area per acre, is used to measure stand condition. Figure 4.15.4 shows the basal area distribution of the stands. Northern hardwoods are distributed throughout the management area on moraines, ground moraines, outwash plains, disintegration moraines and kame terraces with Kotar habitat types of ATFD and AFPo. High quality hardwood stands can be found in the southeast and east portions of the management area and by lake moraines. In most stands, conduct individual tree selection harvests where basal area is over 120 square feet per acre, usually about every 20 years. Where site quality is poor shelterwood and other even-aged harvesting systems will be considered. Stands that have been recently harvested using even-aged management are shown in the immature column in Figure 4.15.4.

Beech Bark Disease is prevalent in this management area and many stands have had or will have salvage harvests due to beech bark disease. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

Currently, 693 acres have a partial harvest or selection harvest prescription assigned. There are 21 acres of northern hardwood that have site conditions limiting their harvest this entry cycle. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

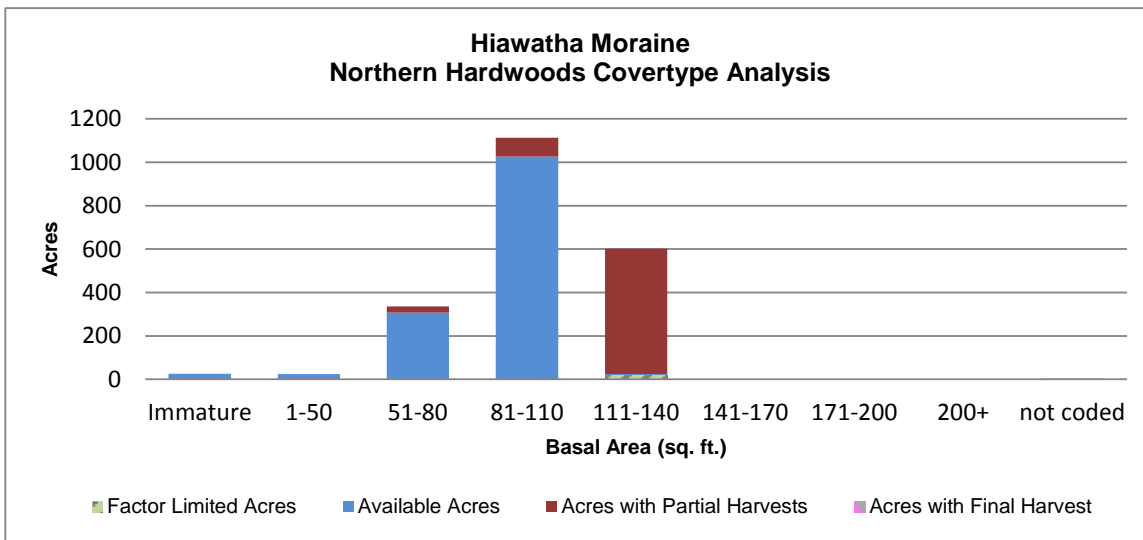


Figure 4.15.4. Basal area distribution of northern hardwoods in the Hiawatha Moraine management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwood stands will be maintained on operable sites using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands. Harvesting will provide for a continuous flow of timber products and a variety of wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected harvest is 1,019 acres of partial or selection harvest.
- Evaluate beech dominated forests to determine the impact of beech bark disease on regeneration.
- Track beech regeneration in these stands and consider herbicide application on beech regeneration to promote regeneration of other species.
- In areas that are losing beech to beech bark disease, consider planting disease resistant beech or oak after harvesting to increase the availability of hard mast.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**4.15.1.4 Forest Cover Type Management – Upland Open/Semi-Open Lands**

Current Condition

Upland open/semi-open lands are found on 1,345 acres (10%) of this management area (Table 4.15.1). This category is a combination of the following non-forested land cover types: herbaceous openland (1,228 acres), bare/sparsely vegetated (110 acres), upland shrub (seven acres) and low-density trees (zero acres). These cover types are valued ecologically as sources of open land habitat for numerous species of wildlife. The High Rollways area is part of an extensive open-land complex in the eastern Upper Peninsula. Some of the large openings have been filling in with aspen and other species. Prescribed burning throughout much of the area has reduced this woody vegetation providing food for deer as they leave the yards in early spring. This also benefits open-land species such as sharp-tailed grouse and upland sandpiper that use the area in the summer. The acreage of upland open/semi-open lands is expected to slightly increase this decade as opening maintenance returns some stands back to their open state.

Desired Future Condition

- Maintain the large openings in the area to provide wildlife habitat and recreational opportunities.

Long-Term Management Objectives

- Continue to maintain large openings for wildlife using effective methods including timber harvesting, chipping and prescribed burning.

**4.15.1.5 Forest Cover Type Management – Cedar**

Current Condition

Cedar occurs on 867 acres (6%) of the management area (Table 4.15.1). Cedar stands in this management area are generally found near the border of the management area in association with streams and creeks flowing into the Manistique River. Many of the stands are within a deer wintering area special conservation area. There has not been any recent harvesting and regeneration of this cover type in this management area (Figure 4.15.5).

Currently, there are no cedar stands scheduled for harvest. At this time there are no acres of cedar with site conditions limiting harvest. Cedar stands in inaccessible areas will be subject to natural processes resulting in a range of successional stages.

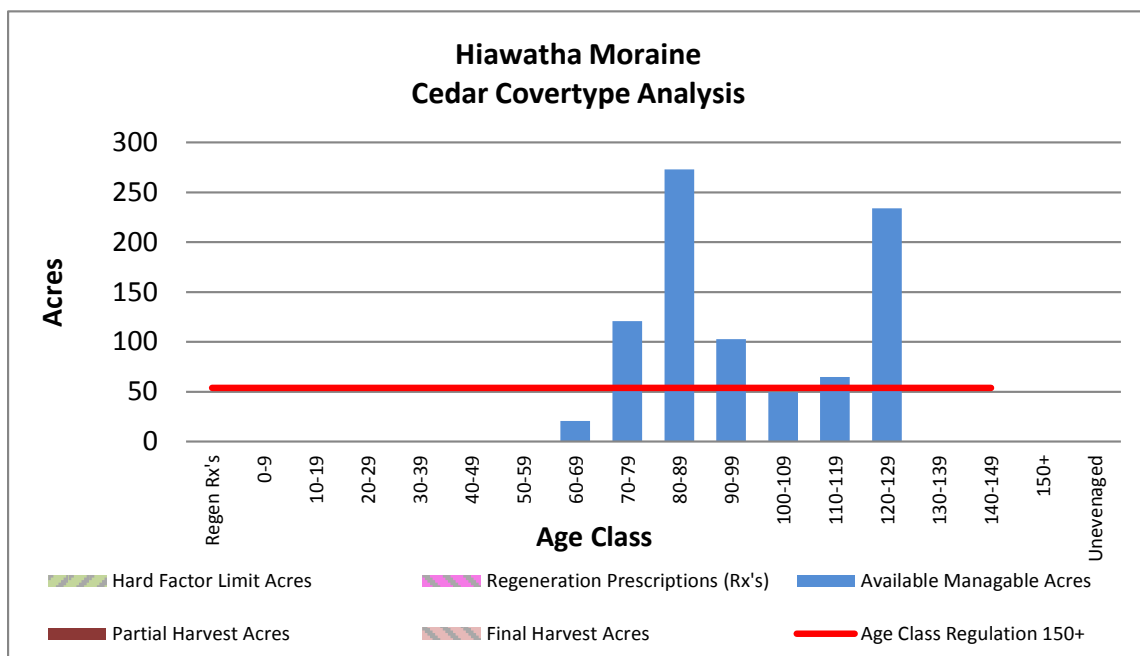


Figure 4.15.5. Age-class distribution of cedar in the Hiawatha Moraine management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Outside the deer wintering areas, cedar stands will be maintained on operable sites through even-aged management, using a 150-year rotation age providing for a regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected harvest for cedar in this management area is zero acres due to the deer wintering complexes.

Long-Term Management Objectives

- In accessible areas outside the deer wintering areas, balance the age-class structure providing for a regulated harvest of approximately 54 acres per decade.
- When resources allow, attempt to purchase more critical wildlife habitat such as the recent purchase within the Sturgeon Hole Deer Yard.

#### 4.15.1.6 Forest Cover Type Management – White Pine

##### Current Condition

White pine occurs on 753 acres (6%) of the management area (Table 4.15.1). White pine is distributed throughout the management area on sandy outwash plains with Kotar habitat types of PARV and PARVAa. While most of the white pine stands are of planted origin, natural stands are also present. White pine regeneration grows well here and stands that have been thinned may have several ages of white pine. As recent shelterwood regeneration harvests have resulted in uneven-aged stands; no acres are shown in the 0-9 and 10-19 year-old age classes. Figure 4.15.6 shows the age-class distribution of the white pine stands in the management area. Following general white pine management guidelines, periodically thin stands with high basal area and conduct regeneration harvests in stands that are economically mature. Use shelterwood or seed tree harvests to promote natural regeneration where possible.

Currently there are 17 acres of white pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Some of the older aged white pine stands are riparian buffers for lakes and creeks and may never be harvested.

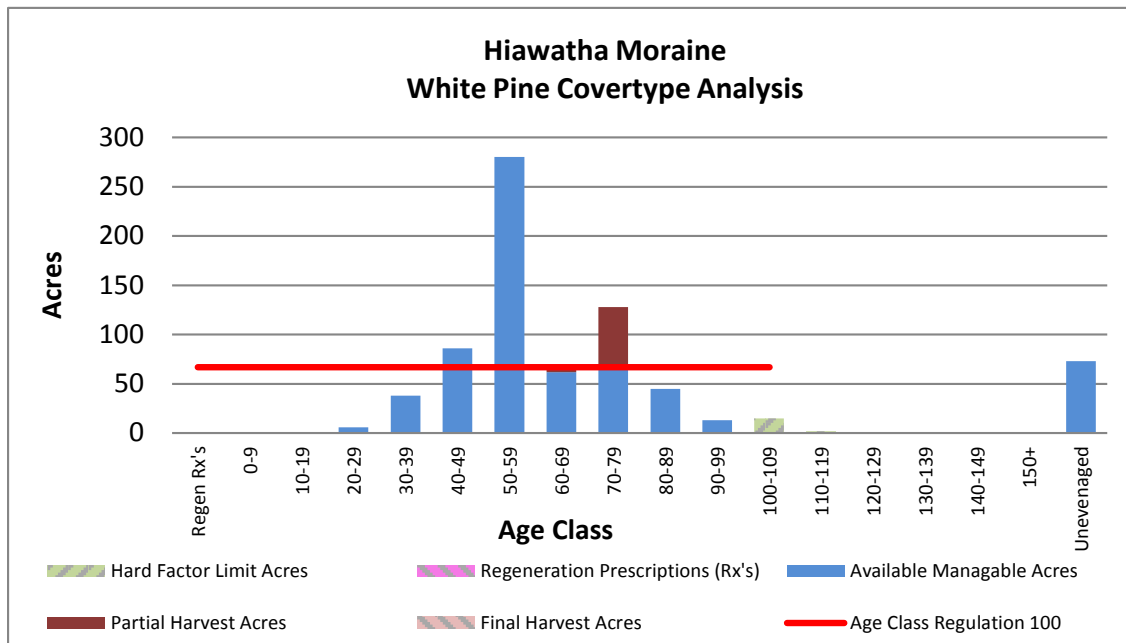


Figure 4.15.6. Age class distribution of white pine in the Hiawatha Moraine management area (2012 Department of Natural Resources inventory data).

##### Desired Future Condition

- White pine will be maintained on operable sites with acres balanced between 0-109 years of age to provide for continual harvesting, wildlife habitat and recreational opportunities.
- White pine stands will be managed through thinning, up until rotation age, followed by shelterwood or seed tree regeneration harvests.

##### 10-Year Management Objectives

- The 10-year projected final harvest is 67 acres of white pine, generally using seed tree harvesting.
- The 10-year projected partial harvest is 270 acres of thinning in stands with high basal area.

##### Long-Term Management Objectives

- Balance the age classes of available white pine providing for a regulated harvest of approximately 67 acres per decade.

#### 4.15.1.7 Forest Cover Type Management – Lowland Open/Semi-Open Lands

##### Current Condition

Lowland open/semi-open lands cover 730 acres (5%) (Table 4.3.1). This category is a combination of lowland shrub (636 acres), marsh (67 acres), treed bog (three acres) and bog (24 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife.

##### Desired Future Condition

- Lowland open/semi-open lands will be retained in their large, roadless state to ensure an adequate level of wildlife habitat and recreational opportunity.

##### Long-Term Management Objectives

- In general, these stands will be maintained without active management to protect their ecological values.
- Lowland shrub stands may be managed for wildlife habitat and/or for biomass if markets materialize.

#### 4.15.1.8 Forest Cover Type Management – Jack Pine

##### Current Condition

Jack pine occurs on 667 acres (5%) of the management area (Table 4.15.1). Jack pine is distributed throughout the management area on outwash plains and in wetland areas. While some of the jack pine acres are in planted stands in the south near the planted red pine, the majority of the jack pine is in natural stands in the north portion of the management area. Scarification is generally used to regenerate jack pine though other methods such as trenching and planting and prescribed burning may be used.

There are currently 83 acres of jack pine with a final harvest prescribed (Figure 4.15.7). There are some acres prescribed for harvest in a different cover type that are prescribed to convert to jack pine after harvest and some acres of jack pine that will convert to other cover types. These acres are shown in figure 4.15.7 in the regeneration prescriptions column. There are 16 acres of jack pine that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Jack pine stands that are unavailable for harvest will remain until biological maturity before succeeding to late successional species.

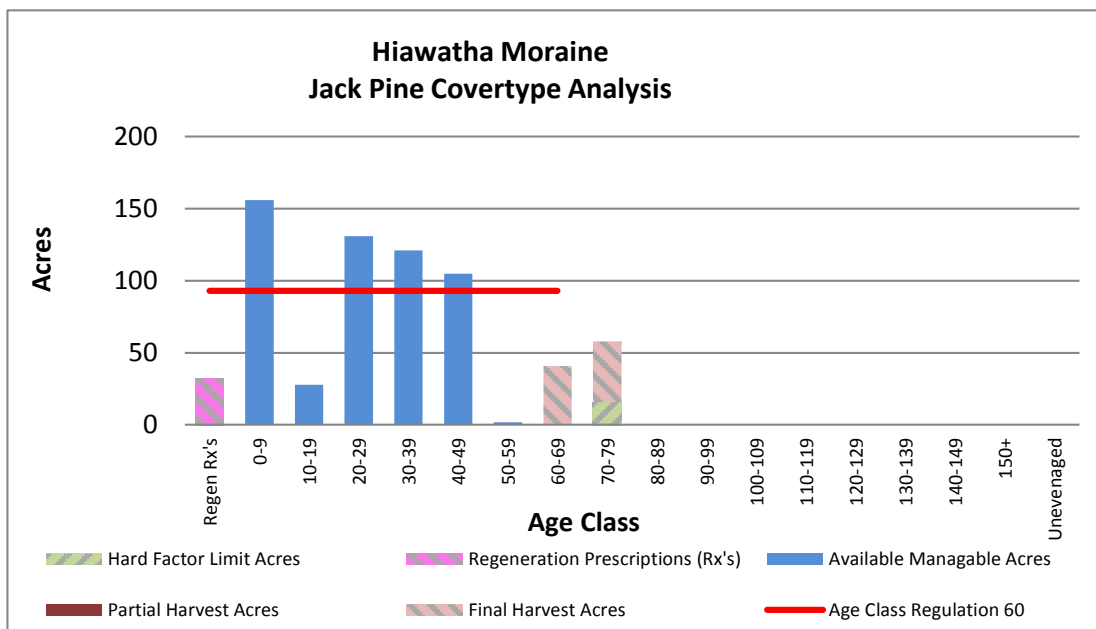


Figure 4.15.7. Age-class distribution of jack pine in the Hiawatha Moraine management area (2012 Department of Natural Resources inventory data).



### Desired Future Condition

- Jack pine will be maintained on operable sites through even-aged management with acres balanced between 0-69 years of age to provide for continual harvesting, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The 10-year projected final harvest is 24 acres of jack pine which is a reduction from the regulated amount due to the current age-class structure of jack pine, where the majority of stands are not yet at rotation age.

### Long-Term Management Objectives

- Balance the age classes of jack pine providing for a regulated harvest of approximately 93 acres per decade.
- Maintain a lower acreage of over-mature stands to lessen the prevalence and severity of jack pine budworm outbreaks.

## **4.15.1.9 Forest Cover Type Management – Other Types**

### Current Condition

There are many cover types spread across the management area that occur on less than 5% of the total management area acres (Table 4.15.1). Lowland conifers occur on 482 acres (4%) of the management area. The “other types” category with 1,036 acres (8%) includes the following cover types, each with 3% or less of the total management area acres: lowland spruce/fir (344 acres), oak (215 acres), tamarack (129 acres), upland spruce/fir (117 acres), lowland deciduous (70 acres), upland conifers (61 acres), hemlock (45 acres), paper birch (23 acres), lowland aspen/balsam poplar (13 acres) and upland mixed forest (nine acres). The “miscellaneous other” category with 131 acres (1%) includes non-forested stands such as of roads, water and sand/soil.

Most of these cover types will be managed as even-aged stands using natural regeneration after harvest. Mixed cover types with high basal area may be thinned prior to final harvest depending on the species composition.

There are 131 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Inaccessible stands may never be harvested and will be subject to successional processes.

### Desired Future Condition

- These minor cover types may be managed on operable sites through even-aged management systems. Harvesting and regenerating these cover types will contribute to the diversity of the landscape while providing for continual harvest, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The projected 10-year final harvest is 142 acres of other types.
- The projected 10-year partial harvest is 50 acres of other types.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## **4.15.2 Featured Wildlife Species**

Wildlife priorities in this management area include the maintenance of early successional aspen habitat, maintaining vegetative and structural diversity within stands, the management of deer wintering complexes and associated breakout areas and maintaining the High Rollaways as part of an extensive opening complex that stretches across the eastern Upper Peninsula.

This management area will include one of the eastern Upper Peninsula Grouse Enhanced Management System areas. The boundaries will be delineated during this planning period by the local biologist in collaboration with the Forest Eastern Upper Peninsula Regional State Forest Management Plan MA 15 Hiawatha Moraine

Resources Division unit manager. Aspen stands that fall within the boundary may be managed to enhance habitat and hunting opportunities for ruffed grouse, woodcock and deer. Habitat treatments may include managing aspen on a shortened rotation with multiple age classes and smaller stand sizes.

### **American Woodcock**

The eastern Upper Peninsula goal for woodcock is to maintain or increase habitat. Management should address the maintenance of adequate early successional habitat to provide feeding, nesting and brood-rearing habitat and opportunity for hunting.

#### Wildlife habitat specifications:

- Balance aspen age class distribution within the management area.
- Maintain or increase the aspen cover type within the management area. Where associated with alder, riparian zones, or forested wetlands use silvicultural practices that encourage the aspen component in mixed stands.
- Maintain rough openings associated with alder, riparian zones or forested wetlands.

### **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age-class distribution for aspen in priority landscapes.

#### Wildlife habitat specifications:

- Maintain and balance the aspen cover type and increase the aspen component in mixed stands within the management area.
- Move to balance the age class distribution of aspen and birch cover types to maintain young forests across the management area.
- Ideal grouse habitat will include large blocks of aspen with several age classes.
- Manage the aspen cover type for smaller patch size, a shorter rotation and a more deliberate habitat configuration within the designated Grouse Enhanced Management Systems areas where appropriate.
- Larger harvest units should have irregular boundaries and retention patches are preferred.
- Promote a conifer component in aspen stands. Leave conifer under four-inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

### **Sharp-tailed Grouse**

The goal for sharp-tailed grouse in the eastern Upper Peninsula is to maintain or improve suitable habitat. Management should focus on enhancing large opening complexes so there is an increase of available habitat.

#### Wildlife habitat specifications:

- Maintain or expand herbaceous open-lands where existing leks occur.
- Manage adjacent forest to maintain young regenerating forest adjacent to permanent openings to maximize use by sharp-tailed grouse.
- Use prescribed fire where appropriate to maintain openings and manage pine types.
- Within open-land complexes maintain connectivity across the landscape.

### **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the department

and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### **4.15.3 Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed three listed species and no natural communities of note occurring in the management area as listed in Table 4.15.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Table 4.15.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Hiawatha Moraine management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Birds</b>								
Common loon	<i>Gavia immer</i>	T/G5/S3-4	Confirmed	HV	Very High	Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	SC/G5/S4	Confirmed	PS	Moderate	Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Dry sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Upland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A
<b>Reptile</b>								
Wood turtle	<i>Glyptemys insculpta</i>	SC/G4/S2S3	Confirmed	MV	Moderate	Northern wet meadow	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern shrub thicket	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

The following special conservation areas are found within the management area: deer wintering area, potential old growth, cold water streams and lakes (Figure 4.15.8). Concentrated recreation area special conservation areas (boat access sites) are listed in the Recreation section 4.15.7 below.

There have been no high conservation value areas or ecological reference areas identified in this management area as illustrated in Figure 4.15.8.

Management goals during this planning period:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.

# Hiawatha Moraine

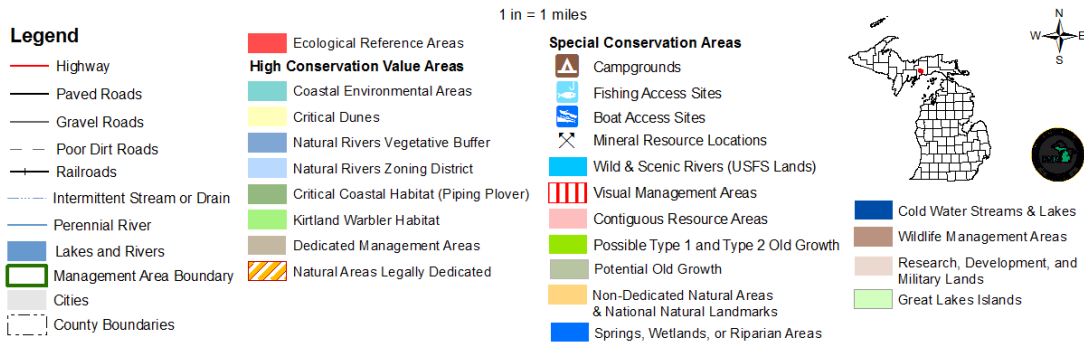
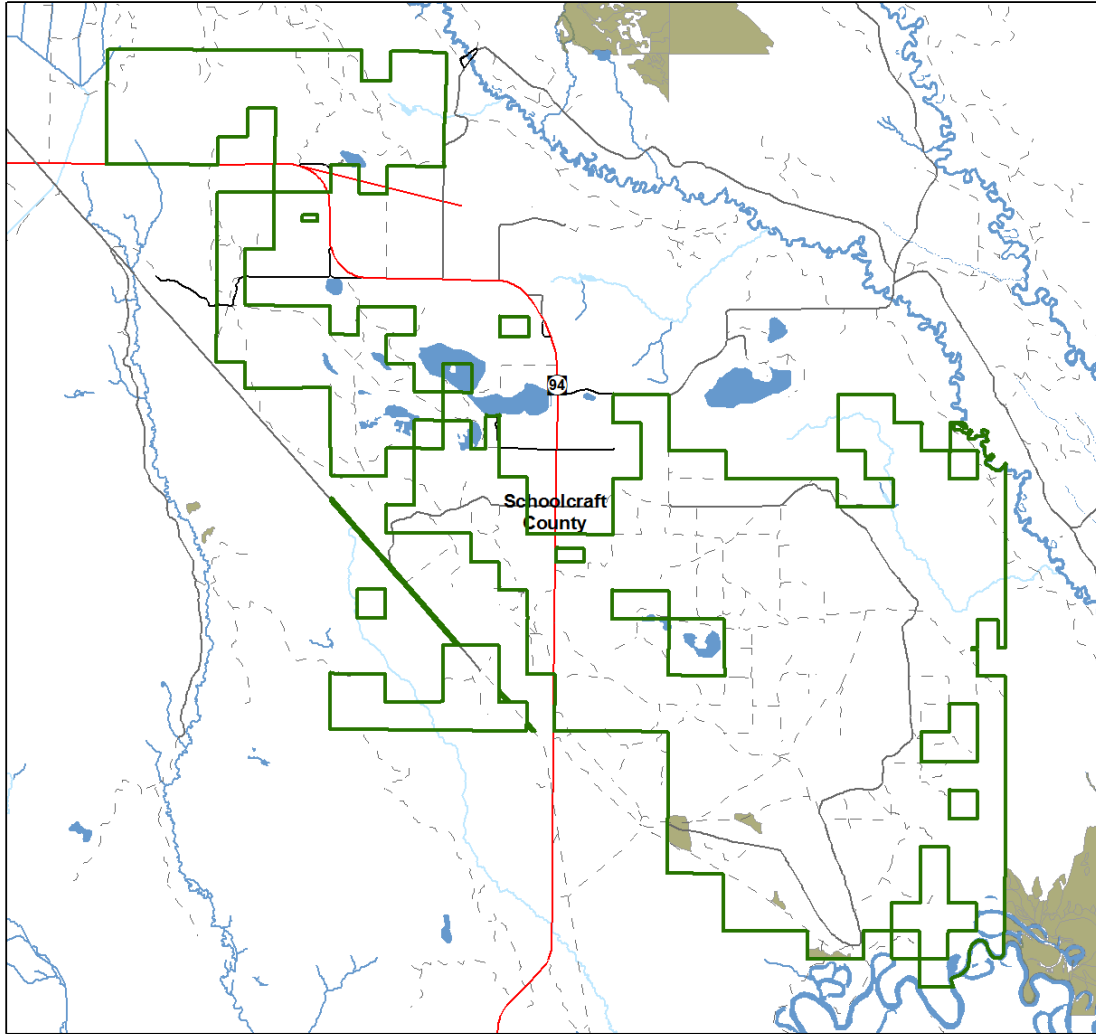


Figure 4.15.8. A map of the Hiawatha Moraine management area showing the special resource areas.

#### 4.15.4 Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Northern hardwoods: beech bark disease
- Aspen: white trunk rot and *Hypoxylon* canker
- White pine: white pine blister rust
- Lowland conifers: spruce budworm, eastern larch beetle and larch casebearer
- Red pine and jack pine: jack pine budworm, red-headed pine sawfly and pine engraver

For further information on forest health refer to Section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

#### 4.15.5 Fire Management

Much of this area is on dry, sandy soils that once supported a mix of barrens and dry to dry-mesic northern forests. These systems were probably maintained by periodic high intensity stand replacement fires, perhaps as often as every 75-100 years. Large openings in this management area have been burned three times since prescribed burn records have been kept. In the spring of 1977 450 acres were burned, 330 acres were burned in the spring of 1983 and 896 acres were burned in the spring of 2000.

- Current plans call for prescribed fire use in the maintenance of these openings. Other burns may be proposed to reduce slash and prepare seedbeds for natural regeneration.
- Public use of the area is largely dispersed recreation. Public access at Dodge Lake and Ashford Lake provide contact points for fire prevention messages.
- This management area falls entirely within the DNR Thompson protection area. In the past, there was a Zone Dispatch plan for this area. It was discontinued in 1998.

#### 4.15.6 Public Access and Recreation

M-94 runs through the management area providing transportation to mills. Gravel and dirt roads provide good access to most of the area.

Recreational facilities include the Haywire Grade off-road vehicle route and two snowmobile trails (Figure 4.15.1). There are also two public boat access sites at Dodge Lake and Ashford Lake.

The area is also used for hunting and berry picking.

Specific hunting recreation improvements such as parking lots, gates, trail planting and trail establishment, as well as the preparation and dissemination of specific promotional material, may be made as a result of Grouse Enhanced Management Systems areas planning in this management area.

#### 4.15.7 Aquatic Resource Management

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. There are no designated high priority trout streams in this management area.

#### **4.15.8 Minerals**

Surface sediments consist primarily of coarse-textured till with minor peat and muck and lacustrine (lake) sand and gravel. The glacial drift thickness varies up to 200 feet. Sand and gravel pits are located in the management area and potential for additional pits is excellent on the uplands.

The Silurian Cabothead Shale, Manitoulin Dolomite and Ordovician Queenston Shale, Big Hill Dolomite and Stonington Formation subcrop below the glacial drift. The Manitoulin Dolomite formation could be quarried for stone.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (five in Schoolcraft). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.16 MA 16 – Huron Patterned Outcrop Management Area

### Summary of Use and Management

Vegetative management in the Huron Patterned Outcrop management area (MA) (Figure 4.16.1) will emphasize protection of rare, threatened and endangered species in association with the Lake Huron shoreline; production of various timber products; wildlife habitat management, including deer wintering areas; and will provide for recreational opportunities. This management area contains two deer wintering special conservation areas that cover most of the management area; a wooded dune and swale ecological reference area; critical habitat for piping plover high conservation value area; and a large number of occurrences of threatened and endangered species. Expected issues in this 10-year planning period include: introduced pests and diseases, invasive species and illegal off-road vehicle use, especially along the lakeshore.

### Introduction

The Huron Patterned Outcrop management area is located in the southeastern portion of the eastern Upper Peninsula in Chippewa and Mackinac counties. It has 27,309 acres of state-owned land. The primary attribute of this management area are the special features it contains, including special conservation areas, ecological reference areas and threatened and endangered species. Additional attributes which were important in identifying this management area include:

- The management area is within the Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of Huron Patterned Outcrop. Variable landscape with upland and scattered low areas associated with coastal streams and coastal fens; often found with areas of limestone outcrop. There is a large limestone quarry on private land in this management area.
- Within this management area there are several special plant and animal habitats along the northern Lake Huron shore, including habitat for several threatened and endangered species. Neotropical song birds use habitat along the coast quite heavily during spring and fall migration.
- There are two small islands in Lake Huron that contain state forest land in this management area. Great Lakes islands provide significant habitat for numerous species including many rare plants and animals, several of which are endemic or largely restricted to the Great Lakes region. Due to their isolation, islands provide good examples of many Great Lakes-associated natural communities and ecosystems. Specific wildlife values include their value to colonial nesting water birds, migratory waterfowl and neotropical migrants who rest and feed on islands on their migration through the Great Lakes. The primary management objectives for Great Lakes islands include the protection of ecological and natural functioning ecosystems and the above mentioned groups of species.
- Recreational opportunities including: camping, hunting, fishing, snowmobiling, kayaking and motorcycling.
- Cranberry Lake State Wildlife Management Area is within the management area. This area consists of a flooding that is managed for waterfowl, marsh birds and aquatic furbearers.

There are several archeological sites and historic lumber era camps. The Lake Huron coastline has experienced land ownership fragmentation with many seasonal second homes on small lots.

The state land in this management area is scattered in small parcels. The Huron Patterned Outcrop management area falls within the Sault Forest Management Unit. The current predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.16.1.



# Huron Patterned Outcrop

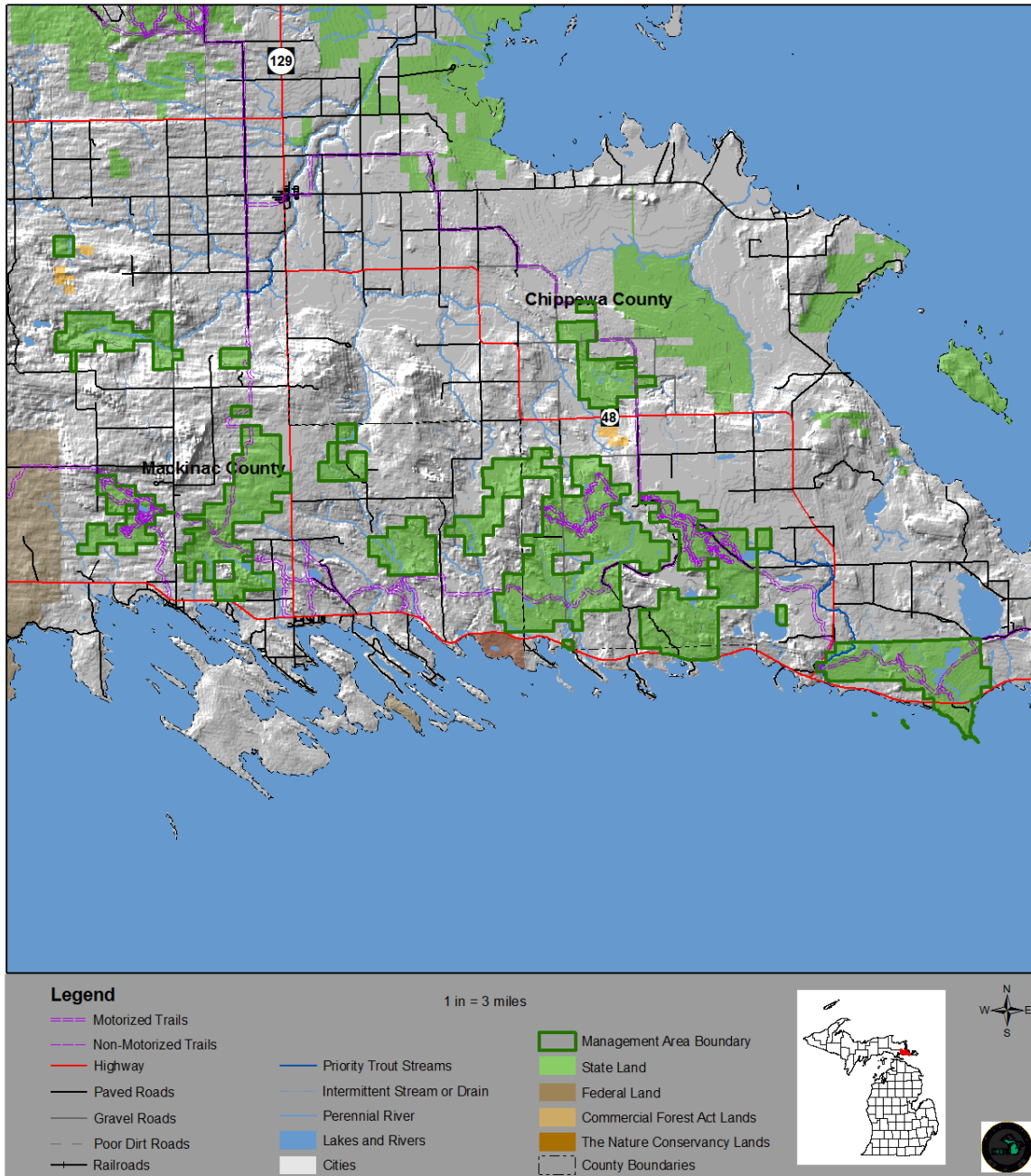


Figure 4.16.1. Location of Huron Patterned Outcrop management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and Lake Huron and the St. Mary's River.

Table 4.16.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Huron Patterned Outcrop management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Aspen	24%	6,641	1,211	5,430	328	0	6,641	905	0
Cedar	20%	5,326	88	5,238	0	0	5,326	327	0
Northern Hardwood	11%	3,082	72	3,010	0	1,498	3,082	0	1,427
Lowland Open/Semi-Open Lands	8%	2,184	0	2,184	0	0	2,184	0	0
Lowland Conifers	6%	1,747	590	1,157	129	0	1,747	129	0
Lowland Aspen/Balsam Poplar	5%	1,387	190	1,197	74	0	1,387	200	0
Paper Birch	3%	829	388	441	0	0	829	76	0
Upland Spruce/Fir	3%	700	368	332	0	0	700	47	0
Mixed Upland Deciduous	3%	705	47	658	94	205	705	94	205
Upland Open/Semi-Open Lands	2%	673	0	673	0	0	673	0	0
Misc Other (Water, Local, Urban)	2%	611	0	611	0	0	611	0	0
Others	13%	3,424	630	2,794	393	391	3,424	301	536
<b>Total</b>	<b>100%</b>	<b>27,309</b>	<b>3,584</b>	<b>23,725</b>	<b>1,018</b>	<b>2,094</b>	<b>27,309</b>	<b>2,079</b>	<b>2,168</b>

Others include: lowland deciduous, lowland mixed forest, red pine, oak, white pine, natural mixed pines, upland conifers, lowland spruce/fir, hemlock, jack pine, tamarack and planted mixed pines.

#### 4.16.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting, mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### 4.16.1.1 Forest Cover Type Management - Aspen

###### Current Condition

Aspen occurs on 6,641 acres (24%) of the management area (Table 4.16.1). Aspen is distributed throughout the management area on dry poor nutrient to mesic medium nutrient sites with Kotar habitat types of PARVAa, ATFD, AFPO and AFOAs (see Appendix E). In this management area aspen has been consistently harvested and regenerated resulting in stands in all age classes of aspen (Figure 4.16.2). Aspen trees commonly occur in other cover types in this area.

There are currently 823 acres prescribed with a final harvest. Approximately 70 acres of other cover types with harvest prescriptions are expected to convert to aspen after harvest. These acres are shown in Figure 4.16.2 in the regeneration prescription column. There are 1,212 acres of aspen that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of aspen will eventually succeed to late successional species.

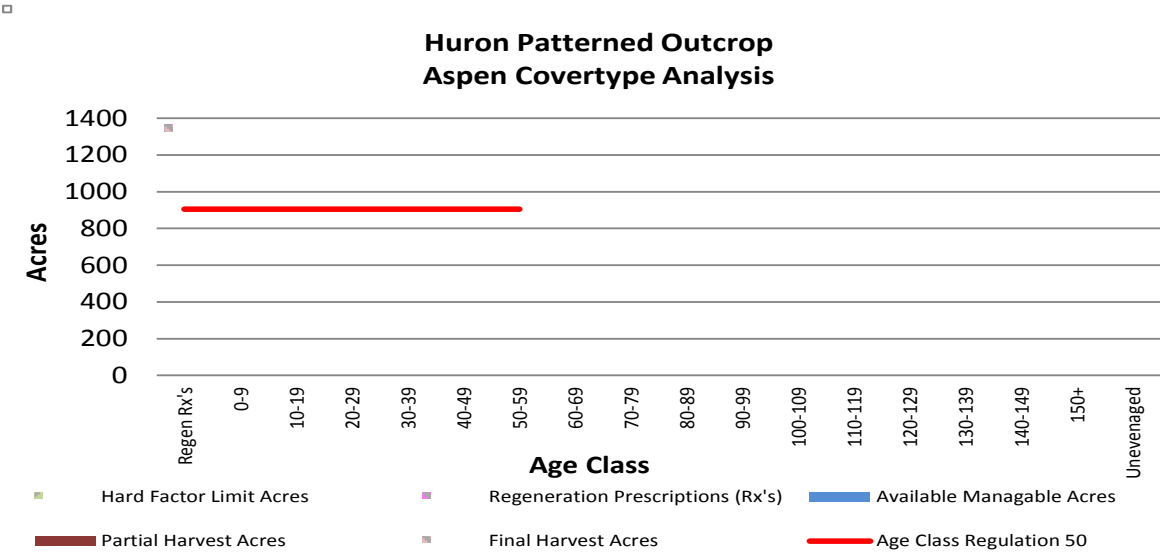


Figure 4.16.2. Age-class distribution of aspen in the Huron Patterned Outcrop management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest is 328 acres of aspen. This is significantly lower than the regulated amount due to the current age-class structure which has a large number of acres in the 0-9 age class and the regeneration prescriptions class.

Long-Term Management Objectives

- Balance the age classes of available aspen providing for a regulated harvest of approximately 905 acres per decade (red line in Figure 4.16.2).

**4.16.1.2 Forest Cover Type Management - Cedar**

Current Condition

Cedar stands occur on 5,326 acres (20%) of the management area (Table 4.16.1). The majority of the cedar stands are found within deer wintering area special conservation areas; therefore, the focus of cedar management will be on winter habitat for deer. In many places cedar is difficult to regenerate due to low snow accumulation and subsequent deer browsing.

There is a need to address future cedar cover within the deer wintering complexes. Limited harvests will occur outside the wintering complexes recognizing that cedar may take many years to regenerate. Reliable and timely regeneration of cedar is a concern from both wildlife and forest management perspectives.

Currently, there is no harvest of cedar prescribed (Figure 4.16.3). There are 88 acres of cedar that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

Desired Future Condition

- Balancing the age classes between 0-159 years of age would provide for regulated harvest, available wildlife habitat and recreational opportunities.

## 10-Year Management Objectives

- The 10-year projected final harvest of cedar is zero acres which is lower than the regulated amount due to the deer wintering complexes.
- If harvesting in this type occurs, ensure that cedar and/or hemlock recruitment/regeneration is reliable if harvesting in this cover type.

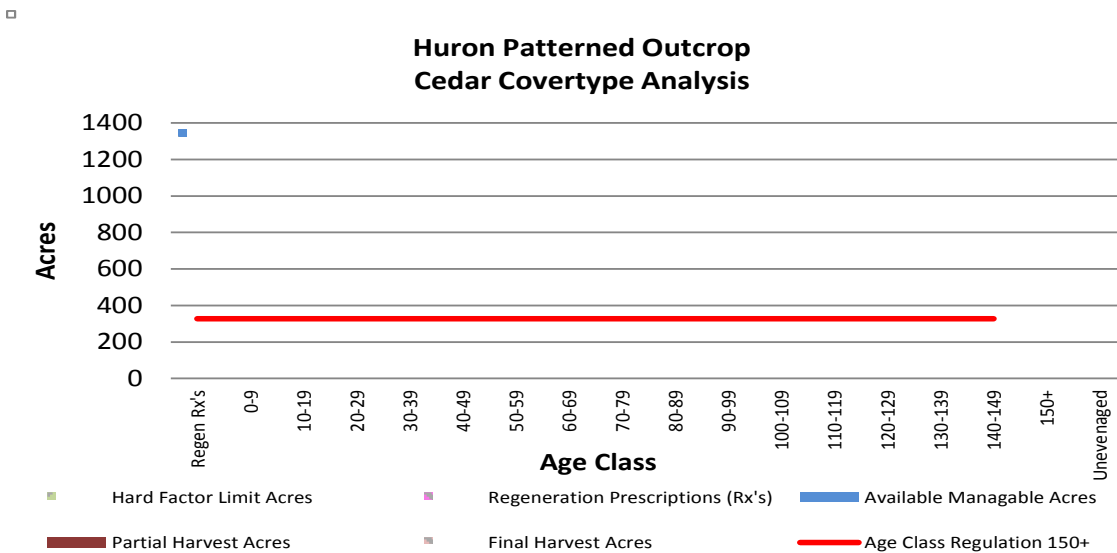


Figure 4.16.3. Age-class distribution of cedar in the Huron Patterned Outcrop management area (2012 Department of Natural Resources inventory data).

## Long-Term Management Objectives

- Cedar stands will be managed to maintain habitat for deer in the wintering complex areas and to retain this forest type in the landscape.
- Outside the deer wintering area, cedar will be managed on a 150 year rotation providing for a regulated harvest of approximately 327 acres per decade.

### 4.16.1.3 Forest Cover Type Management – Northern Hardwoods

#### Current Condition

Northern hardwood occurs on 3,082 acres (11%) of the management area (Table 4.16.1). The majority of the stands have been managed as uneven-aged, thereby having trees of varying sizes and ages. Figure 4.16.4 shows that the majority of the northern hardwood acres are in stands with low to moderate density basal area (51-110 square feet per acre). Northern hardwood stands are distributed on mesic-poor to rich-nutrient sites with Kotar habitat types of ATFD, AFPo and AFOAs. High deer densities may affect the regeneration of some hardwood species. Where stand quality warrants, selection harvests will occur in stands with a basal area over 120 square feet per acre. In general, this will allow most hardwood stands to be selectively harvested every 20 years. Where site quality is poor shelterwood and other even-aged harvesting systems will be considered. Recent even-aged harvesting has resulted in stands in the immature column in Figure 4.16.4.

Beech Bark Disease is prevalent in this management area and many stands have had or will have salvage harvests due to beech bark disease. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

Currently there are 339 acres of northern hardwood with a partial harvest prescribed. There are 70 acres prescribed for harvest in a different cover type that are expected to convert to northern hardwood after harvest. There are 72 acres of northern hardwood that have site conditions limiting their harvest this entry cycle. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

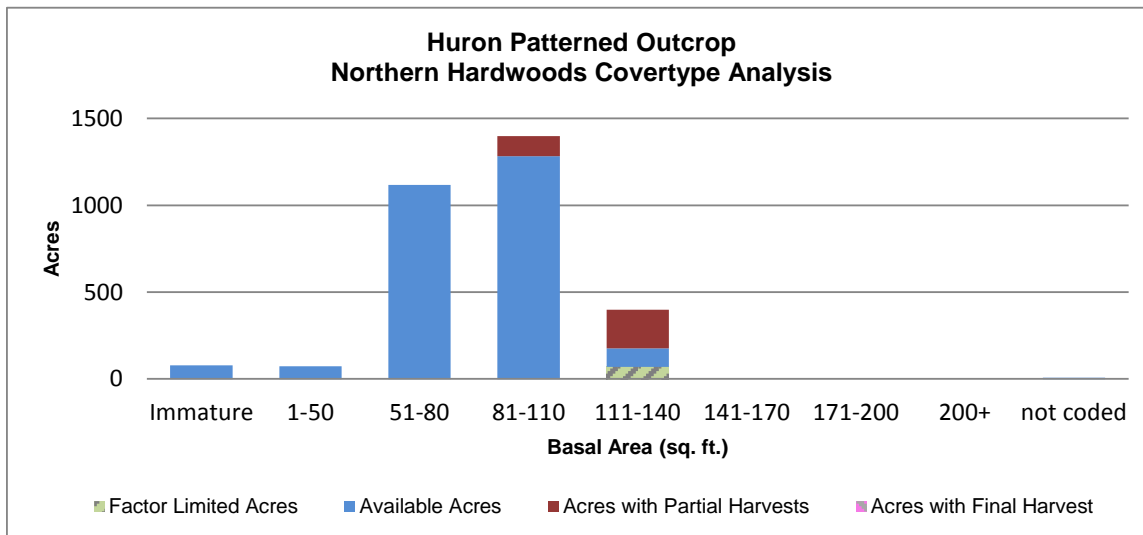


Figure 4.16.4. Basal area distribution of northern hardwood in the Huron Patterned Outcrop management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Northern hardwood stands will be maintained on operable sites by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands.
- Harvesting will provide for a continuous flow of timber products and a variety of wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected partial or selection harvest is 1,498 acres of northern hardwood.
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration.
- Track beech regeneration in these stands and consider herbicide application on beech regeneration to promote regeneration of other species.
- In areas that are losing beech to beech bark disease, consider planting disease resistant beech or oak after harvesting to increase the availability of hard mast.

#### Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

### **4.16.1.4 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

#### Current Condition

Lowland open/semi-open lands occur on 2,184 acres (8%) (Table 4.16.1). This category is a combination of lowland shrub (1,501 acres), marsh (622 acres), treed bog (eight acres) and bog (13 acres). These cover types are valued ecologically as sources of habitat for numerous species of wildlife. Most lowland brush stands are found in association with streams and rivers and contribute to access issues. Many of these stands are seasonally flooded.

#### Desired Future Condition

- Lowland open/semi-open lands will be retained to ensure an adequate level of wildlife habitat and recreational opportunity.

#### Long-Term Management Objectives

- Continue to maintain this habitat type for wildlife and other ecological concerns without active management.

#### 4.16.1.5 Forest Cover Type Management – Lowland Conifers

##### Current Condition

Lowland conifers occur on 1,747 acres (6%) of the management area (Table 4.16.1). Some of these stands occur in deer wintering areas. Over 10% of the lowland conifer stands have been classified as uneven-aged having trees of varying ages and sizes, resulting from natural processes (Figure 4.16.5). There has been a limited amount of lowland conifer stands that have been harvested and regenerated resulting in very few stands in younger age classes. Natural regeneration is expected in these stands after harvesting, though species composition of regeneration may be affected if harvesting occurs in areas with high deer densities.

Currently, there are 77 acres of lowland conifers prescribed for final harvest. There are 590 acres of lowland conifers that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in areas inaccessible for harvest will be subject to natural processes resulting in a range of successional stages.

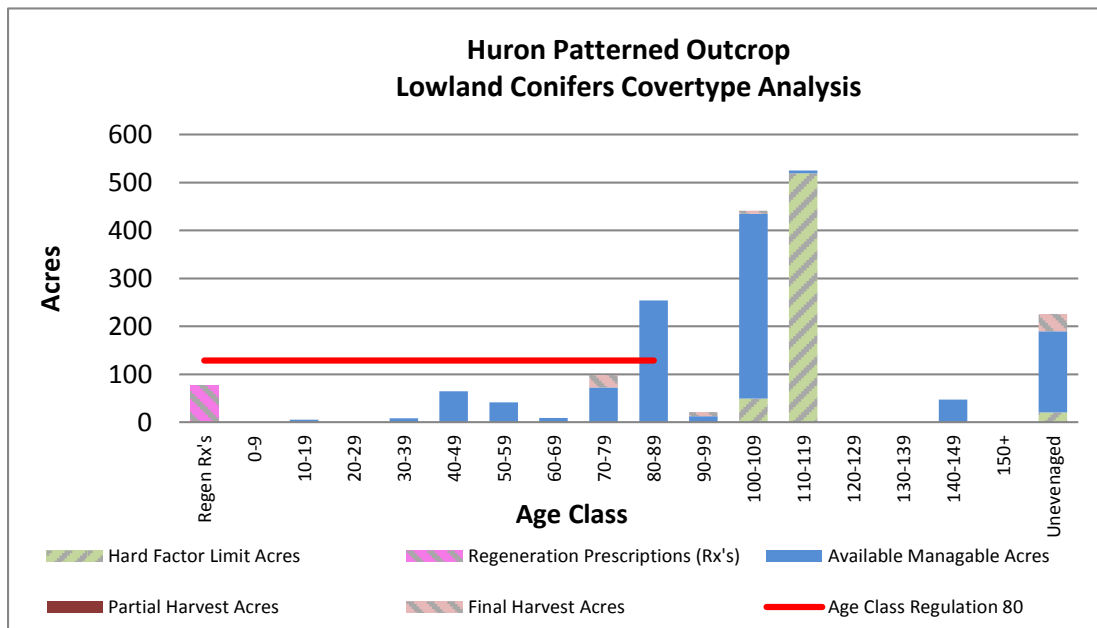


Figure 4.16.5. Age-class distribution of lowland conifers in the Huron Patterned Outcrop management area (2011 Department of Natural Resources inventory data).

##### Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for continual harvest, wildlife habitat and recreational opportunities.

##### 10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 129 acres.

##### Long-Term Management Objectives

- Balance the age-class distribution of accessible lowland conifers providing for a regulated harvest of approximately 129 acres per decade.

#### 4.16.1.6 Forest Cover Type Management – Lowland Aspen/ Balsam Poplar

##### Current Condition

Lowland aspen/balsam poplar occurs on 1,387 acres (5%) of the management area (Table 4.16.1). Many of these stands are found within deer wintering complexes and have a large component of conifer species making them more valuable for wildlife. Approximately 18% of the lowland aspen/balsam poplar stands have been classified as uneven-aged (Figure 4.16.6).

Currently there are no acres prescribed for harvest. There are 22 acres of other cover types that are projected to convert to lowland aspen/balsam poplar following harvest. These acres are shown in Figure 4.16.6 in the regeneration prescriptions column. There are 190 acres of lowland aspen/balsam poplar that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations. Lowland aspen/balsam poplar in inaccessible areas will succeed to more shade tolerant species.

##### Desired Future Condition

- Lowland aspen/balsam poplar stands will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

##### 10-Year Management Objectives

- The projected 10-year final harvest is 74 acres of lowland aspen/balsam poplar which is lower than the regulated harvest amount due to the current age-class structure where the majority of stands are less than 30 years of age.

##### Long-Term Management Objectives

- Balance the age class of accessible lowland aspen/balsam poplar providing for a regulated harvest of approximately 200 acres per decade.

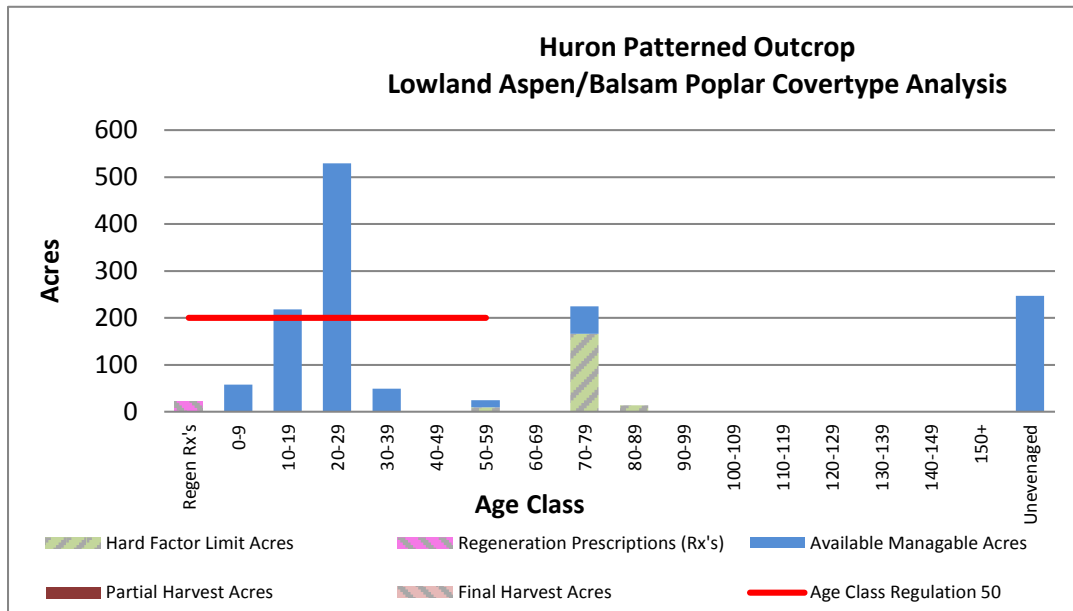


Figure 4.16.6. Age-class distribution of lowland aspen/balsam poplar in the Huron Patterned Outcrop management area (2012 Department of Natural Resources inventory data).



#### **4.16.1.9 Forest Cover Type Management – Other Types**

##### Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acres (Table 4.16.1). Cover types each with 3% of the management area acres include: paper birch (829 acres), mixed upland deciduous (705 acres) and upland spruce/fir (700 acres). Upland open/semi-open lands (673 acres or 2%) is a combination of herbaceous openland, low-density trees, bare/sparsely vegetated and upland shrub.

The “other types” category (3,424 acres or 13%) is a combination of forested cover types with 2% or less of the total management area acres and includes: lowland deciduous (671 acres), lowland mixed forest (646 acres), red pine (489 acres), oak (328 acres), white pine (213 acres), natural mixed pines (140 acres), upland conifers (112 acres), lowland spruce/fir (80 acres), hemlock (27 acres), jack pine (seven acres), tamarack (six acres) and planted mixed pines (three acres). In addition there are 611 acres (2%) of “miscellaneous other” stands, which includes water, sand/soil and roads.

In general, most of these cover types will be managed as even-aged stands using natural regeneration after harvest. White pine, red pine, oak and some of the mixed cover types with high basal area may be thinned prior to final harvest depending upon their species composition.

In these other minor cover types 1,433 acres have been identified as having site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Inaccessible stands will be subject to natural processes and may succeed to late successional species thus changing the cover type distribution in the management area.

##### Desired Future Condition

- These forest stands may be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreation opportunity.

##### 10-Year Management Objectives

- The projected 10-year final harvest is 94 acres of mixed upland deciduous and 393 acres of other types.
- The projected 10-year partial harvest is 205 acres of mixed upland deciduous and 391 acres of other types.

##### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

#### **4.16.2 Featured Wildlife Species**

Within this management area the primary wildlife values include critical deer wintering complexes, early successional aspen, the maintenance of structural and floral diversity, retaining large diameter soft hardwoods and coarse woody debris. Wildlife within this management area is influenced by the Lake Huron shoreline and the geology of the Niagaran Escarpment. Neotropical migrants use the trees along the water’s edge to feed on midges during migration. Portions of the shoreline are designated piping plover critical habitat.

##### **Pileated Woodpecker**

The goal for pileated woodpecker is to maintain or improve habitat. Management should focus on maintaining large diameter deciduous trees in timber sales in priority areas.

##### Wildlife habitat specifications:

- Identify and retain as many existing large (>15 inches in diameter at breast height) snags and cavity trees, coarse woody debris and reserve trees, as possible to ensure a sustainable supply of future cavity/foraging trees and associated coarse woody debris. Poorly formed trees and those damaged by natural disturbance or earlier harvests, particularly deciduous trees, are good candidates for future snags and cavity trees; trees damaged by beech bark disease that were not salvaged are contributing towards this goal. Large diameter aspen and other soft hardwoods are preferred reserve trees.



- Even-aged managed stands: Leave scattered retention patches around some 18 inches in diameter at breast height or greater secure trees as a nucleus, using the upper end of the within stand retention guideline recommendations.
- Uneven-aged managed stands: Retain a minimum of three secure cavity or snags per acre with one exceeding 18 inches in diameter at breast height. If snags or cavity trees are lacking, leave trees with defects of the maximum available size that will likely develop cavities.
- Salvage harvests deemed necessary to remove due to insect, disease, or fire will be offset within the same cover type and age class (within the compartment, management area or eastern Upper Peninsula ecoregion), to minimize impacts on pileated woodpecker habitat. Total allowable harvest in these situations will be evaluated on a case by case basis.

## **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age class distribution for aspen in priority landscapes.

### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Move to balance the age-class distribution of aspen and birch cover types to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation.
- Larger harvest units should have irregular boundaries and include one or two, 1-3 acre un-harvested inclusions for every 40 acres exceeding 40 acres in size.
- Evaluate the conifer component in aspen stands, holding or increasing where desirable. Leave conifer under four inch dbh in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

## **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash and increasing mesic conifer components within stands.

### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under 4 inch diameter at breast height.
- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- Balance age classes in the jack pine cover type to provide young, dense jack pine stands.
- When using herbicide treatments to prepare sites for planting red and jack pine in snowshoe hare habitat, encourage more diverse stands of pine and aspen by using application skips in pockets or along stand edges.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris already present (before cutting), and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance, retaining the maximum residues.

## **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and

hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

#### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### **4.16.3 Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed seven listed species as well as two natural communities of note occurring in the management area as listed in Table 4.16.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

A large portion of the management area falls within deer wintering area special conservation areas. Additional special conservation areas include potential old growth, cold water lakes and streams and high priority trout streams, as well as two Great Lakes islands (Saddlebag Island and Little Saddlebag Island) special conservation areas (Figure 4.16.3).

The management area contains a critical coastal habitat high conservation value area for piping plover. In addition, there is a wooded dune and swale ecological reference area of 728 acres. Ecological reference areas should be managed to protect and enhance their natural vegetative and wildlife communities as directed by ecological reference area-specific management plans.

Management goals during this planning period:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

#### **4.16.4 Forest Health Management**

Although forest health issues span the entire landscape some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Aspen: white trunk rot and *Hypoxylon* canker;
- Northern hardwoods: beech bark disease; and
- Lowland conifers: spruce budworm, eastern larch beetle and larch casebearer.

For further information on forest health refer to Section 3.

#### Invasive Species

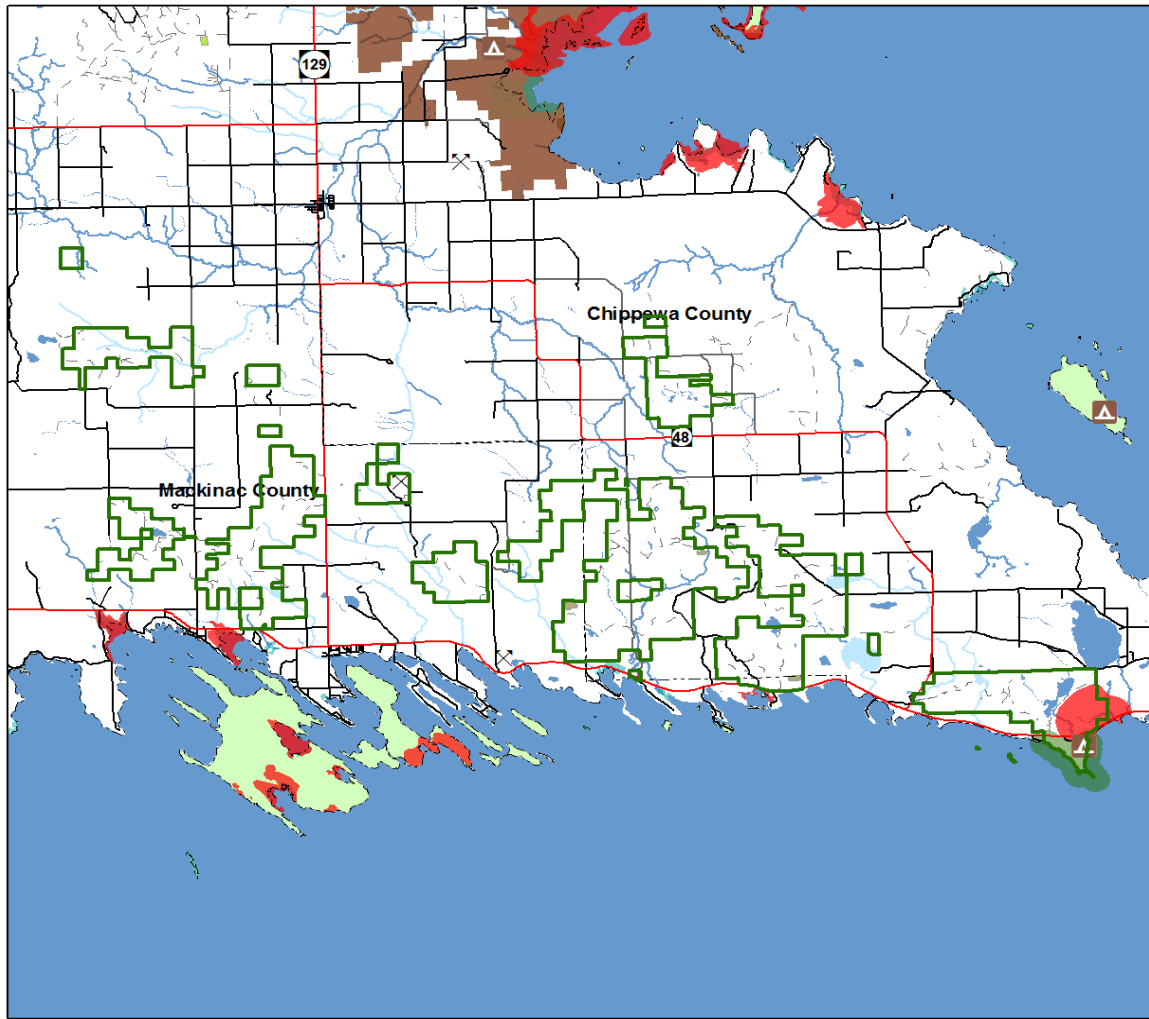
Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

Table 4.16.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Huron Patterned Outcrop management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Dry-mesic northern forest		S3/G4	Confirmed				White Pine	Late
Limestone bedrock glade		S2/G2G4	Confirmed				Upland open/semi-open	N/A
Mesic northern forest		S3/G4	Confirmed				Northern Hardwood	Late
Wooded dune and swale complex		S3/G3	Confirmed				Upland open/semi-open	N/A
<b>Birds</b>								
American bittern	<i>Botaurus lentiginosus</i>	SC/G4/S3-4	Confirmed	MV	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Southern wet meadow	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Piping plover	<i>Charadrius melodus</i>	LE/E/G3/S1	Confirmed	MV	Moderate	Open dunes	Upland open/semi-open	N/A
Black tern	<i>Chlidonias niger</i>	SC/G4/S3	Confirmed	MV	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Emergent Marsh	Lowland open/semi-open	N/A
Common loon	<i>Gavia immer</i>	T/G5/S3-4	Confirmed	HV	Very High	Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Late
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
<b>Snails</b>								
Land snail	<i>Valloria gracilicosta albula</i>	E/G4Q/S1	Confirmed	HV	Moderate	Limestone cliff	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
Tapered vertigo	<i>Vertigo elatior</i>	SC/G5/S3	Confirmed	HV	Moderate	Northern fen	Lowland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Prairie fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Deep-throat vertigo	<i>Vertigo nylanderii</i>	E/G3G4/S3	Confirmed	EV	Moderate	Northern fen	Lowland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
<b>Plants</b>								
Walking fern	<i>Asplenium rhizophyllum</i>	T/G5/S2S3	Confirmed			Mesic northern forest	Northern Hardwood	Late
						Limestone cliff	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone lakeshore cliff	Upland open/semi-open	N/A
						Sinkhole	Upland open/semi-open	N/A
Calypso or fairy-slipper	<i>Calypso bulbosa</i>	T/G5/S2	Confirmed			Rich conifer swamp	Tamarack	Late
						Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone bedrock glade	Upland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Wooded dune & swale complex	Upland open/semi-open	N/A
						Dry northern forest	Jack Pine, Red Pine	Late
						Dry-mesic northern forest	White Pine	Late
						Great Lakes barrens	Upland open/semi-open	N/A
						Volcanic bedrock glade	Upland open/semi-open	N/A
Pitcher's thistle	<i>Cirsium pitcheri</i>	LT/T/G3/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
						Wooded dune & swale complex	Upland open/semi-open	N/A
						Great Lakes barrens	Upland open/semi-open	N/A
						Sand and gravel beach	Upland open/semi-open	N/A
Dwarf lake iris	<i>Iris lacustris</i>	LT/T/G3/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
						Alvar	Upland open/semi-open	N/A
						Wooded dune & swale complex	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
Alaska orchid	<i>Piperia unalascensis</i>	SC/G5/S2S3	Confirmed			Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
Houghton's goldenrod	<i>Solidago houghtonii</i>	LT/T/G3/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
						Alvar	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Interdunal wetland	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

# Huron Patterened Outcrop



## Legend

- Highway
- Paved Roads
- Gravel Roads
- - - Poor Dirt Roads
- Railroads
- Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- Management Area Boundary
- Cities
- County Boundaries

- Ecological Reference Areas
- High Conservation Value Areas**
- Coastal Environmental Areas
- Critical Dunes
- Natural Rivers Vegetative Buffer
- Natural Rivers Zoning District
- Critical Coastal Habitat (Piping Plover)
- Kirtland Warbler Habitat
- Dedicated Management Areas
- Natural Areas Legally Dedicated

1 in = 3 miles

## Special Conservation Areas

- Campgrounds
- Fishing Access Sites
- Boat Access Sites
- Mineral Resource Locations
- Wild & Scenic Rivers (USFS Lands)
- Visual Management Areas
- Contiguous Resource Areas
- Possible Type 1 and Type 2 Old Growth
- Potential Old Growth
- Non-Dedicated Natural Areas & National Natural Landmarks
- Springs, Wetlands, or Riparian Areas



- Cold Water Streams & Lakes
- Wildlife Management Areas
- Research, Development, and Military Lands
- Great Lakes Islands

Figure 4.16.7. A map of the Huron Patterened Outcrop management area showing the special resource areas.

#### **4.16.5 Fire Management**

A variety of fire regimes likely existed in this management area.

- Prescribed fire may be used to maintain openings (both wet and upland) and to encourage pine regeneration.
- Prescribed fire may be used to reduce fuel loading and/or preparatory to planting.
- Fire suppression tactics should take into account the sensitive nature of some of the natural communities in this management area.

#### **4.16.6 Public Access and Recreation**

The state land is spread out in smaller blocks. State highways and county roads provide access to most parcels; however, landowner cooperation is necessary to access some state land.

Recreational facilities include the Detour State Forest Campground, boating access sites at Cranberry Flooding and Bay City Lake and motorized trail facilities including the snowmobile trails, the Foreman Lake, Bay City and Birch Hill motorcycle trails and the Bay City motorcycle trailhead.

The motorcycle trails are designated motorcycle use only by Director's Order. Extreme care must be exercised to maintain the 24 inch trail bed.

#### **4.16.7 Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. Albany Creek is designated as a high priority trout stream in this management area and the details are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.16.1.

#### **4.16.8 Minerals**

Surface sediments consist of primarily thin to discontinuous lacustrine (lake) sand and gravel, clay and silt, glacial outwash sand and gravel, postglacial alluvium, coarse-textured till and peat and muck over bedrock. There is less than 50 feet of glacial drift in this management area. Sand and gravel pits are located in this area and there is potential for additional pits.

The Silurian Engadine, Manistique and Burnt Bluff Groups, Cabothead Shale and Manitoulin Formation and Ordovician Queenston Shale and Big Hill Dolomite subcrop below the glacial drift. The Engadine and Burnt Bluff are quarried for stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (14 in Chippewa and four in Mackinac). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.17 MA 17 – Kincheloe Highlands Management Area

### Summary of Use and Management

Management in the Kincheloe Highlands management area (MA) (Figure 4.17.1) will emphasize timber production; provide for forest based recreational opportunities; maintain or enhance wildlife habitat; and protect areas of threatened, endangered and special concern species. Timber management for this 10-year planning period will focus on thinning red pine plantations and improving the age-class diversity of aspen and oak. Expected issues within the next decade are increased recreational pressure, illegal trash dumping and the introduction and spread of pests, diseases and invasive species.

#### Introduction

The Kincheloe Highlands management area is located in the east portion of the eastern Upper Peninsula, in Chippewa County, near I-75. It has 7,475 acres of state-owned land. Timber harvesting and recreation are the primary attributes in this management area. Additional attributes which were important in identifying this management area include:

- The management area falls within Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- This is a small area of sand lake plain in the center of a broad clay lake plain. This sand plain consists of a series of ancient beach ridges and swales and is many miles from the present Great Lakes shoreline.
- This is an area of higher ground with upland cover types as compared with the adjacent management area which is comprised mainly of lowland forest cover types.
- Northern red oak is prevalent here. There is a northern red oak seed orchard in the management area.
- This management area is surrounding the former Kincheloe U.S. Air Force Base, now the Chippewa International Airport. A cellulosic ethanol production plant has been proposed in this area.
- There are some known archeological sites in the area; this area had prehistoric human use.
- Recreation use is high, with facilities including: motorcycle, snowmobile and cross country ski trails. The area is heavily used for hunting and fishing, and dispersed camping is popular.

The state land in this management area is fairly concentrated, though surrounded by private ownerships. The Kincheloe Highlands management area falls within the Sault Forest Management Unit. The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.17.1.

Table 4.17.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Kincheloe Highlands management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Aspen	22%	1,651	37	1,614	45	0	1,651	269	0
Red Pine	20%	1,477	14	1,463	0	500	1,477	163	860
Northern Hardwood	13%	991	0	991	0	396	991	0	430
Lowland Open/Semi-Open Lands	12%	920	0	920	0	0	920	0	0
Oak	6%	412	0	412	46	50	412	46	150
Lowland Conifers	3%	208	190	18	0	0	208	2	0
Lowland Spruce/Fir	3%	207	0	207	66	0	207	23	0
Natural Mixed Pines	3%	196	0	196	28	76	196	18	76
Upland Open/Semi-Open Lands	4%	326	0	326	0	0	326	0	0
Misc Other (Water, Local, Urban)	1%	77	0	77	0	0	77	0	0
Others	14%	1,010	68	942	136	129	1,010	91	153
<b>Total</b>	<b>100%</b>	<b>7,475</b>	<b>309</b>	<b>7,166</b>	<b>321</b>	<b>1,151</b>	<b>7,475</b>	<b>612</b>	<b>1,669</b>

Others include: cedar, white pine, upland mixed forest, hemlock, lowland deciduous, mixed upland deciduous, jack pine, lowland aspen/balsam poplar, paper birch and upland spruce/fir.

# Kincheloe Highlands

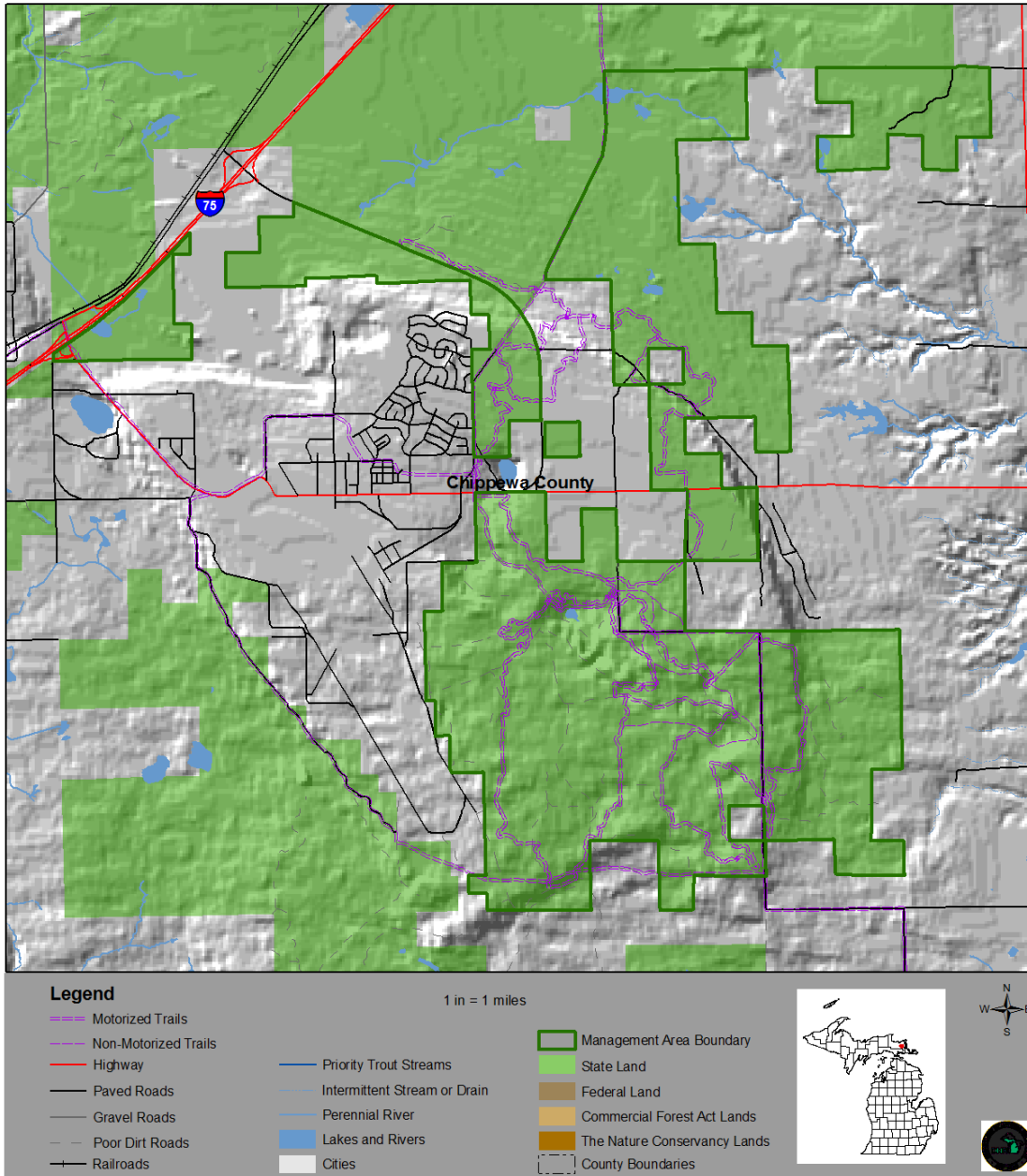


Figure 4.17.1. Location of the Kincheloe Highlands management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and the former Kincheloe Air Force Base.



#### **4.17.1 Forest Cover Type Management Direction**

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### **4.17.1.1 Forest Cover Type Management - Aspen**

###### Current Condition

Aspen occurs on 1,651 acres (22%) of the management area (Table 4.17.1). Aspen stands are distributed throughout the management area on sandy, loamy soils with Kotar habitat types of PArVAa, ATFD and AFPo (see Appendix E). Aspen has been consistently harvested and regenerated resulting in stands in all age classes (Figure 4.17.2). Some of the aspen stands over rotation age may be in areas inaccessible to harvest.

There are currently 10 acres prescribed for final regeneration harvest. Currently there are 17 acres prescribed for harvest in a different cover type that are expected to convert to aspen after harvest. These acres are shown in Figure 4.17.2 in the regeneration prescription column. There are 37 acres of aspen that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of aspen will eventually succeed to late successional species.

###### Desired Future Condition

- Aspen will be maintained on operable sites through even-ages management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

###### 10-Year Management Objectives

- The projected 10-year final harvest is 45 acres which is a reduction from the regulated harvest amount due to the large number of acres less than 30 years old.

###### Long-Term Management Objectives

- Balance the age classes of accessible aspen providing for a regulated harvest of approximately 269 acres per decade (red line in Figure 4.17.2).

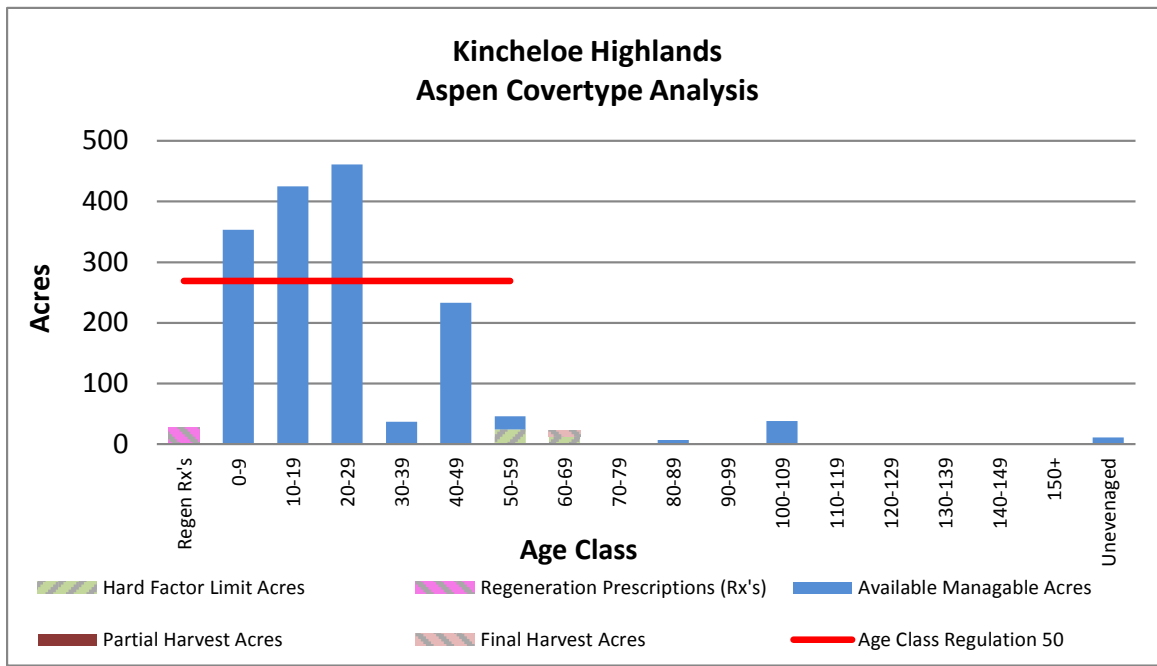


Figure 4.17.2. Age-class distribution of aspen in the Kincheloe Highlands management area (2012 Department of Natural Resources inventory data).

#### 4.17.1.2 Forest Cover Type Management – Red Pine

##### Current Condition

Red pine stands are found on 1,477 acres (20%) of the management area (Table 4.17.1). The majority of the red pine stands in this management area are of planted origin in the 50-59 year age class (Figure 4.17.3). Most of these stands will be available for thinning in the next decade. Following standard guidelines, red pine stands will be thinned as they become available and approximately every ten years after until replacement harvest at economic maturity. At economic maturity, conduct final harvests followed by re-planting. Prescribed burning or the use of herbicide may be necessary to control competing vegetation, thus ensuring successful regeneration.

Currently there are 31 acres prescribed for final harvest, and 211 acres prescribed for partial harvest or thinning. There are a small number of acres currently prescribed in other cover types that are expected to be converted to red pine after harvest and some acres of red pine that will be converted to other cover types after harvest. These acres are shown in the regeneration prescriptions column in Figure 4.17.3. There are 14 acres of red pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

##### Desired Future Condition

- Red pine stands will be maintained and managed through thinning until stand replacement harvest at economic maturity; and
- Acres will be balanced between 0-89 years of age to provide for continual harvest, wildlife habitat and recreational opportunity.

##### 10-Year Management Objectives

- The 10-year projected final harvest of red pine is zero acres which is lower than the regulated harvest amount due to the young ages of the planted stands; and
- The projected partial harvest or thinning of red pine is 500 acres in stands 40-79 years old.

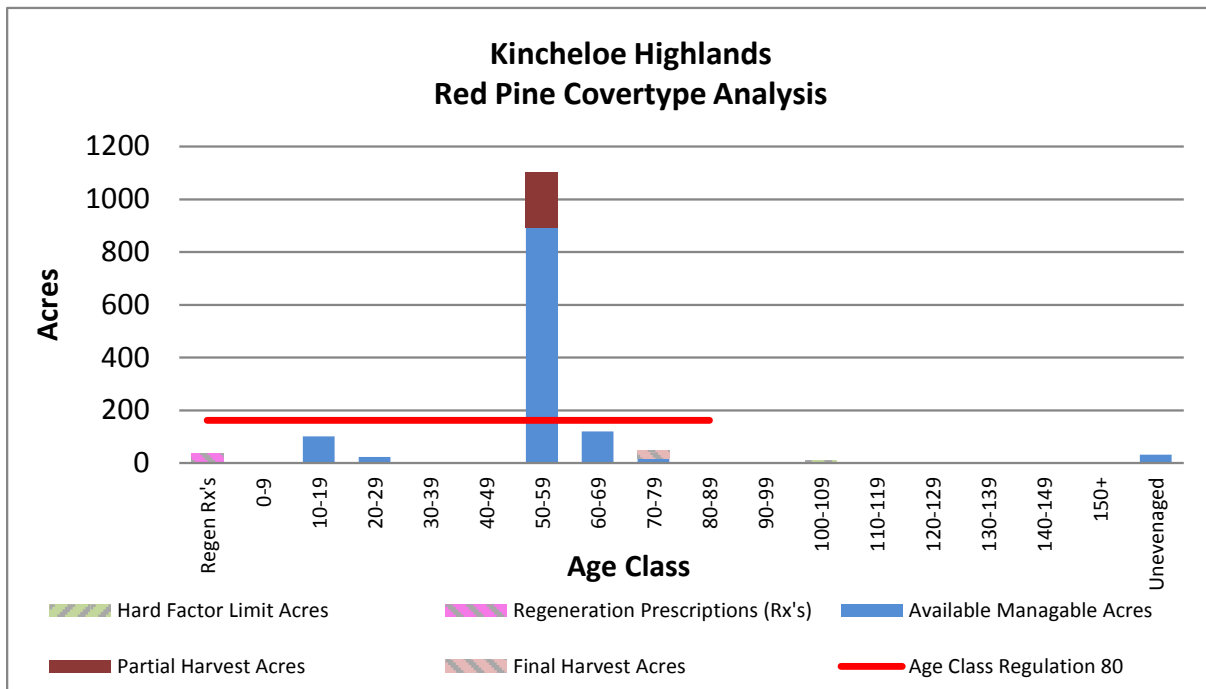


Figure 4.17.3. Age-class distribution of red pine in the Kincheloe Highlands management area (2012 Department of Natural Resources inventory data).

Long-Term Management Objectives

- Balance the age-class structure of red pine providing for a regulated harvest of approximately 163 acres per decade; and
- Stands will be periodically thinned until they meet silvicultural criteria.

**4.17.1.3 Forest Cover Type Management – Northern Hardwoods**

Current Condition

Northern hardwood occurs on 991 acres (13%) of the management area (Table 4.17.1). Northern hardwood stands are distributed throughout the management area on outwash plains and moraines with Kotar habitat types of ATFD and AFPO (see Appendix E). These hardwood stands often contain oak. The majority of the hardwood stands have been managed using individual tree selection to work toward an uneven-aged state. Figure 4.17.4 shows that the basal-area distribution of northern hardwood stands and also shows stands that have been recently harvested through even-aged systems in the immature column. Where stand quality warrants, harvests will use single tree selection maintaining structural and species diversity within the stands. Selection harvest will occur approximately every 20 years. Where site quality is poor shelterwood and other even-aged harvesting systems will be considered.

The majority of these hardwood stands do not contain beech, but beech bark disease is found within this management area. Northern hardwood stands that had a component of beech will now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting in these stands will be delayed due to resultant lower than normal basal area.

Currently, six acres have a selection or partial harvest prescription assigned. There are no acres of northern hardwood with site conditions limiting harvest.

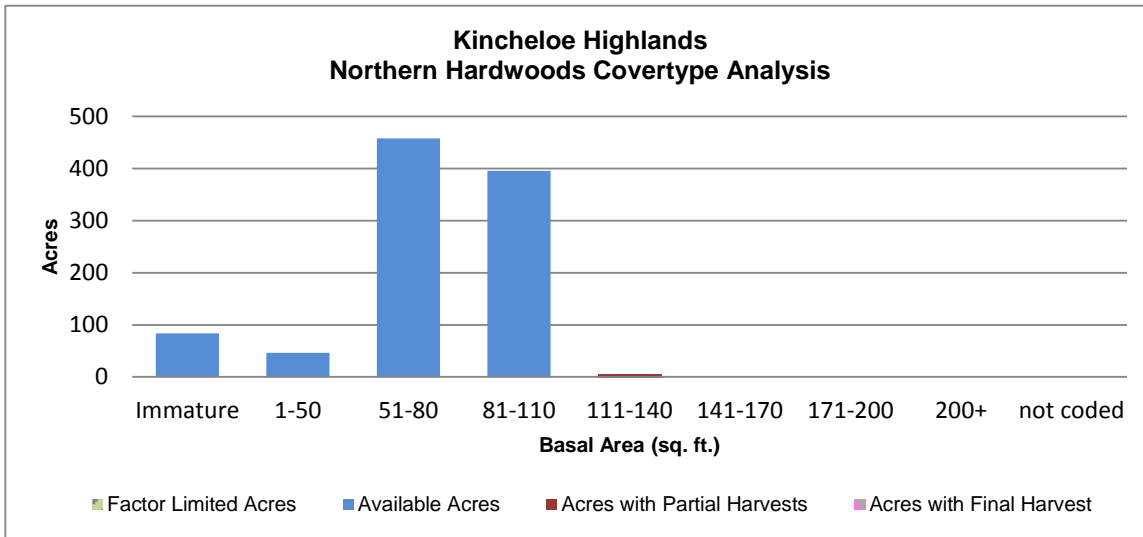


Figure 4.17.4. Basal area distribution of northern hardwoods in the Kincheloe Highlands management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwood stands will be maintained on operable sites by using individual tree selection harvests to provide uneven-aged composition and structurally diverse stands; and
- Harvesting will provide for a continuous flow of timber products and a variety of wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The ten-year projected partial or selection harvest is 396 acres of northern hardwood;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands;
- Consider herbicide applications on beech regeneration to promote regeneration of other species; and
- In areas that have lost beech to beech bark disease, consider planting disease resistant beech or oak to increase the availability of hard mast.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**4.17.1.4 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

Current Condition

Lowland open/semi-open lands occur on 920 acres (12%) (Table 4.17.1). This category is a combination of lowland shrub (592 acres), marsh (268 acres), treed bog (six acres) and bog (54 acres). These cover types are valued ecologically as sources of habitat for numerous species of wildlife. Most lowland brush stands are found in association with streams and rivers which contributes to access issues. Many of these stands are seasonally flooded.

### Desired Future Condition

- Lowland open/semi-open lands will be retained to ensure an adequate level of wildlife habitat and recreational opportunity.

### Long-Term Management Objectives

- Continue to maintain this habitat type for wildlife and other ecological concerns without active management.

### **4.17.1.5 Forest Cover Type Management – Oak**

#### Current Condition

Red oak occurs on 412 acres (6%) of the management area (Table 4.17.1). Oak stands are distributed throughout the management area on sandy or loamy soils with Kotar habitat types of PARVAa, ATFD and AFPO. Most of the oak is found in uneven-aged stands in conjunction with other tree species such as hardwoods and white pine.

Currently there are 48 acres of oak with a partial harvest prescribed (Figure 4.17.5). There are no acres of oak with site conditions limiting harvest.

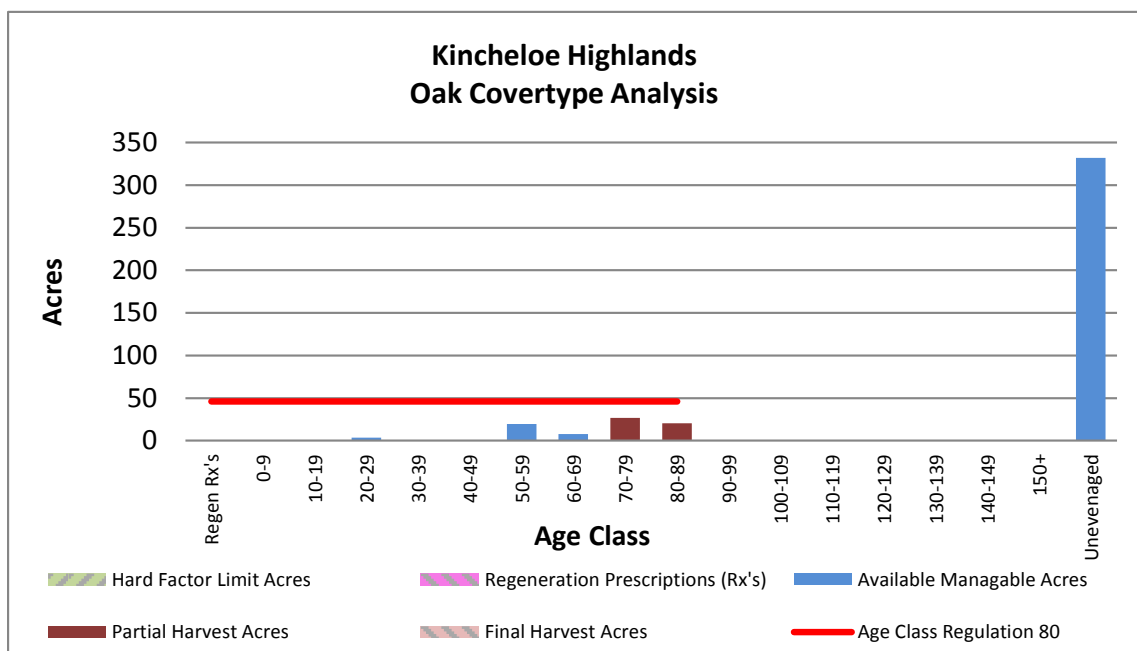


Figure 4.17.5. Age-class distribution of oak in the Kincheloe Highlands management area (2012 Department of Natural Resources inventory data).

### Desired Future Condition

- Red oak stands will be maintained and managed on operable sites through thinning until stand replacement harvest at economic maturity; and
- Acres will be balanced between 0-89 years of age to provide for continual harvest, wildlife habitat and recreational opportunity.

### 10-Year Management Objectives

- The 10-year projected final harvest of red oak is 46 acres to begin balancing the age classes; and
- The 10-year projected partial harvest of oak stands is 50 acres.

### Long-Term Management Objectives

- Balance the age classes of oak providing for a regulated harvest of approximately 46 acres per decade.

#### **4.17.1.6 Forest Cover Type Management – Other Types**

##### Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acres (Table 4.17.1). Upland open/semi-open lands (326 acres or 4%) is a combination of herbaceous open land, bare/sparsely vegetated and upland shrub. Lowland conifers (208 acres), lowland spruce/fir (207 acres) and natural mixed pines (196 acres) each have 3% of the total management area acres.

“Other types” (1,010 acres or 14%) is comprised of forested cover types each with 2% or less of the total management area acres: cedar (185 acres), white pine (173 acres), upland mixed forest (141 acres), hemlock (123 acres), lowland deciduous (117 acres), mixed upland deciduous (95 acres), jack pine (83 acres), lowland aspen/balsam poplar (67 acres), paper birch (19 acres) and upland spruce/fir (seven acres). In addition there are 77 acres (1%) of “miscellaneous other” stands, which includes water, sand/soil and roads.

With the exception of white pine and hemlock, the majority of these cover types will be managed as even-aged stands using natural regeneration after harvest. White pine and mixed cover types with high basal area may be thinned prior to final harvest depending on the species composition.

Approximately 259 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Inaccessible stands may never be harvested and will be subject to successional processes.

##### Desired Future Condition

- These cover types may be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreation opportunity.

##### 10-Year Management Objectives

- The projected 10-year final harvest is 66 acres of lowland spruce/fir, 28 acres of natural mixed pines and 136 acres of other types; and
- The projected 10-year partial harvest is 76 acres of natural mixed pines and 129 acres of other types.

##### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

#### **4.17.2 - Featured Wildlife Species**

Northern hardwoods in this management area have a much higher component of oak than in the surrounding areas. With beech bark disease being highly prevalent in the eastern Upper Peninsula, this source of mast is very important for wildlife species. In pine cover types, the retention of large mature trees is desirable for seed dependent species and in aspen cover types early successional age classes are desirable with retention of mesic conifer and coarse woody debris.

##### **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improve habitat. Management for the species should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land-use. State forest management for bear should focus on improving existing habitat (minimizing fragmentation and maintaining both hard and soft mast) in this management area.

##### Wildlife habitat specifications:

- Maintain or increase tree species that provide mast including beech, oak, black cherry and ironwood.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.

- Retain some large diameter white pine or hemlock as refuge trees.
- Plant disease resistant beech and red oak where appropriate.
- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource.
- Discourage land transactions and management activities that facilitate further fragmenting state lands within the management area.

### **Red Crossbill**

In the eastern Upper Peninsula, the goal for red crossbill is to maintain or increase suitable habitat. Management should focus on maintaining mature and over mature seed producing trees in priority areas.

#### Wildlife habitat specifications:

- Maintain a minimum of 15% of the total acres of appropriate cover types (upland spruce/fir, upland conifers, natural mixed pine and natural red and white pine) in the management area for red crossbill in a mature forest condition (i.e., >150 years for red pine, > 130 years for white pine and > 80 years for white spruce). This can be accomplished with existing factor-limited stands or alternatively by extending the rotation length of these types to 150, 130 and 80 years respectively. In this management area, older age classes for red crossbill habitat are being met by a large number of stands with site conditions that limiting harvesting.
- Retain large mature and over mature red pine, white pine and white spruce in shelter-wood and seed tree cuts.
- Evaluate the management area for the establishment of core tracts of old (greater than 100 years old) pine stands in biodiversity stewardship areas or Type 1 or Type 2 old growth.

### **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age class distribution for aspen in priority landscapes.

#### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Move to balance the age-class distribution of aspen and birch cover types to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation.
- Larger harvest units should have irregular boundaries and include one or two, 1-3 acre unharvested inclusions for every 40 acres exceeding 40 acres in size.
- Evaluate the conifer component in aspen stands, holding or increasing where desirable. Leave conifer under four inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

### **4.17.3 Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed one listed species and no natural communities of note occurring in the management area as listed in Table 4.17.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Table 4.17.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Kincheloe Highlands management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Birds</b>								
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	SC/G5/S4	Confirmed	PS	Moderate	Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Dry sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Upland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

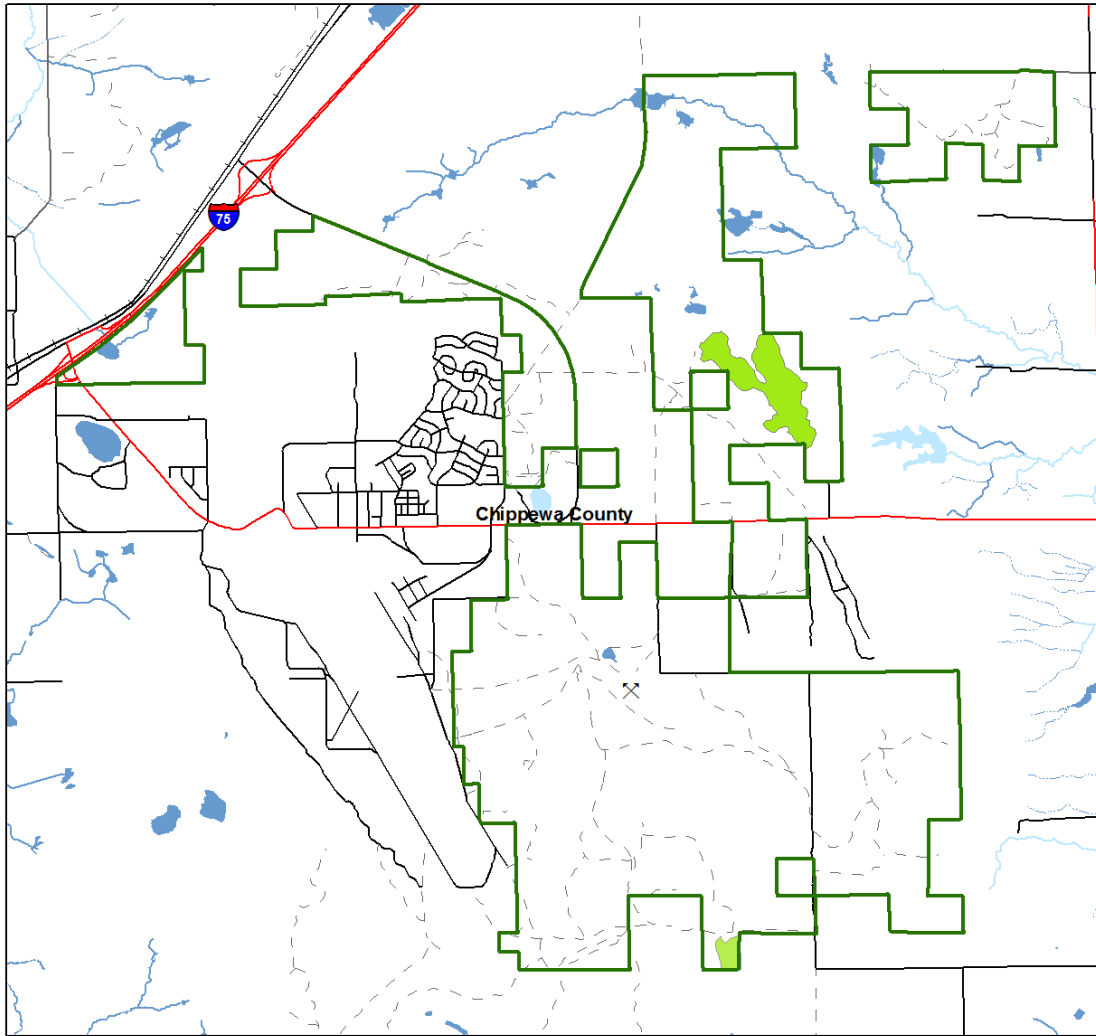
This management area has a large deer wintering area that is a special conservation area (Figure 4.17.6).

Areas that might meet the definition of Type 1 and Type 2 old growth have been identified in an special resource area layer in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support System and area shown in Figure 4.17.6. This set of areas originated from a subset of forested natural communities within some state natural areas and all A/AB-ranked natural heritage database element occurrences. Within the Kincheloe Highlands management area there are 20 acres (Figure 4.17.6) identified as potential Type 2 dry-mesic northern forest.

There have been no high conservation value areas or ecological reference areas identified in this management area.



# Kincheloe Highlands



## Legend

- Highway
- Paved Roads
- Gravel Roads
- Poor Dirt Roads
- Railroads
- Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- Management Area Boundary
- Cities
- - - County Boundaries

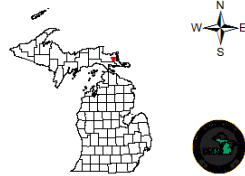
## Ecological Reference Areas

### High Conservation Value Areas

- Coastal Environmental Areas
- Critical Dunes
- Natural Rivers Vegetative Buffer
- Natural Rivers Zoning District
- Critical Coastal Habitat (Piping Plover)
- Kirtland Warbler Habitat
- Dedicated Management Areas
- Natural Areas Legally Dedicated

## Special Conservation Areas

- Campgrounds
- Fishing Access Sites
- Boat Access Sites
- Mineral Resource Locations
- Wild & Scenic Rivers (USFS Lands)
- Visual Management Areas
- Contiguous Resource Areas
- Possible Type 1 and Type 2 Old Growth
- Potential Old Growth
- Non-Dedicated Natural Areas & National Natural Landmarks
- Springs, Wetlands, or Riparian Areas



- Cold Water Streams & Lakes
- Wildlife Management Areas
- Research, Development, and Military Lands
- Great Lakes Islands

Figure 4.17.6. A map of the Kincheloe Highlands management area showing the special resource areas.

Management goals during this planning period:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

#### **4.17.4 Forest Health Management**

Although forest health issues span the entire landscape some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Red pine: red-headed pine sawfly;
- Northern hardwoods: beech bark disease;
- Aspen and lowland poplar: white trunk rot and *Hypoxylon* canker; and
- Oak: oak wilt.

For further information on forest health refer to Section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

#### **4.17.5 Fire Management**

Fire likely maintained the pine and oak communities on the old beach ridges found in this management area. The adjacent wetlands would have also burned to some extent at the same time.

- Prescribed fire may be used to maintain the pine and oak communities in this management area.

#### **4.17.6 Public Access and Recreation**

Trash dumping is a continual problem, and there have been numerous trash clean-ups in the area. Road closures will be considered as needed to control illegal activity and to mitigate potential impacts to wetland soils.

Recreational trail facilities in this management area include Kinross Motorcycle Trail, snowmobile trails and the Pine Bowl cross country ski trail (Figure 4.17.1).

The Kinross Motorcycle Trail is designated motorcycle use only by Director's Order. Extreme care must be exercised to maintain the 24 inch trail bed.

#### **4.17.7 Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. There are no designated high priority trout streams in this management area.

#### **4.17.8 Minerals**

Surface sediments consist of lacustrine (lake) sand and gravel, glacial outwash sand and gravel and postglacial alluvium and coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in this area and there is good potential for additional pits.

The Ordovician Stonington Formation, Utica and Collingwood Shales and Trenton Formation subcrop below the glacial drift. The Trenton is quarried for stone/dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (14 in Chippewa County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.18 MA 18 – Kinross Bog Management Area

### Summary of Use and Management

Vegetative management in the Kinross Bog management area (MA) (Figure 4.18.1) will maintain or enhance wildlife habitat; protect areas of threatened, endangered and special concern species; provide for forest based recreational activities; and provide timber products. Timber management for this 10-year planning period will focus on improving the age-class structure of aspen, black spruce, mixed conifers and jack pine by harvesting older age classes where accessible. Wildlife habitat management objectives will focus on maintaining or enhancing the deer wintering area and perpetuating early-successional communities for species adapted to young forests. Expected issues within this 10-year planning period are introduced pests and diseases and introduction and spread of invasive species.

### Introduction

The Kinross Bog management area is located in the east-central part of the eastern Upper Peninsula, in Chippewa County. It has 15,609 acres of state-owned land. The primary attribute is wildlife habitat. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The primary landform consists of lacustrine sand and gravel with areas of lacustrine clay and silt or broad clay lake plain.
- This is a basin in the Chippewa County landscape containing conifer dominated lowlands. The large coniferous bog, marsh and lowland shrub areas provide unique habitats for plants and animals.
- Recreational opportunities include: snowmobiling, bird watching, fishing and hunting.
- Special features including a special conservation area deer wintering area.

The state land in this management area is fairly concentrated into two blocks surrounding the old Air Force base and the Kincheloe Highlands management area with private parcels interspersed within. The Kinross Bog management area is within the Sault Forest Management Unit. The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.18.1.

Table 4.18.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Kinross Bog management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Lowland Open/Semi-Open Lands	28%	4,302	0	4,302	0	0	4,302	0	0
Lowland Spruce/Fir	17%	2,731	547	2,184	243	0	2,731	243	0
Aspen	16%	2,436	73	2,363	76	0	2,436	394	0
Lowland Conifers	10%	1,483	175	1,308	145	0	1,483	145	0
Cedar	5%	709	0	709	20	0	709	44	0
Lowland Deciduous	4%	656	73	583	65	0	656	65	0
Tamarack	4%	617	379	238	30	0	617	34	0
Jack Pine	4%	564	74	490	0	0	564	70	0
Upland Open/Semi-Open Lands	1%	159	0	159	0	0	159	0	0
Misc Other (Water, Local, Urban)	2%	290	0	290	0	0	290	0	0
Others	11%	1,662	282	1,380	145	231	1,662	155	247
<b>Total</b>	<b>100%</b>	<b>15,609</b>	<b>1,604</b>	<b>14,005</b>	<b>724</b>	<b>231</b>	<b>15,609</b>	<b>1,150</b>	<b>247</b>

Others include: lowland mixed forest, upland spruce/fir, lowland aspen/balsam poplar, red pine, upland mixed forest, northern hardwood, mixed upland deciduous, paper birch, natural mixed pines, upland conifers, white pine, oak and hemlock.

# Kinross Bog

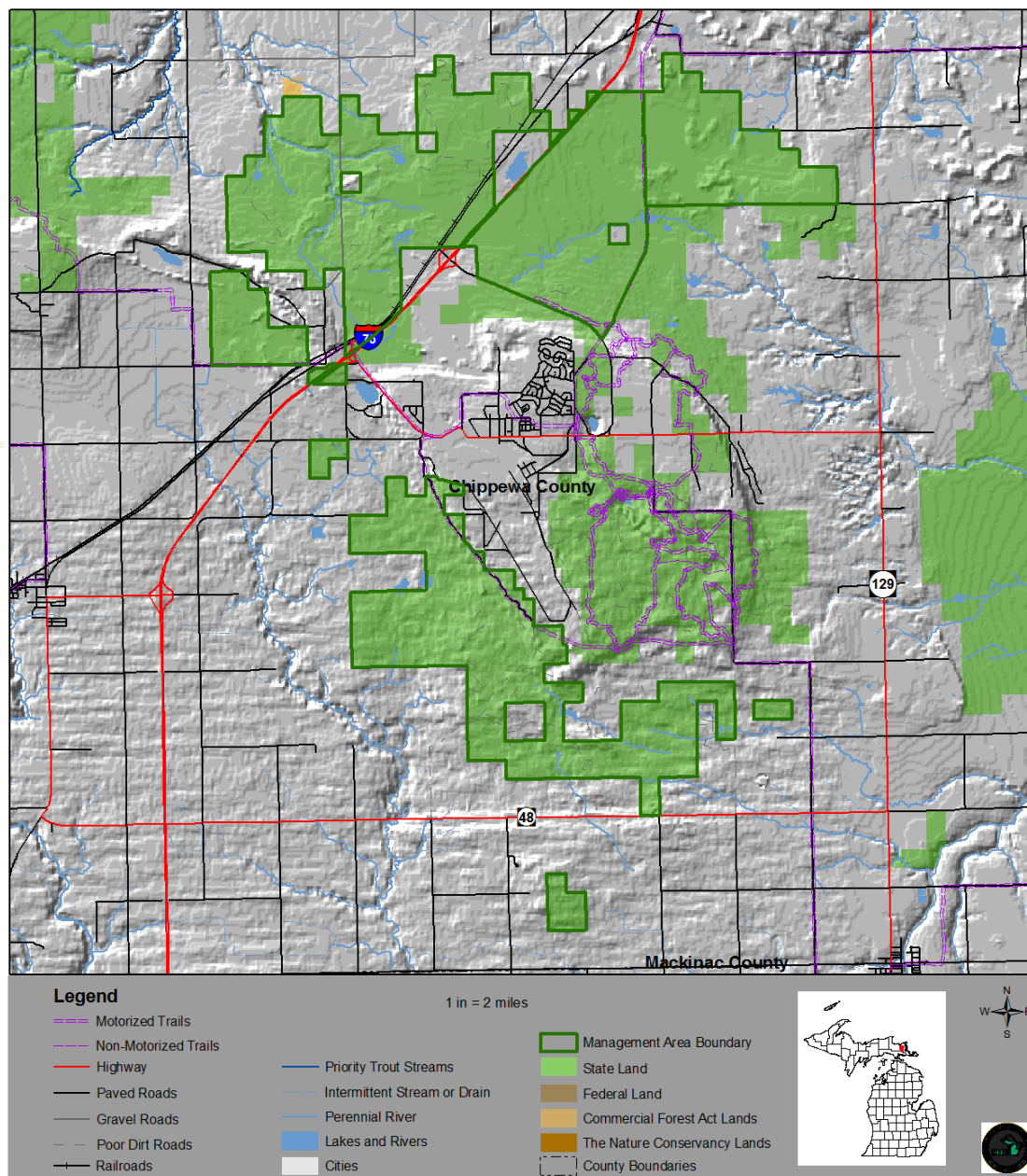


Figure 4.18.1. Location of the Kinross Bog management area (dark green boundary) in relation to the surrounding state forest lands, other ownerships and the former Kincheloe Air Force Base.

## 4.18.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

### Section 4.18.1.1 Forest Cover Type Management – Lowland Open/Semi-Open Lands

#### Current Condition

Lowland open/semi-open lands occur on 4,302 acres (28%) (Table 4.18.1). This category is a combination of lowland shrub (2,634 acres), marsh (1,467 acres), treed bog (134 acres) and bog (67 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. These stands are found in association with creeks, rivers and lowland forested stands. Some of these stands fall within the special conservation area deer wintering area. The large percentage of acres within these and other lowland cover types is what distinguishes this management area and makes access difficult.

#### Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity and to protect the special conservation area values found in these cover types.

#### Long-Term Management Objectives

- Continue to maintain this habitat type for wildlife and other ecological concerns by allowing natural processes to occur.

### Section 4.18.1.2 Forest Cover Type Management – Lowland Spruce/Fir

#### Current Condition

Lowland spruce/fir stands are found on 2,731 acres (17%) of the management area (Table 4.18.1). Lowland spruce/fir stands have been successfully harvested and regenerated through natural regeneration resulting in a range of age classes (Figure 4.18.2).

Currently there are 804 acres with a final harvest prescribed. There are 547 acres of lowland spruce/fir that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of lowland spruce/fir will remain until biological maturity and will be subject to natural processes resulting in a range of successional stages.

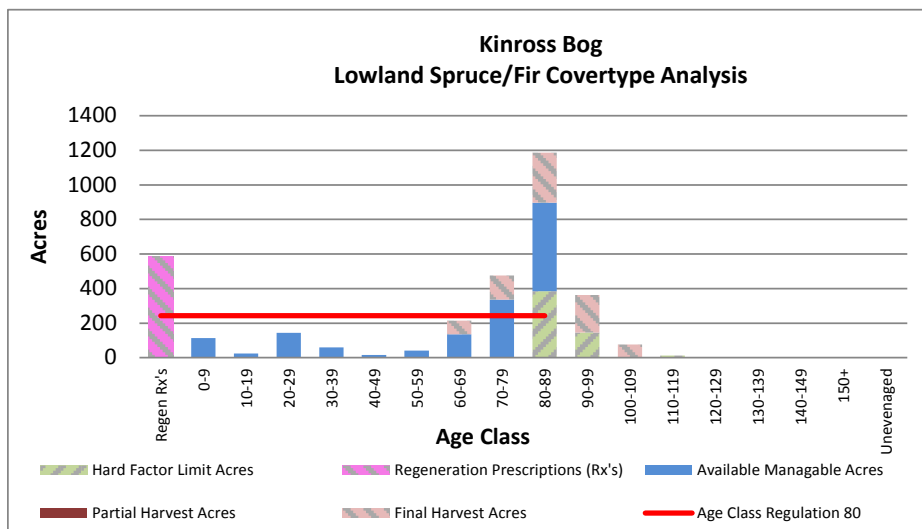


Figure 4.18.2. Age-class distribution of lowland spruce/fir in the Kinross Bog management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland spruce/fir will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest is 243 acres to work toward balancing the age classes.

Long-Term Management Objectives

- Balance the age classes of available lowland spruce/fir providing for a regulated harvest of approximately 243 acres each decade (red line in Figure 4.18.2).

**Section 4.18.1.3 Forest Cover Type Management – Aspen**

Current Condition

Aspen occurs on 2,436 acres (16%) of the management area (Table 4.18.1). Aspen stands are distributed throughout the management area on a range of sites from dry-poor nutrient to mesic-medium nutrient with Kotar habitat types of PARVAa, PARV, ATFD and AFPo (See appendix E). Aspen has been consistently harvested and regenerated in the past with the greatest harvest activity occurring within the last 30 years (Figure 4.18.3).

There are currently 523 acres that have a final harvest prescribed. There are 73 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of aspen will succeed to more shade tolerant species.

Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management balancing acres between 0-59 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

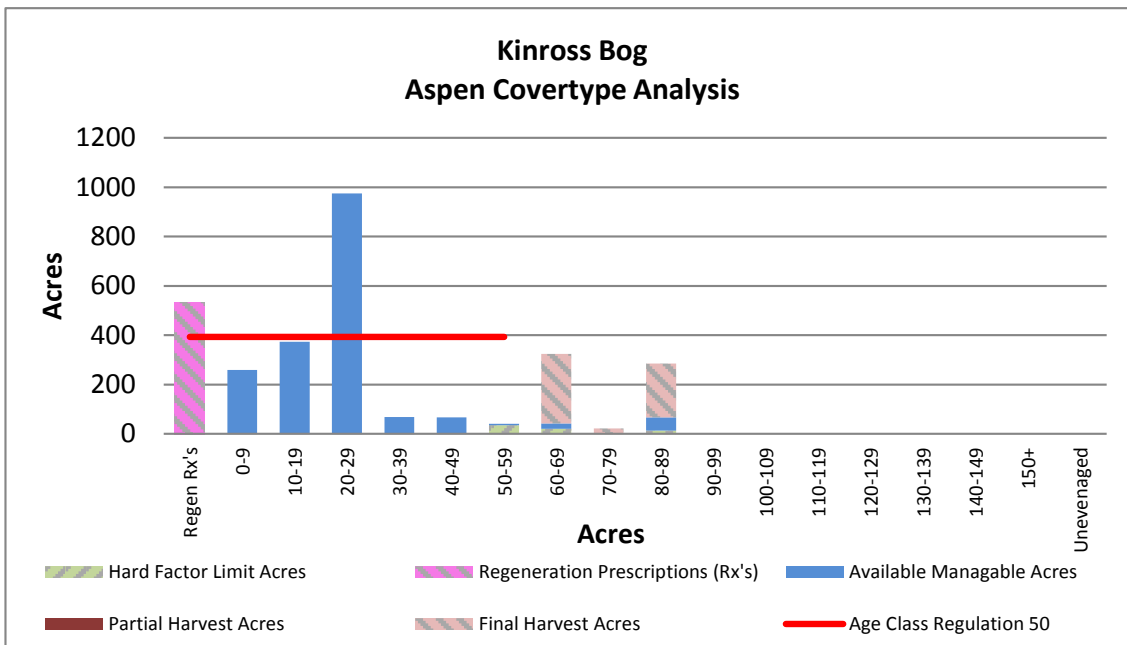


Figure 4.18.3. Age-class distribution of aspen in the Kinross Bog management area (2012 Department of Natural Resources inventory data).



10-Year Management Objectives

- The 10-year projected final harvest is 76 acres of aspen. This is significantly lower than the regulated amount due to the current age-class structure where there are a high number of acres in the regeneration prescriptions column.

Long-Term Management Objectives

- Balance the age-class distribution of accessible aspen stands providing for a regulated harvest of approximately 394 acres per decade.

**Section 4.18.1.4 Forest Cover Type Management – Lowland Conifer**

Current Condition

Lowland conifer stands occur on 1,483 acres (10%) of the management area (Table 4.18.1). Some of these stands are within the deer wintering special conservation area. Lowland conifer stands in this area have been successfully harvested and regenerated with natural regeneration (Figure 4.18.4). A small portion of the lowland conifer stands have been classified as uneven-aged, having trees of varying ages and sizes as a result of natural processes. Access to many of the lowland conifer stands in the management area is limited due to rivers, streams and lack of roads in adjacent wetland cover types.

Currently there are 19 acres with a final harvest prescribed. There are 219 acres prescribed in other cover types that are expected to convert to lowland conifers following harvest. These acres are shown in Figure 4.18.4 in the regeneration prescriptions column. There are 175 acres of lowland conifers that have site conditions limiting their harvest. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in areas inaccessible for harvest will be subject to natural processes resulting in a range of successional stages.

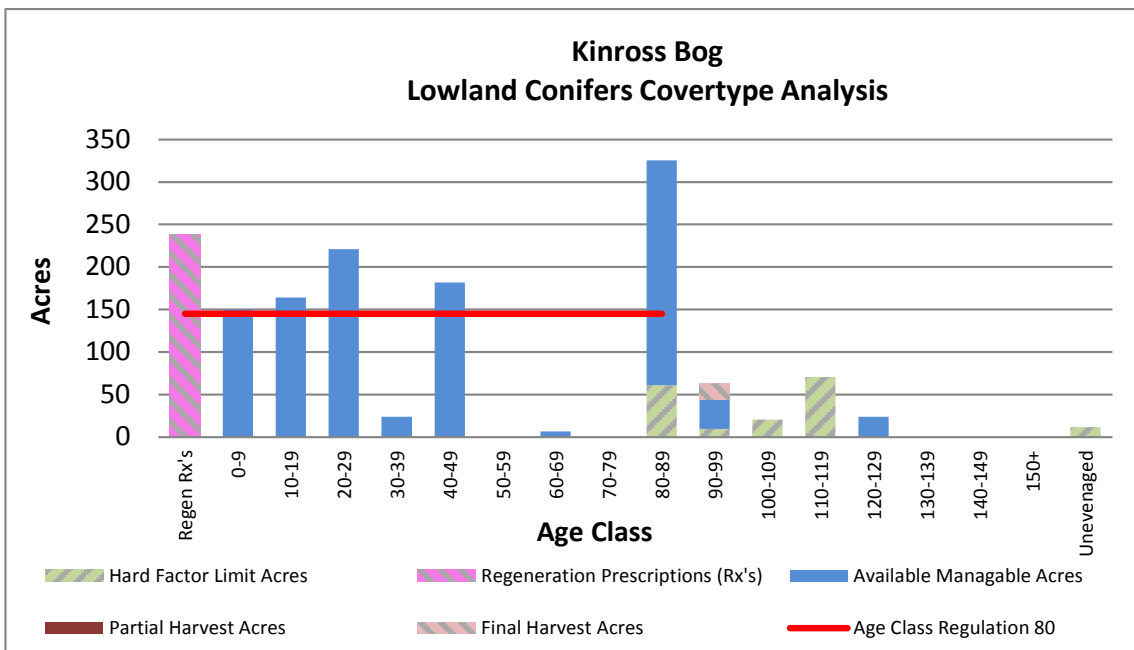


Figure 4.18.4. Age-class distribution of lowland conifers in the Kinross Bog management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age providing for a continuous supply of timber, wildlife habitat and recreational opportunities.



10-Year Management Objectives

- The 10-year projected final harvest is 145 acres of lowland conifers to continue work toward balancing the age classes.

Long-Term Management Objectives

- Balance the age-class structure of accessible lowland conifer stands providing for a regulated harvest of approximately 145 acres every decade.

**Section 4.18.1.5 Forest Cover Type Management – Cedar**

Current Condition

Cedar stands occur on 709 acres (5%) of the management area (Table 4.18.1). Some of these stands are within a deer wintering area special conservation area. Within the deer wintering areas, manage for closed canopy habitat. There has not been any recent harvesting and regeneration of this cover type (Figure 4.18.5).

There is a need to address future cedar cover within the deer wintering complexes. Limited cedar harvests will occur outside the wintering complexes recognizing that cedar may take many years to regenerate. Reliable and timely regeneration of cedar is a concern from both wildlife and forest management perspectives.

At this time, there no cedar stands scheduled for final harvest. There are no stands with site conditions limiting harvest. Cedar stands in inaccessible areas will be subject to natural processes resulting in a range of successional stages.

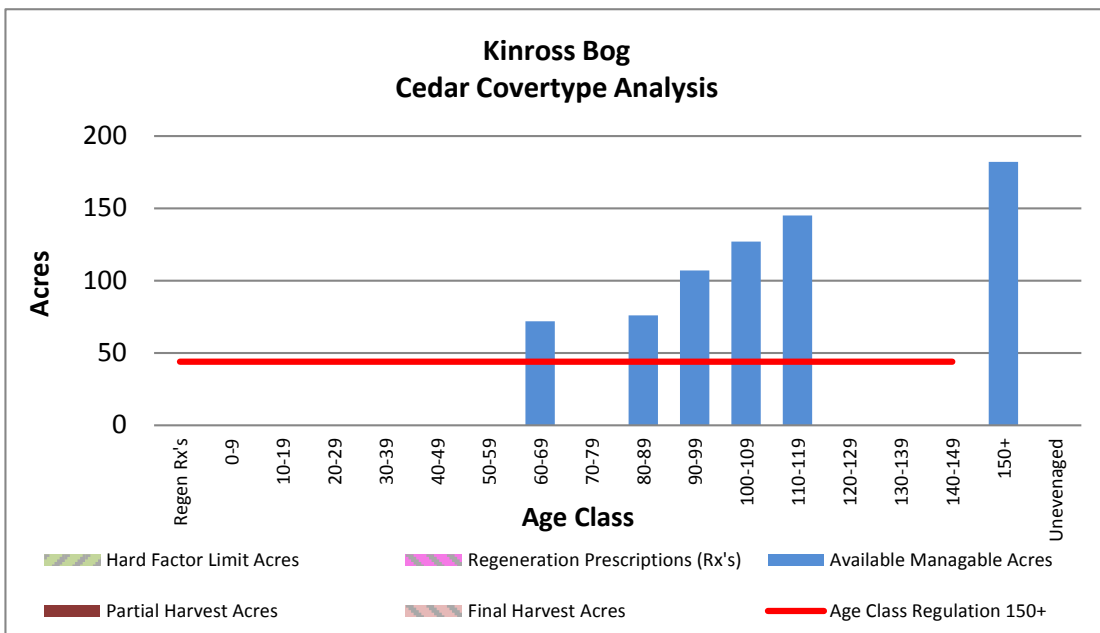


Figure 4.18.5 Age-class distribution of cedar in the Kinross Bog management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Outside the deer wintering areas cedar stands will be maintained on operable sites through even-aged management using a 150-year rotation age providing for continual harvesting, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest is 20 acres of cedar. However, harvest of this type, if it occurs, may vary widely from the projected harvest in order to meet the long-term management objectives.
- Ensure that cedar and/or hemlock recruitment/regeneration is reliable if harvesting in this cover type.

## Long-Term Management Objectives

- In accessible areas outside the deer wintering areas balance the age-class structure providing for a regulated harvest of approximately 44 acres per decade; and
- Within deer wintering complexes focus cedar management on winter habitat for deer.

### **Section 4.18.1.6 Forest Cover Type Management – Other Types**

#### Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acres (Table 4.18.1). Lowland deciduous (656 acres), tamarack (617 acres) and jack pine (564 acres) each have 4% of the management area acres. “Other types” (1,662 acres or 11%) includes forested cover types with 3% or less of the total management area acres and is made up of: lowland mixed forest (420 acres), lowland aspen/balsam poplar (222 acres), red pine (170 acres), upland mixed forest (140 acres), northern hardwood (113 acres), mixed upland deciduous, paper birch, natural mixed pines, upland conifers, white pine, oak and hemlock. In addition there are 290 acres (2%) of “miscellaneous other” stands, which includes water, sand/soil and roads.

With the exception of red pine, northern hardwood and hemlock most of these cover types will be managed as even-aged stands using natural regeneration after harvest. Red pine stands will be periodically thinned until final harvest at rotation age. Northern hardwood stand will generally be harvested through single tree selection to work toward an uneven-aged state.

Approximately 808 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Stands that are inaccessible for harvesting will be subject to natural succession.

#### Desired Future Condition

- These other minor cover types may be managed on operable sites, contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreational opportunity.

#### 10-Year Management Objectives

- The projected 10-year final harvest is 65 acres of lowland deciduous, 30 acres of tamarack and 145 acres of other types; and
- The projected 10-year partial harvest is 231 acres of other types.

#### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.18.2- Featured Wildlife Species**

Management for featured wildlife and their associated include maintenance of a dense understory in lowland conifers, coarse woody debris and mast production.

#### **American Bittern**

The state wide goal for American bittern is to meet the Upper Mississippi Region Great Lakes Region Joint Venture population level as observed by the North American Breeding Bird Survey for Michigan. The eastern Upper Peninsula goal is to provide and maintain suitable habitat for American bittern. State forest management should focus on priority management areas with suitable shallow water marsh (hemi-marsh).

#### Wildlife habitat specifications:

- Manage priority wetlands in a hemi-marsh condition with open water surrounded by emergent vegetation. Optimal hemi-marsh sites for bittern are > 10 acres with the emergent vegetation portions having average water depths of four inches and a 4:1 ratio of adjacent grassland to hemi-marsh.

- Maintain wetland/upland complexes of > 50 acres.
- Buffer management activities at the edges of wetlands to protect marsh hydrology and limit the spread of invasive plant species.

## **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improve habitat. State forest management for the species should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land-use. State forest management for bear should focus on improving existing habitat (minimizing fragmentation and maintaining both hard and soft mast) in this management area.

### Wildlife habitat specifications:

- Maintain or increase tree species that provide mast including beech, oak, black cherry and ironwood.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.
- Retain some large diameter white pine or hemlock as refuge trees.
- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource.
- Discourage land transactions and management activities that facilitate further fragmenting state lands within the management area.

## **Beaver**

The eastern Upper Peninsula goal for beaver is to maintain suitable habitat. Management for the species should focus on providing favorable food within 100 feet of streams that are not designated high priority trout streams. Consideration will be given to best management practices, trout stream management and trends in beaver nuisance permits issued.

### Wildlife habitat specifications:

- Maintain or promote alder, aspen, birch, maple or willow cover types within 100 feet of non-high priority trout streams with gradients of less than 15% and other inland bodies of water.

## **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash and increasing mesic conifer components within stands.

### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under four inch diameter at breast height.
- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- Balance age classes in the jack pine cover type to provide young, dense jack pine stands.
- When using herbicide treatments to prepare sites for planting red and jack pine in snowshoe hare habitat, encourage more diverse stands of pine and aspen by using application skips in pockets or along stand edges.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris already present (before cutting), and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash and create brush piles within timber sales associated with hare habitat. In biomass timber sales apply the Michigan Biomass Harvesting Guidance and retain the maximum amount of residual material.

### **4.18.3 – Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “*DNR’s Approach to the Protection of Rare Species on State Forest Lands*” (IC4172). This is

especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed three listed species and no natural communities of note occurring in the management area as listed in Table 4.18.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Table 4.18.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Kinross Bog management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Birds</b>								
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Southern hardwood swamp		
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	SC/G5/S4	Confirmed	PS	Moderate	Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Dry sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Upland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A
<b>Plants</b>								
Ashy whitlow grass	<i>Draba cana</i>	T/G5/S1	Confirmed			Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone lakeshore cliff	Upland open/semi-open	N/A
						Limestone cliff	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

This management area has a deer wintering area in the western portion that is a special conservation area (Figure 4.17.6).

There have been no high conservation value areas or ecological reference areas identified for this management area.

# Kinross Bog

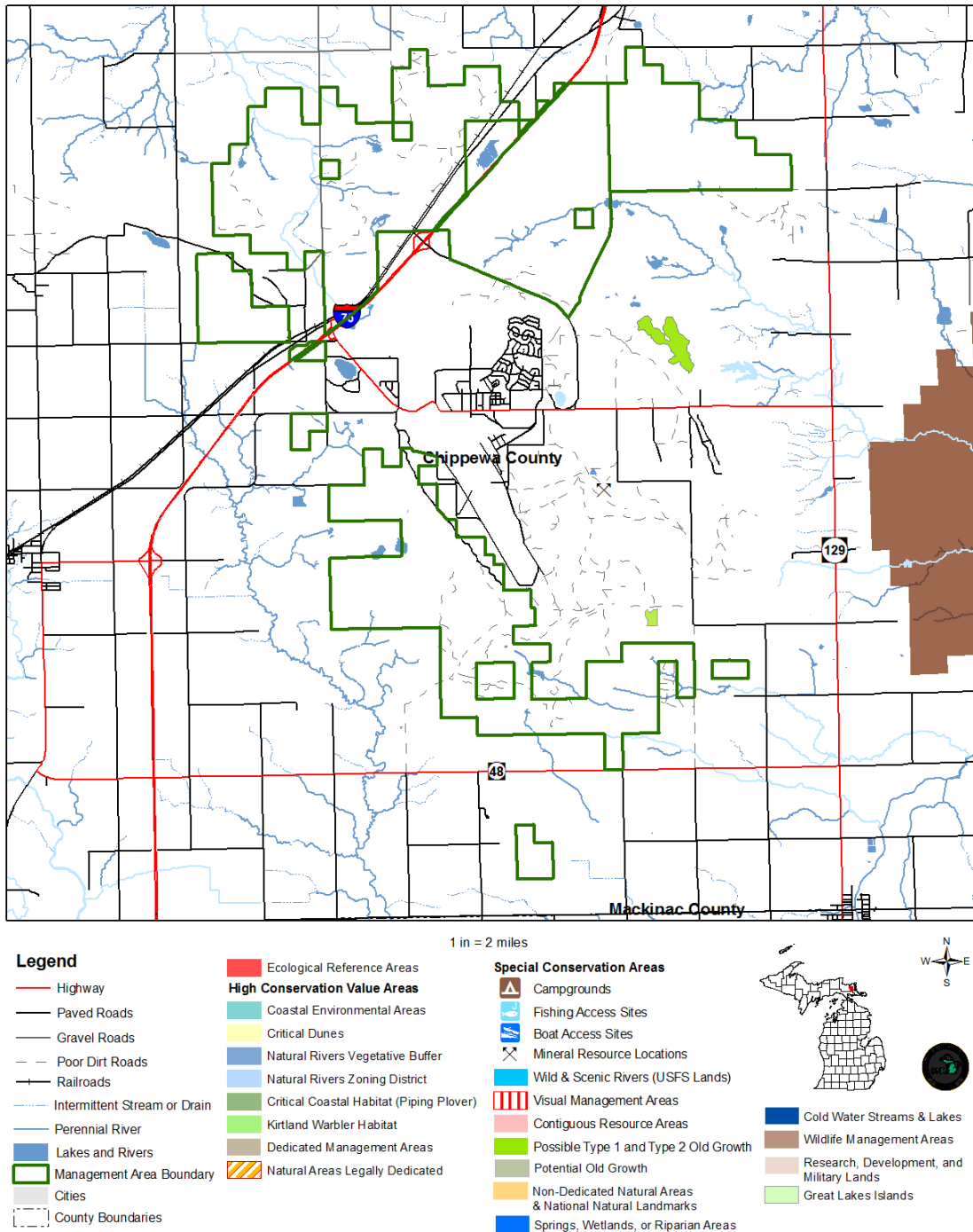


Figure 4.18.6. A map of the Kinross Bog management area showing the special resource areas.

Management goals during this planning period:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.

#### 4.18.4 – Forest Health Management

Although forest health issues span the entire landscape some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Aspen: white trunk rot, *Hypoxyylon* canker; and
- Lowland conifers and lowland spruce/fir: spruce budworm, eastern larch beetle and larch casebearer.

For further information on forest health refer to Section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. No invasive plant species have yet been documented within the management area. Leafy spurge, Japanese knotweed and wild parsnip have been documented within a five-mile buffer of the management area (Table 4.18.3) and monitoring efforts should specifically look for new populations of this species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

Table 4.18.3. Invasive plant species within or near the Kinross Bog management area (Data from the Michigan Invasive Plant Identification Network database)

Kinross Bog - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	4	4	3
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
-	-	Japanese Knotweed <i>Fallopia japonica</i>	1	
-	-	Leafy Spurge <i>Euphorbia esula</i>	2	
-	-	Wild Parsnip <i>Pastinaca sativa</i>	1	

#### 4.18.5 – Fire Management

While disturbance impacts from fire would have been uncommon in this management area, fire would have burned into these bogs from surrounding uplands periodically. Also, fire would have had an active role in maintaining the pine communities in the management area.

- Prescribed fire may be used in this management area to maintain natural communities, as appropriate.
- Fire suppression tactics should take into account the sensitive nature of some of the natural communities in this management area.

#### 4.18.6 – Public Access and Recreation

I-75 divides the larger blocks of this management area. Much of the area has limited access due to the wet conditions of the landscape.

Road closures will be considered as needed to control illegal activity and to mitigate potential impacts to wetland soils.

Motorized trail facilities include the Kinross Motorcycle Trail and snowmobile trails (Figure 4.18.1). The Kinross Motorcycle Trail is designated motorcycle use only by Director's Order. Extreme care must be exercised to maintain the 24 inch trail bed.

Interest in bird watching is increasing in this area. Hunting for deer and ruffed grouse are popular forms of recreation in this management area.

#### **4.18.7 - Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. There are no designated high priority trout streams in this management area.

#### **4.18.8 – Minerals**

Surface sediments consist of lacustrine (lake) sand and gravel and clay and silt, glacial outwash sand and gravel and postglacial alluvium, peat and muck and coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in this area and there is good potential for additional pits on the uplands.

The Ordovician Stonington Formation, Utica and Collingwood Shales and Trenton Formation subcrop below the glacial drift. The Trenton is quarried for stone/dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (14 in Chippewa County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.19 MA 19 – Lake Michigan Shoreline Management Area

### Summary of Use and Management

Vegetative management in the Lake Michigan Shoreline management area (MA) (Figure 4.19.1) will emphasize protection of the unique character of the area and all of the threatened, endangered and special concern species while providing recreational opportunities, forest products and wildlife habitat. Timber management activities include improving the age-class diversity of many even-aged cover types and providing for regeneration of cedar and paper birch stands. The Simmons Woods Special Management Area is located within this management area. Little Brevort Lake Dedicated Natural Area is one of several high conservation value areas. Special conservation areas within the management area include: Seiner's Point, Point Detour, the Crow River Mouth non-dedicated natural areas and extensive wintering deer habitat. This management area contains critical habitat designation for the federally endangered piping plover. This management area will be managed to preserve these biodiversity attributes, threatened and endangered habitats, natural communities and natural areas. Expected issues in this 10-year planning period are increased recreational pressure and illegal off-road vehicle use; invasive species including *Phragmites*; and introduced pests and diseases, including beech bark disease and emerald ash borer.

### Introduction

The Lake Michigan Shoreline management area is located along the southern edge of the eastern Upper Peninsula in Schoolcraft, Mackinac and Delta Counties. It has 46,790 acres of state-owned land. The primary attribute of this management area is the landforms and associated plant communities of the Lake Michigan shoreline. Additional attributes which were important in identifying this management area include:

- The management area falls within the St. Ignace Lake Plain sub-section of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The major landform in this management area is the Niagaran escarpment, an outcrop of dolomitic limestone that rings the Great Lakes basin. Other landforms include limestone bedrock pavement, cobble beach and sand dunes.
- Sand dunes, cobble beaches and bare rock are unique cover types in this management area.
- Many special conservation areas, high conservation value areas and ecological reference areas as well as many rare plant and animal occurrences are found along the lakeshore.
- Recreation along the lakeshore including sightseeing, camping and trout fishing.

Within this management area are traditional fishing villages, and areas of pre-historic, historic and current Native American Indian use. In the pre-settlement period of history the shoreline was important to the early French trappers and the fur trade. This was the historical eastern treaty boundary in the Wisconsin acquisition. Just west of Naubinway the trading sloop *Ranger* was unearthed by archeologists in the early 1990s. Simmons Woods, an area south of Gould City, was associated with the Blaney Park tourist community and was a lumbering town of the early 1900s.

This management area covers a large area geographically. It comprises the state-owned portions of the Lake Michigan shoreline from Mackinac County to the Garden Peninsula in Delta County. The management area falls within the Sault and Shingleton Forest Management Units. The current predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.19.1.



# Lake Michigan Shoreline

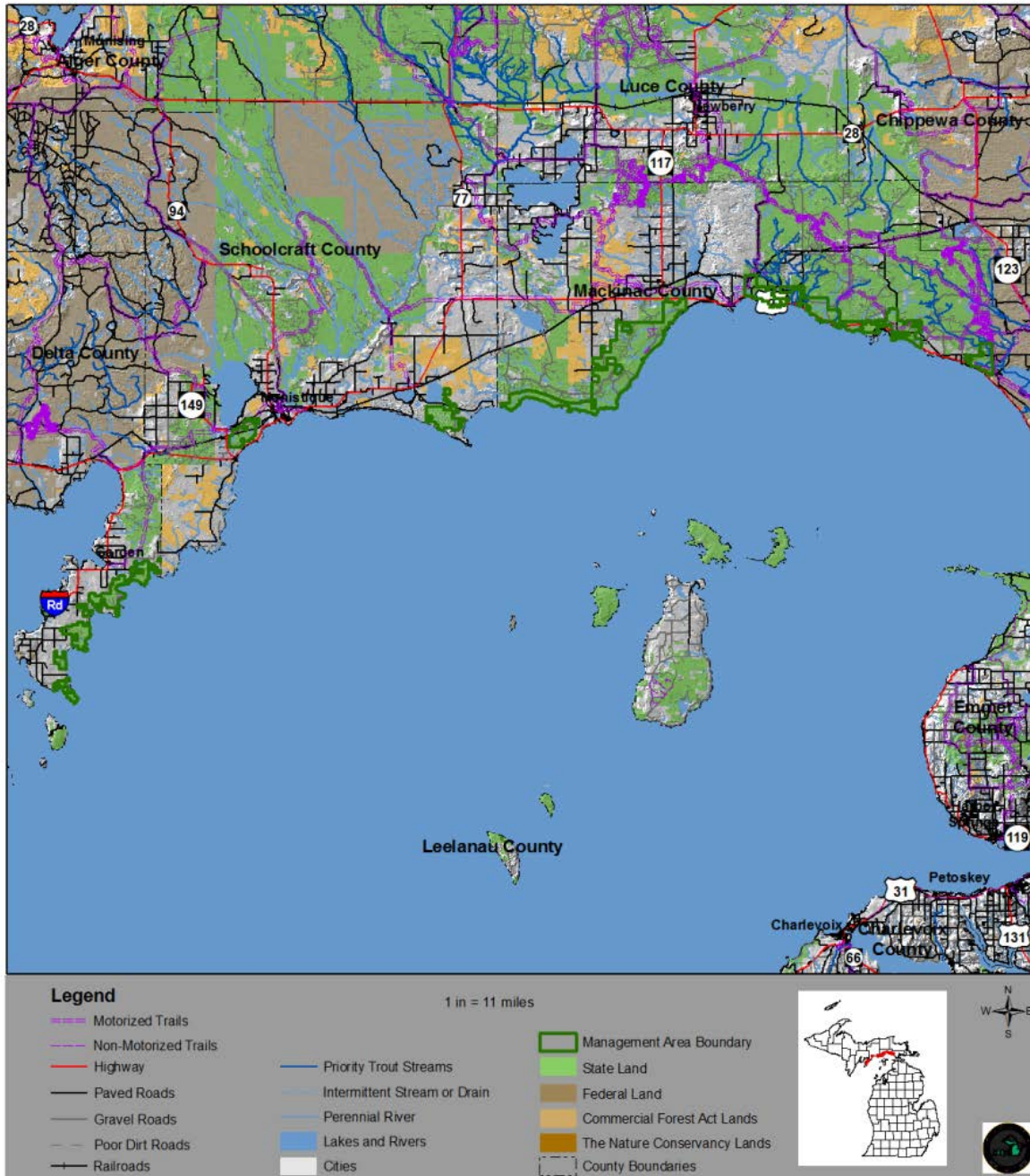


Figure 4.19.1. Location of the Lake Michigan Shoreline management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and Lake Michigan.

Table 4.19.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Lake Michigan Shoreline management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Cedar	25%	11,925	606	11,319	0	0	11,925	708	0
Northern Hardwood	13%	6,307	645	5,662	0	3,242	6,307	0	2,742
Aspen	12%	5,567	241	5,326	55	0	5,567	888	0
Lowland Open/Semi-Open	6%	2,691	0	2,691	0	0	2,691	0	0
Upland Spruce/Fir	6%	2,619	637	1,982	251	0	2,619	283	0
Lowland Conifers	5%	2,418	719	1,699	189	0	2,418	189	0
Paper Birch	4%	2,094	1,790	304	27	0	2,094	51	0
Red Pine	4%	2,041	457	1,584	0	576	2,041	176	576
Upland Conifers	3%	1,343	0	1,343	576	647	1,343	149	647
Upland Mixed Forest	3%	1,206	218	988	223	390	1,206	110	390
Upland Open/Semi-Open Lands	2%	961	0	961	0	0	961	0	0
Misc Other (Water, Local,	3%	1,635	0	1,635	0	0	1,635	0	0
Others	13%	5,983	1,051	4,932	820	978	5,983	539	998
<b>Total</b>	<b>100%</b>	<b>46,790</b>	<b>6,364</b>	<b>40,426</b>	<b>2,140</b>	<b>5,833</b>	<b>46,790</b>	<b>3,093</b>	<b>5,353</b>

Others include: white pine, mixed upland deciduous, lowland deciduous, natural mixed pines, hemlock, jack pine, lowland aspen/balsam poplar, lowland mixed forest, tamarack, lowland spruce/fir, and oak.

#### 4.19.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### Section 4.19.1.1 Forest Cover Type Management - Cedar

###### Current Condition

Cedar occurs on 11,925 acres (25%) of the management area (Table 4.19.1). The alkaline conditions caused, in part, by the limestone bedrock create favorable conditions for cedar. There are several deer wintering habitat special conservation areas in this management area. Maintaining a closed canopy structure provides important cover for deer by reducing the snow depth within the stands. There was some harvest and regeneration work over 30 years ago in northern white cedar (Figure 4.19.2). Increased deer numbers have limited regeneration success since then.

There is a need to address future cedar cover within the deer wintering complexes. Reliable and timely regeneration of cedar is a concern from both wildlife and forest management perspectives.

Currently there are six acres of cedar with a partial harvest prescribed. There are 606 acres with site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

###### Desired Future Condition

- In areas where deer browse is a concern, these stands may not be actively harvested at this time.

###### 10-Year Management Objectives

- The 10-year projected final harvest of cedar is zero acres due to the wintering deer complexes.

## Long-Term Management Objectives

- Within the deer wintering areas, focus cedar management on winter habitat for deer; and
- Outside of the deer wintering areas, look for opportunities to regenerate cedar providing for a regulated harvest of approximately 708 acres per decade (red line in Figure 4.19.2).

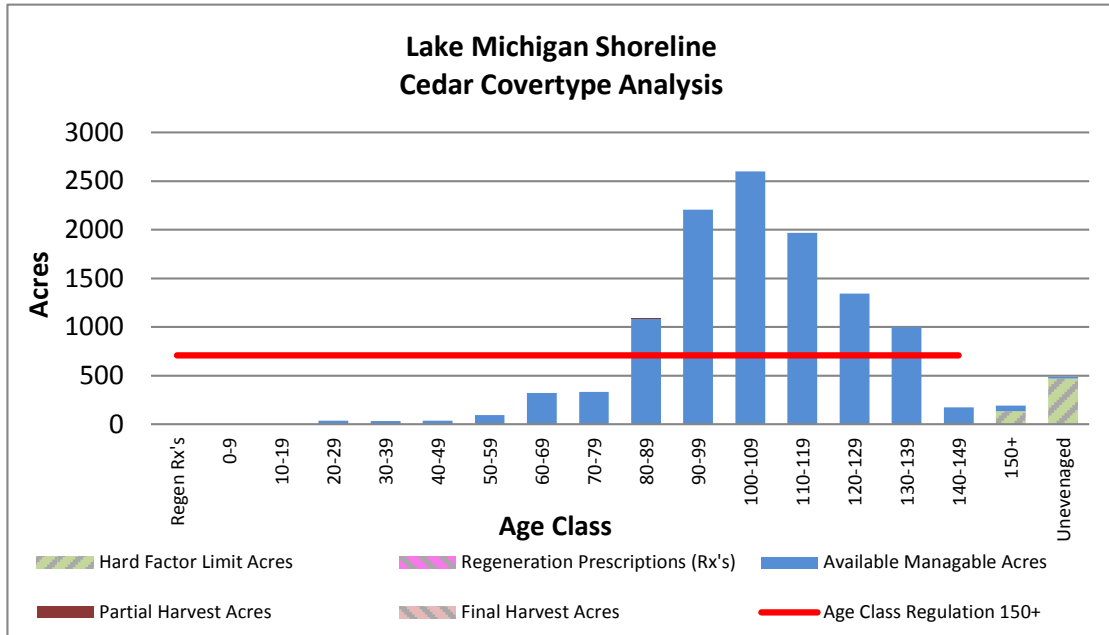


Figure 4.19.2. Age-class distribution of cedar in the Lake Michigan Shoreline management area (2012 Department of Natural Resources inventory data).

### Section 4.19.1.2 Forest Cover Type Management – Northern Hardwoods

#### Current Condition

Northern hardwood stands occur on 6,307 acres (13%) of the management area (Table 4.19.1). The majority of the stands have been managed through individual tree selection to work toward an uneven-aged state. Wind throw due to storms along Lake Michigan has contributed to the uneven-aged structure. Northern hardwood stands are distributed on mesic-poor to rich-nutrient sites with Kotar habitat types of ATFD, AFPO and AFOAs (Appendix E). In northern hardwood stands where quality warrants, stands with a basal area over 120 square feet per acre will be harvested using single tree selection, decreasing stocking levels to a basal area of approximately 80 square feet per acre. In general, this will allow most hardwood stands to be select harvested every 20 years. Where site quality is poor shelterwood and other even-aged harvesting systems will be considered. Recent harvests using even-aged systems are shown in the immature column in Figure 4.19.3. High deer densities may affect the regeneration of some hardwood species.

Beech bark disease is found throughout the management area and salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

Currently there are 1,318 acres with a partial harvest assigned and 11 acres of northern hardwood with a final harvest assigned (Figure 4.19.3). There are 645 acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

#### Desired Future Condition

- Northern hardwood stands will be maintained on operable sites by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands; and
- Harvesting will provide for a continuous flow of timber products and a variety of wildlife habitat and recreational opportunities.

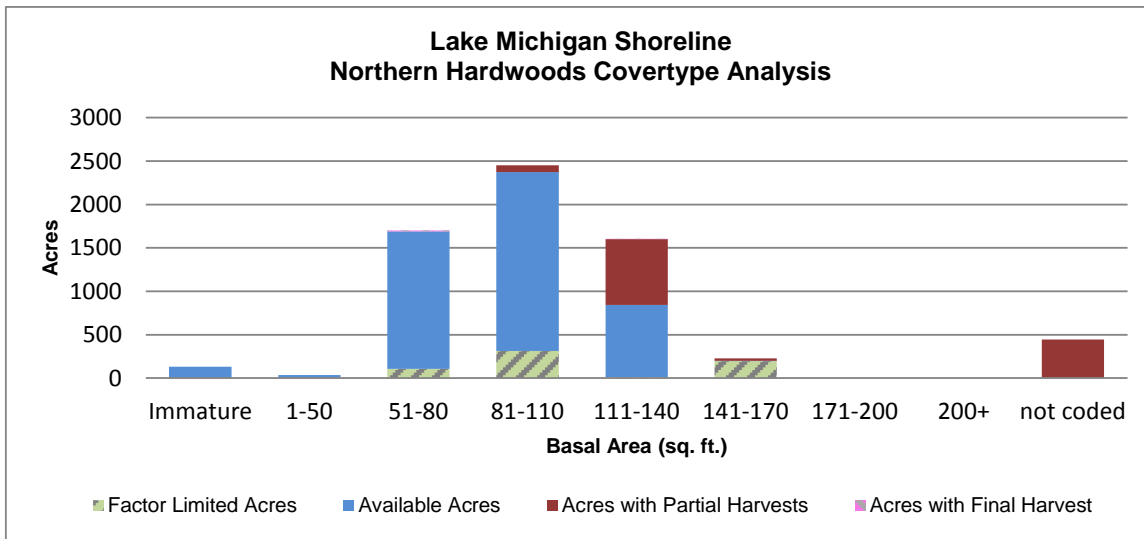


Figure 4.19.3. Basal area distribution of northern hardwood in the Lake Michigan Shoreline management area (2012 Department of Natural Resources inventory data).

10-Year Management Objectives

- The 10-year projected partial or selection harvest of northern hardwood is 3,242 acres;
- Evaluate stands previously dominated by beech dominated forests to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands;
- To favor regeneration of hardwood other than beech, consider herbicide application on beech regeneration to promote regeneration of other species; and
- In areas that are losing beech to beech bark disease, consider planting disease resistant beech or oak after harvesting to increase the availability of hard mast.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.19.1.3 Forest Cover Type Management – Aspen**

Current Condition

Aspen stands occur on 5,567 acres (12%) of the management area (Table 4.19.1). Aspen is distributed throughout the management area on outwash plains, lake plains and moraines with dry poor nutrient to mesic medium nutrient sites. Kotar habitat types include PARVAa, ATFD and AFPO. Aspen has been consistently harvested and regenerated resulting in over 85% of the stands being less than 40 years old (Figure 4.19.4).

There are currently 355 acres of aspen prescribed for final harvest. Approximately 48 acres of other cover types are expected to convert to aspen after harvest. These acres are shown in Figure 4.19.4 in the regeneration prescriptions column. There are 241 acres of aspen that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible aspen areas will eventually succeed to late successional species.

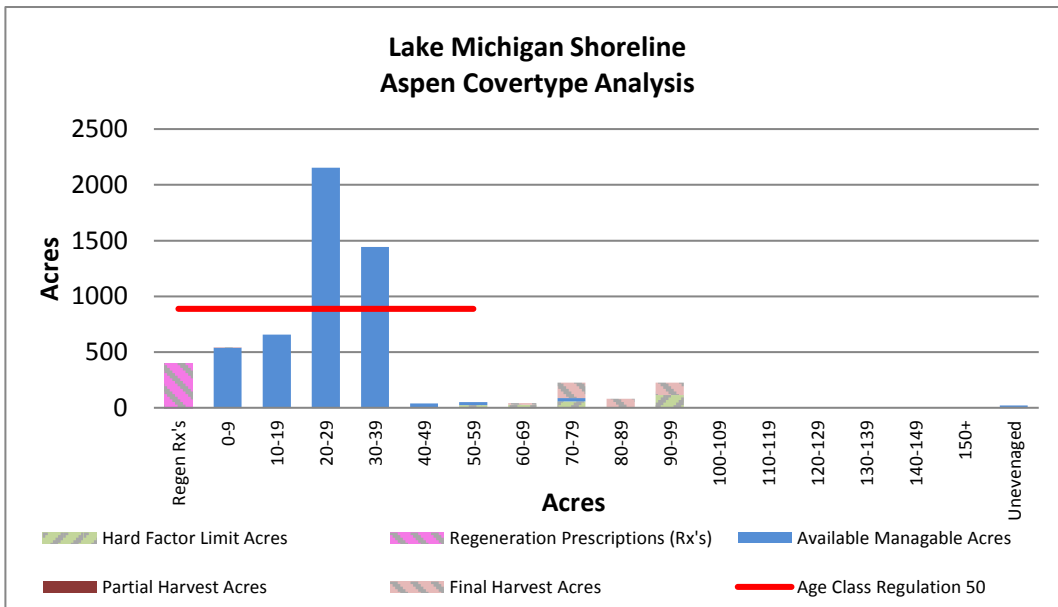


Figure 4.19.4. Age-class distribution of aspen in the Lake Michigan Shoreline management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Aspen dominated stands will be maintained on operable sites through even-aged management, with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest for aspen is 55 acres which is a decrease from the regulated amount due to the current age-class structure where the majority of trees are not yet merchantable.

Long-Term Management Objectives

- Balance the age classes of available aspen providing for a regulated harvest of approximately 888 acres per decade.

**Section 4.19.1.4 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

Current Condition

Lowland open/semi-open lands occur on 2,691 acres (6%). This category is a combination of lowland shrub (1,696 acres), marsh (793 acres), bog (160 acres) and treed bog (42 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. These stands are found in association with creeks, rivers and lowland forested stands. Some of these stands fall within the special conservation area deer wintering area.

Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity as well as to protect the special conservation area values found in these cover types.

Long-Term Management Objectives

- Within these stands allow natural processes to occur while protecting their ecological values from man-made disturbances.

### Section 4.19.1.5 Forest Cover Type Management – Upland Spruce Fir

#### Current Condition

Upland spruce/fir stands occur on 2,619 acres (6%) of the management area (Table 4.19.1). Due to past harvesting and regeneration efforts there are stands in most age classes of upland spruce/fir in this management area (Figure 4.19.5).

Currently there are 37 acres of upland spruce/fir prescribed with a final harvest. There are 637 acres of upland spruce/fir that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Upland spruce/fir stands that are unavailable for harvest will be subject to natural processes, eventually succeeding to late successional species.

#### Desired Future Condition

- Upland spruce/fir will be maintained on operable sites through even-aged management, balancing acres between 0-69 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The projected 10-year final harvest is for 251 acres of upland spruce/fir which is a slight reduction from the regulated harvest amount is due to the current age-class structure where the majority of available stands are not merchantable.

#### Long-Term Management Objectives

- Balance the age classes of available upland spruce/fir stands providing for a regulated harvest of approximately 283 acres every ten years.

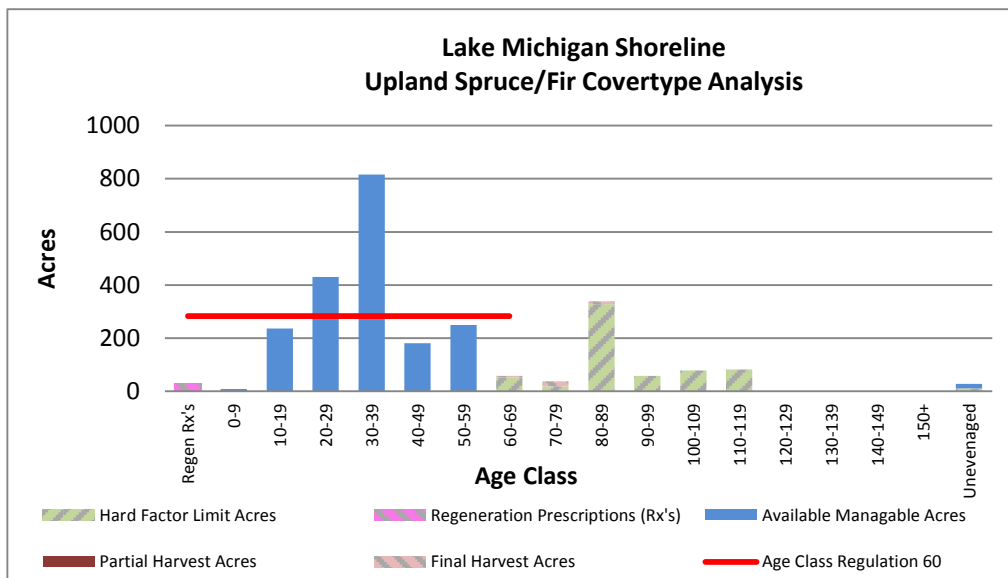


Figure 4.19.5. Age-class distribution of upland spruce/fir in the Lake Michigan Shoreline management area (2012 Department of Natural Resources inventory data).

### Section 4.19.1.6 Forest Cover Type Management – Lowland Conifer

#### Current Condition

Lowland conifer occurs on 2,418 acres (5%) of the management area (Table 4.19.1). Some of these stands are within deer wintering area special conservation areas. Lowland conifer stands in this area have been successfully harvested and regenerated with natural regeneration resulting in stands in all age classes (Figure 4.19.6). A small portion of the lowland conifer stands have been classified as uneven-aged as a result of natural processes. Lowland conifer stands along the Lake Michigan shoreline are valuable to many migrating neotropical bird species.



Currently, there are 38 acres with a final harvest prescribed. There are 719 acres of lowland conifers that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations. Lowland conifer stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management, with acres balanced between 0-89 years of age providing for a continuous supply of timber, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 189 acres.

Long-Term Management Objectives

- Balance the age-class structure of accessible lowland conifer stands providing for a regulated harvest of approximately 189 acres every decade.

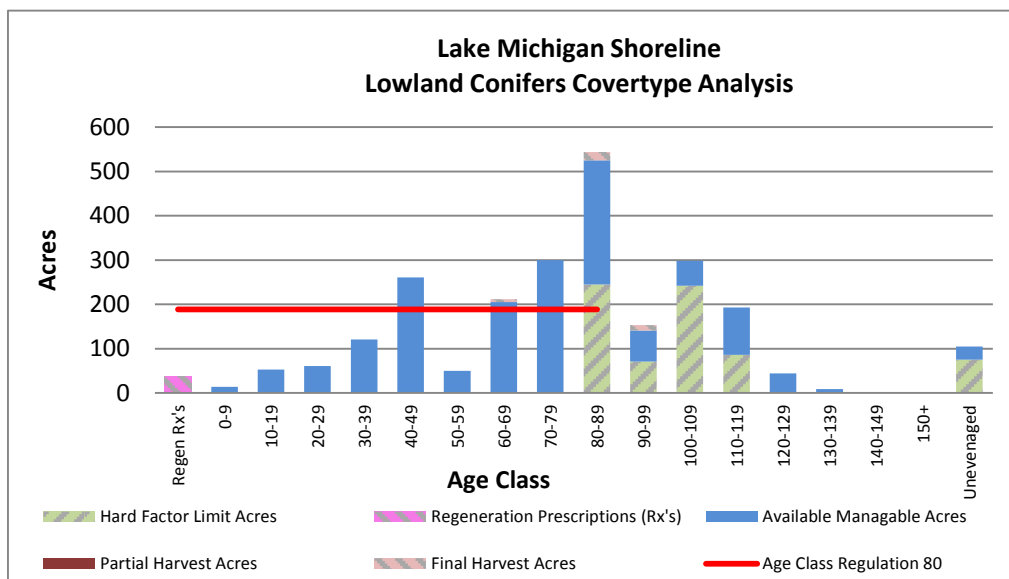


Figure 4.19.6. Age-class distribution of lowland conifers in the Lake Michigan Shoreline management area (2012 Department of Natural Resources inventory data).

**Section 4.19.1.7 Forest Cover Type Management – Other Types**

Current Condition

There are many other cover types spread across the management area that have less than 5% of the total management area acres (Table 4.19.1). Paper birch (2,094 acres) and red pine (2,041 acres) each have 4%, and upland conifers (1,343 acres) and upland mixed forest (1,206 acre) each have 3% of the total management area acres. Upland open/semi-open lands (961 acres of 2%) category is a combination of herbaceous openland, bare/sparsely vegetated, low-density trees and upland shrub.

“Other types” is made up of forested cover types with 2% or less of the total acres, and includes: white pine (1,132 acres), mixed upland deciduous (1,064 acres), lowland deciduous (721 acres), natural mixed pines (704 acres), hemlock (620 acres), jack pine (567 acres), lowland aspen/balsam poplar (340 acres), lowland mixed forest (321 acres), tamarack (252 acres), lowland spruce/fir (235 acres) and oak (27 acres). In addition there are 1,635 acres (3%) of “miscellaneous other” stands, which includes water, sand/soil and roads.

Most of these cover types will be managed as even-aged stands using natural regeneration after harvest. Perform regeneration harvests in even-aged cover types attempting to balance the age classes where possible. Mixed cover types with high basal area may be thinned prior to final harvest depending on the species composition.

Over 3,500 acres of these other minor cover types have site conditions limiting their harvest this entry cycle. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Inaccessible stands will be subject to natural processes, and may succeed to late successional species, thus changing the cover type distribution in the management area.

#### Desired Future Condition

- These other minor cover types may be managed on operable sites, contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The projected 10-year final harvest is: 27 acres of paper birch, 576 acres of upland conifers, 223 acres of upland mixed forest and 820 acres of other types; and
- The projected 10-year partial harvest is: 576 acres of red pine, 647 acres of upland conifers, 390 acres of upland mixed forest and 978 acres of other types.

#### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.19.2- Featured Wildlife Species**

The Lake Michigan Shoreline management area is probably the most biologically diverse landscape within the eastern Upper Peninsula ecoregion. Piping plovers nest in this management area from Pte. Aux Chenes west to Indian Point in Delta County. Another critical habitat value provided in this management area is the use of trees along the water's edge by neotropical migrants to feed on midges. Lowland conifers and cedar in this management area provide important habitat for over-wintering deer.

#### **Piping Plover**

The state-wide goal for the Great Lakes piping plover is to maintain a breeding population of a minimum of 100 nesting pairs. In the eastern Upper Peninsula habitat management should focus on protecting and improving critical habitat on occupied shoreline and throughout designated critical habitat.

#### Wildlife habitat specifications:

- At known breeding sites work with partners to:
  - Limit human activity near nests;
  - Construct predator exclosures around nests; and,
  - Control avian and mammalian predators as needed.
- In other critical habitat, support land acquisitions and conservation easements.
- At active sites, support public education and increased awareness to help avoid disturbance to nesting birds.
- Address/discourage illegal off-road vehicle activity on Great Lakes shorelines.

#### **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.



### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

### **4.19.3 – Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed twenty-four listed species as well as nine natural communities of note occurring in the management area as listed in Table 4.19.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

The Lake Michigan Shoreline management area contains several special conservation areas as shown in Figure 4.19.7. These are the Crow River Mouth (517 acres), Point Detour (484 acres) and Seiner’s Point (3,192 acres) non-dedicated natural areas; extensive winter deer habitat; cold water streams and lakes; and two visual management areas at Big Knob and the Cut River Bridge (Figure 4.19.7).

Areas that might meet the definition of Type 1 and Type 2 old growth have been identified in a special conservation area layer in the Geographic Decision Support Environment and are shown in Figure 4.19.7. This set of areas originated from a subset of forested natural communities within some state natural areas and all A/AB-ranked natural heritage database element occurrences. Within the Lake Michigan Shoreline management area there are 5,856 acres in three patches (Figure 4.19.7) identified as potential Type 2 wooded dune and swale complex with dry-mesic northern forest and/or boreal forest. In addition, approximately 6,000 acres were identified as potential old growth and these stands are also special conservation areas until they are evaluated.

High conservation value areas include: Little Brevort Lake Natural Area and Simmons Woods dedicated management areas, barrier dunes, coastal environmental areas and critical coastal habitat for piping plovers (Figure 4.19.7).

There are seventeen ecological reference areas in this management area, as shown in Figure 4.19.7. These Ecological reference areas represent the following natural communities: three areas of limestone bedrock glade or alvar (10, 103 and 127 acres), two areas of limestone bedrock lakeshore (5 and 17 acres), two areas of Great Lakes marsh (10 and 29 acres), open dunes (16 acres), two areas of interdunal wetland (16 and 57 acres) and seven areas of wooded dune and swale (167, 774, 954, 1757, 2346, 2783 and 3144 acres). All ecological reference areas will be managed to protect and enhance their natural vegetative and wildlife communities as directed by an ecological reference area-specific management plan.

Management goals during this planning period:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

Table 4.19.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Lake Michigan Shoreline management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Alvar		S1/G2?	Confirmed				Upland open/semi-open	N/A
Great Lakes marsh		S3/G2	Confirmed				Lowland open/semi-open	N/A
Interdunal wetland		S2/G2?	Confirmed				Lowland open/semi-open	N/A
Limestone bedrock glade		S2/G2G4	Confirmed				Upland open/semi-open	N/A
Limestone bedrock lakeshore		S2/G3	Confirmed				Upland open/semi-open	N/A
Limestone cobble shore		S3/G2G3	Confirmed				Upland open/semi-open	N/A
Mesic northern forest		S3/G4	Confirmed				Northern Hardwood	Late
Open dunes		S3/G3	Confirmed				Upland open/semi-open	N/A
Wooded dune and swale complex		S3/G3	Confirmed				Upland open/semi-open	N/A
<b>Birds</b>								
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Piping plover	<i>Charadrius melodus</i>	LE/E/G3/S1	Confirmed	MV	Moderate	Open dunes	Upland open/semi-open	N/A
						Common loon	<i>Gavia immer</i>	T/G5/S3-4
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Late
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
						Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
<b>Insect</b>								
Lake Huron locust	<i>Trimerotropis huroniana</i>	T/S2S3/G2G3	Confirmed	MV	Very High	Great Lakes barrens	Upland open/semi-open	N/A
						Open dunes	Upland open/semi-open	N/A
<b>Snail</b>								
Pleistocene catinella	<i>Catinella exile</i>	T/G2/SU	Confirmed	EV	Moderate	Northern fen	Lowland open/semi-open	N/A
						Limestone cobble shore	Lowland open/semi-open	N/A
						Prairie fen	Lowland open/semi-open	N/A
						Interdunal wetland	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
						Tapered vertigo	<i>Vertigo elatior</i>	SC/G5/S3
						Limestone cobble shore	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Prairie fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Hubricht's vertigo	<i>Vertigo hubrichti</i>	E/G3/S2	Confirmed	EV	Moderate	Alvar	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
Crested vertigo	<i>Vertigo pygmaea</i>	SC/G5/S3	Confirmed	MV	Low	Limestone cliff	Upland open/semi-open	N/A
						Granite bedrock lakeshore	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A
						Limestone lakeshore cliff	Upland open/semi-open	N/A
						Volcanic lakeshore cliff	Upland open/semi-open	N/A
						Volcanic bedrock cliff	Upland open/semi-open	N/A
<b>Plants</b>								
Walking fern	<i>Asplenium rhizophyllum</i>	T/G5/S2S3	Confirmed			Mesic northern forest	Northern Hardwood	Late
						Limestone cliff	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone lakeshore cliff	Upland open/semi-open	N/A
						Sinkhole	Upland open/semi-open	N/A
						Green spleenwort	<i>Asplenium trichomanes-ramo</i>	SC/G4/S3
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Rich conifer swamp	Tamarack	Late
						Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone cliff	Upland open/semi-open	N/A
						Limestone lakeshore cliff	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A
Calypso or fairy-slipper	<i>Calypso bulbosa</i>	T/G5/S2	Confirmed			Rich conifer swamp	Tamarack	Late
						Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone bedrock glade	Upland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Wooded dune & swale complex	Upland open/semi-open	N/A
						Dry northern forest	Jack Pine, Red Pine	Late
						Dry-mesic northern forest	White Pine	Late
						Great Lakes barrens	Upland open/semi-open	N/A
						Volcanic bedrock glade	Upland open/semi-open	N/A
						Sedge	<i>Carex albulutscens</i>	T/G5/S2
						Intermittent wetland	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Table 4.19.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Lake Michigan Shoreline management area (Continued).

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage						
<b>Plants (Cont'd)</b>														
Richardson's sedge	<i>Carex richardsonii</i>	SC/G4/S3S4	Confirmed			Alvar	Upland open/semi-open	N/A						
						Northern fen	Lowland open/semi-open	N/A						
						Boreal forest	Upland & Lowland Sp/F	Mid						
						Dry-mesic prairie	Upland open/semi-open	N/A						
						Dry-mesic northern forest	White Pine	Late						
						Hillside prairie	Upland open/semi-open	N/A						
						Limestone bedrock glade	Upland open/semi-open	N/A						
						Limestone bedrock lakeshore	Upland open/semi-open	N/A						
						Limestone cobble shore	Upland open/semi-open	N/A						
						Volcanic cliff	Upland open/semi-open	N/A						
Pitcher's thistle	<i>Cirsium pitcheri</i>	LT/T/G3/S3	Confirmed			Volcanic lakeshore cliff	Upland open/semi-open	N/A						
						Open dunes	Upland open/semi-open	N/A						
						Wooded dune & swale complex	Upland open/semi-open	N/A						
						Great Lakes barrens	Upland open/semi-open	N/A						
						Sand and gravel beach	Upland open/semi-open	N/A						
						Rich conifer swamp	Tamarack	Late						
Ram's head lady's-slipper	<i>Cypripedium orietinum</i>	SC/G3/S3	Confirmed			Boreal forest	Upland & Lowland Sp/F	Mid						
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A						
						Hardwood-conifer swamp	Lowland Mixed	Mid						
						Poor fen	Lowland open/semi-open	N/A						
						Wooded dune & swale complex	Upland open/semi-open	N/A						
						Dry northern forest	Jack Pine, Red Pine	Late						
						Dry-mesic northern forest	White Pine	Late						
						Great Lakes barrens	Upland open/semi-open	N/A						
						Limestone bedrock glade	Upland open/semi-open	N/A						
						Volcanic bedrock glade	Upland open/semi-open	N/A						
Limestone oak fern	<i>Gymnocarpium robertianum</i>	T/G5/S2	Confirmed			Granite bedrock glade	Upland open/semi-open	N/A						
						Rich conifer swamp	Tamarack	Late						
						Limestone bedrock glade	Upland open/semi-open	N/A						
						Limestone lakeshore cliff	Upland open/semi-open	N/A						
						Open dunes	Upland open/semi-open	N/A						
						Intermittent wetland	Lowland open/semi-open	N/A						
Fir clubmoss	<i>Huperzia selago</i>	SC/G5/S3	Confirmed			Open dunes	Upland open/semi-open	N/A						
						Intermittent wetland	Lowland open/semi-open	N/A						
						Dwarf lake iris	<i>Iris lacustris</i>	LT/T/G3/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
												Alvar	Upland open/semi-open	N/A
												Wooded dune & swale complex	Upland open/semi-open	N/A
												Boreal forest	Upland & Lowland Sp/F	Mid
Limestone bedrock glade	Upland open/semi-open	N/A												
Limestone cobble shore	Upland open/semi-open	N/A												
Michigan monkey flower	<i>Mimulus glabratus michiganensis</i>	LE/E/G5T1/S1	Confirmed			Limestone bedrock lakeshore	Upland open/semi-open	N/A						
						Rich conifer swamp	Tamarack	Late						
						Butterwort	<i>Pinguicula vulgaris</i>	SC/G5/S3	Confirmed			Limestone cobble shore	Upland open/semi-open	N/A
												Limestone bedrock lakeshore	Upland open/semi-open	N/A
												Volcanic bedrock lakeshore	Upland open/semi-open	N/A
												Sandstone lakeshore cliff	Upland open/semi-open	N/A
Interdunal wetland	Lowland open/semi-open	N/A												
Coastal fen	Lowland open/semi-open	N/A												
Houghton's goldenrod	<i>Solidago houghtonii</i>	LT/T/G3/S3	Confirmed			Open dunes	Upland open/semi-open	N/A						
						Alvar	Upland open/semi-open	N/A						
						Limestone bedrock lakeshore	Upland open/semi-open	N/A						
						Interdunal wetland	Lowland open/semi-open	N/A						
						Coastal fen	Lowland open/semi-open	N/A						
						Limestone cobble shore	Upland open/semi-open	N/A						
Stitchwort	<i>Stellaria longipes</i>	SC/G5/S2S3	Confirmed			Wet-mesic sand prairie	Lowland open/semi-open	N/A						
						Open dunes	Upland open/semi-open	N/A						
						Lake Huron pansy	<i>Tanacetum huronense</i>	T/G5T4T5/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
												Limestone cobble shore	Upland open/semi-open	N/A
												Wooded dune & swale complex	Upland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

# Lake Michigan Shoreline

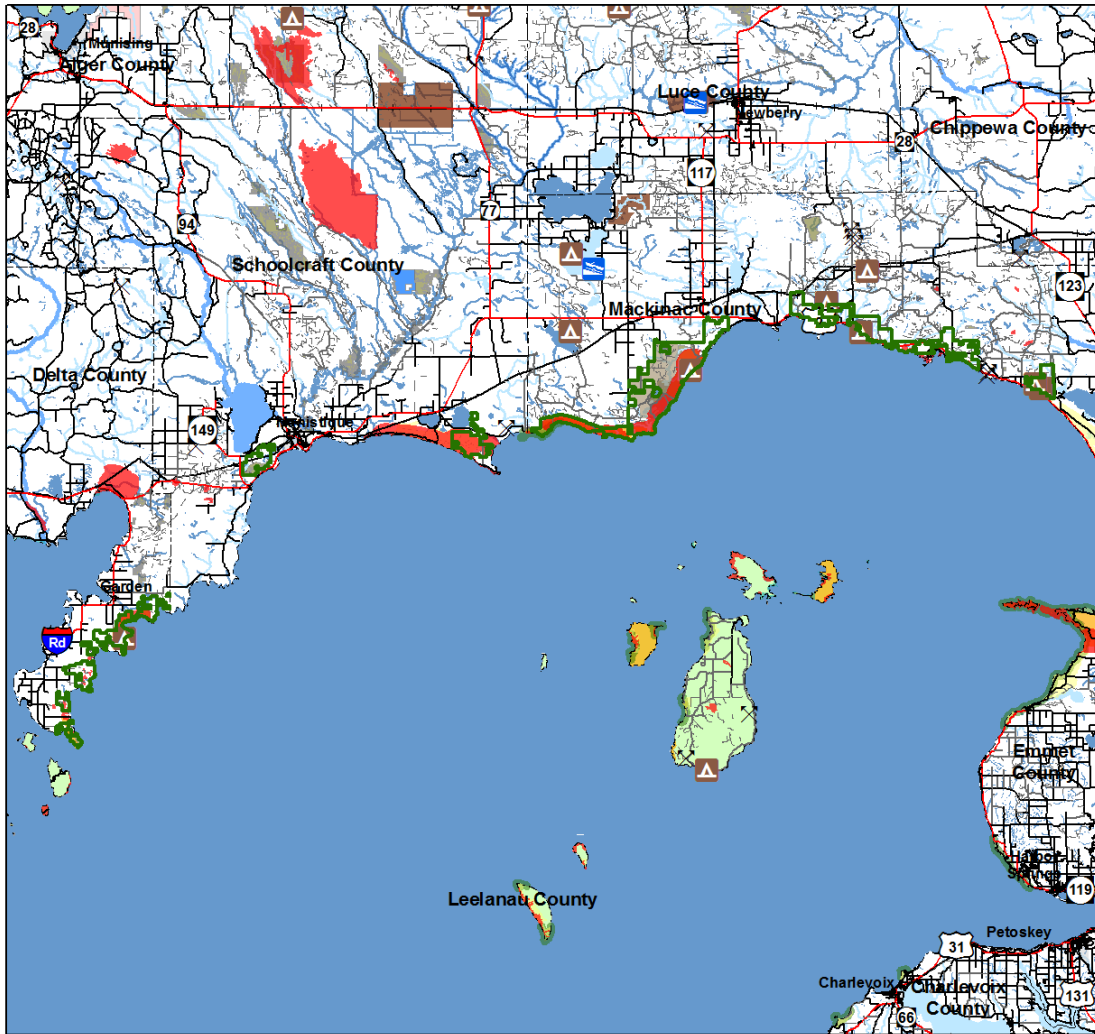


Figure 4.19.7. A map of the Lake Michigan Shoreline management area showing the special resources areas.

#### 4.19.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Northern hardwoods: beech bark disease;
- Aspen and lowland aspen/balsam poplar: white trunk rot and *Hypoxylon* canker; and
- Lowland spruce/fir, Upland spruce/fir: spruce budworm.

For further information on forest health refer to section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. No invasive plant species have yet been documented within the management area. Garlic mustard and Japanese knotweed have been documented within a five-mile buffer of the management area (Table 4.19.3) and monitoring efforts should specifically look for new populations of this species. In addition, the Lake Michigan shoreline is susceptible to *Phragmites*. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

While it is not yet listed in the Michigan Invasive Plant database, there have been sightings of *Phragmites* and garlic mustard within the management area and wild parsnip (*Pastinaca sativa*) within five miles of the management area.

Table 4.19.3. Invasive plant species within or near the Lake Michigan Shoreline management area (Data from the Michigan Invasive Plant Identification Network database).

Lake Michigan Shoreline - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	4	4	2
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
-	-	Garlic Mustard <i>Alliaria petiolata</i>	2	
-	-	Japanese Knotweed <i>Fallopia japonica</i>	2	

#### 4.19.5 – Fire Management

This area is predominantly lowland conifers and marsh. Much of the area likely had a very long fire return interval (up to 3,000 years) with mixed severities. Fire would have had a much more active role in maintaining dry sites on coastal dunes.

- Fire suppression tactics should take into account the sensitive nature of some of the natural communities in this management area.
- Prescribed fire may be used to maintain natural communities within the management area, and to manage invasive species.

#### 4.19.6 – Public Access and Recreation

Illegal off-road vehicle activities are an issue within this management area especially along the Lake Michigan shoreline.

Vehicle access is generally good in this management area.

Recreational trail facilities include snowmobile trails and Switchback Ridge, Big Knob-Crow Lake, Marsh Lake and Ninga Aki pathways (Figure 4.19.1). State forest campgrounds in the area are the Little Brevort Lake North, Hog Island Point, Big Knob and the Portage Bay campgrounds. Boating access sites in the area include Little Brevort Lake North, Little Brevort Lake South and Portage Bay.

Other types of recreation within this management area include: hunting, fishing, canoeing, kayaking, bird watching and sightseeing at the scenic overlooks.

Dispersed camping is popular along the lakeshore in locations including Simmons Woods, South Gould City Road and Fox Point. U.S. Highway 2 is part of the Lake Michigan Circle Tour that many people travel during the summer and fall months.

#### **4.19.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. Portions of the Black and Brevort River watershed systems and Davenport Creek are designated as high priority trout streams in this management area and the details are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support System and in Figure 4.19.1.

#### **4.19.8 – Minerals**

Surface sediments consist primarily of lacustrine (lake) sand and gravel with minor peat and muck and medium-textured till. The glacial drift thickness varies up to 100 feet. Sand and gravel pits are located in this area and there is potential for additional pits.

The Silurian Pte, aux Chenes Formation and Engadine, Manistique and Burnt Bluff Groups subcrop below the glacial drift. The Engadine and Burnt Bluff are quarried for stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (four in Mackinac, five in Schoolcraft and four in Delta). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.20 MA 20 – Mackinac Mix Management Area

### Summary of Use and Management

Vegetative management in the Mackinac Mix management area (MA) (Figure 4.20.1) will emphasize balancing the age classes of aspen and maintaining the red pine resource. Management will strive to produce a sustainable yield of various timber products, enhance game and non-game wildlife habitat, protect areas of unique character and provide for forest-based recreational uses. Expected issues in this 10-year planning period include: introduced pests and diseases, invasive non-native species, replacement of aging water crossings and increased recreational pressure.

#### Introduction

The Mackinac Mix management area is located in the south and western portion of the eastern Upper Peninsula in Mackinac and Chippewa counties. It has 65,648 acres of state-owned land. The primary attributes for this management area is timber production. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- Landforms consist of large areas of lacustrine sand deposits that have flat to gently undulating surfaces. On this topography, only a few inches of elevation change can greatly alter drainage conditions. Drainage conditions also depend on depth to underlying bedrock or fine-textured substrate. Glacial erratic boulders consist of dolomite and provide habitat for special plants. Gravel extraction occurs in this landform. Depth to bedrock is often less than 50 feet. Several gravel pits are located within this management area.
- There are several known historical and prehistoric sites in this management area. This management area held the Rexton Civilian Conservation Corp camp and several logging camps. The Daughters of the American Revolution Red Pine stand is located near Rexton. The management area contains traditional areas for gathering cranberries, blueberries and morel mushrooms.
- Recreational opportunities include: snowmobiling, fishing and hunting, camping, motorcycling, ORV-riding.
- The management area contains special conservation area, deer wintering areas and a bog ecological reference area.

The state land within this management area is fairly concentrated and falls within the Sault Forest Management Unit. The Hiawatha Sportsman's Club borders the west side of the management area covering several thousand acres. The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.20.1.



# Mackinac Mix

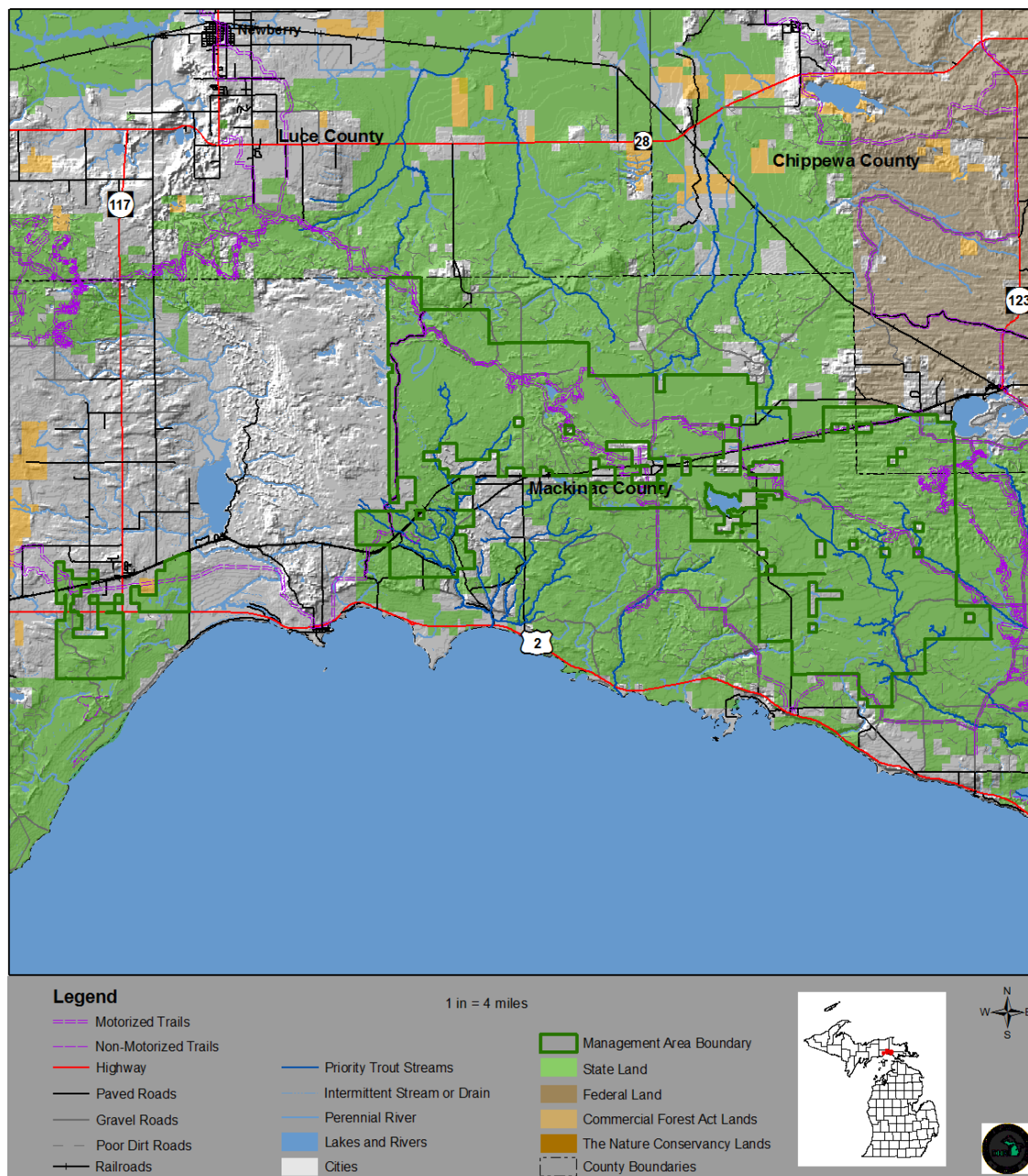


Figure 4.20.1. Location of the Mackinac Mix management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and Lake Michigan.

Table 4.20.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Mackinac Mix management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Cedar	25%	16,210	1,504	14,706	100	0	16,210	919	0
Lowland Open/Semi-Open Lands	17%	11,150	0	11,150	0	0	11,150	0	0
Aspen	13%	8,827	94	8,733	267	0	8,827	1,455	0
Northern Hardwood	11%	7,271	91	7,180	0	3,407	7,271	0	3,407
Lowland Conifers	6%	4,046	1,026	3,020	336	0	4,046	336	0
Red Pine	6%	3,816	44	3,772	0	1,318	3,816	419	1,318
Lowland Spruce/Fir	4%	2,924	1,409	1,515	168	0	2,924	168	0
Upland Open/Semi-Open Lands	3%	2,051	0	2,051	0	0	2,051	0	0
Mixed Upland Deciduous	2%	1,328	98	1,230	176	251	1,328	176	251
Upland Spruce/Fir	2%	1,012	22	990	95	0	1,012	141	0
Upland Mixed Forest	2%	1,010	10	1,000	244	362	1,010	111	362
Misc Other (Water, Local, Urban)	1%	512	0	512	0	0	512	0	0
Others	8%	5,491	1,542	3,949	442	473	5,491	425	598
<b>Total</b>	<b>100%</b>	<b>65,648</b>	<b>5,840</b>	<b>59,808</b>	<b>1,828</b>	<b>5,811</b>	<b>65,648</b>	<b>4,150</b>	<b>5,936</b>

Others include: tamarack, white pine, lowland deciduous, paper birch, lowland mixed forest, upland conifers, hemlock, lowland aspen/balsam poplar, natural mixed pines, jack pine and planted mixed pines.

#### 4.20.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### Section 4.20.1.1 Forest Cover Type Management - Cedar

###### Current Condition

Cedar occurs on 16,210 acres (25%) of the management area (Table 4.20.1). There are several deer wintering habitat special conservation areas in this management area. Maintaining a closed canopy structure provides important cover for deer which reduces the snow depth within the stands. There has been a small amount of harvest and regeneration work in this management area, but none recently (Figure 4.20.2). Regeneration of cedar is often difficult here and some stands regenerated to a mix of conifers and tag alder rather than cedar.

Currently there are no acres of cedar with a harvest prescribed. There are 1,504 acres of cedar that have site conditions limiting harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Cedar stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

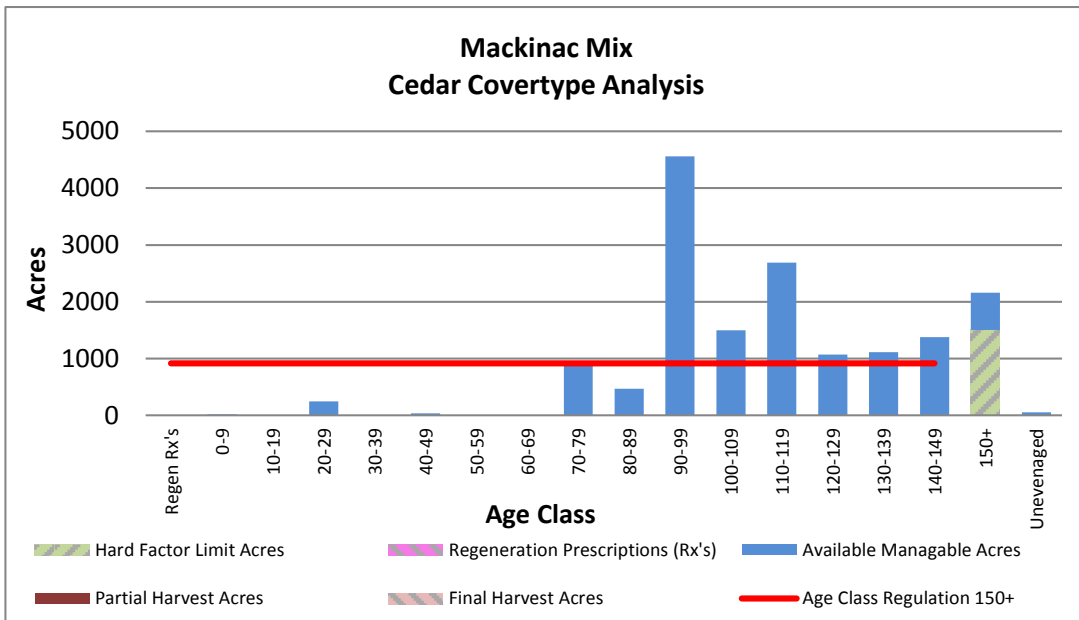


Figure 4.20.2. Age-class distribution of cedar in the Mackinac Mix management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- In areas where deer browse is a concern, these stands may not be actively harvested at this time; and
- Outside of deer wintering areas, cedar may be maintained through even aged management, balancing acres between 0-159 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of cedar is 100 acres. However harvest of this type, if it occurs, may vary widely from the projected harvest in order to meet the long term management objectives.
- Ensure that cedar and/or hemlock recruitment/regeneration is reliable if harvesting in this cover type.

Long-Term Management Objectives

- Develop a comprehensive deer wintering management plan;
- Cedar stands will be managed to maintain winter habitat for deer in wintering areas and to retain this forest type in the landscape;
- Look for opportunities to test different methods of regenerating cedar, especially outside the deer wintering areas; and
- Consider harvest of cedar before rotation age to begin to diversify the age classes providing for a regulated harvest of approximately 919 acres per decade (red line in Figure 4.20.2).

**Section 4.20.1.2 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

Current Condition

Lowland open/semi-open lands occur on 11,150 acres (17%) (Table 4.20.1). This category is a combination of lowland shrub (5,071 acres), treed bog (3,137 acres), bog (1,843 acres) and marsh (1,099 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. These stands are found in association with creeks, rivers and lowland forested stands. Some of these stands fall within the special conservation area deer wintering areas and within the ecological reference areas.

Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity while protecting the special conservation area and ecological reference area values found in these cover types.

Long-Term Management Objectives

- Within these stands allow natural processes to occur while protecting their ecological values from man-made disturbances.

**Section 4.20.1.3 Forest Cover Type Management - Aspen**

Current Condition

Aspen stands occur on 8,827 acres (13%) of the management area (Table 4.20.1). Aspen is distributed throughout the management area on outwash plains, lake plains and moraines with dry-poor nutrient to mesic-medium to rich nutrient sites. Kotar habitat types include PARVAa, ATFD, AFPo and AFOAs (see appendix E). Aspen has been consistently harvested and regenerated resulting in almost 85% of the stands being less than 40 years old (Figure 4.20.3). Most of the aspen stands in this management area have a variety of other tree species mixed in, including: red maple, paper birch, balsam fir, white pine and cedar.

There are currently 266 acres of aspen prescribed for final harvest. Approximately 400 acres of other cover types are expected to convert to aspen after harvest. These acres are shown in Figure 4.20.3 the regeneration prescriptions column. There are 94 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible aspen areas will eventually succeed to late successional species.

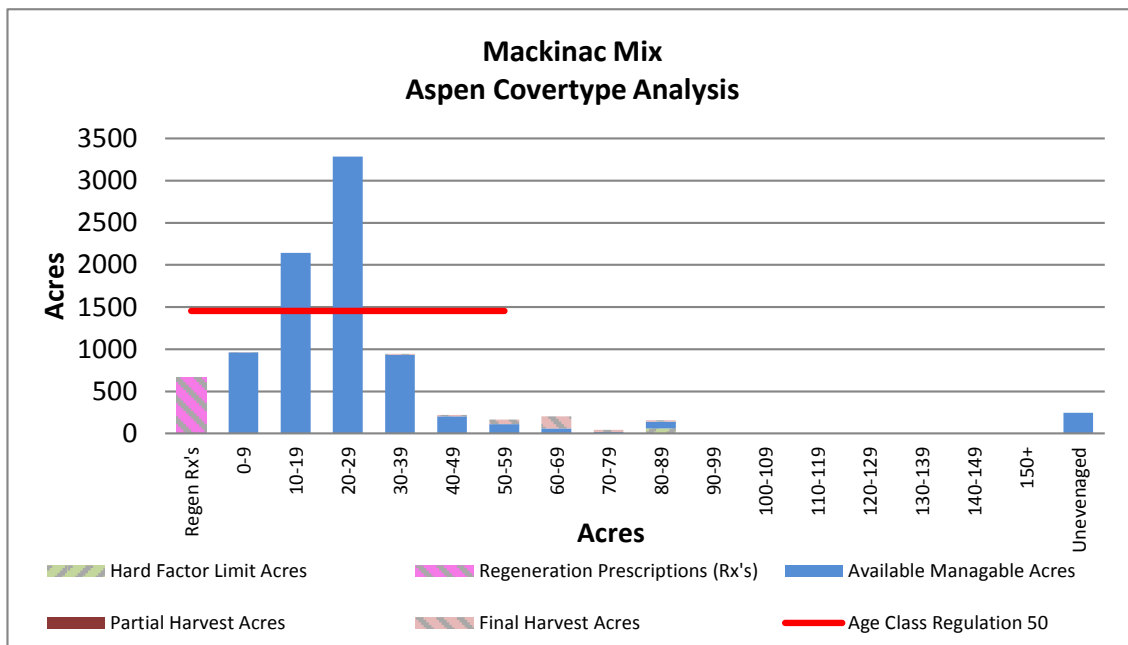


Figure 4.20.3. Age-class distribution of aspen in the Mackinac Mix management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Aspen dominated stands will be maintained on operable sites through even-aged management, with acres balanced between 0-59 years of age providing for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest of aspen is 267 acres which is significantly lower than the regulated amount as most of the aspen stands in the management area are well below rotation age.

Long-Term Management Objectives

- Balance the age classes of available aspen providing for a regulated harvest of approximately 1,455 acres per decade.

**Section 4.20.1.4 Forest Cover Type Management – Northern Hardwoods**

Current Condition

Northern hardwood stands occur on 7,271 acres (11%) of the management area (Table 4.20.1). The majority of the northern hardwood stands have been classified as uneven-aged. Northern hardwood stands are distributed on mesic-poor to rich nutrient sites with Kotar habitat types of PArVAa, ATFD, AFPo and AFOAs (see appendix E). Hardwood stands in this management area mainly consist of sugar maple associations of average to good quality. Some stands contain vernal ponds and small glacial depressions. In northern hardwood stands where quality warrants, use single tree selection harvests in stands with a basal area over 120 square feet per acre, decreasing stocking levels to a basal area of approximately 80 square feet per acre. In general, this will allow most hardwood stands to be select harvested every 20 years. These periodic selection harvests will continue to move the stands toward an uneven-aged, multi-storied structure. Where site quality is poor shelterwood and other even-aged harvesting systems will be considered. Past harvests using even-aged systems are shown in the immature column in Figure 4.20.4.

Beech bark disease has impacted these stands, resulting in high beech mortality. Many stands have had or will have salvage harvests. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area. Garlic mustard has been found in the management area negatively effecting the regeneration of hardwoods. Prescribed burning has been successful in reducing the amount of garlic mustard plants.

Currently there are 1,527 acres with a partial harvest or selection method of cut assigned (Figure 4.20.4). There are some acres of northern hardwood with a harvest assigned that are expected to convert to other cover types after harvest and some acres of other cover types that are expected to convert to northern hardwood after harvest. These acres are shown in Figure 4.20.4 as acres with final harvest prescribed and in the immature column. There are 91 acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

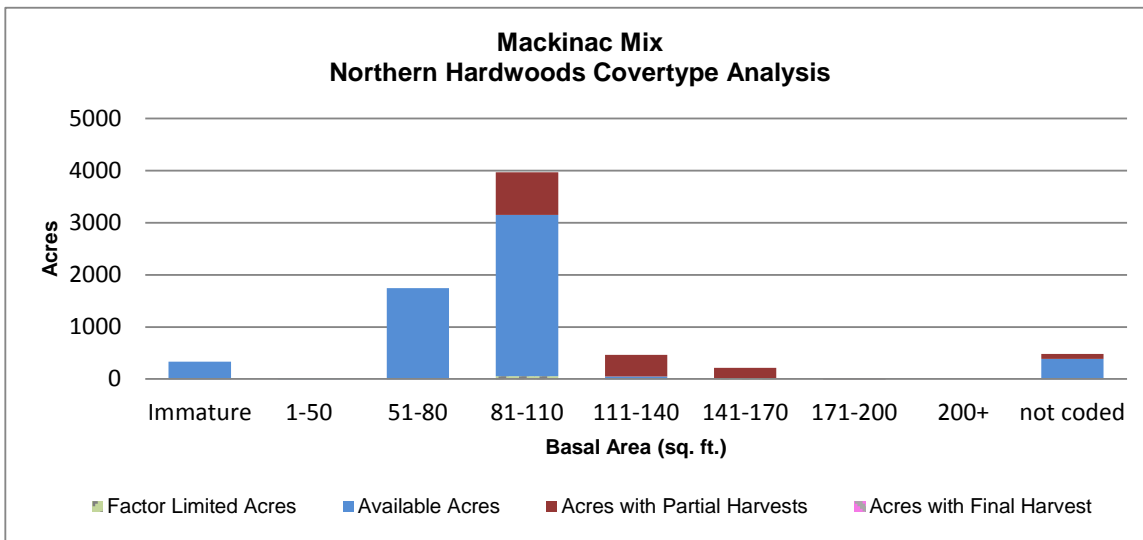


Figure 4.20.4. Basal area distribution of northern hardwood in the Mackinac Mix management area (2012 Department of Natural Resources inventory data).

## Desired Future Condition

- Northern hardwood communities will be maintained on operable sites by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands; and
- Harvesting will provide for a continuous flow of timber products and a variety of wildlife habitat and recreational opportunities.

## 10-Year Management Objectives

- Continue salvage harvests of beech affected by beech bark disease using Beech Bark Disease Management Guidelines;
- Evaluate stands that had a component of beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands;
- Consider herbicide applications and the planting of hard mast producing trees including oak and disease resistant beech; and
- The 10-year projected partial or selection harvest of northern hardwood is 3,407 acres.

## Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle; and
- Continue efforts to eradicate garlic mustard.

## Section 4.20.1.5 Forest Cover Type Management – Lowland Conifer

### Current Condition

Lowland conifer occurs on 4,046 acres (6%) of the management area (Table 4.20.1). Lowland conifer stands in this area have been successfully harvested and regenerated with natural regeneration (Figure 4.20.5). Some of these stands are within deer wintering area special conservation areas. Many of the stands are found in association with streams and are sometimes inaccessible.

Currently there are 53 acres of lowland conifers with a final harvest prescribed. Approximately 55 acres of other cover types are expected to convert to lowland conifers after harvest. These acres are shown in Figure 4.20.5 in the regeneration prescriptions column. There are 1,026 acres of lowland conifers that have site conditions limiting their harvest this entry. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

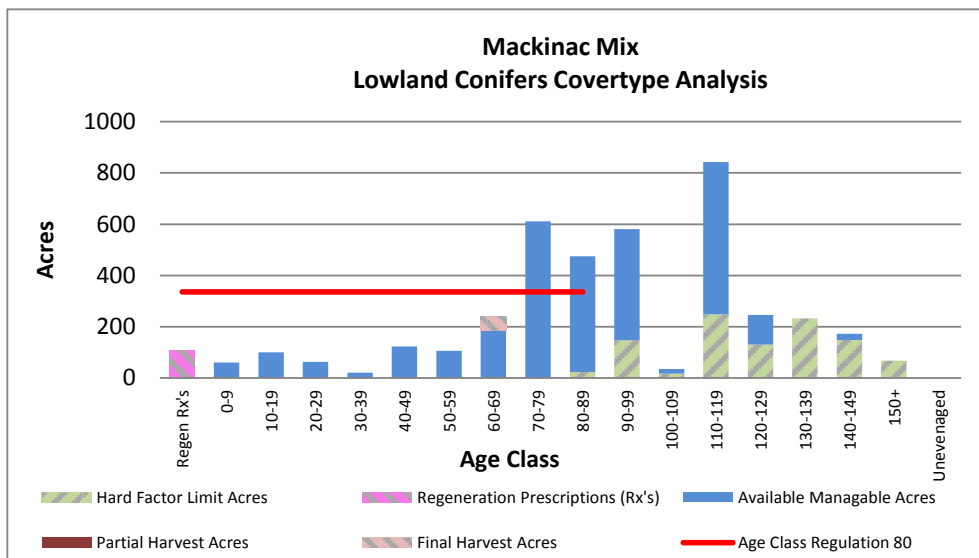


Figure 4.20.5. Age-class distribution of lowland conifers in the Mackinac Mix management area (2012 Department of Natural Resources inventory data).



### Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for continual harvest, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 336 acres.

### Long-Term Management Objectives

- Balance the age-class structure of accessible lowland conifer stands providing for a regulated harvest of approximately 336 acres every decade.

## **Section 4.20.1.6 Forest Cover Type Management – Red Pine**

### Current Condition

Red pine stands occur on 3,816 acres (6%) of the management area (Table 4.20.1). Red pine stands are distributed throughout the management area on a range of sites including stands on all the Kotar habitat types, but mainly on better quality sites of ATFD and AFPO. The majority of the red pine stands is of planted origin and is intensively managed for timber production. Most of the stands have been thinned more than once and regeneration harvests followed by re-planting have started to diversify the age classes (Figure 4.20.6). As most of the planted red pine stands are on very productive sites prescribed burning or the use of herbicide may be necessary to control competing vegetation thus ensuring successful regeneration. Red pine stands on these high-quality sites are usually thinned every ten years, reducing basal area to approximately 120 square feet per acre, until replacement harvest age at 80.

Currently there are 251 acres of red pine prescribed with a final harvest and 379 acres prescribed for partial harvest or thinning. There are some stands in other cover types that are prescribed to be converted to red pine after harvest and some acres of red pine prescribed to be converted to other types. These acres are shown in Figure 4.20.6 in the regeneration prescriptions column. There are 44 acres of red pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Red pine in inaccessible or sensitive areas may remain through biological maturity.

### Desired Future Condition

- Red pine stands will be maintained and managed through thinning until stand replacement harvest at approximately age 80; and
- Balancing acres between 0-89 years of age will provide for continual harvesting, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The 10-year projected final harvest of red pine is zero acres with the reduction from the regulated amount due to the large number of acres in the 0-9 and regeneration prescriptions columns; and
- The 10-year projected partial harvest of red pine is 1,318 acres in stands 40-80 years of age.

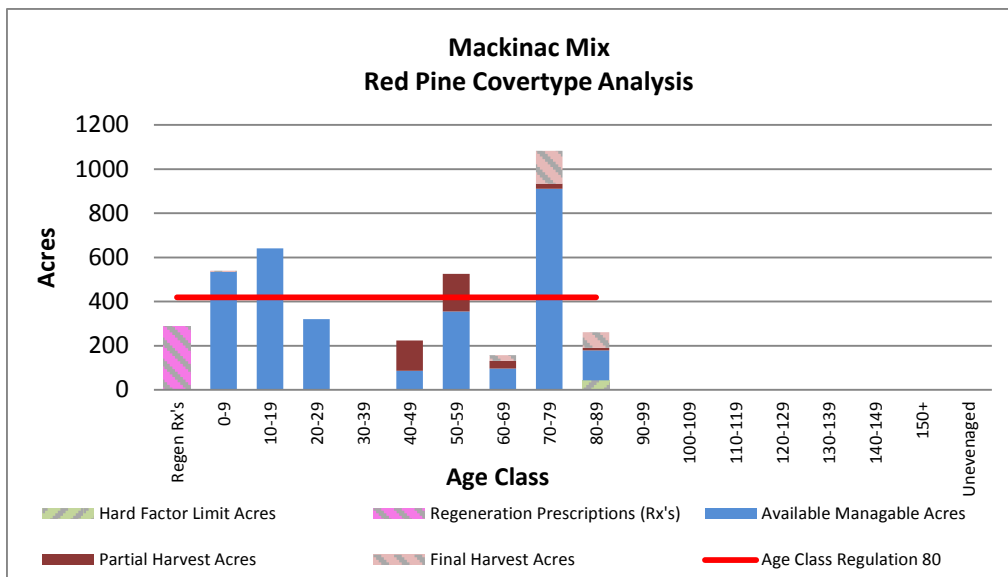


Figure 4.20.6. Age-class distribution of red pine in the Mackinac Mix management area (2012 Department of Natural Resources inventory data).

#### Long-Term Management Objectives

- Balance the age-class distribution of red pine providing for a regulated rotation harvest of approximately 419 acres per decade; and
- Stands will be periodically thinned until they meet silvicultural criteria.

#### **Section 4.20.1.7 Forest Cover Type Management – Other Types**

##### Current Condition

There are many other cover types spread across the management area that have less than 5% of the total management area acres (Table 4.20.1). Lowland spruce/fir (2,924 acres or 4%), upland open/semi-open lands (2,051 acres or 3%), mixed upland deciduous (1,328 acres or 2%), upland spruce/fir (1,012 acres or 2%) and upland mixed forest (1,010 acres or 2%) are the largest cover types in this section.

“Other types” is made up of forested cover types with less than 2% of the total acres and includes: tamarack (877 acres), white pine (849 acres), lowland deciduous (823 acres), paper birch (785 acres), lowland mixed forest (472 acres), upland conifers (463 acres), hemlock (429 acres), lowland aspen/balsam poplar (423 acres), natural mixed pines (288 acres), jack pine (66 acres) and planted mixed pines (16 acres). In addition there are 512 acres (1%) of “miscellaneous other” stands, which includes water, sand/soil and roads.

Most of these cover types with the exception of white pine and hemlock will be managed as even-aged stands using natural regeneration after harvest. Following general timber management guidelines, perform regeneration harvests in even-aged forested cover types, attempting to balance age classes where possible. Natural regeneration of species currently on site is expected. Schedule selection harvests in white pine and hemlock as needed.

There are 2,721 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Where stands are inaccessible, early successional cover types will be changed through natural succession.

##### Desired Future Condition

- These cover types may be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreation opportunity.



## 10-Year Management Objectives

- The projected 10-year final harvest is 168 acres of lowland spruce/fir, 176 acres of mixed upland deciduous, 95 acres of upland spruce/fir, 244 acres of upland mixed forest and 442 acres of other types; and
- The projected 10-year partial harvest is 251 acres of mixed upland deciduous, 362 acres of upland mixed forest and 473 acres of other types.

## Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.20.2 – Featured Species Management**

There is a major deer wintering complex within this management area. In harvested stands, it is beneficial to wildlife to retain large diameter soft hardwoods, coarse woody debris, mast producing species and within stand diversity.

#### **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improve habitat. Management for the species should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land-use.

#### Wildlife habitat specifications:

- Maintain or increase tree species that provide mast including beech, oak, black cherry and ironwood.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.
- Retain some large diameter white pine and hemlock for bear refuge trees.
- Plant disease resistant beech and red oak where appropriate.
- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource.
- Discourage land transactions, and use and management activities that facilitate fragmenting state lands within the management area.

#### **Pileated Woodpecker**

The goal for pileated woodpecker is to maintain or improve habitat. Management should focus on maintaining large diameter deciduous trees in timber sales in priority areas.

#### Wildlife habitat specifications:

- Identify and retain large (>15 inches in diameter at breast height) snags and cavity trees, coarse woody debris and reserve trees as possible to ensure a sustainable supply of future cavity/foraging trees and associated coarse woody debris. Poorly formed trees and those damaged by natural disturbance or earlier harvests, particularly deciduous trees, are good candidates for future snags and cavity trees; trees damaged by beech bark disease that were not salvaged are contributing towards this goal. Large diameter aspen and other soft hardwoods are preferred.
- Even-aged managed stands: Leave scattered retention patches around some 18 inches in diameter at breast height or greater secure trees as a nucleus, using the upper end of the Within Stand Retention Guidance.
- Uneven-aged managed stands: Retain a minimum of three secure cavity or snags per acre with one exceeding 18 inches in diameter at breast height. If snags or cavity trees are lacking, leave trees with defects of the maximum available size that will likely develop cavities.

- Salvage harvests deemed necessary to remove due to insect, disease, or fire will be offset within the same cover type and age class (within the compartment, management area or eastern Upper Peninsula ecoregion), to minimize impacts on pileated woodpecker habitat. Total allowable harvest in these situations will be evaluated on a case-by-case basis.

### **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age class distribution for aspen in priority landscapes.

#### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Move to balance the age class distribution of aspen and birch cover types to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation.
- Larger harvest units should have irregular boundaries and include one or two, 1-3 acre unharvested inclusions for every 40 acres exceeding 40 acres in size
- Evaluate the conifer component in aspen stands, holding or increasing where desirable. Leave conifer under four-inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

### **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash and increasing mesic conifer components within stands.

#### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under four inch diameter at breast height.
- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- Balance age classes in the jack pine cover type to provide young, dense jack pine stands.
- When using herbicide treatments to prepare sites for planting red and jack pine in snowshoe hare habitat, encourage more diverse stands of pine and aspen by using application skips in pockets or along stand edges.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris already present (before cutting) and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance, retaining the maximum residues.

### **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and

hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

#### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### **4.20.3 – Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed fifteen listed species as well as four natural communities of note occurring in the management area as listed in Table 4.20.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Special conservation areas found in the management area include: cold water streams and lakes, high priority trout streams and several deer wintering areas. Approximately 1,100 acres of potential old growth were coded for a broad range of reasons. These stands are also considered special conservation areas until they are evaluated. Concentrated recreation area special conservation areas (boat access sites and state forest campgrounds) are listed in the Recreation section 4.20.6 below.

There is one natural bog community ecological reference area of 48 acres shown in Figure 4.20.7. It will be managed to protect and enhance the natural vegetative and wildlife community as directed by an ERA-specific management plan.

Management goals during this planning period are:

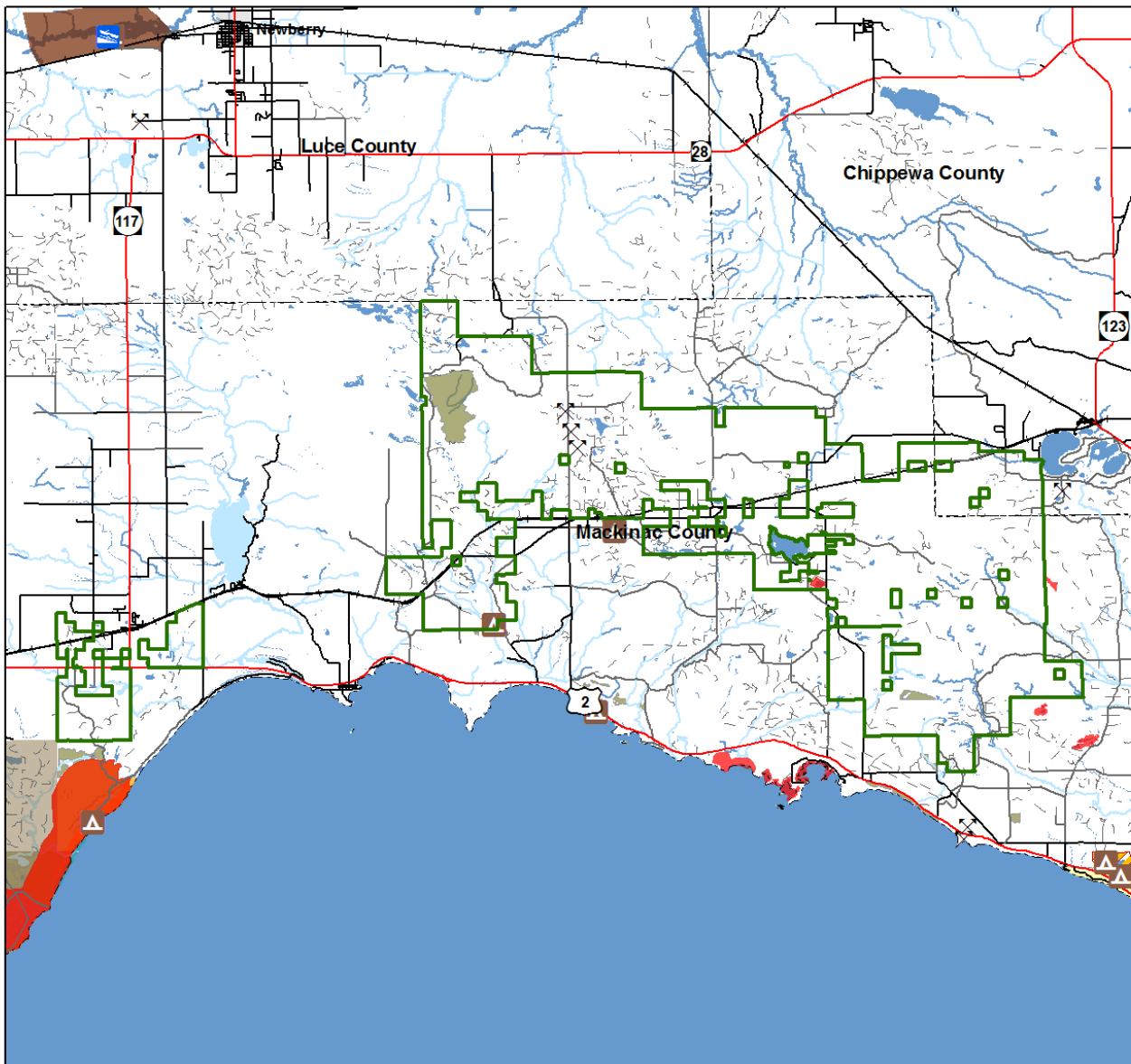
- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

Table 4.20.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Mackinac Mix management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Bog		S4/G3G5	Confirmed				Lowland open/semi-open	N/A
Limestone bedrock glade		S2/G2G4	Confirmed				Upland open/semi-open	N/A
Muskeg		S3/G4G5	Confirmed				Lowland open/semi-open	N/A
Poor fen		S3/G3	Confirmed				Lowland open/semi-open	N/A
<b>Birds</b>								
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Mesic northern Forest	Northern Hardwood	Late
						Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
<b>Snails</b>								
Eastern flat-whorl	<i>Planogyra asteriscus</i>	SC/G4/S3	Confirmed	EV	Low	Limestone cliff	Upland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Northern fen	Lowland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Widespread column	<i>Pupila muscorum</i>	SC/G5/SU	Confirmed	MV	Low	Rich conifer swamp	Tamarack	Late
						Mesic northern forest	Northern Hardwood	Late
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone cliff	Upland open/semi-open	N/A
Land snail	<i>Valloria gracilicosta albula</i>	E/G4Q/S1	Confirmed	HV	Moderate	Limestone cliff	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
Tapered vertigo	<i>Vertigo elatior</i>	SC/G5/S3	Confirmed	HV	Moderate	Northern fen	Lowland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Prairie fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Deep-throat vertigo	<i>Vertigo nylanderi</i>	E/G3G4/S3	Confirmed	EV	Moderate	Northern fen	Lowland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
<b>Mammal</b>								
Moose	<i>Alces alces americana</i>	SC/G5/S4	Confirmed	HV	Very High	Bog	Lowland open/semi-open	N/A
						Emergent Marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Muskeg	Lowland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Poor fen	Lowland open/semi-open	N/A
						Poor conifer swamp	Tamarack	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Northern shrub thicket	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Mesic northern forest	Northern Hardwood	Late
Dry-mesic northern forest	White Pine	Late						
<b>Plants</b>								
Walking fern	<i>Asplenium rhizophyllum</i>	T/G5/S2S3	Confirmed			Mesic northern forest	Northern Hardwood	Late
						Limestone cliff	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone lakeshore cliff	Upland open/semi-open	N/A
Goblin moonwort	<i>Botrychium mormo</i>	T/G3/S2	Confirmed			Sinkhole	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
Male fern	<i>Dryopteris filix-mas</i>	SC/G5/S3	Confirmed			Boreal forest	Upland & Lowland Sp/F	Mid
						Mesic northern forest	Northern Hardwood	Late
						Limestone cliff	Upland open/semi-open	N/A
						Sinkhole	Upland open/semi-open	N/A
Moor rush	<i>Juncus stygius</i>	T/G5/S1S2	Confirmed			Limestone bedrock glade	Upland open/semi-open	N/A
						Volcanic bedrock glade	Upland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
Alpine bluegrass	<i>Poa alpina</i>	T/G5/S1S2	Confirmed			Alvar	Upland open/semi-open	N/A
Alga pondweed	<i>Potamogeton confervoides</i>	SC/G4/S3	Confirmed			Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Submergent marsh	Lowland open/semi-open	N/A
Hill's pondweed	<i>Potamogeton hillii</i>	T/G3/S2	Confirmed			Emergent marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

# Mackinac Mix



1 in = 4 miles

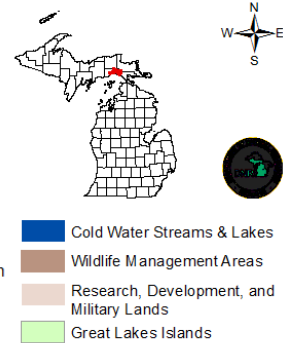
## Legend

- Highway
- Paved Roads
- Gravel Roads
- - - Poor Dirt Roads
- Railroads
- · - · - Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- ▭ Management Area Boundary
- ▭ Cities
- - - County Boundaries

- ▭ Ecological Reference Areas
- High Conservation Value Areas**
- ▭ Coastal Environmental Areas
- ▭ Critical Dunes
- ▭ Natural Rivers Vegetative Buffer
- ▭ Natural Rivers Zoning District
- ▭ Critical Coastal Habitat (Piping Plover)
- ▭ Kirtland Warbler Habitat
- ▭ Dedicated Management Areas
- ▭ Natural Areas Legally Dedicated

## Special Conservation Areas

- ▭ Campgrounds
- ▭ Fishing Access Sites
- ▭ Boat Access Sites
- ▭ Mineral Resource Locations
- ▭ Wild & Scenic Rivers (USFS Lands)
- ▭ Visual Management Areas
- ▭ Contiguous Resource Areas
- ▭ Possible Type 1 and Type 2 Old Growth
- ▭ Potential Old Growth
- ▭ Non-Dedicated Natural Areas & National Natural Landmarks
- ▭ Springs, Wetlands, or Riparian Areas



- ▭ Cold Water Streams & Lakes
- ▭ Wildlife Management Areas
- ▭ Research, Development, and Military Lands
- ▭ Great Lakes Islands

Figure 4.20.7. A map of the Mackinac Mix management area showing the special resource areas.

#### 4.20.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Northern hardwood: beech bark disease, emerald ash borer;
- Aspen and lowland aspen/balsam poplar: white trunk rot and *Hypoxylon* canker;
- Lowland conifers and lowland spruce/fir: spruce budworm, emerald ash borer, eastern larch beetle and larch casebearer; and
- Red pine: red-headed pine sawfly and pine engraver.

For further information on forest health refer to Section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

While it hasn't been officially recorded in the statewide database yet, invasive garlic mustard is within five miles of this management area. Control efforts, including use of prescribed burning, have been effective in reducing the amount of garlic mustard in the area.

#### 4.20.5 – Fire Management

Evaluate managing the Cranberry bog complex through carefully prescribed fires, to allow for the propagation of blueberries and other fruiting shrubs and setting back the encroachment of upland brush and trees.

Fire suppression tactics should take into account the sensitive nature of some of the natural communities in this management area.

Prescribed fire may be used to maintain natural communities within the management area and to manage invasive species.

#### 4.20.6 – Public Access and Recreation

Access for management and recreation is good throughout most of the management area using county and two-track roads. The area is between Naubinway and Newberry, with other small communities nearby, therefore state owned lands receive moderate to heavy use here.

Recreational facilities in the management area include the Black River State Forest Campground and Strouble Lake boat access site. The Hendricks Township day use area (managed through a lease agreement) is also in the management area.

Trail facilities (Figure 4.20.1) include snowmobile trails the Newberry-Rexton Motorcycle Trail and the Peters Creek Cross Country Ski Trail. The Newberry-Rexton Motorcycle Trail is designated motorcycle use only by Director's Order. Extreme care must be exercised to maintain the 24 inch trail bed.

Other popular recreational activities include: fishing, hunting, dispersed camping, berry picking and mushroom hunting.

#### **4.20.7 Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. Parts of the Black, Brevort, Carp and Tahquamenon River watershed systems are designated as high priority trout streams in this management area and the details are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.20.1.

#### **4.20.8 Minerals**

Surface sediments consist of lacustrine (lake) sand and gravel, peat and muck and coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in this area and there is good potential for additional pits on the uplands.

The Silurian Engadine, Manistique and Burnt Bluff Groups subcrop below the glacial drift. The Engadine and Burnt Bluff are quarried for stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (four in Mackinac and 14 in Chippewa). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations. There are several gravel pits on state owned land in this management area. Rexton gravel pit is within the area.



## 4.21 MA 21 – Maxton Plains Management Area

### Summary of Use and Management

Management in the Maxton Plains management area (MA) (Figure 4.21.1) will emphasize protecting and enhancing the unique habitats for rare communities, sensitive species and game and non-game wildlife. This management area contains several ecological reference areas, high conservation value areas and the Maxton Plains non-dedicated natural area (a special conservation area); these areas will be managed according to their specific plans. Timber harvesting is low priority in this management area. The DNR is working with Drummond Island stakeholders on a management planning process for the island. Recommendations have been formed based on stakeholder input and were presented to the Natural Resources Commission. The purpose of the process is to create a comprehensive plan for the island which will provide for the wise use and enjoyment of the island's wildlife, forests and related natural resources while preserving and protecting the values of the resources, including the island's rare and unique features.

### Introduction

The Maxton Plains management area is located on Drummond Island in the far eastern part of the Upper Peninsula in Chippewa County. It has 4,363 acres of state-owned land. The primary attribute in distinguishing this management area from the rest of Drummond Island is the different management options due to the unique natural communities. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula (Albert, 1995).
- The dominant landform is the Drummond Moraine and Drummond Outcrop. These landforms are characterized by thin to discontinuous glacial till over limestone bedrock. Part of the Niagaran Escarpment, underlying limestone bedrock is typically less than 50 feet below the surface. Limestone bedrock is exposed in many places and expressed in the natural communities of alvar and limestone bedrock pavement.
- This management area is characterized primarily by open grass and sedge communities, lowland conifers and aspen.
- Alvar is a globally rare vegetative community. An alvar or pavement barren is a biological environment based on a limestone plain with thin or no soil and sparse vegetation. Trees and bushes are absent or severely stunted.
- The rare plant communities of this area attract tourism to the island for bird watching and viewing rare plants.
- A large portion of the management area is within ecological reference areas and special conservation areas.
- There are two coastal environmental area high conservation value areas. The Lake Huron coastline is important because shallow near shore areas can provide important fish spawning and nursery habitat. This area also provides breeding areas for waterfowl and other riparian wildlife.

This management area consists of a fairly contiguous block of state forest land in the north part of Drummond Island. A large portion of this ownership was purchased using funding from the State Game Fund. The Maxton Plains management area is within the Sault Forest Management Unit. The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.21.1.

# Maxton Plains

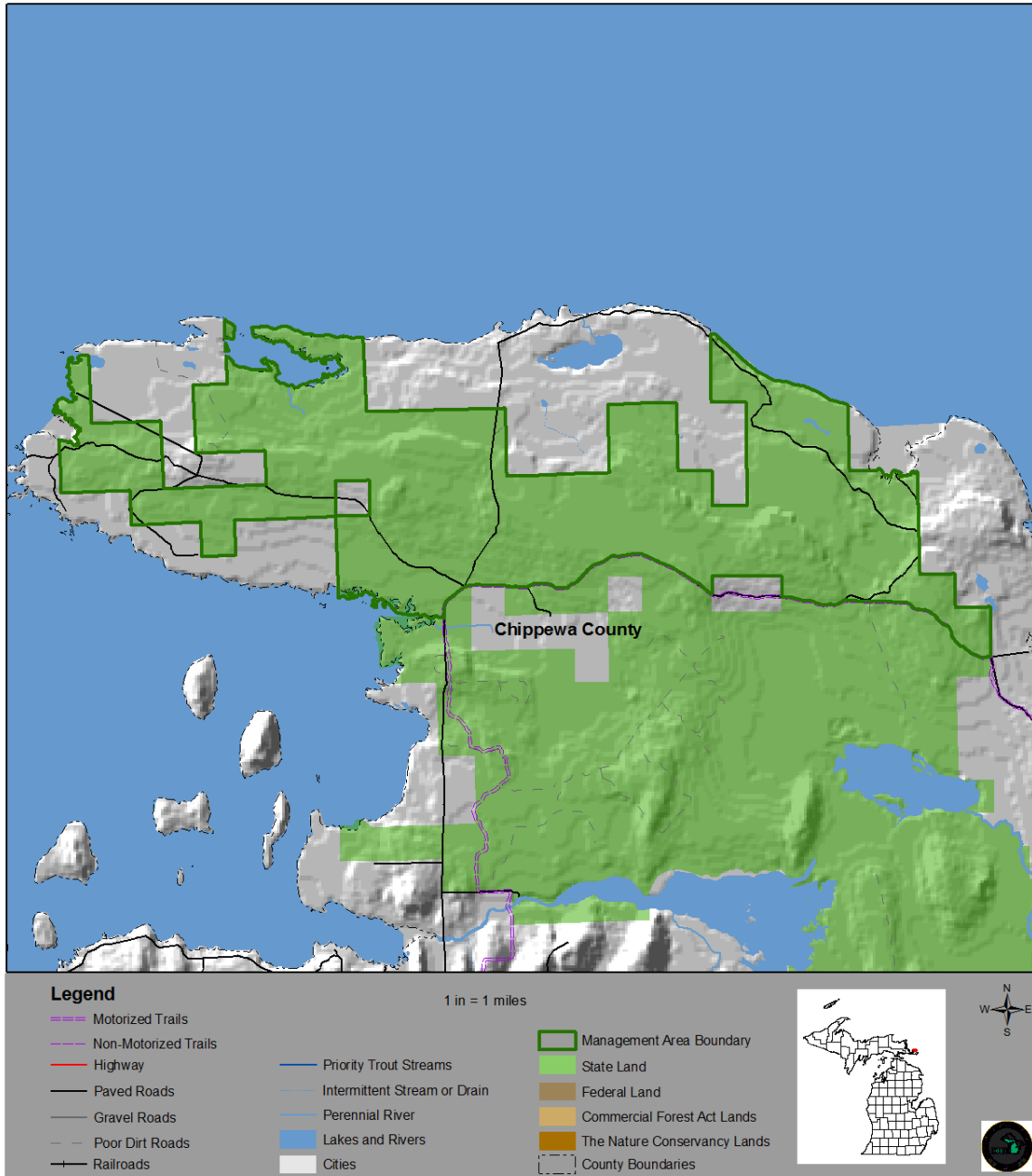


Figure 4.21.1. Location of Maxton Plains management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and Lake Huron.

Table 4.21.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Maxton Plains management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Upland Mixed Forest	25%	1,079	0	1,079	0	0	1,079	120	539
Aspen	22%	962	819	143	0	0	962	24	0
Upland Open/Semi-Open Lands	17%	752	0	752	0	0	752	0	0
Upland Conifers	9%	396	0	396	0	0	396	44	198
Lowland Open/Semi-Open Lands	9%	375	0	375	0	0	375	0	0
Cedar	6%	261	10	251	0	0	261	16	0
Misc Other (Water, Local, Urban)	1%	52	0	52	0	0	52	0	0
Others	11%	486	338	148	0	0	486	19	15
<b>Total</b>	<b>100%</b>	<b>4,363</b>	<b>1,167</b>	<b>3,196</b>	<b>0</b>	<b>0</b>	<b>4,363</b>	<b>223</b>	<b>752</b>

Others include: lowland aspen/balsam poplar, lowland deciduous, lowland mixed forest, upland spruce/fir, red pine, lowland conifers, and natural mixed pines.

#### 4.21.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### Section 4.21.1.1 Forest Cover Type Management – Upland Mixed Forest

###### Current Condition

Upland mixed forest stands occur on 1,079 acres (25%) of the management area (Table 4.21.1). The upland mixed forest cover type contains a mixture of deciduous and coniferous trees with neither type being dominant. Upland mixed forest stands are distributed on dry-mesic to mesic-poor to medium-nutrient sites with Kotar habitat types of PARVAa and ATFD. There has not been any recent harvest work in this cover type and all of these stands have been classified as uneven-aged (Figure 4.21.2). Due to the alvar natural community and other special features balancing of age classes has not been a focus here. A regulated harvest using an 80-year rotation would allow approximately 120 acres of upland mixed forest to be harvested per decade (red line in Figure 4.21.2).

Currently there are not any acres of upland mixed forest with a final harvest prescribed. At this time there are no acres of upland mixed forest with site conditions limiting harvest. Inaccessible stands of upland mixed forest will gradually succeed to more shade tolerant species.

###### Desired Future Condition

- Upland mixed forest stands may be maintained on operable sites generally through even aged management providing for a regulated harvest, wildlife habitat and recreational opportunities.

###### 10-Year Management Objectives

- Due to the alvar natural community and other special features, widespread harvest isn't anticipated; and
- The 10-year projected final harvest of upland mixed forest is zero acres.

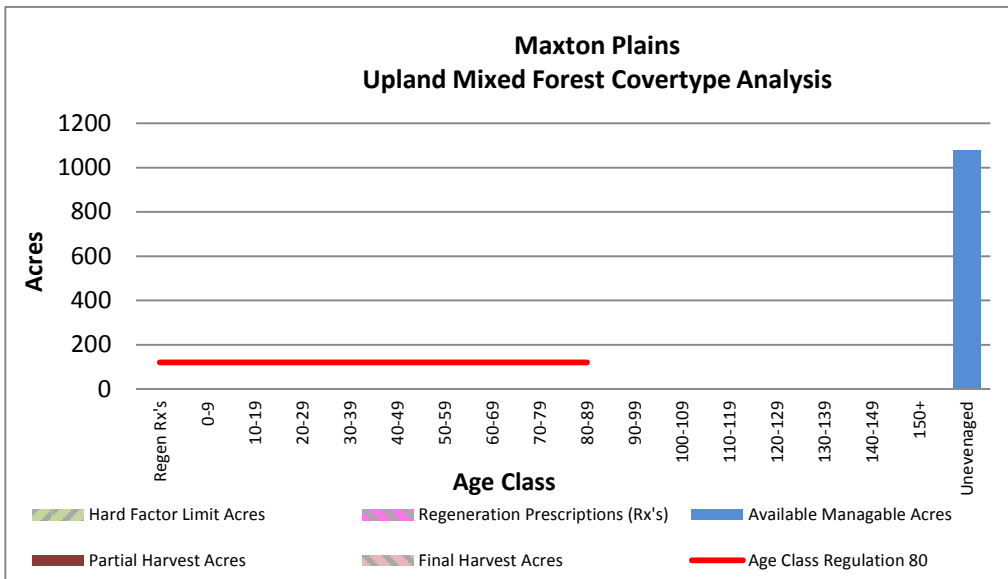


Figure 4.21.2. Age-class distribution of upland mixed forest in the Maxton Plains management area (2012 Department of Natural Resources inventory data).

Long-Term Management Objectives

- Monitor use and condition of the upland mixed forest stands during the 10-year forest inventory schedule.

**Section 4.21.1.2 Forest Cover Type Management - Aspen**

Current Condition

Aspen occurs on 962 acres (22%) of the management area (Table 4.21.1). Aspen is distributed throughout the management area on dry-poor nutrient to mesic-medium nutrient sites with Kotar habitat types of PARVAa, ATFD (see appendix E). Most of the aspen stands in this management area are very open “Serengeti Aspen.” The majority of the aspen stands have been classified as uneven-aged, multi-structured stands of old aspen in association with multiple ages of conifers (Graph 4.21.2). Due to the alvar natural community and other special features, balancing of age classes has not been a focus here. A regulated harvest would allow approximately 24 acres to be final harvested per decade.

Currently there are no acres of aspen prescribed for harvest. The majority of the aspen stands (819 acres) have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of aspen will eventually succeed to late successional species.

Desired Future Condition

- Aspen may be maintained on operable sites through even-aged management providing for a regulated harvest, wildlife habitat and recreational opportunities.

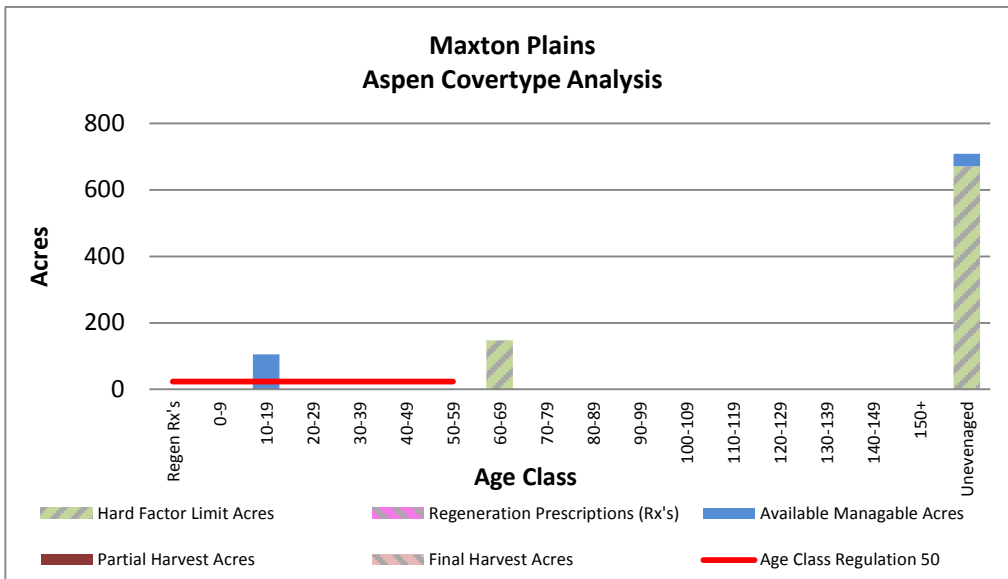


Figure 4.21.3. Age-class distribution of aspen in the Maxton Plains management area (2012 Department of Natural Resources inventory data).

10-Year Management Objectives

- Due to the alvar natural community and other special features, widespread harvest isn't anticipated; and
- The projected 10-year harvest of aspen is zero acres.

Long-Term Management Objectives

- Monitor use and condition of aspen stands during the ten-year forest inventory schedule.

**Section 4.21.1.3 Forest Cover Type Management – Upland Open/Semi-Open Lands**

Current Condition

Upland open/semi-open lands are found on 752 acres (17%) of this management area (Table 4.21.1). This category is a combination of the following non-forested land cover types: herbaceous openland (752 acres), bare/sparsely vegetated (zero acres), upland shrub (zero acres) and low-density trees (zero acres). These cover types are valued ecologically as sources of open land habitat for numerous species of wildlife. Many of these stands in this management area are alvar communities with an emphasis on a number of herbaceous species.

Desired Future Condition

- Maintain these cover types to provide wildlife and rare species habitat and low impact recreational opportunities; and
- Due to the fragile and unique nature of the alvar community disturbance to the soil layer should be avoided except for carefully controlled events with a specific ecological purpose.

Long-Term Management Objectives

- Improve the alvar communities by continuing to remove encroaching vegetation and invasive species.

**Section 4.21.1.4 Forest Cover Type Management – Upland Conifers**

Current Condition

Upland conifers occur on 396 acres (9%) of the management area (Table 4.21.1). The upland conifer cover type contains a mixture of trees, at least 60% of which are some type of coniferous trees, with no one type of conifer tree being dominant. As with most of the cover types in this unique management area, the majority of these conifer stands are classified as uneven-aged with multi-storied structure (Figure 4.21.4). Due to the alvar natural community and other

special features, balancing of age classes has not been a focus here. A regulated harvest would provide approximately 44 acres for final harvest every decade.

Currently there are no upland conifer acres prescribed for harvest. At this time there are no acres with site conditions limiting harvest. Upland conifer stands that are unavailable for harvest will be subject to natural processes, eventually succeeding to late successional species.

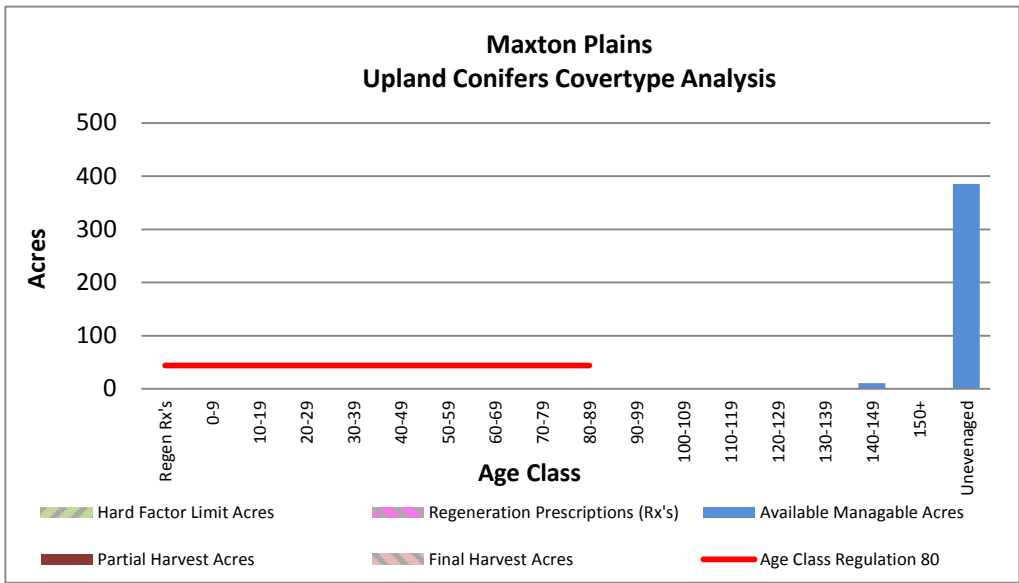


Figure 4.21.4. Age-class distribution of upland conifers in the Maxton Plains management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Upland conifers may be maintained on operable sites through even-aged management providing for a regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- Due to the alvar natural community and other special features, widespread harvest isn't anticipated; and
- The projected 10-year final harvest of upland conifers is zero acres.

Long-Term Management Objectives

- Monitor use and condition of upland conifer stands during the 10-year forest inventory schedule.

**Section 4.21.5 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

Current Condition

Lowland open/semi-open lands occur on 375 acres (9%) (Table 4.21.1). This category is a combination of lowland shrub (171 acres), treed bog (zero acres), bog (zero acres) and marsh (204 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. These stands are found in association with creeks, rivers and lowland forested stands. Some of these stands fall within the special conservation areas, ecological reference areas and high conservation value areas.

Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity while protecting the special conservation area, high conservation value area and ecological reference area values found in these cover types.

### Long-Term Management Objectives

- Continue to maintain this habitat type for wildlife and other ecological concerns, primarily through passive management, allowing natural processes to occur.

### **Section 4.21.1.6 Forest Cover Type Management - Cedar**

#### Current Condition

Cedar stands occur on 261 acres (6%) of the management area (Table 4.21.1). The alkaline conditions caused, in part, by the limestone bedrock create favorable conditions for cedar. Maintaining a closed canopy structure provides important cover for deer and reduces the snow depth within the stands. The majority of the cedar stands have been classified as uneven-aged (Figure 4.21.5). Some of the cedar stands in this management area have large over mature aspen overtopping the cedar. While balancing of age classes isn't a focus at this time, a regulated harvest would provide approximately 16 acres of cedar for final harvest every decade.

No cedar stands are prescribed for harvest in this planning period. At this time there are 10 acres of cedar with site conditions limiting their harvest. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

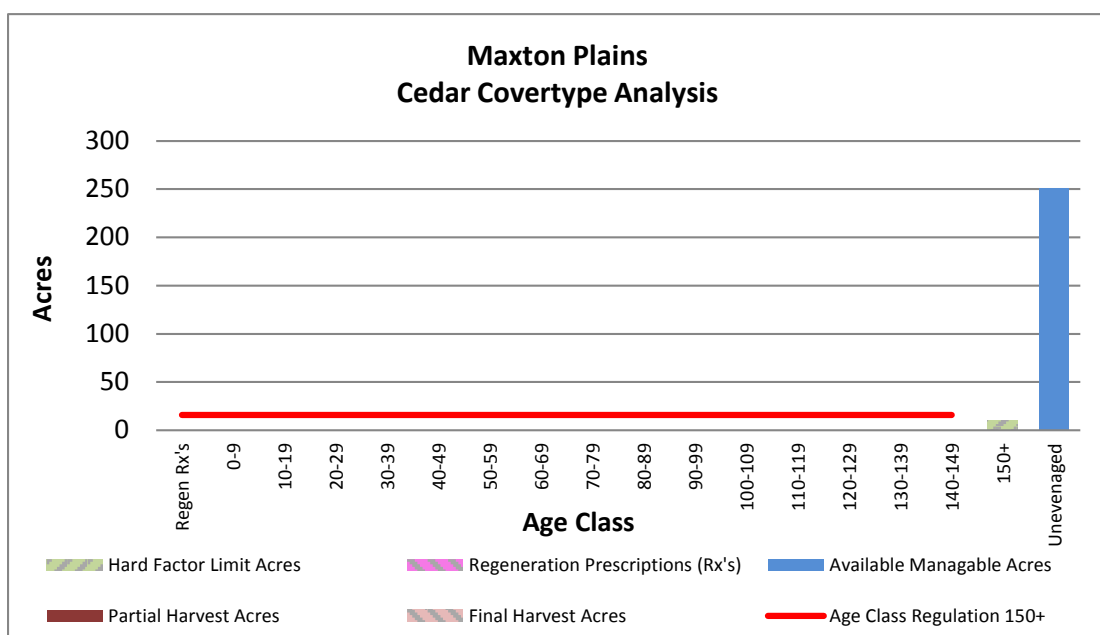


Figure 4.21.5. Age-class distribution of cedar in Maxton Plains management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- In areas where deer browse is a concern, these stands may not be actively harvested at this time.

#### 10-Year Management Objectives

- Cedar stands will be managed to maintain their value as wildlife habitat in this management area; and
- Due to the alvar natural community and other special features, widespread harvest isn't anticipated.
- The 10-year projected harvest of cedar is zero acres.

#### Long-Term Management Objectives

- Cedar stands will be managed to maintain their value as wildlife habitat in this management area.

## Section 4.21.1.7 Forest Cover Type Management – Other Types

### Current Condition

Other types total 486 acres (11%) and are spread across the management area. They include: lowland aspen/balsam poplar (141 acres), lowland deciduous (114 acres), lowland mixed forest (109 acres), upland spruce/fir (49 acres), red pine (45 acres), lowland conifers (21 acres) and natural mixed pines (seven acres). In addition there are 52 acres (1%) of “miscellaneous other” stands, which includes water, sand/soil and roads.

Most of these cover types, with the exception of red pine and natural mixed pines, will be managed as even-aged stands using natural regeneration after harvest.

There are 339 acres these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Inaccessible stands will be subject to natural processes, and may succeed to late successional species, thus changing the cover type distribution in the management area.

### Desired Future Condition

- These cover types may be managed on operable sites, contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreation opportunity.

### 10-Year Management Objectives

- Due to the alvar natural community and other special features, widespread harvest isn’t anticipated;
- The projected 10-year final harvest is zero acres of other types; and
- The projected 10-year partial harvest is zero acres of other types.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## 4.21.2- Featured Wildlife Species

The Maxton Plains management area is dominated by alvar, a globally rare open-land community and many grassland birds, rare plants and other wildlife are found there.

### **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain the population at the 2010 level or improve habitat. Management for the species should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land-use.

### Wildlife habitat specifications:

- Maintain or increase tree species that provide mast including beech, oak, black cherry and ironwood.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.
- Retain some large diameter white pine and hemlock for bear refuge trees.
- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource.
- Discourage land transactions, use and management activities that facilitate fragmenting state lands within the management area.

### **Sharp-tailed Grouse**

In the eastern Upper Peninsula, the goal for sharp-tailed grouse is to maintain or improve suitable habitat. Management should focus on enhancing large opening complexes so there is an increase of available habitat.



#### Wildlife habitat specifications:

- Maintain or expand herbaceous open-lands where existing leks occur.
- Manage adjacent forest to maintain young regenerating forest adjacent to permanent openings to maximize use by sharp-tailed grouse.
- Use prescribed fire where appropriate to maintain openings.
- Within open-land complexes maintain connectivity across the landscape.

#### **Upland Sandpiper**

The eastern Upper Peninsula goal is to provide suitable breeding habitat for upland sandpiper. Management should focus on the maintenance of permanent large opening complexes.

#### Wildlife habitat specifications:

- Maintain opening complexes of 250 acres or larger.
- Open blocks within complexes should be within one mile of each other.
- Where possible, strive to consolidate patches into larger opening complexes, by creating temporary openings associated with permanent openings.
- Work with adjacent landowners within the management area to maximize the amount and distribution of openland habitat.

#### **4.21.3 – Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts with rare species following the guidance in “*DNR’s Approach to the Protection of Rare Species on State Forest Lands*” (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed twenty listed species as well as five natural communities of note occurring in the management area as listed in Table 4.21.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

The entire Maxton Plains management area is part of the Great Lakes islands special conservation area. The other special conservation area here is the Maxton Plains non-dedicated natural area (2,077 acres minus the acres in the Drummond Island management area portion). These special conservation areas are shown in Figure 4.21.6.

There are two coastal environmental area high conservation value areas shown in Figure 4.21.6.

Ecological reference areas include alvar (1,054 acres), Great Lakes marsh (48 acres), limestone bedrock glade (16 acres) and limestone bedrock lakeshore (63 acres). Ecological reference areas will be managed to enhance their natural vegetative and wildlife communities as directed by an ecological reference area-specific management plan.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

Table 4.21.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Maxton Plains management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Alvar		S1/G2?	Confirmed				Upland open/semi-open	N/A
Great Lakes marsh		S3/G2	Confirmed				Lowland open/semi-open	N/A
Limestone bedrock glade		S2/G2G4	Confirmed				Upland open/semi-open	N/A
Limestone bedrock lakeshore		S2/G3	Confirmed				Upland open/semi-open	N/A
Northern wet meadow		S4/G4	Confirmed				Lowland open/semi-open	N/A
<b>Birds</b>								
American bittern	<i>Botaurus lentiginosus</i>	SC/G4/S3-4	Confirmed	MV	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Southern wet meadow	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
<b>Insect</b>								
Leafhopper	<i>Flexamia delongi</i>	SC/GNR/S1S2	Confirmed	PS	Very High	Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Alvar	Upland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
						Dry sand prairie	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Mesic prairie	Upland open/semi-open	N/A
						Pine barrens	Jack Pine	Early
<b>Dragonfly</b>								
Ebony boghaunter	<i>Williamsonia fletcheri</i>	SC/G4/S1S2	Confirmed	MV	Low	Inland lake	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Prairie fen	Lowland open/semi-open	N/A
						Muskeg	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Inundated shrub swamp	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
<b>Snails</b>								
Land snail	<i>Valloria gracilicosta albula</i>	E/G4Q/S1	Confirmed	HV	Moderate	Limestone cliff	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
Tapered vertigo	<i>Vertigo elatior</i>	SC/G5/S3	Confirmed	HV	Moderate	Northern fen	Lowland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Prairie fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Deep-throat vertigo	<i>Vertigo nylanderi</i>	E/G3G4/S3	Confirmed	EV	Moderate	Northern fen	Lowland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
<b>Plants</b>								
Cooper's milk vetch	<i>Astragalus neglectus</i>	SC/G4/S3	Confirmed			Alvar	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Hillside prairie	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Mesic sand prairie	Upland open/semi-open	N/A
						Oak-pine barrens	Oak	Mid
Calypso or fairy-slipper	<i>Calypso bulbosa</i>	T/G5/S2	Confirmed			Rich conifer swamp	Tamarack	Late
						Boreal forest	Upland & Lowland Sp/F	Mid
						Limestone bedrock glade	Upland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Wooded dune & swale complex	Upland open/semi-open	N/A
						Dry northern forest	Jack Pine, Red Pine	Late
						Dry-mesic northern forest	White Pine	Late
						Great Lakes barrens	Upland open/semi-open	N/A
						Volcanic bedrock glade	Upland open/semi-open	N/A
Richardson's sedge	<i>Carex richardsonii</i>	SC/G4/S3S4	Confirmed			Alvar	Upland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Dry-mesic prairie	Upland open/semi-open	N/A
						Dry-mesic northern forest	White Pine	Late
						Hillside prairie	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A
						Volcanic lakeshore cliff	Upland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Table 4.21.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Maxton Plains management area (Continued).

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage						
<b>Plants (Cont'd)</b>														
Bulrush sedge	<i>Carex scirpoidea</i>	T/G5/S2	Confirmed			Alvar	Upland open/semi-open	N/A						
						Northern fen	Lowland open/semi-open	N/A						
						Coastal fen	Lowland open/semi-open	N/A						
						Limestone bedrock lakeshore	Upland open/semi-open	N/A						
						Limestone bedrock glade	Upland open/semi-open	N/A						
						Boreal forest	Upland & Lowland Sp/F	Mid						
Shortstalk chickweed	<i>Cerastium brachypodum</i>	T/G5/S2	Confirmed			Limestone cobble shore	Upland open/semi-open	N/A						
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A						
						Alvar	Upland open/semi-open	N/A						
						Limestone bedrock glade	Upland open/semi-open	N/A						
						Volcanic bedrock glade	Upland open/semi-open	N/A						
						Sandstone bedrock lakeshore	Upland open/semi-open	N/A						
Hill's thistle	<i>Cirsium hillii</i>	SC/G3/S3	Confirmed			Alvar	Upland open/semi-open	N/A						
						Oak-pine barrens	Oak	Mid						
						Pine barrens	Jack Pine	Early						
						Boreal forest	Upland open/semi-open	N/A						
						Dry northern forest	Upland open/semi-open	N/A						
						Dry sand prairie	Upland open/semi-open	N/A						
						Dry-mesic northern forest	Upland open/semi-open	N/A						
						Dry-mesic prairie	Upland open/semi-open	N/A						
						Limestone bedrock glade	Upland open/semi-open	N/A						
						Mesic prairie	Upland open/semi-open	N/A						
						Mesic sand prairie	Upland open/semi-open	N/A						
						Open dunes	Upland open/semi-open	N/A						
						Flattened spike rush	<i>Eleocharis compressa</i>	T/G4/S2	Confirmed			Coastal plain marsh	Lowland open/semi-open	N/A
												Lakeplain wet prairie	Lowland open/semi-open	N/A
Prairie smoke	<i>Geum triflorum</i>	T/G5/S2S3	Confirmed									Dry sand prairie	Upland open/semi-open	N/A
						Alvar	Upland open/semi-open	N/A						
Alaska orchid	<i>Piperia unalascensis</i>	SC/G5/S2S3	Confirmed			Oak-pine barrens	Oak	Mid						
						Boreal forest	Upland & Lowland Sp/F	Mid						
						Limestone bedrock glade	Upland open/semi-open	N/A						
Small skullcap	<i>Scutellaria parvula</i>	T/G4/S2	Confirmed			Limestone bedrock lakeshore	Upland open/semi-open	N/A						
						Limestone cobble shore	Upland open/semi-open	N/A						
						Alvar	Upland open/semi-open	N/A						
						Hillside prairie	Upland open/semi-open	N/A						
Prairie dropseed	<i>Sporobolus heterolepis</i>	SC/G5/S3	Confirmed			Limestone bedrock glade	Upland open/semi-open	N/A						
						Alvar	Upland open/semi-open	N/A						
						Prairie fen	Lowland open/semi-open	N/A						
						Mesic sand prairie	Upland open/semi-open	N/A						
						Wet-mesic sand prairie	Lowland open/semi-open	N/A						
False pennyroyal	<i>Trichostema brachiatum</i>	T/G5/S1	Confirmed			Dry sand prairie	Upland open/semi-open	N/A						
						Alvar	Upland open/semi-open	N/A						
Downy oat-grass	<i>Trisetum spicatum</i>	SC/G5/S2S3	Confirmed			Alvar	Upland open/semi-open	N/A						
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A						
						Volcanic cobble shore	Upland open/semi-open	N/A						
						Volcanic lakeshore cliff	Upland open/semi-open	N/A						
						Sandstone lakeshore cliff	Upland open/semi-open	N/A						
						Granite bedrock lakeshore	Upland open/semi-open	N/A						
						Granite lakeshore cliff	Upland open/semi-open	N/A						

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

# Maxton Plains

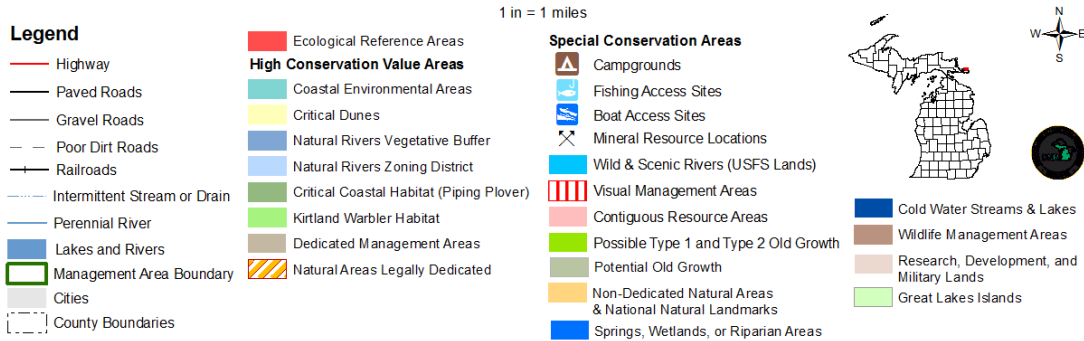
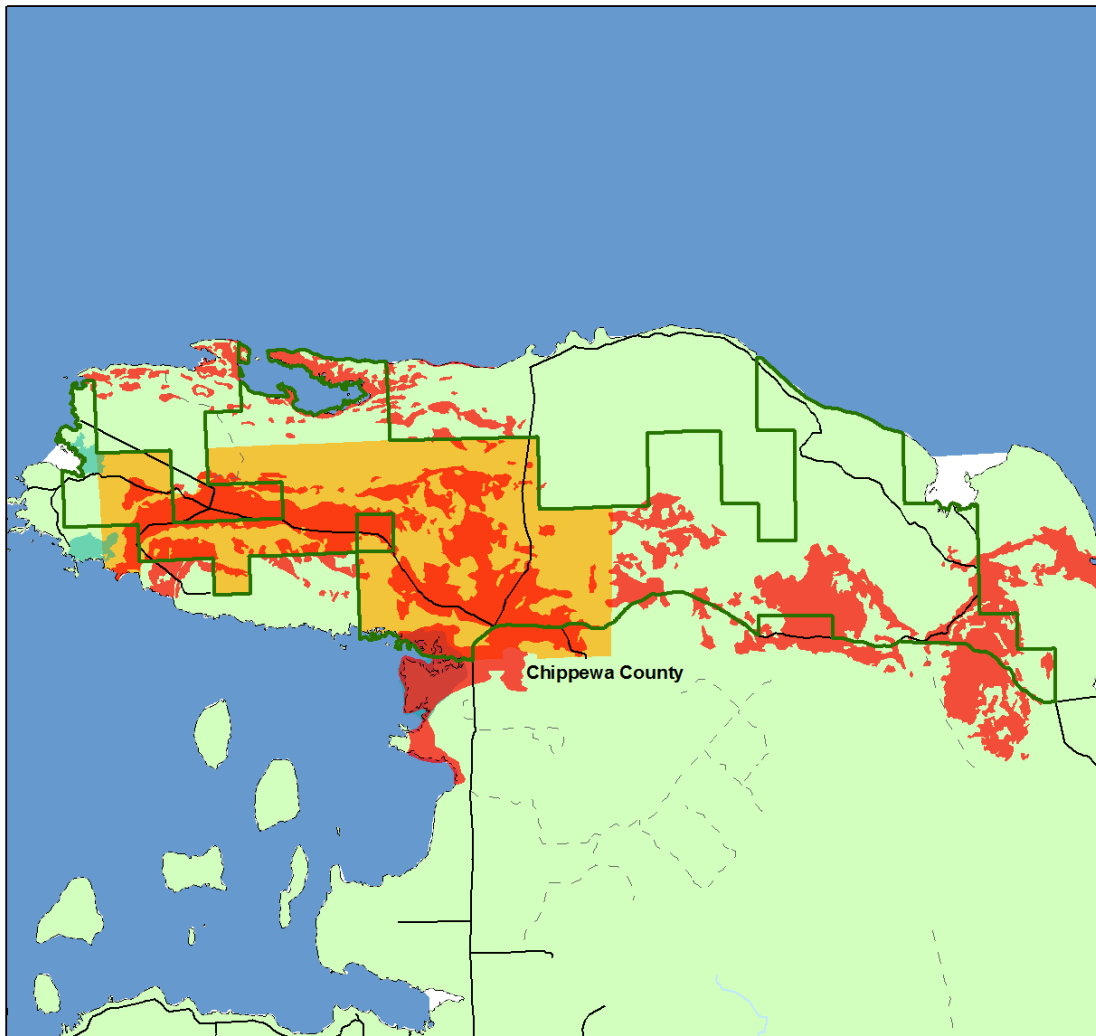


Figure 4.21.6. A map of the Maxton Plains management area showing the special resource areas.

#### 4.21.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Upland mixed: beech bark disease;
- Lowland deciduous: emerald ash borer;
- Aspen: white trunk rot, *Hypoxylon* canker; and
- Lowland conifers: spruce budworm, eastern larch beetle and larch casebearer.

For further information on forest health refer to Section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

In 2010 the department procured grant funding from the Great Lakes Restoration Initiative to contract a field survey for rare and invasive plants on the Maxton Plains Alvar ecological reference area. Twenty one invasive species, among them leafy spurge (*Euphorbia esula*), birds-foot trefoil (*Lotus corniculata*), common St. John's wort (*Hypericum perforatum*), a variety of clovers (*Trifolium spp.*) and cool season grasses were found as well as twelve rare plants. Under this grant, control efforts for the invasive plants occurred in 2011. Continued monitoring and control of the site is a priority as funding allows.

#### 4.21.5 – Fire Management

The shallow soils in this management area likely produced frequent fires, so that this management area is dominated by fire-adapted communities. Significant areas of alvar are present in this management area.

- Prescribed fire is frequently used in this management area to maintain the open character of these natural communities.
- Many of the natural communities in this management area are very sensitive, due to the shallow soils. Alternative suppression tactics which avoid the use of heavy equipment may be necessary in some portions of this management area.
- High recreation use in this management area provides opportunities for targeted fire prevention messages.

#### 4.21.6 – Public Access and Recreation

There are only a few county access roads and very few two-track roads within the management area. Access is limited to established roads in order to protect the alvar community.

Due to the natural species and community management, recreational facilities have intentionally been limited in this area.

Recreational opportunities include: hunting, fishing, bird watching, plant study, coastal paddling and motor boating.

#### **4.21.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. There are no designated high priority trout streams identified in this management area.

#### **4.21.8 - Minerals**

Surface sediments consist of primarily thin to discontinuous sediments over bedrock. There is less than 50 feet of glacial drift in this area of the island. Sand and gravel pits are located on the island, including one state lease, but this area appears to have limited potential for additional pits.

The Ordovician Queenston Shale subcrops below the glacial drift. The Queenston does not have a current economic use.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (14 in Chippewa County and several on the island). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.22 MA 22 – Milakokia Lake Management Area

### Summary of Use and Management

Vegetative management in the Milakokia Lake management area (MA) (Figure 4.22.1) will emphasize providing for forest-based recreational opportunities; providing various timber products; and maintaining or enhancing wildlife habitat. Big Manistique Lake, South Manistique Lake and Milakokia Lake are all fishing destinations with local amenities supporting this activity throughout the year. Deer hunting is an important activity and this management area includes several deer wintering special conservation areas. Expected issues in this 10-year planning period include: access across private property; increased recreational pressure, including off-road vehicle use; introduced pests and diseases, including beech bark disease and emerald ash borer; and invasive plants, including purple loosestrife and garlic mustard.

### Introduction

The Milakokia Lake management area is located in the central part of the eastern Upper Peninsula in Schoolcraft and Mackinac Counties and has 14,387 acres of state-owned land. The primary attribute in identifying this management area is the remote character of all of the isolated parcels of state owned land. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landforms consist of coarse textured glacial till, peat and muck and lacustrine sand and gravel.
- Numerous old railroad grades cross through this management area and many of them are still being used such as Pike Lake Grade and Bryan Grade.
- Hunting, snowmobiling and fishing are popular activities here as this management area is close to several towns. There are several campgrounds and boat access sites in the area.
- The management area has several special conservation area deer wintering areas. Great blue heron colonies are also found in the management area.

The state owned land in this management area is fragmented into many small parcels. There are several small communities nearby, including: Blaney Park, Gulliver, Gould City, Germfask, Curtis, Corinne and Helmer. The Milakokia Lake management area is within both the Sault and Shingleton Forest Management Units. The current predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.22.1.

Table 4.22.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Milakokia Lake management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Cedar	26%	3,719	59	3,660	100	0	3,719	229	0
Aspen	19%	2,716	8	2,708	44	0	2,716	451	0
Lowland Open/Semi-Open Lands	16%	2,237	0	2,237	0	0	2,237	0	0
Northern Hardwood	10%	1,508	0	1,508		827	1,508	0	741
Lowland Aspen/Balsam Poplar	7%	952	152	800	49	0	952	133	0
Lowland Conifers	6%	813	328	485	54	0	813	54	0
Lowland Spruce/Fir	5%	674	231	443	49	0	674	49	0
Upland Open/Semi-Open Lands	2%	313	0	313	0	0	313	0	0
Misc Other (Water, Local, Urban)	1%	124	0	124	0	0	124	0	0
Others	9%	1,331	78	1,253	119	34	1,331	151	34
<b>Total</b>	<b>100%</b>	<b>14,387</b>	<b>857</b>	<b>13,530</b>	<b>415</b>	<b>861</b>	<b>14,387</b>	<b>1,067</b>	<b>775</b>

Others includes: lowland deciduous, upland spruce/fir, lowland mixed forest, upland mixed forest, mixed upland deciduous, tamarack, paper birch and hemlock.



# Milakokia Lake

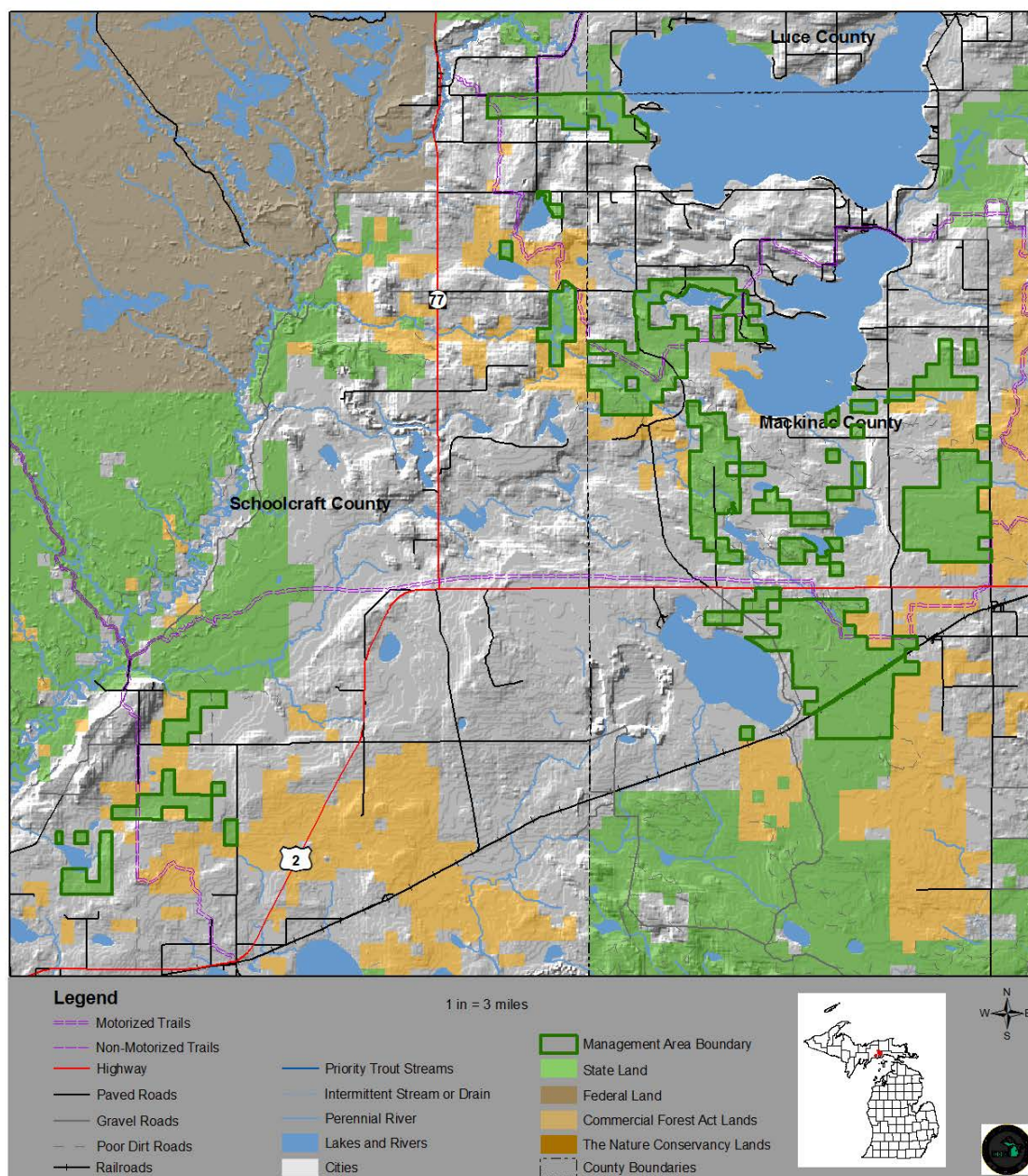


Figure 4.22.1. Location of Milakokia Lake management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and Lake Michigan.

## 4.22.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.



All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

### Section 4.22.1.1 Forest Cover Type Management - Cedar

#### Current Condition

Cedar occurs on 3,719 acres (26%) of the management area (Table 4.22.1). Many of the cedar stands are within deer wintering area special conservation areas. Maintaining a closed canopy structure provides important cover for deer and reduces snow depth within the stands. Some of the stands are in areas inaccessible to harvest, mainly due to the fragmented nature of the management area. In the past, regeneration of cedar has proven difficult. Regeneration harvests have been implemented though a small trial of strip cuts. In areas where deer browse is a concern these stands may not be actively harvested at this time. Cedar stands will be managed to maintain winter habitat for deer and to retain this forest type in the landscape.

Currently there are no cedar stands prescribed for harvest (Figure 4.22.2). At this time there are 59 acres of cedar with site conditions limiting harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Cedar stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

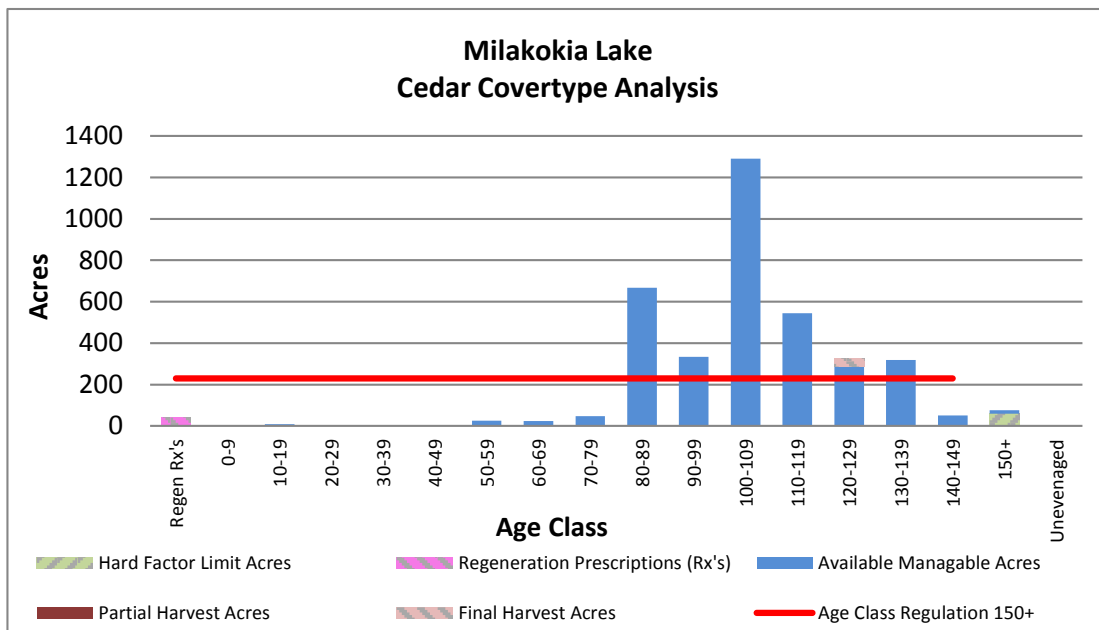


Figure 4.22.2. Age-class distribution of cedar in the Milakokia Lake management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Outside deer wintering areas, cedar may be maintained through even-aged management, balancing acres between 0-159 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected final harvest of cedar is 100 acres. However, harvest of this type, if it occurs, may vary widely from the projected harvest in order to meet the long term management objectives.
- Ensure that cedar and/or hemlock recruitment/regeneration is reliable if harvesting in this cover type.

Long-Term Management Objectives

- Develop a comprehensive deer wintering area management plan;
- Focus cedar management on winter habitat for deer;
- Look for opportunities to test different methods of regenerating cedar, especially outside the deer wintering areas; and
- Consider harvest of cedar before rotation age to begin to diversify the age classes providing for a regulated harvest of approximately 229 acres per decade.

**Section 4.22.1.2 Forest Cover Type Management - Aspen**

Current Condition

Aspen occurs on 2,716 acres (19%) of the management area (Table 4.22.1). Aspen is distributed throughout the management area on outwash plains, lake plains and moraines with dry-poor nutrient to mesic-medium to rich-nutrient sites. Kotar habitat types include PARVAa, ATFD, AFPo and AFOAs (see appendix E). Aspen has been consistently harvested and regenerated resulting in almost 80% of the stands being less than 30 years old (Graph 4.22.2). Aspen in age classes over rotation age may be inaccessible for harvest.

Currently there are 216 acres of aspen prescribed for final harvest (Figure 4.22.3). Approximately 180 acres of other cover types are expected to convert to aspen after harvest. These acres are shown in the regeneration prescriptions column in Figure 4.22.3. There are eight acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of aspen will eventually succeed to late successional species.

Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- A regulated harvest would allow approximately 451 acres of aspen to be harvested per decade; and
- The projected 10-year final harvest of aspen is 44 acres which is a reduction from the target regulated amount due to the current age-class structure where the majority of stands are less than rotation age and not yet merchantable.

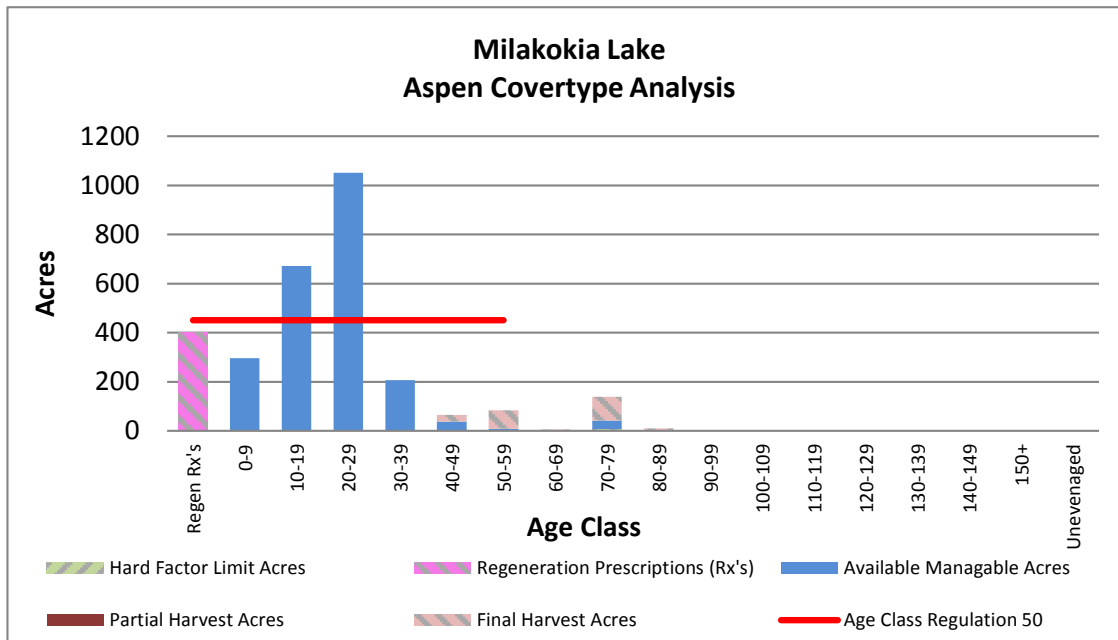


Figure 4.22.3. Age-class distribution of aspen in the Milakokia Lake management area (2012 Department of Natural Resources inventory data).

### Long-Term Management Objectives

- Balance the age classes of available aspen providing for a regulated harvest of approximately 451 acres per decade (red line in Figure 4.22.3).

#### **Section 4.22.1.3 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

##### Current Condition

Lowland open/semi-open lands occur on 2,237 acres (16%) (Table 4.22.1). This category is a combination of lowland shrub (1,797 acres), treed bog (330 acres), bog (0 acres) and marsh (110 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. These stands are found in association with creeks, rivers and lowland forested stands. Some of these stands fall within the special conservation area deer wintering areas.

##### Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity while protecting the special conservation area values found in these cover types.

### Long-Term Management Objectives

- Within these stands allow natural processes to occur while protecting their ecological values from man-made disturbances.

#### **Section 4.22.1.4 Forest Cover Type Management – Northern Hardwoods**

##### Current Condition

Northern hardwood stands occur on 1,508 acres (10%) of the management area (Table 4.22.1). The majority of the hardwood stands were periodically select harvested to work toward an uneven-aged multi-storied structure. This type of management will produce stands with trees of varying sizes and ages. Northern hardwood stands are distributed on outwash plains, moraines, lake plains and ground moraines of mesic-poor to rich-nutrient sites with Kotar habitat types of PARVAa, ATFD, AFPO and AFOAs (see Appendix E). In northern hardwood stands where quality warrants stands with a basal area over 120 square feet per acre will be harvested using single tree selection, decreasing stocking levels to a basal area of approximately 80 square feet per acre. In general, this will allow most hardwood stands to be select harvested every 20 years. Where site quality is poor shelterwood and other even-aged harvesting systems will be considered. Recent even aged harvests are shown in the immature column in Figure 4.22.4.

Beech bark disease is found throughout the management area and salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

Currently there are 298 acres of northern hardwood with a partial harvest method of cut assigned (Figure 4.22.4). At this time there are no acres of northern hardwood that have site conditions limiting their harvest.

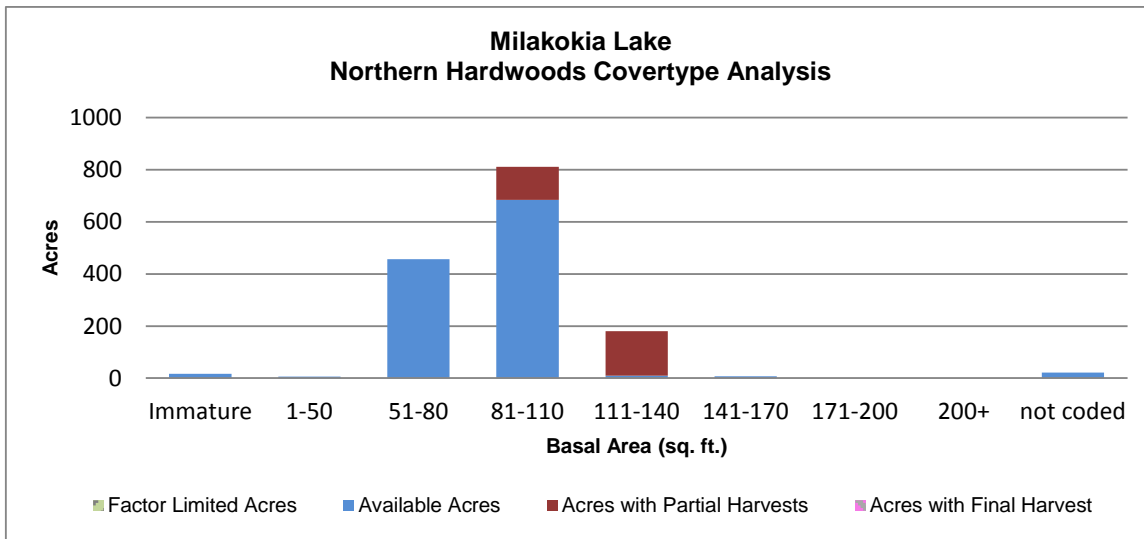


Figure 4.22.4. Basal area distribution of northern hardwood in the Milakokia Lake management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Northern hardwood stands will be maintained on operable sites, generally by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands. Harvesting will provide for a continuous flow of timber products and a variety of wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected partial or selection harvest of northern hardwood is 827 acres;
- Continue salvage harvests of beech affected by beech bark disease using Beech Bark Disease Management Guidelines;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands;
- To favor regeneration of hardwood species other than beech, consider herbicide applications on beech regeneration; and
- In areas where beech was plentiful, consider planting oak and disease resistant beech to improve the availability of hard mast.

#### Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

### **Section 4.22.1.5 Forest Cover Type Management – Lowland Aspen/Balsam Poplar**

#### Current Condition

Lowland aspen/balsam poplar occurs on 952 acres (7%) of the management area (Table 4.22.1). Lowland aspen/balsam poplar stands have been successfully harvested and regenerated in recent years resulting in almost 70% of the available acres being younger than 30 years old (Figure 4.22.5). Many stands over rotation age have not been harvested due to access problems.

Currently there are 49 acres lowland aspen/balsam poplar prescribed for final harvest. There are 152 acres of lowland aspen/balsam poplar that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations. Lowland aspen/balsam poplar in inaccessible areas will eventually succeed to late successional species.

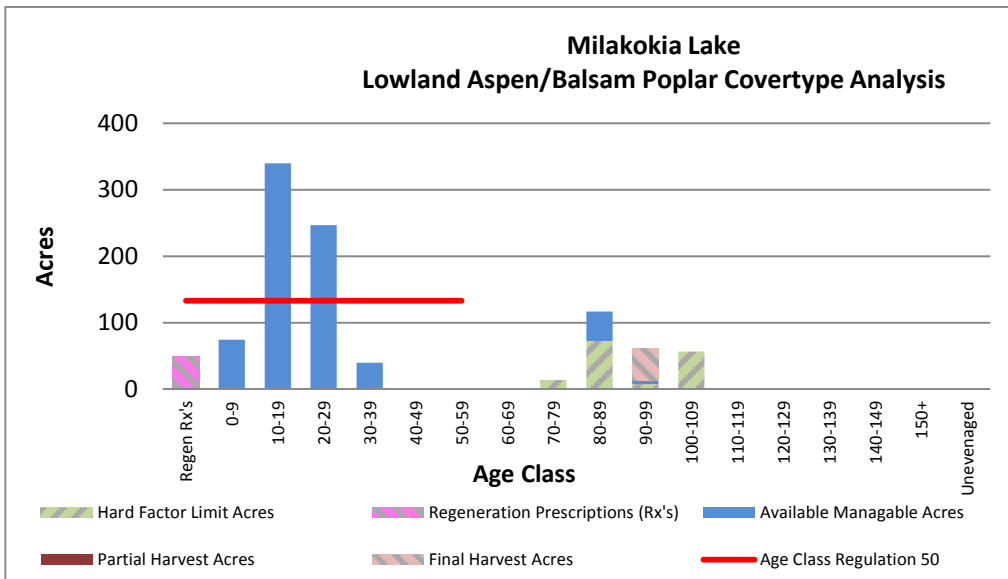


Figure 4.22.5. Age-class distribution of lowland aspen/balsam poplar in the Milakokia Lake management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland aspen/balsam poplar will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland aspen/balsam poplar is 49 acres. This reduction from the regulated amount is due to the current age-class structure where the majority of the stands are younger than rotation age and are not yet merchantable.

Long-Term Management Objectives

- Balance the age class of accessible lowland aspen/balsam poplar providing for a regulated harvest of approximately 133 acres per decade.

**Section 4.22.1.6 Forest Cover Type Management – Lowland Conifers**

Current Condition

Lowland conifers occur on 813 acres (6%) of the management area (Table 4.22.1). Lowland conifer stands in this area have been successfully harvested and regenerated with natural regeneration (Figure 4.22.6). Some of these stands are within deer wintering area special conservation areas. Many of the stands are found in association with streams and are sometimes inaccessible.

Currently there are no acres of lowland conifers with a final harvest prescribed. There are 328 acres of lowland conifers that have site conditions limiting their harvest this entry. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

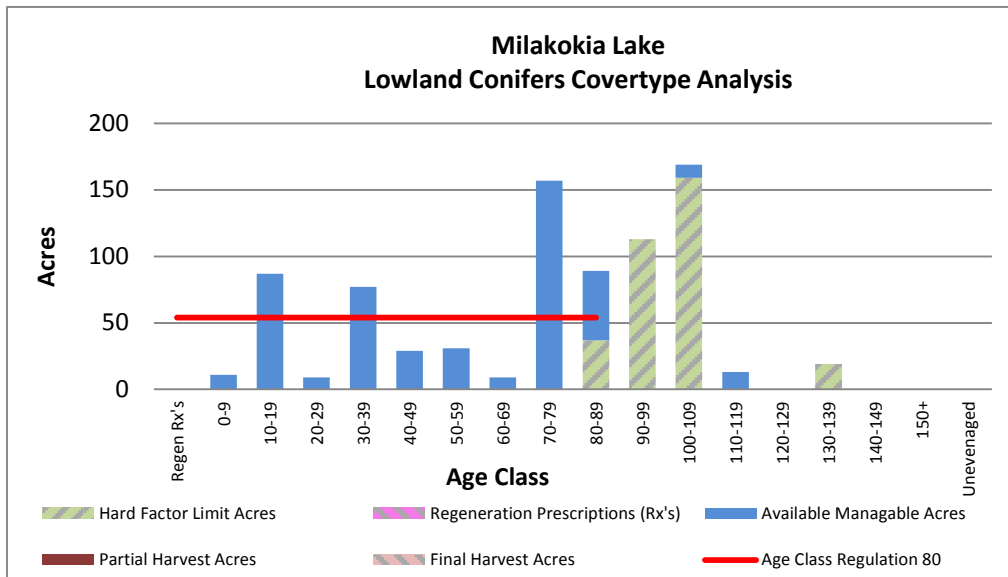


Figure 4.22.6. Age-class distribution of lowland conifer in the Milakokia Lake management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management, with acres balanced between 0-89 years of age, to provide for continual harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 54 acres to work toward balancing the age classes.

Long-Term Management Objectives

- Balance the age class structure of accessible lowland conifer stands providing for a regulated harvest of approximately 54 acres every decade.

**Section 4.22.1.7 Forest Cover Type Management – Lowland Spruce/Fir**

Current Condition

Lowland spruce/fir stands are found on 674 acres (5%) of the management area (Table 4.22.1). The age class distribution of lowland spruce/fir stands is poor, with almost half of the acres in the 80-89 year age class (Figure 4.22.7). Natural regeneration is expected in recently harvested stands.

Currently there are 59 acres of lowland spruce/fir with a final harvest prescribed. There are 231 acres of lowland spruce/fir that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of lowland spruce/fir will remain until biological maturity and will be subject to natural processes, resulting in a range of successional stages.

Desired Future Condition

- Lowland spruce/fir will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland spruce/fir is 49 acres to work toward balancing the age classes.

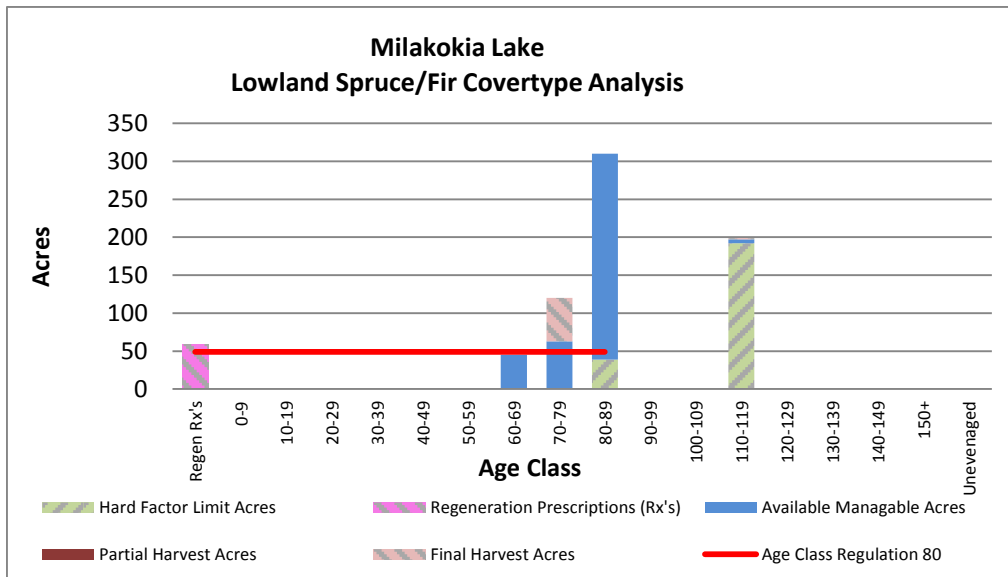


Figure 4.22.7. Age-class distribution of lowland spruce/fir in the Milakokia Lake management area (2012 Department of Natural Resources inventory data).

### Long-Term Management Objectives

- Balance the age classes of available lowland spruce/fir providing for a regulated harvest of approximately 49 acres each decade.

### **Section 4.22.1.8 Forest Cover Type Management – Other Types**

#### Current Condition

The other types (1,331 acres or 9%) category is comprised of forested cover types with less than 5% of the total management area acres (Table 4.22.1). It includes: lowland deciduous (534 acres), upland spruce/fir (243 acres), lowland mixed forest (171 acres), upland mixed forest (165 acres), mixed upland deciduous (99 acres), tamarack (65 acres), paper birch (50 acres) and hemlock (4 acres). Miscellaneous other (124 acres of 1%) includes water, roads and soil/sand/rock.

Most of these cover types are managed as even-aged stands using natural regeneration after harvest. Following general timber management guidelines, conduct regeneration harvests as stands become available. Attempt to balance age classes where possible.

There are 78 acres of these other minor cover types that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Inaccessible stands may never be harvested and will be subject to successional processes.

#### Desired Future Condition

- These cover types may be managed on operable sites, contributing to the compositional diversity of the landscape while providing for continual harvest, available wildlife habitat and recreation opportunity.

#### 10-Year Management Objectives

- Following general timber management guidelines, conduct regeneration harvests as stands become available, followed by natural regeneration. Attempt to balance age classes where possible.
- The projected 10-year final harvest of other types is 119 acres.
- The projected 10-year partial harvest of other types is 34 acres.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

#### 4.22.2 – Featured Species Management

Though state land ownership in this management area is fragmented, for the most part the habitat is intact. Deer overwinter in cedar and lowland conifers along the shore of the Big Manistique Lake and Milikokia Lake in close proximity to residential areas. Wildlife priorities in this management area include the maintenance of deer wintering complexes, management for mature forest conditions and structure in northern hardwoods and early successional aspen.

##### **American Woodcock**

The goal for woodcock in the eastern Upper Peninsula is to maintain or increase habitat. Management should address the maintenance of adequate early successional habitat to provide feeding, nesting and brood-rearing habitat and opportunity for hunting.

##### Wildlife habitat specifications:

- Balance aspen age class distribution within the management area.
- Maintain or increase the aspen cover type within the management area. Where associated with alder, riparian zones or forested wetlands use silvicultural practices that encourage the aspen component in mixed stands.
- Maintain rough openings associated with alder, riparian zones or forested wetlands.

##### **Blackburnian Warbler**

The goal for blackburnian warbler is to maintain suitable breeding habitat. Management for the species should focus on within stand diversity, habitat fragmentation and conifer components in this management area.

##### Wildlife habitat specifications:

- Increase the mesic conifer (e.g., hemlock, white pine, red pine and upland spruce-fir) component by: a) Retaining a larger percentage of mesic conifer during harvests; b) Using silvicultural practices that encourage the regeneration of mesic conifer; and c) Where desired/feasible, underplanting hemlock, white pine and white spruce in hardwood-dominated stands on suitable sites without a seed source.
- Provide more older mesic conifers, particularly hemlock, in the landscape by: a) Allowing some actively managed stands of mesic conifer to grow beyond standard rotation ages; b) Including mature mesic conifers as within-stand structure retained during harvests by following Within-Stand Retention Guidance during harvests; and c) Maintaining mature mesic conifer stands within travel corridor and riparian zone or Type 1 or Type 2 old growth special conservation areas.
- Harvest in hemlock stands, or harvest of hemlock where it is a component in other cover types, will only occur where successful hemlock recruitment is clearly demonstrated.
- Use silvicultural practices that retain, recruit and expand multi-story hemlock stands and hemlock inclusions within hardwood complexes through group selection, scarification and/or direct planting. Hemlock is only to be harvested where successful hemlock recruitment is clearly demonstrated.

##### **Red-shouldered Hawk**

The goal for red-shouldered hawk is to maintain or improve suitable habitat in the ecoregion. Management activities should focus on the maintenance of large blocks of mesic northern forest with the appropriate level of large diameter trees in priority landscapes.

##### Wildlife Habitat Specifications:

- All known woodland raptor nests should be reported to local wildlife staff and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. Confirmed red-shouldered hawk nests are to be documented in accordance with the DNR Approach to the protection of Rare Species on State Forest Lands (CI 4172) and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support System. For Red-shouldered hawk nests, the wildlife habitat specifications contained within Michigan DNR's *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August 2012) will be followed until the workgroup has completed the guidance that will permanently replace the interim guidelines.



## White-tailed Deer

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

### **4.22.3 – Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts with rare species following the guidance in "*DNR's Approach to the Protection of Rare Species on State Forest Lands*" (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed seven listed species as well as two natural communities of note occurring in the management area as listed in Table 4.22.2. A colony of great blue herons has also been identified. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Table 4.22.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Milakokia Lake management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Birds</b>								
Common loon	<i>Gavia immer</i>	T/G5/S3-4	Confirmed	HV	Very High	Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Rich Tamarack swamp		
						Floodplain forest	Lowland mixed	Mid
						Southern hardwood swamp		
						Dry northern forest	Jack Pine, Red Pine	Early
Dry-mesic northern forest	White Pine	Late						
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Special conservation areas in the management area are cold water streams, and deer wintering areas. Concentrated recreation area special conservation areas (boat access sites and state forest campgrounds) are listed in the Recreation section 4.22.7 below.

There have been no high conservation value areas or ecological reference areas identified in this management area as illustrated in Figure 4.22.8.

The management goal during this planning period is:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.

# Milakokia Lake

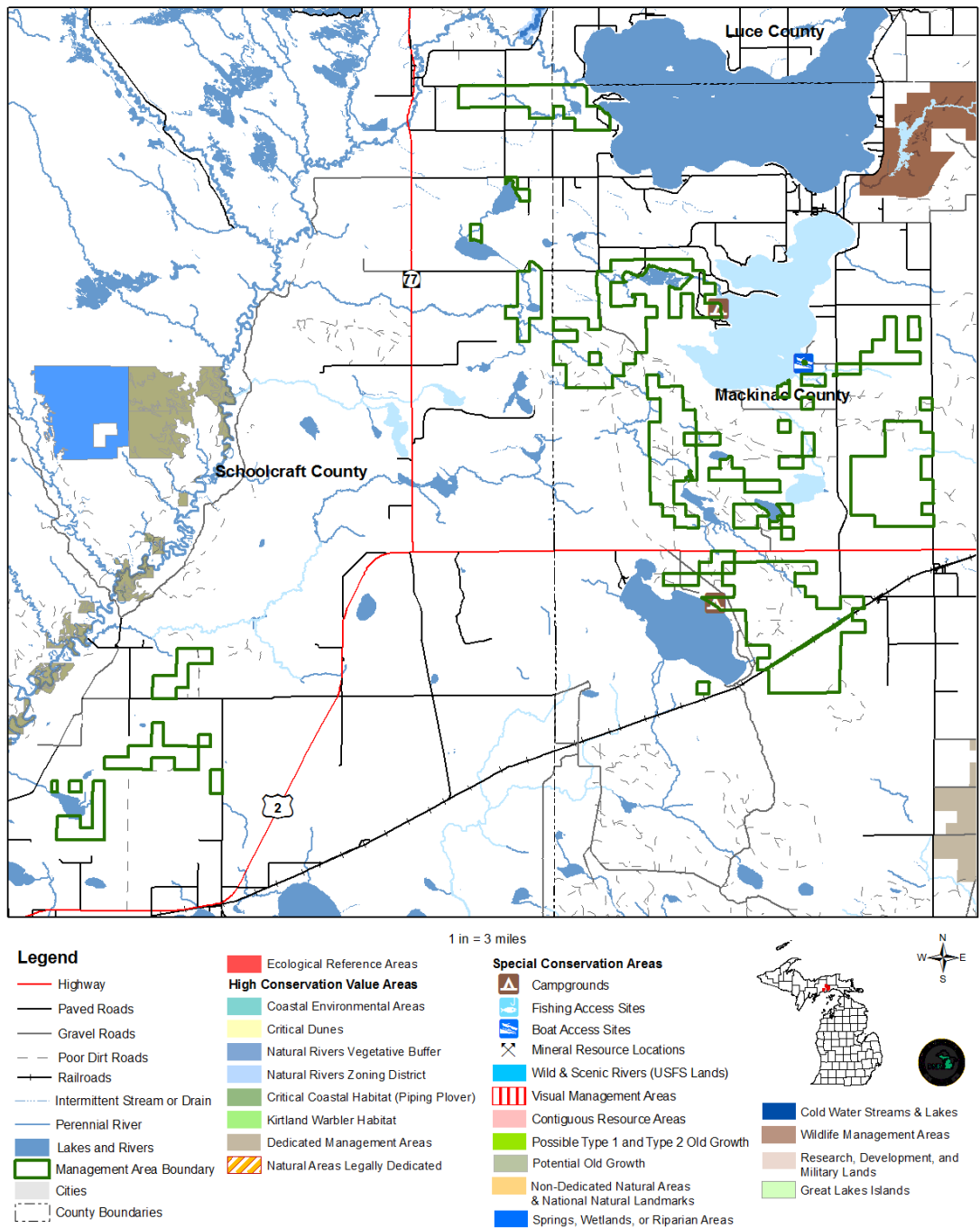


Figure 4.22.8. A map of the Milakokia Lake management area showing the special resource areas.

#### 4.22.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Aspen and lowland aspen/balsam poplar: white trunk rot and *Hypoxylon* canker;
- Northern hardwood: beech bark disease;
- Lowland conifers: spruce budworm, eastern larch beetle and larch casebearer; and
- Other types: emerald ash borer.

For further information on forest health refer to Section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. Garlic mustard has been documented within the management area. Glossy buckthorn, leafy spurge and purple loosestrife have been documented within a five-mile buffer of the management area (Table 4.22.3). Monitoring efforts should specifically look for new populations of these species. Prescribe eradication treatments to any new populations of invasive plant species found in the management area. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled. Garlic mustard was found at Milakokia Lake State Forest Campground. Prescribed burning, mowing, hand pulling and herbicide are being used to control and eradicate it.

Table 4.22.3. Invasive plant species within or near the Milakokia Lake management area (Data from the Michigan Invasive Plant Identification Network database).

Milakokia Lake - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	4	14	18	4
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
Garlic Mustard <i>Alliaria petiolata</i>	4	Glossy Buckthorn <i>Rhamnus frangula</i>	12	
-	-	Leafy Spurge <i>Euphorbia esula</i>	1	
-	-	Purple Loosestrife <i>Lythrum salicaria</i>	1	

#### 4.22.5 – Fire Management

This management area is dominated by mesic forest and lowland communities. Fire probably played a small disturbance role in this management area.

- Little to no prescribed fire activity has occurred in this management area historically, largely due to access difficulties.
- Prescribed fire may be used to control invasive species, as appropriate.

#### 4.22.6 – Public Access and Recreation

State land within the management area is fragmented. There are many small parcels of state owned land surrounded by private land. This has caused access to state forest land to be a problem in some parts of the management area.

Trail facilities are limited to a few snowmobile trails (Figure 4.22.1). There are also boat access sites at Big Manistique Lake, South Manistique Lake (Figure 4.22.8), Milakokia Lake and Kennedy Lake. South Manistique Lake and Milakokia Lake state forest campgrounds are the only two state forest campground facilities in the area (Figure 4.22.8).

There are a significant number of private campgrounds and resorts around the lakes in this management area that contribute to the use of recreational facilities and support the local economy year around.

Hunting, snowmobiling and fishing are popular activities here. Snowmobile trails have been re-routed several times in this management area due to private property concerns/permissions.

#### **4.22.7 - Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. There are no designated high priority trout streams identified in this management area.

#### **4.22.8 - Minerals**

Surface sediments consist of coarse-textured till, lacustrine (lake) sand and gravel, and peat and muck sometimes thin to discontinuous over bedrock. The glacial drift thickness varies between 10 and 100 feet. Sand and gravel pits are located in this area and there is good potential on the uplands for additional pits.

The Silurian Manistique and Burnt Bluff Groups, Cabothead Shale and Manitoulin Formation subcrop below the glacial drift. The Burnt Bluff is quarried for stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (four in Mackinac and five in Schoolcraft). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

There is a state gravel pit off N. Gould City Road (N. Gould City pit) and several small sand pits are located near Milakokia Lake as well as an active limestone quarry on the west side of Milakokia Lake, none of which are on state forest land.

## 4.23 MA 23 – Munuscong Bay Management Area

### Summary of Use and Management

Management in the Munuscong Bay management area (MA) (Figure 4.23.1) will maintain or enhance fish and waterfowl habitat, provide a variety of timber products and provide for forest-based recreational uses. Munuscong Bay is noted for a high-quality fishery and excellent waterfowl habitat. Timber management will emphasize balancing age classes of aspen, lowland poplar and mixed swamp conifers. Expected issues in this 10-year planning period are introduced pests and diseases and the difficulty of regenerating cedar stands.

#### Introduction

The Munuscong Bay management area is located in the far eastern end of the eastern Upper Peninsula in Chippewa County. It has 14,775 acres of state-owned land. The primary attributes are the extensive fish and wildlife resources. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of clay soils on flat lake plain near Munuscong Bay on the St. Mary's River. The soils in this area are very erodible.
- Recreational opportunities including: fishing, camping, snowmobiling and hunting.
- There are special conservation area deer wintering areas, including the Keldon deer yard and Great Lakes marsh and poor fen ecological reference areas within the management area.
- There are several known archeological sites within the management area including old homesteads and a fossil bed.

This management area is within the Munuscong River Watershed, which is primarily a warm and cool water system. It has historically supported a strong walleye run, but is currently adversely affected by agricultural runoff. Munuscong Bay supports an outstanding walleye fishery.

This management area is also the Munuscong State Wildlife Management Area. Waterfowl management has been a priority both along Munuscong Bay and in interior grassland habitat where a number of man-made pot holes were constructed in the low areas. DNR and volunteer crews worked together to create these ponds. Some ponds have also been created on private property through cooperative agreements. Much of this management area is a wildlife flooding dependent upon natural water level fluctuations. The wetland and grassland habitats in the management area provide habitat for waterfowl and grassland species alike.

The state land in this management area is fairly concentrated with some private land throughout. The Munuscong Bay management area is within the Sault Forest Management Unit. The current predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.23.1.

# Munuscong Bay

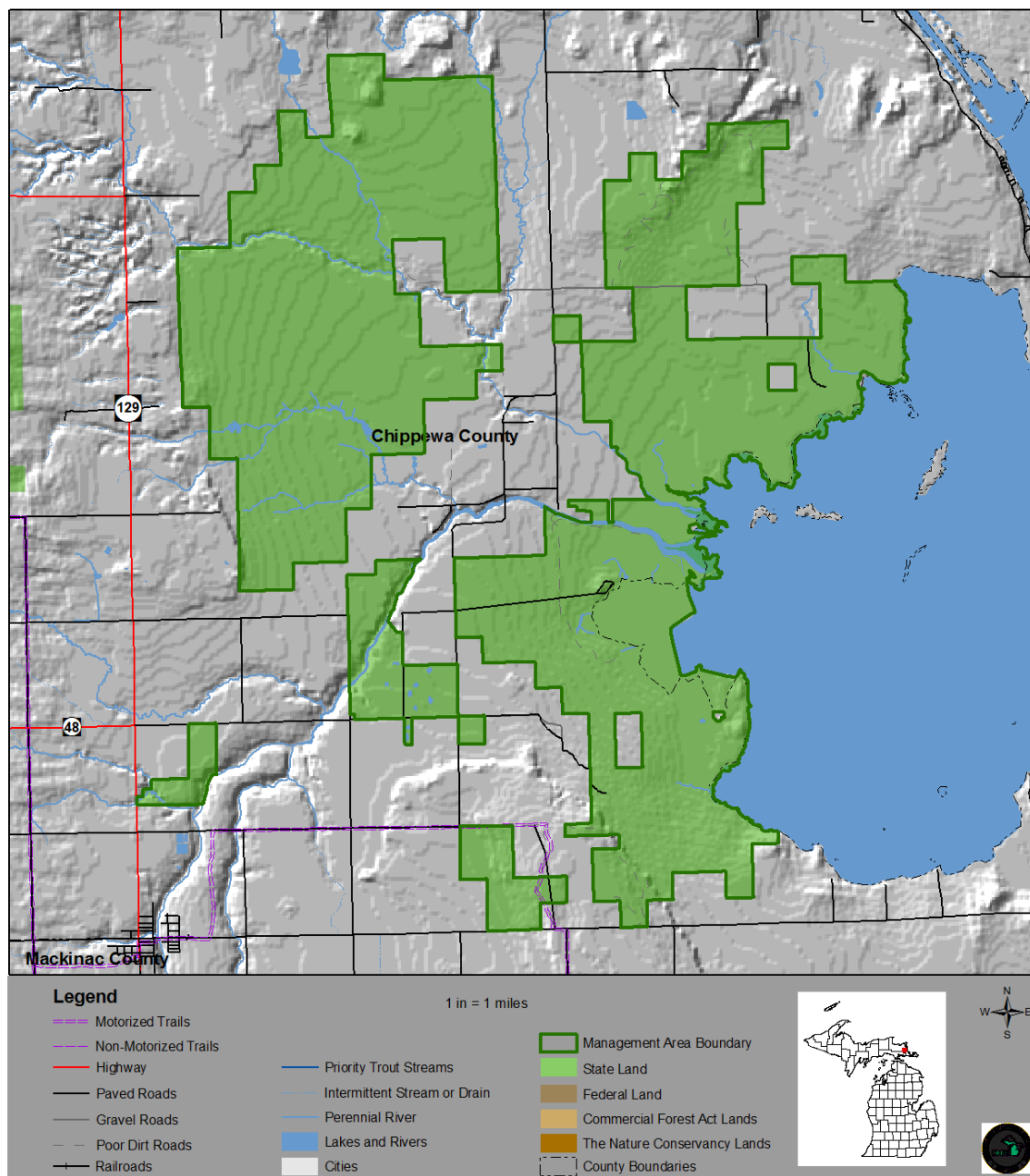


Figure 4.23.1. Location of the Munuscong Bay management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and Munuscong Bay.

Table 4.23.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Munuscong Bay management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Lowland Deciduous	22%	3,216	510	2,706	149	0	3,216	301	0
Lowland Open/Semi-Open Lands	20%	2,890	0	2,890	0	0	2,890	0	0
Cedar	16%	2,371	26	2,345	20	0	2,371	147	0
Lowland Aspen/Balsam Poplar	9%	1,345	463	882	159	0	1,345	159	0
Upland Open/Semi-Open Lands	7%	987	0	987	0	0	987	0	0
Lowland Conifers	6%	830	73	757	84	0	830	84	0
Aspen	5%	806	56	750	109	0	806	125	0
Tamarack	5%	746	212	534	148	0	746	76	0
Misc Other (Water, Local, Urban)	5%	698	0	698	0	0	698	0	0
Others	6%	886	68	818	63	154	886	45	228
<b>Total</b>	<b>100%</b>	<b>14,775</b>	<b>1,408</b>	<b>13,367</b>	<b>732</b>	<b>154</b>	<b>14,775</b>	<b>937</b>	<b>228</b>

Others include: northern hardwood, lowland spruce/fir, red pine, upland spruce/fir, lowland mixed forest, paper birch, mixed upland deciduous and oak.

#### 4.23.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### Section 4.23.1.1 Forest Cover Type Management – Lowland Deciduous

###### Current Condition

Lowland deciduous stands occur on 3,216 acres (22%) of the management area (Table 4.23.1). Lowland deciduous stands in this management area are often found in association with the creeks and drainages making access difficult. Almost 20% of the lowland deciduous stands in this management area have been listed as uneven-aged (Figure 4.23.2). This is generally due to natural processes resulting in a range of size and age classes within the inaccessible stands. Natural regeneration has been effective after past harvesting. Many of the stands in this area contain ash trees. Follow the emerald ash borer management guidelines to salvage ash.

Currently there are no acres of lowland deciduous with a final harvest prescribed. There are 71 acres of other cover types that are expected to convert to lowland deciduous after harvest. These acres are shown in Figure 4.23.2 in the regeneration prescriptions column. There are 510 acres of lowland deciduous that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland deciduous stands in inaccessible areas will be subject to natural processes (fire, windthrow, insect defoliation and beaver flooding) resulting in a range of successional stages.



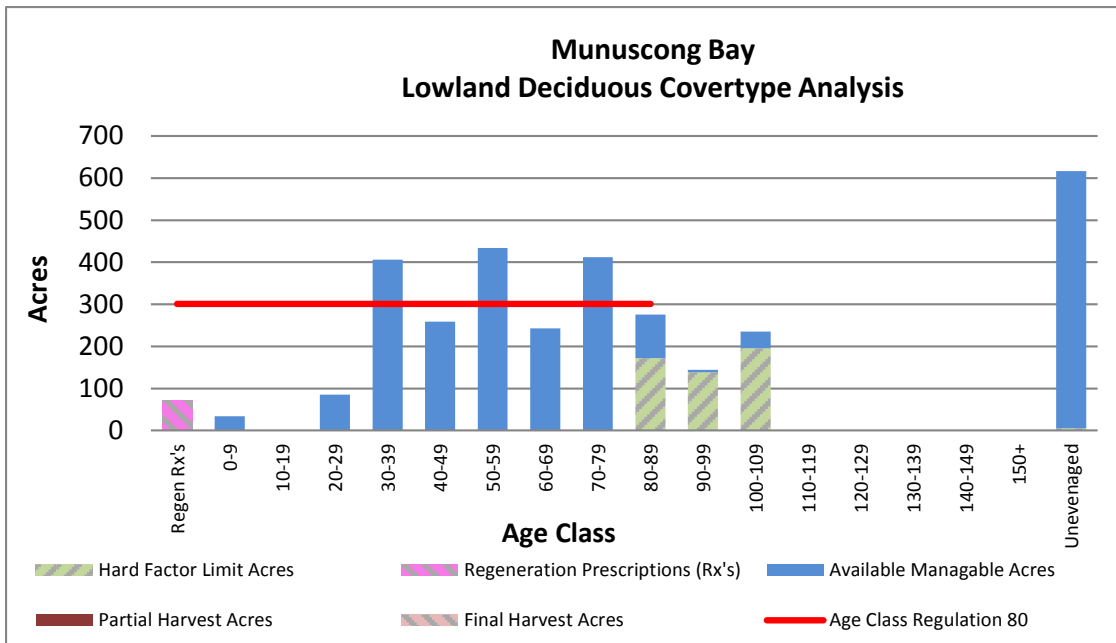


Figure 4.23.2. Age-class distribution of lowland deciduous in the Munuscong Bay management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland deciduous stands will be maintained on operable sites generally through even-aged management with acres balanced between 0-89 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected final harvest of lowland deciduous is 149 acres. Natural regeneration consisting of species currently on site is expected. The decrease from the regulated amount is due to the current age-class structure, where most of the stands over rotation age have site conditions limiting harvest at this time.

#### Long-Term Management Objectives

- Balance the age-class structure of available stands providing for a regulated harvest of approximately 301 acres per decade (red line in Figure 4.23.2).

### **Section 4.23.1.2 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

#### Current Condition

Lowland open/semi-open lands occur on 2,890 acres (20%) (Table 4.23.1). This category is a combination of lowland shrub (1,785 acres), marsh (1,085 acres), bog (15 acres) and treed bog (five acres). Many of these stands lie along the St. Mary's River corridor and are subject to water level fluctuations. These cover types are valued ecologically as sources of habitat for numerous species of wildlife. Most of these stands are found in association with streams and rivers and contribute to access issues. Without intervention natural succession toward woody vegetation may decrease the size of the openings. Some of these stands contain man-made potholes constructed for waterfowl habitat.

#### Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity.

10-Year Management Objectives

- Maintain "emergent-marsh" wetlands to enhance grasslands for species dependent on grassland-wetland complexes; and
- Outside the waterfowl management areas, lowland shrub and marsh stands will generally be maintained without active management.

Long-Term Management Objectives

- Within these stands allow natural processes to occur while protecting their ecological values from man-made disturbances.

**Section 4.23.1.3 Forest Cover Type Management - Cedar**

Current Condition

Cedar occurs on 2,371 acres (16%) of the management area (Table 4.23.1). There has been some harvesting and regeneration of cedar in the past, but none in recent years (Figure 4.23.3). Many of the cedar stands in this management area are found within the Keldon deer yard which is a special conservation area deer wintering area. Within the deer wintering area, cedar stands will be managed to maintain winter habitat for deer and to retain this forest type in the landscape. Maintaining a closed canopy structure provides important cover for deer and reduces snow depth within the stands. Outside of the deer wintering area harvesting may occur where winter deer habitat is not impacted and cedar regeneration is expected.

Currently there are 47 acres of cedar with a final harvest prescribed. There are 26 acres of cedar that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Cedar stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

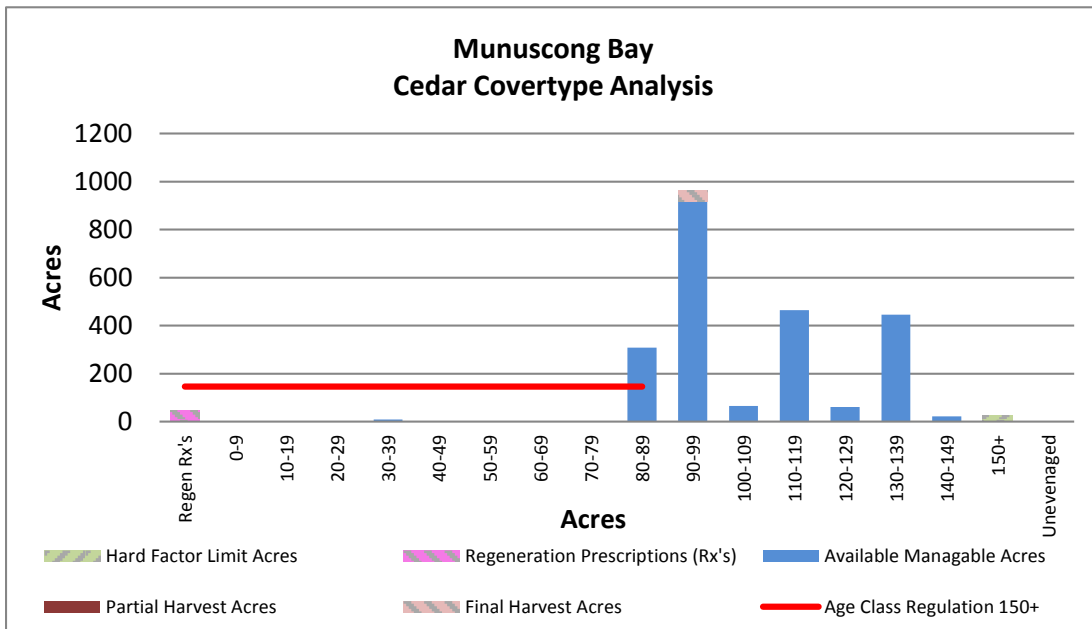


Figure 4.23.3. Age-class distribution of cedar in the Munuscong Bay management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- In areas where deer browse is a concern, these stands may not be actively harvested at this time.

## 10-Year Management Objectives

- The 10-year projected final harvest of cedar is 20 acres. The reduction from the regulated amount is due to the deer wintering area. However, harvest of this type, if it occurs, may vary widely from the projected harvest in order to meet the long term management objectives.
- Ensure that cedar and/or hemlock recruitment/regeneration is reliable if harvesting in this cover type.

## Long-Term Management Objectives

- Within the deer wintering areas, focus cedar management on winter habitat for deer; and
- Outside the deer wintering areas, conduct regeneration harvests to diversify the age classes of cedar providing for a regulated harvest, balancing the acres from 0-159 years of age, allowing approximately 147 acres to be harvested each decade.

### Section 4.23.1.4 Forest Cover Type Management – Lowland Aspen/Balsam Poplar

#### Current Condition

Lowland aspen/balsam poplar occurs on 1,345 acres (9%) of the management area (Table 4.23.1). Many of these stands are inaccessible due to creeks and their associated wetland soils. Accessible stands have been harvested and successfully regenerated with natural regeneration (Figure 4.23.4).

Currently there are no acres of lowland aspen/balsam poplar with a stand replacement harvest prescribed. There are 463 acres of lowland aspen/balsam poplar that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of lowland aspen/balsam poplar will eventually succeed to late successional species.

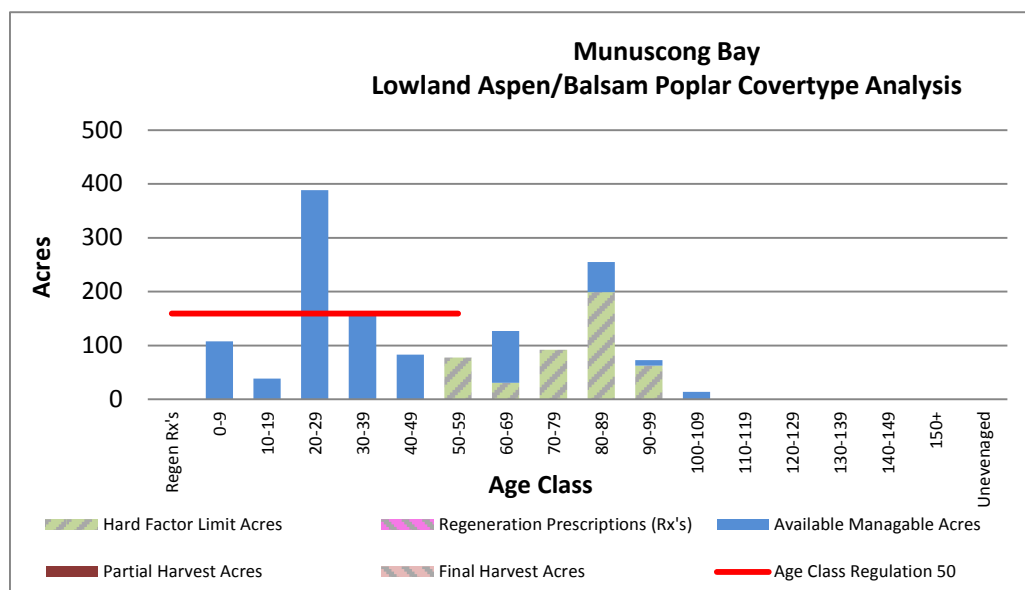


Figure 4.23.4. Age-class distribution of lowland aspen/balsam poplar in the Munuscong Bay management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland aspen/balsam poplar stands will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

## 10-Year Management Objectives

- The 10-year projected final harvest of lowland aspen/balsam poplar is 159 acres.

### Long-Term Management Objectives

- Balance the age class of accessible lowland aspen/balsam poplar providing for a regulated harvest of approximately 159 acres per decade.

### **Section 4.23.1.5 Forest Cover Type Management – Upland Open/Semi-Open Lands**

#### Current Condition

Upland open/semi-open lands occur on 987 acres (7%) of the management area (Table 4.23.1). This category is a combination of the following non-forested land cover types: herbaceous open land (967 acres), upland shrub (four acres), low-density trees (zero acres) and bare/sparsely vegetated (16 acres). These cover types are valued ecologically as sources of open land habitat for numerous species of wildlife.

#### Desired Future Condition

- Upland open/semi-open lands will be retained to ensure an adequate level of wildlife habitat and recreational opportunity.

### Long-Term Management Objectives

- Herbaceous openland communities may be maintained through timber sales and forest treatment proposals using mechanical means or prescribed fire.

### **Section 4.23.1.6 Forest Cover Type Management – Lowland Conifers**

#### Current Condition

Lowland conifers occur on 830 (6%) of the management area (Table 4.23.1). Many of these stands are in low, wet areas with limited access. Lowland conifer stands have been successfully harvested and regenerated using natural regeneration (Figure 4.23.5).

Currently there are no acres of lowland conifers with a final harvest prescribed. There are 73 acres of lowland conifers that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in inaccessible areas will be subject to natural processes (fire, windthrow, insect defoliation and beaver flooding) resulting in a broad range of successional stages.

#### Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age, to provide for continual harvest, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 84 acres.

### Long-Term Management Objectives

- Balance the age-class distribution of lowland conifers providing for a regulated harvest of approximately 84 acres per decade.

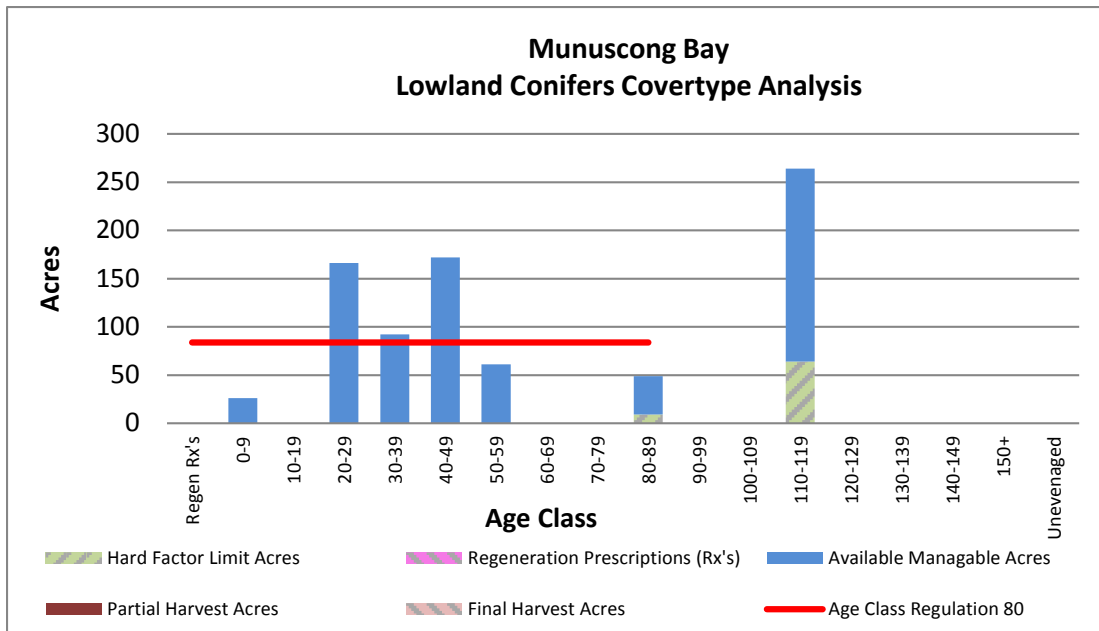


Figure 4.23.5. Age class distribution of lowland conifer in the Munuscong Bay management area (2012 Department of Natural Resources inventory data).

### Section 4.23.1.7 Forest Cover Type Management – Aspen

#### Current Condition

Aspen occurs on 806 acres (5%) of the management area (Table 4.23.1). Aspen stands in this management area are found on sandy or loamy soils with Kotar habitat types of PARv, PARVAa, ATFD and AFPo (see appendix E). Aspen stands have been successfully harvested and regenerated in this management area (Figure 4.23.6).

Currently, 58 acres of aspen have a final harvest prescription. There are 23 acres of other cover types are expected to convert to aspen after harvest. These acres are shown in Figure 4.23.6 in the regeneration prescriptions column. There are 56 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible aspen will eventually succeed to late successional species.

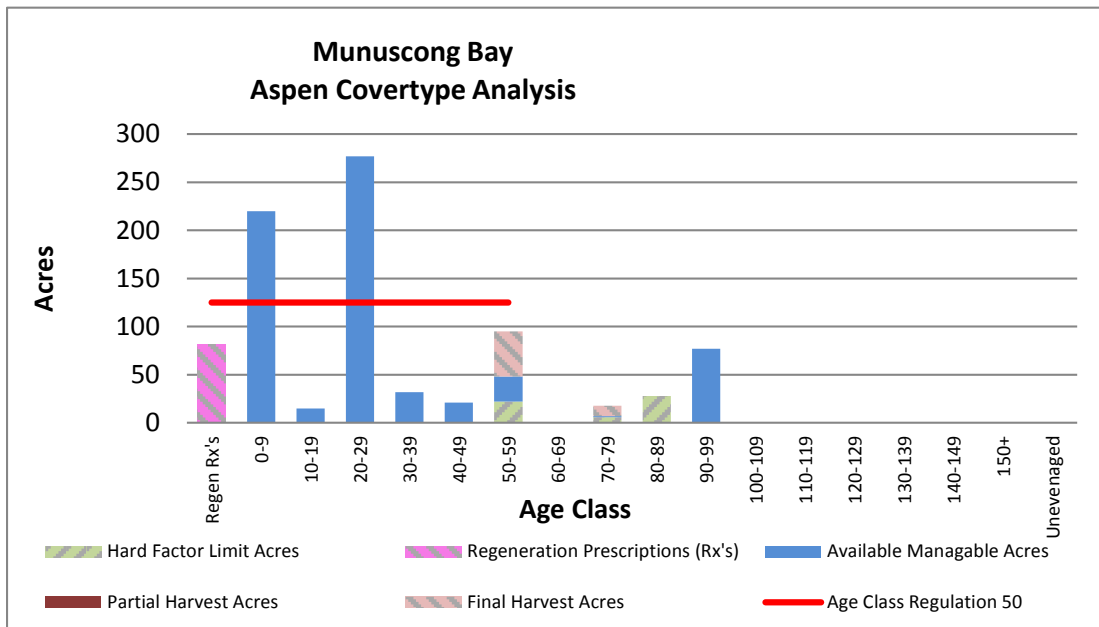


Figure 4.23.6. Age-class distribution of aspen in the Munuscong Bay management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest of aspen is 109 acres. The decrease from the regulated amount is due to the large number of acres in the 0-9 age class.

Long-Term Management Objectives

- Balance the age-class structure of available aspen providing for a regulated harvest of approximately 125 acres per decade.

**Section 4.23.1.8 Forest Cover Type Management – Tamarack**

Current Condition

Tamarack stands occur on 746 acres (5%) of the management area (Table 4.23.1). Many of these stands are inaccessible due to creeks and their associated wetland soils. Accessible stands have been harvested and successfully regenerated with natural regeneration providing some variety in the age classes (Figure 4.23.7).

Currently there are no acres of tamarack that have a harvest prescription. There are 212 acres of tamarack that have site conditions limiting their harvest this entry. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Tamarack stands that are inaccessible will be subject to natural processes, resulting in a range of successional stages.

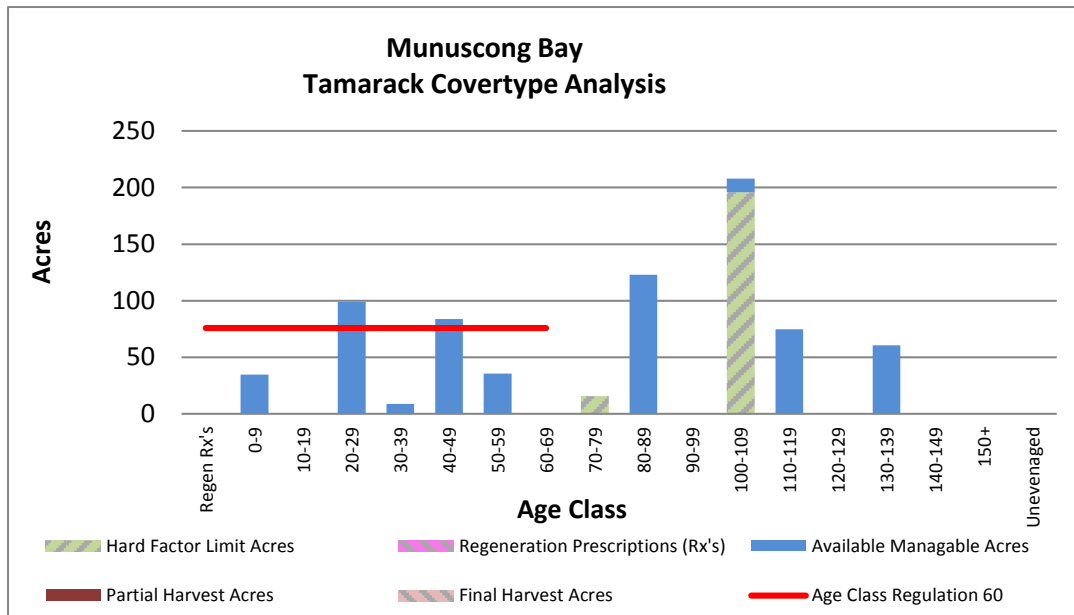


Figure 4.23.7. Age-class distribution of tamarack in the Munuscong Bay management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Tamarack will be maintained on operable sites through even-aged management with acres balanced between 0-69 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of tamarack is 148 acres. The increase from the regulated amount is due to the current age-class structure with a low number of acres in the 0-9 and 10-19 year-old age classes.

## Long-Term Management Objectives

- Balance the age classes of tamarack in accessible stands providing for a regulated harvest of approximately 76 acres per decade.

### **Section 4.23.1.9 Forest Cover Type Management – Other Types**

#### Current Condition

There are a number of other cover types spread across the management area that have less than 5% of the total management area acres (Table 4.23.1). Other types totals 886 acres (6%) and includes: northern hardwood (427 acres), lowland spruce/fir (138 acres), red pine (42 acres), upland spruce/fir (39 acres), paper birch (29 acres), mixed upland deciduous (25 acres) and oak (19 acres). Miscellaneous other stands (698 acres or 5%) include water, roads and sand/soil.

With the exception of northern hardwoods and red pine, most of these cover types will be managed as even-aged stands using natural regeneration after harvest. Following general timber management guidelines, perform regeneration harvests in even-aged forested cover types attempting to balance age classes where possible. Schedule selection harvests in northern hardwoods and red pine as needed.

While beech trees are a minor component of northern hardwood stands in this area, beech bark disease is abundant. Salvage of affected beech is ongoing using Beech Bark Disease Management Guidelines. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

There are 68 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Inaccessible stands may never be harvested and will be subject to successional processes.

#### Desired Future Condition

- These cover types may be managed on operable sites, contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreation opportunity.

#### 10-Year Management Objectives

- The projected 10-year final harvest of other types is 63 acres; and
- The projected 10-year partial harvest of other types is 154 acres.

#### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.23.2- Featured Wildlife Species**

Within this management area is the Munuscong Wildlife Management Area. The primary management goals are for this area are waterfowl and marsh bird management. A significant amount of wildlife based recreation occurs here including waterfowl and deer hunting and bird watching. Other wildlife habitat priorities include managing the aspen resource for aspen dependent species and maintaining the open grassland features in the management area.

#### **American Bittern**

The state wide goal for American bittern is to meet the Upper Mississippi Region Great Lakes Region Joint Venture population level as observed by the North American Breeding Bird Survey for Michigan. The eastern Upper Peninsula goal is to provide and maintain suitable habitat for American bittern. Management should focus on priority management areas with suitable shallow water marsh (hemi-marsh).

#### Wildlife habitat specifications:

- Manage priority wetlands in a hemi-marsh condition, with open water surrounded by emergent vegetation. Optimal hemi-marsh sites for bittern are > 10 acres with the emergent vegetation portions having average water depths of four inches and a 4:1 ratio of adjacent grassland to hemi-marsh.
- Maintain wetland/upland complexes of > 50 acres.
- Buffer management activities at the edges of wetlands to protect marsh hydrology and limit the spread of invasive plant species.

#### **American Woodcock**

The goal for woodcock in the eastern Upper Peninsula is to maintain or increase habitat. Management should address the maintenance of adequate early successional habitat to provide feeding, nesting, brood-rearing habitat and opportunity for hunting.

#### Wildlife habitat specifications:

- Balance aspen age-class distribution within the management area.
- Use silvicultural practices that encourage the aspen component in mixed stands associated with alder, riparian zones or forested wetlands.
- Maintain or increase the aspen cover type within the management area where associated with alder, riparian zones or forested wetlands.
- Maintain rough openings associated with alder, riparian zones or forested wetlands.

#### **Mallard**

The goal is to maintain 420,000 breeding mallards in Michigan when Great Lakes water levels are near their long-term average. The eastern Upper Peninsula goal is to provide and maintain suitable habitat in the ecoregion. Management should focus on priority management areas with suitable shallow marsh (hemi-marsh).

#### Wildlife habitat specifications:

- Maintain priority wetlands in hemi-marsh condition, seeking 50/50 open water to emergent marsh for both breeding and non-breeding habitat.
- Buffer small wetlands.

#### **Sharp-tailed Grouse**

In the eastern Upper Peninsula, the goal for sharp-tailed grouse is to maintain or improve suitable habitat. Management should focus on enhancing large opening complexes so there is an increase of available habitat.

#### Wildlife habitat specifications:

- Maintain or expand herbaceous open-lands where existing leks occur.
- Manage adjacent forest to maintain young regenerating forest adjacent to permanent openings to maximize use by sharp-tailed grouse.
- Consolidate grass openings and planted red pine to increase the stand size of both cover types.
- Use prescribed fire where appropriate to maintain openings and manage pine types.
- Within open-land complexes maintain connectivity across the landscape.

#### **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and



hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

#### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### **4.23.3 – Rare Species and Special Conservation Area Management**

All forest operations must be reviewed for potential conflicts with rare species following the guidance in “*DNR’s Approach to the Protection of Rare Species on State Forest Lands*” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed ten listed species and two natural communities of note occurring in the management area as listed in Table 4.23.2. A colony of great blue herons has also been identified. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Special conservation areas include cold water streams, potential old growth, deer wintering areas and the Munuscong Bay State Wildlife Management Area that covers the whole management area (Figure 4.23.8). Concentrated recreation area special conservation areas (boat access sites and state forest campgrounds) are listed in the Recreation section 4.23.6 below.

High conservation value areas include a coastal environmental area along the St. Mary’s River, and the Munuscong State Wildlife Management Area (15,030 acres), which is a dedicated management area (Figure 4.23.8).

The Munuscong Bay management area contains a Great Lakes marsh (923 acres on state forest land) and a poor fen (94 acres) ecological reference area (Figure 4.23.8). Both ecological reference areas will be managed to protect and enhance their natural vegetative and wildlife communities as directed by an ecological reference area-specific management plan.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

Table 4.23.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Munuscong Bay management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Great Lakes marsh		S3/G2	Confirmed				Lowland open/semi-open	N/A
Poor fen		S3/G3	Confirmed				Lowland open/semi-open	N/A
<b>Birds</b>								
Grasshopper sparrow	<i>Ammodramus savaannarum</i>	SC/G5/S3S4		PS	Moderate	Dry sand prairie	Upland open/semi-open	N/A
						Mesic prairie	Upland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Hillside prairie	Upland open/semi-open	N/A
						Mesic sand prairie	Upland open/semi-open	N/A
American bittern	<i>Botaurus lentiginosus</i>	SC/G4/S3-4	Confirmed	MV	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Southern wet meadow	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Marsh wren	<i>Cistothorus palustris</i>	SC/G5/S3S4	Confirmed	PS	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Emergent Marsh	Lowland open/semi-open	N/A
Yellow rail	<i>Coturnicops noveboracensis</i>	T/G4/S1S2	Confirmed	MV	Moderate	Northern wet meadow	Lowland open/semi-open	N/A
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Least bittern	<i>Ixobrychus exilis</i>	T/G5/S2	Confirmed	MV	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Emergent Marsh	Lowland open/semi-open	N/A
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	SC/G5/S4	Confirmed	PS	Moderate	Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Dry sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Upland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A
<b>Plant</b>								
Ashy whitlow grass	<i>Draba cava</i>	T/G5/S1	Confirmed			Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone lakeshore cliff	Upland open/semi-open	N/A
						Limestone cliff	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

# Munuscong Bay

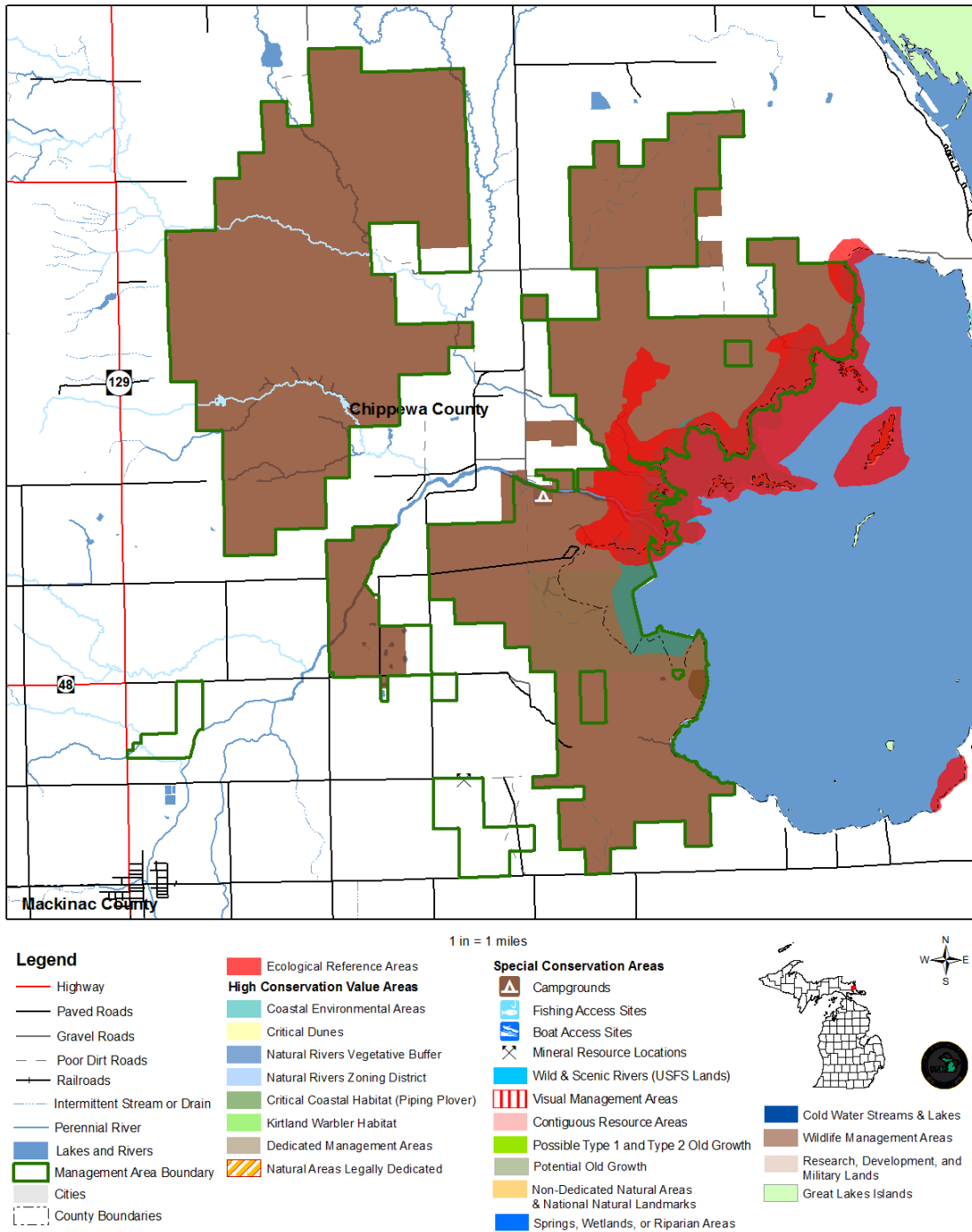


Figure 4.23.8. A map of the Munuscong Bay management area showing the special resource areas.

#### **4.23.4 – Forest Health Management**

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Aspen and lowland aspen/balsam poplar: white trunk rot and *Hypoxylon* canker;
- Lowland deciduous: emerald ash borer; and
- Lowland conifers: spruce budworm.

For further information on forest health refer to Section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys, and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

#### **4.23.5 – Fire Management**

Fire would have been a periodic disturbance in these coastal areas during periods of low water.

- Prescribed fire may be used to maintain the open nature of these natural communities.
- Fire suppression tactics should take into account the sensitive nature of some of the natural communities in this management area.

#### **4.23.6 – Public Access and Recreation**

Access for management and recreation is good where county roads are adjacent to state lands; however, some portions of the management area can only be accessed through private lands.

Recreational facilities are limited to the Munuscong River State Forest Campground and boat access site and a snowmobile trail (Figure 4.23.1).

Fishing and hunting are popular activities, especially waterfowl hunting. Bird watching is an increasingly popular pursuit.

#### **4.23.7 - Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. There are no designated high priority trout streams identified in this management area.

#### **4.23.8 – Minerals**

Surface sediments consist of coarse-textured till, lacustrine (lake) sand, gravel, clay and silt, peat and muck and coarse-textured till. The glacial drift thickness varies between 100 and 200 feet. Sand and gravel pits are located in the general area and there is potential for additional pits on the uplands.

The Ordovician Stonington Formation, Utica and Collingwood Shales and Trenton and Black River Formations subcrop below the glacial drift. The Trenton and Black River are quarried for stone/dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (14 in Chippewa County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.24 MA 24 - North Rudyard Management Area

### Summary of Use and Management

Management in the North Rudyard management area (MA) (Figure 4.24.1) will emphasize wildlife habitat, timber production and provide for forest-based recreational opportunities. Wildlife habitat management will include: maintaining or enhancing the deer wintering area special conservation area; perpetuating early-successional communities for young-forest dependent species; wildlife related recreation opportunities; and maintaining soft and hard mast sources. Timber management within this 10-year planning period will work toward balancing the age classes of aspen; increasing the proportion of young oak; and the continuation of management through selection harvest of the northern hardwood cover type. Expected issues in this 10-year planning period are increased recreational pressure and introduced pests and diseases, especially beech bark disease and emerald ash borer.

### Introduction

The North Rudyard management area is located in the east portion of the eastern Upper Peninsula in central Chippewa County and has 8,256 acres of state-owned land. Wildlife habitat is the primary attribute in this management area. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of clay lake plain, with a small area of sandy lake plain. The northern portion of the management area is in a large, clay lake plain which extends north nearly to Brimley and east to the St. Mary's River. The Clay Lake Plain Ecosystem Project was published in 1995. This Upper Peninsula Resource Conservation and Development report describes the clay lake plain in detail.
- The south end of the management area has an upland ridge where northern red oak is found. Northern red oak is the primary hard mast species in this area. Wildlife game species using this food source include: deer, bear, ruffed grouse, squirrels and turkeys.
- Recreational opportunities include bear, grouse and deer hunting, and snowmobiling.
- In the southeast corner of the management area there is a deer wintering area special conservation area.

The state forest land in this management area is concentrated, with a few private ownerships in the middle. The North Rudyard Management Area is within the Sault Ste. Marie Forest Management Unit. The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.24.1.

Table 4.24.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the North Rudyard management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Lowland Open/Semi-Open Lands	26%	2,182	0	2,182	0	0	2,182	0	0
Aspen	14%	1,128	11	1,117	18	0	1,128	186	0
Cedar	14%	1,124	13	1,111	10	0	1,124	69	0
Lowland Aspen/Balsam Poplar	13%	1,077	96	981	375	0	1,077	164	0
Northern Hardwood	9%	706	0	706	0	102	706	0	344
Lowland Deciduous	8%	635	36	599	6	0	635	67	0
Lowland Conifers	4%	320	64	256	28	0	320	28	0
Lowland Spruce/Fir	3%	261	18	243	0	0	261	27	0
Upland Open/Semi-Open Lands	1%	102	0	102	0	0	102	0	0
Misc Other (Water, Local, Urban)	0%	26	0	26	0	0	26	0	0
Others	8%	695	26	669	70	88	695	83	158
<b>Total</b>	<b>100%</b>	<b>8,256</b>	<b>265</b>	<b>7,991</b>	<b>506</b>	<b>190</b>	<b>8,256</b>	<b>624</b>	<b>502</b>

Others include: tamarack, oak, lowland mixed forest, red pine, upland mixed forest, mixed upland deciduous, upland conifers, upland spruce/fir, and jack pine.

# North Rudyard

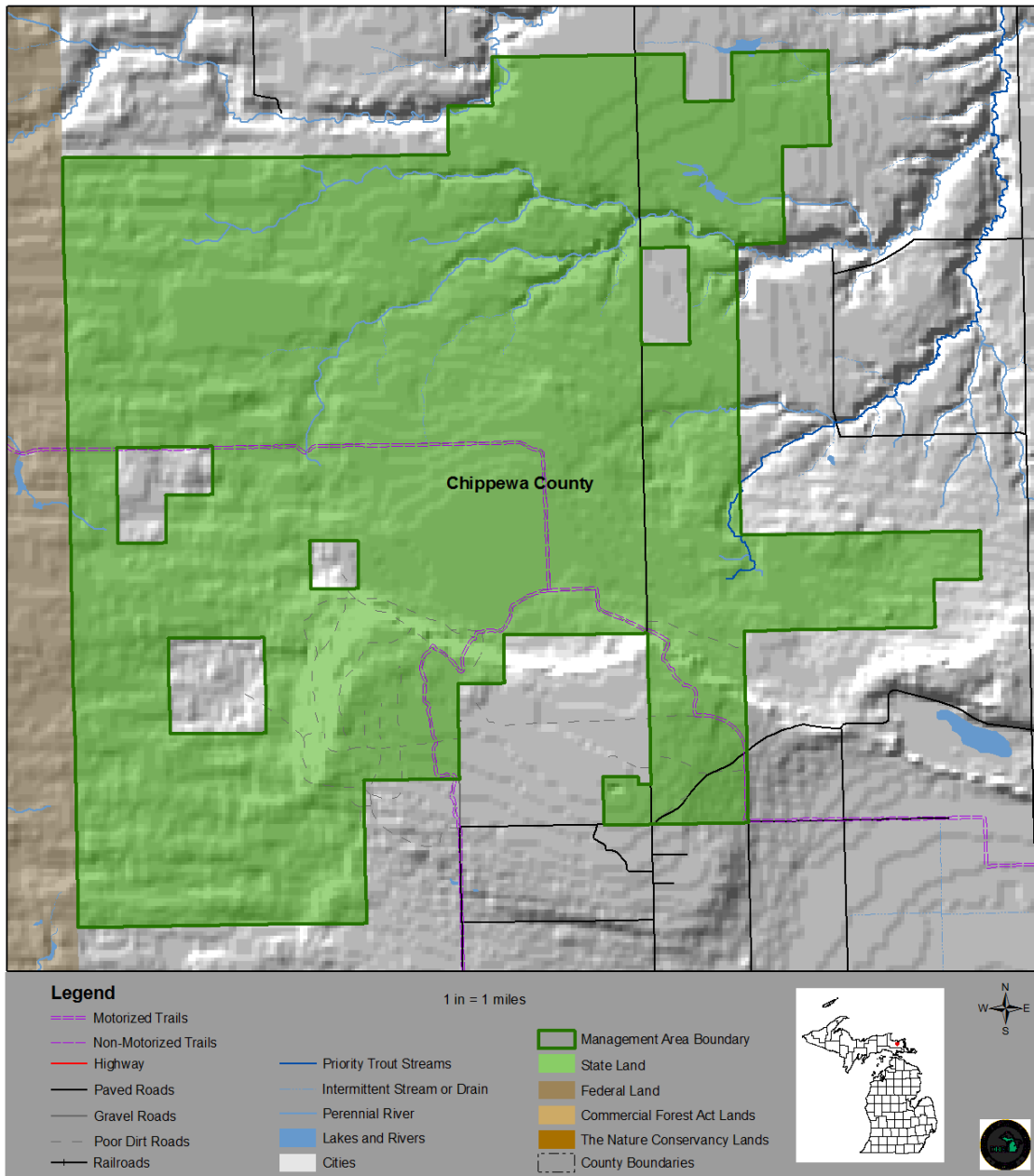


Figure 4.24.1. Location of the North Rudyard management area (dark green boundary) in relation to surrounding state forest lands and other ownerships.

#### **4.24.1 Forest Cover Type Management Direction**

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### **Section 4.24.1.1 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

###### Current Condition

Lowland open/semi-open lands occur on 2,182 acres (26%) of the management area (Table 4.24.1). This category is a combination of: lowland shrub (1,864 acres), marsh (191 acres), bog (127 acres) and treed bog (zero acres). These cover types are valued ecologically as sources of habitat for numerous species of wildlife. Many of these stands are found in association with streams and rivers and contribute to the access issues in the management area. Willow is more abundant than tag alder in the expansive lowland brush areas. Presently, this cover type is used as habitat for sharp-tailed grouse, snowshoe hare and songbirds.

###### Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity.

###### 10-Year Management Objectives

- Maintain this cover type for wildlife habitat; and
- Evaluate lowland brush stands for reversion to younger age classes to provide habitat for woodcock and other species maintaining most of these stands without active management.

###### Long-Term Management Objectives

- Within these stands allow natural processes to occur while protecting their ecological values from man-made disturbances.

##### **Section 4.24.1.2 Forest Cover Type Management – Aspen**

###### Current Condition

Aspen occurs on 1,128 acres (14%) of the management area (Table 4.24.1). Aspen is distributed throughout the management area on dry to mesic, poor- to medium-nutrient sites with Kotar habitat types of PARVAa and ATFD (see Appendix E). Aspen has been consistently harvested in the last 30 years resulting in a large amount of young stands in this area (Figure 4.24.2). Over 25% of the aspen stands have been classified as uneven aged.

Currently, 40 acres of aspen have a final harvest prescribed. There are 11 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of aspen will eventually succeed to late successional species.



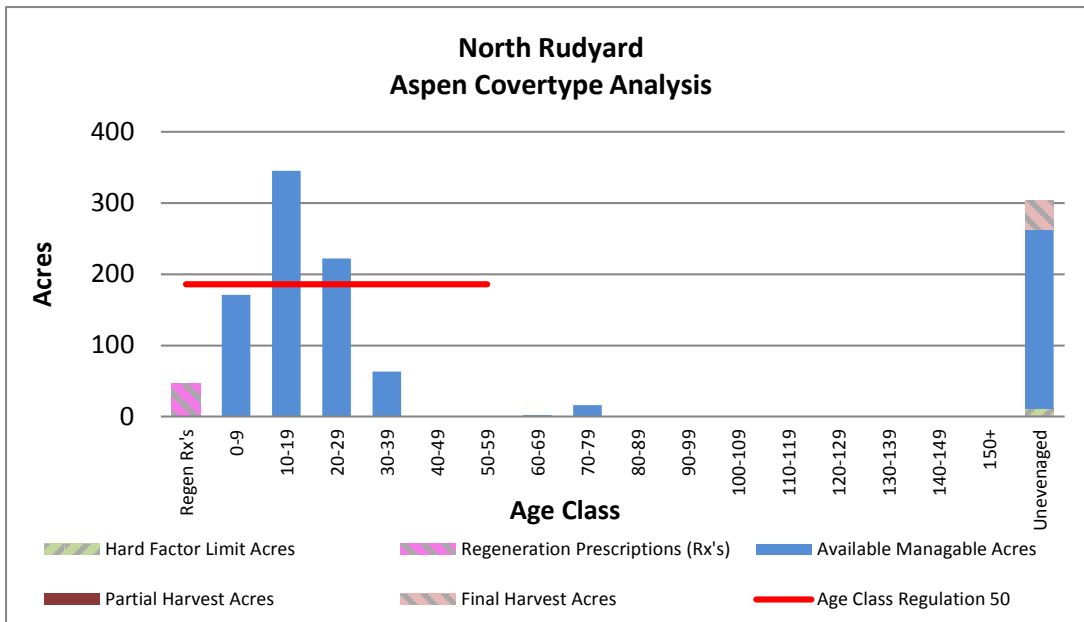


Figure 4.24.2. Age-class distribution of aspen in the North Rudyard management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest of aspen is 18 acres. This reduction from the regulated amount is due to the current age-class structure with most of the stands in young age classes.

Long-Term Management Objectives

- Balance the age-class structure of available aspen providing for a regulated harvest of approximately 186 acres per decade (red line in Figure 4.24.2).

**Section 4.24.1.3 Forest Cover Type Management – Cedar**

Current Condition

Cedar occurs on 1,124 acres (14%) of the management area (Table 4.24.1). Many of the cedar stands are within a wintering deer area special conservation area. Maintaining a closed canopy structure provides important cover for deer, reducing snow depths within the stands. Some of the stands are in areas inaccessible to harvest. There has been no harvest and regeneration work in recent years (Figure 4.24.3). While harvesting of cedar is not emphasized in this management area, look for opportunities to harvest cedar where winter deer habitat is not impacted, cedar regeneration is likely and wetland soils are not adversely impacted.

Currently there are no acres of cedar with a final harvest prescribed. There are 13 acres of cedar that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Cedar stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

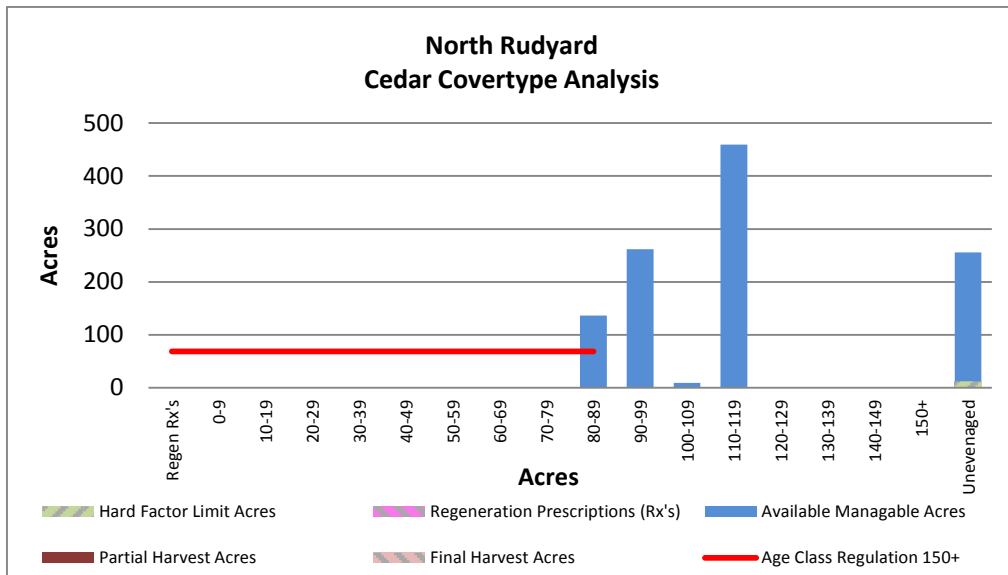


Figure 4.24.3. Age-class distribution of cedar in the North Rudyard management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- In areas where deer browse is a concern, these stands may not be actively harvested.

10-Year Management Objectives

- The 10-year projected final harvest of cedar is 10 acres, with the reduction from the regulated amount due to the deer wintering area. However, harvest of this type, if it occurs, may vary widely from the projected harvest in order to meet the long-term management objectives.
- Ensure that cedar and/or hemlock recruitment/regeneration is reliable if harvesting in this cover type.

Long-Term Management Objectives

- Within the deer wintering areas, focus cedar management on winter habitat for deer;
- Outside of the deer wintering areas, conduct regeneration harvests to diversify the age classes of cedar; and
- A regulated harvest, using a 150 year rotation, would allow approximately 69 acres of cedar to be harvested each decade.

**Section 4.24.1.4 Forest Cover Type Management – Lowland Aspen/Balsam Poplar**

Current Condition

Lowland aspen/balsam poplar occurs on 1,077 acres (13%) of the management area (Table 4.24.1). A portion of the stands have been typed as uneven aged (Figure 4.24.4). Available stands have been successfully harvested and regenerated through natural regeneration resulting in a variety of age classes.

Currently there are 68 acres of lowland aspen/balsam poplar with a final harvest prescribed. There are 96 acres of lowland aspen/balsam poplar that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of lowland aspen/balsam poplar will eventually succeed to late successional species.

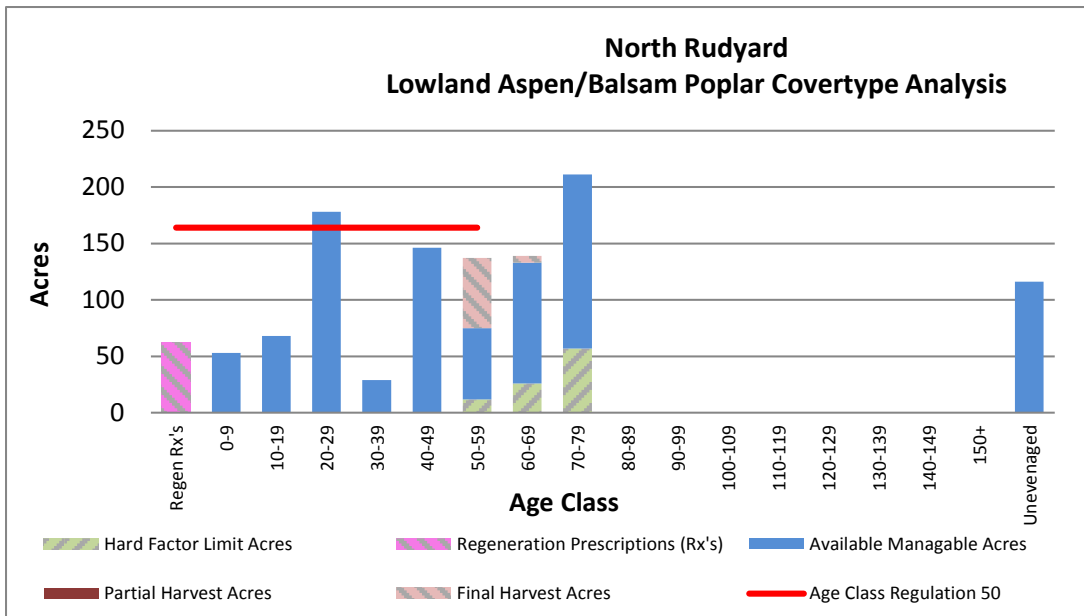


Figure 4.24.4. Age-class distribution of lowland aspen/balsam poplar in the North Rudyard management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland aspen/balsam poplar will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland aspen/balsam poplar is for 375 acres. The increase from the regulated amount is due to the low numbers of acres in the 0-9 and 10-19 year-old age classes and the large number of stands that are over-mature.

Long-Term Management Objectives

- Balance the age class of accessible lowland aspen/balsam poplar providing for a regulated harvest of approximately 164 acres per decade.

**Section 4.24.1.5 Forest Cover Type Management – Northern Hardwood**

Current Condition

Northern hardwood stands occur on 706 acres (9%) of the management area (Table 4.24.1). Northern hardwoods are found on mesic-medium to rich sites with Kotar habitat types of AFPO and AFOAs. These are high quality sites that provide good growth. The majority of the stands have been managed as uneven aged. Northern red oak is often a component of these stands.

In most stands, conduct selection harvests in stands with a basal area over 120 square feet per acre decreasing stocking levels to a basal area of approximately 80 square feet per acre. In general, this will allow most northern hardwood stands to be selectively harvested every 20 years. Where site quality is poor shelterwood and other even-aged harvesting systems will be considered. Recent harvests using even-aged systems are shown in the immature column in Figure 4.24.5.

Beech bark disease is found throughout the management area resulting in high beech mortality. Many stands have had or will have salvage harvests due to beech bark disease. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed, due to resultant lower than normal residual basal area.

Currently there are 540 acres with a partial harvest prescription assigned (Figure 4.24.5). There are no acres of northern hardwoods that have site conditions limiting their harvest at this time.

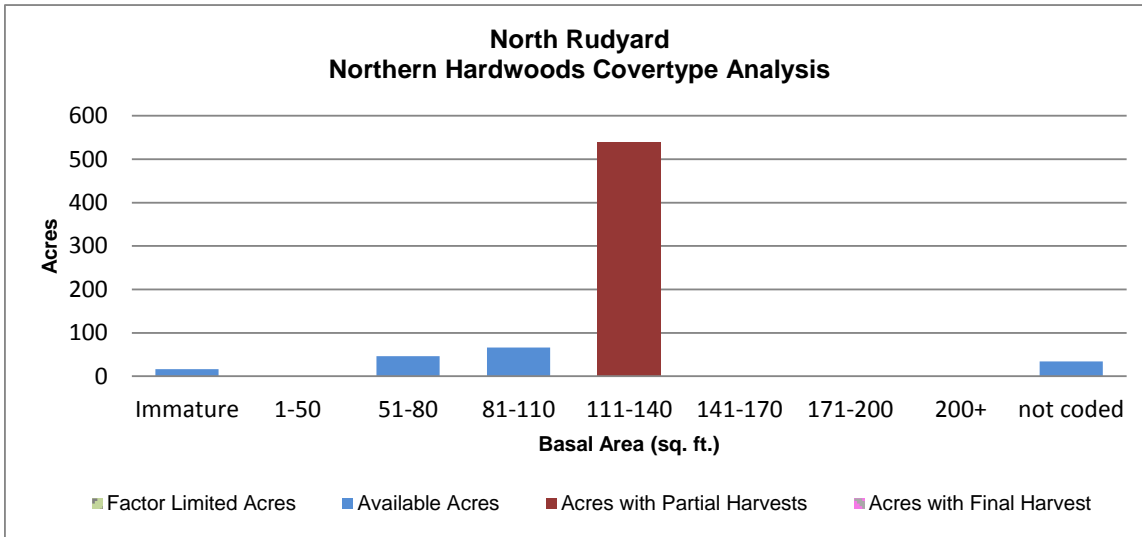


Figure 4.24.5. Basal area distribution of northern hardwoods in the North Rudyard management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwood stands will be maintained on operable sites by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands; and
- Harvesting will provide for a continuous flow of timber products and a variety of wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected partial or selection harvest of northern hardwood is 102 acres;
- Continue salvage harvests of beech affected by beech bark disease using Beech Bark Disease Management Guidelines;
- Evaluate stands that had a component of beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands; and
- To favor regeneration of hardwood other than beech, consider herbicide applications and the planting of hard mast producing trees, including oak and disease resistant beech.

Long-Term Management Objectives

- Selectively harvest northern hardwood stands on a 20-year cycle.

**Section 4.24.1.6 Forest Cover Type Management – Lowland Deciduous**

Current Condition

Lowland deciduous stands occur on 635 acres (8%) of the management area (Table 4.24.1). Lowland deciduous stands in this management area are often found in association with the creeks and drainages making access difficult. Approximately 38% of the lowland deciduous stands have been listed as uneven aged (Figure 4.24.6). This is generally due to natural processes resulting in a range of size and age classes within the inaccessible stands. Natural regeneration has been effective after past harvesting.

Currently there are 120 acres of lowland deciduous with a final harvest prescribed. There are 35 acres of other cover types that are expected to convert to lowland deciduous after harvest. These acres are shown in Figure 4.24.6 in the regeneration prescriptions column. There are 36 acres of lowland deciduous that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland deciduous stands in inaccessible areas will be subject to natural processes (fire, windthrow, insect defoliation and beaver flooding) resulting in a range of successional stages.

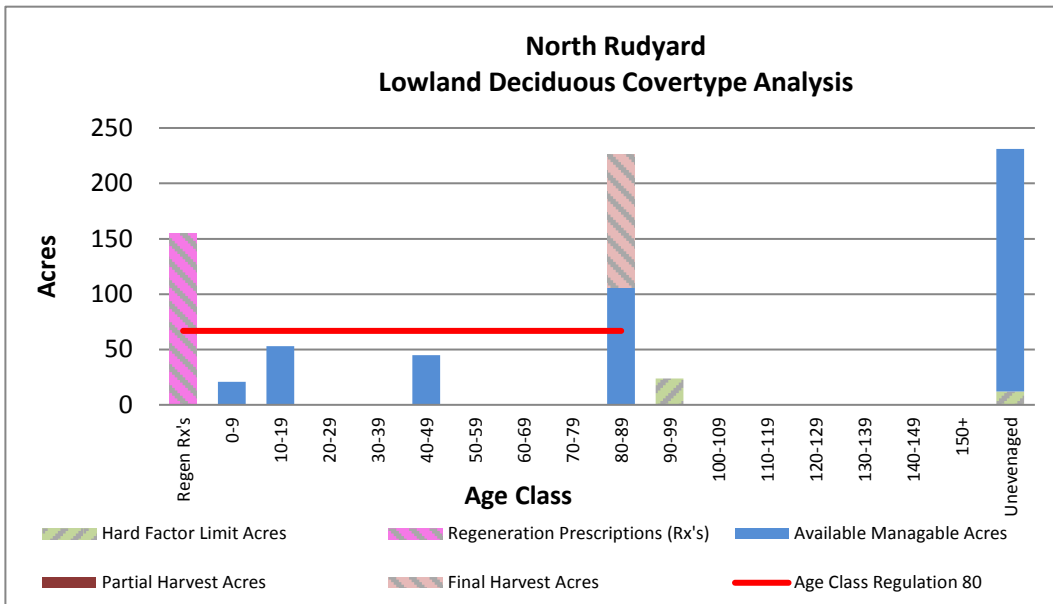


Figure 4.24.6. Age-class distribution of lowland deciduous in the North Rudyard management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland deciduous stands will be maintained on operable sites generally through even-aged management with acres balanced between 0-89 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland deciduous is 6 acres. The decrease from the regulated amount is due to the large number of acres in the regeneration prescriptions column; and
- Follow Emerald Ash Borer Management Guidelines in stands with a component of ash.

Long-Term Management Objectives

- Balance the age class structure of available stands providing for a regulated harvest of approximately 67 acres per decade.

**Section 4.24.1.7 Forest Cover Type Management – Other Types**

Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acres (Table 4.24.1). Lowland conifers (320 acres or 4%) and lowland spruce/fir (261 acres or 3%) are the two largest cover types. Other types is made up of cover types with 2% or less of the total management area acres and includes: tamarack (188 acres), oak (140 acres), lowland mixed forest (92 acres), red pine (77 acres), upland mixed forest (66 acres), mixed upland deciduous (62 acres), upland conifers (38 acres), upland spruce/fir (21 acres) and jack pine (11 acres).

With the exception of oak and red pine most of these cover types will be managed as even-aged stands using natural regeneration after harvest. Mixed stands with high basal areas may be thinned prior to final harvest. Periodically thin red pine stands with high basal area prior to final harvest.

There are approximately 26 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Inaccessible stands may never be harvested and will be subject to natural successional processes.

### Desired Future Condition

- These cover types may be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreation opportunity.

### 10-Year Management Objectives

- The projected 10-year final harvest is 28 acres of lowland conifers and 70 acres of other types; and
- The projected 10-year partial harvest is 88 acres of other types.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## **4.24.2 – Featured Wildlife Species**

A deer wintering complex is adjacent to hardwood stands in the southern part of the management area. These hardwood stands contain oak and provide nutrition to deer that are breaking out of their winter habitat.

### **American Woodcock**

The goal for woodcock in the eastern Upper Peninsula is maintain or increase habitat. Management should address the maintenance of adequate early successional habitat to provide feeding, nesting, brood-rearing habitat and opportunity for hunting.

#### Wildlife habitat specifications:

- Balance aspen age-class distribution within the management area.
- Maintain or increase the aspen cover type within the management area. Where associated with alder, riparian zones or forested wetlands use silvicultural practices that encourage the aspen component in mixed stands.
- Maintain rough openings associated with alder, riparian zones or forested wetlands.

### **Red-shouldered Hawk**

The goal for red-shouldered hawk is to maintain or improve suitable habitat in the ecoregion. Management activities should focus on the maintenance of large blocks of mesic northern forest with the appropriate level of large diameter trees in priority landscapes.

#### Wildlife habitat specifications:

- All known woodland raptor nests should be reported to local wildlife staff and included in Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. Confirmed red-shouldered hawk nests are to be documented in accordance with the DNR Approach to the protection of Rare Species on State Forest Lands (CI 4172) and included in Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. For Red-shouldered hawk nests, the wildlife habitat specifications contained within Michigan DNR's *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August 2012) will be followed until the workgroup has completed the guidance that will permanently replace the interim guidelines.

### **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age-class distribution for aspen in priority landscapes.

#### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Move to balance the age-class distribution of aspen and birch cover types to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation.

- Larger harvest units should have irregular boundaries and include one or two, 1-3 acre unharvested inclusions for every 40 acres over 40 acres in size.
- Evaluate the conifer component in aspen stands, holding or increasing where desirable. Leave conifer under four-inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

### **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states “Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer.” There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

#### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock woolly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### **4.24.3 – Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts with rare species following the guidance in “*DNR’s Approach to the Protection of Rare Species on State Forest Lands*” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed no listed species or natural communities of note occurring in the management area. A colony of great blue herons has been identified. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Special conservation areas found within the management area are high priority trout streams and deer wintering areas as shown in Figure 4.24.7.

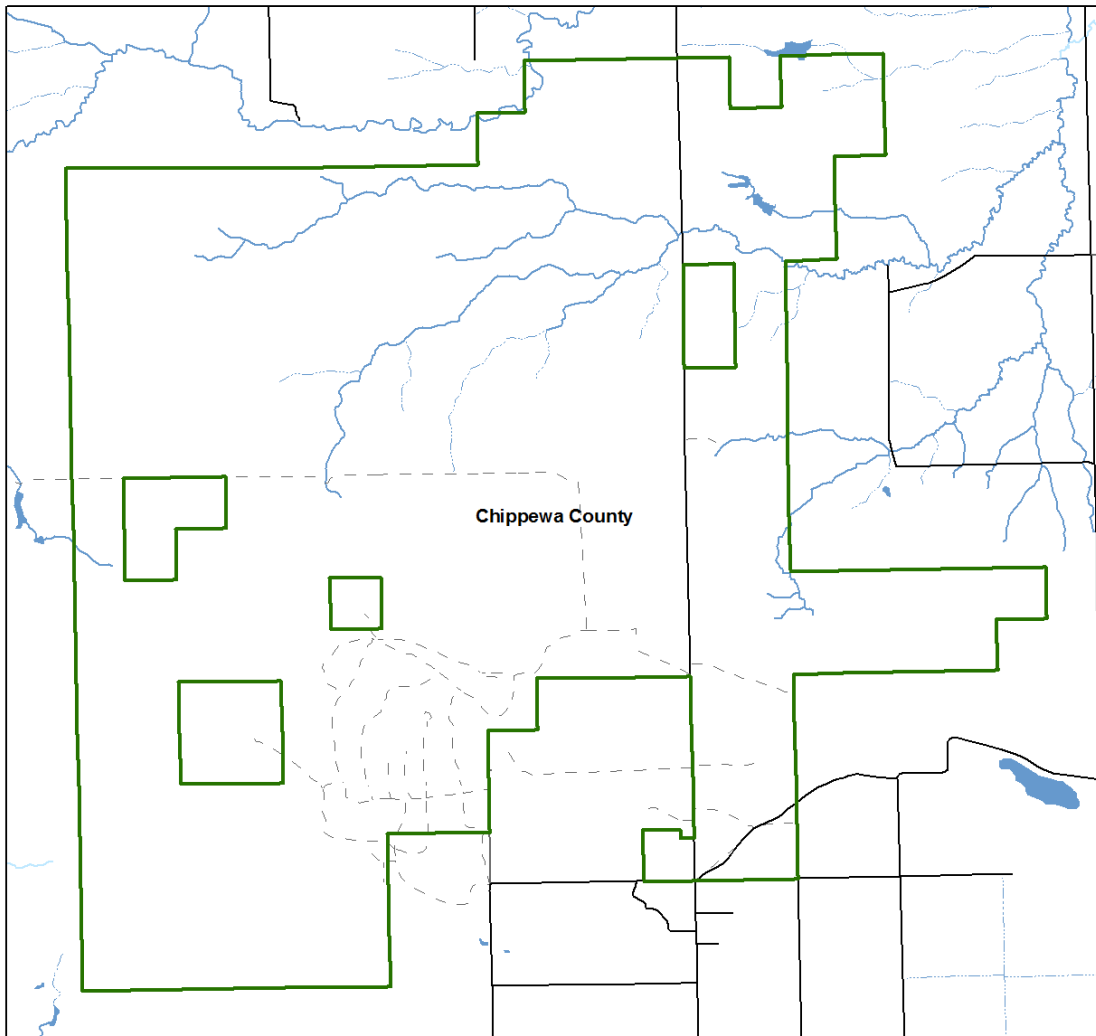
There have been no high conservation value areas or ecological reference areas identified in the management unit as illustrated in Figure 4.24.7.

The management goal during this planning period is:

1. Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.



# North Rudyard



## Legend

- |  |  |   |   |
|--|--|---|---|
| <ul style="list-style-type: none"> <li>— Highway</li> <li>— Paved Roads</li> <li>— Gravel Roads</li> <li>- - - Poor Dirt Roads</li> <li>— Railroads</li> <li>- - - Intermittent Stream or Drain</li> <li>— Perennial River</li> <li>— Lakes and Rivers</li> <li>— Management Area Boundary</li> <li>— Cities</li> <li>- - - County Boundaries</li> </ul> | <ul style="list-style-type: none"> <li>Ecological Reference Areas</li> <li><b>High Conservation Value Areas</b></li> <li>Coastal Environmental Areas</li> <li>Critical Dunes</li> <li>Natural Rivers Vegetative Buffer</li> <li>Natural Rivers Zoning District</li> <li>Critical Coastal Habitat (Piping Plover)</li> <li>Kirtland Warbler Habitat</li> <li>Dedicated Management Areas</li> <li>Natural Areas Legally Dedicated</li> </ul> | <ul style="list-style-type: none"> <li><b>Special Conservation Areas</b></li> <li>Campgrounds</li> <li>Fishing Access Sites</li> <li>Boat Access Sites</li> <li>Mineral Resource Locations</li> <li>Wild &amp; Scenic Rivers (USFS Lands)</li> <li>Visual Management Areas</li> <li>Contiguous Resource Areas</li> <li>Possible Type 1 and Type 2 Old Growth</li> <li>Potential Old Growth</li> <li>Non-Dedicated Natural Areas &amp; National Natural Landmarks</li> <li>Springs, Wetlands, or Riparian Areas</li> </ul> | <div style="text-align: center;"> <p>1 in = 1 miles</p> </div> <div style="text-align: center;"> </div> <ul style="list-style-type: none"> <li>Cold Water Streams &amp; Lakes</li> <li>Wildlife Management Areas</li> <li>Research, Development, and Military Lands</li> <li>Great Lakes Islands</li> </ul> |
|--|--|---|---|

Figure 4.24.7. A map of the North Rudyard management area showing the special resource areas.

#### 4.24.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Aspen and lowland aspen/balsam poplar: white trunk rot and *Hypoxylon* canker;
- Northern hardwoods: beech bark disease; and
- Cover types with ash: emerald ash borer.

For further information on forest health refer to section 3.

#### Invasive Plant Species

Invasive species may pose a major threat to forest resources, impacting timber production, wildlife habitat and recreational access. No invasive plant species have yet been documented within the management area. Purple loosestrife has been documented within a five-mile buffer of the management area (Table 4.24.2) and monitoring efforts should specifically look for new populations of this species. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

Table 4.24.2. Invasive plant species within or near the North Rudyard management area (Data from the Michigan Invasive Plant Identification Network database).

North Rudyard - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	1	1	1
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
-	-	Purple Loosestrife <i>Lythrum salicaria</i>	1	

#### 4.24.5 – Fire Management

Consider reintroducing fire into the oak type in this management area to encourage natural regeneration of the oak.

Prescribed fire may be used to maintain the open nature of some of the natural communities in this management area.

#### 4.24.6 – Public Access and Recreation

County road access is limited to the south and east part of the management area, with the Tilson Road giving north south access. There are few forest roads in the area; therefore, most of the management area is inaccessible.

The only recreational facility is the main snowmobile trail connecting the local communities of Rudyard and Kinross.

#### 4.24.7 – Aquatic Resource Management

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values.

Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. There is one designated high priority trout stream (South Branch of the Waishka River) identified in this management area and the details are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.24.1.

#### **4.24.8 - Minerals**

Surface sediments consist of lacustrine (lake) clay and silt, coarse-textured till, and peat and muck. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the management area and there is potential for additional pits on the uplands.

The Ordovician Trenton and Black River Formations subcrop below the glacial drift. The Trenton and Black River are quarried for stone/dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (14 in Chippewa County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.25 MA 25 – Pictured Rocks Buffer Management Area

### Summary of Use and Management

Pictured Rocks Buffer management area (MA) (Figure 4.25.1) is located adjacent to the fee boundary of Pictured Rocks National Lakeshore. The management area is largely within the inland buffer zone of the park. Management within this management area is conducted with this geographic context in mind. Vegetative management in the Pictured Rocks Buffer management area will emphasize high-quality hardwood management in the west portion of the management area and pine management in the east portion. Goals also include maintaining or enhancing wildlife habitat, protecting areas of unique character and providing recreational opportunities. Aesthetics on travel routes into the Pictured Rocks National Lakeshore should also be emphasized. Expected issues in this 10-year planning period are increased recreational use due to the recent paving of H-58; introduction and spread of invasive species; and introduced pests and diseases, especially beech bark disease.

### Introduction

The Pictured Rocks Buffer management area is located in the northwest part of the eastern Upper Peninsula in Alger County, and has 19,077 acres of state-owned land. Adjacency to the Pictured Rocks National Lakeshore is the primary attribute for this management area. Additional attributes which were important in identifying this management area include:

- The management area falls within the Luce Subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of sandy ridges of end moraine and pitted outwash and lacustrine deposits of glacial and postglacial origin.
- The state land within the management area is fairly concentrated in two separate blocks. The east block of this management area consists of mainly pine types; while the west block consists mainly of hardwoods. Intensive timber management is very important in this management area.
- This management area provides access to Pictured Rocks National Lakeshore, and therefore receives a high amount of drive-through use by park visitors. Pictured Rocks National Lakeshore and DNR work cooperatively on projects within the inland buffer zone.
- Recreational opportunities include: hiking, camping, blueberry picking, bear and deer hunting, trout fishing, snowmobiling and sightseeing.

The east portion of this management area adjacent to the Danaher Kingston Outwash management area and has logging history from the 1800's similar to that area. Remains of old railroad grades and pine camps are still present.

The management area falls within the Shingleton Forest Management Unit. The current predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.25.1.

# Pictured Rocks Buffer

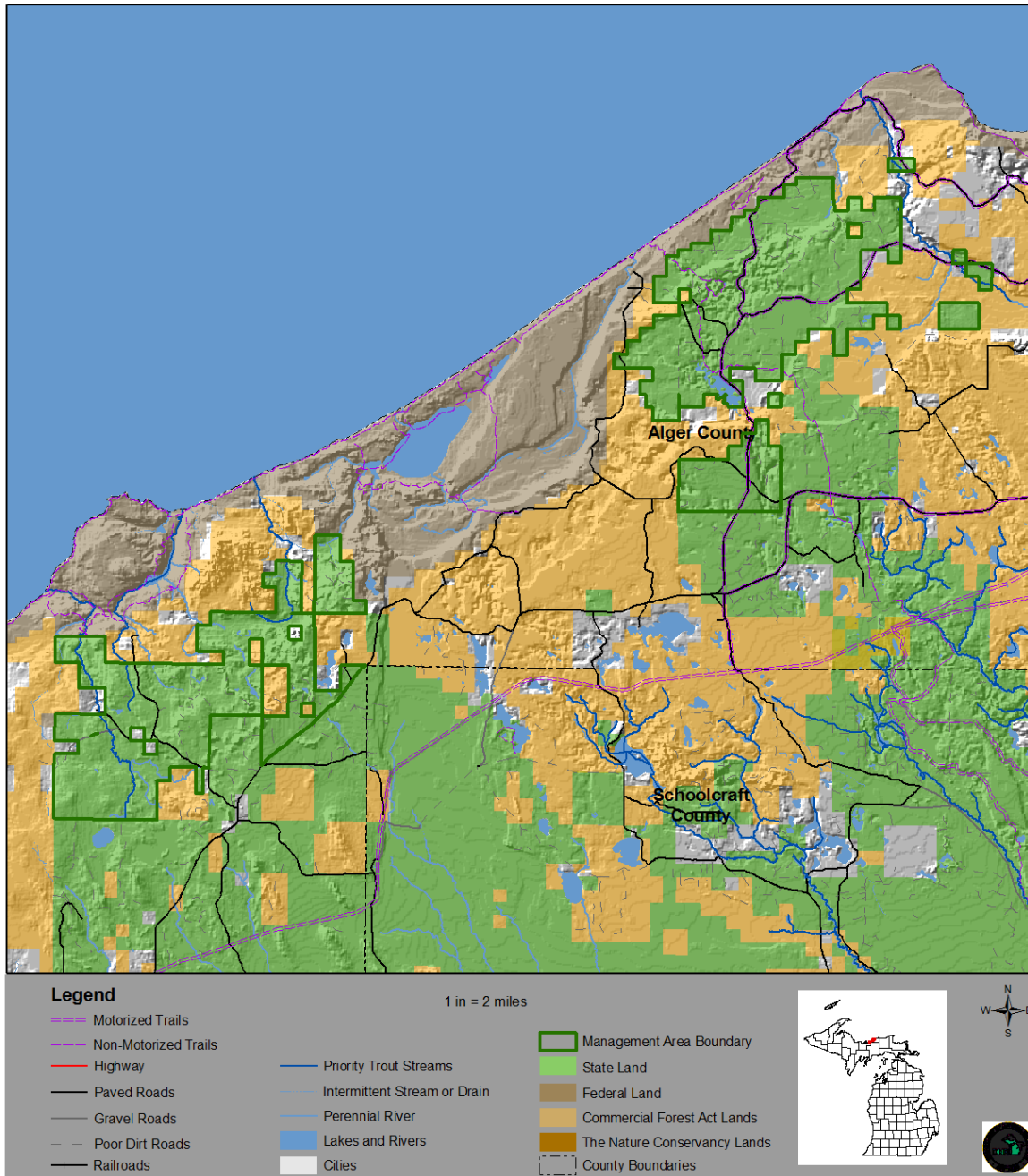


Figure 4.25.1. Location of the Pictured Rocks Buffer management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and Lake Superior.

Table 4.25.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Pictured Rocks Buffer management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Northern Hardwood	33%	6,306	398	5,908	0	2,059	6,306	0	2,763
Red Pine	16%	3,131	0	3,131	348	967	3,131	348	1,814
White Pine	8%	1,542	0	1,542	140	600	1,542	140	600
Cedar	6%	1,054	140	914	57	0	1,054	57	0
Upland Open/Semi-Open Lands	5%	1,015	0	1,015	0	0	1,015	0	0
Lowland Conifers	5%	957	256	701	95	0	957	78	0
Aspen	5%	951	29	922	0	0	951	154	0
Jack Pine	5%	887	0	887	43	0	887	127	0
Lowland Open/Semi-Open Lands	3%	534	0	534	0	0	534	0	0
Misc Other (Water, Local, Urban)	2%	387	0	387	0	0	387	0	0
Others	12%	2,313	229	2,084	231	83	2,313	234	403
<b>Total</b>	<b>100%</b>	<b>19,077</b>	<b>1,052</b>	<b>18,025</b>	<b>914</b>	<b>3,709</b>	<b>19,077</b>	<b>1,138</b>	<b>5,580</b>

Others include: natural mixed pines, lowland deciduous, paper birch, upland conifers, mixed upland deciduous, hemlock, upland spruce/fir, lowland mixed forest, upland mixed forest and oak.

#### 4.25.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### Section 4.25.1.1 Forest Cover Type Management – Northern Hardwoods

###### Current Condition

Northern hardwood stands occur on 6,306 acres (33%) of the management area (Table 4.25.1). The majority of the hardwood stands are found in the west part of the management area, and consist of high quality sugar maple stands with a Kotar habitat types of AFOAs and AFPo (see appendix E). Management of the northern hardwood stands in the west block of the management area is intensive. Hardwood stands throughout the management area have generally been managed as uneven-aged stands, with individual tree selection harvests about every 20 years.

In the east portion of the management area, the northern hardwood stands contain more red maple, beech, white pine and hemlock. These stands are less productive than the west block, and have habitat types of ATFD and PArVAa. Where site quality is poor, shelterwood and other even-aged harvesting systems will be considered.

Beech bark disease is prevalent in this management area and many stands have had or will have salvage harvests due to beech bark disease. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

Currently, 1,035 acres of northern hardwood have a selection harvest prescription assigned and 16 acres have a final harvest prescribed (Figure 4.25.2). There are 269 acres of other cover types that are expected to convert to northern hardwood after harvest. These acres have already been accounted for in Figure 4.25.2. There are 398 acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

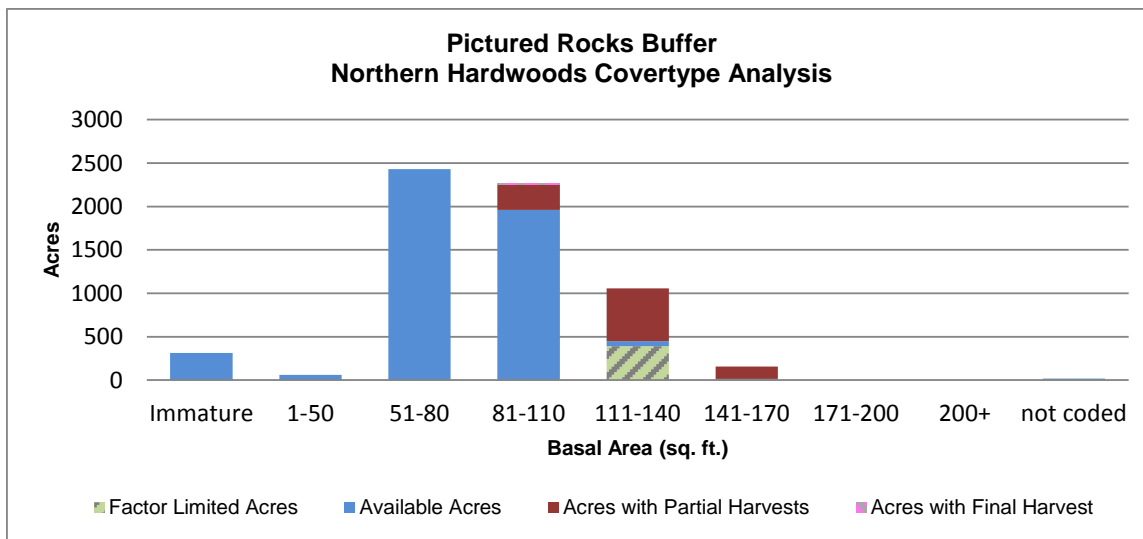


Figure 4.25.2. Basal area distribution of northern hardwood in the Pictured Rocks Buffer management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Northern hardwood stands will be maintained on operable sites using individual tree selection harvests to provide uneven-aged compositionally and structurally diverse stands; and
- Harvesting will provide for a continuous flow of timber products and a variety of wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected partial or selection harvest of northern hardwood is 2,059 acres.
- Evaluate beech dominated forests to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands;
- Consider herbicide application on beech regeneration to promote regeneration of other species; and
- In areas that are losing beech to beech bark disease, consider planting disease resistant beech or oak after harvesting to increase the availability of hard mast.

#### Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

### **Section 4.25.1.2 Forest Cover Type Management – Red Pine**

#### Current Condition

Red pine occurs on 3,131 acres (16%) of the management area (Table 4.25.1). Almost all of the red pine stands are found in the east portion of the management area on sandy soils with habitat types PVE and PARV (see appendix E). There are both natural and planted stands. The majority of the planted stands are 40-59 years old, whereas the stands over 70 years of age are of natural origin (Figure 4.25.3). The natural red pine stands have been managed using individual tree selection followed by shelterwood or seed tree harvests. This has developed uneven-aged stands. Many of the natural stands are mixed with white pine and have been managed to maintain the mix. Planted red pine stands are thinned approximately every 10 years starting about age 40-50 depending on site quality and followed by a regeneration harvest at economic maturity. Regenerate these stands by re-planting to red pine or to jack pine on very poor PVE habitat sites.

Currently there are 749 acres of red pine prescribed for with a partial harvest. There are no acres of red pine prescribed for final harvest. There are some acres of other types currently prescribed for harvest that will be converted to red pine after harvest and some acres of red pine that will be converted to other types after harvest. This may slightly increase the red pine acreage this decade. At this time there are no stands with hard factor limits.

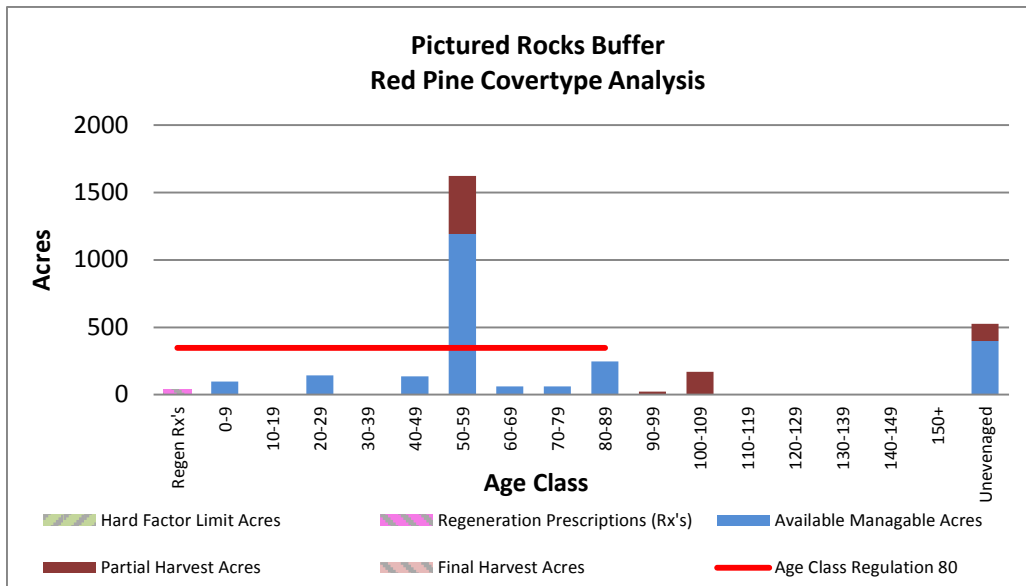


Figure 4.25.3. Age-class distribution of red pine in the Pictured Rocks Buffer management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Red pine will be maintained and managed through thinning until stand replacement harvest at economic maturity with acres balanced between 0-89 years of age to provide for continual harvest, wildlife habitat and recreational opportunity.

10-Year Management Objectives

- The 10-year projected final harvest of red pine is 348 acres to work toward balancing the age classes of red pine; and
- The 10-year projected partial harvest of red pine is 967 acres of thinning in stands 50-80 years old.

Long-Term Management Objectives

- Balance the age-class structure of red pine to provide a regulated harvest of approximately 348 acres of red pine per decade;
- Stands will be continually thinned until they meet silvicultural criteria; and
- While the intent is to maintain existing red pine acreage, conversion to jack pine or grass on lower quality planted sites or to white pine in natural mixed stands may slightly change red pine acreage over time.

**Section 4.25.1.3 Forest Cover Type Management – White Pine**

Current Condition

White pine occurs on 1,542 acres (8%) of the management area (Table 4.25.1), the majority of which are in the east block. White pine stands in this area are often found on Rubicon sands and have a PVE or PArV habitat type. All white pine stands in this management area are natural stands. Many of these stands are mixes of white and red pine. White pine is also found in association with aspen and hardwood. As white pine reproduces very well in this area natural regeneration is successful after harvesting. Approximately 67% of the white pine stands have been managed as uneven-aged; using individual tree selection harvesting followed by shelterwood or seed tree harvesting at economic maturity. The basal area distribution of white pine is shown in Figure 4.25.4.

There are no acres of white pine currently prescribed for final harvest. There are 21 acres of white pine prescribed for partial harvest or thinning. At this time there are no stands with hard factor limits.



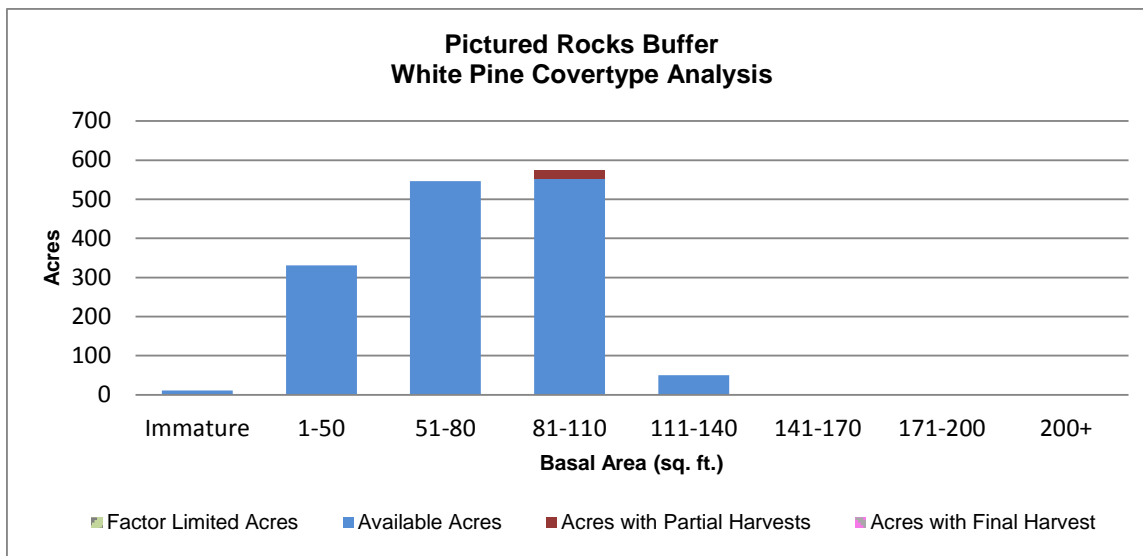


Figure 4.25.4. Age-class distribution of white pine in the Pictured Rocks Buffer management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- White pine stands will be maintained on operable sites with acres balanced between 0-109 years of age to provide for continual harvesting, wildlife habitat and recreational opportunities; and
- White pine stands will be managed through thinning up until rotation age followed by shelterwood or seed tree regeneration harvests.

#### 10-Year Management Objectives

- The 10-year projected final harvest of white pine is 140 acres, generally using seed tree harvesting; and
- The 10-year projected partial harvest of white pine is 600 acres.

#### Long-Term Management Objectives

- Balance the age classes of available white pine providing for a regulated harvest of approximately 140 acres per decade.

### **Section 4.25.1.4 Forest Cover Type Management - Cedar**

#### Current Condition

Cedar stands are found on 1,054 acres (6%) of the management area (Table 4.25.1). Generally, these stands are found in riparian zones in the west block of the management area. A portion of the cedar stands are listed as uneven-aged, showing evidence of successful cedar regeneration (Figure 4.25.5). While cedar has not been a focus for harvesting, successful harvesting and regeneration have somewhat diversified the age classes. Consider prescribed burning to aid natural regeneration.

Currently there are no acres of cedar prescribed for harvest. There are 140 acres of cedar that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Cedar stands in inaccessible areas will be subject to natural processes resulting in a range of successional stages.

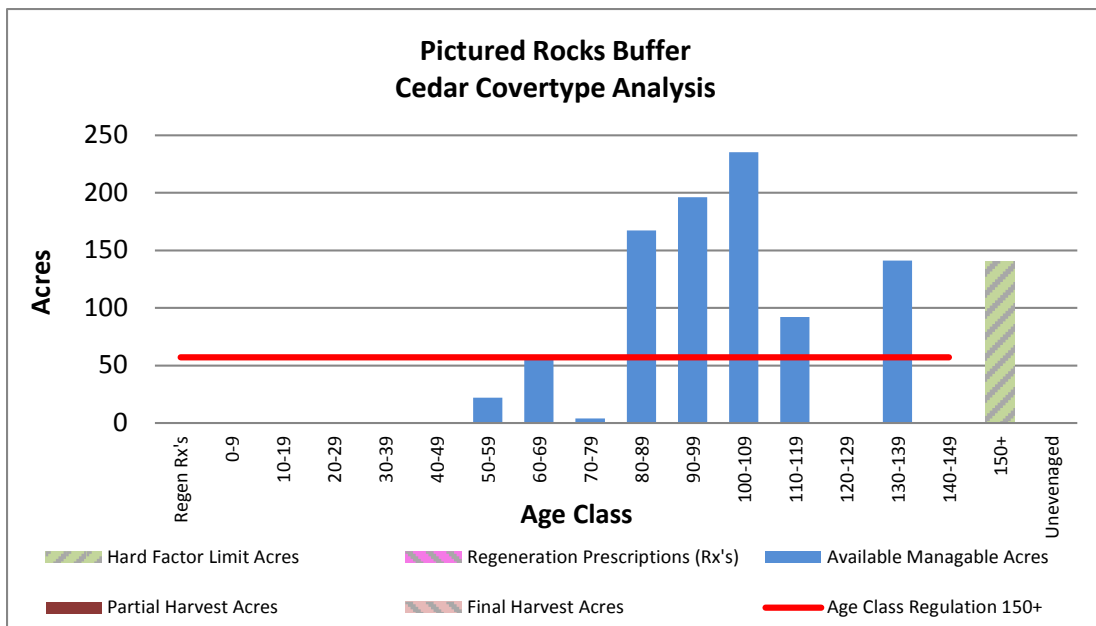


Figure 4.25.5. Age-class distribution of cedar in the Pictured Rocks Buffer management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Where deer wintering is not a concern, cedar communities will be maintained on operable sites through even-aged management balancing the acres between 0-159 years of age to provide for regulated harvest, wildlife habitat and recreational opportunity.

10-Year Management Objectives

- The 10-year projected final harvest of cedar is approximately 57 acres.

Long-Term Management Objectives

- In accessible areas outside of deer wintering areas, balance the age class structure providing for a regulated harvest of approximately 57 acres per decade.

**Section 4.25.1.5 Forest Cover Type Management – Upland Open/Semi-Open Lands**

Current Condition

Upland open/semi-open lands occur on 1,015 acres (5%) of the management area (Table 4.25.1). This category is a combination of the following non-forested land cover types: herbaceous open land (713 acres), bare/sparsely vegetated (62 acres), low-density trees (183 acres) and upland shrub (128 acres). Most of these stands are on sandy unproductive soils in the east part of the management area at the north end of the Kingston plains. Herbaceous open land is a general term and in this area represents the low vegetation consisting of bracken fern, blueberry, reindeer moss, blue *Cladonia* and black huckleberry. Natural succession of small openings to white pine is occurring where site conditions favor quality white pine and opening maintenance projects are not prescribed.

Red and jack pine in the east portion of the management area were often planted in 10, 20 and 40 acre blocks with grass openings between. Some herbaceous opening stands may be converted to red or jack pine in order to consolidate the acreage of similar types into larger blocks for habitat and ease of management. In other locations, less productive forest stands may be converted to herbaceous opening to offset conversions to forested cover and to allow for consolidated management. The total acreage of herbaceous opening verses pine will be maintained.

Desired Future Condition

- Large openings will be maintained or enhanced on suitable sites benefiting open-land wildlife species.

Long-Year Management Objectives

- Continue to maintain the large openings for wildlife using effective methods including timber harvesting, chipping and prescribed burning.

**Section 4.25.1.6 Forest Cover Type Management - Lowland Conifers**

Current Condition

Lowland conifers occur on 957 acres (5%) of the management area (Table 4.25.1). Almost 10% of the lowland conifer stands have been classified as uneven aged having trees of varying ages and sizes as a result of natural processes (Figure 4.25.6). Lowland conifer stands have been successfully harvested and regenerated through natural regeneration resulting in a wide range of age classes.

Currently there are five acres of lowland conifers with a final harvest prescribed. There are 256 acres of lowland conifers that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations. Lowland conifer stands in areas inaccessible for harvest will be subject to natural processes resulting in a range of successional stages.

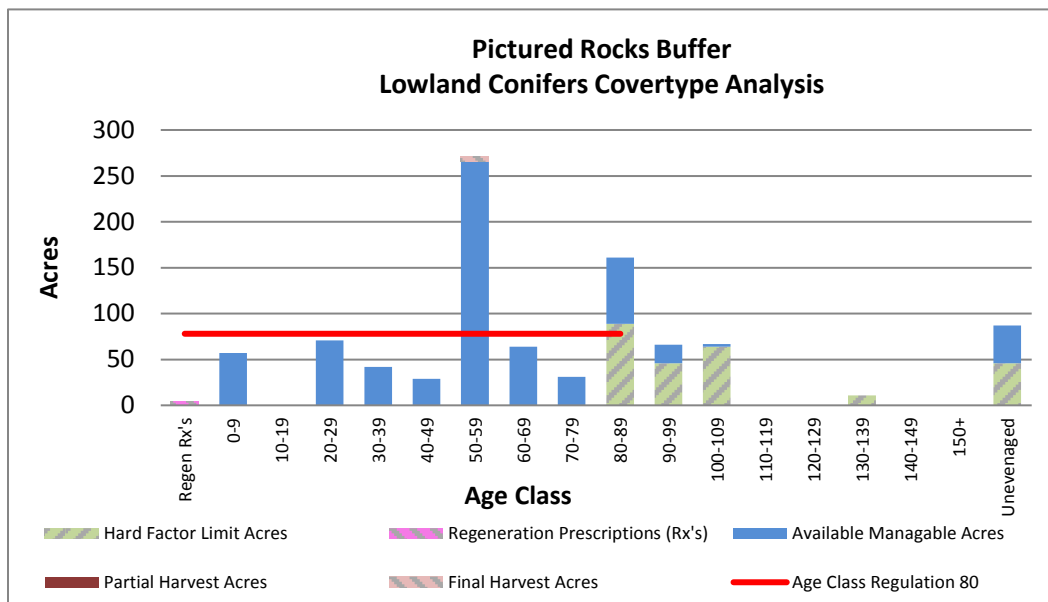


Figure 4.25.6. Age-class distribution of lowland conifers in the Pictured Rocks Buffer management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifers will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age providing for a regulated harvest, wildlife habitat and recreation opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 95 acres which is slightly higher than the regulated amount due to the current age-class structure.

Long-Term Management Objectives

- Balance the age-class structure of accessible lowland conifers providing for a regulated harvest of approximately 78 acres per decade.

## Section 4.25.1.7 Forest Cover Type Management - Aspen

### Current Condition

Aspen occurs on 951 acres (5%) of the management area (Table 4.25.1). Aspen stands are distributed throughout the management area mainly on Rubicon sands of outwash plains with Kotar habitat types of PVE and PArV in the east block and on ground moraines with Kotar types of AFPo and AFOAs in the west block. Aspen has been consistently harvested and regenerated in recent years resulting in over 80% of the aspen acres in the 0-9, 10-19 and 20-29 year-old age classes (Figure 4.25.7). A portion of the aspen acres have been classified as uneven-aged stands. These aspen stands are generally old open areas that are regenerating with different aged aspen clones.

Currently there are 13 acres of aspen with a final harvest prescribed. Approximately 37 acres of other cover types prescribed with a final cut are expected to convert to aspen after harvest. These acres have been accounted for in Figure 4.25.7. There are 30 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations. Inaccessible stands of aspen will eventually succeed to late successional species.

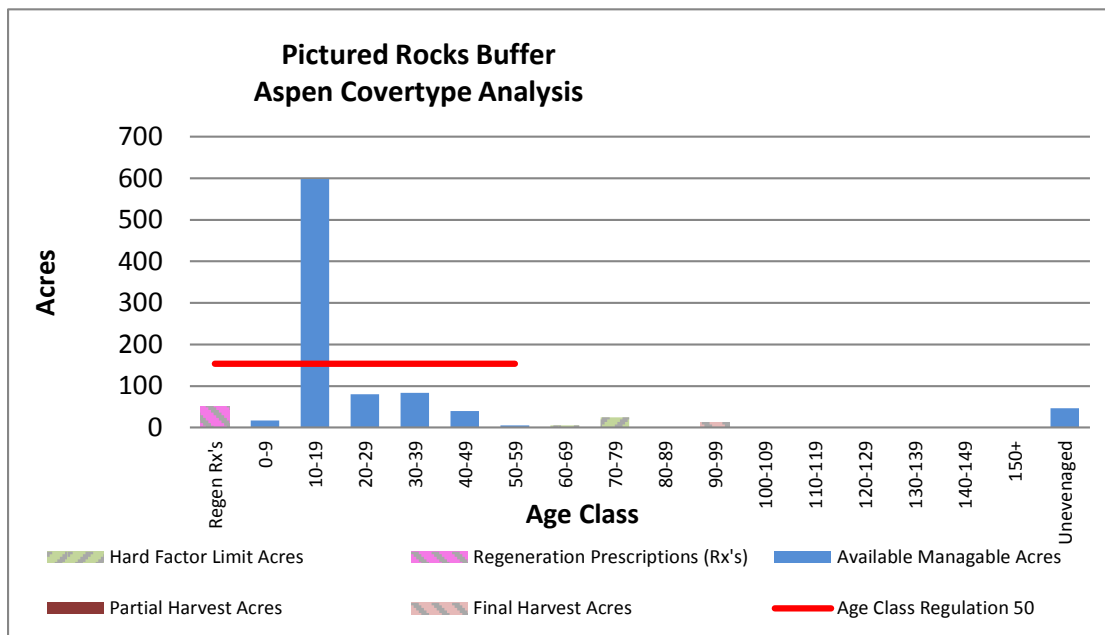


Figure 4.25.7. Age-class distribution of aspen in the Pictured Rocks Buffer management area (2012 Department of Natural Resources inventory data).

### Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreation opportunities.

### 10-Year Management Objectives

- The 10-year projected final harvest of aspen is zero acres. The reduction in acres from the regulated amount is because the majority of the stands are in young age classes.

### Long-Term Management Objectives

- Balance the age-class structure of accessible aspen stands providing for a regulated harvest of approximately 154 acres per decade.

## Section 4.25.1.7 Forest Cover Type Management – Jack Pine

### Current Condition

Jack pine stands occur on 887 acres (5%) of the management area (Table 4.25.1). There are both planted and natural stands of jack pine; nearly all are in the east block of the management area on sandy soils with a Kotar habitat type PVE. Jack pine has been consistently harvested and regenerated resulting in a variety of age classes. While most of the stands were regenerated naturally through scarification or prescribed fire some were replanted. To take advantage of site conditions and to provide for wildlife habitat, stands of jack pine, red pine and open land may be moved or consolidated. Total acreage of jack pine is expected to remain similar.

Currently there are 118 acres of jack pine with a final harvest prescription assigned (Figure 4.25.7). There are some acres in other cover types that are expected to convert to jack pine after harvest. These acres are accounted for in Figure 4.25.7. There are no acres of jack pine that have site conditions limiting their harvest at this time.

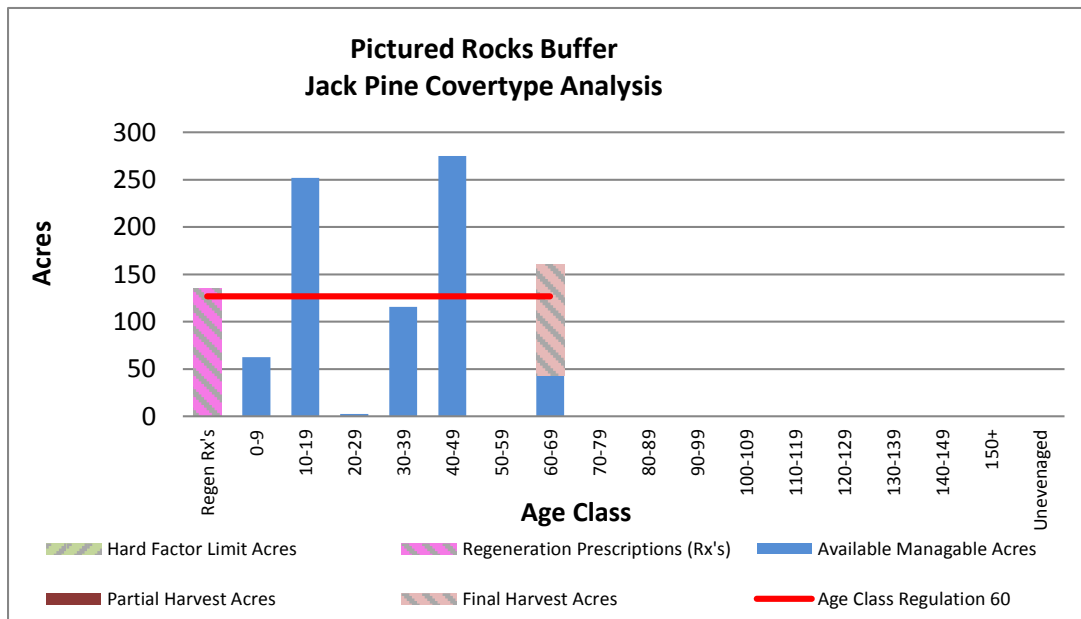


Figure 4.25.7. Age-class distribution of jack pine in the Pictured Rocks Buffer management area (2012 Department of Natural Resources inventory data).

### Desired Future Condition

- Jack pine will be maintained on operable sites through even-aged management. In general, acres will be balanced between 0-69 years of age to provide for continual harvest, available wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The 10-year projected final harvest of jack pine is 43 acres with the decrease from the regulated amount due to the small number of jack pine in older age classes.

### Long-Term Management Objectives

- Balance the age classes of jack pine providing for a regulated harvest of approximately 127 acres per decade; and
- Maintain a lower acreage of over-mature stands to lessen the prevalence and severity of jack pine budworm outbreaks.

## Section 4.25.1.8 Forest Cover Type Management – Other Types

### Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acres (Table 4.25.1). The “other forest cover types” category has approximately 2,313 acres (12%) of the management area. This category includes: natural mixed pines (644 acres), lowland deciduous (494 acres), paper birch (437 acres), upland conifers (194 acres), mixed upland deciduous (190), hemlock (150 acres), upland spruce/fir (100 acres), lowland mixed forest (75 acres), upland mixed forest (22 acres) and oak (seven acres). The majority of these forested cover types are managed using even-aged harvesting systems and will be reforested by natural regeneration. For even-aged management types, attempt to balance the acres using standard rotation ages.

There are 229 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands may never be harvested and will be subject to successional processes.

Lowland open/semi open lands has 534 acres (3%) and is made up of marsh (226 acres), lowland shrub (179 acres), treed bog (102 acres) and bog (27 acres). Miscellaneous other has 387 acres (2%) and is made up of water, roads and sand/soil.

### Desired Future Condition

- These cover types may be managed on operable sites by using even-aged management systems; and
- Harvesting and regenerating these cover types will contribute to the compositional diversity of the landscape in addition to providing wood products, wildlife habitat and recreational opportunity.

### 10-Year Management Objectives

- The projected 10-year final harvest is 231 acres of other types; and
- The projected 10-year partial harvest is 83 acres of other types.

### Long-Term Management Objectives

- Where there is sufficient acreage, balance the age classes of these cover types to provide a sustainable yield of forest products and wildlife habitat.

## 4.25.2 – Featured Wildlife Species

The primary cover type in this management area is northern hardwoods which have high wildlife values. Balancing timber harvests with the desire for mature forest conditions for some species will be essential.

### **American Marten**

The goal for marten in the eastern Upper Peninsula is to maintain or increase suitable habitat and strive to identify, maintain and connect known populations to facilitate genetic exchange. Management should address the maintenance and improvement of corridors, dead wood and conifer components in priority landscapes.

### Wildlife habitat specifications:

- Identify key stands that provide linkages between habitat areas. In these stands, maintain a minimum of 30% canopy cover as marten tend to avoid stands with less canopy cover.
- Identify and maintain corridors between large forested tracts.
- Where coarse woody debris is lacking, increase both standing dead and down dead wood by leaving at least three large diameter (>14 inches in diameter at breast height) live trees to serve as future den trees, snags, coarse woody debris and logs on the ground per acre in harvested stands.
- Increase the within-stand component of mesic conifers in mixed stands. Consider under-planting on suitable sites where a seed source is absent.
- Limit biomass harvesting and whole tree harvesting in key marten areas.

## **Blackburnian Warbler**

The goal for blackburnian warbler is to maintain suitable breeding habitat. Management for the species should focus on within stand diversity, habitat fragmentation and conifer components in this management area.

### Wildlife habitat specifications:

- Increase the mesic conifer (e.g., hemlock, white pine, red pine and upland spruce-fir) component on state forests by: a) Retaining a larger percentage of mesic conifer during harvests; b) Using silvicultural practices that encourage the regeneration of mesic conifer; and c) Where desired/feasible, underplanting hemlock, white pine and white spruce in hardwood-dominated stands on suitable sites without a seed source.
- Provide more older mesic conifers, particularly hemlock, in the landscape by: a) Allowing some actively managed stands of mesic conifer to grow beyond standard rotation ages; b) Including mature mesic conifers as within-stand structure retained during harvests by following Within-Stand Retention Guidance during harvests; and c) Maintaining mature mesic conifer stands within travel corridor and riparian zone or Type 1 or 2 old growth special conservation areas.
- Use silvicultural practices that retain and expand multi-story hemlock stands and hemlock inclusions within hardwood complexes through group selection, scarification and/or direct planting.

## **Northern Goshawk**

The goal for northern goshawk in the eastern Upper Peninsula is to maintain or improve suitable habitat. Management should focus on maintaining contiguous blocks of suitable habitat, providing structural diversity within stands and limiting disturbance to nesting birds in priority areas.

### Wildlife habitat specifications:

- All known woodland raptor nests should be reported to local wildlife staff and included in Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. For northern goshawk nests, the wildlife habitat specifications contained within Michigan DNR's *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August 2012) will be followed until the workgroup has completed the guidance that will permanently replace the interim guidelines.

## **Pileated Woodpecker**

The goal for pileated woodpecker is to maintain or improve habitat. Management should focus on maintaining large diameter deciduous trees in timber sales in priority areas.

### Wildlife habitat specifications:

- Identify and retain large (>15 inches in diameter at breast height) snags and cavity trees, coarse woody debris and reserve trees, as possible to ensure a sustainable supply of future cavity and foraging trees and associated coarse woody debris. Poorly formed trees and those damaged by natural disturbance or earlier harvests, particularly deciduous trees, are good candidates for future snags and cavity trees; trees damaged by beech bark disease that were not salvaged are contributing towards this goal. Large diameter aspen and other soft hardwoods are preferred reserve trees.
- Even-aged managed stands: Leave scattered retention patches around some 18 inches in diameter at breast height or greater secure trees as a nucleus, using the upper end of the Within Stand Retention Guidance.
- Uneven-aged managed stands: Retain a minimum of three secure cavity or snags per acre with one exceeding 18 inches in diameter at breast height. If snags or cavity trees are lacking, leave trees with defects of the maximum available size that will likely develop cavities.
- Salvage harvests deemed necessary to remove dead trees due to insect, disease, or fire will be offset within the same cover type and age class (within the compartment, management area or eastern Upper Peninsula ecoregion) to minimize impacts on pileated woodpecker habitat. Total allowable harvest in these situations will be evaluated on a case-by-case basis.

## **4.25.3 – Rare Species and Special Conservation Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence. Eastern Upper Peninsula Regional State Forest Management Plan MA 25 Pictured Rocks Buffer

Past surveys have noted and confirmed two listed species as well as one natural communities of note occurring in the management area as listed in Table 4.25.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Special conservation areas include: cold water streams and lakes, high priority trout streams, a visual management area covering the majority of the management area for Pictured Rocks National Lakeshore and the Pictured Rocks Inland Buffer Zone Contiguous Resource Area (Figure 4.25.8). Concentrated recreation area special conservation areas (boat access sites and state forest campgrounds) are listed in the Recreation section 4.25.6 below.

Table 4.25.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Pictured Rocks Buffer management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Community</b>								
Rich conifer swamp		S3/G4	Confirmed				Tamarack	Late
<b>Birds</b>								
Common loon	<i>Gavia immer</i>	T/G5/S3-4	Confirmed	HV	Very High	Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
<b>Plants</b>								
American dune wild-rye	<i>Leymus mollis</i>	SC/G5/S3	Confirmed			Open dunes	Upland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.



## Pictured Rocks Buffer

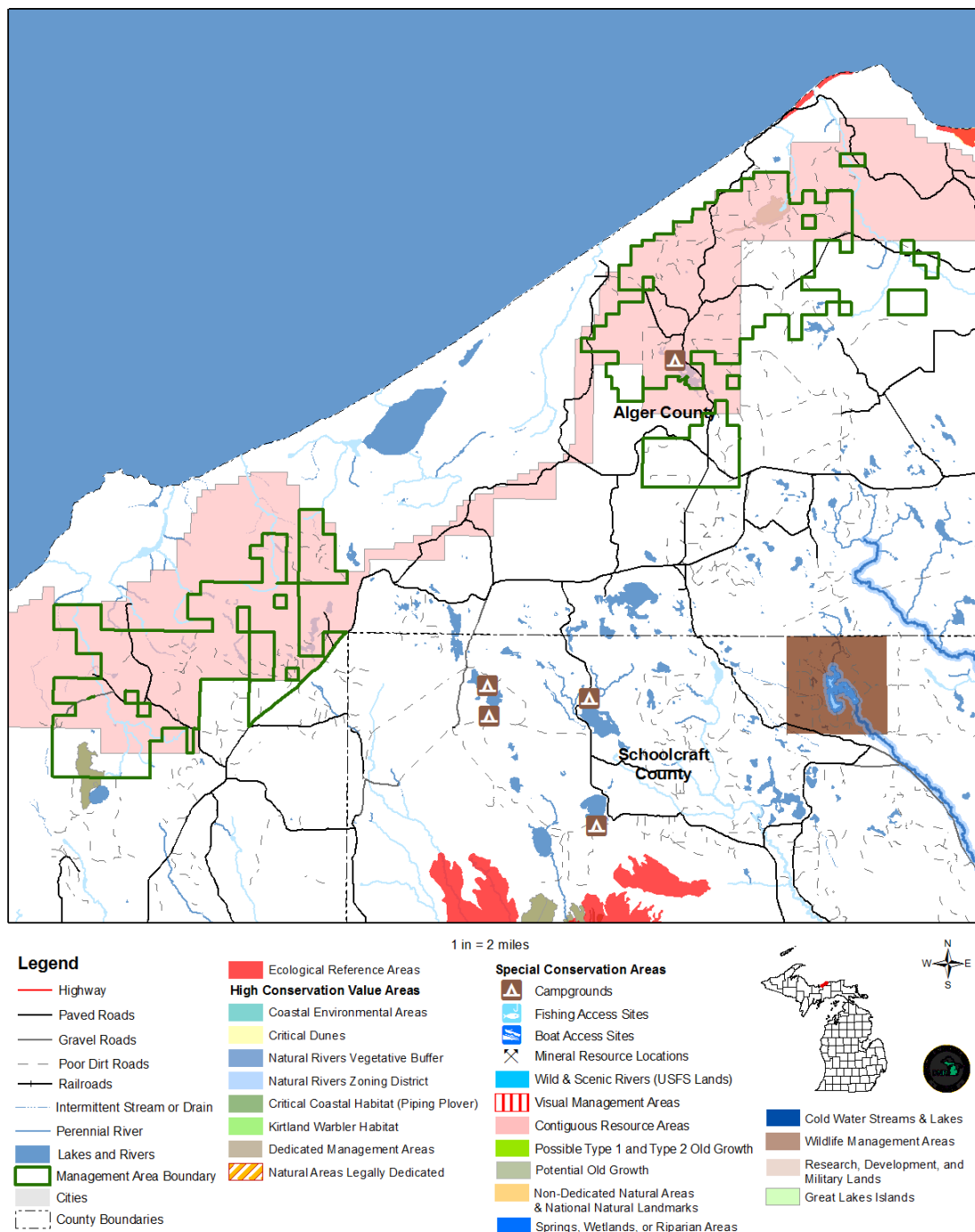


Figure 4.25.8. A map of the Pictured Rocks Buffer management area showing the special resource areas.

There have been no high conservation value areas or ecological reference areas identified for the Pictured Rocks Buffer management area as illustrated in Figure 4.25.8.

The management goal during this planning period is:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.

#### 4.25.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Northern hardwoods: beech bark disease;
- Red and jack pine: jack pine budworm, pine engraver and pine engraver beetles;
- White grubs (Found in the Kingston Plains) and *Scleroderris* canker (The nearby Deer Park management area has a history of *Scleroderris* canker impacting young red and jack pine plantings); and
- White pine: white pine blister rust (Kingston Plains).

For further information on forest health refer to section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys, and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

#### 4.25.5 – Fire Management

Because the key feature of this management area is its proximity to the National Lakeshore instead of any unifying ecological context there are two distinct fire regimes represented. The eastern portion is dominated by barrens and dry forest soils which were subject to more frequent fires. The western portion, dominated by mesic and wet soils, was probably not significantly modified by fire disturbance under natural fire regimes.

Three burns have been conducted in the past to promote pine regeneration on the Kingston plains. Burns in 1983 and 1987 were conducted to remove lichen cover to allow pine establishment. An under-burn was conducted in red pine 1996.

- The Kingston Lake Campground and Fox River Pathway trailheads provide good locations to provide fire prevention information aimed at campers, hikers and berry pickers.
- Prescribed fire may be used to maintain the pine communities in this management area.

#### 4.25.6 – Public Access and Recreation

Gravel county roads and dirt two-track roads provide good access for management and recreation to most of the management area. H-58, the main access route, has been recently paved which has greatly increased the amount of recreational traffic in this area.

Trail facilities include snowmobile trails and the Fox River Pathway (Figure 4.25.1). Other recreational facilities include the Kingston Lake State Forest Campground and public boat access site (Figure 4.25.8).

Blueberry picking is popular in the Kingston Plains area. The entire management area is used for hunting and fishing.

Access to Pictured Rocks National Lakeshore is through this management area. When Pictured Rocks National Lakeshore campgrounds are full, park visitors often camp at nearby Kingston Lake State Forest Campground. People frequently hike the Fox River pathway from Kingston Lake State Forest Campground to Twelve Mile Beach campground in the national lakeshore.

#### 4.25.7 – Aquatic Resource Management

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. Portions of Hurricane, Chapel, Mosquito and Spray creeks are designated high priority trout streams and are identified in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.25.1.

#### **4.25.8 – Minerals**

Surface sediments consist of lacustrine (lake) sand and gravel, an end moraine of medium-textured till, and glacial outwash sand and gravel and postglacial alluvium. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the management area and there is good potential for additional pits on the uplands.

The Ordovician Prairie du Chien and Cambrian Trempealeau Formation and Munising Group subcrop below the glacial drift. The Prairie du Chien and Trempealeau could be used for stone.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (one mineral well in Alger County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.26 MA 26 – Sage Truck Trail Management Area

### Summary of Use and Management

Management in the Sage Truck Trail management area (MA) (Figure 4.26.1) will provide a variety of timber products, maintain or enhance wildlife habitat and provide for forest-based recreational uses. The Sage Truck Trail area is noted for karst features which offer unique plant habitat and recreational opportunities. Features such as caves and sinkholes occur in the Fiborn Quarry area. Timber management will emphasize balancing the age classes of aspen and uneven-aged management of hardwoods. Management activities may be significantly constrained by poor access in the lowland areas. Due to site conditions, winter harvesting is common. Expected issues in this 10-year planning period include introduced pests and diseases and the difficulty of regenerating cedar and other lowland conifer types.

### Introduction

The Sage Truck Trail management area is located in the central portion of the eastern Upper Peninsula in Luce, Chippewa and Mackinac Counties. It has 37,760 acres of state-owned land. The primary attribute is timber harvesting. Additional attributes which were important in identifying this management area include:

- The management area falls within both the Niagaran Escarpment and Lake Plain subsection 8.1, and the Luce subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- Landforms in this management area consist of glacial moraine fragments, lacustrine lowlands, limestone escarpment, morainal lake bed complex and glacial outwash features. Much of this area was flooded at one time (see the Tahquamenon River assessment).
- This management area has limestone bedrock influenced vegetation with areas of limestone exposed at the surface and Karst features including caves.
- This area contains some hardwood knolls with closely associated wetlands to include large bog expanses, black spruce/tamarack forested wetlands and northern white cedar.
- Aspen and hardwood stands make up over one third of the acres in this management area and are managed rather intensively. There is also intensive management of red pine in planted stands occurring along the Dinkey Line Road.
- Much of the coniferous lowland within the management area is managed for closed canopy winter deer habitat; there are deer wintering complex special conservation areas. In addition, this management area provides excellent moose, wolf and bear habitat.
- There are several known archeological sites in the management area including an old homestead and many narrow gauge railroad beds.
- Recreational activities include: snowmobiling, motorcycle and ORV (off-road vehicle) riding and grouse, bear and deer hunting.

The headwaters of the Sage and Hendrie River systems are in this management area. This management area does not contain any significant surface lakes.

The active Hendricks Gravel Quarry and the retired Fiborn Quarry are located in this management area. The Michigan Karst Conservancy owns the 480 acre Fiborn Karst Preserve in the southeast part of this management area which includes an extensive and nearly complete karst drainage system with sinkholes, caves and disappearing streams. A small portion of this system extends onto state owned land.

The state land in this management area is fairly concentrated with some private parcels interspersed within. The Sage Truck Trail management area is within the Newberry and Sault forest management units.

# Sage Truck Trail

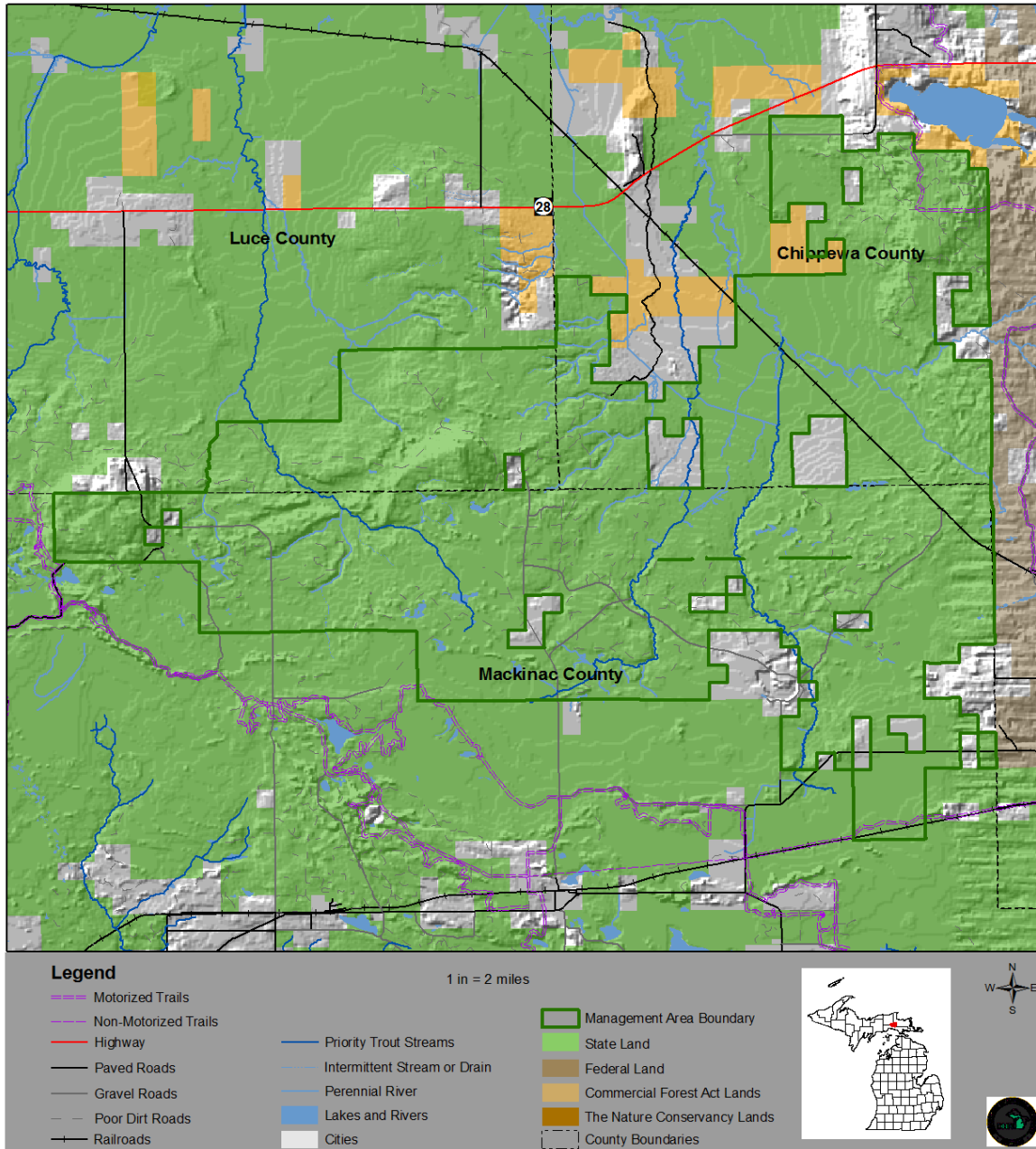


Figure 4.26.1. Location of the Sage Truck Trail management area (dark green boundary) in relation to surrounding State Forest Lands and other ownerships.

The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.26.1.

Table 4.26.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Sage Truck Trail management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Aspen	20%	7,668	517	7,151	192	0	7,668	1,192	0
Lowland Open/Semi-Open Lands	16%	5,924	0	5,924	0	0	5,924	0	0
Northern Hardwood	15%	5,847	638	5,209		2,601	5,847	0	2,501
Cedar	14%	5,236	27	5,209	100	0	5,236	326	0
Lowland Conifers	9%	3,445	995	2,450	272	0	3,445	272	0
Lowland Spruce/Fir	4%	1,491	601	890	99	0	1,491	99	0
Red Pine	3%	1,077	35	1,042	0	315	1,077	116	315
Upland Open/Semi-Open Lands	3%	1,017	0	1,017	0	0	1,017	0	0
Misc Other (Water, Local, Urban)	1%	317	0	317	0	0	317	0	0
Others	15%	5,738	1,252	4,486	896	681	5,738	542	973
<b>Total</b>	<b>100%</b>	<b>37,760</b>	<b>4,065</b>	<b>33,695</b>	<b>1,559</b>	<b>3,597</b>	<b>37,760</b>	<b>2,547</b>	<b>3,789</b>

Others include: upland conifers, mixed upland deciduous, lowland deciduous, upland mixed forest, lowland aspen/balsam poplar, tamarack, lowland mixed forest, upland spruce/fir, paper birch, white pine, hemlock and natural mixed pines.

#### 4.26.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### Section 4.26.1.1 Forest Cover Type Management - Aspen

###### Current Condition

Aspen occurs on 7,668 acres (20%) of the management area (Table 4.26.1). Aspen stands are distributed throughout the management area on a variety of sites from very dry-poor nutrient to mesic-medium nutrient. Kotar habitat types include PARv, PARVAa, ATFD, AFPo and AFOAs (see appendix E). Aspen stands have been successfully harvested and regenerated in recent years resulting in over 70% of the aspen acres being less than 30 years old (Figure 4.26.2).

There are currently 458 acres of aspen prescribed for regeneration harvest. There are some stands of aspen that are expected to convert to other types after harvest and some stands in other types that are expected to convert to aspen after harvest. These acres are shown in Figure 4.26.2 in the regeneration prescriptions column. There are 517 acres of aspen that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of aspen will eventually succeed to late successional species.

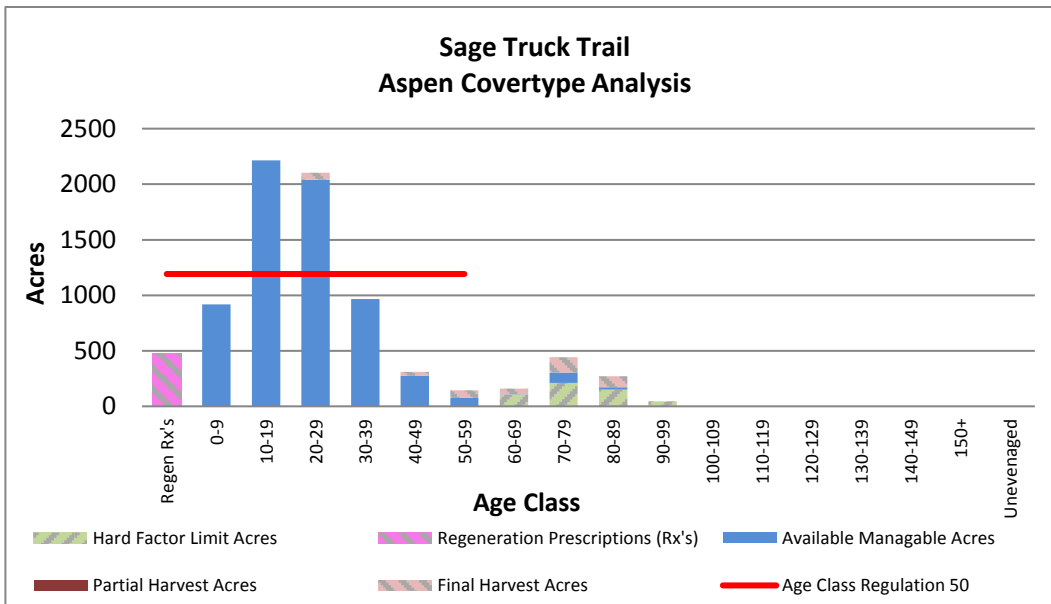


Figure 4.26.2. Age-class distribution of aspen in Sage Truck Trail management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest of aspen is 192 acres with a reduction from the regulated amount due to the current age-class structure where most of the acres are not yet merchantable.

Long-Term Management Objectives

- Balance the age classes of accessible aspen providing for a regulated harvest of approximately 1,192 acres per decade (red line in Figure 4.26.2).

**Section 4.26.1.2 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

Current Condition

Lowland open/semi-open lands occur on 5,924 acres (16%) of the management area (Table 4.26.1). This category is a combination of lowland shrub (4,902 acres), marsh (505 acres), treed bog (435 acres) and bog (82 acres). These wet areas provide important habitat for a large number of wildlife species including moose and songbirds.

Desired Future Condition

- Lowland open/semi-open lands will be retained to ensure an adequate level of wildlife habitat and recreational opportunity.

Long-Term Management Objectives

- In general, these stands will be maintained without active management to protect their ecological values.

### Section 4.26.1.3 Forest Cover Type Management – Northern Hardwoods

#### Current Condition

Northern hardwood stands occur on 5,847 acres (16%) of the management area (Table 4.26.1). The majority of these hardwood stands have been managed as uneven-aged. Stand density, described as basal area (square feet per acre) is used to measure stand condition. Northern hardwoods in this management area are found on a range of sites from dry-mesic poor nutrient to mesic-medium nutrient. Kotar habitat types include PARVAa, ATFD and AFPO. The majority of these sites have high potential to grow quality stems.

Most stands will be harvested using individual tree selection harvests when basal area is over 120 square feet per acre usually about every 20 years. Where site quality is poor shelterwood and other even-aged harvesting systems will be considered.

Beech bark disease is prevalent in this management area resulting in high beech mortality. Salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

Currently 1,379 acres of northern hardwood have a selection harvest prescription assigned and there are 35 acres with a final harvest prescribed (Figure 4.26.3). There are 638 acres of northern hardwood that have site conditions limiting their harvest. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

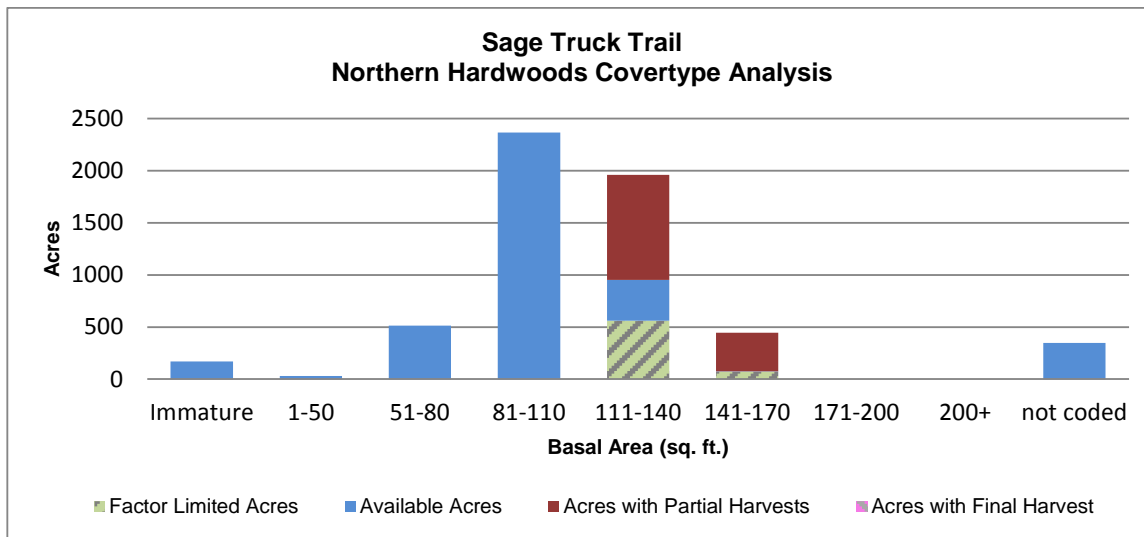


Figure 4.26.3. Basal area distribution of northern hardwoods in the Sage Truck Trail management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Northern hardwood will be maintained on operable sites generally using selection harvests to provide uneven-aged compositionally and structurally diverse stands;
- Some hardwood stands found on poor sites may be managed as even-aged; and
- Harvesting will provide for a continuous flow of timber products and a variety of wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected partial harvest of northern hardwood is 2,601 acres;
- Continue salvage harvests of beech affected by beech bark disease using Beech Bark Disease Management Guidelines;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands; and



- To favor regeneration of hardwood other than beech, consider herbicide applications on beech regeneration and the planting of hard mast producing trees including oak and disease resistant beech.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.26.1.4 Forest Cover Type Management – Cedar**

Current Condition

Cedar occurs on 5,236 acres (14%) of the management area (Table 4.26.1). There are several deer wintering habitat special conservation areas in this management area. Cedar stands will be managed to maintain winter habitat for deer and to retain this forest type in the landscape. Maintaining a closed canopy structure provides important cover for deer and reducing snow depth within the stands. There has not been any recent harvesting and regeneration of this cover type in this management area (Figure 4.26.4).

At this time, there is no cedar scheduled for upcoming harvest. There are 27 acres of cedar that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Cedar stands in inaccessible areas will be subject to natural processes resulting in a range of successional stages.

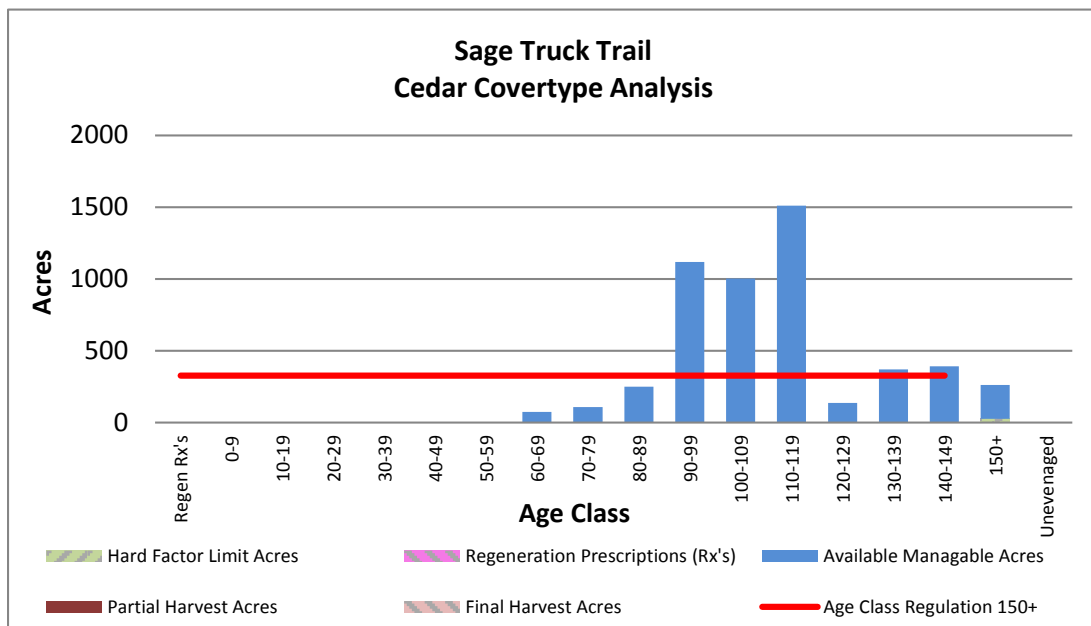


Figure 4.26.4. Age-class distribution of cedar in the Sage Truck Trail management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- In areas where deer browse is a concern stands may not be actively harvested at this time;
- Outside the deer wintering areas, cedar stands will be maintained on operable sites through even-aged management with acres balanced between 0-159 years of age providing for continual harvesting, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of cedar is 100 acres with the reduction from the regulated amount due to the deer wintering complexes;
- Ensure that cedar and/or hemlock recruitment/regeneration is reliable if harvesting in this cover type.

Long-Term Management Objectives

- In accessible areas outside of the deer wintering areas balance the age-class structure providing for a regulated harvest of approximately 326 acres per decade.

**Section 4.26.1.5 Forest Cover Type Management – Lowland Conifers**

Current Condition

Lowland conifers occur on 3,445 acres (9%) of the management area (Table 4.26.1). There has been some recent harvesting of lowland conifers in this management area (Figure 4.26.5). The majority of stands are over rotation age and a small portion of the lowland conifer stands have been classified as uneven-aged as a result of natural processes. Access to lowland conifer stands in this area is difficult.

Currently there are 121 acres of lowland conifers with a final harvest prescribed. There are 995 acres of lowland conifers that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in inaccessible areas will be subject to natural processes (fire, windthrow, insect defoliation and beaver flooding) resulting in a broad range of successional stages.

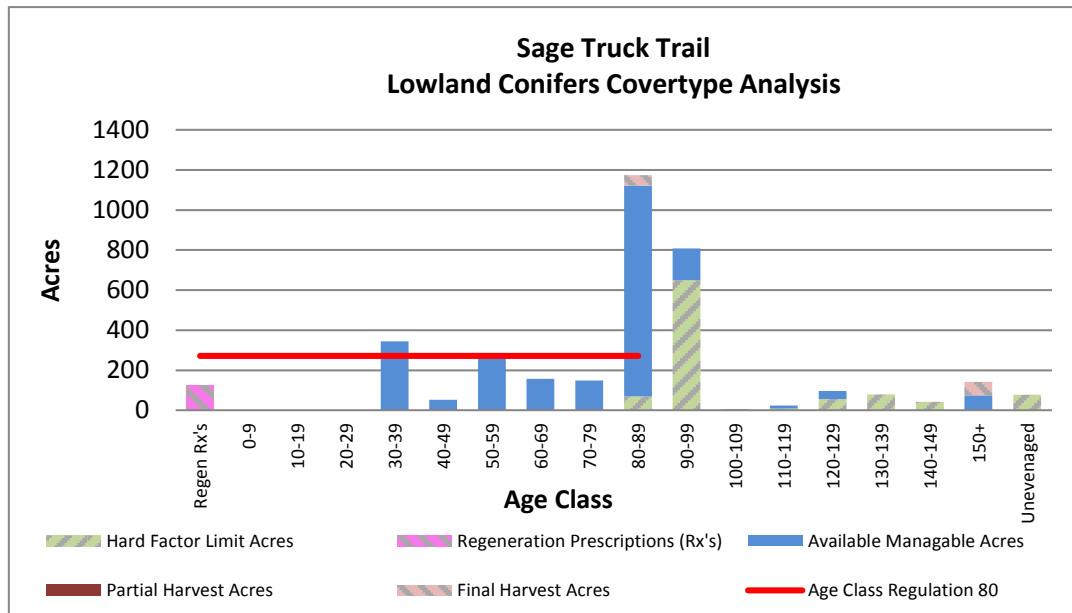


Figure 4.26.5. Age-class distribution of lowland conifers in the Sage Truck Trail management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 272 acres.

Long-Term Management Objectives

- Balance the age-class structure of accessible lowland conifer stands providing for a regulated harvest of approximately 272 acres per decade.

## **Section 4.26.1.6 Forest Cover Type Management – Other Types**

### Current Condition

There are many other cover types spread across the management area that have less than 5% of the total management area acres (Table 4.26.1). Lowland spruce/fir (1,491 acres or 4%), red pine (1,077 acres or 3%) and upland open/semi-open lands (1,017 acres or 3%) are the largest. Other types total 5,738 acres (15%) and are spread across the management area. This category is made up of forested cover types with 2% or less of the management area acres. They include: upland conifers (826 acres), mixed upland deciduous (662 acres), lowland deciduous (620 acres), upland mixed forest (578 acres), lowland aspen/balsam poplar (561 acres), tamarack (549 acres), lowland mixed forest (523 acres), upland spruce/fir (488 acres), paper birch (377 acres), white pine (228 acres), hemlock (187 acres) and natural mixed pines (139 acres). Miscellaneous other stands total 317 acres, and comprises water, roads and soil/sand.

Most of these cover types will be managed as even-aged stands using natural regeneration after harvest. Attempt to balance age classes where possible. Mixed cover types with high basal area may be thinned prior to final harvest.

There are 1,888 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Stands that are inaccessible for harvesting will be subject to natural succession.

### Desired Future Condition

- These cover types may be managed on operable sites through even-aged management systems; and
- Harvesting and regenerating these cover types will contribute to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreation opportunity.

### 10-Year Management Objectives

- The projected 10-year final harvest is 99 acres of lowland spruce/fir and 896 acres of other types; and
- The projected 10-year partial harvest is 315 acres of red pine and 681 acres of other types.

### Long-Term Management Issues

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## **4.26.2 – Featured Wildlife Species**

Priorities for wildlife management in this management area include the maintenance of a closed canopy in the large Sage River deer wintering complex. Northern hardwoods in this management area are diverse and mature forest conditions are desirable. This management area receives a fair amount of hunting pressure for grouse and early successional aspen management is a priority.

### **American Marten**

The goal for marten in the eastern Upper Peninsula is to maintain or increase suitable habitat and strive to identify, maintain and connect known populations to facilitate genetic exchange. Management should address the maintenance and improvement of corridors, dead wood and conifer components in priority landscapes.

### Wildlife habitat specifications:

- Maintain a minimum of 30% canopy cover in key even-aged managed stands of northern hardwood and conifer stands as marten tend to avoid stands with less canopy cover. Write prescriptions to minimize potential blowdown.
- Discourage land transactions and management activities that facilitate further fragmenting of marten habitat within the management area by identifying and maintaining corridors between large forested tracts.
- Provide older forest conditions in this management area.

- Retain and limit disturbance to existing downed coarse woody debris and exceed Within-Stand Retention Guidance for its maintenance. Where coarse woody debris is lacking, increase both standing dead and down dead wood by leaving at least three secure large diameter (>14 inches in diameter at breast height) live trees to serve as future den trees, snags and coarse woody debris (logs) on the ground per acre in harvested stands.
- Increase the within-stand component of mesic conifers in mixed stands and enhance mesic conifer forest types by group or gap selective harvest. Consider underplanting on suitable sites where a seed source is absent.
- Limit firewood permits, biomass harvesting, and whole tree harvesting in this management area considering retaining the maximum residues in the Woody Biomass Harvesting Guidelines.

## **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improve habitat. State forest management for the species should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land-use. State forest management for bear should focus on improving existing habitat (minimizing fragmentation and maintaining both hard and soft mast) in this management area.

### Wildlife habitat specifications:

- Maintain or increase the beech and oak component of hardwood forests in this management area. Retain representation of black cherry and ironwood.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.
- Retain some large diameter white pine or hemlock as refuge trees.
- Plant disease resistant beech and red oak where appropriate.
- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource.
- Discourage land transactions and management activities that facilitate further fragmenting state lands within the management area.

## **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age-class distribution for aspen in priority landscapes.

### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Move to balance the age-class distribution of aspen and birch cover types to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation.
- Larger harvest units should have irregular boundaries and include one or two, 1-3 acre unharvested inclusions for every 40 acres exceeding 40 acres in size.
- Evaluate the conifer component in aspen stands, holding or increasing the conifer component in aspen stands. Leave conifer under four inch dbh in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

## **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash, increasing mesic conifer components and increasing beaver abundance.

### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under four inches in diameter at breast height.

- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- When using herbicide treatments to prepare sites for planting red and jack pine in snowshoe hare habitat, encourage more diverse stands of pine and aspen by using application skips in pockets or along stand edges.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain coarse woody debris (slash) already present (before cutting) and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance and retain the maximum residual amount.

### White-tailed Deer

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states “Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer.” There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

#### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### 4.26.3 – Rare Species and Special Conservation Area Management

All forest operations must be reviewed for potential conflicts with rare species following the guidance in “DNR’s *Approach to the Protection of Rare Species on State Forest Lands*” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed five listed species as well as three natural communities of note occurring in the management area as listed in Table 4.25.2. The caves and sink holes are karst features associated with the Fiborn Karst Preserve and the Fiborn Quarry. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Table 4.26.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Sage Truck Trail management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Caves		S1/G4?	Confirmed				Special Feature	N/A
Muskeg		S3/G4G5	Confirmed				Lowland open/semi-open	N/A
Sinkhole		S2/G3G5	Confirmed				Special Feature	N/A
<b>Birds</b>								
Northern goshawk	<i>Accipiter gentilis</i>	SC/G5/S3	Confirmed	PS	Very High	Mesic northern Forest	Northern Hardwood	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Late
						Dry-mesic northern forest	White Pine	Late
						Boreal forest	Upland & Lowland Sp/F	Mid
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
<b>Mammal</b>								
Moose	<i>Alces alces americana</i>	SC/G5/S4	Confirmed	HV	Very High	Bog	Lowland open/semi-open	N/A
						Emergent Marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Muskeg	Lowland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Poor fen	Lowland open/semi-open	N/A
						Poor conifer swamp	Tamarack	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Northern shrub thicket	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Mesic northern forest	Northern Hardwood	Late
						Dry-mesic northern forest	White Pine	Late
<b>Plants</b>								
Goblin moonwort	<i>Botrychium mormo</i>	T/G3/S2	Confirmed			Mesic northern forest	Northern Hardwood	Late
						Boreal forest	Upland & Lowland Sp/F	Mid
Alga pondweed	<i>Potamogeton confervoides</i>	SC/G4/S3	Confirmed			Submergent marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Special conservation areas within the management area are cold water streams and lakes, high priority trout streams (Figure 4.26.1) and deer wintering areas (Figure 4.26.6).

There have been no high conservation value areas or ecological reference areas identified for this management area.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.

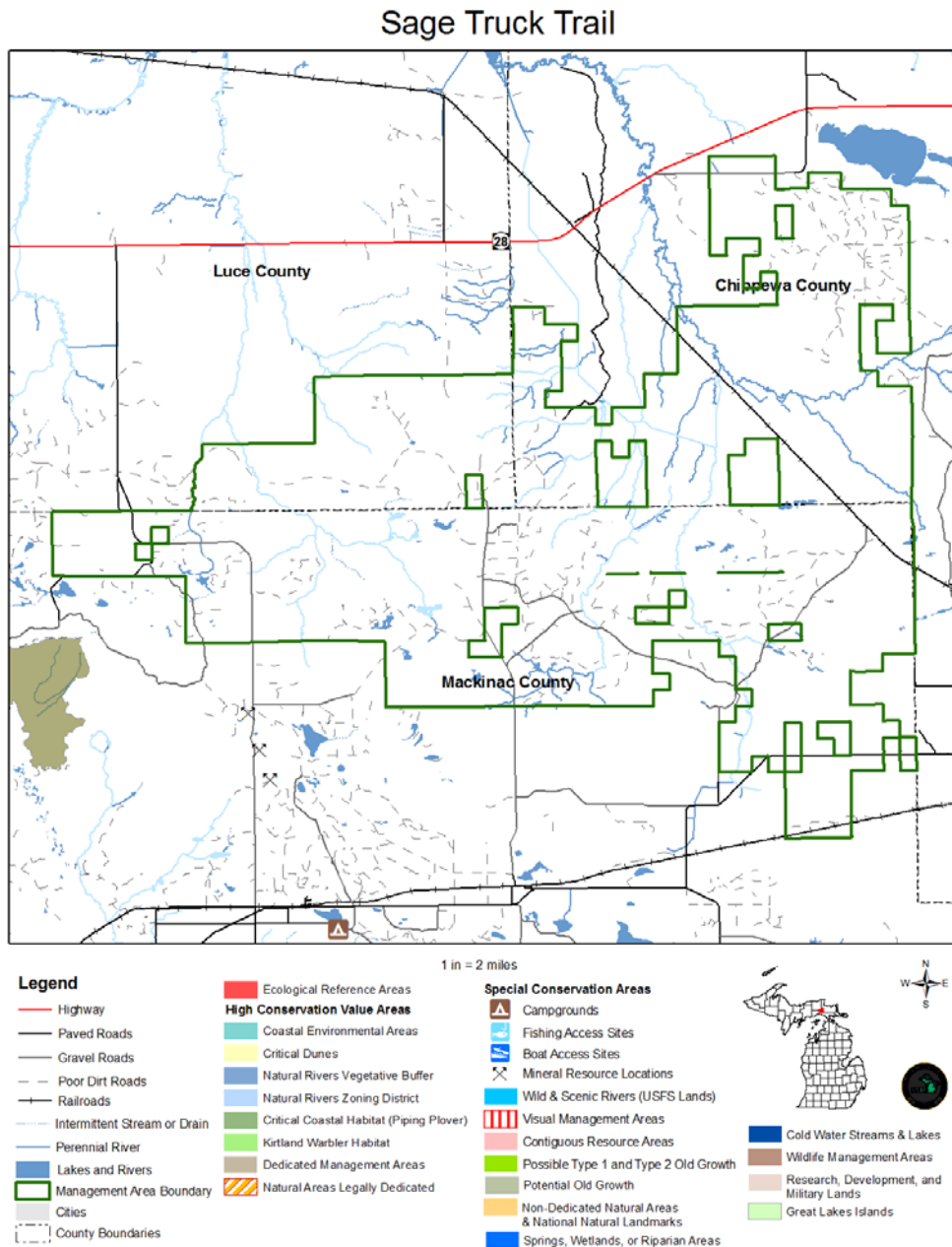


Figure 4.26.6. A map of the Sage Truck Trail management area showing the special resource areas.

#### 4.26.4 – Forest Health Management

Although forest health issues span the entire landscape some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Upland mixed: beech bark disease;
- Aspen and lowland aspen/balsam poplar: white trunk rot and *Hypoxylon* canker; and
- Lowland conifers: spruce budworm, eastern larch beetle and larch casebearer.

For further information on forest health refer to Section 3.

## Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys and it should not be assumed there are no species present. There are unsubstantiated reports of invasive plant species at the Fiborn quarry. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

### **4.26.5 – Fire Management**

Prescribed fire may be used to reduce fuel loads and/or as preparatory to planting pine.

Prescribed fire may also be used to encourage natural red pine regeneration.

Access for fire suppression purposes is very limited in this management area.

### **4.26.6 – Public Access and Recreation**

The County road system only enters the management area around the periphery, and does not extend into the center. Forest trails created for timber sales are also limited to the upland portions. This leaves the north central part of the management area virtually roadless.

Recreational facilities include: a snowmobile trail and the Newberry-Rexton motorcycle trail near the southern edge of the management area (Figure 4.26.1).

Grouse, bear and deer hunting are popular.

### **4.26.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. Portions of the Tahquamenon River watershed are designated as high priority trout stream and are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.26.1.

### **4.26.8 – Minerals**

Surface sediments consist of peat and muck, lacustrine (lake) clay and silt, an end moraine of coarse-textured till and coarse-textured till sometimes thin to discontinuous. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the management area and there is good potential for additional pits on the uplands.

The Silurian Manistique and Burnt Bluff Groups, Cabothead Shale and Manitoulin Formation and Ordovician Queenston Shale Big Hill Dolomite, Stonington Formation and Utica Shale subcrop below the glacial drift. The Burnt Bluff is quarried for stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (14 in Chippewa, four in Mackinac and two in Luce). No economic oil and gas production has been found in the Upper Peninsula.



Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

The Hendricks Gravel Quarry is under lease and the road system is gated closed to the public.

The Fiborn Quarry exists along an old railroad corridor. It was one of the first limestone quarries in the eastern Upper Peninsula and is currently closed to operations. These features are all to the south of the management area boundary. There are also Karst features (such as caves and underground streams) associated with the abandoned quarry.

## 4.27 MA 27 – Seney Manistique Swamp Management Area

### Summary of Use and Management

Vegetative management in the Seney Manistique Swamp management area (MA) (Figure 4.27.1) will provide timber products; maintain or enhance wildlife habitat; protect areas of unique character including rich conifer swamp, patterned fen and dry-mesic northern forest ecological reference areas and deer wintering special conservation areas; and provide for forest based recreational uses. Timber management objectives for this 10-year planning period include: improving the age-class distribution of jack pine, aspen and red pine; and continued selective harvesting of northern hardwoods to achieve an all-age class structure. Wildlife management objectives include increasing the structural complexity of northern hardwood communities for interior forest species; perpetuating early-successional communities to promote wildlife populations adapted to young forests; and providing for hunting and other wildlife related recreation. Management activities may be constrained due to poor access in this swampy area. Expected issues for this 10-year planning period include the need to regenerate natural stands of red pine and introduced insect and disease concerns (especially emerald ash borer and beech bark disease).

### Introduction

The Seney Manistique Swamp management area is located in the west part of the eastern Upper Peninsula in Schoolcraft County between the communities of Seney, Shingleton and Manistique. The management area has 148,134 acres of state forest land. The primary attribute of this management area is the large mosaic of wetland features associated with dry uplands. Additional attributes which were important in identifying this management area include:

- The management area falls primarily within the Luce subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The management area is dominated by conifers and non-forested areas. Despite highways M-94 and M-28 going through the management area this is a remote area with few secondary roads. Access between roads is difficult due to the large expanses of wetlands.
- The dominant landform consists of the Seney Lake Plain with the Manistique River corridor flowing through.
- This management area contains one of the Upper Peninsula Grouse Enhanced Management Systems areas. This area plan will emphasize balanced age classes of aspen for timber production and ruffed grouse habitat.
- A large number of rare species and ecological reference areas and special conservation areas are found here.
- The 1976 Seney Fire occurred in a large portion of this management area both north and south of M-28 and west of Seney. The fire began on the Seney National Wildlife Refuge and spread onto state forest lands. At approximately 78,000 acres this was the largest wildfire in Michigan's recorded post-logging era history.

This is the largest management area in the eastern Upper Peninsula and falls within the Shingleton Forest Management Unit. The Seney National Wildlife Refuge is on the east border of the management area and the Hiawatha National Forest is on the west side. The predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.27.1.

# Seney Manistique Swamp

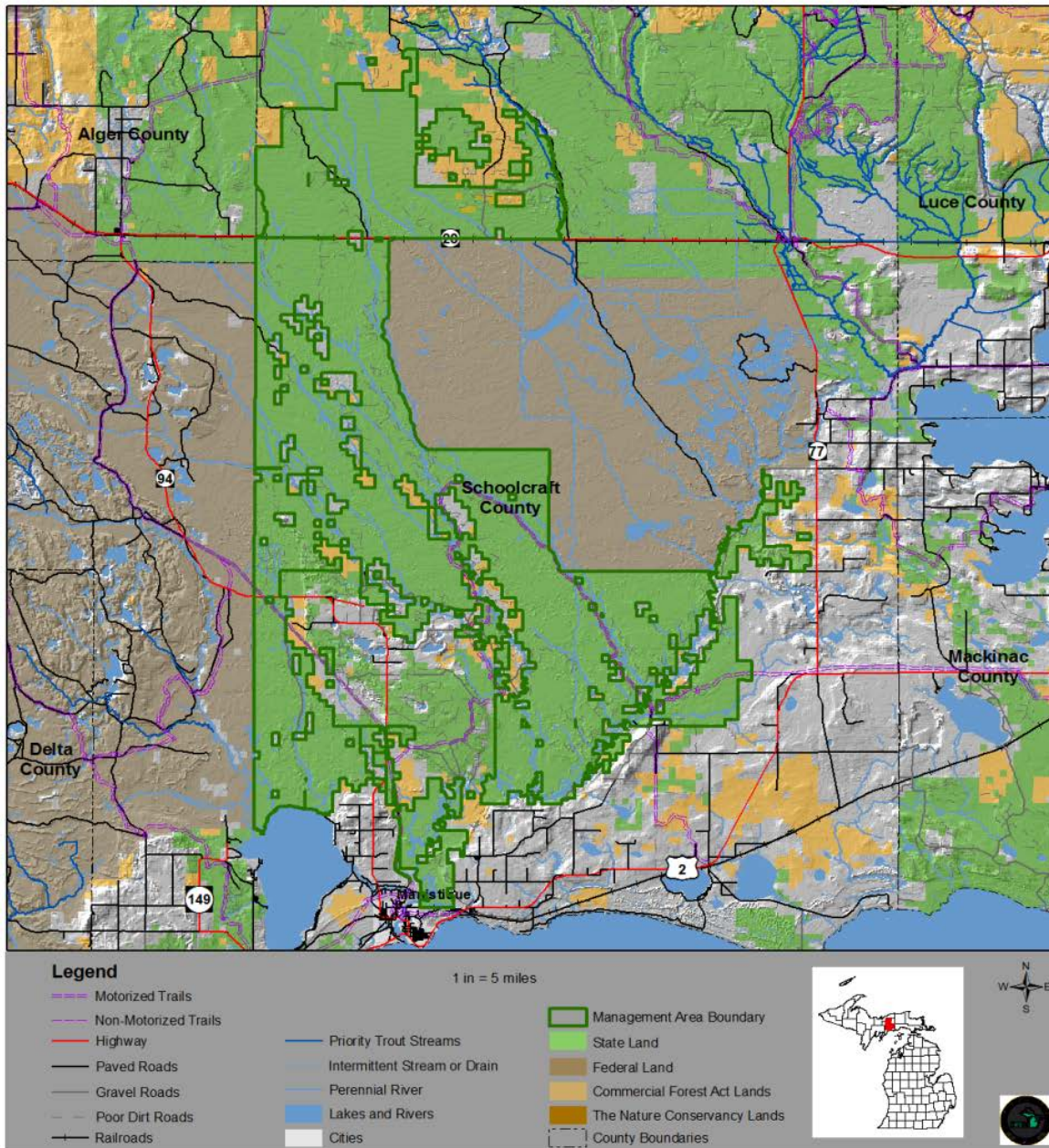


Figure 4.27.1. Location of the Seney Manistique Swamp management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and the city of Manistique.

Table 4.27.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Seney Manistique Swamp management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Lowland Open/Semi-Open Lands	37%	54,825	0	54,825	0	0	54,825	0	0
Jack Pine	15%	22,425	1,670	20,755	1,287	0	22,425	2,965	0
Lowland Conifers	6%	9,099	2,736	6,363	1,050	0	9,099	707	0
Lowland Spruce/Fir	5%	7,876	1,156	6,720	466	0	7,876	747	0
Aspen	5%	7,870	180	7,690	301	0	7,870	1,282	0
Northern Hardwood	5%	7,709	293	7,416	0	4,050	7,709	0	3,439
Red Pine	5%	7,582	1,097	6,485	721	1,671	7,582	721	2,541
Cedar	5%	7,494	79	7,415	100	0	7,494	463	0
Lowland Deciduous	4%	5,785	1,022	4,763	529	0	5,785	529	0
White Pine	2%	2,715	140	2,575	234	573	2,715	234	692
Upland Open/Semi-Open Lands	1%	1,429	0	1,429	0	0	1,429	0	0
Misc Other (Water, Local, Urban)	2%	2,462	0	2,462	0	0	2,462	0	0
Others	7%	10,863	2,218	8,645	629	927	10,863	925	1,152
<b>Total</b>	<b>100%</b>	<b>148,134</b>	<b>10,592</b>	<b>137,542</b>	<b>5,317</b>	<b>7,221</b>	<b>148,134</b>	<b>8,573</b>	<b>7,824</b>

Others include: tamarack, natural mixed pines, upland conifers, hemlock, lowland mixed forest, upland mixed forest, lowland aspen/balsam poplar, upland spruce/fir, paper birch, mixed upland deciduous, oak and planted mixed pines.

#### 4.27.1 Forest Cover Type Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major and some of the minor cover types within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, the natural processes of succession and disturbances will provide ecological benefits. While most stands have a variety of tree species and other vegetation, they are classified by the species with the dominant canopy coverage.

The following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous wildlife species; and for the variety of recreational opportunities they provide. Harvesting and regenerating these cover types will provide for a continuous flow of forest products and will help to ensure (or provide) wildlife habitat.

##### Section 4.27.1.1 Forest Cover Type Management – Lowland Open/Semi-Open Lands

###### Current Condition

The management area contains a large amount of lowland open/semi-open lands totaling 54,825 acres (37%) (Table 4.27.1). This category is a combination of marsh (25,003 acres), lowland shrub (25,102 acres), treed bog (4,462 acres) and bog (258 acres). The three patterned fen ecological reference areas in the management area contain a significant amount of marsh and lowland shrub stands. Deer wintering complex special conservation areas are also found in these cover types. The large lowland shrub and marsh stands contain many ridges and islands of pine. Most of the lowland open/semi-open lands are found in association with streams and rivers. The large percentage of acres within these lowland cover types is a distinguishing feature of this management area. The large wetland complexes and the lack of roads and bridges make access throughout this management area difficult.

###### Desired Future Condition

- Lowland open/semi-open lands will be retained in their large roadless state to ensure an adequate level of wildlife habitat and recreational opportunity while protecting the ecological reference area and special conservation area values found in these cover types.

###### Long-Term Management Objectives

- In general, these stands will be maintained without active management to protect their ecological values; and
- Evaluate the need for prescribed fire to discourage excessive shrub growth in sedge peatlands to maintain habitat for open-land wildlife.

## Section 4.27.1.2 Forest Cover Type Management – Jack Pine

### Current Condition

Jack pine occurs on 22,425 acres (15%) of the management area (Table 4.27.1). Jack pine is found throughout the management area on outwash plains, lake plains and stream terraces. Most of these stands are found on wetter sites, often with a component of black spruce. A large portion of the jack pine acres in the older age classes are either inaccessible or otherwise unavailable for intensive management. Lowland jack pine stands on wet sandy soils topped by a thin organic layer have unique plant assemblages. Jack pine is generally managed on a 60-year rotation in this management area to produce quality pulpwood. Accessible jack pine stands have been consistently harvested and regenerated in recent years (Figure 4.27.2). Natural regeneration using scarification or prescribed burning is used to regenerate stands followed by planting where necessary.

Currently there are 3,007 acres of jack pine with a final harvest prescription assigned and 65 acres with a partial harvest assigned. There are 141 acres of other cover types with a harvest prescribed that are expected to convert to jack pine after harvest. These acres are shown in the regeneration prescriptions column of Figure 4.27.2. There are 1,670 acres of jack pine that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible islands of jack pine within the large marshes will undergo natural succession.

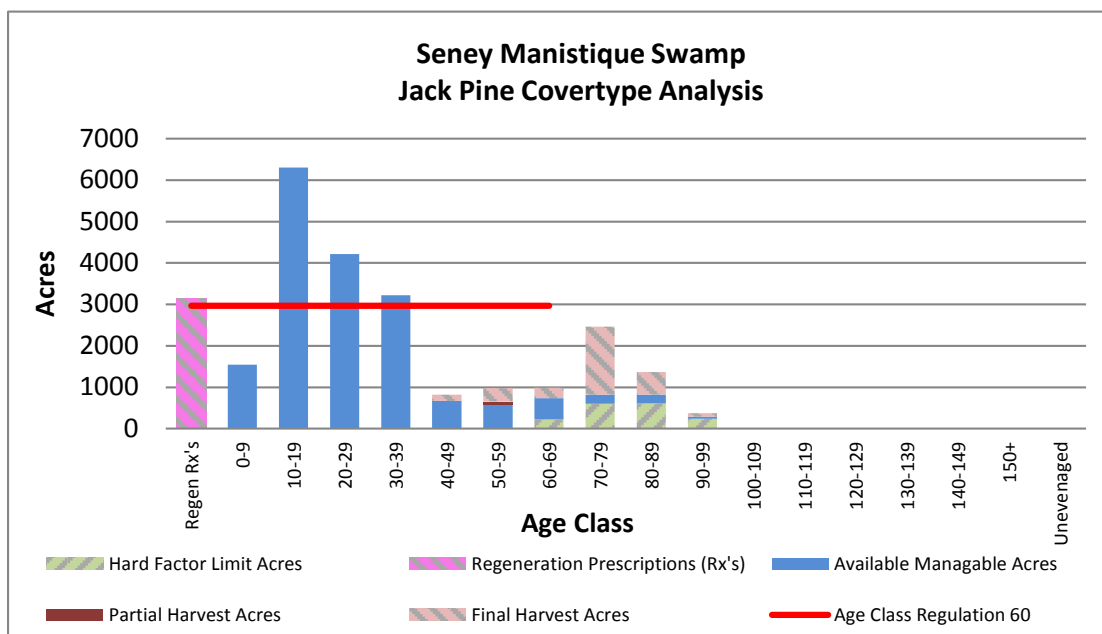


Figure 4.27.2. Age-class distribution of jack pine in the Seney Manistique Swamp management area (2012 Department of Natural Resources inventory data).

### Desired Future Condition

- Jack pine will be maintained on operable sites through even-aged management with acres balanced between 0-69 years of age to provide for continual harvest, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The 10-year projected regeneration harvest is for 1,287 acres of jack pine (Table 4.27.1) which is lower than the regulated amount because of the low number of acres over 39 years of age.

### Long-Term-Management Objectives

- Balance the age classes of accessible jack pine providing for a regulated harvest of approximately 2,965 acres every decade (the red age class regulation line in Figure 4.27.2); and
- Maintain a lower acreage of over-mature stands to lessen the prevalence and severity of jack pine budworm outbreaks and to reduce the threat of damaging wildfire.



### Section 4.27.1.3 Forest Cover Type Management – Lowland Conifers

#### Current Condition

Lowland conifer cover types occur on 9,099 acres (6%) of the management area (Table 4.27.1). These stands are often inaccessible and many are found within deer wintering complex special conservation areas or other special designations. Approximately 10% of the lowland conifer stands have been classified as uneven-aged as a result of natural processes (Figure 4.27.3). Lowland conifer stands have been successfully harvested and regenerated through natural regeneration resulting in a wide range of age classes.

Currently there are 638 acres with a final harvest prescribed. In addition, there are approximately 29 acres in other cover types that are currently prescribed for harvest that are expected to convert to lowland conifers. These acres are shown in the regeneration prescriptions column in Figure 4.27.3. There are 2,736 acres of lowland conifers that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

#### Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for continual harvest, wildlife habitat and recreational opportunities.

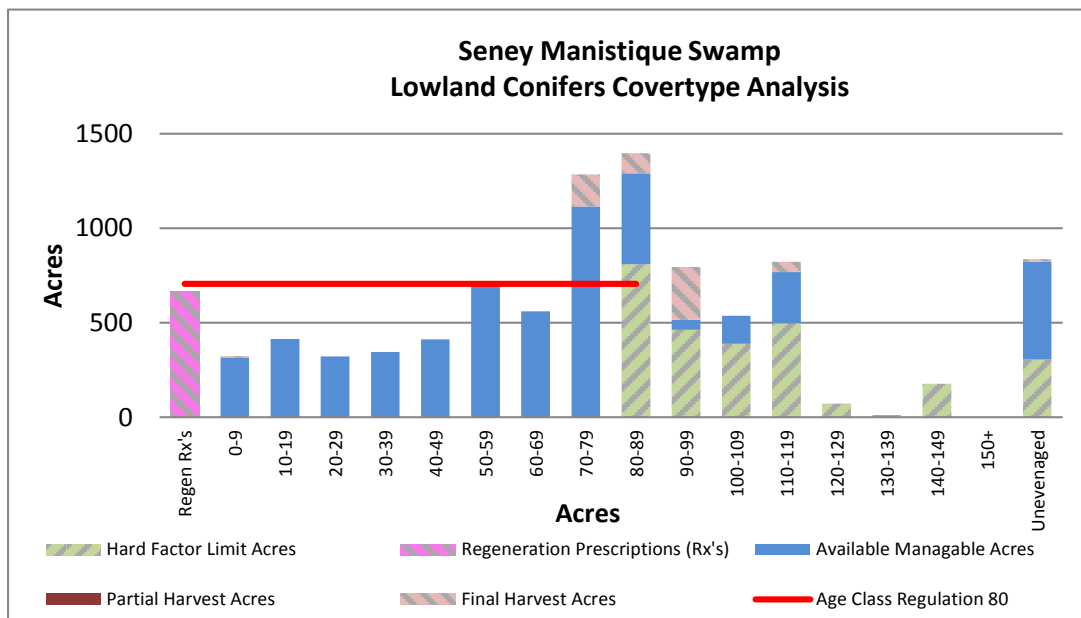


Figure 4.27.3. Age-class distribution of lowland conifer in the Seney Manistique Swamp management area (2012 Department of Natural Resources inventory data).

#### 10-Year Management Objectives

- The 10-year projected harvest is 1,050 acres of regeneration harvest in lowland conifers which is slightly higher than the regulated amount due to the large number of acres that are mature and over-mature.

#### Long-Term Management Objectives

- Balance the age-class structure of accessible stands providing for a regulated harvest of approximately 707 acres per decade.

## Section 4.27.1.4 Forest Cover Type Management – Lowland Spruce/Fir

### Current Condition

The lowland spruce/fir cover type is found on 7,876 acres (5%) of the management area (Table 4.27.1). Many of these lowland spruce/fir stands are a combination of black spruce and jack pine. Lowland spruce/fir stands have been successfully harvested and naturally regenerated in the past resulting in stands in all age classes.

Currently there are 913 acres with a final harvest prescribed (Figure 4.27.4). There are 1,156 acres of lowland spruce/fir that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland spruce/fir stands in areas inaccessible for harvest will be subject to natural processes resulting in a range of successional stages.

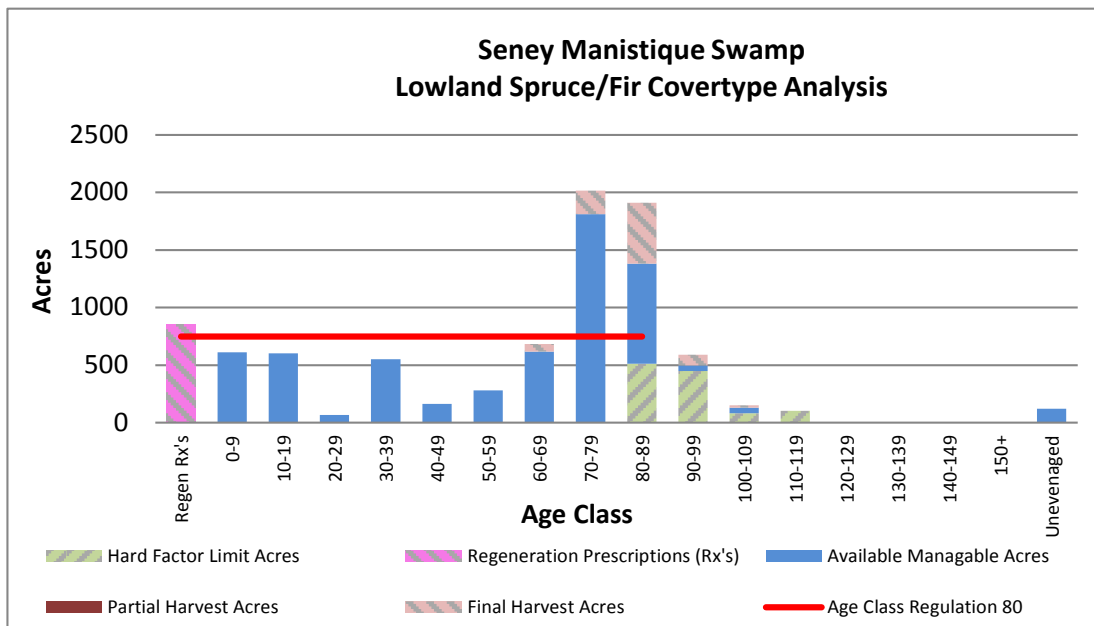


Figure 4.27.4. Age-class distribution of lowland spruce/fir in the Seney Manistique Swamp management area (2012 Department of Natural Resources inventory data).

### Desired Future Condition

- Lowland spruce/fir stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The 10-year projected regeneration harvest is 466 acres. The projected harvest is lower than the regulated harvest due to the large number of acres in the regeneration prescriptions age class.

### Long-Term Management Objectives

- Balance the age classes of available stands providing for a regulated harvest of approximately 747 acres per decade.

## Section 4.27.1.5 Forest Cover Type Management – Aspen

### Current Condition

Aspen occurs on 7,870 acres (5%) of the management area (Table 4.27.1). Aspen is found throughout the management area on outwash plains, lake plains, stream terraces and dunes. Accessible aspen has been harvested resulting in 90% of the acres less than 40 years of age (Figure 4.27.5). Many of the stands over rotation age are located on ridges within the

large marsh complexes and are inaccessible for harvest at this time. Aspen within the Mint Farm Grouse Enhanced Management System area may be managed slightly different than the rest of the aspen within the management area through shorter rotation ages and smaller harvest areas.

There are currently 107 acres of aspen prescribed for final harvest. Approximately 130 acres of other cover types that are currently prescribed for harvest are expected to convert to aspen after harvest. These acres are shown in the regeneration prescriptions column in Figure 4.27.5. There are 180 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of aspen will succeed to more shade tolerant species.

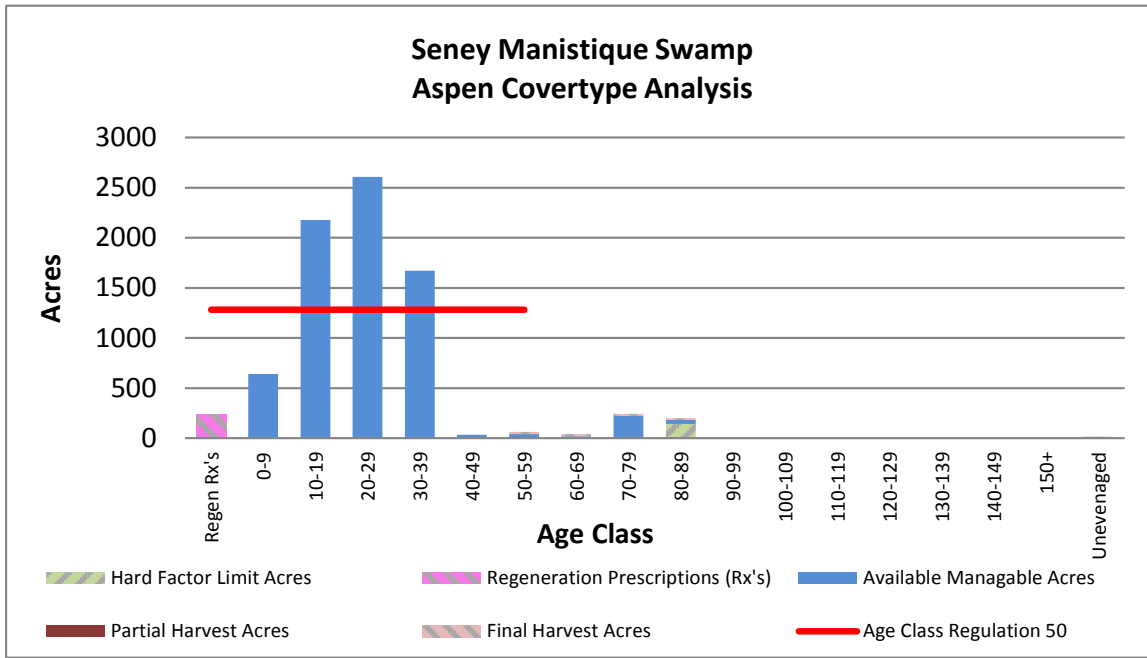


Figure 4.27.5. Age-class distribution of aspen in the Seney Manistique Swamp management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- The aspen cover type will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age to provide for regulated harvest, wildlife habitat and recreation opportunity.

10-Year Management Objectives

- The projected 10-year final harvest of aspen is for 301 acres and because of the current age-class structure, it is not possible to harvest at the regulated level for some time.

Long-Term Management Objectives

- Balance the age-class structure of accessible aspen stands providing for a regulated harvest of approximately 1,282 acres per decade.

**Section 4.27.1.6 Forest Cover Type Management – Northern Hardwood**

Current Condition

Northern hardwood cover types occur on 7,709 acres (5%) of the management area (Table 4.27.1). Northern hardwood stands are found throughout the management area mainly on outwash plains and lake plains with Kotar habitat types of ATFD, AFPo and PARVAa (see appendix E). Hardwood stands in this management area are dominated by red maple. About 75% of the hardwood stands have been classified as uneven-aged (Figure 4.27.6). In general, most of the uneven-aged hardwood stands are selectively harvested every 20 years. Where site quality is poor shelterwood and other even aged harvesting systems have been used. This has resulted in some acres of immature hardwoods (Figure 4.27.6).



Beech bark disease is found throughout the management area and salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area. Follow emerald ash borer and ash management guidelines for salvage in stands with ash trees.

Currently there are 843 acres with a partial harvest prescription assigned. In addition, 65 acres of northern hardwood have a final harvest prescribed. There are 293 acres of northern hardwoods that have site conditions limiting their harvest. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

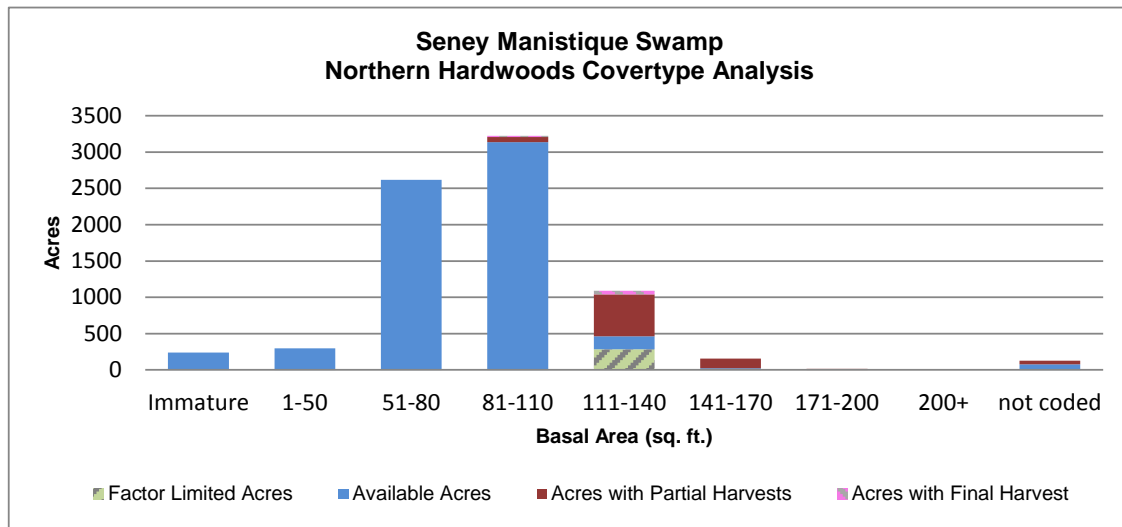


Figure 4.27.6. Basal area distribution of northern hardwoods in the Seney Manistique Swamp management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Northern hardwoods will be maintained on operable sites, generally by using individual tree selection harvesting providing uneven-aged composition and structurally diverse stands which will be of benefit to a variety of wildlife habitat and will provide recreational opportunities and a continuous supply of timber.

#### 10-Year Management Objectives

- The projected 10-year partial or selection harvest of northern hardwood is 4,050 acres;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands;
- To favor regeneration of hardwood other than beech, consider herbicide application on beech regeneration to promote regeneration of other species; and
- In areas that are losing beech to beech bark disease, consider planting disease resistant beech or oak after harvesting to increase the availability of hard mast.

#### Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

### **Section 4.27.1.7 Forest Cover Type Management – Red Pine**

#### Current Condition

Red pine is found on 7,582 acres (5%) of the management area (Table 4.27.1). The majority of these stands are of natural origin, often on inaccessible islands within large marsh complexes. Uneven-aged stands have developed as a result of past harvesting practices such as selection and shelterwood or seed tree cuts in mature stands (Figure 4.27.7). In some of the hard to access stands red pine regeneration has not always been adequate and harvests have resulted in a mix of regenerating species. Natural red pine stands will be regenerated naturally through shelterwood and seed tree harvesting when possible and planted if natural regeneration is not adequate.

Red pine stands are thinned as soon as products can be harvested, generally once they reach age 40. On good sites stands are thinned approximately every ten years, with longer intervals on poor sites, until stand replacement harvest at economic maturity at approximately age 80. Red pine will be maintained and managed on operable sites through thinning until stand replacement harvest at economic maturity which is approximately 80 years of age.

Currently 775 acres of red pine have a partial harvest prescribed and 167 acres have a final harvest prescribed. There are 1,097 acres of red pine that have site conditions limiting their harvest this decade. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Red pine in areas that are not accessible will be subject to natural processes.

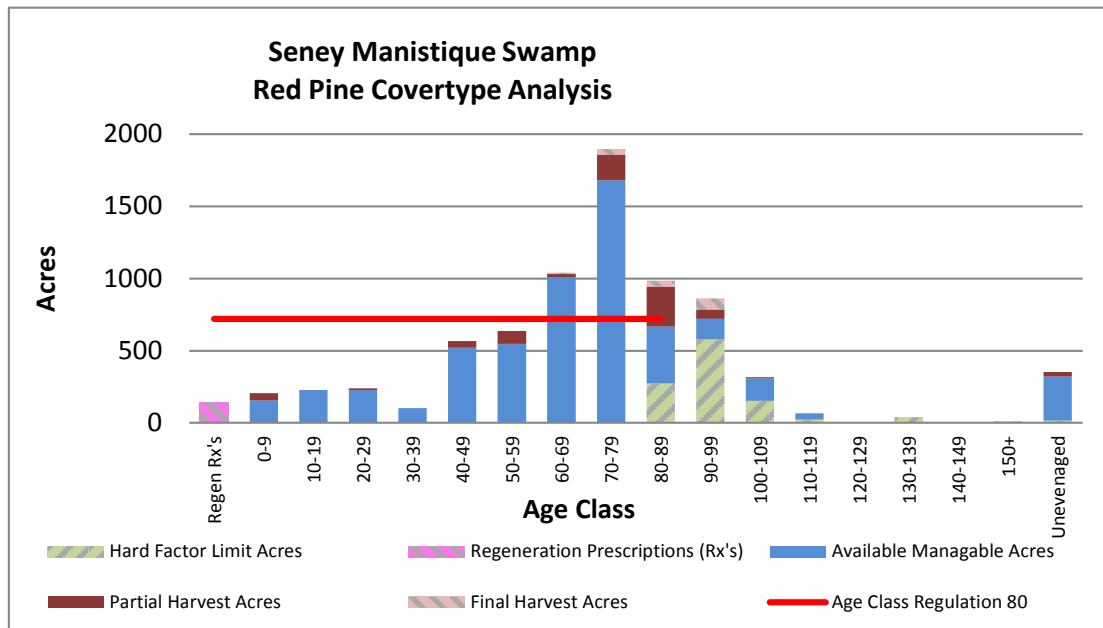


Figure 4.27.7. Age-class distribution of red pine in the Seney Manistique Swamp management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Balancing acres between 0-89 years of age will provide for continual harvesting, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest of red pine is 721 acres to work toward balancing the age classes of red pine; and
- The projected 10-year partial harvest or thinning of red pine is 1,671 acres in younger age classes.

Long-Term Management Objectives

- Balance the age-class distribution of accessible stands of red pine providing for a regulated harvest of 721 acres per decade.

**Section 4.27.1.8 Forest Cover Type Management – Cedar**

Current Condition

Cedar occurs on 7,494 acres (5%) of the management area (Table 4.27.1). Many of the cedar stands in this management area fall into special conservation areas for wintering deer or stream corridors. Cedar communities provide valuable habitat for wildlife. Cedar trees are very long lived and generally provide excellent closed canopy habitat. Within the special conservation area deer wintering areas, maintain a closed canopy for winter habitat to provide important cover for deer and reduce snow depth within the stands. Very little harvesting has been done in cedar stands in this management area and the majority of the stands are over 80 years old (Figure 4.27.8).

Although there will be no harvesting of cedar within deer wintering complexes there is a need to address future cedar cover. Limited cedar harvests will occur outside the wintering complexes recognizing that cedar takes many years to regenerate and escape deer browsing. Reliable and timely regeneration of cedar is a concern from both wildlife and forest management perspectives.

Currently, there are 93 acres assigned for final harvest. There are 79 acres of cedar that have site conditions limiting their harvest this decade. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Cedar stands in areas inaccessible for harvest will be subject to natural processes.

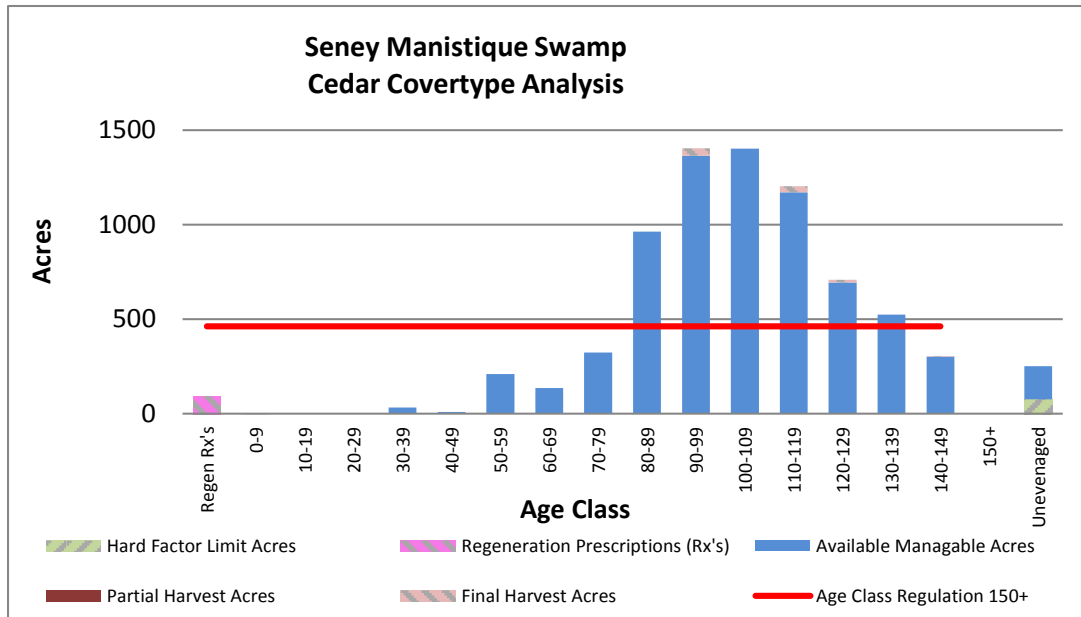


Figure 4.27.8. Age-class distribution of cedar in the Seney Manistique Swamp management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Where deer wintering activities are not a concern, cedar will be maintained on operable sites through even-aged management; and
- Balance the age classes between 0-159 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected harvest is for 100 acres of regeneration harvest. This is lower than the regulated amount due to the use of cedar stands by wintering deer and concern of adequate regeneration.

Long-Term Management Objectives

- Within the deer wintering areas, focus cedar management on winter habitat for deer;
- Outside the deer wintering areas, focus on using different methods of harvesting with the goal of regenerating cedar;
- Consider harvest of cedar before rotation age to begin to diversify the age classes;
- Use a 150-year regulated rotation to allow approximately 463 acres to be final harvested per decade.

**Section 4.27.1.9 Forest Cover Type Management – Other Types**

Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acres (Table 4.27.1). Lowland deciduous (5,785 acres or 4%) and white pine (2,715 acres or 2%) are two of the larger ones. The “other forest cover types” category has 10,863 acres (7%) of the management area. This category includes: tamarack (2,023 acres or 1%), natural mixed pines (1,755 acres or 1%), upland conifers (1,399 acres

or 1%), hemlock (1,287 acres or 1%), lowland mixed forest (926 acres or 1%), upland mixed forest (789 acres or 1%) and upland open/semi-open lands (1,429 acres or 1%); and the following cover types with less than 1% of the total acres in the management area: lowland aspen/balsam poplar, upland spruce/fir, paper birch, mixed upland deciduous, oak and planted mixed pines. In addition there are 2,462 acres (2%) of “miscellaneous other” stands, which includes water, sand/soil and roads.

With the exception of white pine the majority of these cover types are managed as even-aged stands following general timber management guidelines regarding harvest. Natural regeneration of species currently on site is expected after harvest. Age classes will be balanced where possible. Mixed cover types with high basal area may be thinned depending on the species composition prior to final harvest. Periodically thin white pine stands with high basal area prior to regeneration harvest.

Approximately 3,380 acres of these other minor cover types have site conditions limiting their harvest this decade. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

#### Desired Future Condition

- These cover types will be managed on operable sites through even-aged management attempting to balance age-classes through rotation age; and
- This will contribute to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The projected 10-year final regeneration harvest includes: 529 acres of lowland deciduous, 234 acres of white pine and 629 acres of other types; and
- The projected 10-year partial harvest includes: 573 acres of white pine and approximately 927 acres of other types.

#### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.27.2 – Featured Wildlife Species**

Aspen management for early successional species is an important wildlife goal in this management area. The creation of dense understory and retention of woody debris in jack pine and lowland types will be important management objectives. This management area borders the Seney National Wildlife Refuge, therefore efforts to coordinate wildlife management activities on state land with those conducted on the Seney National Wildlife Refuge frequently occur. During this 10-year planning period additional analyses to better define the spatial extent of priority areas for each featured species will be performed.

This management area includes an Upper Peninsula Grouse Enhanced Management System. The area boundary will be delineated during this planning period. Aspen stands that fall within the boundary will be managed to enhance habitat and hunting opportunities for ruffed grouse, woodcock, deer, turkey and hare. Habitat treatments may include managing aspen on a shortened rotation with multiple age classes and smaller stand sizes. The remainder of the management area (outside the boundary) will be managed based on the direction in the management area write up.

#### **Beaver**

The goal for beaver in the eastern Upper Peninsula is to maintain suitable habitat. Management for the species should focus on providing favorable food within 100 feet of streams that are not designated high priority trout streams. Consideration will be given to best management practices, trout stream management and trends in beaver nuisance permits issued.

#### Wildlife habitat specifications:

- Maintain or promote alder, aspen, birch, maple or willow within 100 feet of non-high priority trout streams with gradients of less than 15% and other inland bodies of water.

#### **Moose**

The goal for moose in the eastern Upper Peninsula is to maintain or increase habitat. Management for moose should focus on providing early successional browse adjacent to lowland conifer complexes, the maintenance of hemlock within stands and protecting willow, a valuable food source, along riparian and wetland edges.

#### Wildlife habitat specifications:

- Encourage early successional for hardwood browse (in the 0-9 and 10-19 year-old age classes) in close proximity to closed canopy lowland conifer swamps.
- Balance the aspen age-class distribution to ensure a more sustainable supply of browse.
- Maintain or promote thermal refugia in harvested stands by retaining hemlock and other conifers.

#### **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age-class distribution for aspen in priority landscapes during this planning cycle.

#### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Balance the age-class distribution of aspen and birch cover type to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation.
- Larger harvest units should have irregular boundaries and include one or two 1-3 acre un-harvested inclusions for every 40 acres exceeding 40 acres in size.
- Evaluate the conifer component in aspen stands, holding or increasing where desirable. Leave conifer under four inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

#### **Sharp-tailed Grouse**

In the eastern Upper Peninsula, the goal for sharp-tailed grouse is to maintain or improve habitat. Management should focus on maintaining large opening complexes so there is an increase of available habitat.

#### Wildlife habitat specifications:

- Maintain or expand herbaceous open-lands where existing leks occur.
- Manage to maintain young regenerating forest (jack pine, aspen and spruce) adjacent to permanent openings to maximize use by sharp-tailed grouse.
- Use prescribed fire where appropriate to maintain openings.
- Within open-land complexes maintain connectivity of openings across the landscape.

#### **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash and increasing mesic conifer components within stands.

#### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under four inch diameter at breast height.

- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- Balance age classes in the jack pine cover type to provide young, dense jack pine stands.
- When using herbicide treatments to prepare sites for planting red and jack pine in snowshoe hare habitat, encourage more diverse stands of pine and aspen by using application skips in pockets or along stand edges.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris already present (before cutting) and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance and retain the maximum residual amount.

## White-tailed Deer

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states “Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer.” There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

### 4.27.3 – Rare Species and Special Conservation Area Management

All forest operations must be reviewed for potential conflicts with rare species following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence. When listed species are present or past surveys have indicated their presence, management will follow established species management guidelines.

Past surveys have noted and confirmed twenty-four listed species as well as six natural communities of note occurring in the management area as listed in Table 4.27.2. A colony of great blue herons has also been identified. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

There are several special conservation areas in this management area including the Rainy Wildlife Viewing Area visual management area near Indian Lake. Deer wintering area special conservation areas, including the Sturgeon Hole Deeryard, are also found in the management area. Other special conservation areas include cold water streams and lakes and high priority trout streams (Figure 4.27.1). Within the Seney Manistique Swamp management area there are 164 acres (Figure 4.27.9) identified as potential Type 1 or Type 2 old growth special conservation areas. In addition, approximately 18,000 acres were identified as potential old growth and these stands are also special conservation areas until they are evaluated. Concentrated recreation area special conservation areas (state forest campgrounds) are listed in the Recreation section 4.27.6 below.

Although there are currently no identified high conservation value areas, there are three patterned fen ecological reference areas (104 acres, 4,548 acres and 6,945 acres) within the management area as shown in Figure 4.27.9. Ecological reference areas will be managed to protect and enhance their natural vegetative and wildlife communities as directed by ecological reference area-specific management plans.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

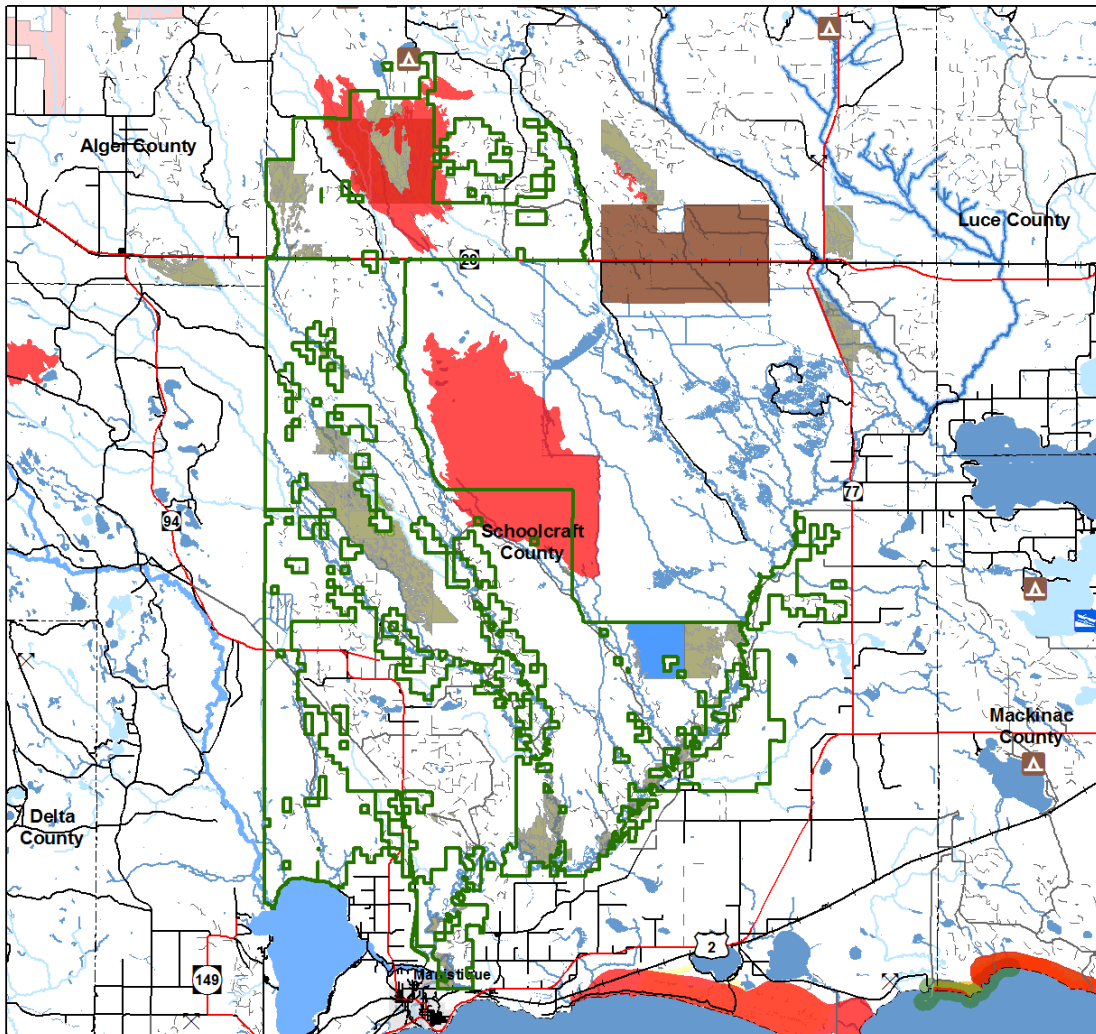
Table 4.27.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Seney Manistique Swamp management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Dry-mesic northern forest		S3/G4	Confirmed				White Pine	Late
Dry northern forest		S3/G3?	Confirmed				Jack Pine, Red Pine	Late
Northern wet meadow		S4/G4	Confirmed				Lowland open/semi-open	N/A
Patterned fen		S2/GU	Confirmed				Lowland open/semi-open	N/A
Poor fen		S3/G3	Confirmed				Lowland open/semi-open	N/A
Rich conifer swamp		S3/G4	Confirmed				Tamarack	Late
<b>Birds</b>								
Northern goshawk	<i>Accipiter gentilis</i>	SC/G5/S3	Confirmed	PS	Very High	Mesic northern Forest	Northern Hardwood	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Late
						Dry-mesic northern forest	White Pine	Late
						Boreal forest	Upland & Lowland Sp/F	Mid
Yellow rail	<i>Catamixops noveboracensis</i>	T/G4/S1S2	Confirmed	MV	Moderate	Northern wet meadow	Lowland open/semi-open	N/A
Kirtland's warbler	<i>Dendroica kirtlandii</i>	LE/E/G1/S1	Confirmed	PS	Very High	Pine barrens	Jack Pine	Early
						Dry northern forest	Jack Pine, Red Pine	Early
Merlin	<i>Falco columbarius</i>	T/G5/S1S2	Confirmed	PS	Very High	Boreal forest	Upland & Lowland Sp/F	Mid
						Great Lakes barrens	Upland open/semi-open	N/A
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
<b>Butterflies</b>								
Frigga fritillary	<i>Boloria frigga</i>	SC/G5/S3S4	Confirmed	HV	Low	Bog	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
Northern blue	<i>Lycaeides idas nabakovi</i>	T/GSTU/S2	Confirmed	HV	Very High	Dry northern forest	Jack Pine, Red Pine	Late
						Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
Hoary comma	<i>Polygonia gracilis</i>	SC/G5/S3	Confirmed	HV	Low	Boreal forest	Upland & Lowland Sp/F	Mid
<b>Dragonfly</b>								
Ebony boghaunter	<i>Williamsonia fletcheri</i>	SC/G4/S1S2		MV	Low	Inland lake	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Prairie fen	Lowland open/semi-open	N/A
						Muskeg	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Inundated shrub swamp	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
<b>Fish</b>								
Lake sturgeon	<i>Acipenser fulvescens</i>	T/G3G4/S2		HV	Moderate	Great Lakes	Aquatic	N/A
						Rivers	Aquatic	N/A
						Mainstem streams	Aquatic	N/A
<b>Snails</b>								
Hubricht's vertigo	<i>Vertigo hubrichti</i>	E/G3/S2	Confirmed	EV	Moderate	Alvar	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock lakeshore	Upland open/semi-open	N/A
Mystery vertigo	<i>Vertigo paradoxa</i>	SC/G4G5Q/S3	Confirmed	HV	Low	Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Volcanic bedrock glade	Upland open/semi-open	N/A
						Limestone bedrock glade	Upland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Northern fen	Lowland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
						Dry-mesic northern forest	White Pine	Late
						Limestone lakeshore cliff	Upland open/semi-open	N/A
<b>Reptile</b>								
Wood turtle	<i>Glyptemys insculpta</i>	SC/G4/S2S3	Confirmed	MV	Moderate	Northern wet meadow	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern shrub thicket	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
<b>Plants</b>								
Black sedge	<i>Carex nigra</i>	E/G5/S1	Confirmed			Poor fen	Lowland open/semi-open	N/A
						Wooded dune & swale complex	Upland open/semi-open	N/A
English sundew	<i>Drosera anglica</i>	SC/G5/S3	Confirmed			Northern wet meadow	Lowland open/semi-open	N/A
						Prairie fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Interdunal wetland	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
Slender spike rush	<i>Eleocharis nitida</i>	E/G4/S1	Confirmed			Poor fen	Lowland open/semi-open	N/A
Vasey's rush	<i>Juncus vaseyi</i>	T/G57/S1S2	Confirmed			Intermittent wetland	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
Auricled twayblade	<i>Listera auriculata</i>	SC/G3G4/S2S3	Confirmed			Northern shrub thicket	Upland open/semi-open	N/A
Canada rice grass	<i>Oryzopsis canadensis</i>	T/G5/S2	Confirmed			Pine barrens	Jack Pine	Early
Sweet coltsfoot	<i>Petasites sagittatus</i>	T/G5/S1S2	Confirmed			Patterned fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
Dwarf raspberry	<i>Rubus acaulis</i>	E/G5T5/S1	Confirmed			Northern fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
Clinton's bulrush	<i>Scirpus clintonii</i>	SC/G4/S3	Confirmed			Intermittent wetland	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
Dwarf bilberry	<i>Vaccinium cespitosum</i>	T/G5/S1S2	Confirmed			Dry sand prairie	Upland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Sandstone lakeshore cliff	Upland open/semi-open	N/A
						Sandstone cliff	Upland open/semi-open	N/A
						Dry northern forest	Jack Pine, Red Pine	Late

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.



# Seney Manistique Swamp



### Legend

- Highway
- Paved Roads
- Gravel Roads
- - - Poor Dirt Roads
- Railroads
- · - · - Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- ▭ Management Area Boundary
- ▭ Cities
- - - County Boundaries

- High Conservation Value Areas**
- ▭ Ecological Reference Areas
  - ▭ Coastal Environmental Areas
  - ▭ Critical Dunes
  - ▭ Natural Rivers Vegetative Buffer
  - ▭ Natural Rivers Zoning District
  - ▭ Critical Coastal Habitat (Piping Plover)
  - ▭ Kirtland Warbler Habitat
  - ▭ Dedicated Management Areas
  - ▭ Natural Areas Legally Dedicated

- Special Conservation Areas**
- ▭ Campgrounds
  - ▭ Fishing Access Sites
  - ▭ Boat Access Sites
  - ▭ Mineral Resource Locations
  - ▭ Wild & Scenic Rivers (USFS Lands)
  - ▭ Visual Management Areas
  - ▭ Contiguous Resource Areas
  - ▭ Possible Type 1 and Type 2 Old Growth
  - ▭ Potential Old Growth
  - ▭ Non-Dedicated Natural Areas & National Natural Landmarks
  - ▭ Springs, Wetlands, or Riparian Areas

1 in = 5 miles

North arrow and compass rose.

- ▭ Cold Water Streams & Lakes
- ▭ Wildlife Management Areas
- ▭ Research, Development, and Military Lands
- ▭ Great Lakes Islands

Figure 4.27.9. A map of the Seney Manistique Swamp management area showing the special resource areas.

#### 4.27.4 – Forest Health Management

Although forest health issues span the entire landscape some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Red and jack pine: jack pine budworm, red-headed pine sawfly, pine engraver and *Scleroderris* canker;
- Aspen: white trunk rot and *Hypoxylon* canker;
- Northern hardwoods: beech bark disease; and
- Lowland conifers and lowland spruce/fir: spruce budworm, eastern larch beetle and larch casebearer.

Further information on forest health can be found in Section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. No invasive plant species have yet been documented within the management area, but leafy spurge, Japanese knotweed and glossy buckthorn have been documented within a five-mile buffer of the management area (Table 4.27.3), and monitoring efforts should specifically look for new populations of this species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

Table 4.27.3. Invasive plant species within or near the Seney Manistique Swamp management area (Data from the Michigan Invasive Plant Identification Network database).

Seney Manistique Swamp - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	6	6	3
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
-	-	Glossy Buckthorn <i>Rhamnus frangula</i>	4	
-	-	Japanese Knotweed <i>Fallopia japonica</i>	1	
-	-	Leafy Spurge <i>Euphorbia esula</i>	1	

#### 4.27.5 – Fire Management

Dominated by lowland soils, this management area may have been subjected to a higher fire frequency than normally would be expected. Small changes in elevation can bring about significant changes in soils and fire regime. This area is subject to severe stand replacement fires during periods of extended drought. The 1976 Seney Fire is an example of such a fire that occurred in this management area.

Organic soils limit the opportunities for prescribed fire over much of the management area and access for fire suppression or for implementing prescribed fire is poor.

The following fire management concepts will be applied in the management area:

- Fire suppression and prescribed fire activities should be coordinated with the Seney National Wildlife Refuge.
- Reintroduce prescribed fire to the natural pine ridges in this management area, where opportunities exist.

#### **4.27.6 – Public Access and Recreation**

Much of this very large management area is remotely located, and without roads. Many of the timber sales in this management area are harvested in the winter due to need for frozen soil conditions to cross large marshes and the need to improve the existing road infrastructure. Although there are many water crossings in this management area harvesting and recreational activities may be constrained due to lack of bridges and culverts. Condition of water crossings is continually monitored and some bridges and culverts may be temporarily closed due to unsafe conditions. Roads and water crossings for public access will be reviewed during the planning of forest operations.

Some of the private hunting camps which are surrounded by state forest land have locked gates limiting access.

Recreational facilities in the management area include: Mead Creek State Forest Campground, Merwin Creek State Forest Campground (managed by Schoolcraft County), the Rainey Wildlife viewing area and several snowmobile trails (Figure 4.27.1).

Hunting, trapping, fishing and ORV-riding are popular in this area. Private canoe outfitters operate on the Manistique River.

#### **4.27.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. Portions of the Manistique River watershed are listed as a designated high priority trout stream and are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.27.1.

#### **4.27.8 – Minerals**

Surface sediments consist primarily of lacustrine (lake) sand and gravel, coarse-textured till and peat and muck. The glacial drift thickness varies up to 200 feet. Sand and gravel pits are located in the management area and potential is excellent on the uplands to the east for additional pits.

The Silurian Burnt Bluff Group, Cabothead Shale, Manitoulin Dolomite and Ordovician Queenston Shale, Big Hill Dolomite and Stonington Formation, Utica and Collingwood Shales, Trenton and Black River Formations occur throughout the eastern Upper Peninsula below the glacial drift. The Burnt Bluff, Trenton and Black River formations are quarried for stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (five in Schoolcraft). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

Oil, gas, mineral production, and quarrying are a minor intrusion on state forest land in the eastern Upper Peninsula and this condition is not expected to change throughout the life of this plan.

## 4.28 MA 28 – Strickler Aspen Management Area

### Summary of Use and Management

Vegetative management in the Strickler Aspen management area (MA) will emphasize the production of aspen for both timber products and wildlife habitat. Management will strive to sustainably produce various timber products; enhance early successional habitat for grouse; and provide for forest-based recreational uses including deer hunting, grouse hunting and morel mushroom gathering. The Strickler Grouse Management Plan was developed in 1994 to emphasize balanced age classes of aspen for timber production and ruffed grouse habitat. This area is bounded by the Strickler Road on the north, the Old Stage Road on the south, the East Branch of the Black River on the west and the Hog Island Creek on the east and encompasses 2,168 acres. Some roadways have been intentionally gated closed after harvest by Director's Order to create a walk-in game bird hunting opportunity and to protect the roads. The Ruffed Grouse Society donated money for timber sale preparation and installation of gates and signs to help develop this area. Expected issues in this 10-year planning period include: illegal off-road vehicle use, introduction and spread of invasive species and introduced pests and diseases.

### Introduction

The Strickler Aspen management area is located in the central portion of the eastern Upper Peninsula in west Mackinac County. It has 19,253 acres of state-owned land. Intensive aspen management for timber production and ruffed grouse habitat is the primary attribute of this management area. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform is the Newberry Moraine which consists of lacustrine sand and gravel with small streams.
- The cover types within this management area have been highly altered from circa 1800 vegetation types to the current dominance of aspen.
- Recreational opportunities including: snowmobiling, camping, deer and grouse hunting, trout fishing and mushroom picking.

The Old Stage Road, a primary travel route for early settlers, is within the management area.

The state owned land in this management area is contiguous. The Strickler Aspen management area falls within the Sault Forest Management Unit. The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.28.1.

Table 4.28.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Strickler Aspen management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Aspen	36%	6,884	42	6,842	101	0	6,884	1,141	0
Cedar	13%	2,508	474	2,034	30	0	2,508	127	0
Red Pine	8%	1,603	0	1,603	0	452	1,603	178	452
Lowland Open/Semi-Open Lands	7%	1,360	0	1,360	0	0	1,360	0	0
Northern Hardwood	7%	1,344	0	1,344	0	816	1,344	0	616
Lowland Conifers	6%	1,161	585	576	192	0	1,161	64	0
Lowland Aspen/Balsam Poplar	6%	1,107	184	923	0	0	1,107	154	0
Upland Mixed Forest	3%	647	0	647	0	148	647	72	148
Upland Open/Semi-Open Lands	3%	583	0	583	0	0	583	0	0
Misc Other (Water, Local, Urban)	1%	107	0	107	0	0	107	0	0
Others	10%	1,949	439	1,510	296	167	1,949	192	167
<b>Total</b>	<b>100%</b>	<b>19,253</b>	<b>1,724</b>	<b>17,529</b>	<b>619</b>	<b>1,583</b>	<b>19,253</b>	<b>1,928</b>	<b>1,383</b>

Others include: upland mixed forest, mixed upland deciduous, lowland spruce/fir, lowland mixed forest, paper birch, lowland deciduous, upland spruce/fir, planted mixed pines, upland conifers, white pine and natural mixed pines.

# Strickler Aspen



Figure 4.28.1. Location of the Strickler Aspen Management Area (dark green boundary) in relation to surrounding state forest lands, other ownerships and Lake Michigan.

#### 4.28.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### Section 4.28.1.1 Forest Cover Type Management - Aspen

###### Current Condition

Aspen occurs on 6,884 acres (36%) of the management area (Table 4.28.1). Aspen is distributed throughout the management area on a range of sites from dry-poor nutrient to mesic-medium nutrient with Kotar habitat types of PARVAa, ATFD and AFPO (see appendix E). Accessible aspen has been consistently harvested and regenerated over (Figure 4.28.2). The majority of the aspen stands in this management area have conifer trees mixed in. About 30% of the aspen in this management area is within the Strickler Grouse management area. The Strickler Grouse Management Plan emphasizes balanced age classes of aspen for timber production and ruffed grouse habitat.

Currently there are 437 acres of aspen with a final or regeneration harvest pending. There are 161 acres of other cover types that are expected to convert to aspen after harvest. These acres are shown in Figure 4.28.2 in the regeneration prescriptions column. There are 42 acres of aspen that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of aspen will gradually succeed to more shade tolerant species.

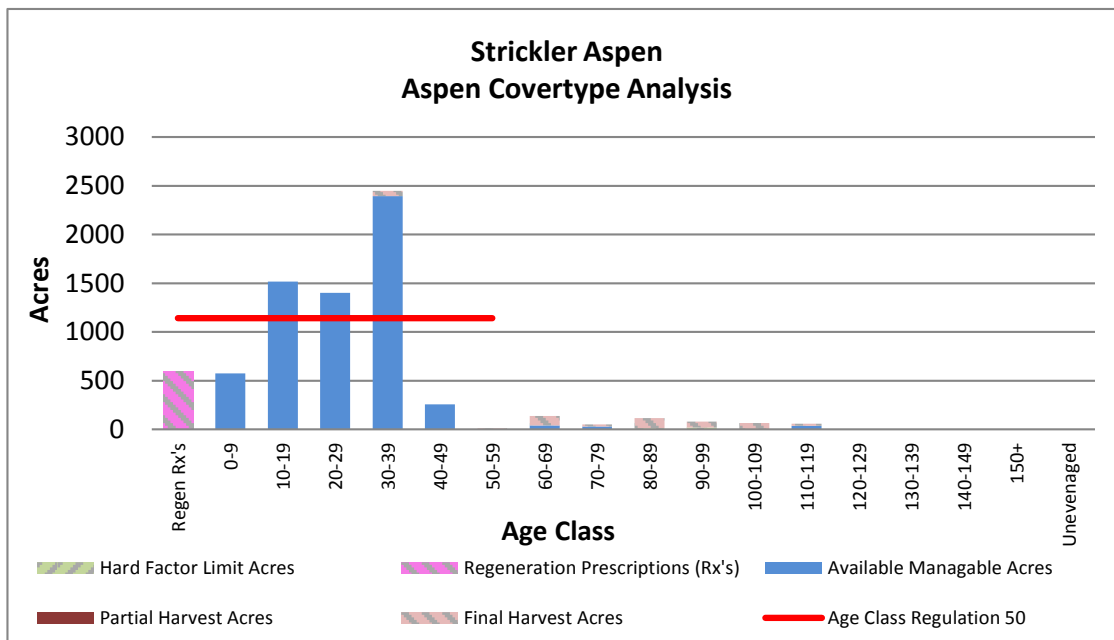


Figure 4.28.2. Age-class distribution of aspen in the Strickler Aspen management area (2012 Department of Natural Resources inventory data).

###### Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

## 10-Year Management Objectives

- The projected 10-year final harvest of aspen is 101 acres. The large reduction from the regulated amount is due to the current age-class structure where the majority of stands are immature.

## Long-Term Management Objectives

- Balance the age-class structure of accessible aspen stands providing for a regulated harvest of approximately 1,141 acres per decade (red line in Figure 4.28.2).

### Section 4.28.1.2 Forest Cover Type Management - Cedar

#### Current Condition

Cedar stands occur on 2,508 acres (13%) of the management area (Table 4.28.1). Younger age classes of cedar are non-existent in this management area. Cedar stands within the deer wintering complex special conservation areas will be managed to maintain wintering habitat for deer and to retain this forest type in the landscape. Maintaining a closed canopy structure provides important cover for deer and reduces snow depth within the stands. Outside the deer wintering area, harvest cedar in places where cedar regeneration is expected.

Currently there are no acres of cedar prescribed for final harvest (Figure 4.28.3). There are 474 acres of cedar that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Cedar stands in areas inaccessible for harvest will be subject to natural processes resulting in a range of successional stages.

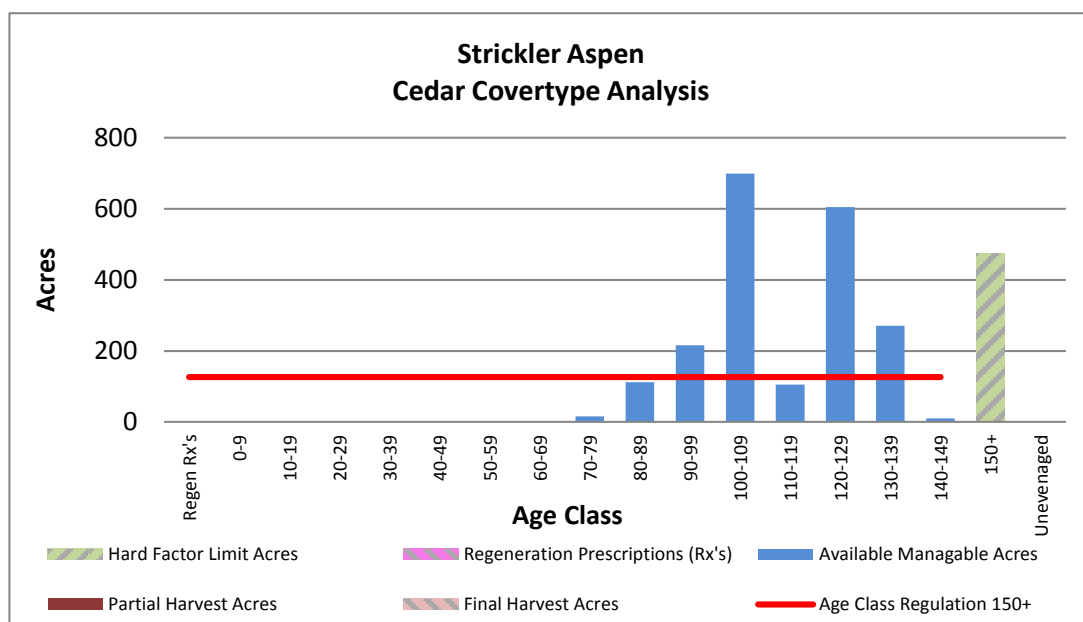


Figure 4.28.3. Age-class distribution of cedar in the Strickler Aspen management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Where deer wintering activities are not a concern, cedar will be maintained on operable sites through even-aged management.

## 10-Year Management Objectives

- The projected 10-year final harvest of cedar is 30 acres. However harvest of this type, if it occurs, may vary widely from the projected harvest in order to meet the long-term management objectives.
- Ensure that cedar and/or hemlock recruitment/regeneration is reliable if harvesting in this cover type.



## Long-Term Management Objectives

- Within deer wintering complexes, focus cedar management on winter habitat for deer;
- Look for opportunities to test different methods of regenerating cedar, especially outside of the deer wintering areas.
- Consider harvest of cedar before rotation age to begin to diversify the age classes.
- Using a 150-year regulated rotation would allow approximately 127 acres of cedar to be final harvested per decade.

### Section 4.28.1.3 Forest Cover Type Management – Red Pine

#### Current Condition

Red pine stands are found on 1,603 acres (8%) of the management area (Table 4.28.1). Red pine is distributed on a range of sites from very dry-poor nutrient to mesic-medium sites. Kotar habitat types include PARV, PARVAa, ATFD and AFPO (see appendix E). These sites produce high-quality red pine. The majority of the red pine are planted stands. Red pine stands on these high-quality sites are usually thinned every ten years, reducing basal area to approximately 120 square feet per acre until replacement harvest age at 80. Regeneration harvests followed by re-planting have resulted in stands in younger age classes (Figure 4.28.4). As most of the planted red pine stands are on very productive sites, prescribed burning or the use of herbicide may be necessary to control competing vegetation thus ensuring successful regeneration. Use shelterwood or seed tree methods of final harvest where natural red pine regeneration would be successful.

Currently there are 44 acres of red pine prescribed with a final harvest and 163 acres prescribed for partial harvest or thinning. There are no acres of red pine that have site conditions limiting their harvest. Red pine found in inaccessible or sensitive areas may remain through biological maturity.

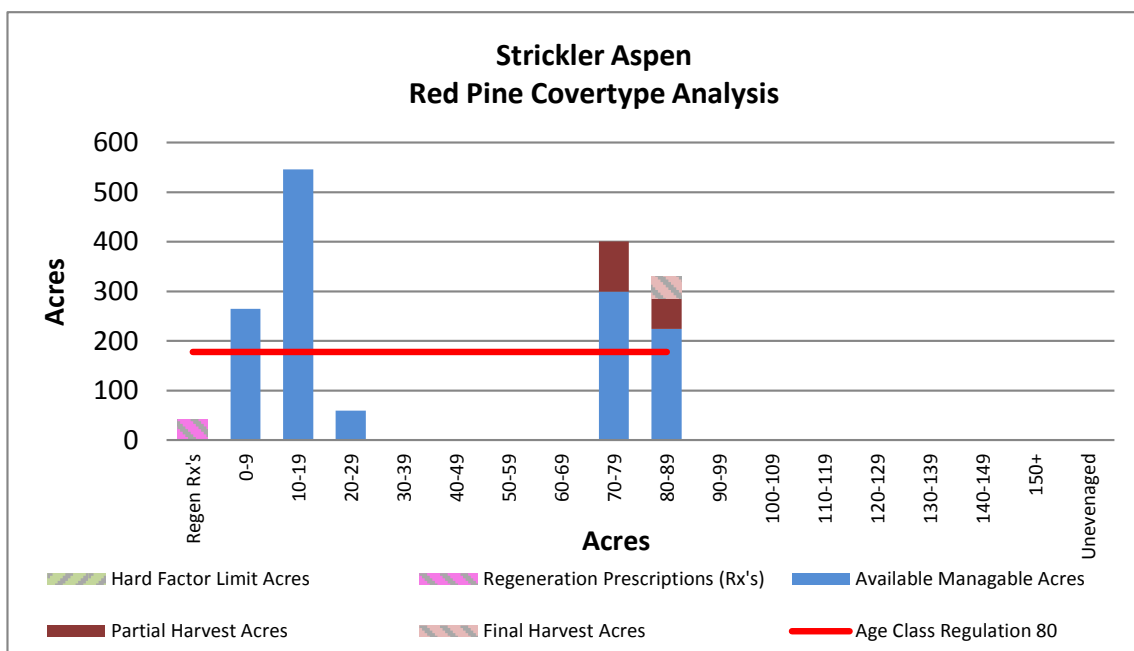


Figure 4.28.4. Age-class distribution of red pine in the Strickler Aspen management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Red pine stands will be maintained and managed through thinning until stand replacement harvest at economic maturity; and
- Acres will be balanced between 0-89 years of age to provide for continual harvest, wildlife habitat and recreational opportunity.



### 10-Year Management Objectives

- The 10-year projected final harvest of red pine is zero acres with the reduction from the regulated amount due to the current age-class structure where there are a large number of acres in the 0-9 and 10-19 year-old age classes.
- The 10-year projected partial harvest, or thinning, of red pine is 452 acres.

### Long-Term Management Objectives

- Balance the age-class distribution of red pine providing for a regulated harvest of approximately 178 acres per decade.
- Stands will be periodically thinned until they meet silvicultural criteria and then regenerated.

## **Section 4.28.1.4 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

### Current Condition

Lowland open/semi-open lands occur on 1,360 acres (7%) of the management area (Table 4.28.1). This category is a combination of lowland shrub (1,184 acres), marsh (153 acres), bogs (23 acres) and treed bog (zero acres). These cover types are valued ecologically as sources of habitat for numerous species of wildlife. Many of these stands are found in association with streams and rivers.

### Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity.

### Long-Term Management Objectives

- Most of these stands will be maintained without active management.

## **Section 4.28.1.5 Forest Cover Type Management – Northern Hardwoods**

### Current Condition

Northern hardwood occurs on 1,344 acres (7%) of the management area (Table 4.28.1). The majority of the hardwood stands have been managed as uneven-aged. Northern hardwood stands are distributed on a range of sites from dry-mesic poor nutrient to mesic-rich nutrient with Kotar habitat types of PARVAa, ATFD, AFPO and AFOAs. Many of these sites have high potential to grow quality trees. These northern hardwood stands are managed with single tree selection harvests generally when basal area is over 120 square feet per acre decreasing stocking levels to a basal area of approximately 80 square feet per acre. Consider shelterwood or other even-age treatments in lower quality stands. Recent harvests using even-aged systems are shown in the immature column in Figure 4.28.5.

Beech bark disease has been found in this area and salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

Currently, there are 269 acres prescribed for partial or selection harvest (Figure 4.28.5). At this time, there are no acres of northern hardwood with hard factor limits affecting harvest.

### Desired Future Condition

- Northern hardwood will be maintained on operable sites by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands.

### 10-Year Management Objectives

- Continue salvage harvests of beech affected by beech bark disease using Beech Bark Disease Management Guidelines.
- Evaluate beech dominated forests to determine the impact of beech bark disease on regeneration. Track beech regeneration in these stands.

- To favor regeneration of hardwood other than beech, consider herbicide applications and the planting of hard mast producing trees, including oak and disease resistant beech.
- The projected 10-year partial harvest of northern hardwood is 816 acres.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

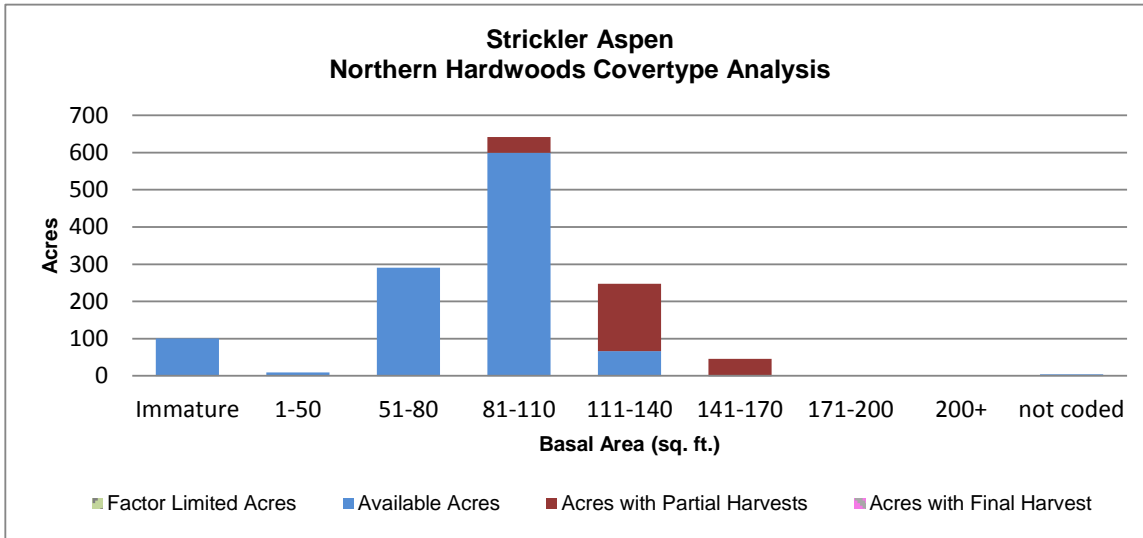


Figure 4.28.5. Basal area distribution of northern hardwood in the Strickler Aspen management area (2012 Department of Natural Resources inventory data).

**Section 4.28.1.6 Forest Cover Type Management – Lowland Conifer**

Current Condition

Lowland conifers occur on 1,161 acres (6%) of the management area (Table 4.28.1). Lowland conifer stands have been successfully harvested and regenerated through natural regeneration which has somewhat diversifying the age classes (Figure 4.28.6).

At this time, there are two acres of lowland conifers prescribed for regeneration harvest. Approximately 585 acres of lowland conifers have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Conifer stands in inaccessible areas will be subject to natural processes, resulting in a range of successional stages.

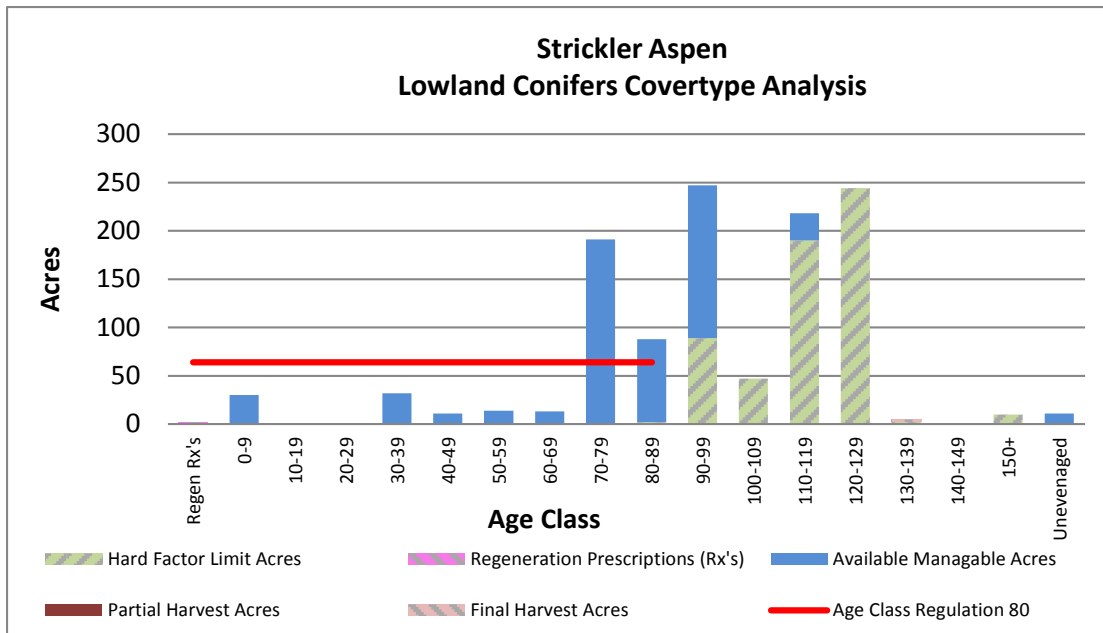


Figure 4.28.6. Age-class distribution of lowland conifers in the Strickler Aspen management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifers will be maintained on operable sites through even-aged management, with acres balanced between 0-89 years of age to provide for continual harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 192 acres. This increase from the regulated amount is due to the current age-class structure where the majority of stands are in older age classes.

Long-Term Management Objectives

- Balance the age-class structure of accessible stands. A regulated harvest would allow approximately 64 acres of lowland conifers to be harvested per decade.

**Section 4.28.1.7 Forest Cover Type Management – Lowland Aspen/Balsam Poplar**

Current Condition

Lowland aspen/balsam poplar occurs on approximately 1,107 acres (6%) of the management area (Table 4.28.1). Over the last 30 years, available lowland aspen/balsam poplar stands have been successfully harvested and regenerated through natural regeneration, resulting in 75% of the acres in these young age classes (Figure 4.28.7). A small portion of the stands have been typed as uneven-aged, having a variety of sizes and ages of trees.

Currently there are 73 acres of lowland aspen/balsam poplar with a final harvest prescribed. There are 184 acres of lowland aspen/balsam poplar that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of lowland aspen/balsam poplar will eventually succeed to late successional species.

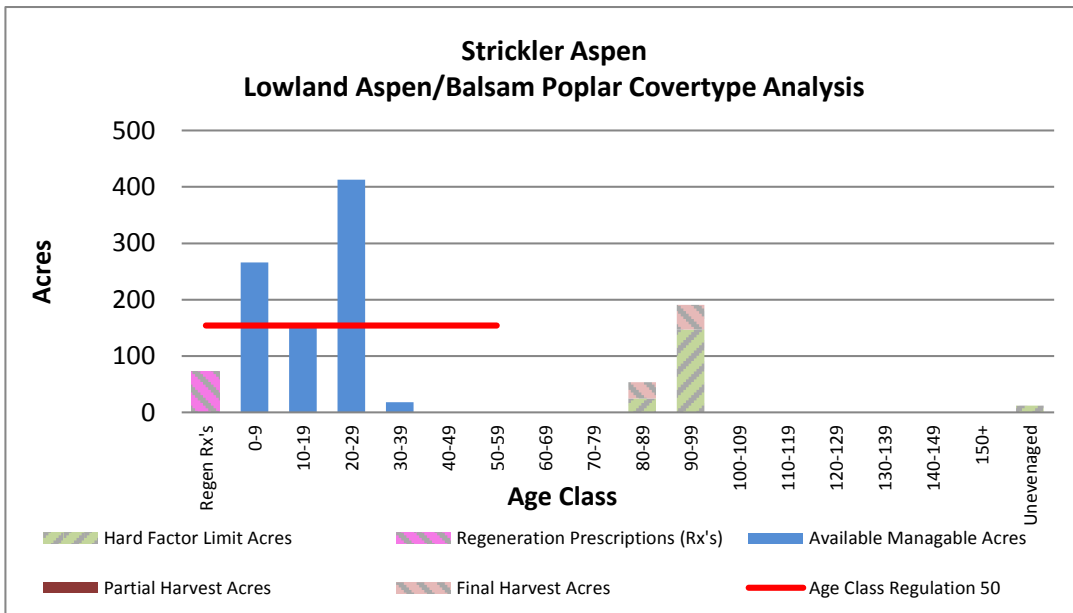


Figure 4.28.7. Age-class distribution of lowland aspen/balsam poplar in the Strickler Aspen management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland aspen/balsam poplar will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland aspen/balsam poplar is zero acres due to the current age-class structure with the majority of stands in young age classes.

Long-Term Management Objectives

- Balance the age class of accessible lowland aspen/balsam poplar providing for a regulated harvest of approximately 154 acres per decade.

**Section 4.28.1.8 Forest Cover Type Management – Other Types**

Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acres (Table 4.28.1). Upland mixed forest (647 acres) and upland open/semi-open lands (583 acres) each have 3% of the total acres. Upland open/semi-open lands includes: herbaceous openland (329 acres), upland shrub (161 acres), low-density trees (77 acres) and bare/sparsely vegetated (16 acres). Other types total 1,949 acres (10%) is comprised of forested cover types with 2% or less of the total management area acres and includes: mixed upland deciduous (426 acres), lowland spruce/fir (334 acres), lowland mixed forest (332 acres), lowland deciduous (244 acres), paper birch (232 acres), upland spruce/fir (226 acres), planted mixed pines (79 acres), upland conifers (51 acres), white pine (16 acres) and natural mixed pines (nine acres).

Most of these cover types are managed as even-aged stands. Following general timber management guidelines, conduct regeneration harvests as stands become available followed by natural regeneration. Mixed cover types with high basal area may be thinned depending on their species composition prior to final harvest.

There are 439 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Inaccessible stands may never be harvested and will be subject to successional processes.

### Desired Future Condition

- These cover types may be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The projected 10-year final harvest is 296 acres of other types.
- The projected 10-year partial harvest is 148 acres of upland mixed forest and 167 acres of other types.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## **4.28.2 – Featured Wildlife Species**

This management area includes an Upper Peninsula Grouse Enhanced Management System. The Strickler Grouse Management Plan was developed in 1994 to emphasize balanced age classes of aspen for timber production and to enhance habitat and hunting opportunities for ruffed grouse, woodcock, deer, turkey and hare. All ages of aspen are present and this is a popular spot for wildlife based recreation. Habitat treatments may include managing aspen on a shortened rotation with multiple age classes and smaller stand sizes. The remainder of the aspen (outside the boundary) will be managed based on the direction in the management area write up. Management priorities include the retention of mesic conifers and coarse woody debris in managed stands. The second most prevalent cover type is cedar which is used by wintering deer and associated wildlife species.

### **American Woodcock**

The goal for woodcock in the eastern Upper Peninsula is to maintain or increase suitable habitat. Management should address the maintenance of adequate early successional habitat to provide feeding, nesting and brood-rearing habitat and opportunity for hunting.

#### Wildlife habitat specifications:

- Balance aspen age-class distribution within the management area.
- Use silvicultural practices that encourage the aspen component in mixed stands associated with alder, riparian zones or forested wetlands.
- Maintain or increase the aspen cover type within the management area where associated with alder, riparian zones or forested wetlands.
- Maintain rough openings associated with alder, riparian zones or forested wetlands.

### **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age-class distribution for aspen in priority landscapes.

#### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Move to balance the age-class distribution of aspen and birch cover types to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60.
- Larger harvest units should have irregular boundaries and include one or two, 1-3 acre unharvested inclusions for every 40 acres exceeding 40 acres in size.
- Evaluate the conifer component in aspen stands, holding or increasing where desirable. Leave conifer under four inches in diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

## Snowshoe Hare

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash, increasing mesic conifer components and increasing beaver abundance.

### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under four inch diameter at breast height.
- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris slash already present (before cutting), and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance and retain the maximum residual amount.

## White-tailed Deer

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.

- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### 4.28.3 – Rare Species and Special Conservation Area Management

All forest operations must be reviewed for potential conflicts with rare species following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed no listed species or natural communities of note occurring in the management area. Any established management guidelines will be followed when such species or natural communities are found. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Special conservation areas include cold water lakes and streams, high priority trout streams (Figure 4.28.1), and a deer wintering complex that covers the majority of the management area. Concentrated recreation area special conservation areas (state forest campgrounds) are listed in the Recreation section 4.28.6 below.

No high conservation value areas or ecological reference areas have been identified in this management area.

The management goal during this planning period is:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.

#### 4.28.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Aspen and lowland aspen/balsam poplar: white trunk rot and *Hypoxylon* canker
- Northern hardwood: beech bark disease
- Red pine: red-headed pine sawfly, pine engraver and *Scleroderris* canker
- Lowland conifers: spruce budworm, eastern larch beetle and larch casebearer

For further information on forest health refer to Section 3.

#### Invasive Species

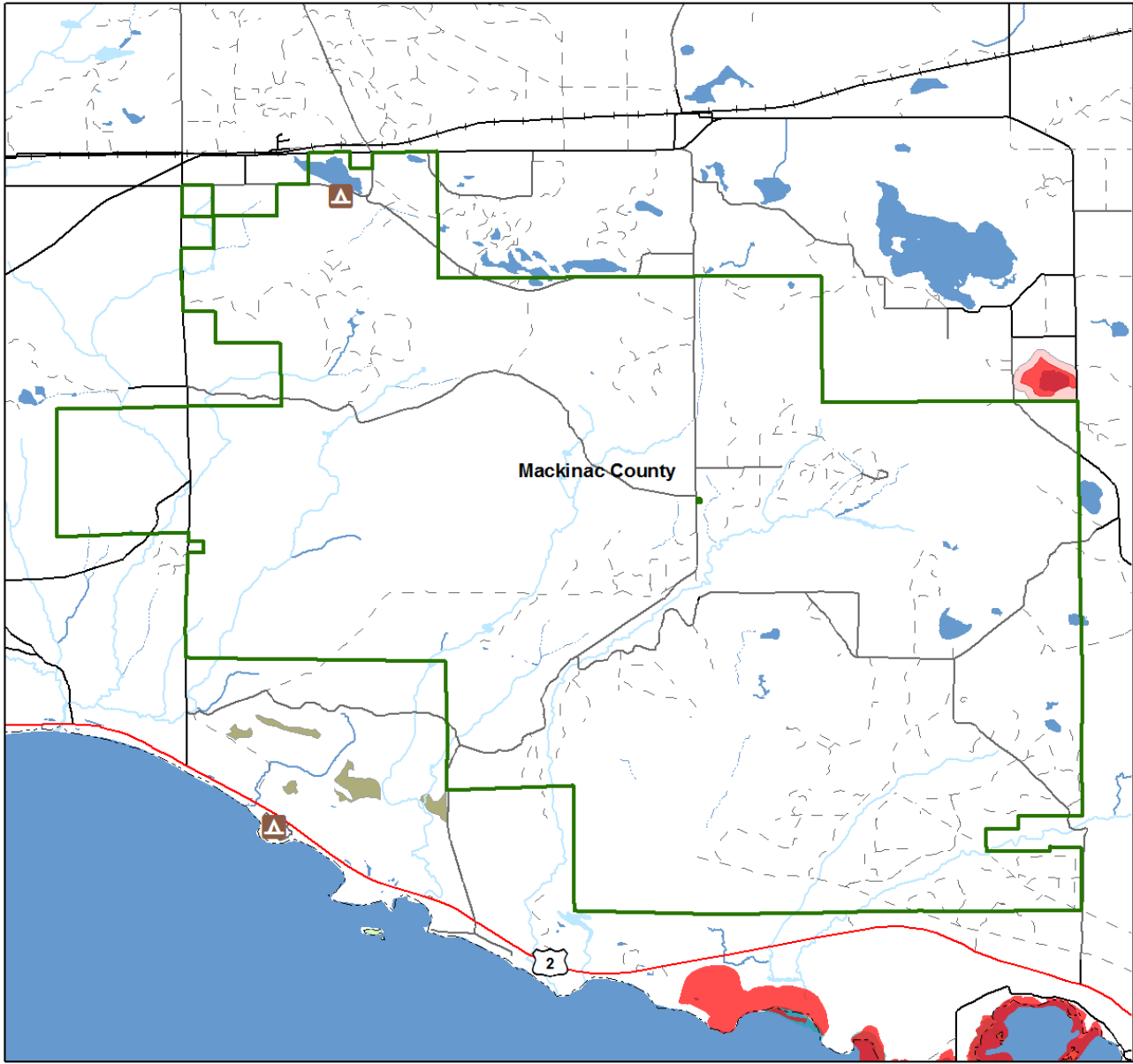
Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

#### 4.28.5 – Fire Management

Northern hardwoods which have historically been a major component of this management area are rarely impacted by natural fire regimes. However, disturbance through fire has played an important role in the initial propagation and maintenance of pine types and aspen types. The following fire management concepts should be applied in the management area:

- Re-introduce fire in the pine areas and red pine plantations to encourage natural red pine and to discourage competition, particularly from red maple.
- Incorporate fire as a tool to restore or maintain managed openings.

# Strickler Aspen



**Legend**

- Highway
- Paved Roads
- Gravel Roads
- - - Poor Dirt Roads
- Railroads
- - - Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- Management Area Boundary
- Cities
- - - County Boundaries

- Ecological Reference Areas
- High Conservation Value Areas**
- Coastal Environmental Areas
- Critical Dunes
- Natural Rivers Vegetative Buffer
- Natural Rivers Zoning District
- Critical Coastal Habitat (Piping Plover)
- Kirtland Warbler Habitat
- Dedicated Management Areas
- Natural Areas Legally Dedicated

- 1 in = 1 miles
- Special Conservation Areas**
- ▲ Campgrounds
  - Fishing Access Sites
  - Boat Access Sites
  - Mineral Resource Locations
  - Wild & Scenic Rivers (USFS Lands)
  - Visual Management Areas
  - Contiguous Resource Areas
  - Possible Type 1 and Type 2 Old Growth
  - Potential Old Growth
  - Non-Dedicated Natural Areas & National Natural Landmarks
  - Springs, Wetlands, or Riparian Areas

- Cold Water Streams & Lakes
- Wildlife Management Areas
- Research, Development, and Military Lands
- Great Lakes Islands

Figure 4.28.8. A map of the Strickler Aspen management area showing the special resource areas.



#### **4.28.6 – Public Access and Recreation**

State forest trails bisect this management area (Figure 4.28.1), with county road systems at the east and west.

Gates were installed on several forest trails to provide walk-in hunting opportunities. A management objective for this management area is to perpetuate walk-in hunting opportunities in the Strickler Grouse Management Area by maintaining gate closures.

Recreational facilities are limited to snowmobile trails (Figure 4.28.1) and the Garnet Lake state forest campground, managed by Hudson Township, in the northwest corner of the management area (Figure 4.28.8).

Deer and grouse hunting are a well-established activity. This is a premier morel mushroom hunting area.

#### **4.28.7 - Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. The East Branch of the Black River and Davenport Creek has been designated high priority trout streams and are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.28.1.

#### **4.28.8 – Minerals**

Surface sediments consist of lacustrine (lake) sand and gravel, and minor peat and muck and coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are not located in this area but there may be some potential for additional pits.

The Silurian Engadine Group subcrops below the glacial drift. The Engadine is quarried for stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (four in Mackinac County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.29 MA 29 – Tahquamenon River Basin Wetlands Management Area

### Summary of Use and Management

Management in the Tahquamenon River Basin Wetlands management area (MA) will emphasize sustainably producing timber products, enhancing wildlife habitat and providing for forest-based recreational uses. Management activities may be limited by poor access and the low wet ground in this area. Expected issues in this 10-year planning period are increased recreational pressure, introduced pests and diseases, including beech bark disease and emerald ash borer and non-native invasive species.

#### Introduction

The Tahquamenon River Basin Wetlands management area is located in the north central portion of the eastern Upper Peninsula in Luce and Chippewa Counties. It has 83,326 acres of state-owned land. The primary attribute for this management area is the landforms of the Tahquamenon River basin which lead to a variety of unique values. Additional attributes which were important in identifying this management area include:

- The management area falls primarily within the Luce subsection (8.2) of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of the Tahquamenon River Drainage. This land form is characterized by glacial moraine fragments, lacustrine lowlands and glacial outwash features. Much of this area was flooded by ancient Lake Superior at various times in history. This area contains the largest expanse of wetlands in the state.
- This area is associated with the Sage and Hendrie River systems and the Tahquamenon River corridor in Luce, Chippewa and Mackinac Counties.
- The Dollarville flooding is used extensively by nesting and migrating shorebirds, waterfowl, eagles, osprey and aquatic furbearers. Wild rice grows in the flooding and within the channel of the Tahquamenon River and is harvested by Native American residents.
- Recreational opportunities including snowmobiling, hunting and fishing.

In an attempt to alter the hydrology of the area and promote farming a few of the larger streams such as the Sage River, Hendrie River and McLeod Ditch were ditched and channelized. This did not drain the swamps as intended though the channels remain. The Soo Line/Soo Junction railroad was established in 1910 to access a mill on the mainstream of the Tahquamenon River. The Betty B landing, where the railroad ended at the river, was the location of a tugboat named "*Betty B*" that towed barges up the river full of tourists to enjoy the scenery in the 1930s. The southern end of the Charcoal railroad grade, which transported hardwood timber to the Vulcan Furnace Company charcoal kiln, as well as the historical Kneeland-Bigelow Logging camp and associated railroad grade are within the management area.

The state owned lands in this management area are concentrated with some private parcels interspersed throughout. The management area falls within the Newberry Forest Management Unit. The predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.29.1.

# Tahquamenon Basin Wetlands

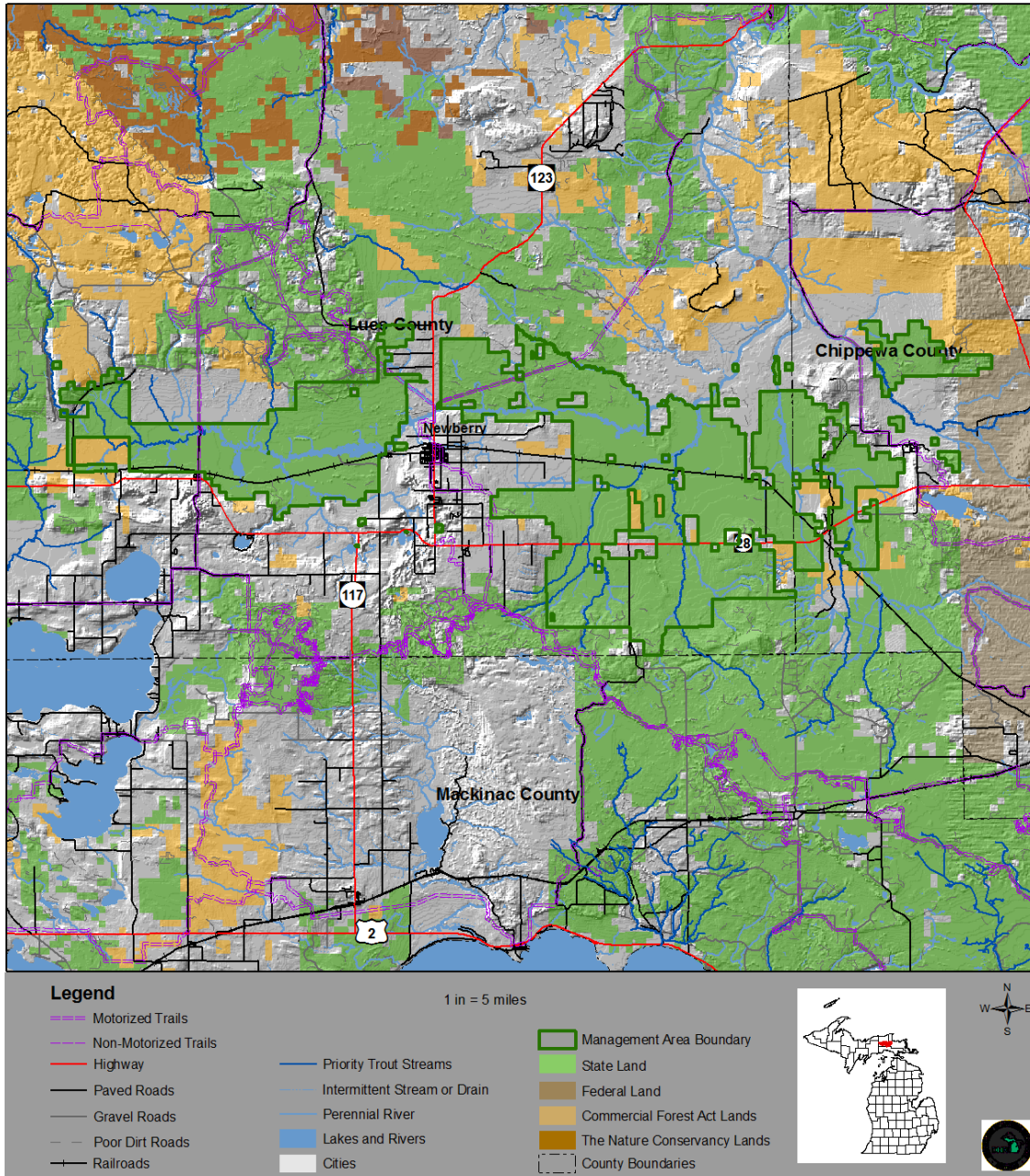


Figure 4.29.1. Location of the Tahquamenon River Basin Wetlands management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and the town of Newberry.

Table 4.29.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Tahquamenon River Basin Wetlands management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Lowland Open/Semi-Open Lands	33%	27,372	0	27,372	0	0	27,372	0	0
Cedar	16%	13,676	406	13,270	100	0	13,676	829	0
Lowland Conifers	15%	12,349	5,476	6,873	764	0	12,349	764	0
Lowland Spruce/Fir	6%	5,358	1,715	3,643	405	0	5,358	405	0
Aspen	6%	5,245	672	4,573	374	0	5,245	762	0
Lowland Deciduous	6%	4,593	815	3,778	420	0	4,593	420	0
Northern Hardwood	4%	3,645	99	3,546	0	1,553	3,645	0	1,584
Lowland Aspen/Balsam Poplar	4%	3,074	592	2,482	270	0	3,074	414	0
Upland Open/Semi-Open Lands	1%	662	0	662	0	0	662	0	0
Misc Other (Water, Local, Urban)	2%	1,452	0	1,452	0	0	1,452	0	0
Others	7%	5,900	1,484	4,416	763	427	5,900	522	538
<b>Total</b>	<b>100%</b>	<b>83,326</b>	<b>11,259</b>	<b>72,067</b>	<b>3,096</b>	<b>1,980</b>	<b>83,326</b>	<b>4,116</b>	<b>2,122</b>

Others include: tamarack, jack pine, lowland mixed forest, white pine, upland spruce/fir, paper birch, hemlock, upland conifers, mixed upland deciduous, upland mixed forest and red pine.

#### 4.29.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### Section 4.29.1 Forest Cover Type Management – Lowland Open/Semi-Open Lands

###### Current Condition

This management area contains a large amount of lowland open/semi-open lands totaling 27,373 acres (33%) (Table 4.29.1). This category is a combination of lowland shrub (11,555 acres), treed bog (10,641 acres), marsh (5,143 acres) and bog (33 acres). These wet areas provide important habitat for a large number of wildlife species. Many of these stands are included within the deer wintering complex special concern areas. Most of these types are found in association with streams and rivers and contribute to the access issues in the management area. The large percentage of acres within these and other lowland cover types is what distinguishes this management area and makes access throughout difficult.

###### Desired Future Condition

- Lowland open/semi-open lands will be retained in their large roadless state to ensure an adequate level of wildlife habitat and recreational opportunity while protecting the special conservation area values found in these cover types.

###### Long-Term Management Objectives

- In general, these stands will be maintained without active management to protect their ecological values; and
- Where possible, protect these areas from harvest operations in adjacent stands.

##### Section 4.29.1.2 Forest Cover Type Management - Cedar

###### Current Condition

Cedar occurs on 13,676 acres (16%) of the management area (Table 4.29.1). Approximately 10% of the cedar stands have been classified as uneven aged reflecting the multi-storied stands found in accessible unmanaged stands (Figure

4.29.2). Cedar stands around McMillan and the Sage and Hendrie Rivers provide critical winter habitat for white-tailed deer (special conservation area deer wintering complexes) and maintaining a closed canopy structure is important. There has been very little recent cedar harvesting in this management area.

There is a need to address future cedar cover within the deer wintering complexes. Reliable and timely regeneration of cedar is a concern from both wildlife and forest management perspectives.

Currently there are 164 acres of cedar prescribed for final harvest. There are 406 acres of cedar that have site conditions limiting their harvest. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Cedar stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

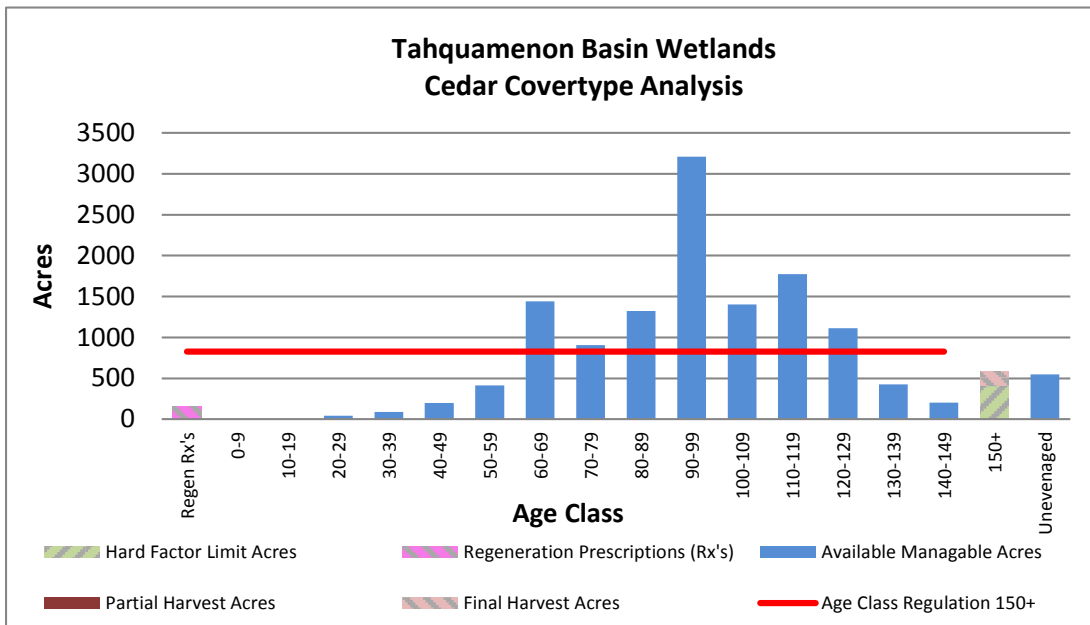


Figure 4.29.2. Age-class distribution of cedar in the Tahquamenon River Basin Wetlands management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Where deer wintering activities are not a concern, cedar will be maintained on operable sites through even-aged management; and
- Balancing the age classes between 0-159 years of age would provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of cedar is for 100 acres with the reduction from the regulated amount due to the deer wintering complexes.

Long-Term Management Objectives

- Within deer wintering areas, focus cedar management on winter habitat for deer;
- Outside of the deer wintering areas, look for opportunities to test different methods of regenerating cedar, especially outside of the deer wintering areas;
- Consider harvest of cedar before rotation age to begin to diversify the age classes; and
- Using a 150-year regulated rotation would allow approximately 829 acres to be harvested per decade.



### Section 4.29.1.3 Forest Cover Type Management – Lowland Conifers

#### Current Condition

Lowland conifers occur on 12,349 acres (15%) of the management area (Table 4.29.1). Approximately 10% of the lowland conifer stands have been classified as uneven aged as a result of natural processes (Figure 4.29.3). Lowland conifer stands have been successfully harvested and regenerated through natural regeneration resulting in stands in all age classes. The majority of the lowland conifer stands in this area have intermittent drainages and sub-surface flow throughout especially in the Tahquamenon River Basin management area.

Currently there are 238 acres of lowland conifers prescribed for final harvest. There are 5,476 acres of lowland conifers that have site conditions limiting their harvest. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in areas that are inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

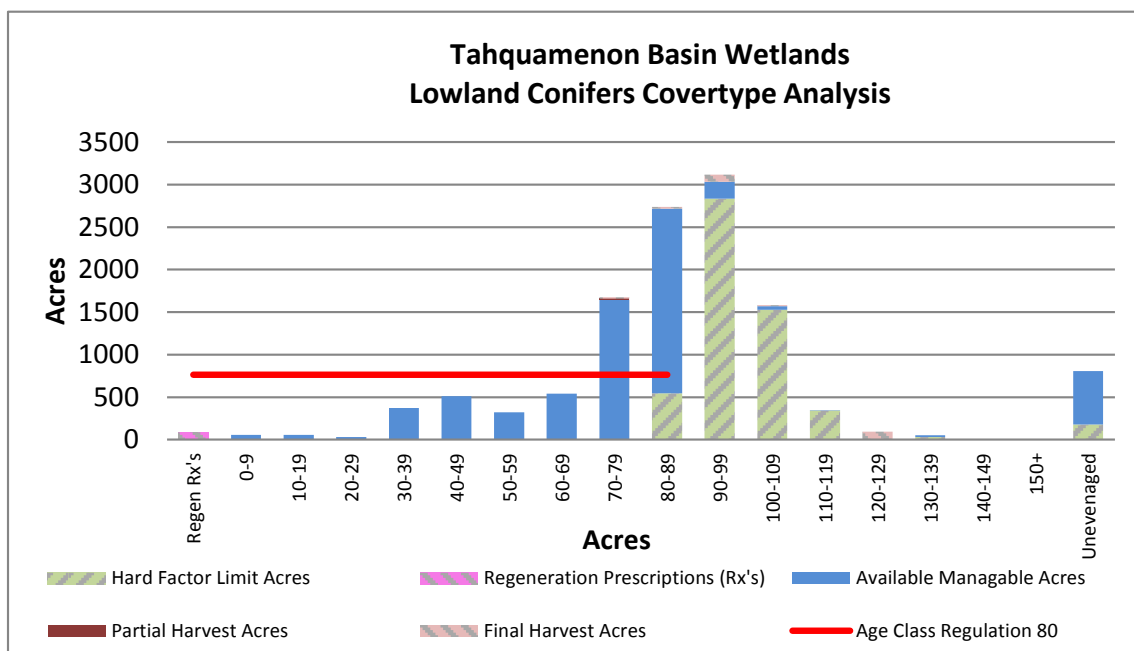


Figure 4.29.3. Age-class distribution of lowland conifers in the Tahquamenon River Basin Wetlands management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for continual harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 764 acres to work toward balancing the age classes.

#### Long-Term Management Objectives

- Balance the age-class structure of available stands providing for a regulated harvest of about 764 acres per decade.

### Section 4.29.1.4 Forest Cover Type Management – Lowland Spruce/Fir

#### Current Condition

Lowland spruce/fir stands are found on 5,358 acres (6%) of the management area (Table 4.29.1). Lowland spruce/fir stands have been successfully harvested and regenerated in the past resulting in stands in most age classes (Figure

4.29.4). The majority of the lowland spruce/fir stands in this area have intermittent drainages and sub-surface flow throughout especially in the Tahquamenon River Basin management area.

Currently there are 572 acres of lowland spruce/fir with a final harvest prescribed. There are 1,715 acres of lowland spruce/fir that have site conditions limiting their harvest. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands will undergo natural successional processes.

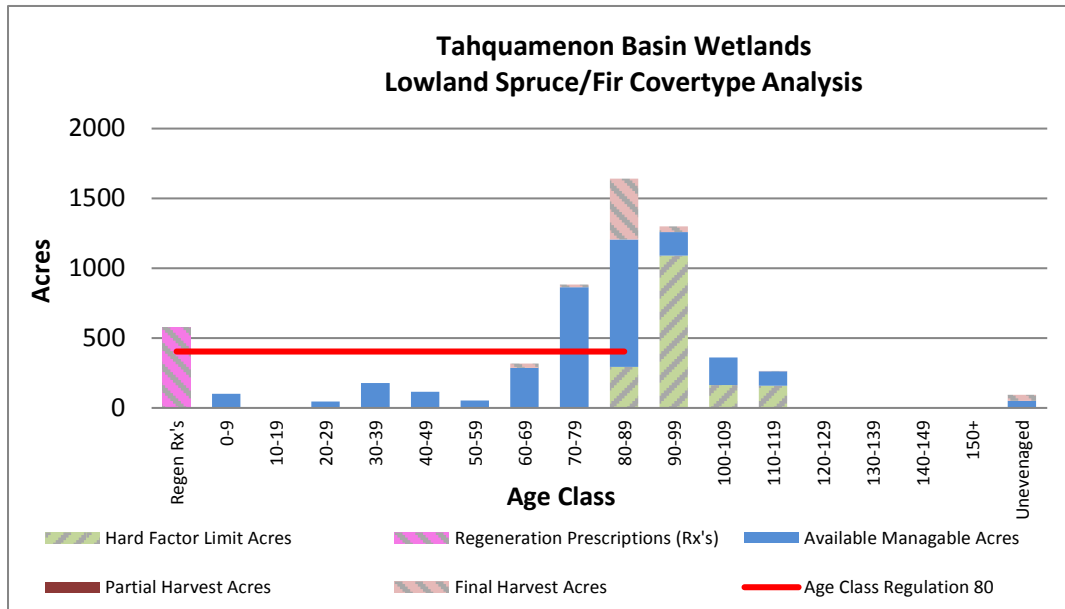


Figure 4.29.4. Age-class distribution of lowland spruce/fir in the Tahquamenon River Basin Wetlands management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland spruce/fir will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age providing for a regulated harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected final harvest of lowland spruce/fir is 405 acres to work toward balancing the age classes.

#### Long-Term Management Objectives

- Balance the age classes of accessible lowland spruce/fir stands providing for a regulated harvest of approximately 405 acres per decade.

### **Section 4.29.1.5 Forest Cover Type Management – Aspen**

#### Current Condition

Aspen occurs on 5,245 acres (6%) of the management area (Table 4.29.1). Aspen stands are distributed throughout the management area on outwash plains and lake plains, on dry- to mesic-poor to medium-nutrient sites with habitat classes of PARVAa, ATFD and AFPo (see appendix E). Accessible aspen has been consistently harvested over the last 40 years, contributing toward balanced age classes (Figure 4.29.5).

There are currently 305 acres of aspen prescribed with a final harvest. Approximately 70 acres of other cover types are expected to convert to aspen after harvest. These acres are shown in the regeneration prescriptions column in Figure 4.29.5. There are 672 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of aspen will succeed to more shade tolerant species.

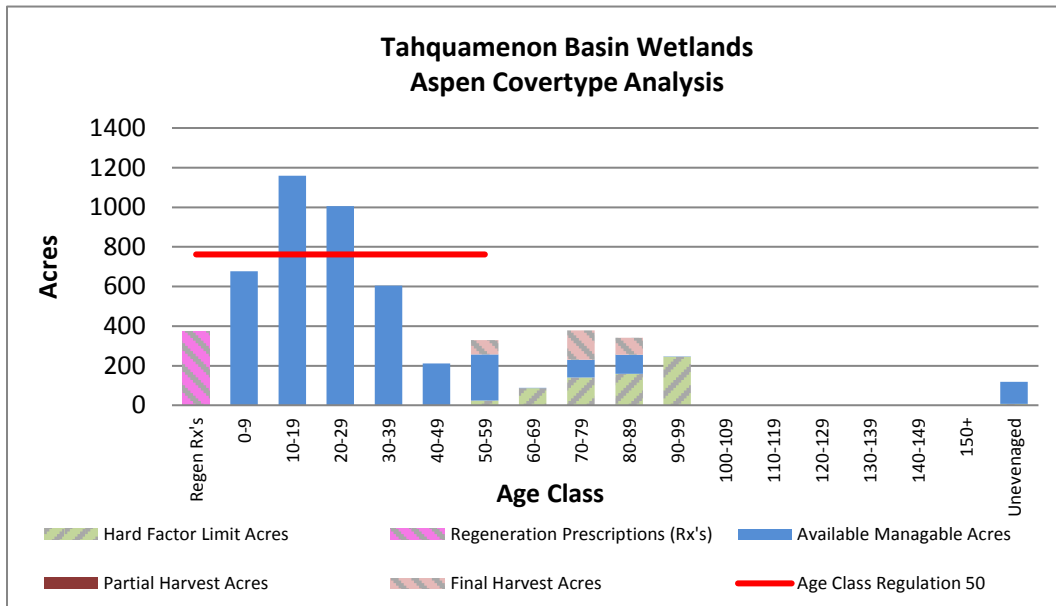


Figure 4.29.5. Age-class distribution of aspen in the Tahquamenon River Basin Wetlands management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest of aspen is 374 acres with the decrease from the regulated amount due to the current age-class structure where most of the acres of aspen are in younger age classes.

Long-Term Management Objectives

- Balance the age classes of accessible stands of aspen providing for a regulated harvest of approximately 762 acres per decade.

**Section 4.29.1.6 Forest Cover Type Management – Lowland Deciduous**

Current Condition

Lowland deciduous stands are found on 4,593 acres (6%) of the management area (Table 4.29.1). Lowland deciduous stands in this management area are often found in association with the creeks and drainages making access difficult. Almost half of the acres have been coded as uneven aged due to the variety of ages and sizes of trees within the stands (Figure 4.29.6). In areas that have been recently harvested natural regeneration has been successful.

Currently there are 111 acres of lowland deciduous with a final harvest and 24 acres of lowland deciduous with a partial harvest prescribed. There are approximately 30 acres of other cover types are expected to convert to lowland deciduous after harvest. These acres are shown in the regeneration prescriptions column in Figure 4.29.7. There are 815 acres of lowland deciduous that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from harvest calculations. Inaccessible stands will be subject to natural processes, resulting in uneven-aged structure and a shift to late successional species.



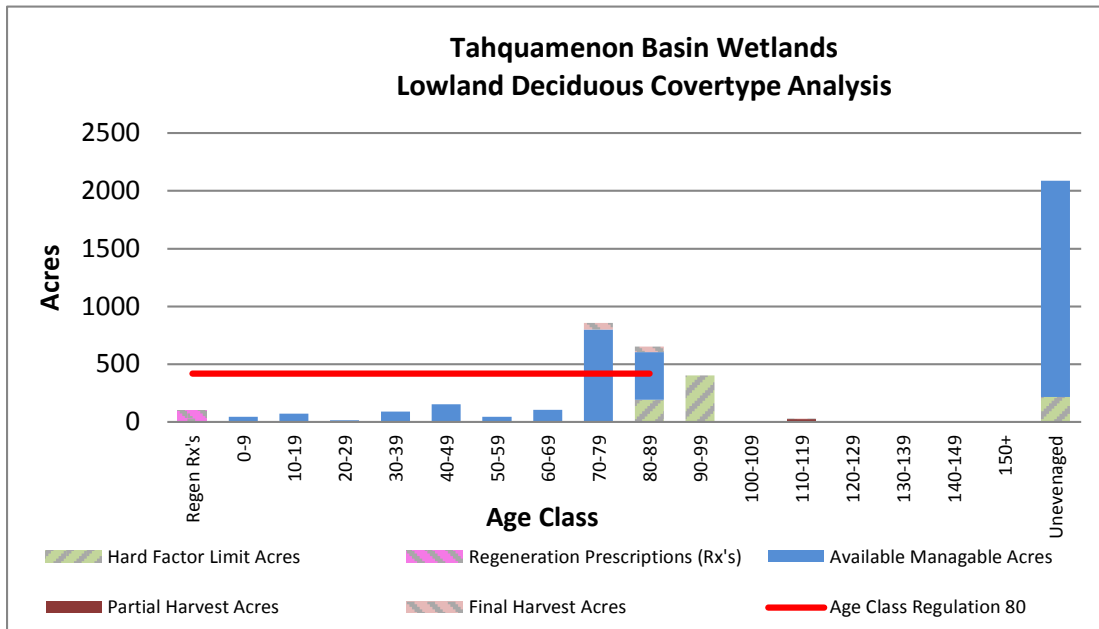


Figure 4.29.7. Age-class distribution of lowland deciduous in the Tahquamenon River Basin Wetlands management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland deciduous stands will be maintained on operable sites generally through even-aged management with acres balanced between 0-89 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland deciduous is 420 acres to work toward balancing the age classes.

Long-Term Management Objectives

- Balance the age classes of accessible lowland deciduous stands providing for a regulated harvest of approximately 420 acres per decade.

**Section 4.29.1.7 Forest Cover Type Management – Other Types**

Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acres (Table 4.29.1). Northern hardwood (3,645 acres) and lowland aspen/balsam poplar (3,074 acres) each have 4% of the total management area acres. Other types total approximately 5,900 acres (7%) and are spread across the management area. This category is made up of forested cover types with 2% or less of the management area acres. They include: tamarack (1,582 acres), jack pine (917 acres), lowland mixed forest (771 acres), white pine (745 acres), upland spruce/fir (681 acres), paper birch (334 acres), hemlock (301 acres), upland conifers (160 acres), mixed upland deciduous (150 acres), upland mixed forest (137 acres) and red pine (122 acres).

Following general timber management guidelines schedule individual tree selection harvests in uneven-aged stands and regeneration harvests in even-aged cover types using natural regeneration after harvest. Where there is sufficient acreage, balance the age classes of even-aged cover types.

Beech bark disease is found throughout the management area and salvage of affected beech is ongoing. Stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

Approximately 2,175 acres of these other minor cover types have site conditions limiting their harvest this entry. These hard factor limited acres have been removed from the total number of manageable acres available for harvest. Inaccessible stands may never be harvested and will be subject to successional processes.

Upland open/semi-open lands occur on 662 acres (1%) and are comprised of: bare/sparsely vegetated (370 acres), low-density trees (177 acres), herbaceous openland (89 acres) and upland shrub (26 acres). Miscellaneous other types occur on 1,452 acres (2%) and include roads, water and sand/soil.

#### Desired Future Condition

- These cover types may be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreation opportunity.

#### 10-Year Management Objectives

- The projected 10-year final harvest is 270 acres of lowland aspen/balsam poplar and 763 acres of other types; and
- The projected 10-year partial harvest is 1,553 acres of northern hardwood and 427 acres of other types.

#### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.29.2- Featured Wildlife Species**

The Tahquamenon River and its associated drainages greatly influence the distribution of cover types in this management area. Associated with the river systems are lowland swamp conifers and cedar complexes that are important deer wintering complexes within the management area, including those around the McMillan area and the Sage and Hendrie rivers. The Dollarville flooding is used extensively by nesting and migrating shorebirds, waterfowl, eagles, osprey and aquatic furbearers. Wild rice grows in the flooding and the river channel and provides a source of nutrition for waterfowl. Management in this management area for wildlife should focus on retaining a closed canopy within the deer wintering complexes, promoting hard and soft mast, the retention of structure in boreal forest and the creation of dense undergrowth and woody debris in harvested lowland stands.

#### **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improve habitat. Management for the species should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land-use.

#### Wildlife habitat specifications:

- Maintain or increase tree species that provide mast including beech, oak, black cherry and ironwood.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.
- Retain some large diameter white pine or hemlock as refuge trees.
- Plant disease resistant beech and red oak where appropriate.
- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource.
- Discourage land transactions and management activities that facilitate further fragmenting state lands within the management area.

#### **Gray Jay**

The goal for gray jay in the eastern Upper Peninsula is to maintain or increase suitable habitat. Management should focus on maintaining representation of older age classes of timber in appropriate cover types as well as retention of important structural features within harvested stands in priority areas.

#### Wildlife habitat specifications:

- The primary goal is to maintain appropriate cover types (birch, lowland deciduous, fir, lowland conifer, lowland spruce/fir, tamarack and bogs) in the management area in a variety of age classes. Maintain 15% of the total acres in relevant cover types in older age classes (at least 20 years beyond “normal” rotation length for the cover type).
  - This can be accomplished either with stands that are already factor limited or by extending the rotation age. In this management area, older age classes (greater than 100 years) for gray jay habitat are being met by the large number of stands with site conditions that limiting harvesting.
- Patches are preferred over single trees within timber harvest sale boundaries though it is beneficial to have both.
- Offset salvage harvests deemed necessary due to insect, disease or fire within the same cover type and age class (within the compartment, management area or eastern Upper Peninsula ecoregion), to minimize impacts on gray jay habitat. Total allowable harvest in these situations will be evaluated on a case-by-case basis.

#### **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion, state forest management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash, increasing mesic conifer components and increasing beaver abundance.

#### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under four inch diameter at breast height.
- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- Maintain young dense jack pine stands.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris already present (before cutting), and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance and retain the maximum residual amount.

#### **White-tailed Deer**

The eastern Upper Peninsula goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR Department procedure 32.22-07 states “Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer.” There is a complex relationship between deer abundance; available summer and winter habitat; timber management; and regeneration tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the department and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

#### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas and within ¼-mile of severe-winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.

- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring break out areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g., hemlock wooly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.
- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### 4.29.3 – Rare Species and Special Conservation Area Management

All forest operations must be reviewed for potential conflicts with rare species following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed six listed species and no natural communities of note occurring in the management area as listed in Table 4.29.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Table 4.29.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Tahquamenon River Basin Wetlands management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Birds</b>								
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
<b>Butterfly</b>								
Frigga fritillary	<i>Boloria frigga</i>	SC/G5/S3S4	Confirmed	HV	Low	Bog	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
<b>Plants</b>								
Goblin moonwort	<i>Botrychium mormo</i>	T/G3/S2	Confirmed			Mesic northern forest	Northern Hardwood	Late
						Boreal forest	Upland & Lowland Sp/F	Mid
Dwarf raspberry	<i>Rubus acaulis</i>	E/G5T5/S1	Confirmed			Northern fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
Satiny willow	<i>Salix pellita</i>	SC/G5/S2S3	Confirmed			Sand and gravel beach	Upland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Special conservation areas in this management area include cold water lakes and streams, high priority trout streams (Figure 4.29.1), several deer wintering complexes, and the Dollarville Flooding State Wildlife Management Area (Figure 4.29.8). In addition, approximately 800 acres were identified as potential old growth, and these stands are also special

conservation areas until they are evaluated. Concentrated recreation area special conservation areas (boat access sites and state forest campgrounds) are listed in the Recreation section 4.29.6 below.

No high conservation value areas or ecological reference areas have been identified for this management area as illustrated in Figure 4.29.8.

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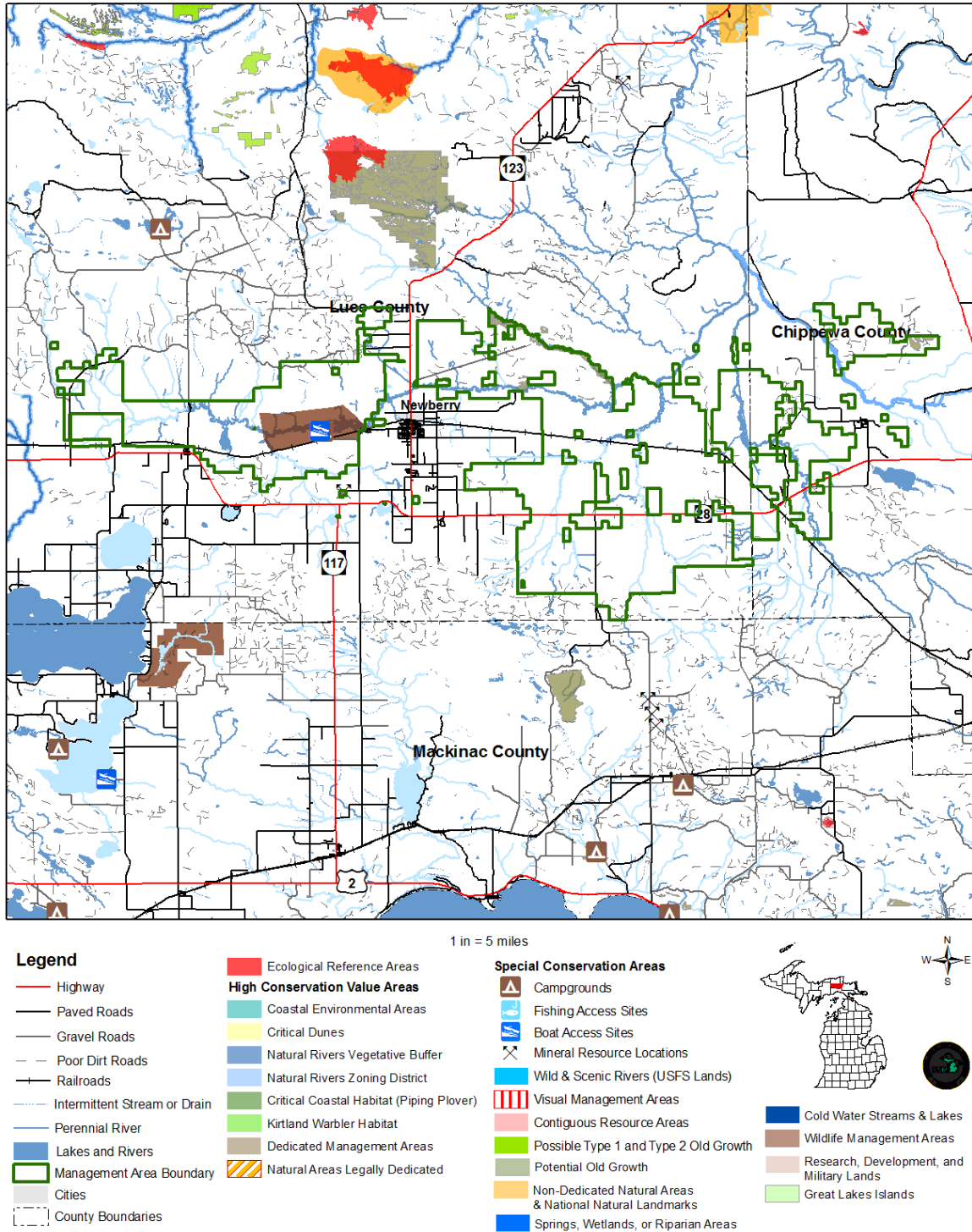


Figure 4.29.8. A map of the Tahquamenon River Basin Wetlands management area showing the special resource areas.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.

#### 4.29.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Aspen and lowland aspen/balsam poplar: white trunk rot and *Hypoxylon* canker;
- Lowland deciduous: emerald ash borer; and
- Lowland conifers and lowland spruce/fir: spruce budworm, eastern larch beetle and larch casebearer.

For further information on forest health refer to Section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. No invasive plant species have yet been documented within the management area. Leafy spurge, reed canary grass, spotted knapweed and wild parsnip have been documented within a five-mile buffer of the management area (Table 4.29.3) and monitoring efforts should specifically look for new populations of this species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

In addition to the invasive species that have been documented in the Michigan Invasive Plant Identification Network database, there have been recent sightings of purple loosestrife in the management area and *Phragmites* in and around the management area in the Dollarville Flooding area.

Table 4.29.3. Invasive plant species within or near the Tahquamenon River Basin Wetlands management area (Data from the Michigan Invasive Plant Identification Network database).

Tahquamenon River Basin Wetlands - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	6	6	4
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer		Occurrences
-	-	Leafy Spurge <i>Euphorbia esula</i>		1
-	-	Reed Canary Grass <i>Phalaris arundinacea</i>		2
-	-	Spotted Knapweed <i>Centaurea stoebe</i>		2
-	-	Wild Parsnip <i>Pastinaca sativa</i>		1

#### 4.29.5 – Fire Management

This area is dominated by lowland swamp conifers and marsh complex. The majority of this area has a fire return interval of 35 – 200 years with mixed severity. Prescribed fire has not been used in this area since prescribed fire records have been kept.

- Modified suppression tactic may be necessary in this management area because of the wet soils.
- Access for fire suppression is very poor in this management area.

#### **4.29.6 – Public Access and Recreation**

Rivers, creeks and low, wet ground limit access to large portions of the management area.

Recreational facilities within the management area include: boat access sites at Natalie, McPhee's Landing and Dollarville Dam; snowmobile trails as shown in Figure 4.29.1 and the Natalie State Forest Campground. There is also the privately owned Toonerville Trolley which follows the Soo Line grade.

Bird watching, hunting, trapping and horse riding are popular. The Dollarville flooding is used heavily by waterfowl hunters, boaters and fishermen.

#### **4.29.7 - Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. The Tahquamenon River system is designated as high priority trout stream in this management area, and is shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.29.1.

#### **4.29.8 – Minerals**

Surface sediments consist of peat and muck, lacustrine (lake) sand, gravel, clay and silt, glacial outwash sand and gravel and postglacial alluvium and coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the management area and there is good potential on the uplands for additional pits.

The Silurian Cabothead Shale and Manitoulin Formation and Ordovician Queenston Shale, Big Hill Dolomite, Stonington Formation, Utica and Collingwood Shales and Trenton Formation subcrop below the glacial drift. The Trenton is quarried for stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (14 in Chippewa and two in Luce). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

Charcoal Grade sand pit and Dollarville gravel pit are within the management area.

## 4.30 MA 30 – Tahquamenon River Patterned Fens Management Area

### Summary of Use and Management

Vegetative management in the Tahquamenon River Patterned Fens management area (MA) will emphasize protection of the unique character of the area and the biodiversity attributes, threatened and endangered habitats and natural communities while providing recreational opportunities, timber products and wildlife habitat. The management area contains patterned fen ecological reference areas and the McMahon Lake Strangmoor non-dedicated natural area special conservation area. Timber management activities include improving the age class diversity of even-aged types such as jack pine, lowland spruce and lowland conifers. Expected issues in this 10-year planning period are increased recreational pressure, introduced pests and diseases including beech bark disease, emerald ash borer and non-native invasive species.

### Introduction

The Tahquamenon River Patterned Fens management area is located in the north central portion of the eastern Upper Peninsula in Luce County. It has 29,577 acres of state-owned land. The primary attribute for this management area are the unique ecological features found here such as the patterned fens. Additional attributes which were important in identifying this management area include:

- The management area falls within the Luce Subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform in this management area is the Two Hearted Lowlands, a sand lake plain that contains the largest expanses of wetland in the state.
- Vegetation is primarily non-forested peatland complexes with pine ridges surrounded by forested landscapes.
- Some of the forested cover types are not actively managed due to lack of access and high ecological values. Harvests have occurred on accessible sand ridges with jack pine, red pine and aspen.
- Recreational opportunities including hunting, fishing, berry and morel mushroom gathering and bird watching.
- The Sleeper Lakes fire in 2007 burned in the patterned fen and muskeg natural communities. A unique assemblage of native plants and animals use these peatlands. Subsequent to the Sleeper Lake wildfire there has been an increase in use by the uncommon black-backed woodpecker.

This management area contains a large block of contiguous state forest land. The Nature Conservancy's McMahon Lake Preserve and Two-Hearted reserve are adjacent to this management area at the north. The Tahquamenon River Patterned Fens management area falls within the Newberry Forest Management Unit. The current predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.30.1.



# Tahquamenon River Patterned Fens

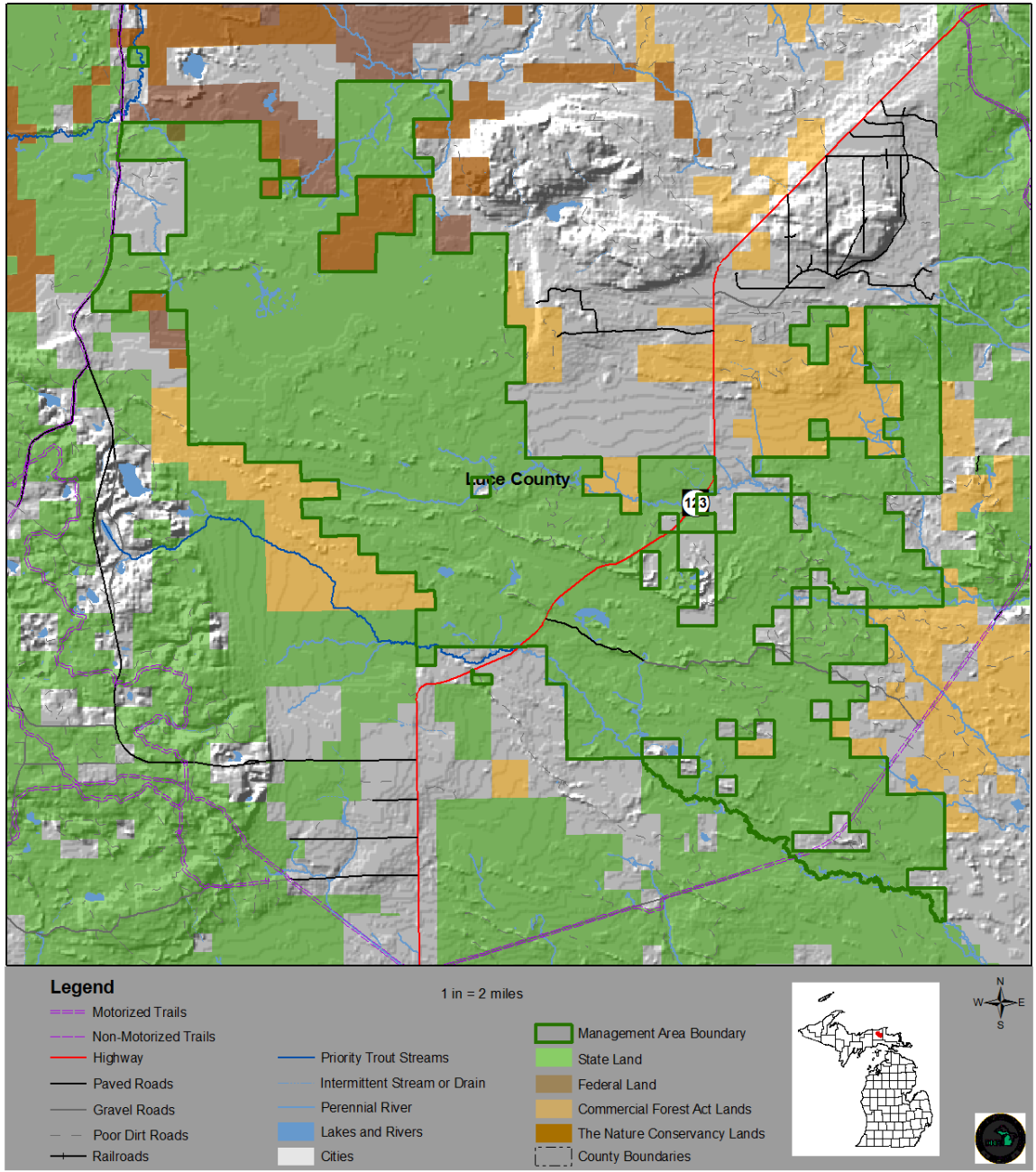


Figure 4.29.1. Location of Tahquamenon River Patterned Fens management area (dark green boundary) in relation to surrounding state forest lands and other ownerships.

Table 4.30.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Tahquamenon River Patterned Fens management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Lowland Open/Semi-Open Lands	66%	19,480	0	19,480	0	0	19,480	0	0
Jack Pine	8%	2,331	980	1,351	349	0	2,331	193	0
Lowland Conifers	6%	1,848	676	1,172	442	0	1,848	130	0
Lowland Spruce/Fir	5%	1,431	207	1,224	256	0	1,431	136	0
White Pine	3%	832	121	711	213	225	832	65	314
Red Pine	3%	769	312	457	173	18	769	51	280
Upland Open/Semi-Open Lands	0%	43	0	43	0	0	43	0	0
Misc Other (Water, Local, Urban)	1%	305	0	305	0	0	305	0	0
Others	9%	2,538	908	1,630	52	161	2,538	117	165
<b>Total</b>	<b>100%</b>	<b>29,577</b>	<b>3,204</b>	<b>26,373</b>	<b>1,486</b>	<b>404</b>	<b>29,577</b>	<b>692</b>	<b>759</b>

Others include: northern hardwood, cedar, tamarack, lowland deciduous, aspen, hemlock, paper birch and lowland aspen/balsam poplar.

#### 4.30.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### Section 4.30.1.1 Forest Cover Type Management – Lowland Open/Semi-Open Lands

###### Current Condition

The management area contains a large amount of lowland open/semi-open lands totaling approximately 19,480 acres (66%) (Table 4.30.1). This category is a combination of treed bog (9,169 acres), marsh (8,394 acres), lowland shrub (1,733 acres) and bog (184 acres). The patterned fen ecological reference areas are primarily found within the marsh cover type. Much of the muskeg element occurrence is in the treed bog cover type. Many of these non-forested stands are found in association with streams and rivers and contribute to access issues within the management area. A large portion of these cover types in the center of the management area is roadless. Some of the large marshes in this area may be seasonally dry. The large marshes are often used by wildlife species including moose and migrating birds.

###### Desired Future Condition

- Lowland open/semi-open lands will be retained in their large, roadless state to provide wildlife habitat and recreational opportunities while protecting the ecological values found in these cover types.

###### Long-Term Management Objectives

- In general, these stands will be maintained without active management.

##### Section 4.30.1.2 Forest Cover Type Management – Jack Pine

###### Current Condition

Jack pine stands occur on 2,331 acres (8%) of the management area (Table 4.30.1). Jack pine is found on beach ridges, dunes and lake plains on dry, poor-nutrient sandy soils with a Kotar habitat class of PVE (see appendix E) and in wetland areas. The large peatland complex contains many jack pine ridges. The muskeg element occurrence area contains a lot of acres of poorly stocked jack pine. The jack pine stands in this management area are generally of natural origin and often have other pine species or spruce mixed in. Following harvest, natural regeneration using scarification or prescribed burning is used to regenerate stands followed by planting where necessary. Due to the large wetland areas access for timber harvest is sometimes limited.

Currently there are 84 acres of jack pine prescribed with a final harvest (Figure 4.30.2). There are 980 acres of jack pine that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Jack pine in areas that are inaccessible or otherwise restricted from harvest will remain until biological maturity, eventually succeeding to late successional species.

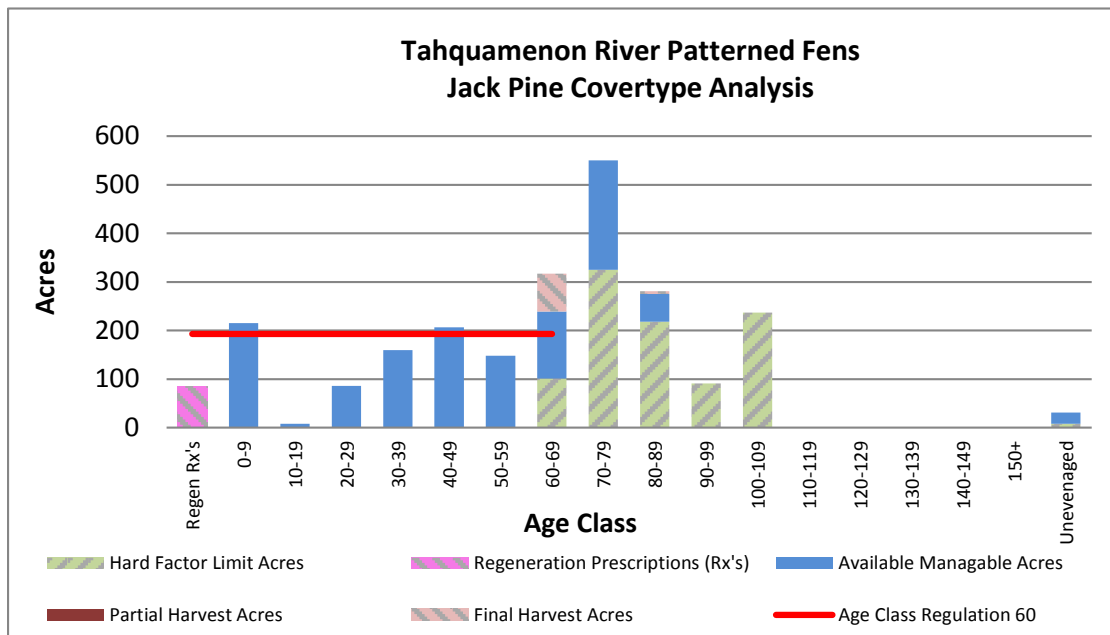


Figure 4.30.2. Age-class distribution of jack pine in the Tahquamenon River Patterned Fens management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Jack pine will be maintained on operable sites through even-aged management with acres balanced between 0-69 years of age to provide for continual harvesting, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest of jack pine is for 349 acres. The increase from the regulated amount is due to the current age-class structure where many stands are over rotation age.

Long-Term Management Objectives

- Maintain a lower acreage of over-mature stands to lessen the prevalence and severity of jack pine budworm outbreaks; and
- In accessible areas, balance the age classes of jack pine providing for a regulated harvest of approximately 193 acres per decade.

**Section 4.30.1.3 Forest Cover Type Management – Lowland Conifer**

Current Condition

Lowland conifers occur on 1,848 acres (6%) in this management area (Table 4.30.1). The majority of the lowland conifer stands are in the east portion of the management area. Some harvest and regeneration work was done in the past, but there has been no recent activity (Figure 4.30.3). Where past harvests occurred natural regeneration was successful. Almost 25% of the stands have been classified as uneven-aged reflecting the multi-storied stands found in inaccessible unmanaged areas.

Currently there are 13 acres of lowland conifers with a final harvest prescribed. There are 676 acres of lowland conifers that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in areas unavailable for harvest will be subject to natural processes, resulting in a range of successional stages.

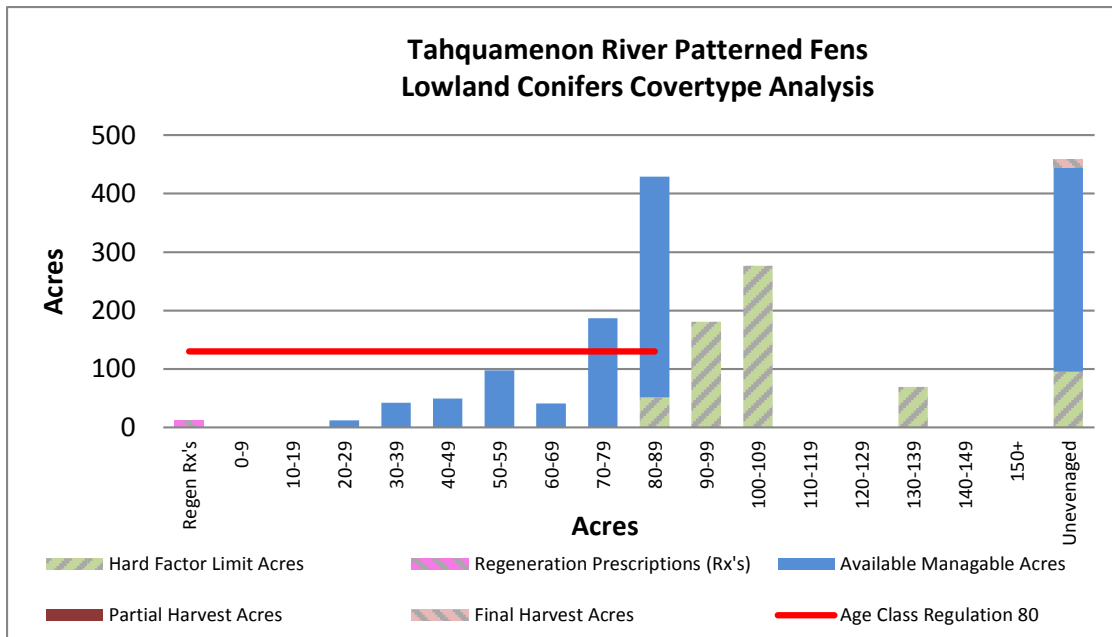


Figure 4.30.3. Age-class distribution of lowland conifers in the Tahquamenon River Patterned Fens management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for continual harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 442 acres. This increase from the regulated amount is due to the current age-class structure with very few young stands present.

Long-Term Management Objectives

- Balance the age-class structure of accessible stands providing for a regulated harvest of 130 acres per decade.

**Section 4.30.1.4 Forest Cover Type Management – Lowland Spruce/Fir**

Current Condition

Lowland spruce/fir stands are found on 1,431 acres (5%) of the management area (Table 4.30.1). Lowland spruce/fir stands have been successfully harvested and regenerated in the past resulting in stands in several age classes (Figure 4.30.4). A number of the stands are inaccessible due to their location within the large marsh complexes or are unavailable for intensive management due to special concerns.

Currently there are no acres of lowland spruce/fir prescribed for harvest. There are 207 acres of lowland spruce/fir that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland spruce/fir stands in areas unavailable for harvest at this time will be subject to natural processes, resulting in a range of successional stages.

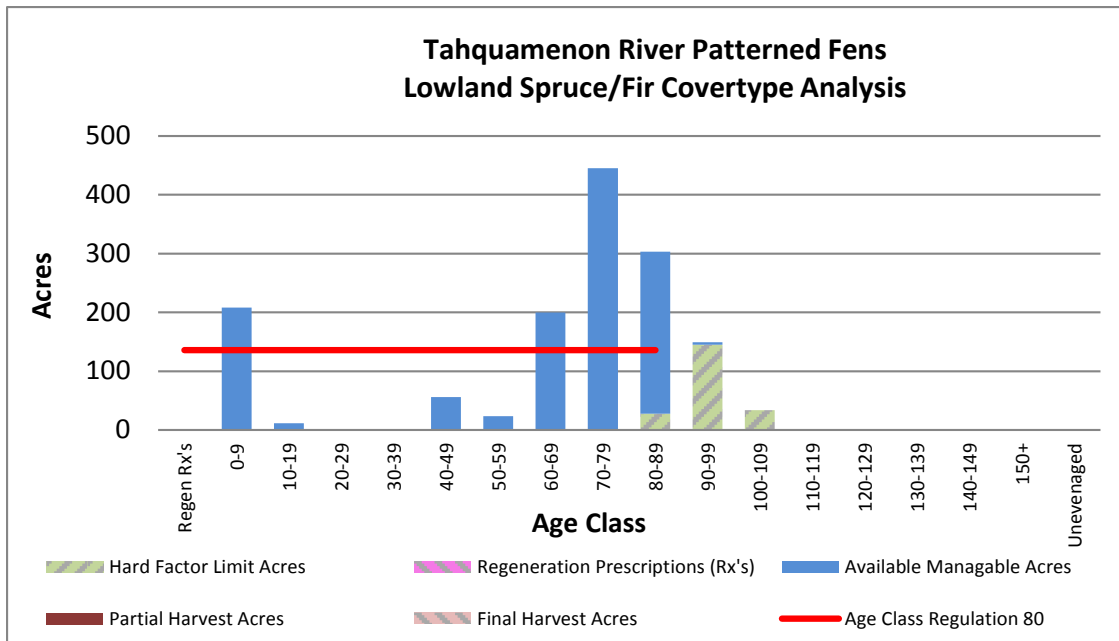


Figure 4.30.4. Age-class distribution of lowland spruce/fir in the Tahquamenon River Patterned Fens management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland spruce/fir stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for a continuous flow of timber products and a variety of wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest is 256 acres of lowland spruce/fir. The increase from the regulated amount is due to the current age-class structure.

Long-Term Management Objectives

- Balance the age classes of available stands providing for a regulated harvest of approximately 136 acres of lowland spruce/fir per decade.

**Section 4.30.1.5 Forest Cover Type Management – Other Types**

Current Condition

There are many other cover types spread across the management area that have less than 5% of the total management area acres (Table 4.30.1). White pine (832 acres) and red pine (769 acres) each have 3% of the total acres. “Other types” is made up of forested cover types with 2% or less of the total acres and includes: northern hardwoods (732 acres), cedar (482 acres), tamarack (467 acres), lowland deciduous (444 acres), aspen (189 acres), hemlock (128 acres), paper birch (50 acres) and lowland aspen/balsam fir (46 acres).

Following general timber management guidelines, thin red and white pine stands until economic maturity followed with a seed tree or shelterwood harvest to provide for natural regeneration where possible. For northern hardwood stands use individual tree selection where quality warrants and even aged management on poor quality sites. Most other cover types are managed following even-aged guidelines for harvest. Mixed cover types with high basal area may be thinned prior to final harvest depending on the species composition.

Beech bark disease is found throughout the management area and salvage of affected beech is ongoing. Stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed, due to resultant lower than normal residual basal area.

There are 1,341 acres of these other minor cover types that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Some acres of cover types found on low, wet ground may be inaccessible for harvesting and will be subject to natural succession.

Upland open/semi-open lands contain 43 acres of bare/sparsely vegetated lands. In addition there are 305 acres (1%) of "miscellaneous other" stands, which includes water, sand/soil and roads.

#### Desired Future Condition

- These cover types will be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreational opportunity.

#### 10-Year Management Objectives

- The projected 10-year final harvest is 213 acres of white pine, 173 acres of red pine and 52 acres of other types; and
- The projected 10-year partial harvest is 225 acres of white pine, 18 acres of red pine and 161 acres of other types.

#### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.30.2- Featured Wildlife Species**

The ridges of red and jack pine found within the expansive wetland areas have very high biodiversity values. Wildlife management objectives for the following featured species include the retention of mesic conifers, hard and soft mast and forest structure within harvested stands; the preservation of pine ridges in the peatland complexes and early successional browse where it can be created adjacent to lowlands.

#### **Blackburnian Warbler**

The goal for blackburnian warbler is to maintain suitable breeding habitat. State forest management for the species should focus on within stand diversity, habitat fragmentation and conifer components in this management area.

#### Wildlife habitat specifications:

- Increase the mesic conifer (e.g., hemlock, white pine, red pine and upland spruce-fir) component on state forests by: a) Retaining a larger percentage of mesic conifer during harvests; b) Using silvicultural practices that encourage the regeneration of mesic conifer; and c) Where desired/feasible, underplanting hemlock, white pine and white spruce in hardwood-dominated stands on suitable sites without a seed source.
- Provide more older mesic conifers, particularly hemlock, in the landscape by: a) Allowing some actively managed stands of mesic conifer to grow beyond standard rotation ages; b) Including mature mesic conifers as within-stand structure retained during harvests by following Within-Stand Retention Guidance during harvests; and c) Maintaining mature mesic conifer stands within travel corridor and riparian zone or Type 1 or Type 2 old growth special conservation areas.
- Only allow harvest in hemlock stands or where hemlock is a component in other cover types where successful hemlock recruitment has been clearly demonstrated.

#### **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improving habitat. State forest management for the species should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land-use.

#### Wildlife habitat specifications:

- Maintain or increase tree species that provide mast including beech, oak, black cherry and ironwood.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.
- Retain some large diameter white pine or hemlock as refuge trees.
- Plant disease resistant beech and red oak where appropriate.
- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource.
- Discourage land transactions and management activities that facilitate further fragmentation of state lands within the management area.

#### **Moose**

The goal for moose in the eastern Upper Peninsula is to maintain or increase suitable habitat. Management for moose should focus on providing early successional browse adjacent to lowland conifer complexes, the maintenance of hemlock within stands and protecting willow, a valuable food source, along riparian and wetland edges.

#### Wildlife habitat specifications:

- Encourage early successional hardwood browse (in the 0-9 and 10-19 year-old age class) in close proximity to closed canopy lowland conifer swamps.
- Balance aspen age-class distribution to ensure a more sustainable supply of browse.
- Maintain or promote thermal refugia in harvested stands by retaining hemlock and other conifers.
- Increase mesic conifer (e.g., hemlock, white pine, red pine and upland spruce-fir) component on state forests by: a) Retaining a larger percentage of mesic conifer during harvests; b) Using silvicultural practices that encourage the regeneration of mesic conifer; and c) Where desired/feasible, under planting hemlock, white pine and white spruce in hardwood-dominated stands on suitable sites without a seed source. Increase the percentage of mesic conifers, where suitable, across the landscape by 10% during this planning cycle.
- Willow is an important browse species, as are submergent and emergent aquatic vegetation associated with summer feeding areas. Ensure sustainable supplies of each.

#### **Red Crossbill**

In the eastern Upper Peninsula, the goal for red crossbill is to maintain or increase suitable habitat. Management should focus on maintaining mature and over-mature seed producing trees in priority areas.

#### Wildlife habitat specifications:

- Maintain a minimum of 15% of the total acres of appropriate cover types (upland spruce/fir, upland conifers, natural mixed pine and natural red and white pine) in the management area for red crossbill in a mature forest condition (i.e., >150 years for red pine, > 130 years for white pine and > 80 years for white spruce). This can be accomplished with existing factor-limited stands or alternatively by extending the rotation length of these types to 150, 130 and 80 years respectively. In this management area older age classes for red crossbill habitat are being met by a large number of stands with site conditions that limiting harvesting.
- Retain large mature and over mature red pine, white pine and white spruce in shelter-wood and seed tree cuts.
- Evaluate the management area for the establishment of core tracts of old (greater than 100 years old) pine stands in biodiversity stewardship areas or Type 1 or Type 2 old growth.

#### **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, state forest management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash, increasing mesic conifer components and increasing beaver abundance.

#### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under four inch diameter at breast height.



- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- Maintain young dense jack pine stands.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris slash already present (before cutting), and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance and retain the maximum residual amount.

## **Spruce Grouse**

The goal for spruce grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on retention of mixed conifers on riparian/lowland edges, the increase of in stand species diversity, and landscape level planning to ensure populations are not isolated.

### Wildlife habitat specifications:

- In jack pine harvests leave mixed conifer and/or jack pine retention strips of mature trees along riparian corridors and lowland margins as well as along upland edges.
- Maintain spruce seed trees through retention, especially at lowland margins.
- Maintain or increase diversity of conifer stands by implementing seed tree/shelterwood prescriptions and limiting the use of herbicides, especially along lowland edges.
- Large clearcuts may isolate populations of spruce grouse so landscape level planning must take into account this species need for low-density mixed-conifer travel corridors to connect suitable stands.
- Ensure black spruce recruitment/regeneration is reliable where harvested. Monitoring should be required to ensure we are getting desired results from management.

### **4.30.3 – Rare Species and Special Conservation Area Management**

All forest operations must be reviewed for potential conflicts with rare species following the guidance in “*DNR’s Approach to the Protection of Rare Species on State Forest Lands*” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed seven listed species as well as two natural communities of note occurring in the management area as listed in Table 4.30.2. A colony of great blue herons has also been identified. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.



Table 4.30.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Tahquamenon River Patterned Fens management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Muskeg		S3/G4G5	Confirmed				Lowland open/semi-open	N/A
Patterned fen		S2/GU	Confirmed				Lowland open/semi-open	N/A
<b>Birds</b>								
Yellow rail	<i>Coturnicops noveboracensis</i>	T/G4/S1S2	Confirmed	MV	Moderate	Northern wet meadow	Lowland open/semi-open	N/A
Merlin	<i>Falco columbarius</i>	T/G5/S1S2	Confirmed	PS	Very High	Boreal forest	Upland & Lowland Sp/F	Mid
						Great Lakes barrens	Upland open/semi-open	N/A
Common loon	<i>Gavia immer</i>	T/G5/S3-4	Confirmed	HV	Very High	Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
<b>Butterfly</b>								
Frigga fritillary	<i>Boloria frigga</i>	SC/G5/S3S4	Confirmed	HV	Low	Bog	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
<b>Plants</b>								
Panicled screwstem	<i>Bartonia paniculata</i>	T/G5/S2	Confirmed			Inermittent wetland	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
Farwell's water milfoil	<i>Myriophyllum farwellii</i>	T/G5/S2	Confirmed			Emergent marsh	Lowland open/semi-open	N/A
Alga pondweed	<i>Potamogeton confervoides</i>	SC/G4/S3	Confirmed			Submergent marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Special conservation areas in the management area include: the Tahquamenon Scenic Heritage Route (M-123 shown in Figure 4.30.5), cold water lakes and streams, high priority trout streams (Figure 4.30.1) and the McMahan Lake Strangmoor non-dedicated natural area (3,928 acres) shown in Figure 4.30.5. In addition, approximately 7,500 acres were identified as potential old growth and these stands are also special conservation areas until they are evaluated.

The East Branch of the Two-Hearted River is a state designated natural river and along with its corridor is a high conservation value area (Figure 4.30.5). The Two-Hearted River Natural River Plan (DNR, Dec. 1973) guidelines will be followed for management activities within this area.

There are two patterned fen ecological reference areas (1,399 and 1,375 acres) occurring within this management area (Figure 4.30.5). Ecological reference areas will be managed to protect and enhance their natural vegetative and wildlife communities as directed by ecological reference area-specific management plans.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

#### 4.30.4 – Forest Health Management

Although forest health issues span the entire landscape some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Jack pine: jack pine budworm and pine engraver; and
- Lowland conifers and lowland spruce/fir: spruce budworm, eastern larch beetle and larch casebearer.

For further information on forest health refer to Section 3.

## Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

Scotch pine has been identified as an invasive species to remove in this area. Continue removal of Scotch pine through timber sales and forest treatment proposals followed by planting of other native species.

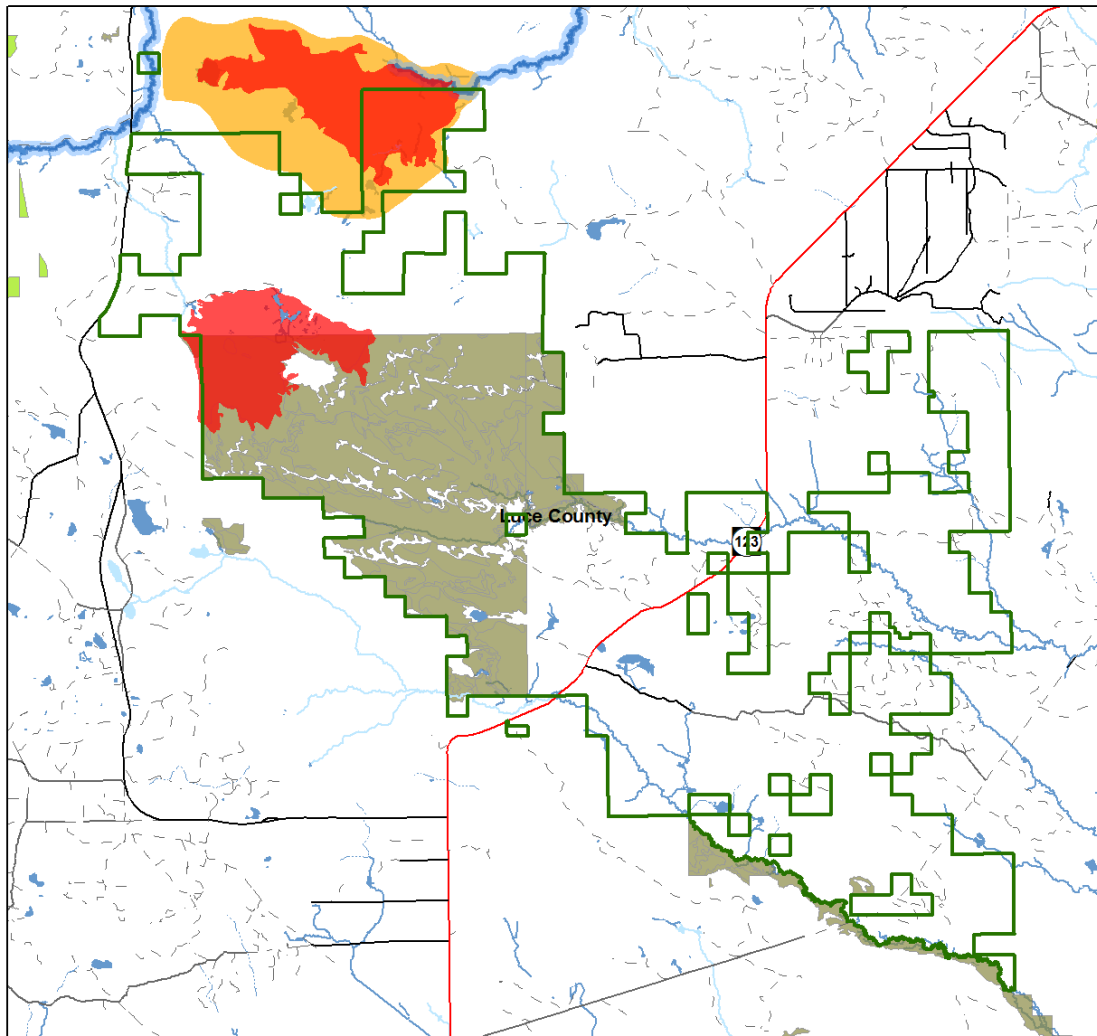
### **4.30.5 – Fire Management**

This management area is composed largely of a single, continuous peatland. As evidenced by the 2007 Sleeper Lake fire, periodic fires associated with summer drought probably burned much of the area in single events or a single season. Sufficient drought, coupled with ignition, may occur at least every 100 years, with conditions that supported the 1976 Seney fire only 31 years earlier.

This management area falls within the DNR Newberry protection area. All wildfires are subject to appropriate initial attack response. Modified suppression tactics may be necessary in this management area because of the wet soils.

The Sleeper Lake fire burned most of the management area west of M-123. An effort was made after the Sleeper Lake Fire to restore proper ecological function to areas that had fire control lines. A survey was conducted by Michigan Natural Features Inventory in the summer of 2008 to determine fire effects on vegetation and to evaluate the effect of the fire control lines on hydrology.

# Tahquamenon River Patterned Fens



## Legend

- Highway
- Paved Roads
- Gravel Roads
- - - Poor Dirt Roads
- Railroads
- · - · - Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- ▭ Management Area Boundary
- ▭ Cities
- - - County Boundaries

## Ecological Reference Areas

- Ecological Reference Areas
- High Conservation Value Areas**
- Coastal Environmental Areas
- Critical Dunes
- Natural Rivers Vegetative Buffer
- Natural Rivers Zoning District
- Critical Coastal Habitat (Piping Plover)
- Kirtland Warbler Habitat
- Dedicated Management Areas
- Natural Areas Legally Dedicated

## Special Conservation Areas

- ▲ Campgrounds
- Fishing Access Sites
- Boat Access Sites
- ⊗ Mineral Resource Locations
- Wild & Scenic Rivers (USFS Lands)
- ▨ Visual Management Areas
- Contiguous Resource Areas
- Possible Type 1 and Type 2 Old Growth
- Potential Old Growth
- Non-Dedicated Natural Areas & National Natural Landmarks
- Springs, Wetlands, or Riparian Areas



- Cold Water Streams & Lakes
- Wildlife Management Areas
- Research, Development, and Military Lands
- Great Lakes Islands

Figure 4.30.5. A map of the Tahquamenon River Patterned Fen management area showing the special resource areas.

#### **4.30.6 – Public Access and Recreation**

Currently, road access to much of the management area is limited. New access roads used by firefighters during the Sleeper Lake Fire have been removed or blocked to eliminate access to this sensitive area by conventional vehicles and off-road vehicles. Other road closures will be considered if they are providing unwanted access.

A joint planning effort between The Nature Conservancy and the DNR was begun in the fall of 2009 to identify expected issues. Management activities should be coordinated with The Nature Conservancy where lands are interspersed with their reserve. There is an effort underway to trade parcels so that both the state and The Nature Conservancy can block in ownership.

There are no DNR recreational facilities in this management area. Recreational opportunities include: hunting, fishing, berry and morel mushroom gathering, horse riding and bird watching.

#### **4.30.7 - Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. Portions of the Tahquamenon and Two-Hearted River watersheds are designated high priority trout streams in this management area, and they are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.30.1.

#### **4.30.8 – Minerals**

Surface sediments consist of peat and muck, with minor lacustrine (lake) sand, gravel and an end moraine of coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the area and there is potential for additional pits on the uplands.

The Ordovician Trenton and Black River Formations and Prairie du Chien Group subcrop below the glacial drift. The Trenton and Black River are quarried for stone/dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (two wells in Luce County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.31 MA 31 – Two Hearted Headwaters Management Area

### Summary of Use and Management

Vegetative management in the Two Hearted Headwaters management area (MA) will emphasize forest and riverine based recreational opportunities, wildlife habitat and timber production. The Pretty Lakes Complex area offers a unique recreational experience through both a traditional state forest campground and a wilderness-like camping opportunity. Recreational users may enter the backcountry by paddling, portaging or by hiking the Pretty Lakes trail system. Expected issues in this 10-year planning period include: increased recreational demand and introduced pests and diseases.

#### Introduction

The Two Hearted Headwaters management area is located in the central portion of the eastern Upper Peninsula, in Luce County. It has 17,923 acres of state-owned land. The primary attributes of this management area are the recreational opportunities. Additional attributes which were important in identifying this management area include:

- The management area falls within the Luce subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- Landforms in this management area are moraine ridges and pitted outwash plains. Kettles within the pitted outwash and moraines contain small lakes and bogs with thick deposits of peat.
- The landscape is dominated by the Two Hearted River which is a state designated natural river. The river valley creates its own distinctive vegetation when compared to surrounding landscapes. Most of the headwaters of the Two-Hearted River originate within this management area.
- Kettle Hole Lake and bog areas include: the Two-Hearted Lakes, Beavertown Lakes, the North Branch Lakes and the Pretty Lakes Complex.
- A hardwood swamp conifer ecological reference area is within the management area.
- Recreational opportunities include: trout fishing, berry picking, snowmobiling, off-road vehicle (ORV) riding, camping, kayaking, canoeing, hunting and wildlife viewing.

The state owned land in this management area covers a large portion of the Two Hearted River watershed and is interspersed with private parcels. A large portion of the private land owned in proximity to this management area is part of The Nature Conservancy Two-Hearted River Forest Reserve. The management area is within the Newberry Forest Management Unit. The current predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.31.1.

Table 4.31.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Two Hearted Headwaters management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Lowland Open/Semi-Open Lands	35%	6,356	0	6,356	0	0	6,356	0	0
White Pine	12%	2,166	958	1,208	374	414	2,166	110	511
Lowland Conifers	14%	2,520	832	1,688	658	0	2,520	188	0
Northern Hardwood	8%	1,503	25	1,478	0	561	1,503	0	561
Lowland Spruce/Fir	8%	1,406	621	785	221	0	1,406	87	0
Red Pine	4%	796	319	477	108	243	796	53	269
Cedar	4%	642	0	642	40	0	642	40	0
Upland Open/Semi-Open Lands	0%	2	0	2	0	0	2	0	0
Misc Other (Water, Local, Urban)	4%	716	0	716	0	0	716	0	0
Others	10%	1,816	40	1,776	157	296	1,816	165	421
<b>Total</b>	<b>100%</b>	<b>17,923</b>	<b>2,794</b>	<b>15,129</b>	<b>1,558</b>	<b>1,514</b>	<b>17,923</b>	<b>643</b>	<b>1,762</b>

Others include: jack pine, natural mixed pines, hemlock, upland conifers, aspen, upland mixed forest, lowland deciduous, planted mixed pines, tamarack, paper birch, and lowland aspen/balsam poplar.

## Two Hearted Headwaters

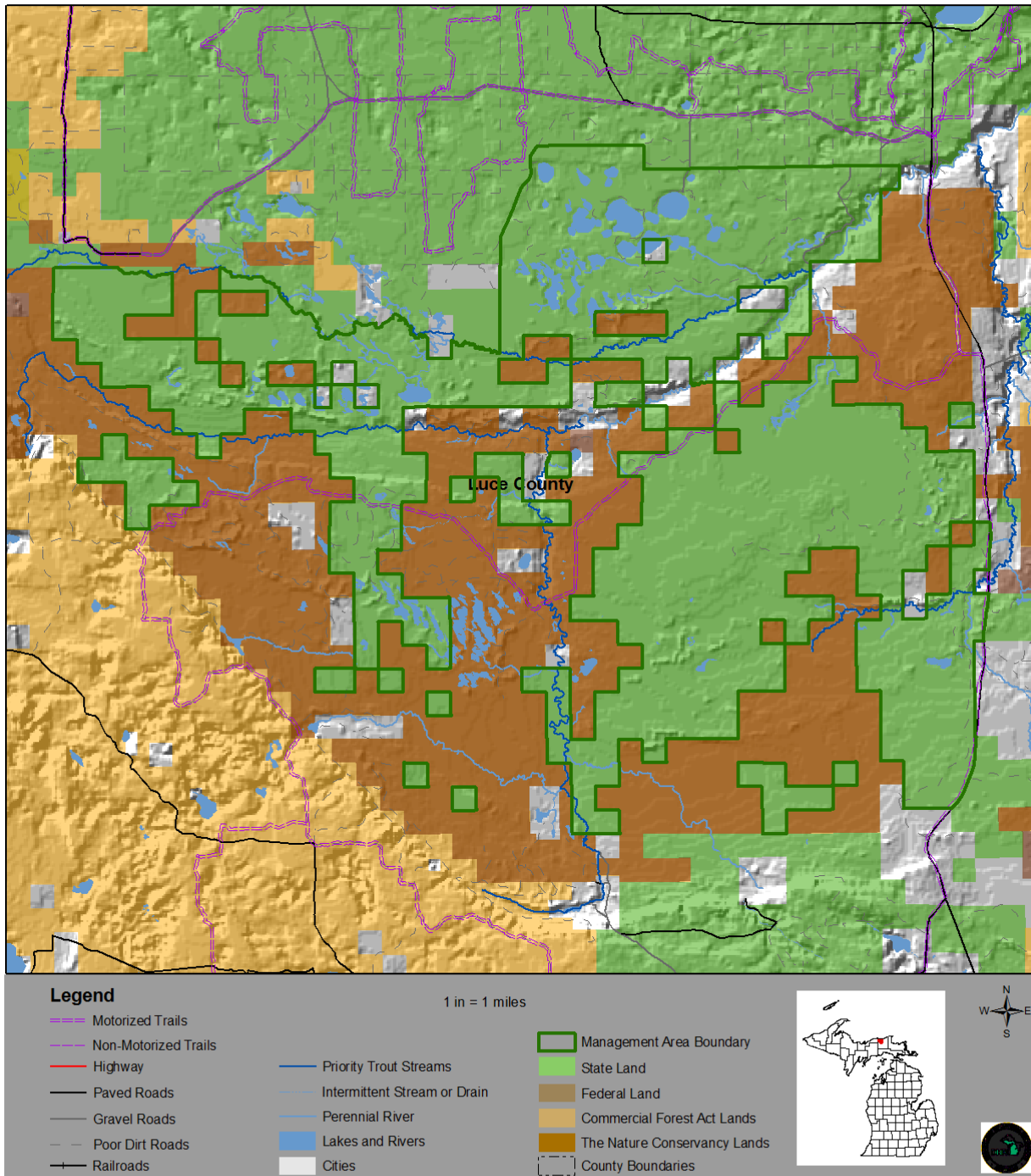


Figure 4.31.1. Location of the Two Hearted Headwaters management area (dark green boundary) in relation to surrounding state forest lands and other ownerships.

#### **4.31.1 Forest Cover Type Management Direction**

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### **Section 4.31.1.1 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

###### Current Condition

This management area contains a large amount of lowland open/semi-open lands totaling approximately 6,356 acres (35%) (Table 4.31.1). This category is a combination of treed bog (3,286 acres), marsh (2,482 acres), lowland shrub (387 acres) and bog (201 acres). These wetland communities are valued ecologically as sources of habitat for numerous species of wildlife. Some of these stands are within riparian corridors, ecological reference area and high conservation value area designations.

###### Desired Future Condition

- Lowland open/semi-open lands will be retained to ensure an adequate level of wildlife habitat and recreational opportunity while protecting special conservation values found in these cover types.

###### Long-Term Management Objectives

- In general, these stands will be maintained without active management to protect their ecological values; and
- Follow best management practice guidelines to protect these areas from harvest operations in adjacent stands.

##### **Section 4.31.1.2 Forest Cover Type Management – White Pine**

###### Current Condition

White pine stands occur on 2,166 acres (12%) of the management area (Table 4.31.1). The majority of the white pine stands in this area are of natural origin. White pine stands in this management area are found on dunes, outwash plains and lake plains with Kotar habitat types of PVE, PArV and PArVAa (see appendix E). White pine in this area grows in association with red pine, hemlock and hardwood and is often found around lakes, rivers or bogs. White pine is being regenerated using natural regeneration primarily through shelterwood harvesting. Thinning followed by shelterwood harvesting has resulted in some of the white pine stands being classified as uneven-aged stands having trees of various sizes and ages (Figure 4.31.2). Some older white pine stands form riparian buffers for lakes and creeks and may not ever be harvested.

Currently, 214 acres of white pine are scheduled for partial harvest. There are 958 acres of white pine that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

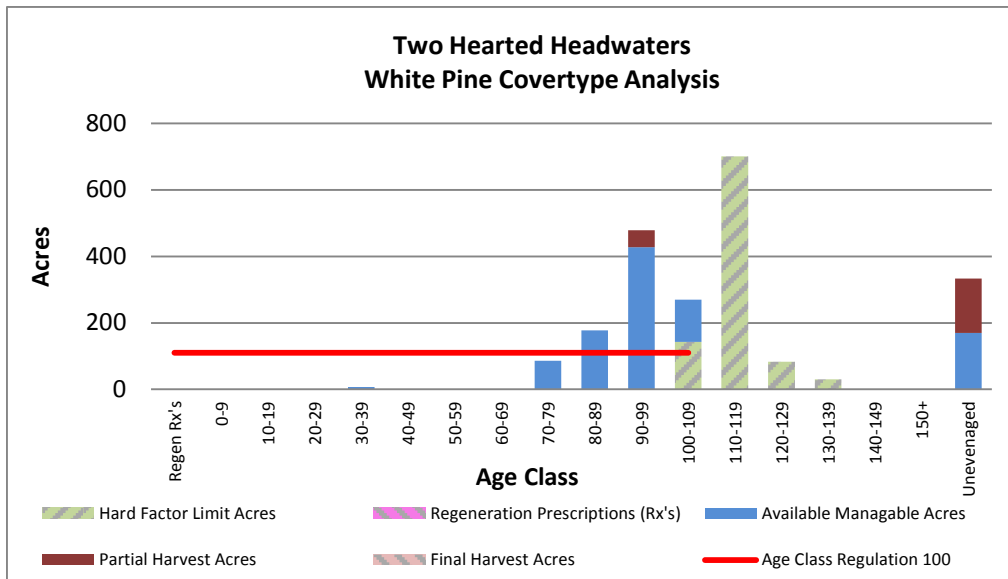


Figure 4.31.2. Age class distribution of white pine in the Two Hearted Headwaters management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- White pine stands will be maintained on operable sites with acres balanced between 0-109 years of age to provide for continual harvesting, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of white pine is for 374 acres. The increase from the regulated amount is due to the current age-class structure; and
- The 10-year projected partial harvest of white pine is 414 acres.

Long-Term Management Objectives

- A regulated harvest would allow approximately 110 acres for final harvest per decade.
- Periodically thin stands with high basal area prior to final harvest at rotation age.

**Section 4.31.1.3 Forest Cover Type Management – Lowland Conifer**

Current Condition

Lowland conifers occur on 2,520 acres (14%) of the management area (Table 4.31.1). Access is very limited in this management area due to the rivers, lakes, marshes and bogs. Some of the lowland conifer stands fall within the vegetative buffer of the Two-Hearted Natural River. Almost 25% of the lowland conifer stands have been classified as uneven aged having trees of varying ages and sizes as a result of natural processes (Figure 4.31.3). While there has been no recent harvesting in this cover type in this management area, lowland conifer stands in nearby areas have been successfully regenerated using natural regeneration.

Currently there are not any acres of lowland conifers prescribed for final harvest. There are 832 acres of lowland conifers that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in areas that are inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.



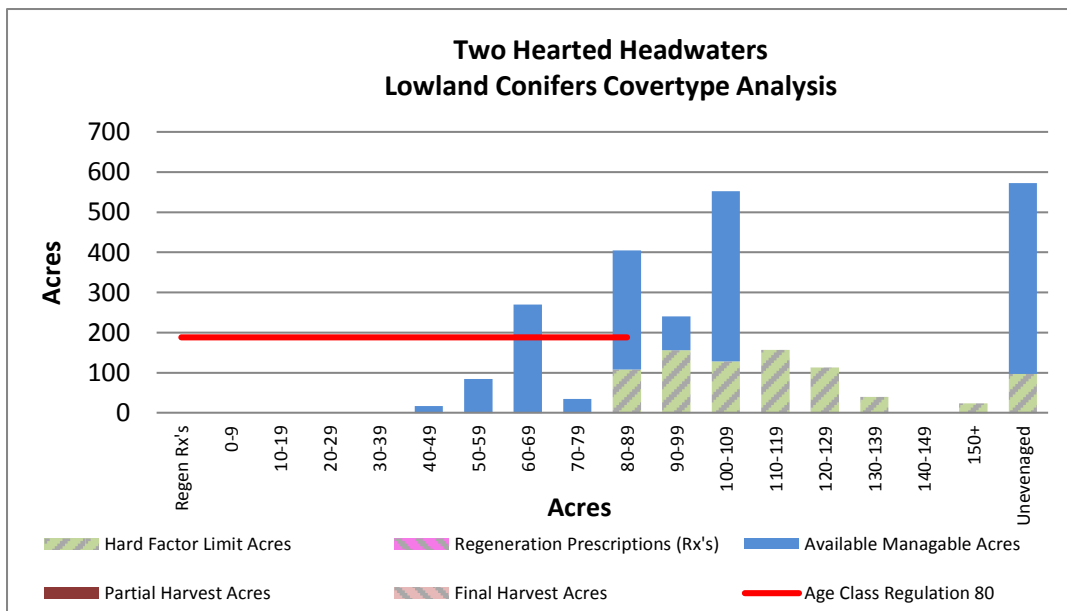


Figure 4.31.3. Age-class distribution of lowland conifers in the Two Hearted Headwaters management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management using an 80-year rotation to provide for continual harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 658 acres. The increase from the regulated amount is due to the current age-class structure where none of the stands are in younger age classes.

Long-Term Management Objectives

- Balance the age-class structure of available stands providing for a regulated harvest of about 188 acres of lowland conifers per decade.

**Section 4.31.1.4 Forest Cover Type Management – Northern Hardwood**

Current Condition

Northern hardwood occurs on 1,503 acres (8%) of the management area (Table 4.31.1). Northern hardwoods are distributed throughout the management area on lake plains, outwash plains, dunes and stream terrace with habitat classes of AFPo, ATFD, PArVAa and PArV (see appendix E). These sandy soils range from dry-poor nutrient to mesic-medium nutrient sites. The better sites have potential to grow quality stems and single tree selection harvesting is used in stands with a basal area over 120 square feet per acre to decreasing stocking levels. In general, this will allow most hardwood stands to be selectively harvested every 20 years. Where site quality is poor shelterwood and other even-aged harvesting systems will be considered. Recent harvests using even-aged systems are shown in the immature column in Figure 4.31.4.

Beech bark disease is found throughout the management area and salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed due to resultant lower than normal residual basal area.

Currently there are 321 acres of northern hardwood with a partial harvest assigned. There are 25 acres of northern hardwoods that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

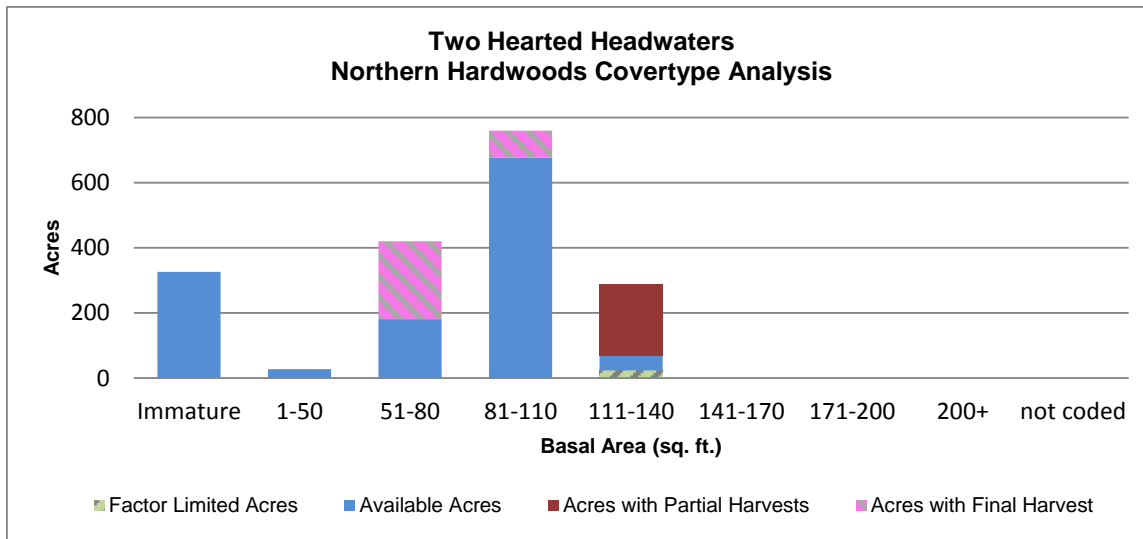


Figure 4.31.4. Basal area distribution of northern hardwood in the Two Hearted Headwaters management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwood stands will be maintained on operable sites by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands; and
- Harvesting will provide for a continuous flow of timber products and a variety of wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10 year projected partial or selection harvest of northern hardwood is 561 acres;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands;
- To favor regeneration of hardwood other than beech, consider herbicide application on beech regeneration to promote regeneration of other species; and
- In areas that are losing beech to beech bark disease, consider planting disease resistant beech or oak after harvesting to increase the availability of hard mast.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.31.1.5 Forest Cover Type Management – Lowland Spruce/Fir**

Current Condition

Lowland spruce/fir stands are found on 1,406 acres (8%) of the management area (Table 4.31.1). While there has been some recent harvest and regeneration of lowland/spruce fir, the majority of stands are in older age classes (Figure 4.31.5). Approximately half of the stands are sparsely stocked with less than 50 square feet per acre of basal area and have low site indexes. As with lowland conifer stands access is often limited and some lowland spruce/fir stands fall within the vegetative buffer of the Two Hearted Natural River. Even aged management using clearcutting followed by natural regeneration is an effective way to regenerate lowland spruce/fir stands in this area.

Currently there are 84 acres of lowland spruce/fir with a final harvest prescribed. There are 621 acres of lowland spruce/fir that have site conditions limiting their harvest. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands will undergo natural processes, resulting in a range of successional stages.

## Desired Future Condition

- Lowland spruce/fir stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for continual harvesting, wildlife habitat and recreational opportunities.

## 10-Year Management Objectives

- The 10-year projected final harvest of lowland spruce/fir is 221 acres. The increase from the regulated amount is due to the current age-class structure.

## Long-Term Management Objectives

- Balance the age classes of accessible lowland spruce/fir stands providing for a regulated harvest of approximately 87 acres per decade.

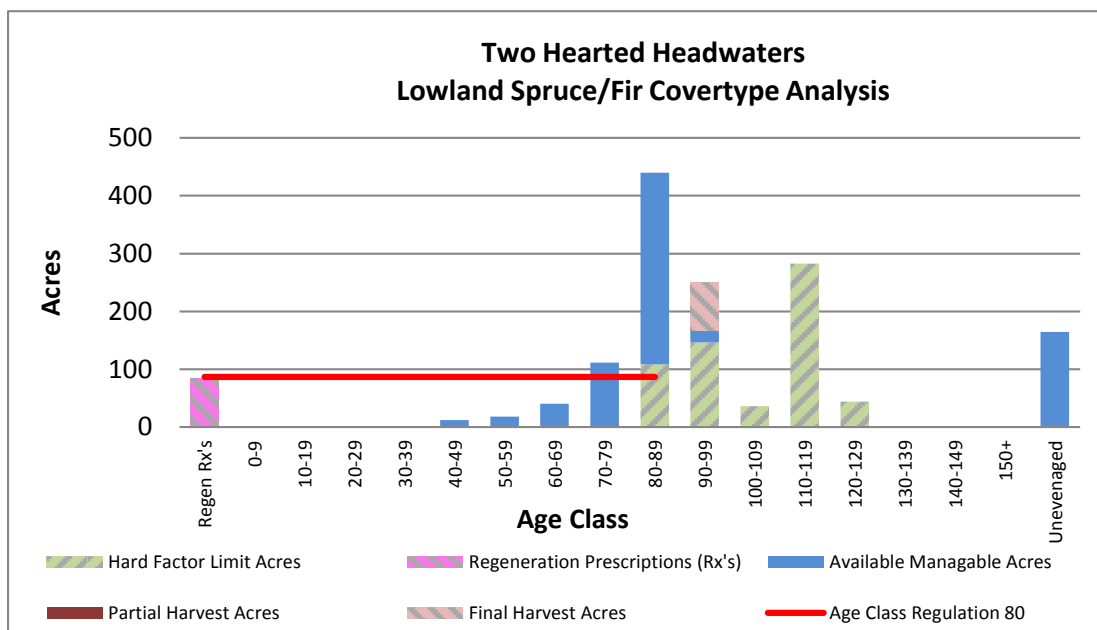


Figure 4.31.5. Age-class distribution of lowland spruce/fir in the Two Hearted Headwaters management area (2012 Department of Natural Resources inventory data).

## Section 4.31.1.6 Forest Cover Type Management – Other Types

### Current Condition

There are many other cover types spread across the management area that have less than 5% of the total management area acres (Table 4.31.1). Red pine (796 acres) and cedar (642 acres) each have 4% of the total management area acres. The “other types” category (1,816 acres or 10%) is a combination of cover types with 3% or less of the total acres and is made up of: jack pine (504 acres), natural mixed pines (452 acres), hemlock (419 acres), upland conifers (156 acres), aspen (137 acres) and upland mixed forest, lowland deciduous, planted mixed pines, tamarack, paper birch and lowland mixed forest each with less than 100 acres.

The majority of these forested cover types are managed using even-aged harvesting systems and will be reforested by natural regeneration. For even-aged management types attempt to balance the acres using standard rotation ages. Red pine, white pine, mixed pines and other mixed cover types with high basal area may be thinned prior to final harvest depending on the species composition.

There are 359 acres of these other minor cover types that have site conditions limiting their harvest this entry. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Where stands are inaccessible early successional cover types will be changed through natural succession, thus slightly changing the cover type distribution.

Miscellaneous other stands include 716 acres (4%) and include water, roads and sand/soil.

#### Desired Future Condition

- These cover types will be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreation opportunities.

#### 10-Year Management Objectives

- The projected 10-year final harvest is 108 acres of red pine, 40 acres of cedar and 157 acres of other types.
- The projected 10-year partial harvest is 243 acres of red pine and 296 acres of other types.

#### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.31.2 – Featured Species**

The Two-Hearted Headwaters management area exhibits high biodiversity values due to the spatial arrangement of lowland habitats intermingled with upland habitats. In forested stands the primary wildlife values include mature forest conditions the retention of coarse woody debris and large diameter soft hardwoods and mesic conifers, especially large diameter white pine and hemlock. The loss of beech mast due to beech bark disease severely impacts wildlife values; it is therefore desirable to plant either disease resistant beech or oak.

#### **American Marten**

The goal for marten in the eastern Upper Peninsula is to maintain or increase suitable habitat and strive to identify, maintain and connect known populations to facilitate genetic exchange. Management should address the maintenance and improvement of corridors, dead wood and conifer components in priority landscapes.

#### Wildlife Habitat Specifications:

- Maintain a minimum of 30% canopy cover in key even-aged managed stands of northern hardwood and conifer stands as marten tend to avoid stands with less canopy cover. Write prescriptions to minimize potential blowdown.
- Discourage land transactions and management activities that facilitate further fragmenting of marten habitat within the management area by identifying and maintaining corridors between large forested tracts.
- Provide older forest conditions in this management area.
- Retain and limit disturbance to existing downed coarse woody debris and exceed Within-Stand Retention Guidance for its maintenance. Where coarse woody debris is lacking, increase both standing dead and down dead wood by leaving at least three secure large diameter (>14 inches in diameter at breast height) live trees to serve as future den trees, snags and coarse woody debris (logs) on the ground per acre in harvested stands.
- Increase the within-stand component of mesic conifers in mixed stands and expand mesic conifer forest types by group or gap selective harvest. Consider underplanting on suitable sites where a seed source is absent.
- Limit firewood permits, biomass harvesting and whole tree harvesting considering retaining the maximum residues in the Woody Biomass Harvesting Guidelines.

#### **Blackburnian Warbler**

The goal for blackburnian warbler is to maintain suitable breeding habitat. Management for the species should focus on within stand diversity, habitat fragmentation and conifer components in this management area.

#### Wildlife habitat specifications:

- Increase the mesic conifer (e.g. hemlock, white pine, red pine and upland spruce-fir) component on state forests by: a) Retaining a larger percentage of mesic conifer during harvests; b) Using silvicultural practices that encourage the regeneration of mesic conifer; and c) Where desired/feasible, underplanting hemlock, white pine and white spruce in hardwood-dominated stands on suitable sites without a seed source.

- Provide more older mesic conifers, particularly hemlock, in the landscape by: a) Allowing some actively managed stands of mesic conifer to grow beyond standard rotation ages; b) Including mature mesic conifers as within-stand structure retained during harvests by following Within-Stand Retention Guidance during harvests; and c) Maintaining mature mesic conifer stands within travel corridor and riparian zone or Type 1 or Type 2 old growth special conservation areas
- Only allow harvest in hemlock stands, or where hemlock is a component in other cover types, where successful hemlock recruitment has been clearly demonstrated.

## **Black Bear**

The goal for black bear in the eastern Upper Peninsula is to maintain or improve habitat. Management for the species should focus on improving existing habitat (minimizing fragmentation and maintaining hard and soft mast) to offset potential population declines due to changes in land-use.

### Wildlife habitat specifications:

- Maintain or increase tree species that provide mast including beech, oak, black cherry and ironwood.
- Beech trees with bear claw scars on the bark are generally good mast producers and should be retained wherever possible.
- Retain some large diameter white pine or hemlock as refuge trees.
- Plant disease resistant beech and red oak where appropriate.
- Maintain or increase mast by providing forest clearings that promote food sources such as pin cherry, juneberry/serviceberry, hazel, raspberry, blackberry and blueberry. Minimize herbicide use that would be detrimental to this resource.
- Discourage land transactions and management activities that facilitate further fragmenting state lands within the management area.

## **Pileated Woodpecker**

The goal for pileated woodpecker is to maintain or improve habitat. Management should focus on maintaining large diameter deciduous trees in timber sales in priority areas.

### Wildlife habitat specifications:

- Identify and retain as many existing large (>15 inches in diameter at breast height) snags and cavity trees, coarse woody debris and reserve trees, as possible to ensure a sustainable supply of future cavity and foraging trees and associated coarse woody debris. Poorly formed trees and those damaged by natural disturbance or earlier harvests, particularly deciduous trees, are good candidates for future snags and cavity trees; trees damaged by beech bark disease that were not salvaged are contributing towards this goal. Large diameter aspen and other soft hardwoods are preferred.
- Even-aged managed stands: Leave scattered retention patches around some 18 inches in diameter at breast height or greater secure trees as a nucleus, using the upper end of the Within Stand Retention Guidance.
- Uneven-aged managed stands: Retain a minimum of three secure cavity or snags per acre with one exceeding 18 inches in diameter at breast height. If snags or cavity trees are lacking, leave trees with defects of the maximum available size that will likely develop cavities.
- Salvage harvests deemed necessary due to insect, disease, or fire will be offset within the same cover type and age class (within the compartment, management area or ecoregion), to minimize impacts on pileated woodpecker habitat. Total allowable harvest in these situations will be evaluated on a case-by-case basis.

### **4.31.3 – Rare Species and Special Conservation Area Management**

All forest operations must be reviewed for potential conflicts with rare species following the guidance in “*DNR’s Approach to the Protection of Rare Species on State Forest Lands*” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed four listed species as well as six natural communities of note occurring in the management area as listed in Table 4.31.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Special conservation areas in this management area include cold water lakes and streams and high priority trout streams (Figure 4.31.1). Concentrated recreation area special conservation areas (boat access sites and state forest campgrounds) are listed in the Recreation section 4.29.6 below.

Within the Two Hearted Headwaters management area there are several areas identified as potential Type 1 or Type 2 old growth. They are dry-mesic northern forest (194 acres and 848 acres), hardwood-conifer swamp (37 acres) and three areas of rich conifer swamp (444 acres, 207 acres and 334 acres). These are all shown in Figure 4.31.6.

The Two-Hearted River system is a state designated natural river and along with its corridor is a high conservation value area (Figure 4.31.6). The Two-Hearted River Natural River Plan (DNR, Dec. 1973) contains specific requirements for management in this area.

There is one ecological reference area in this management area representing the hardwood-conifer swamp natural community (37 acres) shown in Figure 4.31.6. This ecological reference area will be managed to protect and enhance its natural vegetative and wildlife communities as directed by an ecological reference area -specific management plan.

Table 4.31.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Two Hearted Headwaters management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Dry-mesic northern forest		S3/G4	Confirmed				White Pine	Late
Hardwood-conifer swamp		S3/G4	Confirmed				Lowland open/semi-open	N/A
Intermittent wetland		S3/G2	Confirmed				Lowland open/semi-open	N/A
Muskeg		S3/G4G5	Confirmed				Lowland open/semi-open	N/A
Patterned fen		S2/GU	Confirmed				Lowland open/semi-open	N/A
Rich conifer swamp		S3/G4	Confirmed				Tamarack	Late
<b>Birds</b>								
Spruce grouse	<i>Falco pennis canadensis</i>	SC/G5/S2-3	Confirmed	MV	Very High	Bog	Lowland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Poor conifer swamp	Tamarack	Late
						Dry northern forest	Jack Pine, Red Pine	Late
Merlin	<i>Falco columbarius</i>	T/G5/S1S2	Confirmed	PS	Very High	Boreal forest	Upland & Lowland Sp/F	Mid
						Great Lakes barrens	Upland open/semi-open	N/A
Common loon	<i>Gavia immer</i>	T/G5/S3-4	Confirmed	HV	Very High	Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
<b>Plants</b>								
Alga pondweed	<i>Potamogeton confervoides</i>	SC/G4/S3	Confirmed			Submergent marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

#### 4.31.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

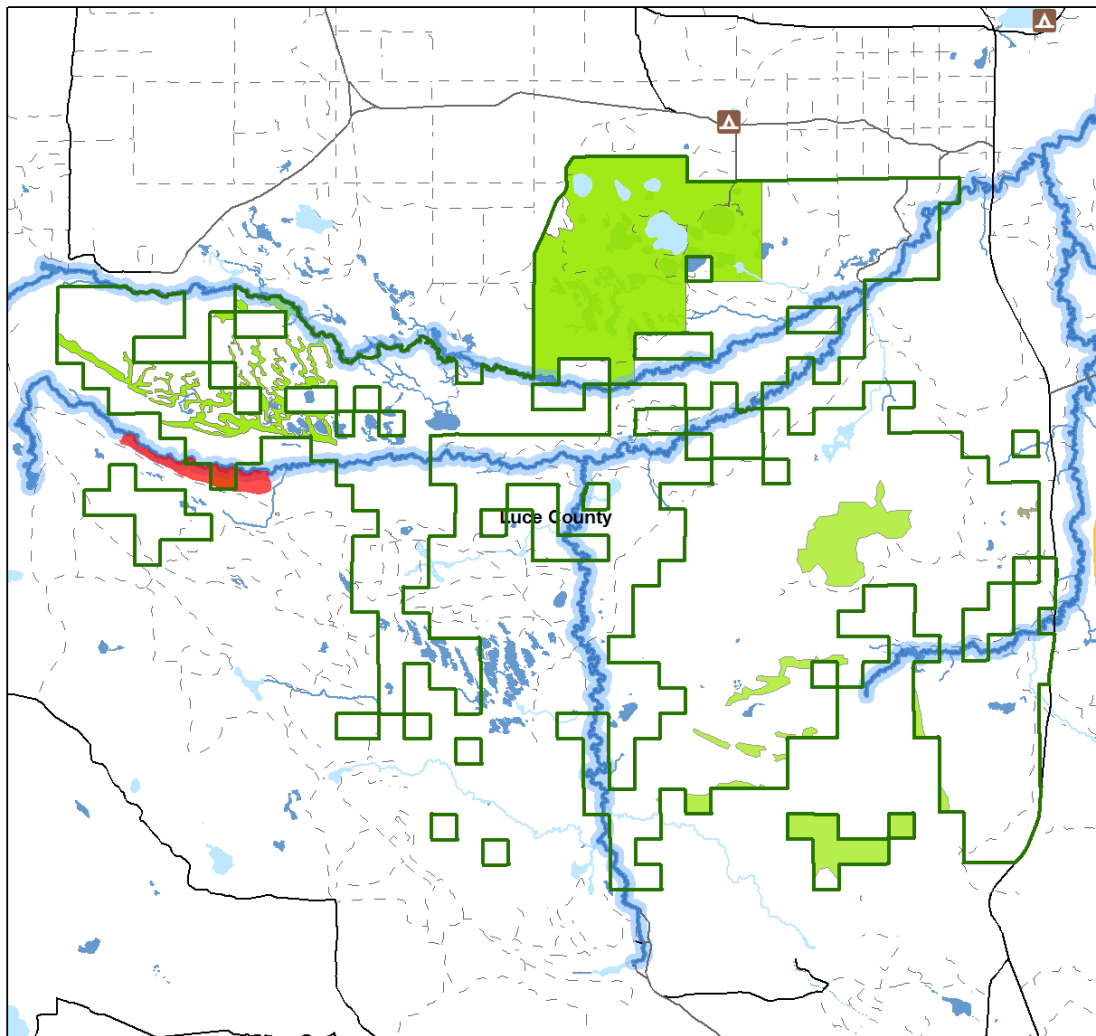
- Northern hardwoods: beech bark disease;
- Red and jack pine: jack pine budworm, white grubs, red-headed pine sawfly, pine engraver and *Scleroderris* canker;
- White pine: white pine blister rust; and
- Lowland conifers and lowland spruce/fir: spruce budworm, eastern larch beetle and larch casebearer.

For further information on forest health refer to Section 3.

## Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. Absence of data is likely due to lack of surveys, and it should not be assumed there are no species present. Monitoring efforts should specifically look for new populations of the 10 priority invasive plant species identified in Section 3 of this plan. Prescribe eradication treatments to any new populations of priority invasive plant species found in the management area.

### Two Hearted Headwaters



1 in = 1 miles

#### Legend

- Highway
- Paved Roads
- Gravel Roads
- - - Poor Dirt Roads
- Railroads
- Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- Management Area Boundary
- Cities
- - - County Boundaries

#### Ecological Reference Areas

- Coastal Environmental Areas
- Critical Dunes
- Natural Rivers Vegetative Buffer
- Natural Rivers Zoning District
- Critical Coastal Habitat (Piping Plover)
- Kirtland Warbler Habitat
- Dedicated Management Areas
- Natural Areas Legally Dedicated

#### Special Conservation Areas

- ▲ Campgrounds
- Fishing Access Sites
- Boat Access Sites
- Mineral Resource Locations
- Wild & Scenic Rivers (USFS Lands)
- Visual Management Areas
- Contiguous Resource Areas
- Possible Type 1 and Type 2 Old Growth
- Potential Old Growth
- Non-Dedicated Natural Areas & National Natural Landmarks
- Springs, Wetlands, or Riparian Areas



- Cold Water Streams & Lakes
- Wildlife Management Areas
- Research, Development, and Military Lands
- Great Lakes Islands

Figure 4.31.6. A map of the Two Hearted Headwaters management area showing the special resource areas.

#### **4.31.5 – Fire Management**

This area has a mixture of hardwood and pine types and lowland conifer ridges scattered in marsh complexes. Most of the management area has a fire return interval of 35-200 years. There is no record of prescribed fire activity in this management area.

- The Blind Sucker and Two-Hearted Zone Dispatch areas are part of this management area. Those plans call for aggressive initial attack based upon current fire danger.
- Prescribed fire may be used in this management area to promote natural pine regeneration.

#### **4.31.6 – Public Access and Recreation**

The east portions of the management area are accessed by county roads and forest trails. The CCI road (Burma Grade) is a public thoroughfare, but not a county maintained road. This road accesses a significant portion of the management area. The western portion of the management area has fewer roads.

A joint planning effort between The Nature Conservancy and the DNR was begun in the fall of 2009 to identify expected issues. Management activities should be coordinated with The Nature Conservancy, where lands are interspersed with their reserve. There is an effort underway to trade parcels so that both the DNR and The Nature Conservancy can block in ownership.

Trail facilities in this management area include snowmobile trails (Figure 4.31.1) and the Pretty Lakes Pathway. The Pretty Lakes State Forest Campground provides camping opportunities. Boat motors are not allowed on Pretty Lake or the other Lakes in the Pretty Lake Complex.

Additional recreational opportunities include: trout fishing, berry picking, hunting (especially bear) and wildlife viewing. Many of the small lakes within this watershed are used recreationally for fishing, kayaking/canoeing and bird watching.

#### **4.31.7 - Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. Part of the Two-Hearted River watershed is designated as high priority trout stream in this management area and details are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.31.1.

#### **4.31.8 – Minerals**

Surface sediments consist of peat and muck, lacustrine (lake) sand, gravel and minor end moraine of coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are not located in the area, but there is potential for additional pits on the uplands.

The Ordovician Black River Formation and Prairie du Chien Group and Cambrian Trempealeau Formation and Munising Group subcrop below the glacial drift. The Black River is quarried for stone/dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (two wells in Luce County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.



## 4.32 MA 32 – Waishkey Bay Management Area

### Summary of Use and Management

Management in the Waishkey Bay management area (MA) will provide for forest-based recreational uses, enhance wildlife habitat and provide for timber products. The most important recreational facility within the management area is the snowmobile trail, which runs on the old railroad corridor through the management area. The trail connects Sault Ste. Marie with trail systems to the west and south and receives a lot of use. Vegetative management will emphasize balancing the age-class structure of even-aged cover types where possible. However, access to most of the state owned land is difficult and timber management activities will be significantly constrained. Expected issues in this 10-yr planning period include: introduced pests and diseases, such as emerald ash borer, increased recreational pressure and illegal trash dumping.

### Introduction

The Waishkey Bay management area is located near the northern shoreline of Lake Superior in the eastern portion of the eastern Upper Peninsula, in Chippewa County. It has 2,698 acres of state-owned land. The primary attribute of the management area is the two small parcels of concentrated state land which are isolated from other management areas. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain Subsection 8.1 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of lacustrine silts and clays with lake formed sand ridges. Soils are very prone to erosion and tend to be acid.
- The area was cut over heavily when the mill in Waishkey Bay was operating. The present forest has a great deal of lowland types with white pine and paper birch on the ridges.
- When the Bay Mill and town burned in 1904, only the Native American residents remained. Fishing, blueberry picking and logging were important then and now. There are known prehistoric and historic sites in this management area.
- Recreational uses include: snowmobile trails on state and private lands, intensive use by bow hunters and firearm deer hunters, fishing and cross country skiing.
- There was an outbreak of emerald ash borer at Brimley State Park involving a quarantine, ash tree removal and subsequent monitoring.

This is a small management area comprised of two contiguous blocks with an old railroad bed connecting them. The management area is surrounded by private land, and access is somewhat limited. The management area falls within the Sault Forest Management Unit. The predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.32.1.

Table 4.32.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Waishkey Bay management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Lowland Open/Semi-Open Lands	38%	1,015	0	1,015	0	0	1,015	0	0
Lowland Spruce/Fir	16%	443	45	398	154	0	443	44	0
Lowland Deciduous	14%	372	212	160	63	0	372	18	0
Aspen	14%	370	60	310	177	0	370	52	0
Paper Birch	9%	230	227	3	0	0	230	1	0
Upland Open/Semi-Open Lands	0%	5	0	5	0	0	5	0	0
Misc Other (Water, Local, Urban)	1%	15	0	15	0	0	15	0	0
Others	9%	248	45	203	65	16	248	19	42
<b>Total</b>	<b>100%</b>	<b>2,698</b>	<b>589</b>	<b>2,109</b>	<b>459</b>	<b>16</b>	<b>2,698</b>	<b>134</b>	<b>42</b>

Others include: white pine, cedar, tamarack, lowland conifers and jack pine.

# Waishkey Bay

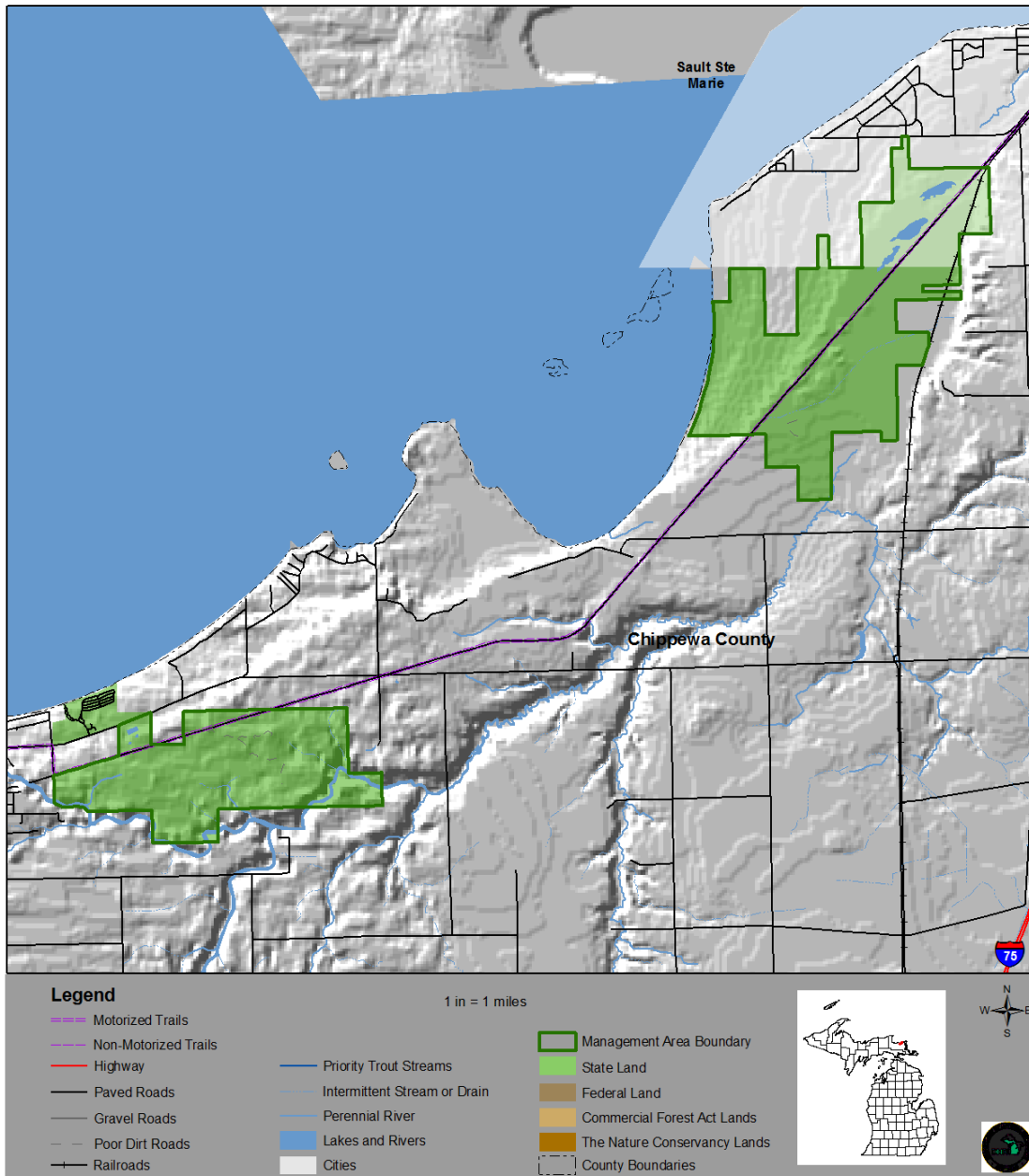


Figure 4.32.1. Location of the Waishkey Bay management area (dark green boundary) in relation to surrounding other ownerships, Whitefish Bay, Sault Ste. Marie and the town of Bay Mills.

#### **4.32.1 Forest Cover Type Management Direction**

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products, ecologically as sources of habitat for numerous species, and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

##### **Section 4.32.1.1 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

###### Current Condition

Lowland open/semi-open lands occur on 1,015 acres (38%) of the management area (Table 4.32.1). This category is a combination of lowland shrub (738 acres), marsh (225 acres), treed bog (52 acres) and bog (zero acres). Some of these stands are found in low areas between small ridge dune features. These habitat types are important for several wildlife species including songbirds and moose.

###### Desired Future Condition

- Lowland open/semi-open lands will be maintained to provide wildlife habitat and recreational opportunities.

###### Long-Term Management Objectives

- In general, these stands will be maintained without active management to protect their ecological values.

##### **Section 4.32.1.2 Forest Cover Type Management – Lowland Spruce/Fir**

###### Current Condition

Lowland spruce/fir occurs on 443 acres (16%) of the management area (Table 4.32.1). Some harvest and regeneration work was done in the past, but there has been no recent activity (Figure 4.32.2).

Currently there are no acres of lowland spruce/fir with a final harvest prescribed. There are 45 acres of lowland spruce/fir that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Stands unavailable to harvest will continue to experience natural processes (windthrow, flooding and senescence) resulting in a range of successional stages.

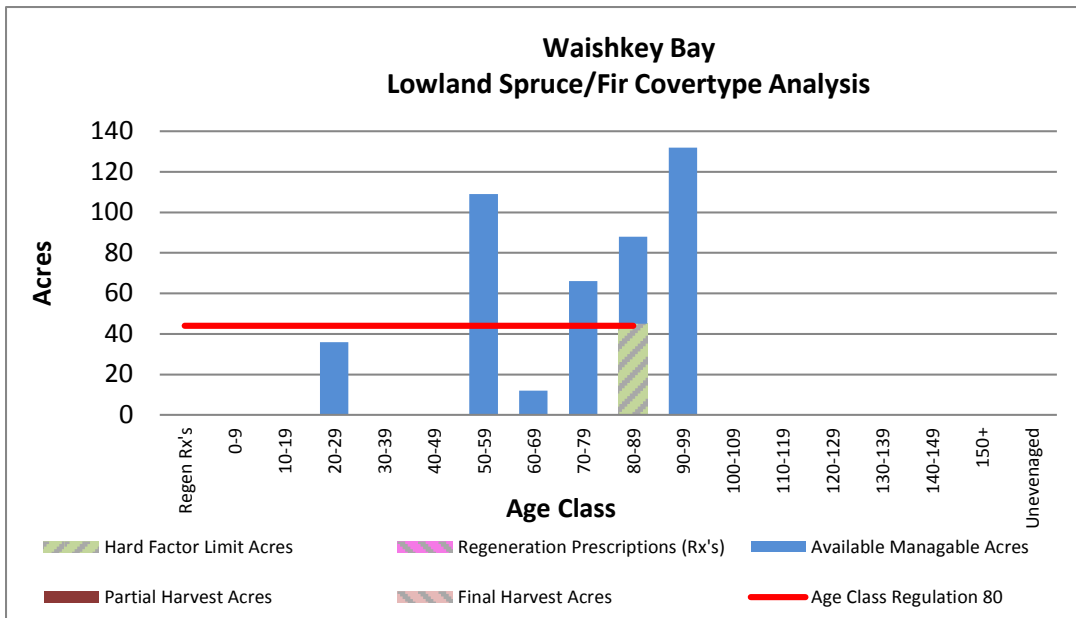


Figure 4.32.2. Age-class distribution of lowland spruce/fir in the Waiskey Bay management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland spruce/fir stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of lowland spruce/fir is 154 acres to work toward balancing the age classes. The increase from the regulated amount is due to the current age class structure where there are no stands less than 20 years of age.

Long-Term Management Objectives

- Balance the age-class structure of available stands providing for a regulated harvest of approximately 44 acres per decade (red line in Figure 4.32.2).

**Section 4.32.1.3 Forest Cover Type Management – Lowland Deciduous**

Current Condition

Lowland deciduous stands occur on 372 acres (14%) of the management area (Table 4.32.1). A small portion of the cover type has been classified as uneven aged. There has been no recent harvest and regeneration work in this area (Figure 4.32.3). Lowland deciduous stands in this management area contain a large component of black ash. Emerald ash borer was found at nearby Brimley State Park. Follow Emerald Ash Borer Guidelines to salvage the trees.

Currently, there are no acres of lowland deciduous prescribed for harvest. There are 212 acres of lowland deciduous that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Stands that are unavailable to harvest will continue to experience natural processes, resulting in a shift to late successional species. emerald ash borer may change the species composition of these stands.

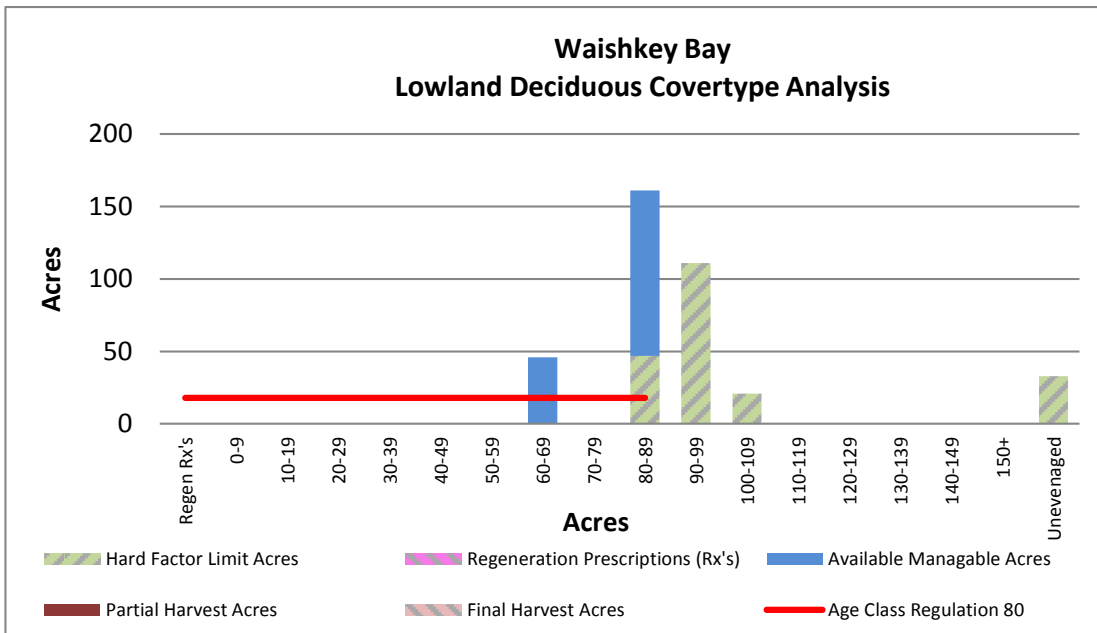


Figure 4.32.3. Age-class distribution of lowland deciduous in the Waiskey Bay management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland deciduous stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for regulated harvest, available wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected final harvest is 63 acres of lowland deciduous, with natural regeneration expected, to work toward balancing the age classes;
- The increase in harvest from the regulated amount is due to the current age class structure where there are no stands in younger age classes; and
- Follow Emerald Ash Borer Guidelines for harvesting of ash.

#### Long-Term Management Objectives

- Balance the age class structure of available stands providing for a regulated harvest of approximately 18 acres of lowland deciduous per decade.

### **Section 4.32.1.4 Forest Cover Type Management – Aspen**

#### Current Condition

Aspen occurs on 370 acres (14%) of the management area (Table 4.32.1). Aspen is distributed throughout the management area in PARv and PARVAa Kotar habitat types (see appendix E). These stands are predominately made up of trembling aspen. There has been no recent harvest and regeneration work of aspen in this area (Figure 4.32.4).

Currently there are no acres of aspen with a harvest prescribed. There are 370 acres of aspen that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Aspen stands that are unavailable to harvest will continue to experience natural processes, resulting in a shift to late successional species.

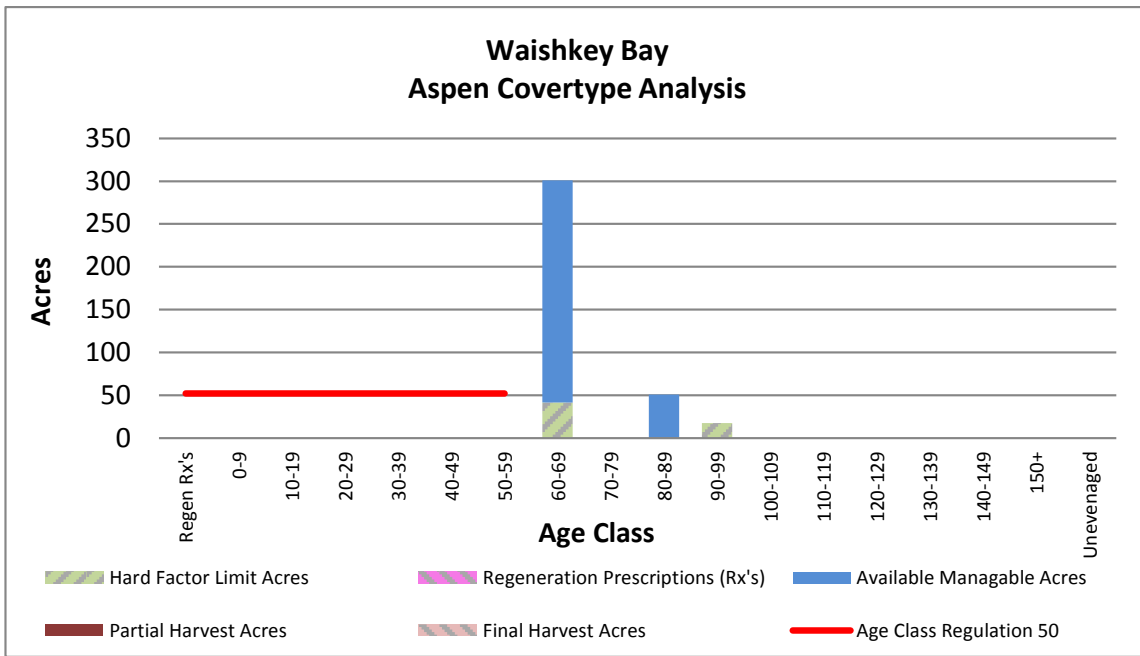


Figure 4.32.4. Age-class distribution of aspen in the Waishkey Bay management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The projected 10-year final harvest of aspen is 177 acres to begin balancing the age classes of aspen. The increase in harvest from the regulated amount is due to the current age class structure where there are no stands in younger age classes.

#### Long-Term Management Objectives

- Balance the age-class structure of available stands providing for a regulated harvest of approximately 52 acres of aspen per decade.

### **Section 4.32.1.5 Forest Cover Type Management – Paper Birch**

#### Current Condition

Paper birch stands occur on 230 acres (9%) of the management area (Table 4.32.1). Paper birch is distributed throughout the management area in PARV and PARVAa Kotar habitat types (see appendix E). There has been no recent harvesting and regeneration of paper birch (Figure 4.32.5).

Almost all of the paper birch stands in this management area have site conditions limiting their harvest. These hard factor limited stands have been removed from the total number of manageable acres available for harvest calculations. As the majority of the acres of paper birch are currently unavailable for harvest a regulated harvest is currently unattainable. If site conditions change allowing harvest determine the rotation regulation level. Paper birch in this area is often difficult to regenerate. Shelterwood or seed tree harvests may be followed by scarification, prescribed burning and/or seeding to ensure adequate regeneration. Inaccessible stands of paper birch will eventually succeed to more shade tolerant species.

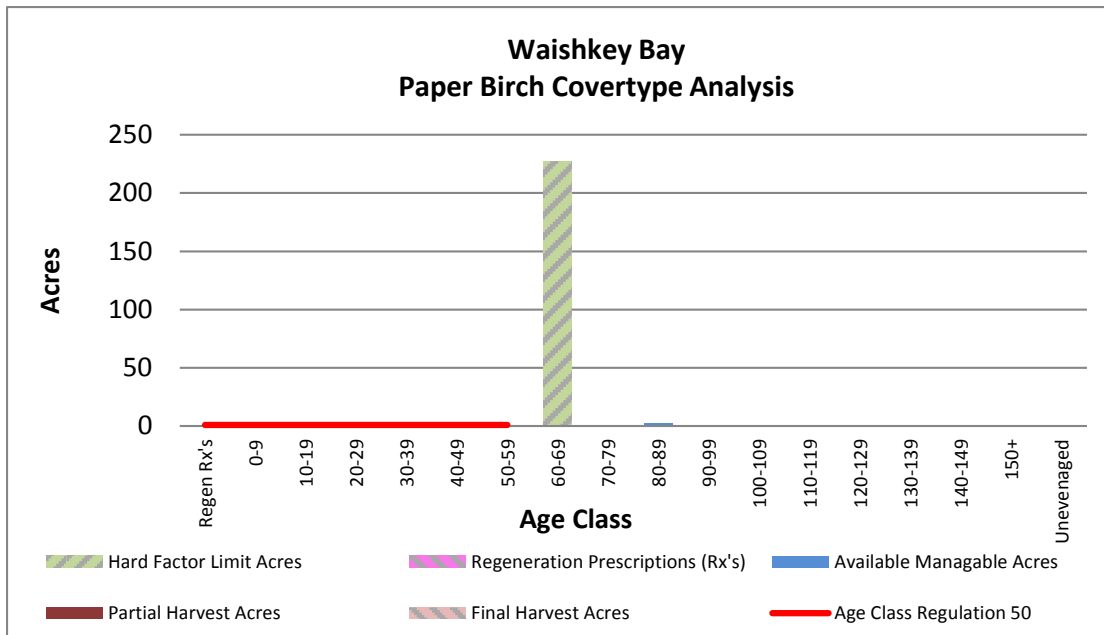


Figure 4.32.5. Age-class distribution of paper birch in the Waiskey Bay management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Paper birch stands will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age to provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected final harvest of paper birch is zero acres.

Long-Term Management Objectives

- Maintain the paper birch cover type in this area.

**Section 4.32.1.6 Forest Cover Type Management – Other Types**

Current Condition

Other cover types total 248 acres (9%) and are spread across the management area (Table 4.32.1). They include: white pine (85 acres or 3%), cedar (72 acres or 2%), tamarack (40 acres or 1%), lowland conifers (27 acres or 1%) and jack pine (24 acres or 1%). The majority of these forested cover types are managed using even-aged harvesting systems and will be reforested by natural regeneration. White pine or mixed cover types may be thinned prior to final harvest at rotation age.

There are 45 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Where stands are inaccessible early successional cover types will be changed through natural succession, thus slightly changing the cover type distribution.

Upland open/semi-open lands include three acres of herbaceous openland and two acres of bare/sparsely vegetated. There are 15 acres of “miscellaneous other” stands which includes water and roads.

Desired Future Condition

- These cover types may be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest, wildlife habitat and recreation opportunity.

## 10-Year Management Objectives

- The projected 10-year final harvest of other types is 65 acres; and
- The 10-year projected partial harvest of other types is 16 acres.

## Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.32.2- Featured Wildlife Species**

Wildlife management goals in this management area include: the protection of emergent wetlands, retention of large diameter soft hardwoods in harvested stands, older boreal forest conditions and retention of patches in boreal forest harvests.

#### **American Bittern**

The statewide goal for American bittern is to meet the Upper Mississippi Region Great Lakes Region Joint Venture population level as observed by the North American Breeding Bird Survey for Michigan. The eastern Upper Peninsula goal is to provide and maintain suitable habitat for American bittern. Management should focus on priority management areas with suitable shallow water marsh (hemi-marsh).

#### Wildlife habitat specifications:

- Manage priority wetlands in a hemi-marsh condition, with open water surrounded by emergent vegetation. Optimal hemi-marsh sites for bittern are > 10 acres with the emergent vegetation portions having average water depths of four inches and a 4:1 ratio of adjacent grassland to hemi-marsh.
- Maintain wetland/upland complexes of > 50 acres.
- Maintain water levels from the April through August breeding season.
- Buffer management activities at the edges of wetlands to protect marsh hydrology and limit the spread of invasive plant species.

#### **Gray Jay**

Gray jays serve as an umbrella species for other wildlife dependent upon boreal forests. The goal for gray jay in the eastern Upper Peninsula is to maintain or increase suitable habitat. Management should focus on maintaining representation of older age classes of timber as well as retention of important structural features within harvested stands in priority areas.

#### Wildlife habitat specifications:

- The primary goal is to maintain appropriate forest types (birch, lowland deciduous, fir, lowland conifer, lowland spruce/fir, tamarack and bogs) in the management area in a variety of age classes. Maintain 15% of the total acres in relevant cover types in older age classes (at least 20 years beyond “normal” rotation length for the cover type).
  - This can be accomplished either with stands that are already factor limited or by extending the rotation age. In this management area, older age classes (greater than 100 years) for gray jay habitat are being met by the large number of stands with site conditions that limit harvesting.
- Patches are preferred over single trees within timber harvest sale boundaries though it is beneficial to have both.
- Offset salvage harvests deemed necessary due to insect or disease or fire within the same cover type and age class (within the compartment, management area or eastern Upper Peninsula ecoregion) to minimize impacts on pileated woodpecker habitat. Total allowable harvest in these situations will be evaluated on a case-by-case basis.

#### **Pileated Woodpecker**

The goal for pileated woodpecker is to maintain or improve habitat. Management should focus on maintaining large diameter deciduous trees in timber sales in priority areas.



Wildlife habitat specifications:

- Identify and retain large (>15 inches in diameter at breast height) snags and cavity trees, coarse woody debris and reserve trees, as possible to ensure a sustainable supply of future cavity and foraging trees and associated coarse woody debris. Poorly formed trees and those damaged by natural disturbance or earlier harvests, particularly deciduous trees, are good candidates for future snags and cavity trees, trees damaged by beech bark disease that were not salvaged are contributing towards this goal. Large diameter aspen and other soft hardwoods are preferred reserve green trees.
- Even-aged managed stands: Leave scattered retention patches around some 18 inches in diameter at breast height or greater secure trees as a nucleus using the upper end of the Within Stand Retention Guidance.
- Uneven-aged managed stands: Retain a minimum of three secure cavity or snags per acre with one exceeding 18 inches in diameter at breast height. If snags or cavity trees are lacking, leave trees with defects of the maximum available size that will likely develop cavities.
- Salvage harvests deemed necessary to remove due to insect, disease or fire will be offset within the same cover type and age class (within the compartment, management area or ecoregion), to minimize impacts on pileated woodpecker habitat. Total allowable harvest in these situations will be evaluated on a case-by-case basis.

**4.32.3 – Rare Species and Special Conservation Area Management**

All forest operations must be reviewed for potential conflicts with rare species following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed two listed species and no natural communities of note occurring in the management area as listed in Table 4.32.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Table 4.32.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Waishkey Bay management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Birds</b>								
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	SC/G5/S4	Confirmed	PS	Moderate	Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Dry sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Upland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A
<b>Fish</b>								
Lake sturgeon	<i>Acipenser fulvescens</i>	T/G3G4/S2	Confirmed	HV	Moderate	Great Lakes	Aquatic	N/A
						Rivers	Aquatic	N/A
						Mainstem streams	Aquatic	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

No high conservation value areas or ecological reference areas have been identified for this management area as illustrated in Figure 4.32.6.

The management goal during this planning period is:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.

# Waiskey Bay

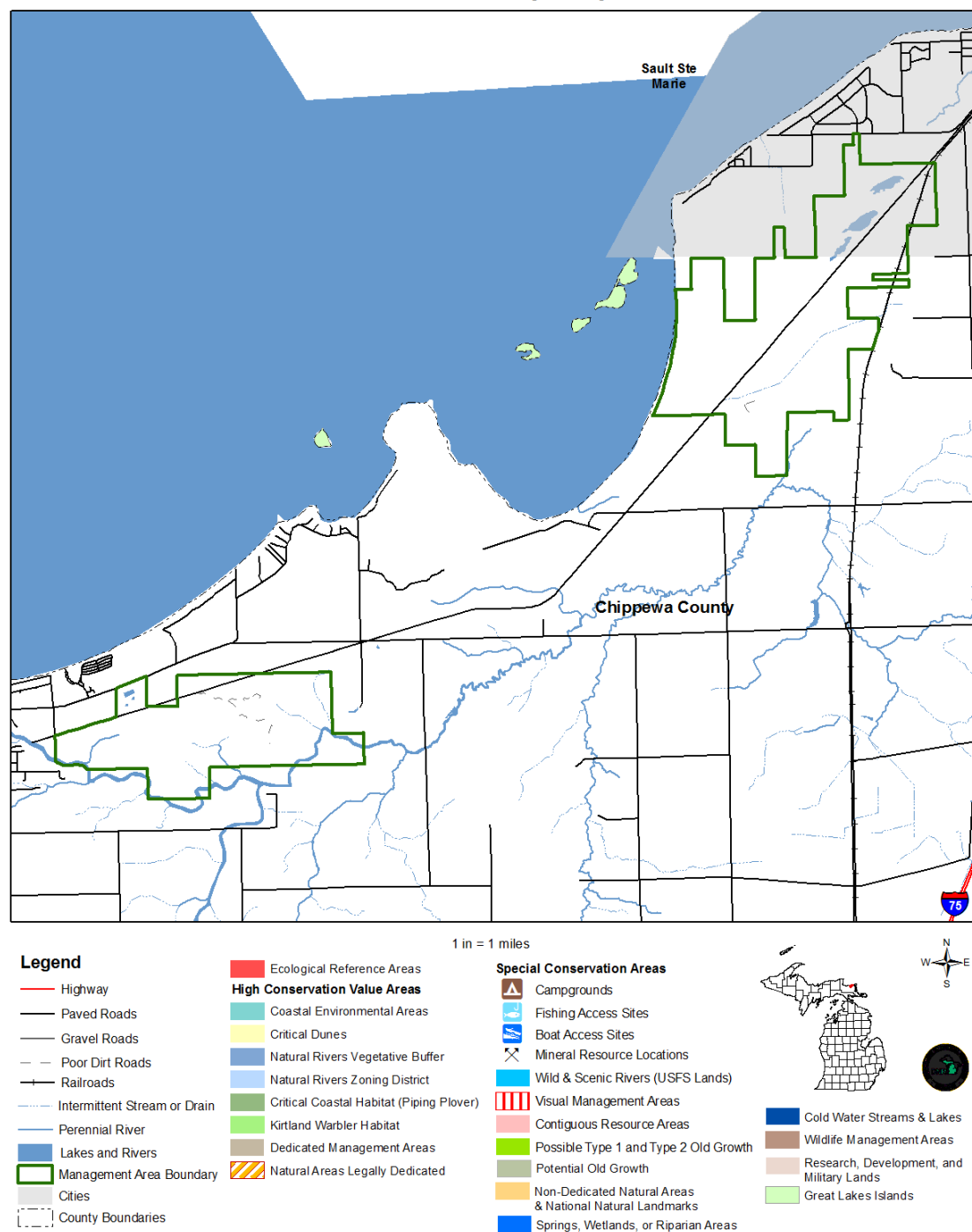


Figure 4.32.6. A map of the Waiskey Bay management area showing the special resource areas.

## 4.32.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Lowland conifers and lowland spruce/fir: spruce budworm;
- Lowland deciduous: emerald ash borer; and
- Aspen and lowland aspen/balsam poplar: white trunk rot and *Hypoxylon* canker.

For further information on forest health refer to Section 3.

### Invasive Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. No invasive plant species have yet been documented within the management area. Common buckthorn, Japanese knotweed, purple loosestrife and wild parsnip have been documented within a five-mile buffer of the management area (Table 4.32.3) and monitoring efforts should specifically look for new populations of this species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

Table 4.32.3. Invasive plant species within or near the Waishkey Bay management area (Data from the Michigan Invasive Plant Identification Network database).

Waishkey Bay - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	8	8	4
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
-	-	Common Buckthorn <i>Rhamnus cathartica</i>	2	
-	-	Japanese Knotweed <i>Fallopia japonica</i>	4	
-	-	Purple Loosestrife <i>Lythrum salicaria</i>	1	
-	-	Wild Parsnip <i>Pastinaca sativa</i>	1	

#### 4.32.5 – Fire Management

Opportunities may exist to use prescribed fire to encourage paper birch regeneration in combination with commercial harvests.

#### 4.32.6 – Public Access and Recreation

Road access throughout the management area is limited and a few of the roads that do exist have trash dumping issues.

Recreational facilities include a snowmobile trail on state and private lands.

The Algonquin Cross Country Ski Trail and Pathway is in the northeast portion of the area within the Sault Ste. Marie city limits. Grooming is supported by contributions from users and local businesses.

Other activities include intensive use by bow hunters and firearm deer hunters and bird watching, which is gaining in popularity.

#### 4.32.7 – Aquatic Resource Management

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. There are no designated high priority trout streams identified in this management area in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment.

#### **4.32.8 – Minerals**

Surface sediments consist of lacustrine (lake) sand, gravel, clay and silt and peat and muck. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are not located in the management area and there is limited potential for additional pits.

The Precambrian Jacobsville Sandstone subcrops below the glacial drift. The Jacobsville was previously used as a building stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (14 in Chippewa County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.33 MA 33 – Whitefish Vermillion Point Management Area

### Summary of Use and Management

Management in the Whitefish Vermillion Point management area (MA) will emphasize protecting the unique dune and swale complex near Whitefish Point and the other natural communities found here, sustainably produce various timber products and provide for forest-based recreational opportunities. Management activities in portions of the management area may be constrained by poor access and wetland cover types. Whitefish Point is recognized as being important habitat for migratory birds and has been designated by the American Bird Conservancy as being a globally Important Bird Area. Expected issues in this 10-year planning period are increased recreational pressure, introduced pests and diseases and non-native invasive species.

#### Introduction

The Whitefish Vermillion Point management area is located in the north-central part of the eastern Upper Peninsula, along Lake Superior in western Chippewa County. The management area has 44,010 acres of state-owned land. The primary attribute in this management area is recreation. Additional attributes which were important in identifying this management area include:

- The management area falls within Luce Subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform close to Whitefish Point consists of an extensive complex of alternating swales and sand-spits, sand dunes and beach ridges which support natural communities such as wooded dune and swale. The dune and swale complexes are unique assemblages of physical geography, soil types and vegetative components. Farther inland sandy outwash plains are more common.
- Lake Superior, which is on two sides of Whitefish Point, modifies the local climate and vegetation.
- The DNR recently purchased a large parcel of land near Crisp Point.
- Timber management, mainly red and jack pine harvesting, is important in the management area. Harvesting in some areas is limited by dune and swale topography and proximity to special management areas.
- Non-forested communities are dominated by peatlands, generally found in the south portions of the management area.
- Gathering of blueberries and cranberries is an important cultural use within the management area. There are several known archaeological sites. The nearby town of Paradise has an annual blueberry festival.
- This management area contains a critical coastal habitat high conservation value area and two non-dedicated natural area special conservation areas.
- Recreational opportunities include: camping, fishing, boating, bird watching and snowmobiling.

This management area contains several locally destinations that receive a large amount of recreational use, including the Great Lakes Shipwreck Historical Museum, a 33 acre parcel of land at the point managed and owned by the U.S. Fish and Wildlife Service as part of the Seney National Wildlife Refuge and The Michigan Audubon's Whitefish Point Bird Observatory. Tahquamenon Falls State Park is on the south border of the management area.

Whitefish Point management area forms a large, relatively contiguous block of state owned land. The management area falls within the Newberry Forest Management Unit. The predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.33.1.

# Whitefish Vermillion Point

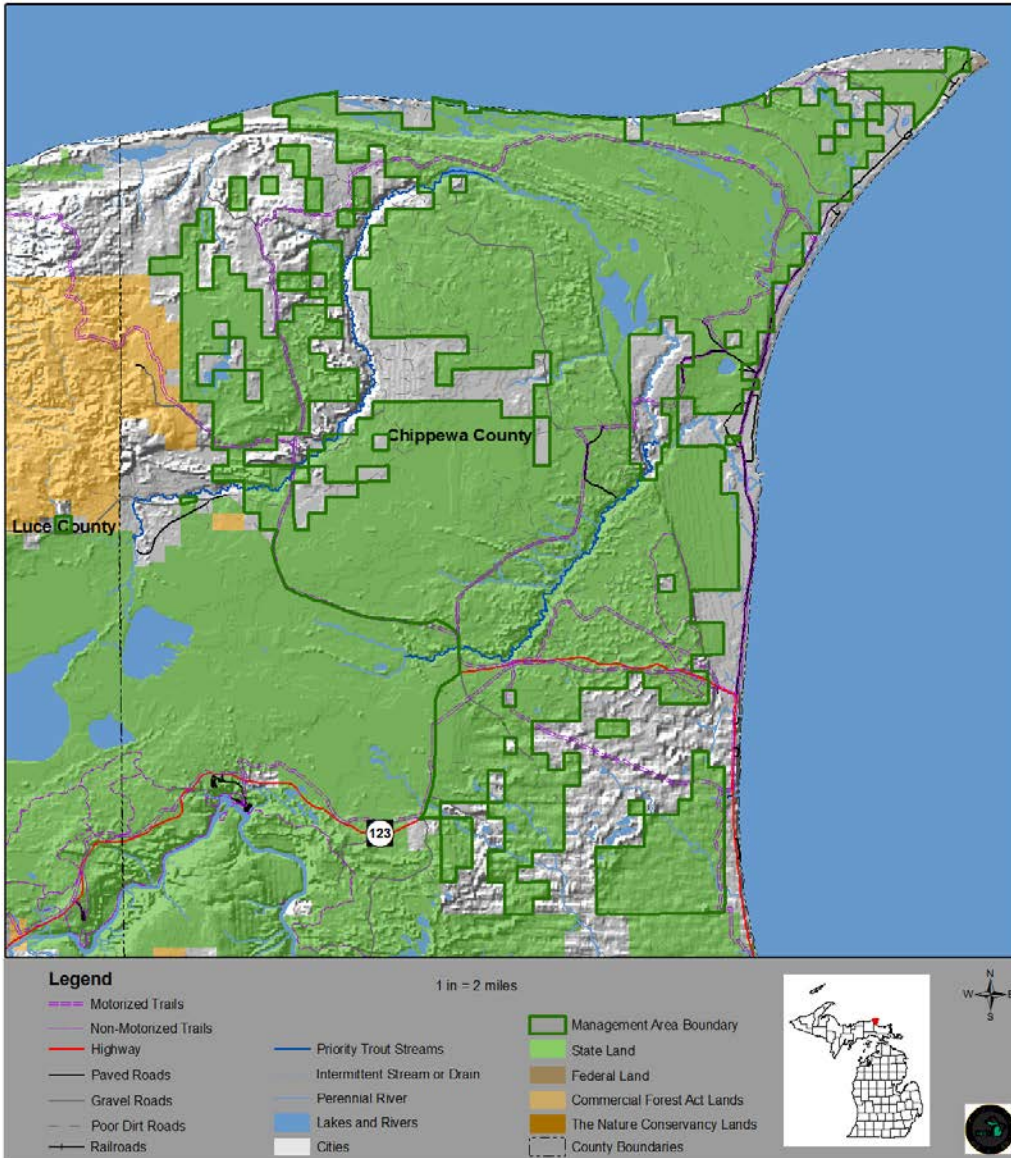


Figure 4.33.1. A map of the Whitefish Vermillion Point management area (dark green boundary) in relation to other ownerships, Tahquamenon Falls State Park (state land west of the management area and north of highway 123) and Lake Superior.

Table 4.33.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Whitefish Vermillion Point management area, eastern Upper Peninsula ecoregion (2013 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Final Harvest
Jack Pine	36%	17,126	1,071	16,055	480	0	17,126	2,294	0
Lowland Open/Semi-Open Lands	20%	9,697	0	9697	0	0	9,697	0	0
Northern Hardwood	7%	3,533	0	3533	0	1,655	3,533	0	1,655
Red Pine	6%	2,689	25	2664	296	881	2,689	296	1,093
Lowland Conifers	5%	2,641	10	2631	292	0	2,641	292	0
Aspen	3%	1,537	0	1537	110	0	1,537	256	0
Lowland Mixed Forest	2%	1,015	0	1015	113	0	1,015	113	0
Natural Mixed Pines	2%	874	338	536	49	209	874	49	209
Lowland Spruce/Fir	2%	828	25	803	89	0	828	89	0
White Pine	2%	817	0	817	74	336	817	74	378
Upland Open/Semi-Open Lands	1%	372	0	372	0	0	372	0	0
Misc Other (Water, Local, Urban)	7%	3,482	0	3482	0	0	3,482	0	0
Others	7%	3,428	217	3211	601	740	3,428	382	745
<b>Total</b>	<b>100%</b>	<b>48,039</b>	<b>1,686</b>	<b>46,353</b>	<b>2,105</b>	<b>3,821</b>	<b>48,039</b>	<b>3,845</b>	<b>4,080</b>

Others include: lowland spruce/fir, oak, upland spruce/fir, cedar, upland conifers, upland mixed forest, lowland mixed forest, hemlock, lowland aspen/balsam poplar, lowland deciduous, mixed upland deciduous and tamarack.

### 4.33.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (e.g., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant species.

All of the following cover types are valued commercially for their timber products, ecologically as sources of habitat for numerous species, and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

#### Section 4.33.1.1 Forest Cover Type Management – Jack Pine

##### Current Condition

Jack pine occurs on 17,126 acres (36%) of the management area (Table 4.33.1). Most of the jack pine is in large pure stands of natural origin. Jack pine is distributed across the management area on sandy soils with Kotar habitat types of PARv and PVE (see Appendix E). Jack pine is well suited to these very dry, very poor-nutrient sites and provides a valuable timber resource in this management area. Jack pine in this management area has been consistently harvested and regenerated providing stands in all age classes (Figure 4.33.2). Natural regeneration following scarification has been effective in this area, followed by planting if necessary.

Currently there are no acres of jack pine with a final harvest prescribed. There are 1,071 acres of jack pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of jack pine will eventually succeed to more shade tolerant species.

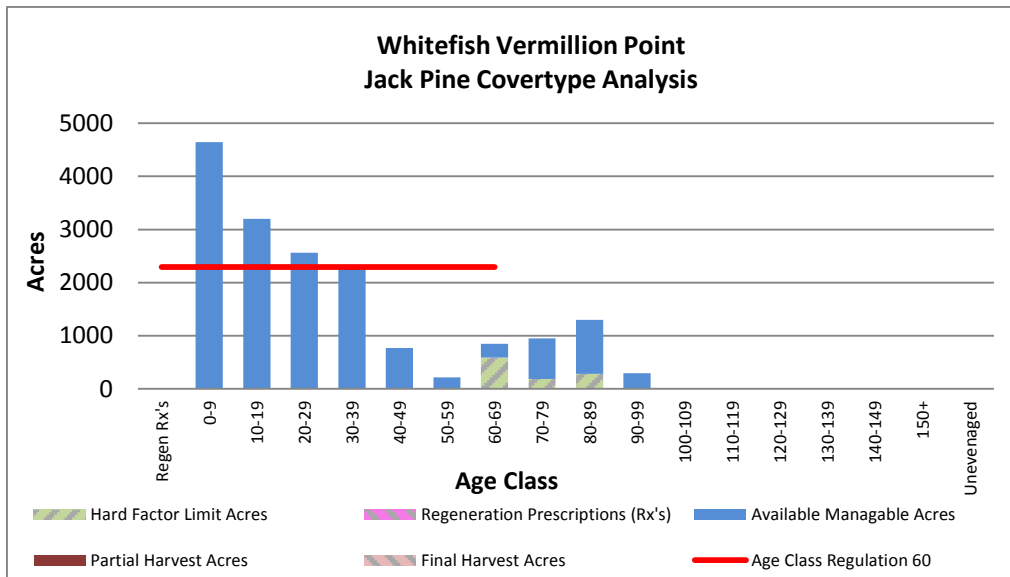


Figure 4.33.2. Age-class distribution of jack pine in the Whitefish Vermillion Point management area (2013 Department of Natural Resources inventory data).

Desired Future Condition

- Jack pine will be maintained on operable sites through even-aged management with acres balanced between 0-69 years of age to provide for continual harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest of jack pine is 480. This reduction from the regulated amount is due to the large number of acres in the 0-9 age class.

Long-Term Management Objectives

- Maintain a lower acreage of over-mature stands to lessen the prevalence and severity of jack pine budworm outbreaks; and
- Balance the age classes of jack pine providing for a regulated harvest of approximately 2,294 acres per decade (red line in Figure 4.33.2).

**Section 4.33.1.2 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

Current Condition

The management area contains a large amount of lowland open/semi-open lands totaling 9,697 acres (20%) (Table 4.33.1). This category is a combination of treed bog (4,555 acres), lowland shrub (3,681 acres), bog (754 acres) and marsh (707 acres). These cover types are valued ecologically as sources of habitat for numerous species of wildlife including moose. Cranberry bogs, marsh and treed bogs often occur within patterned peatlands. Most of the bog areas are in the southern portion of the management area.

Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity.

Long-Term Management Objectives

- In general, these stands will be maintained without active management to protect their ecological values.



### Section 4.33.1.3 Forest Cover Type Management – Northern Hardwood

#### Current Condition

Northern hardwoods occur on 3,533 acres (7%) of the management area (Table 4.33.1). Most of the hardwood stands are composed of red maple, sugar maple and beech, with white pine, hemlock and various other hardwood species mixed in. The stands generally fall into the Kotar habitat types of PArVAa, ATFD and AFPo (see Appendix E). Northern hardwood stands are distributed on lake plains and outwash plains and are dry to mesic-, poor to medium-nutrient sites. The majority of the stands have been managed using single tree selection, generally every 20 years, maintaining structural and species diversity to work towards an uneven-aged state. Where site quality is poor shelterwood and other even-aged harvesting systems will be considered. Stands that have been managed through even-aged systems are shown in the immature column in Figure 4.33.3. A large number of stands have not yet had basal area coded (not coded column in Figure 4.33.3). This is because northern hardwood stands within the area recently purchased at Crisp Point have not yet had field inventory completed.

Beech bark disease is prevalent throughout the management area and many stands have had or will have salvage harvests due to beech bark disease. Beech mortality and salvage harvesting has resulted in decreased stocking levels. Further selection harvesting in these stands will be delayed due to resultant lower than normal residual basal area.

Currently, there are no stands with harvests prescribed. There are no acres of northern hardwood that have site conditions limiting their harvest at this time.

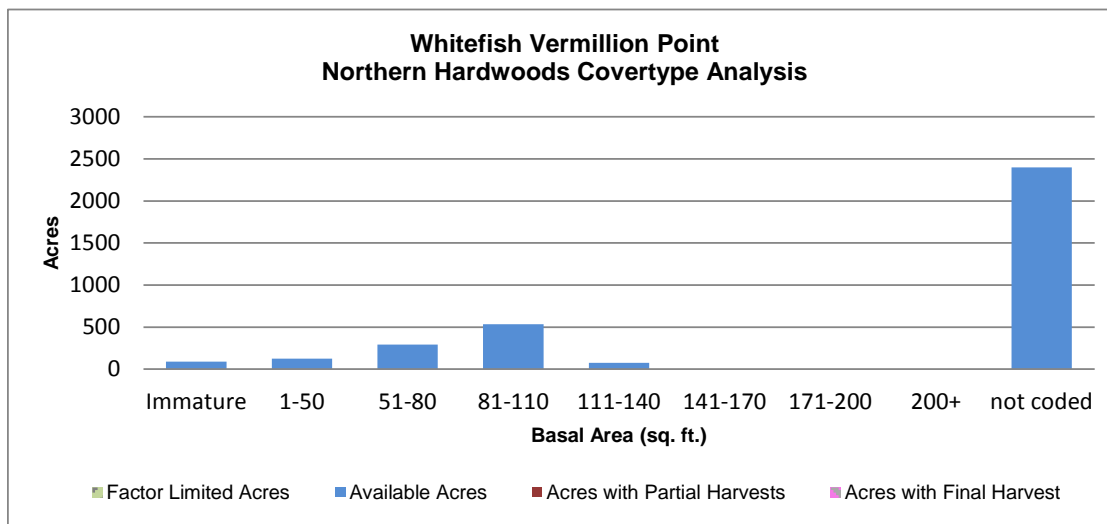


Figure 4.33.3. Basal area distribution of northern hardwood in the Whitefish Vermillion Point management area (2013 Department of Natural Resources inventory data).

#### Desired Future Condition

- Northern hardwoods will be maintained on operable sites generally by using individual tree selection harvesting which will provide uneven-aged composition and structurally diverse stands.

#### 10-Year Management Objectives

- The 10-year projected partial harvest is 1,655 acres of northern hardwoods;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands; and
- To favor regeneration of other hardwood species consider herbicide applications of beech regeneration and planting of hard mast producing trees including oak and disease resistant beech.

#### Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

## Section 4.33.1.4 Forest Cover Type Management – Red Pine

### Current Condition

Red pine stands are found on 2,689 acres (6%) of the management area (Table 4.33.1). Red pine stands in this management area are of natural origin and are often mixed with white and jack pine. The majority of red pine stands have a Kotar habitat type of PArV (see Appendix E). These dry sites have the capacity to produce quality red pine. Many red pine stands are found on the steep, narrow, sandy ridges in the wooded dune and swale complexes. Throughout the remainder of the management area the red pine is managed intensively for timber production. Red pine stands have been periodically thinned followed by regeneration harvests generally using shelterwood or seed tree systems to promote natural regeneration. Planting of red pine is sometimes necessary to supplement natural regeneration.

Currently there is no acreage of red pine prescribed with either a final harvest or for partial harvest (Figure 4.33.3). There are 271 acres of red pine that have site conditions limiting their harvest and have been removed from the total number of manageable acres available for harvest calculations. Red pine remaining through biological maturity may be replaced by other climax species.

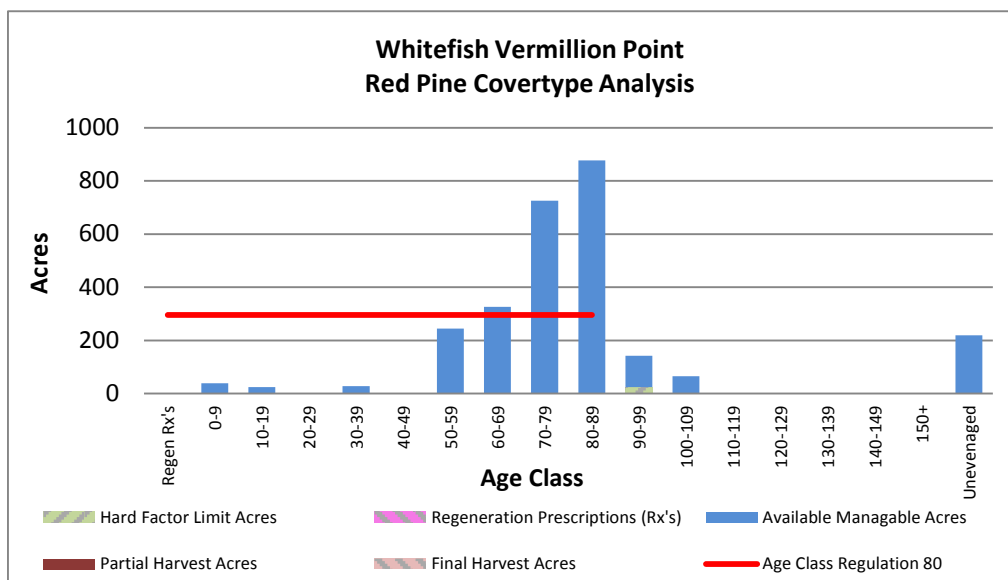


Figure 4.33.4. Age-class distribution of red pine in the Whitefish Vermillion Point management area (2013 Department of Natural Resources inventory data).

### Desired Future Condition

- Red pine will be maintained and managed on operable sites through thinning until stand replacement harvest at economic maturity, approximately 80 years of age;
- Balancing acres between 0-89 years of age will provide for continual harvesting, wildlife habitat and recreational opportunities; and
- Red pine on inaccessible sites may be left until biological maturity at over 200 years of age.

### 10-Year Management Objectives

- The 10-year projected final harvest of red pine is 296 acres to work toward balancing the age classes of red pine; and
- The 10-year projected partial harvest of red pine is 881 acres.

### Long-Term Management Objectives

- Balance the age-class structure of available red pine providing for a regulated harvest of approximately 296 acres per decade; and
- Stands will be periodically thinned until they meet silvicultural criteria.

### Section 4.33.1.5 Forest Cover Type Management – Lowland Conifers

#### Current Condition

Lowland conifers occur on 2,641 acres (5%) of the management area (Table 4.33.1). A small portion of the cover type is listed as uneven-aged reflecting multi-storied stands. There has been no recent regeneration harvesting in this area (Figure 4.33.4).

Currently there are not any acres of lowland conifers prescribed for final harvest. There are 10 acres of lowland conifers that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in areas unavailable for harvest will be subject to natural processes, resulting in a range of successional stages.

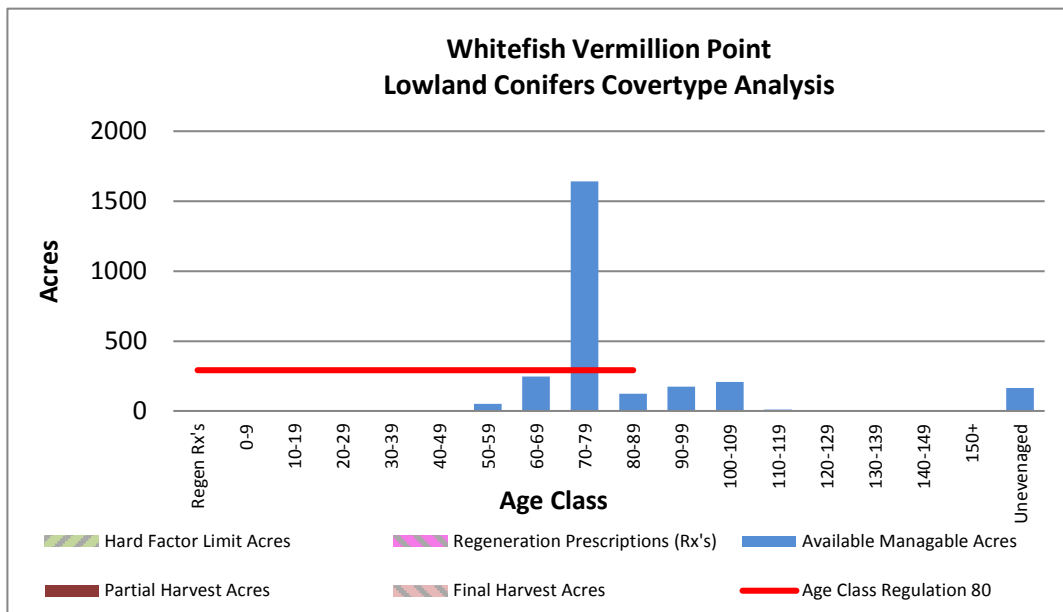


Figure 4.33.5. Age-class distribution of lowland conifers in the Whitefish Vermillion Point management area (2013 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management with acres balanced between 0-89 years of age to provide for continual harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 292 acres to work toward balancing the age classes in this cover type.

#### Long-Term Management Objectives

- Balance the age-class structure of available stands providing for a regulated harvest of 292 acres of lowland conifers per decade.

### Section 4.33.1.6 Forest Cover Type Management – Other Types

#### Current Condition

There are many other cover types spread across the management area that have less than 5% of the total management area acres (Table 4.33.1). Aspen (1,537 acres or 3%), lowland mixed forest (1,015 acres or 2%), natural mixed pines (874 acres or 2%), lowland spruce/fir (828 acres or 2%) and white pine (817 acres or 2%). “Other types” are made up of forested cover types with 2% or less of the total acres and includes: paper birch, upland conifers, oak, cedar, upland spruce/fir, mixed upland deciduous, upland mixed forest, hemlock, lowland deciduous, tamarack and lowland aspen/balsam poplar.

With the exception of oak and pines, the majority of these forested cover types are managed using even-aged harvesting systems and will be reforested by natural regeneration. For even-aged management types, attempt to balance the acres where possible using standard rotation ages. White pine, oak and mixed cover types with high basal area may be thinned prior to final harvest depending on the species composition.

Upland open/semi-open lands (372 acres or 1%) is a combination of herbaceous openland, bare/sparsely vegetated, low-density trees and upland shrub. In addition there are 3,482 acres (7%) of "miscellaneous other" stands, which includes water, sand/soil and roads.

Almost 600 acres of these other minor cover types have site conditions limiting their harvest this entry cycle. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible stands of early successional species such as aspen and paper birch will eventually succeed to more shade tolerant species.

#### Desired Future Condition

- These cover types may be managed on operable sites contributing to the compositional diversity of the landscape while providing for continual harvest available wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The projected 10-year final harvest is 110 acres of aspen, 113 acres of lowland mixed forest, 49 acres of natural mixed pines, 89 acres of lowland spruce/fir, 74 acres of white pine and 601 acres of other types; and
- The projected 10-year partial harvest is 209 acres of natural mixed pines, 336 acres of white pine and 740 acres of other types.

#### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.33.2 – Featured Wildlife Species**

Whitefish Point is an important area for migratory birds. The surrounding land and water features create a natural corridor funneling thousands of birds directly to the point each spring and fall as they travel through the Great Lakes region. The majority of the shoreline within the management area is considered critical habitat for the federally endangered piping plover and other rare Great Lakes endemic species. During harvest, consideration of migrating and nesting bird species is of high importance. Retention, standing snags, coarse woody debris and appropriate timing of harvests are important management factors. Specific recommendations for other featured species include the retention of large diameter red and white pine, the retention of mature trees along lowland edges and providing connectivity of forest types.

#### **Moose**

The goal for moose in the eastern Upper Peninsula is to maintain or increase suitable habitat. Management for moose should focus on providing early successional browse adjacent to lowland conifer complexes, the maintenance of hemlock within stands and protecting willow, a valuable food source, along riparian and wetland edges.

#### Wildlife habitat specifications:

- Encourage early successional hardwood browse (in the 0-9 and 10-19 year-old age class) in close proximity to closed canopy lowland conifer swamps.
- Balance aspen age-class distribution to ensure a more sustainable supply of browse.
- Maintain or promote thermal refugia in harvested stands by retaining hemlock and other conifers.
- Increase mesic conifer (e.g., hemlock, white pine, red pine and upland spruce-fir) component on state forests by:  
a) Retaining a larger percentage of mesic conifer during harvests; b) Using silvicultural practices that encourage the regeneration of mesic conifer; and c) Where desired/feasible, under planting hemlock, white pine and white spruce in hardwood-dominated stands on suitable sites without a seed source. Increase the percentage of mesic conifers, where suitable, across the landscape by 10% during this planning cycle.
- Willow is an important browse species, as are submergent and emergent aquatic vegetation associated with summer feeding areas. Ensure sustainable supplies of each.

## Piping Plover

The statewide goal for the Great Lakes piping plover is to maintain a breeding population of a minimum of 100 nesting pairs. In the eastern Upper Peninsula, management should focus on protecting and improving critical habitat on occupied shoreline, and throughout designated critical habitat.

### Wildlife habitat specifications:

- At known breeding sites work with partners to:
  - Limit human activity near nests;
  - Construct predator exclosures around nests; and
  - Control avian and mammalian predators as needed.
- In other critical habitat, support land acquisitions and conservation easements.
- At active sites, support public education and increased awareness to help avoid disturbance to nesting birds.
- Address/discourage illegal off-road vehicle activity on Great Lakes shorelines.

## Red Crossbill

In the eastern Upper Peninsula, the goal for red crossbill is to maintain or increase habitat. State forest management should focus on maintaining mature and over mature seed producing trees in priority areas.

### Wildlife habitat specifications:

- Maintain a minimum of 15% of the total acres of appropriate cover types (upland spruce/fir, upland conifers, natural mixed pine and natural red and white pine) in the management area for red crossbill in a mature forest condition (e.g., >150 years for red pine, > 130 years for white pine and > 80 years for white spruce).
- This can be accomplished with existing factor-limited stands or alternatively by extending the rotation length of these types to 150, 130 and 80 years respectively. In this management area older age classes for red crossbill habitat are being met by a large number of stands with site conditions that limiting harvesting.
- Retain large mature and over mature red pine, white pine and white spruce in shelter-wood and seed tree cuts.
- Evaluate the management area for the establishment of core tracts of old (greater than 100 years old) pine stands in biodiversity stewardship areas or Type 1 or Type 2 old growth.

## Spruce Grouse

The goal for spruce grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on retention of mixed conifers on riparian/lowland edges, the increase of in stand species diversity and landscape level planning to ensure populations are not isolated.

### Wildlife habitat specifications:

- In jack pine harvests leave mixed conifer and/or jack pine retention strips of mature trees along riparian corridors and lowland margins as well as along upland edges.
- Maintain spruce seed trees through retention, especially at lowland margins.
- Maintain or increase diversity of conifer stands by implementing seed tree/shelterwood prescriptions and limiting the use of herbicides, especially along lowland edges.
- Large clearcuts may isolate populations of spruce grouse so landscape level planning must take into account this species' need for low-density mixed-conifer travel corridors to connect suitable stands.
- Ensure black spruce recruitment/regeneration is reliable where harvested. Monitoring should be required to ensure we are getting desired results from management.

### 4.33.3 – Rare Species and Special Conservation Area Management

All forest operations must be reviewed for potential conflicts with rare species following the guidance in “*DNR’s Approach to the Protection of Rare Species on State Forest Lands*” (IC4172). This is especially important when listed species are present or past surveys have indicated a possibility of their presence.

Past surveys have noted and confirmed fifteen listed species as well as three natural communities of note occurring in the management area as listed in Table 4.33.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

Special conservation areas include: cold water streams and lakes, high priority trout streams (Figure 4.33.1), the Tahquamenon Scenic Heritage Route, Tahquamenon State Park Visual Management Area and Marsh Lakes (31 acres) and Vermillion Point (112 acres) non-dedicated natural areas (Figure 4.33.6). Concentrated recreation area special conservation areas (boat access sites and state forest campgrounds) are listed in the Recreation section 4.33.6 below.

The majority of the shoreline within the management area (Figure 4.33.6) is within a high conservation value area for critical coastal habitat for the federally endangered piping plover and other rare Great Lakes endemic species (see Table 4.33.2). A Director's Order is in place to help protect nesting plovers and other shorebirds.

In the southeast corner of the management area there is a four-acre patterned fen ecological reference area (Figure 4.33.6). Ecological reference areas will be managed to enhance and protect their natural vegetative and associated wildlife communities by an ecological reference area-specific management plan.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.

Table 4.33.3. Occurrence information for special concern, rare, threatened and endangered communities and species for the Whitefish Vermillion Point management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Muskeg		S3/G4G5	Confirmed				Lowland open/semi-open	N/A
Patterned fen		S2/GU	Confirmed				Lowland open/semi-open	N/A
Wooded dune and swale complex		S3/G3	Confirmed				Upland open/semi-open	N/A
<b>Birds</b>								
American bittern	<i>Botaurus lentiginosus</i>	SC/G4/S3-4	Confirmed	MV	Very High	Great Lakes marsh	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Southern wet meadow	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Piping plover	<i>Charadrius melodus</i>	LE/E/G3/S1	Confirmed	MV	Moderate	Open dunes	Upland open/semi-open	N/A
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern forest	Northern Hardwood	Late
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid
<b>Butterfly</b>								
Hoary comma	<i>Polygona gracilis</i>	SC/G5/S3	Confirmed	HV	Low	Boreal forest	Upland & Lowland Sp/F	Mid
<b>Moth</b>								
Dune cutworm	<i>Euxoa aurulenta</i>	SC/G5/S1S2	Confirmed	PS	Very High	Wooded dune & swale complex	Upland open/semi-open	N/A
						Open dunes	Upland open/semi-open	N/A
						Sand and gravel beach	Upland open/semi-open	N/A
						Great Lakes barrens	Upland open/semi-open	N/A
<b>Dragonfly</b>								
Incurvate emerald	<i>Samatoclara incurvata</i>	SC/G4/S1S2	Confirmed	MV	Very High	Headwater Stream	Aquatic	N/A
						Rich conifer swamp	Tamarack	Late
						Bog	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
Ebony boghaunter	<i>Williamsonia fletcheri</i>	SC/G4/S1S2	Confirmed	MV	Low	Inland lake	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Northern fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
						Prairie fen	Lowland open/semi-open	N/A
						Muskeg	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Inundated shrub swamp	Lowland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
<b>Insect</b>								
Lake Huron locust	<i>Trimerotropis huroniana</i>	T/S2S3/G2G3	Confirmed	MV	Very High	Great Lakes barrens	Upland open/semi-open	N/A
						Open dunes	Upland open/semi-open	N/A
<b>Reptile</b>								
Wood turtle	<i>Glyptemys insculpta</i>	SC/G4/S2S3	Confirmed	MV	Moderate	Northern wet meadow	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern shrub thicket	Upland open/semi-open	N/A
						Mesic northern forest	Northern Hardwood	Late
<b>Plants</b>								
Douglas's hawthorn	<i>Crataegus douglasii</i>	SC/G5/S3S4	Confirmed			Volcanic bedrock glade	Upland open/semi-open	N/A
						Volcanic bedrock lakeshore	Upland open/semi-open	N/A
						Boreal forest	Upland & Lowland Sp/F	Mid
						Mesic northern forest	Northern Hardwood	Late
						Northern bald	Upland open/semi-open	N/A
						Open dunes	Upland open/semi-open	N/A
						Sand and gravel beach	Upland open/semi-open	N/A
						Sandstone bedrock lakeshore	Upland open/semi-open	N/A
						Volcanic cliff	Upland open/semi-open	N/A
						Volcanic cobble shore	Upland open/semi-open	N/A
						Volcanic lakeshore cliff	Upland open/semi-open	N/A
American dune wild-rye	<i>Leymus mollis</i>	SC/G5/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
American shore-grass	<i>Littorella uniflora</i>	SC/G5/S2S3	Confirmed			Submergent marsh	Lowland open/semi-open	N/A
Dwarf raspberry	<i>Rubus acaulis</i>	E/G5T5/S1	Confirmed			Northern fen	Lowland open/semi-open	N/A
						Patterned fen	Lowland open/semi-open	N/A
						Poor fen	Lowland open/semi-open	N/A
Lake Huron pansy	<i>Tanacetum huronense</i>	T/G5T4T5/S3	Confirmed			Open dunes	Upland open/semi-open	N/A
						Limestone cobble shore	Upland open/semi-open	N/A
						Wooded dune & swale complex	Upland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

# Whitefish Vermillion Point

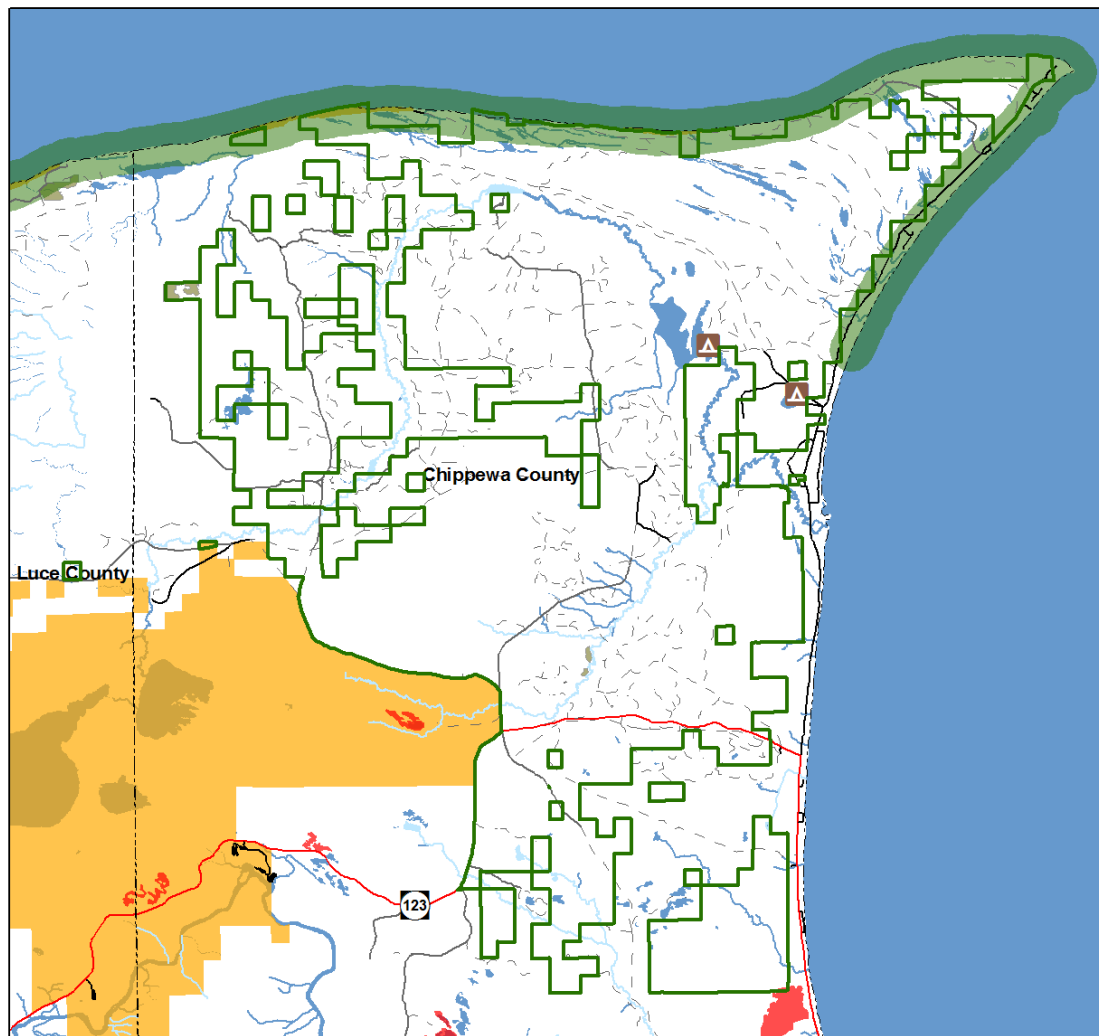


Figure 4.33.6. A map of the Whitefish Vermillion Point management area showing the special resource areas.



#### 4.33.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Red and jack pine: jack pine budworm, white grubs, red-headed pine sawfly, pine engraver and *Scleroderris* canker; and
- Lowland conifers: spruce budworm, eastern larch beetle and larch casebearer.

For further information on forest health refer to Section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a forest health threat to forested and non-forested areas throughout the management area. No invasive plant species have yet been documented within the management area. Garlic mustard and Japanese knotweed have been documented within a five-mile buffer of the management area (Table 4.33.3) and monitoring efforts should specifically look for new populations of this species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

Table 4.33.3. Invasive plant species within or near the Whitefish Vermillion Point management area (Data from the Michigan Invasive Plant Identification Network database).

Whitefish Vermillion Point - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	2	2	2
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
-	-	Garlic Mustard ( <i>Alliaria petiolata</i> )	1	
-	-	Japanese Knotweed ( <i>Fallopia japonica</i> )	1	

#### 4.33.5 – Fire Management

Wooded dune and swale communities dominate much of this shoreline management area. With varying mixtures of red, white and jack pine and the alternating open and forested swales, individual fires only infrequently impacted large areas. Frequency of stand replacement fires was very low. Farther from the shoreline, fires on dry sandy soils were less frequent than expected due to lake effect on the humidity regime. In the last 40 years, only three prescribed burns have been proposed within the management area. Only one has been completed, 26 acres of slash reduction burned in September of 2004.

- In 2009, Whitefish Township received a Community Wildfire Protection Planning grant. The state park provides access to a large number of forest recreational users. The facilities at Whitefish Point and in Paradise also provide opportunities to provide prevention messages to forest users.
- This management area falls within the DNR Newberry protection area. The Whitefish Zone Dispatch plan calls for aggressive initial attack based on current fire danger. The adjacent Tahquamenon Falls State Park has a modified suppression plan based on fuels, values at risk and expected fire danger.

#### 4.33.6 – Public Access and Recreation

Due to landforms and private parcels, access is somewhat limited near Whitefish Point.

Additional roads and trails should be carefully evaluated so as not to impact the more fragile sites within this management area. Illegal off-road vehicle use, particularly on the Lake Superior shoreline, is a concern due to the critical habitat for piping plovers.

Recreational facilities include: snowmobile trails (Figure 4.33.1), Andrus Lake State Forest Campgrounds (Figure 4.33.6), and the Shell Drake Dam and Whitefish Point Harbor boating access sites.

This area is a destination for winter snowmobilers as well as summer tourists. Hunting, trapping, blueberry picking, kayaking, beach combing, fishing, bird watching and other wildlife observation are forms of recreation within this management area.

#### **4.33.7 - Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. The Betsy River system is designated as a high priority trout stream in this management area and the details are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.33.1.

#### **4.33.8 – Minerals**

Surface sediments consist of lacustrine (lake) sand and gravel, an end moraine of coarse-textured till and peat and muck. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the management area and there is good potential for additional sites on the uplands.

The Precambrian Jacobsville Sandstone subcrops below the glacial drift. The Jacobsville was previously used as a building stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (14 in Chippewa County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

Michigan Department of Natural Resources

Forest Resources Division

And

Wildlife Division

**Eastern Upper Peninsula  
Regional State Forest Management Plan**

**December 2013**

*Planning Team:*

Kristen Matson  
Sherry MacKinnon  
David L. Price  
Scott L. Jones, Editor

Approved:



Keith Creagh, Director  
Michigan Department of Natural Resources

Date: \_\_\_\_\_

12/12/13



# Regional State Forest Management Plan Eastern Upper Peninsula – Executive Summary December 2013

In Michigan, the Department of Natural Resources (DNR) works hard to sustainably manage state-owned forest land for the many economic, recreational and environmental values that are part of those forest lands. To accomplish this, the DNR manages state forest lands using an ecosystem-based approach in a way that meets our current forest needs while not compromising the needs of future generations.

The DNR has been certified by the Forest Stewardship Council and the Sustainable Forestry Initiative; both of these agencies have audited the DNR's current forest management practices against biological, social and economic standards and independently certified those practices to be in compliance with such standards.



The Regional State Forest Management Plan (RSFMP) for the eastern Upper Peninsula (EUP) ecoregion is one of three plans that will help bridge the planning and communication gaps between the 2008 Michigan State Forest Management Plan and the annual inventory and planning performed by the local management unit. The RSFMP is intended to help achieve the planning requirements of Part 525 of the Natural Resources and Environmental Protection Act, as well as forest certification standards. The RSFMP is an operational plan that is intended to provide landscape-level direction that will guide the local management decisions affecting forest types and related habitat.

## Plan Origins

There has been a need for a landscape level plan for several years. With additional feedback from the 2004 and 2005 forest certification audits, the planning process moved forward. In 2005, a series of stakeholder input sessions identified the following categories of interests that the public wanted to see addressed in the state forest plans:

- Public recreation
- Biodiversity – old growth
- Wildlife habitat and management
- Invasive exotic species
- Roads
- Land use
- Timber and vegetation management
- Riparian management zones
- Planning process
- Interagency cooperation
- Spirituality – solitude
- Public education and awareness
- Funding.

Internal and external input went into the development of the EUP plan outline. The internal process of grouping state forest lands into management areas, based on similar ownership, socioeconomic and ecological attributes, culminated with public meetings in 2009 to review the management area boundaries.

Management direction for the EUP management areas (including the development of the model to project timber harvest levels based on DNR inventory data) was developed by DNR district and state planning staff. These draft management area plans were reviewed by unit and other regional DNR staff in a series of internal meetings throughout 2012 and revisions were made based on this input. In October 2012, the full draft EUP regional plan was released to the public.

## Plan Content

The eastern Upper Peninsula RSFMP contains six major sections, plus appendices, a glossary and citation of literature.

## **Section 1**

This section is an introduction to the plan that describes its purpose and organization, geographical context and intended implementation.

## **Section 2**

This section provides a history of forests in the eastern Upper Peninsula, the origin of the present state forest system, and a look at the 19<sup>th</sup>- and 20<sup>th</sup>-century periods of large-scale extraction of natural resources and how those extractions have influenced the forest composition and present management of forest resources.

## **Section 3**

An understanding of the history in Section 2 sets the stage for Section 3, which describes current forest conditions and trends related to:

- Forest resources
- Forest health
- Featured wildlife species and habitat needs
- Water and fish habitat
- Socio-economic context of the plan (including timber production; forest recreation and tourism; hunting, trapping and fishing; oil and gas production; and mineral extraction).

Specifically, this section touches on the following topics:

- State forest timber sales in the EUP over the past decade have fluctuated between 10,000 and 15,000 acres per year from approximately 1,064,927 acres of actual forested land. Harvest acres of northern hardwoods, jack pine, red pine and aspen account for about 80 percent of the state forest timber sales in the EUP.
- A number of forest insects and diseases are present and threaten forest conditions in the EUP; the most significant of these are beech bark disease, spruce budworm, and emerald ash borer.
- Featured wildlife species in the EUP are the American bittern, American marten, American woodcock, beaver, black bear, blackburnian warbler, eastern bluebird, gray jay, Kirtland's warbler, mallard, moose, pileated woodpecker, piping plover, northern goshawk, red crossbill, red-shouldered hawk, ruffed grouse, sharp-tailed grouse, snowshoe hare, spruce grouse, upland sandpiper, white-tailed deer and wild turkey.
- There are many inland lakes and over 800 miles of streams in the EUP, including the Fox and Two Hearted rivers, which are designated natural rivers. The EUP is surrounded by three of the Great Lakes: Superior, Huron and Michigan.
- As of 2005, there were more than 400 jobs in forest product industries in the EUP. There were more than 80 businesses involved in forestry and logging, and wages for the forestry and logging and wood products manufacturing sectors in the EUP totaled almost \$10 million.
- The state forests of the EUP provide over 1 million acres of land for motorized recreation as well as hiking, biking, horseback riding, hunting, fishing, camping, bird watching and other recreation activities. There are 12 state-managed pathways providing a total of 100 miles of hiking, biking and skiing trails; 35 forest campgrounds providing 621 campsites; and 1,300 miles of snowmobile trails, 206 miles of all-terrain vehicle trails and 205 miles of motorcycle trails.
- As of 2011, there were nearly 700,000 deer hunters, more than 100,000 turkey hunters, over 250,000 small game hunters and more than 1.2 million anglers in Michigan. In 2006, estimated statewide expenditures for hunting and trapping topped \$900 million, while fishing brought in some \$1.6 billion. Additionally, wildlife watchers contributed another \$1.6 billion in annual economic activity. State forests in the EUP contributed to a large portion of this activity.
- Currently, there are no significant oil and gas leases on state forest lands in the EUP.

## **Section 4**

This regional plan provides specific management direction for each of the 33 state forest management areas in the EUP. The management direction for each management area focuses on forest type and related wildlife habitat. Section 4 is comprised of 33 management area-specific plans, each containing:

- A summary of use and management;
- An introduction, which includes a projection of harvest acres in this 10-year planning period;

- Management direction for each of the major and some of the minor forest cover types in the management area, including current conditions, desired future conditions, 10-year management objectives and long-term management issues;
- Featured wildlife species and habitat specifications; and
- Discussions of rare fish, wildlife and plant management, forest health management, aquatic resources, fire management, recreation, access and other region-specific issues, such as oil and gas development.

Management direction related to other issues or uses (forest health, fire management, recreation, access or oil and gas development) is only provided in the context of forest type management. The plans do not contain specific goals related to recreation or oil and gas infrastructure placement and/or development. These are addressed in other DNR planning documents, such as the 2008-2012 Michigan Statewide Comprehensive Outdoor Recreation Plan. The plans do provide direction for operational implementation of other plans.

Plan sections on special resource areas (special conservation areas, high conservation value areas and ecological reference areas) also address management direction for other uses and values (e.g., recreation).

The DNR uses a modified area control approach to maintaining the sustainability of timber on state forest land. Consistent with this approach, the balancing of age and basal area classes over the rotation period for various forest types is a long-term desired future condition within most management areas. Each management area plan contains a calculation of projected harvest levels, which is framed in terms of projected harvests (in acres) for the major and minor cover types for the following decade. Specific highlights include:

- A breakdown of the dominant forest types: lowland open/semi-open lands (19 percent), northern hardwoods (11 percent), aspen (11 percent), cedar (11 percent), jack pine (9 percent), red pine (7 percent) and lowland conifers (7 percent);
- Proposed timber sales on approximately 123,000 acres over the next decade (an average of about 12,300 acres per year that is subject to year-of-entry variability and other factors);
- Trends which may result in a slight reduction in near future hardwood acres, due to beech bark disease; and
- Opportunities to increase harvest prescriptions in lowland deciduous and conifer cover types – for which assessments are currently in progress.

## **Section 5**



The plan concludes with Section 5, which describes monitoring, reporting, review and revision requirements. It includes:

- Information on monitoring directives;
- DNR protocols for inventory and assessment, surveillance and assessment, compliance monitoring, effectiveness monitoring, validation monitoring and reporting;
- A 10-year review and revision periodicity; and
- Known deficiencies in the plan that will need to be addressed in future revisions.

The concepts and actions outlined in the EUP Regional State Forest Management Plan are part of a 10-year plan, one that will be expertly reviewed and revised along the way – ensuring sound and sustainable forest treatments in all management areas.

## **Section 6**

Appendices

## **Section 7**

Forest Planning Glossary



## 4.1 MA 1 – 8 Mile Corner Management Area

### Summary of Use and Management

Vegetative management in the 8 Mile Corner management area (MA) (Figure 4.1.1) will emphasize the selective management of the northern hardwood resource and balancing the age classes of aspen. Management will strive to produce sustained yields of various timber products, enhance wildlife habitat, and provide for forest based recreational uses. In addition, emphasis will be placed on protecting unique areas, threatened and endangered species. Expected issues within this 10-year planning period are increased recreational pressure, illegal off-road vehicle activity and introduced pests and diseases, especially emerald ash borer and beech bark disease.

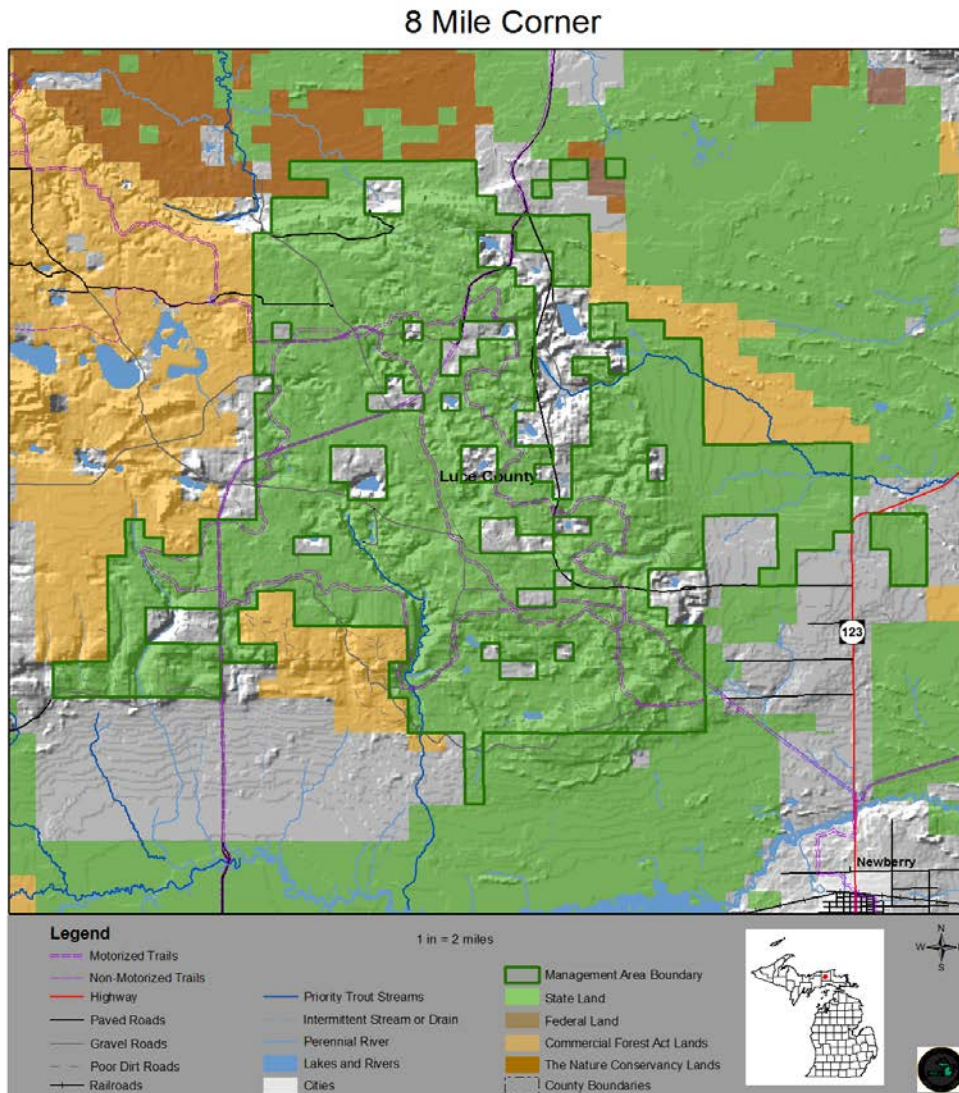


Figure 4.1.1. Location of 8 Mile Corner management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and the village of Newberry in Luce County.

### Introduction

The 8 Mile Corner management area is located in the central portion of the eastern Upper Peninsula in Luce County. It has 26,575 acres of state-owned land. The primary attributes are timber production and habitat for featured wildlife species including ruffed grouse and white-tailed deer. Additional attributes which were important in identifying this management area include:

- The management area falls primarily within the Luce subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- A dominant landform consisting of sandy outwash and till-plain between the Two-Hearted and Tahquamenon river systems.
- Cover types of aspen and northern hardwood are now predominant, verses historic cover types of white pine and northern hardwood.
- Recreational opportunities including high use snowmobiling and ORV-riding due to the proximity to Newberry.

Spincich Lake opening, a large grassy opening complex of over 300 acres, is within this management area. This area was created through disturbances from past logging and farm practices. Portions of this opening now contain red pine, aspen and low-quality northern hardwood. Formerly, white pine and northern hardwood mixes made up most of the acreage.

This management area is close to Newberry, and is interspersed with private parcels. The 8 Mile Corner management area falls within the Newberry Forest Management Unit. The predominant cover types, acreages and projected harvest acres for the management area are shown in Table 4.1.1.

Table 4.1.1. Current cover types, acreages, projected harvest acres and projected 10-year cover type acreage for the 8 Mile Corner management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Aspen	24%	6,267	217	6,050	367	0	6,267	1,008	0
Northern Hardwood	23%	6,131	418	5,713	0	1,728	6,131	0	2,260
Upland Open/Semi-Open Lands	10%	2,712	0	2,712	0	0	2,712	0	0
White Pine	8%	2,107	0	2,107	192	719	2,107	192	719
Red Pine	8%	2,005	104	1,901	211	1,142	2,005	211	1,152
Lowland Conifers	7%	1,732	317	1,415	539	0	1,732	157	0
Upland Spruce/Fir	4%	1,024	132	892	366	0	1,024	127	0
Cedar	4%	978	0	978	0	0	978	61	0
Lowland Open/Semi-Open Lands	4%	934	0	934	0	0	934	0	0
Lowland Spruce/Fir	3%	703	375	328	107	0	703	36	0
Misc Other (Water, Local, Urban)	1%	295	0	295	0	0	295	0	0
Others	6%	1,687	462	1,225	176	65	1,687	150	85
Total	100%	26,575	2,025	24,550	1,958	3,654	26,575	1,942	4,216

Others include: Lowland deciduous, jack pine, lowland aspen/balsam poplar, paper birch, hemlock, upland mixed forest, lowland mixed forest, natural mixed pines, mixed upland deciduous, upland conifers and tamarack.

#### 4.1.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major and some of the minor cover types within the management area. This information applies to those portions of the forest where active management (i.e., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, the natural processes of succession will provide ecological benefits. While most stands have a variety of tree species and other vegetation, they are classified by the species with the dominant canopy coverage.

The following cover types are valued commercially for their timber products, ecologically as sources of habitat for numerous species and for the variety of recreational opportunities they provide. Harvesting and regenerating these cover types will provide for a continuous flow of forest products and will help to ensure (or provide) wildlife habitat.

##### Section 4.1.1.1 Forest Cover Type Management - Aspen

###### Current Condition

Aspen occurs on 6,267 acres (24%) of the management area (Table 4.1.1). Aspen is distributed throughout the management area on lake plains, outwash plains, disintegration moraines and ground moraines. This encompasses a range of sites on loamy soils, from dry poor nutrient to mesic medium nutrient, with Kotar habitat types of PARV, PARVAa, ATFD and AFPo (defined in Appendix E). Aspen stands in this management area are often mixed with hardwood, white pine, balsam fir and other conifers. Aspen has been consistently harvested in the past, with the greatest harvest activity occurring within the last 30 years (Figure 4.1.2).



There are currently 516 acres that have a final or regeneration harvest pending. There are 47 acres of northern hardwoods currently prescribed for harvest that are expected to convert to aspen through harvest. These acres are shown in Figure 4.1.2 in the regeneration prescriptions column.

There are 217 acres of aspen that have site conditions limiting their harvest. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Aspen stands that are inaccessible for commercial harvest will eventually succeed to mid- or late-successional species, including balsam fir, red maple and white pine.

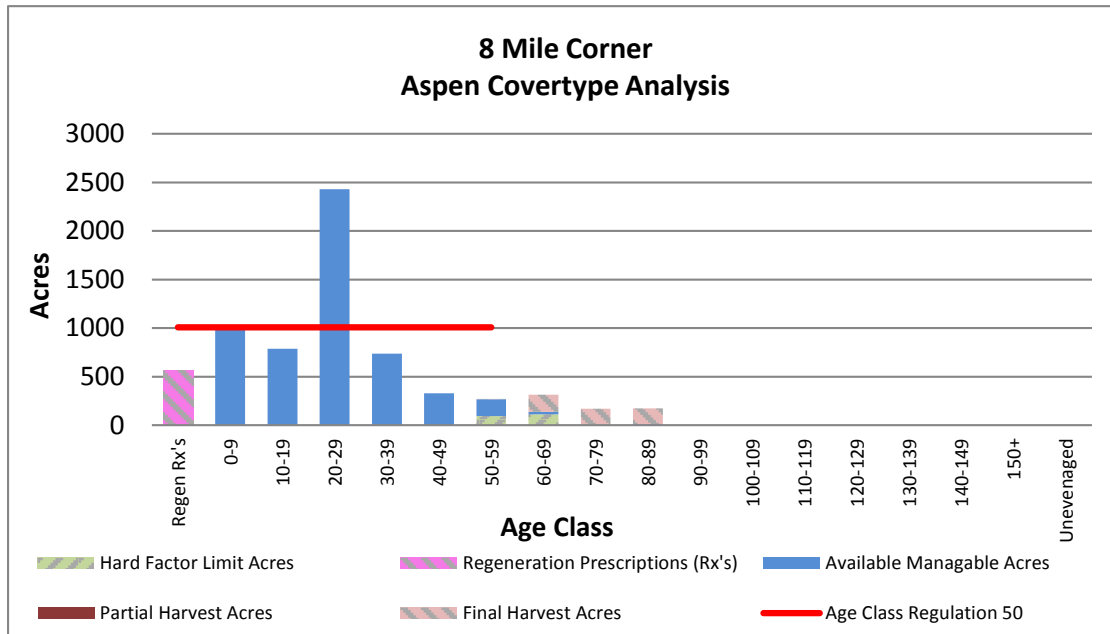


Figure 4.1.2. Age-class distribution of aspen on the 8 Mile Corner management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- The aspen cover type will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age to provide for regulated harvest, wildlife habitat as represented by the featured wildlife species ruffed grouse and recreational opportunities.

10-Year Management Objectives

- The projected 10-year harvest is approximately 367 acres. This is lower than the regulated amount due to the current age class structure. To accomplish the projected harvest level, plan to harvest some of the stands in the 40-49 year age class that will reach rotation age this planning period.

Long-Term Management Objectives

- Balance the age-class distribution of accessible aspen stands by harvesting and regenerating the regulated harvest amount of approximately 1,008 acres per decade (red line in Figure 4.1.2).

**Section 4.1.1.2 Forest Cover Type Management – Northern Hardwood**

Current Condition

Northern hardwood cover types occur on 6,131 acres (23%) of the management area (Table 4.1.1). Northern hardwoods are distributed throughout the management area on outwash plains and ground moraines on dry, dry-mesic and mesic poor-to-medium nutrient sites (Kotar habitat classes: PARVAa, AFTD and AFPo) (Appendix E). The majority of the stands have been managed using single tree selection, generally every 20 years, maintaining structural and species diversity to work towards an uneven-aged state, thereby having trees of varying ages and sizes. Figure 4.1.3 shows the distribution of northern hardwood stands by basal area range.

The northern hardwoods on poor soils are generally of lower quality, and some of these stands are being managed using even-aged systems, shown as immature in Figure 4.1.3. Poor site hardwood may be considered for conversion to another cover type, such as aspen or pine.

Beech bark disease is found within this management area, and many stands have had salvage harvests. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Delay further selection harvesting in these stands, due to the resultant lower than normal residual basal area.

Figure 4.1.3 shows stands currently under prescription and those with factors limiting harvest. Currently there are 538 acres with a partial harvest method of cut assigned. In addition there are 47 acres of hardwood with a final harvest method of cut prescribed which are expected to convert to aspen. These acres have already been moved from the northern hardwood total to the aspen total. There are 418 acres of northern hardwood that have site conditions limiting their harvest this planning period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

Desired Future Condition

- Northern hardwoods will be maintained on suitable sites and will produce a sustainable yield of forest products, generally by using individual tree selection harvesting. This will provide uneven-aged composition and structurally diverse stands. These stand conditions will be of benefit to a variety of wildlife represented by the featured species and will provide recreational opportunities.

10-Year Management Objectives

- The 10-year projected harvest of northern hardwood is 1,728 acres of partial or selection harvest;
- Continue salvage harvests of beech affected by beech bark disease using Beech Bark Disease Management Guidelines;
- Evaluate beech dominated forests to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands; and
- To favor regeneration of hardwood other than beech, consider herbicide applications of beech regeneration, and planting of hard mast producing trees, including disease resistant beech and oak.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

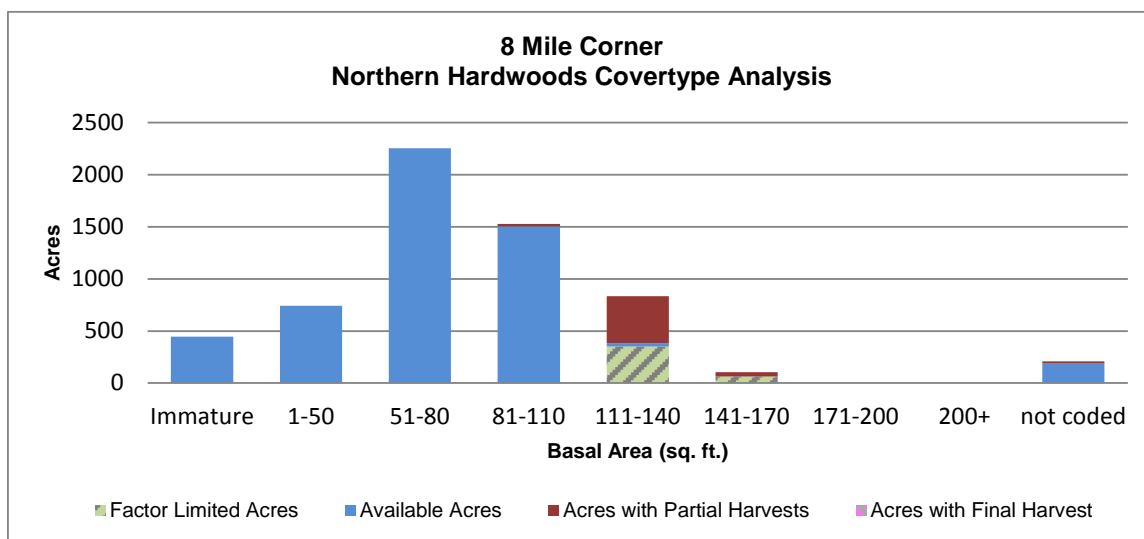


Figure 4.1.3. Basal area distribution of northern hardwood in the 8 Mile Corner management area (2012 Department of Natural Resources inventory data).

### **Section 4.1.1.3 Forest Cover Type Management – Upland Open/Semi-Open Lands**

#### Current Condition

Upland open/semi-open lands occur on 2,712 acres (10%) of the management area (Table 4.1.1). This category is a combination of the following non-forested land cover types: herbaceous open land (1,640 acres), upland shrub (1,000 acres), bare/sparsely vegetated (65 acres) and low density trees (seven acres). These cover types are valued ecologically as sources of open land habitat for numerous species of wildlife. The large opening complexes, including the Spincich Lake area, provide habitat for open-land species such as sharp-tailed grouse and upland sandpiper. Hardwoods are becoming established in some of the small areas formerly typed as open land. Opening maintenance is necessary to maintain these open areas. Some of the smallest openings may be allowed to succeed to aspen, pine or hardwoods.

Consider consolidating openings and pine plantations by shifting planting location after regeneration harvests in pine stands. The resulting larger openings will benefit many wildlife species.

#### Desired Future Condition

- Maintain large upland open/semi-open lands to provide wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- Maintain large openings through prescribed fire and mechanical cutting.

#### Long-Term Management Objectives

- Maintain the large upland open/semi-open lands to provide habitat; and
- Where feasible and necessary, use control methods on invasive non-native plants.

### **Section 4.1.1.4 Forest Cover Type Management – White Pine**

#### Current Condition

White pine dominated cover types occur on 2,107 acres (8%) of the management area (Table 4.1.1). White pine stands are found on sandy soils in outwash plains and lake plains, on very-dry to dry, very-poor to poor nutrient sites (Kotar habitat classes: PArV and PArVAa) (Appendix E). These white pine stands are generally of natural origin. White pine is found mixed with other pines, hardwoods and aspen. White pine regeneration grows well here, and stands that have been periodically thinned before a final harvest may have several ages of white pine, due to natural regeneration in the openings created by harvest. This management has resulted in over 60% of the acreage being classified as uneven-aged stands (Figure 4.1.4). Because of the large number of stands in the uneven-aged category from selection harvesting, there are not many stands in the younger age classes. Even age stands over 60 years of age are generally a result of man-made disturbances in the landscape.

Currently, there are 64 acres of white pine prescribed for partial harvest and zero acres prescribed for final harvest (Figure 4.1.4). There are no acres of white pine that have site conditions limiting their harvest at this time.

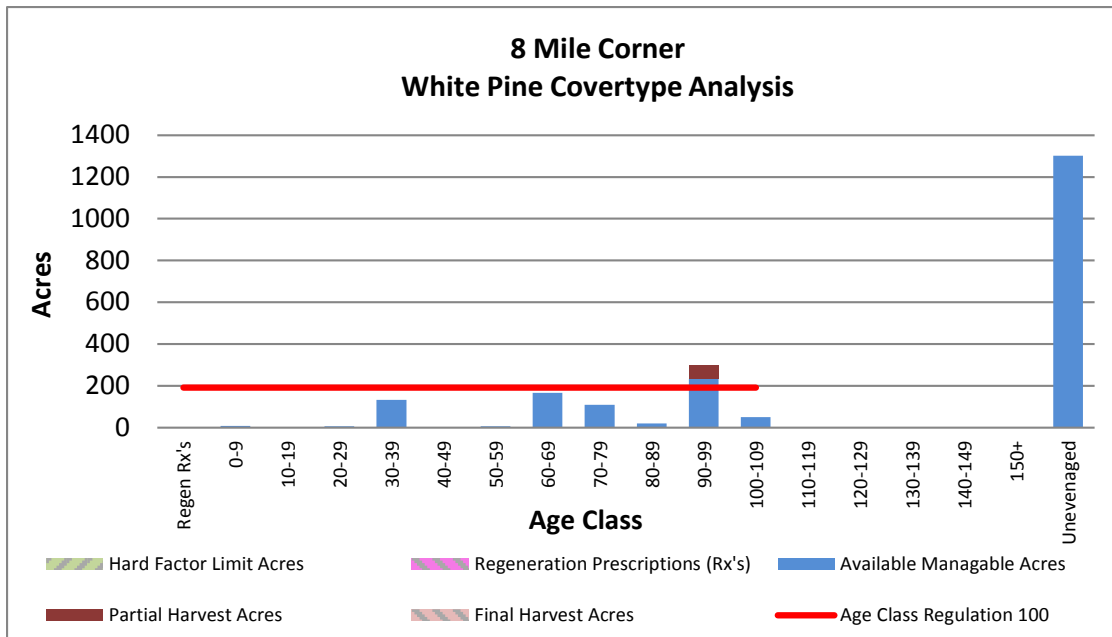


Figure 4.1.4. Age class distribution of white pine in the 8 Mile Corner management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- White pine stands will be maintained on operable sites with acres balanced between 0-109 years of age, with intermediate thinning and selection cuts, followed by shelterwood or seed tree regeneration harvests at rotation age;
- Harvesting will provide for a continuous flow of timber products;
- Provide for a variety of wildlife habitat and recreational opportunities; and
- White pine found in riparian buffers or other sensitive sites may remain until biological maturity.

10-Year Management Objectives

- The 10-year projected harvest of white pine is 192 acres of final harvest, generally using seed tree harvesting; and
- The 10-year projected partial harvest is 719 acres of thinning in stands with high basal area.

Long-Term Management Objectives

- A regulated harvest would allow approximately 192 acres for final harvest per decade; and
- Prior to final harvest at rotation age, periodically thin stands with high basal area.

**Section 4.1.1.5 Forest Cover Type Management – Red Pine**

Current Condition

Red pine stands are found on 2,005 acres (8%) of the management area (Table 4.1.1). Red pine grows very well on the sandy soil types found on outwash plains and moraines in the management area and it yields high value products. Sites run from very dry to mesic and very poor to medium-quality in terms of nutrients, with common Kotar habitat classes of PARv and PARVAa (Appendix E). The majority of the stands are of planted origin and in the 40-70 year age classes (Figure 4.1.5). These stands are first thinned as products become available, normally at about age 40, and then thinned again every 10-20 years until rotation age. At rotation age, planted stands will generally be clearcut and replanted to red pine. Prescribed burning and herbicide are sometimes used for site preparation and release of planted seedlings. Shelterwood or seed tree harvests may occur if natural regeneration is expected.

At rotation harvest, red pine stands will be evaluated as to site potential; some stands may be liquidated to consolidate openings, some replanted to red pine and some may be allowed to convert to other types when the site is more suited to that cover type. It is expected that the total acreage of red pine will remain similar over time, even if the location of the stands are moved to take advantage of site potential and to consolidate cover types.

Approximately 330 acres are currently scheduled for partial harvest (Figure 4.1.5). There are no final harvests currently scheduled. There are 104 acres of red pine that have site conditions limiting their harvest this decade. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

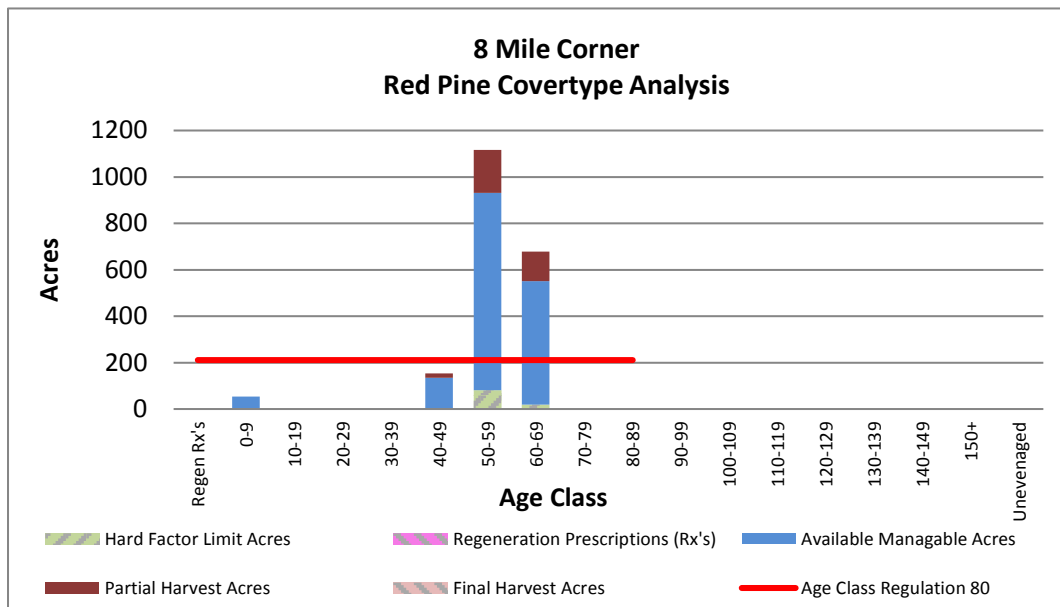


Figure 4.1.5. Age-class distribution of red pine in the 8 Mile Corner management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Red pine stands will be maintained and managed through thinning until stand replacement harvest at economic maturity, with acres balanced between zero and 89 years of age to provide for continual harvest;
- Provide wildlife habitat;
- Provide recreational opportunities; and
- Red pine found in riparian buffers or other sensitive sites may remain until biological maturity.

#### 10-Year Management Objectives

- The 10-year projected final harvest of red pine is 211 acres to work toward balancing the age classes of red pine; and
- The 10-year projected partial harvest or thinning of red pine is 1,142 acres.

#### Long-Term Management Objectives

- Maintain a balanced age-class structure;
- Provide a regulated harvest and regeneration of about 211 acres of red pine per decade; and
- Prior to final harvest at rotation age, periodically thin stands with high basal area.

### **Section 4.1.1.6 Forest Cover Type Management – Lowland Conifers**

#### Current Condition

Lowland conifers occur on approximately 1,732 acres (7%) of the management area (Table 4.1.1). The majority of these stands are located in the east part of the management area, with some stands found around the north and south edges. While the majority of the stands are in older age classes, some harvesting and regeneration of lowland conifer stands has occurred in this management area. Natural regeneration consisting of species currently on site transpired after harvesting. Access to some of the lowland conifer stands in the management area is limited due to rivers, streams and lack of roads in adjacent wetland cover types.

Currently there are zero acres with a method of cut prescribed (Figure 4.1.6). There are 317 acres of lowland conifers that have site conditions limiting their harvest. These hard factor limited acres have been removed from the total number of Eastern Upper Peninsula Regional State Forest Management Plan MA 1– 8 Mile Corner

manageable acres available for harvest calculations. Lowland conifer stands in inaccessible areas will be subject to natural processes, resulting in a range of successional stages.

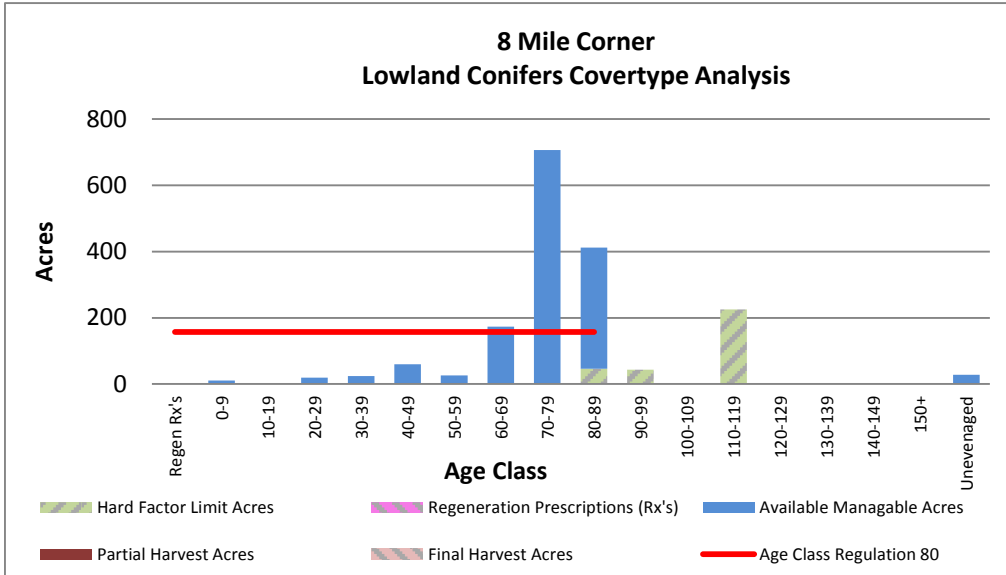


Figure 4.1.6. Age-class distribution of lowland conifers in the 8 Mile Corner management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management, with acres balanced between zero and 89 years of age; and
- Provide for a continuous supply of timber, available wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected final harvest is 539 acres (this increase from the regulated amount is due to the current age-class structure where the majority of the stands are in older age classes, at or near rotation age).

#### Long-Term Management Objectives

- Balance the age-class structure of accessible lowland conifer stands allowing for a regulated final harvest of approximately 157 acres every decade.

### **Section 4.1.1.7 Forest Cover Type Management – Other Types**

#### Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acres (Table 4.1.1). Upland spruce fir (1,024 acres or 4%); cedar (978 acres or 4%); lowland open/semi-open lands (934 acres or 4%); and lowland spruce/fir (703 acres or 3%) are the larger cover types. The lowland open/semi-open lands category is made up of lowland shrub (403 acres); bog (327 acres); treed bog (133 acres); and marsh (71 acres).

The “others” category in Table 4.1.1 (1,687 acres or 6%) is a combination of forest cover types with 2% or less of the management area acres, including lowland deciduous, jack pine, lowland aspen/balsam poplar, paper birch, hemlock, upland mixed forest, lowland mixed forest, natural mixed pines, mixed upland deciduous, upland conifers and tamarack. In addition, there are 295 acres of “miscellaneous other” stands, which includes water and roads.

The majority of these cover types have been managed as even-aged stands, using natural regeneration after harvest. In mixed cover types with high basal area, stands are sometimes thinned, prior to final harvest at rotation age.

Approximately 968 acres of the cover types with less than 5% of the total management area acres have site conditions limiting their harvest this decade. These hard factor limited acres have been removed from the total number of Eastern Upper Peninsula Regional State Forest Management Plan MA 1– 8 Mile Corner

manageable acres available for harvest calculations. Inaccessible stands may never be harvested, and will be subject to successional processes.

#### Desired Future Condition

- These cover types will be maintained on suitable sites and will contribute to the compositional diversity of the landscape while providing forest products and wildlife habitat.

#### 10-Year Management Objectives

- The projected 10-year final harvest is 366 acres of upland spruce/fir, 107 acres of lowland spruce/fir and 176 acres of other cover types; and
- The projected 10-year partial harvest is 65 acres of other cover types.

#### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat; and
- In cover types with sufficient acreage, work towards balancing the age classes.

### **4.1.2 Featured Wildlife Species**

Within the aspen and northern hardwoods cover types, wildlife habitat values are maintained by the retention of mesic conifers and large diameter soft hardwoods, young aspen forest for browse and structure and mature forest conditions in northern hardwood stands. Complex forest structure is important for many forest-dwelling wildlife species. Of special concern in this area is the loss of beech mast and a priority for this planning period is to increase this food source by planting disease resistant beech and red oak. The other forest cover types, though in smaller percentages, contribute to the overall biodiversity of this management area.

#### **Blackburnian Warbler**

The goal for blackburnian warbler is to maintain suitable habitat. State forest management for the species should focus on within stand diversity, habitat fragmentation, and conifer components in this management area.

#### Wildlife habitat specifications:

- Increase the mesic conifer (e.g., hemlock, white pine, red pine and upland spruce-fir) component on state forests by: a) Retaining a larger percentage of mesic conifer during harvests; b) Using silvicultural practices that encourage the regeneration of mesic conifer; and c) Where desired/feasible, underplant hemlock, white pine and white spruce in hardwood-dominated stands on suitable sites without a seed source.
- Provide more older mesic conifers, particularly hemlock, in the landscape by: a) Allowing some actively managed stands of mesic conifer to grow beyond standard rotation ages; b) Including mature mesic conifers as within-stand structure retained during harvests by following Within-Stand Retention Guidance; and c) Maintaining mature mesic conifer stands within travel corridors, riparian zones or Type 1 or 2 old growth special conservation areas.
- Use silvicultural practices that retain, recruit and expand multi-story hemlock stands and hemlock inclusions within hardwood complexes through group selection, scarification and/or direct planting.

#### **Pileated Woodpecker**

The goal for pileated woodpecker is to maintain suitable habitat. Management should focus on maintaining large diameter deciduous trees in timber sales in priority areas.

#### Wildlife habitat specifications:

- Identify and retain large (>15 inches in diameter at breast height snags and cavity trees, coarse woody debris, and reserve trees, as possible to ensure a sustainable supply of future cavity and foraging trees and associated coarse wood debris in all cover types. Poorly formed trees and those damaged by natural disturbance or earlier harvests, particularly deciduous trees, are good candidates for future snags and cavity trees. Large diameter aspen and other soft hardwoods are preferred.

- Even-aged managed stands: Leave scattered retention patches around some 18 inches in diameter at breast height or greater secure trees as a nucleus, using the upper end of the Within Stand Retention Guidance.
- Uneven-aged managed stands: Retain a minimum of three secure cavity or snags per acre with one exceeding 18 inches in diameter at breast height. If snags or cavity trees are lacking, leave trees with defects of the maximum available size that will likely develop cavities.
- Salvage harvests deemed necessary to remove due to insect, disease, or fire will be offset within the same cover type and age class (within the compartment, management area or eastern Upper Peninsula ecoregion), to minimize impacts on pileated woodpecker habitat. Total allowable harvest in these situations will be evaluated on a case-by-case basis.

## **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain or improve habitat. Management should focus on maintaining and balancing the age-class distribution for aspen in priority landscapes during this planning cycle.

### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Balance the age-class distribution of aspen and birch cover type to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation.
- Larger harvest units should have irregular boundaries and include one or two 1-3 acre unharvested inclusions for every 40 acres exceeding 40 acres in size.
- Evaluate the conifer component in aspen stands, holding or increasing where desirable. Leave conifer under four-inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

## **White-tailed Deer**

Deer are a keystone species and can impact (both beneficially and detrimentally) vegetative communities. The decline of hard mast in the way of beech nuts in the eastern Upper Peninsula is a concern. The goal for deer management in this management area is to provide suitable summer range.

### Wildlife habitat specifications:

- Provide hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush and warm-season grasses that will concentrate deer use in the fall on areas open to public hunting.
  - Where habitat types are appropriate and funding allows, increase diversity of hard mast by planting oak and disease resistant beech; and
  - Maintain grass openings.

### **4.1.3 Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “*DNR’s Approach to the Protection of Rare Species on State Forest Lands*” (IC4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed two listed species occurring in the management area (Table 4.1.2). Any established management guidelines will be followed.



Table 4.1.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Eight Mile Corner management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Birds</b>								
Common loon	<i>Gavia immer</i>	T/G5/S3-4	Confirmed	HV	Very High	Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Special conservation areas in this management area are approximately 117 acres of potential old growth (Figure 4.1.7) and the Tahquamenon River high priority trout stream tributaries (Figure 4.1.1).

There are currently no identified high conservation value areas in the management area.

A small portion (25 acres) of a patterned fen ecological reference area is located in the far northeastern corner of the management area (Figure 4.1.7). The majority of this ecological reference area is located in the adjoining Tahquamenon Patterned Fens management area. This ecological reference area will be managed to protect and enhance the natural vegetative and wildlife communities as directed by an ecological reference area -specific management plan.

## 8 Mile Corner

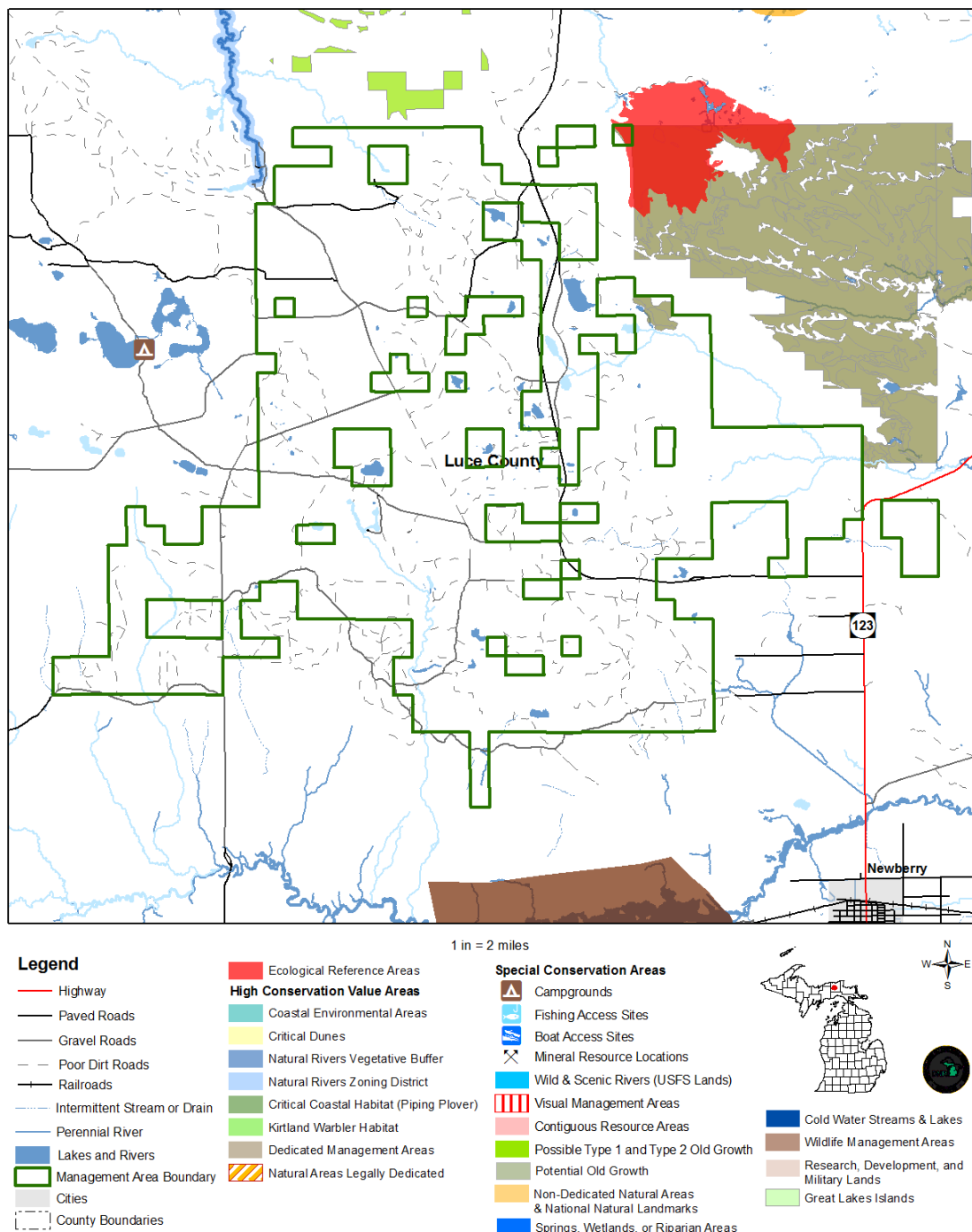


Figure 4.1.7. A map of the 8 Mile Corner management area showing the special resource areas.

Management goals during this planning period:

1. Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
2. Evaluate all potential Type 1, potential Type 2 old growth and potential old growth areas to determine their status as a special resource area.
3. Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

### 3.1.4. Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Northern hardwoods: Beech bark disease and emerald ash borer;
- Aspen: White trunk rot and *Hypoxylon* canker;
- White pine: White pine blister rust ;
- Lowland conifers: Spruce budworm, eastern larch beetle and larch casebearer; and
- Red pine: Pine engraver.

For further information on forest health refer to Section 3.

#### Invasive Species

Invasive exotic species, specifically plants, may pose a threat to forest resources, impacting timber production, wildlife habitat and recreational access. No invasive plant species have yet been documented within the management area, but leafy spurge has been documented within a 5-mile buffer of the management area (Table 4.1.3), and monitoring efforts should specifically look for new populations of this species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

Leafy spurge is a threat to open/grasslands, and is on the list containing the highest threat invasive species to the state's forest systems where local control and eradication is possible.

Table 4.1.3. Invasive plant species within or near the 8 Mile Corner management area (Data from the Michigan Invasive Plant Identification Network database).

8 Mile Corner - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	1	1	1
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer		Occurrences
-	-	Leafy Spurge <i>Euphorbia esula</i>		1

### 4.1.5 Fire Management

Much of the area is comprised of mesic and lowland soils, which were rarely influenced by fire disturbance. Drier Kalkaska soils, on the west side, are more likely to support pines. This portion of the management area was probably subject to periodic fire that occurred, generally every 80-150 years. The following fire management concepts should be applied in the management area:

- Use of prescribed fire on the drier soils may be considered to maintain pine communities and encourage natural regeneration;
- When conditions allow swamp stands to dry out enough to burn, using fire as a management tool may be considered to accomplish objectives; and
- There is a Community Wildfire Protection Plan being developed for Luce County that will provide guidance for fire prevention and wildland/urban interface activities.

### 4.1.6 Public Access and Recreation

County Road 407, a paved road that runs through this management area, provides recreational access and access to timber markets.

Recreational special conservation areas within the management area include snowmobile trails and the Silver Creek Off-Road Vehicle trail (Figure 4.1.1).

Opportunities for wildlife recreation include hunting for ruffed grouse, deer and bear.

#### **4.1.7 Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. A portion of the Tahquamenon River system is designated as high priority trout stream in this management area and details are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.1.1.

#### **4.1.8 Minerals**

Surface sediments consist of an end moraine of coarse-textured till, glacial outwash sand and gravel and postglacial alluvium, peat and muck and coarse-textured till. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are not located in this management area, but there is good potential for additional sites.

The Ordovician Utica and Collingwood Shales and Trenton and Black River Formations subcrop below the glacial drift. The Trenton and Black River are quarried for stone and dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula (two in Luce County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.2 MA 2 – Battydoe Deer Yard Management Area

### Summary of Use and Management

Management in the Battydoe Deer Yard management area (MA) (Figure 4.2.1) will emphasize critical wintering deer habitat, timber production and forest-based recreation. Deer travel long distances to this area to winter in the dense cedar near Lake Michigan. Timber harvesting activities are generally conducted in the winter to benefit the deer. Expected issues in this 10-year planning period include: difficulty of regenerating cedar and other tree species, introduced pests and diseases and illegal off-road vehicle (ORV) use.

### Introduction

The Battydoe Deer Yard management area is located in the central part of the eastern Upper Peninsula (EUP) in Mackinac County. It has 16,689 acres of state-owned land. The primary attribute for this management area is the critical habitat for wintering deer. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the EUP ecoregion (Albert 1995).
- The dominant landform consists of extensive conifer-dominated wetlands on sandy lake plain. Upland sites feature northern hardwoods and aspen. Dune and swale landforms are found along the southern edge of the management area.
- Recreational opportunities including hunting, trapping and fishing.
- A large, active limestone quarry is adjacent to the west and north of the management area.

The state forest land in this management area is concentrated, with a few private in-holdings. The Battydoe Deer Yard management area falls within the Sault Ste. Marie Forest Management Unit (FMU). The predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.2.1.

Table 4.2.1 Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Battydoe Deer Yard management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Cedar	34%	5,665	86	5,579	50	0	5,665	349	0
Northern Hardwood	20%	3,368	254	3,114	0	1,327	3,368	0	1,327
Aspen	12%	2,012	48	1,964	100	0	2,012	327	0
Lowland Conifers	5%	831	35	796	108	0	831	88	0
Mixed Upland Deciduous	5%	803	12	791	115	195	803	113	195
Lowland Deciduous	5%	763	108	655	0	0	763	73	0
Lowland Open/Semi-Open Lands	4%	720	0	720	0	0	720	0	0
Lowland Aspen/Balsam Poplar	3%	455	92	363	0	0	455	61	0
Paper Birch	2%	328	50	278	0	0	328	46	0
Upland Spruce/Fir	2%	319	66	253	36	0	319	36	0
Upland Open/Semi-Open Lands	2%	277		277			277		
Misc Other (Water, Local, Urban)	2%	291	0	291	0	0	291	0	0
Others	5%	857	164	693	189	113	857	76	125
<b>Total</b>	<b>100%</b>	<b>16,689</b>	<b>913</b>	<b>15,775</b>	<b>598</b>	<b>1,635</b>	<b>16,689</b>	<b>1,169</b>	<b>1,647</b>

Other Types include: lowland spruce/fir, upland mixed forest, lowland mixed forest, upland conifers, white pine and tamarack.

## Battydoe Deer Yard

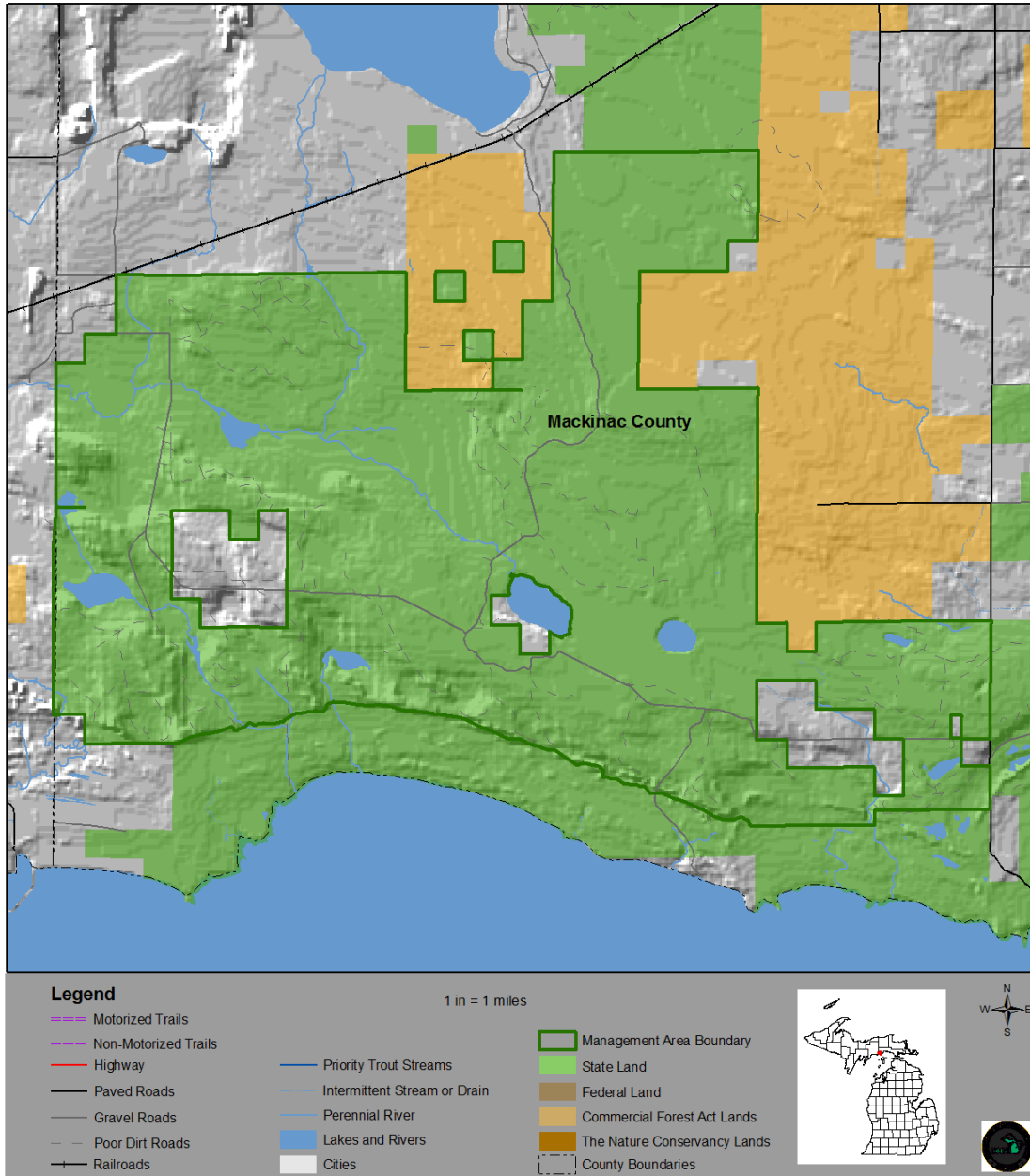


Figure 4.2.1 Location of the Battydoe Deer Yard management area (dark green boundary) in relation to the surrounding state forest lands and other ownerships.

### 4.2.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (e.g., timber harvest, prescribed fire, planting, mowing) will be conducted. In other portions of the state

forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.

The following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

#### **Section 4.2.1.1 Forest Cover Type Management - Cedar**

##### Current Condition

Cedar occurs on approximately 5,762 acres (34%) of the management area (Table 4.2.1). All of the cedar stands in this management area are within a critical deer wintering habitat special conservation area (SCA); therefore, the primary management for cedar in this MA will be to maintain closed canopy conditions. Maintaining a closed canopy structure provides important cover for deer, reducing snow depths within the stands. The majority of cedar stands are over 100 years of age (Figure 4.2.2). Cedar harvesting in this area has been limited by the combined effect of high deer numbers and low snowfall on cedar regeneration. Cedar strip cut harvesting was done on an experimental basis and resulted in cedar regeneration. There is a need to address future cedar cover within the deer wintering complexes. Reliable and timely regeneration of cedar is a concern from both wildlife and forest management perspectives, making it important to ensure that cedar and/or hemlock recruitment/regeneration is reliable, if harvesting in this cover type.

Currently, there are no cedar stands prescribed for harvest. While a regulated harvest would allow approximately 349 acres to be harvested per decade (red line in Figure 4.2.2), this is currently not a focus of cedar management in this management area due to the deer wintering area.

There are 86 acres of cedar that have site conditions limiting their harvest this decade. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.

##### Desired Future Condition

- Cedar trees are very long lived and generally provide excellent closed canopy habitat for wildlife. In areas where deer browse is a concern, these stands may not be actively harvested at this time.

##### 10-Year Management Objectives

- The 10-year projected harvest of cedar is approximately 50 acres. This is lower than the regulated amount of 349 acres per decade due to the use of cedar stands by wintering deer; and
- Harvest of this type, if it occurs, may vary widely from the projected harvest, in order to meet the long-term wildlife management objectives.

##### Long-Term Management Objectives

- Cedar stands will be managed to maintain habitat for deer in the wintering areas and to retain this forest type in the landscape; and
- Look for opportunities to test different methods of regenerating cedar.

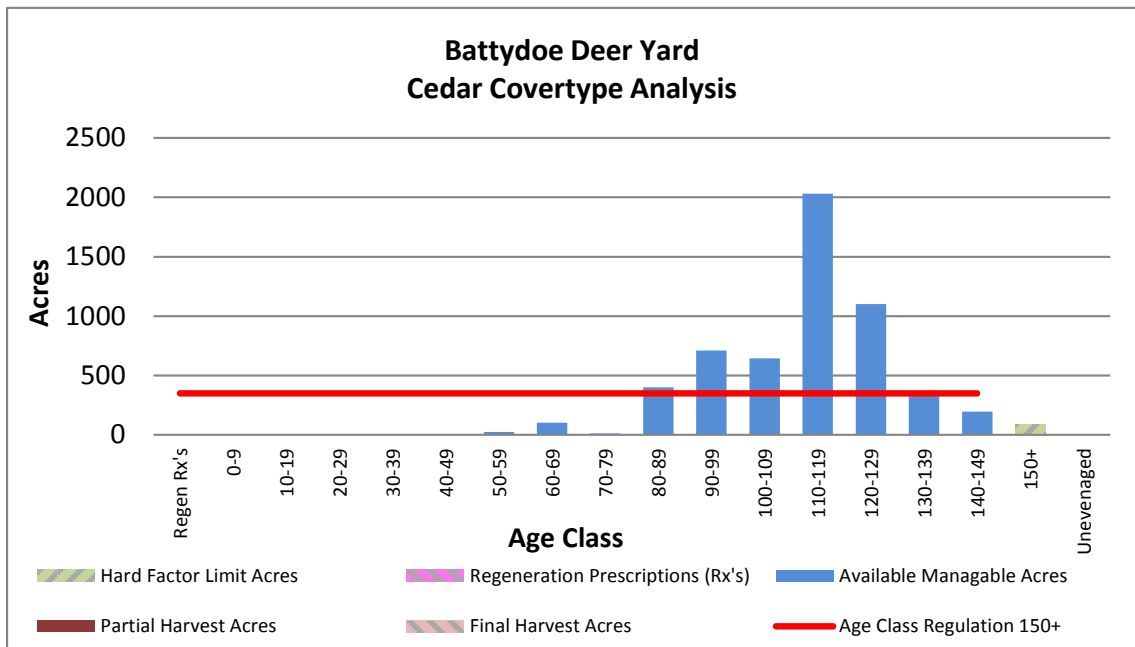


Figure 4.2.2 – Age class distribution of cedar in the Battydoe Deer Yard management area (2012 Department of Natural Resources inventory data).

### Section 4.2.1.2 Forest Cover Type Management – Northern Hardwoods

#### Current Condition

Northern hardwood cover types occur on 3,368 acres (20%) of the management area (Table 4.2.1). Northern hardwoods are distributed throughout the management area on mesic medium to rich nutrient loam soils (Kotar habitat classes: AFPo, AFOAs and ATFD (see Appendix E). Approximately 20% of the hardwood stands have been classified as uneven-aged, with trees of varying ages and sizes. While the majority of stands will be managed through individual tree selection to work toward an uneven-aged state, poor quality stands have been managed using even-aged harvesting systems, and just over 10% of the stands are currently coded as immature (Figure 4.2.3). Regeneration of hardwood stands in this MA has been impacted by high deer numbers and a large percentage of the regeneration is beech, as it is not a preferred food source of deer.

Beech bark disease (BBD) has impacted the management area, resulting in high beech mortality. This management area is past the killing front of BBD, and salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to BBD mortality and salvage harvesting. Further selection harvesting will be delayed, due to resultant lower than normal residual basal area (BA).

Currently, 662 acres have a partial harvest method of cut assigned. In addition, there are 27 acres of poor-quality hardwoods that have a final harvest prescribed. There are 254 acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations.



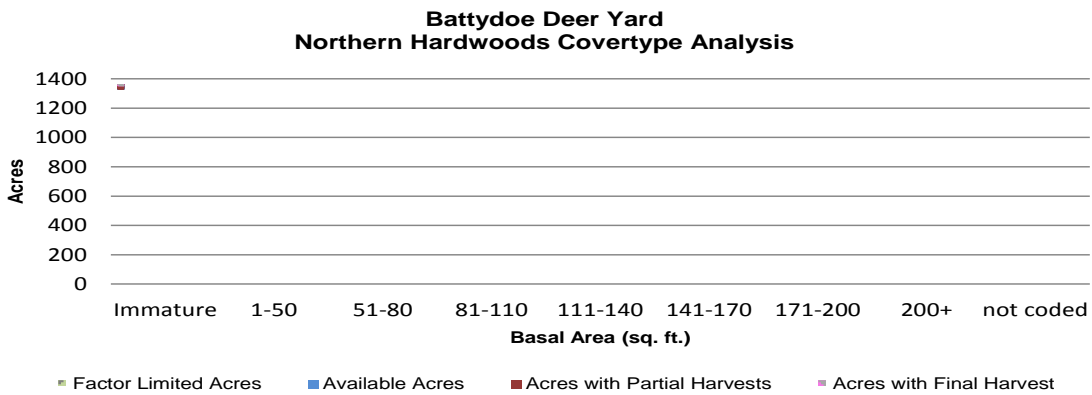


Figure 4.2.3 – Basal area distribution of northern hardwoods in the Battydoe Deer Yard management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwoods will be maintained on operable sites, generally by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands; and
- This will provide for a continuous supply of timber, available wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year harvest is for 1,327 acres of partial or selection harvest;
- Evaluate stands previously dominated by beech to determine the impact of BBD on regeneration;
- Track beech regeneration in these stands; and
- Favor regeneration of hardwood other than beech, consider herbicide applications of beech regeneration and planting of hard mast producing trees, including disease resistant beech and oak.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.2.1.3 Forest Cover Type Management – Aspen**

Current Condition

Aspen occurs on 2,012 acres (12%) of the management area (Table 4.2.1). Aspen is distributed throughout the management area on mesic poor- to medium- to rich-nutrient sandy loam soils with ATFD, AFPo and AFOAs Kotar habitat classes. Accessible aspen has been consistently harvested over the last 30 years, resulting in approximately 80% of the aspen stands being in the 0-29 year age classes (Figure 4.2.4).

Currently, there are 28 acres prescribed for final harvest. There are 24 acres prescribed for harvest in other cover types that are expected to convert to aspen after harvest. These acres are shown in Figure 4.2.3 in the regeneration prescriptions column and were removed from the manageable acres in the other types. There are 48 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible aspen will eventually succeed to late successional species.

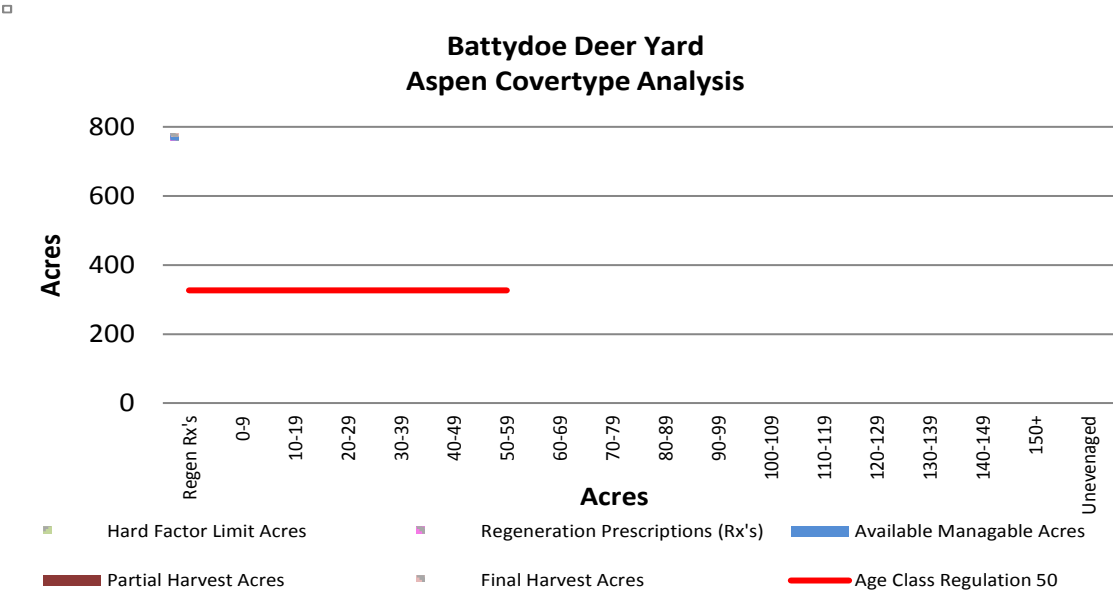


Figure 4.2.4 – Age-class distribution of aspen in the Battydoe Deer Yard management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Aspen stands will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age. This will provide for regulated harvest, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- Due to the current age-class structure, the projected 10-year final harvest of aspen is 100 acres. This is less than the regulated amount due to the current age-class structure. To achieve this projected harvest level, some stands will be harvested before reaching rotation age.

Long-Term Management Objectives

- Balance the age-class structure of aspen by harvesting and regenerating the regulated amount of approximately 327 acres per decade (red line in Figure 4.2.4).

**Section 4.2.1.4 Forest Cover Type Management – Lowland Conifers**

Current Condition

Lowland conifers occur on approximately 831 acres (5%) of the management area (Table 4.2.1). Lowland conifer stands have been successfully harvested and regenerated in this area, resulting in many age classes (Figure 4.2.5). Many of the lowland conifer stands in this MA will be managed for deer wintering habitat. While deer may affect the regeneration of cedar, natural regeneration consisting of other species currently on site is expected after harvesting. Some of the stands in older age classes may be inaccessible for harvest at this time due to access.

Currently, there are 23 acres with a final harvest prescription, and 46 acres with a partial harvest prescription. There are 35 acres of lowland conifer that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland conifer stands in inaccessible areas will be subject to natural processes, resulting in a range of successional stages.

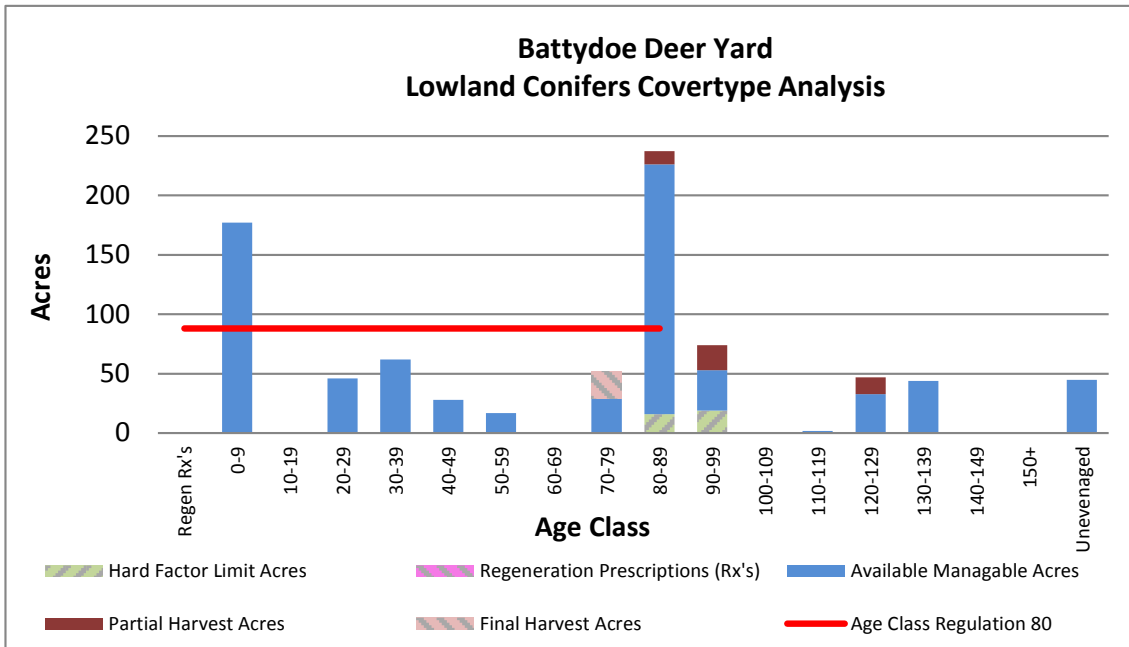


Figure 4.2.5 – Age-class distribution of lowland conifers in the Battydoe Deer Yard management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management, with acres balanced between 0-89 years of age. This will provide for a continuous supply of timber, available wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest for lowland conifers is 108 acres. The 10-year projected harvest is slightly higher than the regulated harvest amount, due to the current age class structure where there are a lot of acres in the 80-89 year age class.

Long-Term Management Objectives

- Balance the age-class structure of available lowland conifer stands providing a regulated harvest of approximately 88 acres to be harvested per decade; and
- Minimize the impact of high deer numbers on the species composition of regeneration.

**Section 4.2.5 Forest Cover Type Management – Mixed Upland Deciduous**

Current Condition

Mixed upland deciduous stands occur on 803 acres (5%) of the management area (Table 4.2.1). As the name suggests, these stands occur on upland sites and contain a variety of tree species. The species composition varies from stand to stand, but normally includes hardwood species such as aspen, birch, maple, beech and cherry. Conifer species may also be present, but normally compose less than 20% of the crown closure. Depending upon their species mix, mixed upland deciduous stands with high basal area may be thinned before reaching rotation age where final harvest normally occurs. Natural regeneration has been successful in mixed upland deciduous stands in this management area.

Currently, there are 66 acres prescribed for final harvest (Figure 4.2.6). There are 12 acres of mixed upland deciduous that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Mixed upland deciduous stands in inaccessible areas will be subject to natural processes, resulting in a range of successional stages.

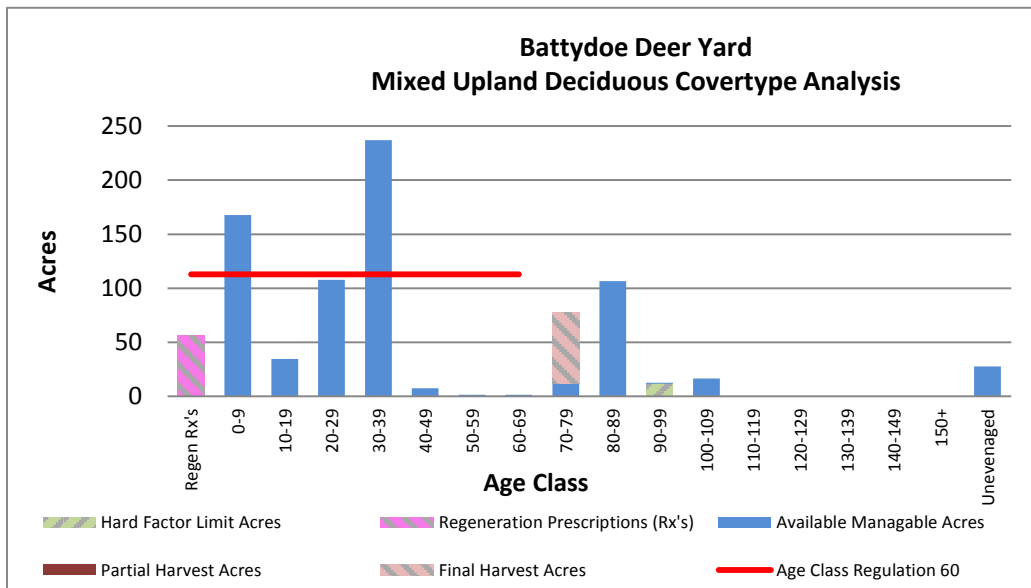


Figure 4.2.6 – Age-class distribution of mixed upland deciduous in the Battydoe Deer Yard management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Mixed upland deciduous stands will be maintained on operable sites through even-aged management, with acres balanced between 0-69 years of age. This will provide for a continuous supply of timber, available wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The projected 10-year final harvest for mixed upland deciduous stands is 115 acres; and
- The projected 10-year partial harvest, or thinning, of stands with high BA is 195 acres.

Long-Term Management Objectives

- Balance the age-class structure of available mixed upland deciduous stands producing a regulated harvest of approximately 113 acres to be final harvested per decade; and
- Prior to final harvest at rotation age and dependent upon species composition, periodically thin stands with high BA.

**Section 4.2.6 Forest Cover Type Management – Lowland Deciduous**

Current Condition

Lowland deciduous cover types occur on 763 acres (5%) of the management area (Table 4.2.1). Lowland deciduous stands have been successfully harvested and regenerated in this area, resulting in many age classes (Figure 4.2.7). These stands are generally managed using even-aged systems, followed by natural regeneration.

Currently there are 67 acres with a partial harvest method of cut prescribed. In addition, there are approximately 33 acres in other cover types that are currently prescribed for harvest, that are expected to convert to lowland deciduous after harvest. These acres are shown in Figure 4.2.7 in the regeneration prescriptions column. There are 108 acres of lowland deciduous that have site conditions limiting their harvest this entry period. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Lowland deciduous stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

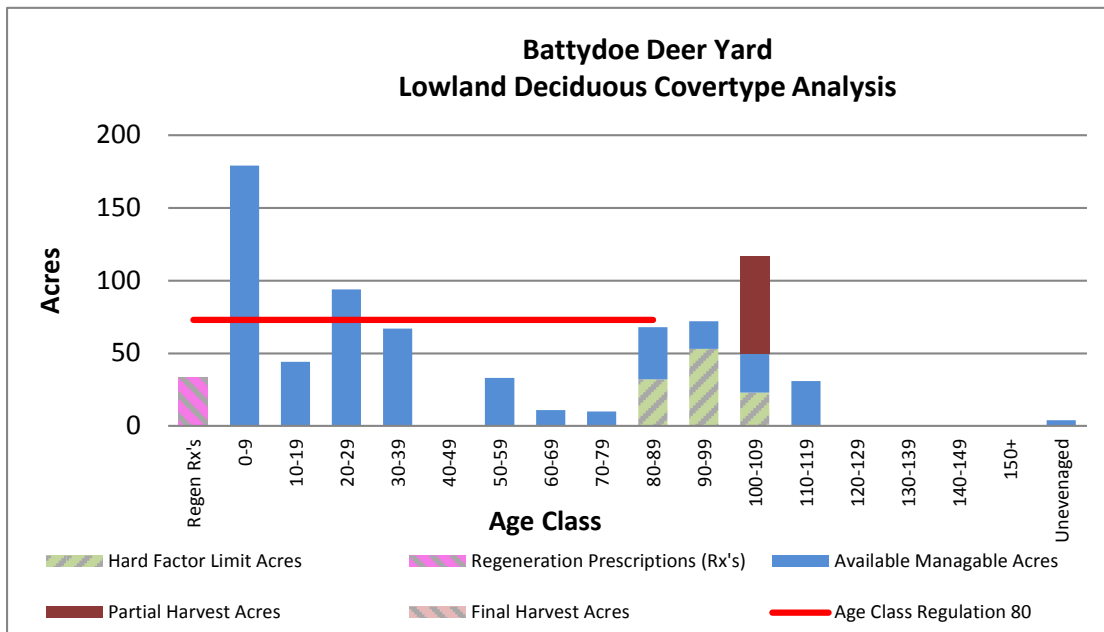


Figure 4.2.7 – Age-class distribution of lowland deciduous in the Battydoe Deer Yard management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland deciduous stands will be maintained on operable sites through even-aged management, with acres balanced between 0-89 years of age, to provide for continual harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year projected harvest is zero acres due to the large number of acres in the 0-9 year age class.

#### Long-Term Management Objectives

- Balance the age-class structure of accessible stands providing a regulated harvest of approximately 73 acres to be harvested per decade.

### **Section 4.2.1.7 Forest Cover Type Management – Other Types**

#### Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acres (Table 4.2.1). Lowland open/semi-open lands (720 acres or 4%) is made up of lowland shrub (566 acres), bog (59 acres), marsh (55 acres) and treed bog (40 acres). Paper birch (328 acres) and upland spruce/fir (318 acres) each contain about 2% of the total acres. Upland open/semi-open lands (277 acres or 2%) is made up of herbaceous openland (124 acres), low-density trees (113 acres), upland shrub (24 acres) and bare/sparsely vegetated (1 acre).

The “others” category with 857 acres (5%) includes cover types with less than 2% of the total acres: lowland spruce/fir, upland mixed forest, lowland mixed forest, upland conifers, white pine and tamarack. In addition, there are 291 acres (2%) of “miscellaneous other” stands, which include water, sand/soil and roads.

In general, most of these cover types are managed as even-aged stands, using natural regeneration after harvest. Some of the mixed cover types with high basal area may be thinned, depending upon their species composition, prior to final

harvest. Approximately 371 acres of these other minor cover types have site conditions limiting harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Early successional cover types found in inaccessible areas will move toward mid and late successional cover types.

#### Desired Future Condition

- These cover types will be maintained on suitable sites and will contribute to the compositional diversity of the landscape while providing forest products and wildlife habitat.

#### 10-Year Management Objectives

- The projected 10-year final harvest includes: 36 acres of upland spruce/fir and 189 acres of other types; and
- The projected 10-year partial harvest is 113 acres of other types.

#### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

### **4.2.2 Featured Species Management**

This is a key area for wintering deer in the Lake Michigan watershed. The primary wildlife value of this management area is provided by cedar and lowland conifer stands. The vast majority of these cover types are in mature age classes and are used by approximately 80 species of wildlife. The spatial arrangement of other forest cover types, northern hardwoods in particular, make this management area biologically diverse.

#### **Red-shouldered Hawk**

The goal for red-shouldered hawk is to maintain or improve suitable habitat in the ecoregion. Management activities should focus on the maintenance of large blocks of mesic northern forest with the appropriate level of large diameter trees in priority landscapes.

#### Wildlife habitat specifications:

- All known woodland raptor nests should be reported to local wildlife staff and included in the Integrated Forest Monitoring Assessment and Prescription (IFMAP) Geographic Decision Support Environment (GDSE). Confirmed red-shouldered hawk nests are to be documented in accordance with the "DNR's Approach to the Protection of Rare Species on State Forest Lands" (IC4172) and included in the IFMAP GDSE.
- For red-shouldered hawks, the wildlife habitat specifications contained within Michigan DNR's *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August 2012) will be followed until the workgroup has completed the guidance that will permanently replace the interim guidelines.

#### **Ruffed Grouse**

The goal for ruffed grouse in the EUP is to maintain or improve habitat. Management should focus on maintaining and balancing the age-class distribution for aspen in priority landscapes within this management area.

#### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Move to balance the age-class distribution of aspen and birch cover type to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation.
- Larger harvest units should have irregular boundaries and include one or two 1-3 acre unharvested inclusions for every 40 acres exceeding 40 acres in size.
- Evaluate the conifer component in aspen stands, holding or increasing where desirable. Leave conifer under four inch DBH in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

## Snowshoe Hare

The goal for snowshoe hare in the EUP is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining coarse woody debris, increasing mesic conifer components, and increasing beaver abundance.

### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under 4 inch DBH.
- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris slash already present, and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance, retaining the maximum residues.

## White-tailed Deer

The EUP goals for white-tailed deer are to: 1) Maintain existing deer wintering complexes, and 2) Expand the extent of areas suitable as winter deer habitat, especially in the medium and high snowfall zones. Management should focus on maintaining habitat quality in priority wintering complexes. DNR procedure 32.22-07 states, "Coniferous swamps are important as winter deeryards and shall be managed primarily for deer. The objective shall be to maintain them for this purpose and through commercial cuttings and silvicultural practices, improve these areas to provide winter cover and food for deer." There is a complex relationship between deer abundance, available summer and winter habitat, timber management, and regeneration of tree species, particularly white cedar and hemlock. It is recognized that meeting both timber management and deer goals presents challenges for the DNR and our stakeholders. Information on deer wintering complexes is currently being updated and new management guidelines are being developed. When completed, these will provide additional direction for managing these critical areas for white-tailed deer.

### Wildlife habitat specifications for deer wintering complexes:

- Strive to maintain > 50% of the land area within deer wintering complexes in mixed or pure stands of cedar, hemlock, white and black spruce, white and natural red pine, balsam fir, mixed swamp conifer and mixed upland conifer-hardwood.
- In northern white cedar and hemlock cover types that are commonly occupied by deer during severe winters, especially in medium and high snowfall zones, maintain canopy closure of >65%.
- In deer wintering complexes in low snowfall areas, and within ¼ mile of severe winter cover in the higher snowfall zones, write prescriptions that strive to maintain canopy closure of 40-65%, favoring cedar, hemlock, white spruce, black spruce, balsam fir and white pine.
- Provide winter forage in deer wintering complexes through stands of regenerating hardwood or brush, including preferred species of red maple, sugar maple, aspen, yellow birch, ashes, oaks, dogwood, crabapple, elderberry, high-bush cranberry, sumac and hazel.
- Enhance accessibility to winter browse within deer wintering complexes by maintaining mature mesic conifer components within upland hardwood stands or by maintaining or enhancing sheltered travel corridors between areas of conifer cover and browse.
- Provide spring breakout areas by maintaining open hardwood stands on southern exposures and herbaceous openings adjacent to deer wintering complexes.
- When possible, timber harvests within deer wintering complexes should be carried out only during winter months and tops should be left. Chipping of non-bole wood and whole-tree harvesting in the deer wintering complexes should be avoided, but will be discussed on a case-by-case basis through the compartment review process.
- Harvests of cedar and hemlock may only be conducted when:
  - There is reasonable confidence of successful recruitment/regeneration of the cover types; or
  - There is a forest health issue (e.g. hemlock woolly adelgid); or
  - Part of an approved research project; or
  - Removal of selected trees will facilitate a reduction of harvest trails, landings, etc. to minimize soil sedimentation and possible soil compaction issues.

- Provide fall foods in the form of hard and soft mast, and provide dense escape cover or bedding areas in the form of early successional forests, brush, and warm-season grasses that will encourage fall deer use in areas open to public hunting. Where habitat types are appropriate, increase diversity of hard mast by planting oak.

#### 4.2.3 Rare Species and Special Resource Area Management

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “Rare Species Protection Approach and Assessment Guidelines for DNR Staff on State Forest Lands (IC 4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region. Past surveys have noted and confirmed three listed species and one natural community as shown in Table 4.2.2. Any established management guidelines will be followed.

Table 4.2.2 Occurrence information for special concern, rare, threatened and endangered communities and species for the Battydoe Deer Yard management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Wooded dune and swale complex		S3/G3	Confirmed				Upland open/semi-open	N/A
<b>Birds</b>								
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Bald eagle	<i>Haliaeetus leucocephalus</i>	SC/G5/S4	Confirmed	IL	Moderate	Bog	Lowland open/semi-open	N/A
						Hardwood-conifer swamp	Lowland Mixed	Mid
						Northern hardwood swamp	Black Ash	Late
						Poor conifer swamp	Tamarack	Late
						Floodplain forest	Lowland mixed	Mid
						Dry northern forest	Jack Pine, Red Pine	Early
						Dry-mesic northern forest	White Pine	Late
						Mesic northern Forest	Northern Hardwood	Late
Osprey	<i>Pandion haliaetus</i>	SC/G5/S2-3	Confirmed	PS	Low	Coastal fen	Lowland open/semi-open	N/A
						Northern hardwood swamp	Black Ash	Late
						Floodplain forest	Lowland Mixed	Mid
						Hardwood-conifer swamp	Lowland Mixed	Mid

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

This entire management area provides winter habitat for white-tailed deer and is designated as an obligate winter deer range special conservation area (SCA). Other SCAs within the management area are possible type 1 or type 2 old growth areas, and the Milakokia River cold water stream.

There are currently no identified high conservation value areas in this management area.

There are two wooded dune and swale complex ecological reference areas (ERAs) of 145 and 11 acres within the management area. The majority of the wooded dune and swale complex ERAs are in the Lake Michigan Shoreline management area to the south. ERAs will be managed to enhance and protect their natural vegetative and associated wildlife communities by an ERA-specific management plan. Figure 4.2.8 shows the SCAs and ERAs for this management area.

Management goals during this planning period are:

1. Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
2. Evaluate all potential Type 1 and potential Type 2 old growth areas to determine their status as a special resource area.
3. Develop and maintain management and monitoring plans for ecological reference areas on state forest land.



## Battydoe Deer Yard

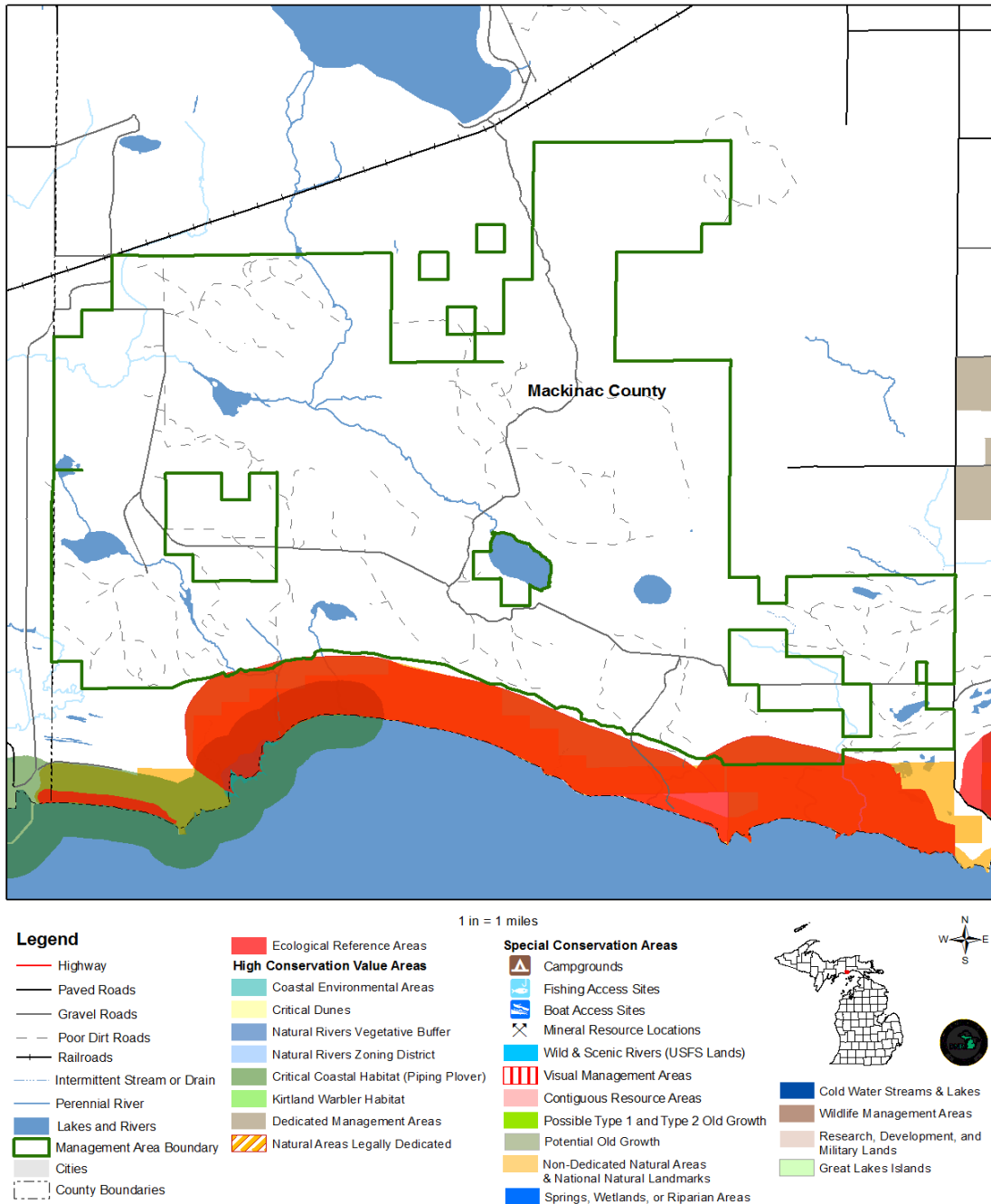


Figure 4.2.8. A map of the Battydoe Deer Yard management area showing the special resource areas.

### 4.2.4 Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Northern hardwoods: beech bark disease
- Aspen and lowland aspen/balsam poplar: white trunk rot and *Hypoxylon* canker
- Upland and lowland conifers: spruce budworm, eastern larch beetle and larch casebearer
- Lowland deciduous: emerald ash borer (EAB)

Further information on forest health can be found in Section 3.

### Invasive Plant Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. No invasive plant species have yet been documented within the management area, but garlic mustard has been documented within a five mile buffer of the management area (Table 4.2.3), and monitoring efforts should specifically look for new populations of this species. Evaluate eradication treatments of any new populations of invasive plant species found in the management area. Invasive species that merit eradication efforts are those species that threaten sensitive sites due to their location or growth characteristics and have population levels that may be successfully controlled.

While it is not yet listed in the Michigan Invasive Plant database, there have been sightings of wild parsnip (*Pastinaca sativa*) in the management area.

Table 4.2.3 Invasive plant species within or near the Battydoe Deer Yard management area. (Data from the Michigan Invasive Plant Identification Network database).

Battydoe Deer Yard - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	4	4	1
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer		Occurrences
-	-	Garlic Mustard <i>Alliaria petiolata</i>		4

### 4.2.5 Fire Management

Much of the land area, being wetland, is of uncertain fire frequency. Sites dominated by northern white cedar and hardwood islands probably will not be significantly impacted by wildland fire. Black spruce, treed bogs and marshes may be more receptive to fire ignition and spread with lower water levels. The following fire management concepts should be applied in the MA:

- Fire may be used as a management tool in these lowland conifer stands under appropriate conditions.

### 4.2.6 Public Access and Recreation

Access to portions of the management area is limited by lack of roads, and streams and small lakes.

There are no established recreational facilities in this management area.

Snowshoe hare, deer, bear, and bobcat hunting, and trapping are important forms of recreation in this management area.

### 4.2.7 Aquatic Resource Management

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process, and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. There are no designated high priority trout streams identified in this management area.

#### 4.2.8 Minerals

Surface sediments consist of an coarse-textured till, peat and muck and lacustrine (lake) sand and gravel. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the area, but there is potential.

The Silurian Engadine and Manistique Groups subcrop below the glacial drift. The Engadine is quarried for stone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula. (two in western Mackinac County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

FINAL DRAFT

## 4.3 MA 3 – Bullock Ranch Management Area

### Summary of Use and Management

The Bullock Ranch opening is one of several large openings within the eastern Upper Peninsula (EUP) that are managed for a suite of open-land species including sharp-tailed grouse, merlin and upland sandpiper. Vegetative management in the Bullock Ranch management area (MA) (Figure 4.3.1) will emphasize maintaining the large opening complex; producing sustainable yields of various timber products; protecting unique areas and threatened, endangered and special concern species; and providing for forest-based recreational uses. Timber management objectives include improving the age-class balance of jack pine and red pine. Wildlife habitat management objectives include enhancing the large opening complexes, and hunting and other wildlife related recreation opportunities. Management activities may be constrained by poor access throughout much of the area. Expected issues in this 10-year planning period include the introduction and spread of spotted knapweed and other invasive plants and the difficulty in regenerating natural red pine ridges within the marshes.

### Introduction

The Bullock Ranch management area is located in the eastern Upper Peninsula in Schoolcraft County, along the “Seney Stretch” of M-28. The area is bounded by the Seney National Wildlife Refuge on the south, the Driggs River on the west and the Fox River on the east. The town of Seney is in the southeast part of the management area. There are 29,710 acres of state-owned land. The primary attribute for this management area is the large Bullock Ranch open land complex. Additional attributes which are important in identifying this management area include:

- The majority of the management area falls within the Luce Subsection 8.2 of the eastern Upper Peninsula ecoregion (Albert, 1995).
- The dominant landform consists of ancient lake plain, with wet organic soils.
- Current forest communities are dominated by jack pine, red pine and open land.
- Special features include: cold water stream special conservation areas, a natural river high conservation value area and an ecological reference area.
- Recreational facilities include hiking trails, snowmobile trails and campgrounds.

This is a highly altered landscape. Historically, marshes, peatlands and low productivity swamps were the predominant vegetation on the very poorly drained topography. Much of this area was drained by ditching during the early 1900's in a failed effort to convert the area to farmland. The altered hydrology resulted in organic soils that are hydrophobic or unable to hold water, which makes prescribed burning difficult to control.

The state land in this management area is concentrated with a few private parcels. The Bullock Ranch management area is within the Shingleton Forest Management Unit. The predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.3.1.

# Bullock Ranch

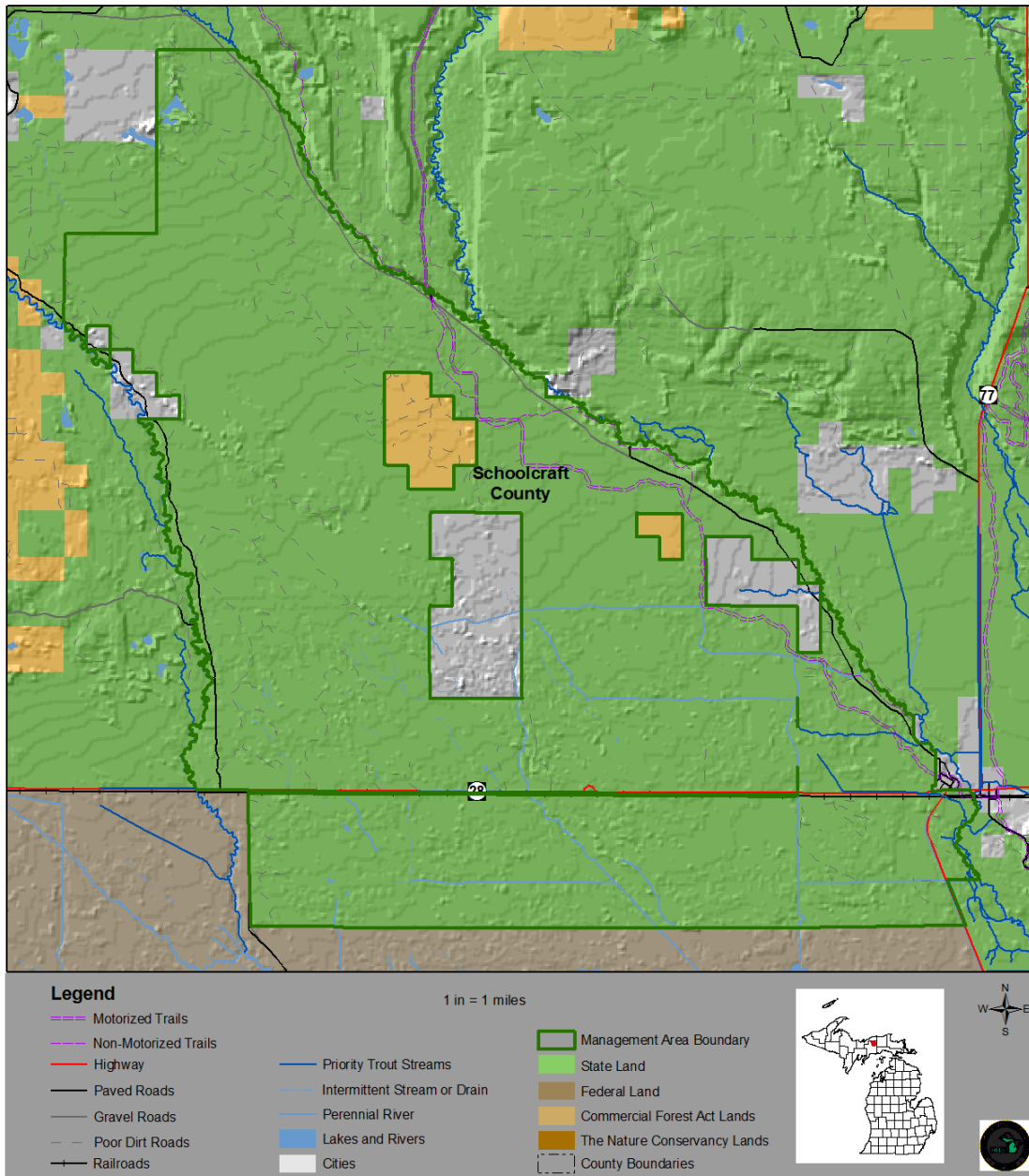


Figure 4.3.1. Location of the Bullock Ranch management area (dark green boundary) in relation to surrounding state forest lands and private ownerships.

Table 4.3.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Bullock Ranch management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Lowland Open/Semi-Open Lands	31%	9,320	0	9,320	0	0	9,320	0	0
Jack Pine	27%	8,071	162	7,909	177	0	8,071	1,130	0
Red Pine	18%	5,206	474	4,732	442	1,101	5,206	526	1,871
Upland Open/Semi-Open Lands	7%	2,211	0	2,211	0	0	2,211	0	0
Lowland Spruce/Fir	4%	1,185	112	1,073	0	0	1,185	119	0
Aspen	3%	999	0	999	104	0	999	167	0
White Pine	2%	509	130	379	102	40	509	34	111
Natural Mixed Pines	2%	461	7	454	0	25	461	41	52
Misc Other (Water, Local, Urban)	1%	190	0	190	0	0	190	0	0
Others	5%	1,558	166	1,392	210	39	1,558	170	89
<b>Total</b>	<b>100%</b>	<b>29,710</b>	<b>1,050</b>	<b>28,660</b>	<b>1,035</b>	<b>1,205</b>	<b>29,710</b>	<b>2,187</b>	<b>2,123</b>

Others include: lowland aspen/balsam poplar, tamarack, lowland conifers, lowland deciduous, northern hardwood, upland conifers, oak, upland spruce/fir, planted mixed pines and lowland mixed forest.

### 4.3.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (e.g., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species. Management areas consist of compartments and stands that are defined by their predominant vegetative cover type.

The following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting and regenerating these cover types will provide for a continuous flow of forest products and values.

#### Section 4.3.1.1 Forest Cover Type Management – Lowland Open/Semi-Open Lands

##### Current Condition

The management area contains a large amount of lowland open/semi-open lands totaling approximately 9,320 acres (31%) (Table 4.3.1) This category is a combination of lowland shrub (5,028 acres), marsh (4,268 acres), treed bog (17 acres) and bog (three acres). These cover types function ecologically as sources of habitat for numerous species of wildlife, including sharp-tailed grouse which is a featured species. The lowland shrub and marsh stands contain many ridges and islands of pine. A large portion of these cover types in the center of the management area are roadless.

##### Desired Future Condition

- Lowland open/semi-open lands will be retained in their large, roadless state to ensure an adequate level of wildlife habitat and recreational opportunity.

##### Long-Term Management Objectives

- Within marshes, treed bogs and bogs, allow natural processes to occur while protecting the ecological values from man-made disturbances; and
- Lowland shrub stands will generally remain unmanaged, with the possible exceptions of management for wildlife habitat and/or for biomass, if markets materialize.

#### Section 4.3.1.2 Forest Cover Type Management – Jack Pine

##### Current Condition

Jack pine occurs on 8,071 acres (27%) of this management area (Table 4.3.1). Jack pine is distributed throughout the management area on lake plains, outwash plains and depressions on outwash plains. The upland sites have Kotar habitat types of PVE and PArV (See Appendix E). The greater proportion of the jack pine stands in this management area are on Eastern Upper Peninsula Regional State Forest Management Plan MA 3 Bullock Ranch

low, wet ground. The majority of the jack pine stands are of natural origin. Many of the stands in the older age classes are found on islands within the large wetland matrix. Jack pine stands have been consistently harvested and regenerated in this area. Most of the young jack pine stands were regenerated through prescribed burning or scarification after harvesting, followed by planting where necessary.

Currently, there are 764 acres prescribed with a final harvest method of cut (Figure 4.3.2). There are acres in other cover types that are expected to be converted to jack pine following harvest, and some stands of jack pine may be converted to other cover types after final harvest. These acres are shown in Figure 4.3.2 in the regeneration prescriptions column. This is being done to take advantage of site conditions. The total acres of jack pine are expected to remain similar to what they are now. There are 162 acres of jack pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Inaccessible islands of jack pine will eventually convert to other climax species.

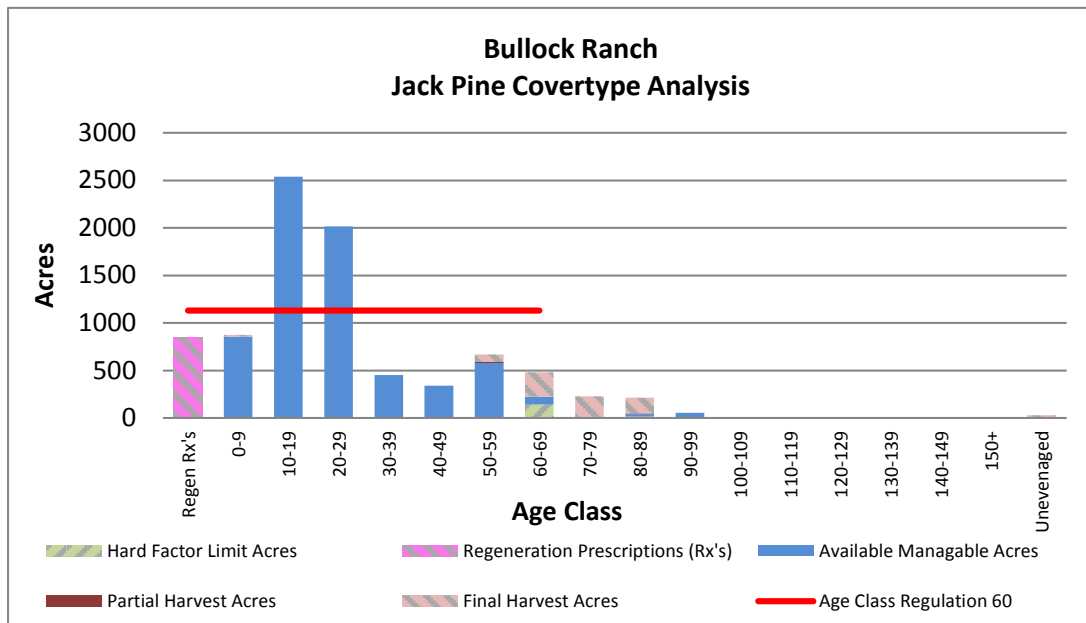


Figure 4.3.2. Age-class distribution of jack pine in the Bullock Ranch management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Jack pine stands will be maintained on operable sites through even-aged management with acres balanced between 0-69 years of age to provide for regulated harvest, wildlife management and recreational opportunities.

#### 10-Year Management Objectives

- The 10-year harvest projection is for 177 acres of jack pine final harvest. This is lower than the regulated amount due to the current age-class structure where the majority of stands are found in the 10-29 year age classes.

#### Long-Term Management Objectives

- Maintain a lower acreage of over-mature stands to lessen the prevalence and severity of jack pine budworm outbreaks; and
- Balance the age-class structure of jack pine providing a regulated harvest of approximately 1,130 acres to be harvested per decade (red line in Figure 4.3.2).

### **Section 4.3.1.3 Forest Cover Type Management – Red Pine**

#### Current Condition

Red pine occurs on 5,206 acres (18%) of the management area (Table 4.3.1). Red pine is distributed throughout the management area on outwash plains, lake plains and stream terraces, with Kotar habitat types of PVE, PArV and PArVAa (See Appendix E). While the majority of the red pine stands in this management area are of natural origin, there are a

number of planted stands along the Fox River Road north of Seney. Red pine has been successfully harvested and regenerated in this area. In general, the planted stands will continue to be thinned approximately every 10 years until economic maturity at age 80, then harvested and replanted.

Many of the natural red pine stands have had shelterwood or seed tree harvests, followed by natural regeneration, which has resulted in some two-aged and uneven-aged stands. Where natural regeneration is low due to competition, trenching and planting has been used. In areas with aspen competition on sandy soils, consider reintroducing fire in the red pine stands to encourage red pine regeneration. Most of the older acres of red pine are natural stands on islands within large roadless marshes, and may not be accessible. A portion of the inaccessible islands of red pine north of M-28 are within a dry northern forest ecological reference area.

Currently, there are 74 acres prescribed for final harvest, and 229 acres prescribed for partial harvest (Figure 4.3.3). There are stands prescribed for harvest in other cover types that are prescribed to be converted to red pine after harvest, and red pine acres that are prescribed to be converted to other cover types to take advantage of site conditions. These acres have been accounted for in the totals and are shown in Figure 4.3.3 in the regeneration prescriptions column. While this may slightly change the red pine acreage, the total acres of red pine in the management area is expected to remain similar to what it is now.

There are 474 acres of red pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Small inaccessible islands of red pine in the large marsh complexes may never have access for harvesting and will remain until natural senescence.

Desired Future Condition

- Red pine will be maintained and managed through thinning until stand replacement harvest at economic maturity with acres balanced between 0-89 years of age to provide for continual harvest, available wildlife habitat and recreational opportunity. Small islands of red pine dispersed in marsh areas may never have access for harvesting and will be allowed to reach biological maturity (over 200 years).

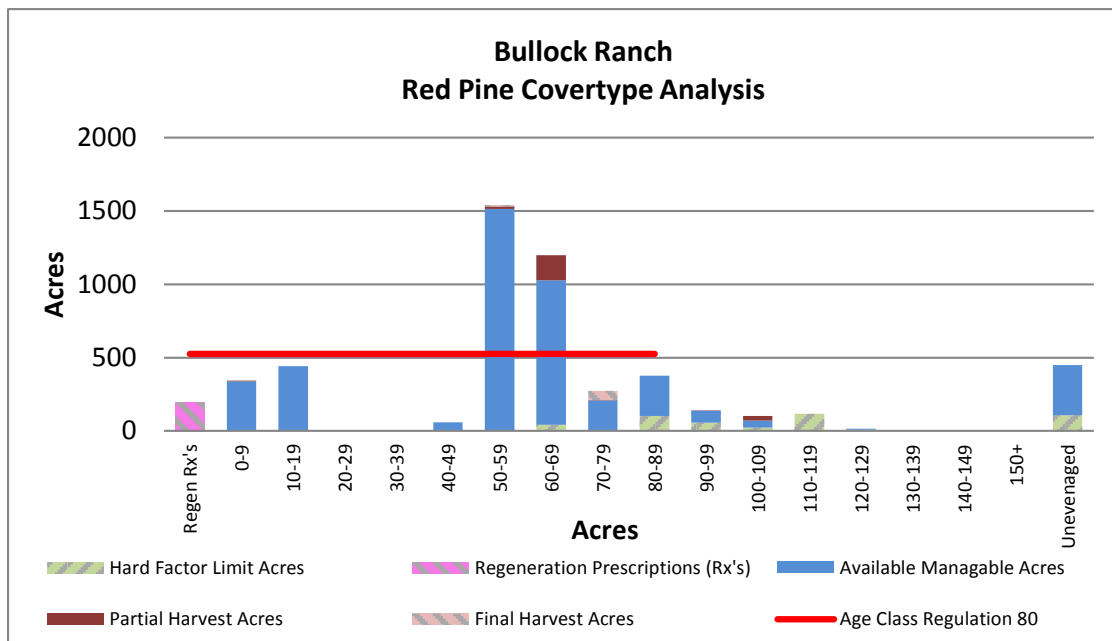


Figure 4.3.3. Age-class distribution of red pine in the Bullock Ranch management area (2012 Department of Natural Resources inventory data).

10-Year Management Objectives

- The 10-year projected final harvest of red pine is for approximately 442 acres to work toward balancing the age classes of red pine. This is less than the regulated amount due to the current age class structure, where the majority of stands is in the 50-69 year classes and is available for thinning.
- The 10-year projected partial harvest, or thinning, of red pine is 1,101 acres.



## Long-Term Management Objectives

- Balance the age-class structure of available red pine providing a regulated harvest of approximately 526 acres for final harvest per decade;
- Stands will be periodically thinned until they meet silvicultural criteria; and
- Protect the ecological values in the dry northern forest ecological reference area.

### **Section 4.3.1.4 Forest Cover Type Management – Upland Open/Semi-Open Lands**

#### Current Condition

Upland open/semi-open lands occur on approximately 2,211 acres (7%) of the management area (Table 4.3.1). This category is a combination of the following non-forested land cover types: herbaceous open land (1,843 acres), bare/sparsely vegetated (197 acres), upland shrub (90 acres) and low-density trees (48 acres). These communities are valued ecologically as sources of open land habitat for numerous species of wildlife. The large grass openings contain sharp-tail grouse leks and wildlife management goals in these cover types will focus on open land species, such as sharp-tailed grouse. The large Bullock Ranch opening has been historically managed through planting, mowing, prescribed burning, herbicide spraying and the removal of competing vegetation using both hand tools and timber sales where volume is sufficient.

Mechanical and biological control measures have been used in this area to reduce the amount of spotted knapweed in the core large Bullock Ranch herbaceous opening.

#### Desired Future Condition

- The large upland openings will be maintained to benefit a variety of wildlife species and to provide recreational opportunities.

#### 10-Year Management Objectives

- Maintain large upland openings through timber sales and forest treatment proposals; and
- Decrease the amount of spotted knapweed and other invasive plants in the large opening complexes, using biological, chemical and mechanical treatments.

## Long-Term Management Objectives

- Consolidate or link large opening complexes across the landscape to provide habitat.

### **Section 4.3.1.5 Forest Cover Type Management – Other Types**

#### Current Condition

There are many other forest cover types spread across the management area that have less than 5% of the total management area acreage (Table 4.3.1). Lowland spruce/fir (1,185 or 4%), aspen (999 acres or 3%), white pine (509 acres or 2%) and natural mixed pines (461 acres or 1%) are the largest. The “others” category contains 1,558 acres (5%) and is a sum of cover types with less than 1% of the total management area acres, including: lowland aspen/balsam poplar, tamarack, lowland conifers, lowland deciduous, northern hardwood, upland conifers, oak, upland spruce/fir, planted mixed pines and lowland mixed forest. In addition, there are 190 acres (1%) of “miscellaneous other” stands, which includes water, sand/soil and roads.

With the exception of northern hardwood and natural mixed pines, these cover types have been managed as even-aged stands, using general timber management guidelines regarding harvest. Natural regeneration of species currently on site has been effective. Depending upon species composition, mixed cover types with high basal area may be thinned prior to final harvest at rotation age.

Just over 300 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Where stands are inaccessible, early successional cover types will be changed through natural succession, thus slightly changing the cover type distribution.

## Desired Future Condition

- These cover types will be maintained on suitable sites and will contribute to the compositional diversity of the landscape while providing forest products and wildlife habitat.

## 10-Year Management Objectives

- The projected 10-year final harvest acres include: 104 acres of aspen, 102 acres of white pine and 210 acres of other types; and
- The projected 10-year partial harvest (thinning) acres include: 40 acres of white pine, 25 acres of natural mixed pines and 39 acres of other types.

## Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat; and
- In cover types with sufficient acreage, work towards balancing the age classes.

### **4.3.2 – Featured Species Management**

Historical land use has created a wildlife management opportunity in this management area. The large herbaceous openings, which are peatlands that were drained in the early 1900's, provide habitat for open-land species and provide connectivity to other open lands across the eastern Upper Peninsula landscape. Other dominant forest cover types including high-quality examples of dry northern forest and lowland conifers allow for a diversity of wildlife management options. This management area borders the Seney National Wildlife Refuge so collaboration with the U.S. Fish and Wildlife Service across ownerships is desirable and does occur on a regular basis.

#### **Beaver**

The goal for beaver in the eastern Upper Peninsula is to maintain suitable habitat for beaver. Management should focus on providing favorable food within 100 feet of streams that are not designated as high priority trout streams. Consideration will be given to best management practices, trout stream management and trends in beaver nuisance permits issued.

#### Wildlife habitat specifications:

- Maintain or promote alder, aspen, birch, maple or willow within 100 feet of non-high priority trout streams with gradients of less than 15% and other inland bodies of water.

#### **Gray Jay**

The goal for gray jay in the eastern Upper Peninsula is to maintain or increase suitable habitat. Management should focus on maintaining representation of older age classes of appropriate cover types, as well as retention of important structural features within harvested stands in priority areas.

#### Wildlife habitat specifications:

- The primary goal is to maintain appropriate forest types (birch, lowland deciduous, fir, lowland conifer, lowland spruce/fir, tamarack and bogs) in the management area, in a variety of age classes. Maintain 15% of the total acres in relevant cover types in older age classes (at least 20 years beyond "normal" rotation length for the cover type).
  - This can be accomplished either with stands that are already factor limited or by extending the rotation age. In this management area, older age classes (greater than 100 years) for gray jay habitat are being met by the large number of stands with site conditions that limit harvesting.
- Patches are preferred over single trees within timber harvest sale boundaries, though it is beneficial to have both.
- Offset salvage harvests deemed necessary due to insect, disease or fire within the same cover type and age class (within the compartment, management area or eastern Upper Peninsula ecoregion), to minimize impacts on gray jay habitat. Total allowable harvest in these situations will be evaluated on a case-by-case basis.

## Sharp-tailed Grouse

In the eastern Upper Peninsula, the goal for sharp-tailed grouse is to maintain or increase suitable habitat resulting in a harvestable surplus across the ecoregion. Management should focus on enhancing large opening complexes so there is an increase of available habitat.

Higher densities of sharp-tail grouse are present within the Bullock Ranch management area, due to the heterogeneous nature of the cover type assemblages.

### Wildlife habitat specifications:

- Maintain or expand herbaceous open lands where existing leks occur.
- Manage adjacent forest to maintain young regenerating forest adjacent to permanent openings to maximize use by sharp-tailed grouse.
- Use prescribed fire where appropriate to maintain openings and manage pine types.
- Within open land complexes maintain connectivity across the landscape.

### 4.3.3 – Rare Species and Special Resource Area Management

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “*Rare Species Protection Approach and Assessment Guidelines for DNR Staff on State Forest Lands*” (IC 4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed two listed species and one natural community of note occurring in the management area as shown in Table 4.3.2. Any established management guidelines will be followed.

Table 4.3.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Bullock Ranch management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Dry northern forest		S3/G3?	Confirmed				Jack Pine, Red Pine	Late
<b>Birds</b>								
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>	SC/G5/S4	Confirmed	PS	Moderate	Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Dry sand prairie	Upland open/semi-open	N/A
						Wet-mesic sand prairie	Upland open/semi-open	N/A
						Northern shrub thicket	Upland open/semi-open	N/A
<b>Plants</b>								
Vasey's rush	<i>Juncus vaseyi</i>	T/G5?/S1S2	Confirmed			Intermittent wetland	Lowland open/semi-open	N/A
						Lakeplain wet prairie	Lowland open/semi-open	N/A
						Lakeplain wet-mesic prairie	Lowland open/semi-open	N/A

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

The Bullock Ranch is a large open complex that is recognized as a state wildlife area special conservation area. Other special conservation areas in this management area are potential old growth areas, the Fox River high priority trout stream and the Driggs River cold water stream and high priority trout stream (Figure 4.3.1).

The Fox River system is a state designated natural river and along with its corridor is a high conservation value area as shown in Figure 4.3.4. The Fox River Natural River Plan (DNR, Nov. 3, 1988) contains specific requirements for management in this area.

There is also a dry northern forest natural community ecological reference area of 109 acres within the management area. The ecological reference area will be managed to protect and enhance the natural vegetative and wildlife communities by an ecological reference area-specific management plan. The special resource areas are shown in Figure 4.3.4.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type-1, potential Type-2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

#### **4.3.4 – Forest Health Management**

Although forest health issues span the entire landscape, some specific threats are more important in this management area, due to the species composition, site quality or other factors. Some of the more important forest health pests in this management area by major cover type include:

- Red and jack pine: jack pine budworm, pine engraver and *Scleroderris* canker.

Further information on forest health can be found in Section 3.

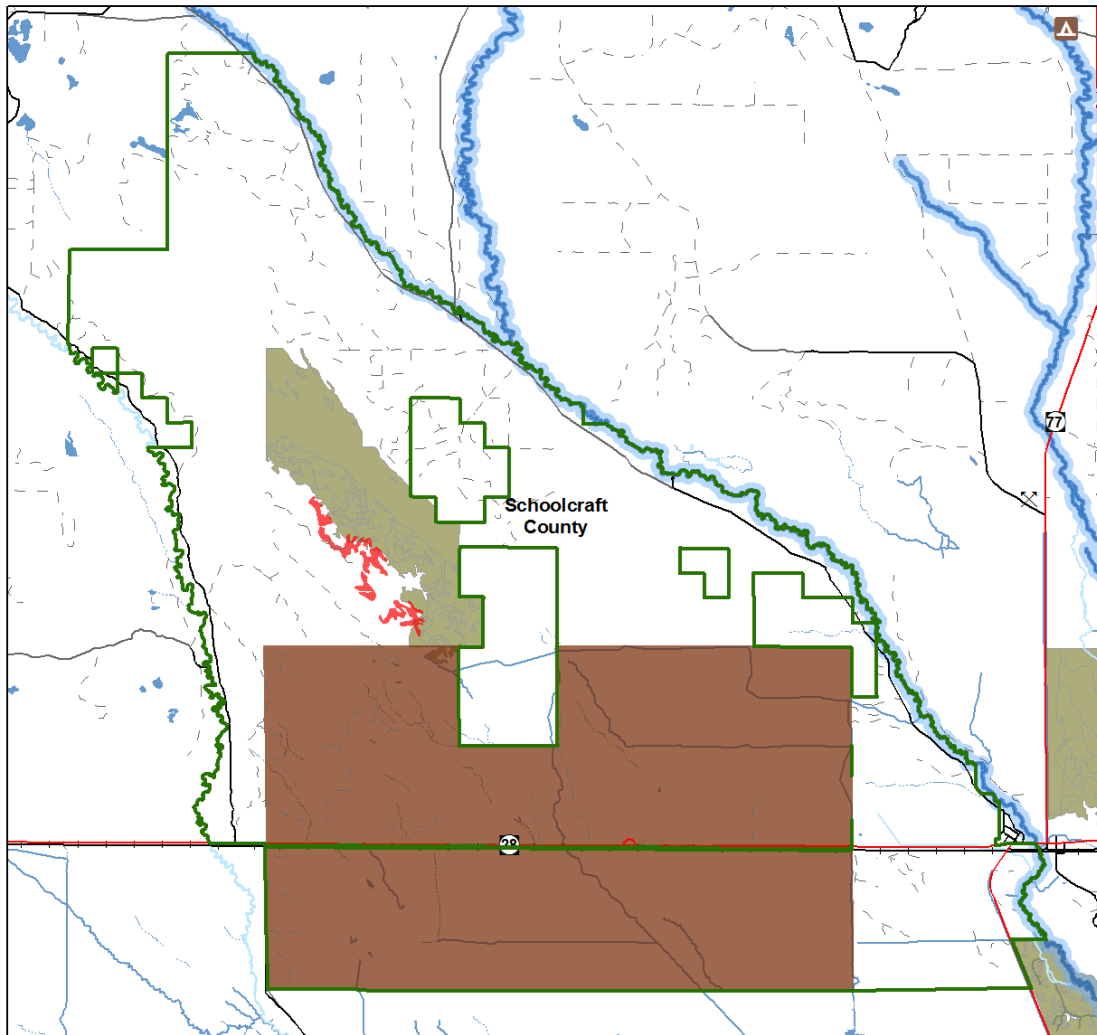
#### Invasive Plant Species

Glossy buckthorn has been documented within a five mile buffer of the management area (Table 4.3.3), and monitoring efforts should specifically look for new populations of this species. Control efforts, including herbicide and burning, in conjunction with the Seney National Wildlife Refuge, have helped reduce the amount of glossy buckthorn in the area. Wild parsnip is found within the management area along M-28.

An invasive plant species of concern within this management area is spotted knapweed. Mechanical and biological control measures have been used in this area to reduce the amount of spotted knapweed in the large herbaceous openings. As resources allow, continue work on decreasing the amount of spotted knapweed and other invasive plants in the large opening complexes.

Invasive species that merit eradication efforts are those species that threaten sensitive sites, due to their location or growth characteristics and have population levels that may be successfully controlled.

# Bullock Ranch



## Legend

- Highway
- Paved Roads
- Gravel Roads
- - - Poor Dirt Roads
- Railroads
- - - Intermittent Stream or Drain
- Perennial River
- Lakes and Rivers
- Management Area Boundary
- Cities
- - - County Boundaries

- Ecological Reference Areas
- High Conservation Value Areas**
- Coastal Environmental Areas
- Critical Dunes
- Natural Rivers Vegetative Buffer
- Natural Rivers Zoning District
- Critical Coastal Habitat (Piping Plover)
- Kirtland Warbler Habitat
- Dedicated Management Areas
- Natural Areas Legally Dedicated

1 in = 1 miles

## Special Conservation Areas

- Campgrounds
- Fishing Access Sites
- Boat Access Sites
- Mineral Resource Locations
- Wild & Scenic Rivers (USFS Lands)
- Visual Management Areas
- Contiguous Resource Areas
- Possible Type 1 and Type 2 Old Growth
- Potential Old Growth
- Non-Dedicated Natural Areas & National Natural Landmarks
- Springs, Wetlands, or Riparian Areas



- Cold Water Streams & Lakes
- Wildlife Management Areas
- Research, Development, and Military Lands
- Great Lakes Islands

Figure 4.3.4. A map of the Bullock Ranch management area showing the special resource areas.

Table 4.3.3. Invasive plant species within or near the Bullock Ranch management area (Data from the Michigan Invasive Plant Identification Network database).

Bullock Ranch - FRD Management Areas	Cases within FRD Areas	Cases within 5 Mile Buffer	Total number of cases	Total number of different Invasive Species
	1	12	12	1
Invasive Species within FRD Areas	Occurrences	Invasive Species within 5 Mile Buffer	Occurrences	
Wild Parsnip	1	Glossy Buckthorn <i>Rhamnus frangula</i>	12	

#### 4.3.5 – Fire Management

Interspersed dry forests and wetland communities probably supported a natural fire regime much like dry and dry-mesic forest communities. Stand replacement fires probably occurred with drought conditions that occur periodically. Recent examples of such extreme widespread drought are 1976 and 2007.

Fire suppression in this management area is often difficult, due to the organic soils found here.

The following fire management concepts will be used in this management area:

- Where appropriate, re-introduce fire in the red pine stands to encourage red pine regeneration and to discourage competition, particularly from aspen. Generally, this will not occur on organic soils.
- This management area falls within the DNR Seney protection area. All wildfires are subject to appropriate initial attack response.

#### 4.3.6 – Public Access and Recreation

The state land in this management area is concentrated with few private parcels. A large portion of the management area is without roads. Access for management and/or recreation is generally very limited due to the large areas of marsh and lowland brush. The Wisconsin Central Railroad along the south side of M-28 limits access to the south to the existing crossings.

Recreational facilities include: the Fox River pathway and snowmobile trails (Figure 4.3.1). The Fox River state forest campground and Fox River boat access site are close to but outside the state forest land.

Other recreational opportunities include: dispersed camping, fishing, canoeing and kayaking along the Fox and Driggs Rivers. The area is also heavily used for deer, bear and grouse hunting.

#### 4.3.7 – Aquatic Resource Management

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. A portion of the Manistique River system is designated as high priority trout stream in this management area and the details are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment.

#### **4.3.8 - Minerals**

Surface sediments consist of peat and muck and lacustrine (lake) sand and gravel. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are not located in the area, and potential for additional pits appears to be limited.

The Ordovician Utica and Collingwood Shales and Trenton and Black River Formations subcrop below the glacial drift. The Trenton and Black River are quarried for stone/dolostone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula. (five in Schoolcraft County). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

#### 4.4 MA 4 – Carp River Red Pine Management Area

##### Summary of Use and Management

Vegetative management in the Carp River Red Pine management area (MA) (Figure 4.4.1) will emphasize management of the red pine resource, balancing the age classes of aspen and selective management of northern hardwoods. Management will strive to produce sustainable yields of various timber products, enhance wildlife habitat, protect areas of unique character and provide for forest-based recreational uses. Expected issues within this 10-year planning period include introduced pests and diseases and increased recreational pressure.

##### Introduction

The Carp River Red Pine management area is located in the south central portion of the eastern Upper Peninsula, in Mackinac and Chippewa Counties. It has 20,718 acres of state-owned land. The intensively managed red pine is the primary attribute of this management area. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the eastern Upper Peninsula ecoregion (Albert, 1995);
- Various landforms of glacial lacustrine origin characterize the sub-subsection, including flat lake bed, deltaic deposits of sand, cold water trout streams, parabolic dune fields and shallow embayments containing transverse dunes;
- Current cover types of red pine, aspen and northern hardwood are a result of disturbance after the 1800's logging era. Mixed pine stands were planted by members of the Rexton Civilian Conservation Corps camp, after the failure of pre-depression era farms;
- Recreation including snowmobiling, motorcycling, hunting and fishing; and
- Special features include three natural community ecological reference areas.

The Carp River system was used as a pre-historic transportation route and historically for log transportation.

State-owned land in this management area is consolidated and falls within the Sault Ste. Marie Forest Management Unit. The Hiawatha National Forest borders the east side of the management area. The predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.4.1.

Table 4.4.1. Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Carp River management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Red Pine	23%	4,809	25	4,784	0	1,437	4,809	532	1,615
Aspen	15%	3,034	161	2,873	137	0	3,034	479	0
Northern Hardwood	11%	2,377	4	2,373	0	1,002	2,377	0	1,002
Lowland Open/Semi-Open Lands	11%	2,210	0	2,210	0	0	2,210	0	0
Upland Open/Semi-Open Lands	7%	1,380	0	1,380	0	0	1,380	0	0
Lowland Conifers	5%	1,057	406	651	72	0	1,057	72	0
Cedar	4%	920	0	920	58	0	920	58	0
Jack Pine	4%	851	0	851	83	0	851	122	0
Lowland Spruce/Fir	3%	641	285	356	14	0	641	40	0
Mixed Upland Deciduous	3%	622	10	612	206	241	622	87	241
Misc Other (Water, Local, Urban)	0%	79	0	79	0	0	79	0	0
Others	13%	2,738	421	2,317	305	306	2,738	242	471
<b>Total</b>	<b>100%</b>	<b>20,718</b>	<b>1,312</b>	<b>19,406</b>	<b>875</b>	<b>2,986</b>	<b>20,718</b>	<b>1,632</b>	<b>3,329</b>

Others include: upland conifers, upland spruce/fir, upland mixed forest, hemlock, white pine, lowland aspen/balsam poplar, natural mixed pines, lowland deciduous, tamarack, lowland mixed forest, paper birch and planted mixed pines.



# Carp River Red Pine

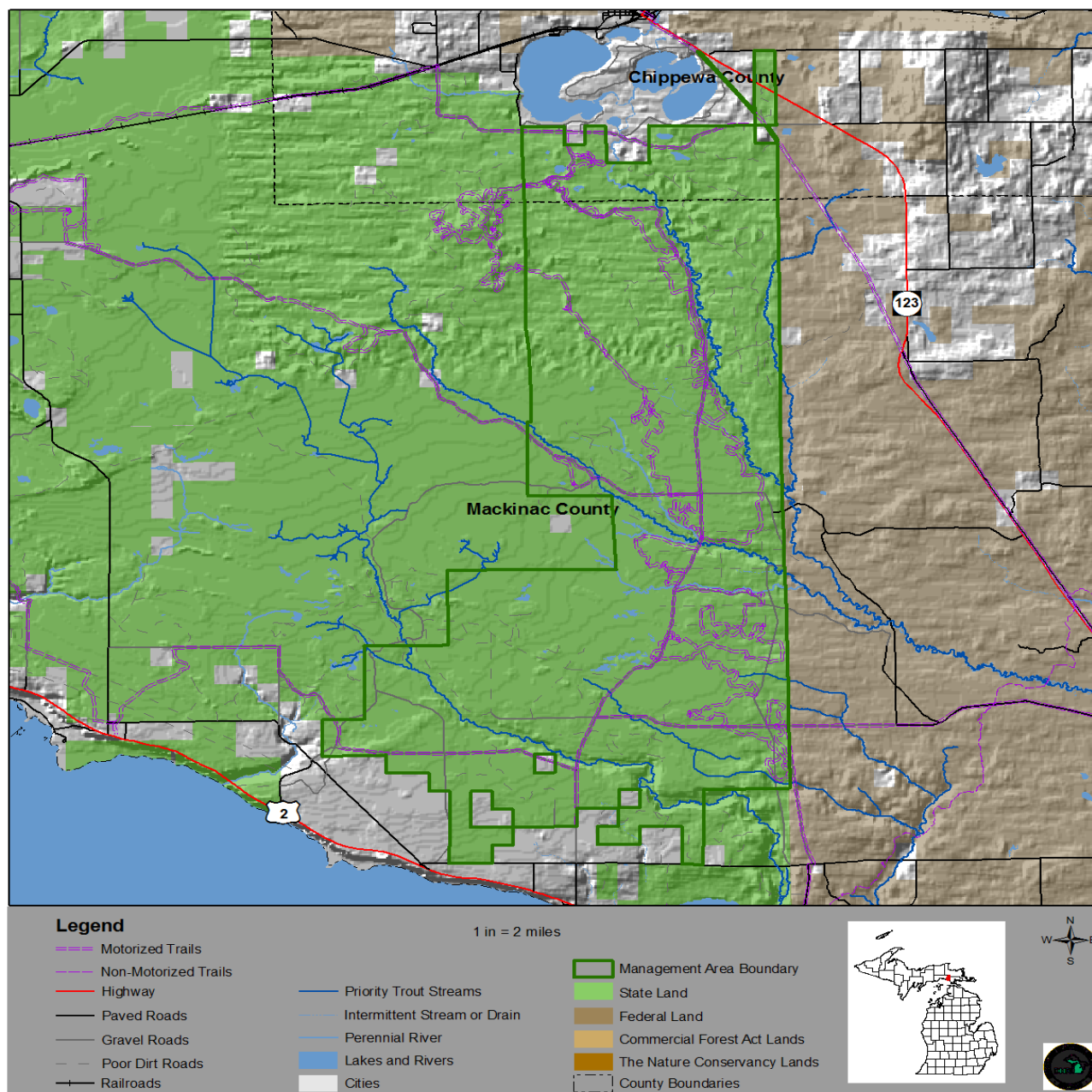


Figure 4.4.1. Location of the Carp River management area (dark green boundary) in relation to surrounding state forest lands other ownerships and Lake Michigan.

## 4.4.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active management (e.g., timber harvest, prescribed fire, planting and mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.

The following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

#### **Section 4.4.1.1 Forest Cover Type Management – Red Pine**

##### Current Condition

Red pine occurs on 4,809 acres (23%) of the management area (Table 4.4.1). Red pine stands are distributed throughout the management area on sandy and loamy soils of outwash plains and moraines with Kotar habitat types of PARVAa, ATFD and AFPO (see Appendix E). These are dry to mesic sites with high potential to grow quality stems. The majority of the red pine stands within the management area were planted in the 1930s by Civilian Conservation Corps workers. Red pine stands on these high-quality sites are usually thinned every 10 years, reducing basal area to approximately 120 square feet per acre, until replacement harvest age at 80. Regeneration harvests in many of these stands, followed by re-planting, have resulted in a large number of stands in younger age classes. As most of the planted red pine stands are on very productive sites, prescribed burning or the use of herbicide may be necessary to control competing vegetation, thus ensuring successful regeneration.

Currently, there are 465 acres prescribed with for final harvest and 997 acres are prescribed for partial harvest or thinning (Figure 4.4.2). There are 25 acres of red pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Red pine in inaccessible or sensitive areas may remain through biological maturity.

##### Desired Future Condition

- Red pine stands will be maintained and managed through thinning until stand replacement harvest at approximately age 80. Balancing acres between 0-89 years of age will provide for continual harvesting, wildlife habitat represented by the featured species and recreational opportunities.

##### 10-Year Management Objectives

- The 10-year projected harvest is for approximately 1,437 acres of partial harvest or thinning; and
- Due to the current age-class structure of red pine with no stands between 50 and 69 years of age, there are no final harvests projected this decade.

##### Long-Term Management Objectives

- Balance the age-class distribution of red pine providing a regulated rotation harvest of approximately 532 acres of red pine for final harvest per decade (red line on Figure 4.4.2); and
- Stands will be periodically thinned until final harvest when they meet silvicultural criteria.

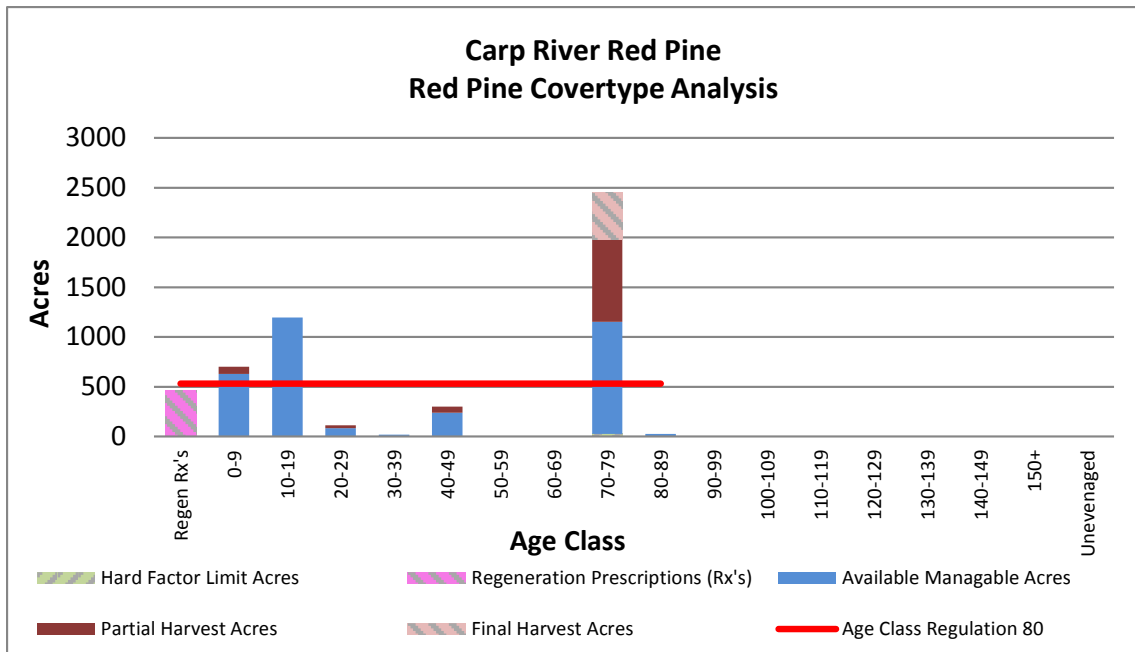


Figure 4.4.2. Age-class distribution of red pine in the Carp River management area (2012 Department of Natural Resources inventory data).

### Section 4.4.1.2 Forest Cover Type Management - Aspen

#### Current Condition

Aspen occurs on approximately 3,034 acres (15%) of the management area (Table 4.4.1). Aspen stands are distributed across the management area on sandy soils with a range of Kotar habitat types including: PVE, PArV, PArVAa, ATFD and AFPo (see Appendix E). Aspen has been consistently harvested and regenerated in recent years, resulting in about 68% of the aspen acreage being in the 0-29 year age classes (Figure 4.4.3).

There are currently 214 acres prescribed for regeneration harvest. In addition, there are 56 acres prescribed for harvest in other cover types that are expected to convert to aspen after harvest. These acres are shown in Figure 4.4.3 in the regeneration prescriptions column. There are 161 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations. Inaccessible stands of aspen will eventually succeed to late successional species.

#### Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for regulated harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The projected 10-year final harvest of aspen is 137 acres. Due to the current age-class structure where the majority of the aspen is in the 10-29 year age classes, the projected 10-year final harvest is considerably less than the regulated amount.

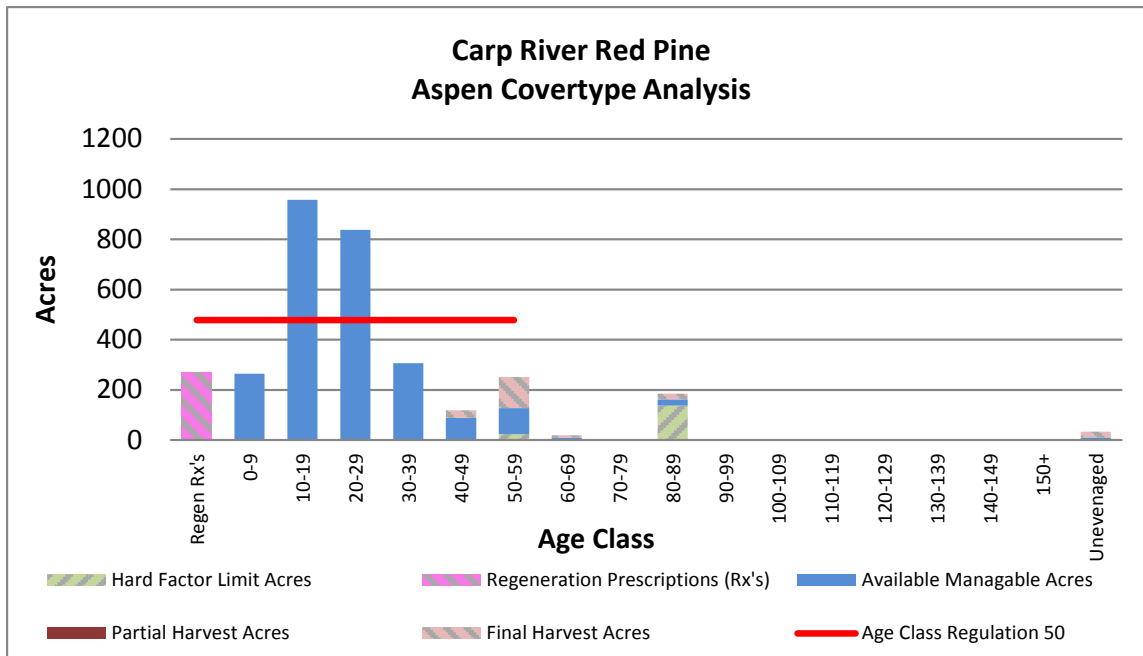


Figure 4.4.3. Age-class distribution of aspen in the Carp River management area (2012 Department of Natural Resources inventory data).

Long-Term Management Objectives

- Balance the age-class structure of accessible aspen stands providing a regulated harvest of approximately 479 acres for harvest per decade.

**Section 4.4.1.3 Forest Cover Type Management – Northern Hardwoods**

Current Condition

Northern hardwood stands occur on approximately 2,377 acres (11%) of the management area (Table 4.4.1). Northern hardwoods are distributed on loam and sand soils of moraines and outwash plains with Kotar habitat types of PARVAa, ATFD and AFPo (see Appendix E). These dry to mesic sites have high potential to grow quality stems. The majority of the stands have been managed using single tree selection to work toward an uneven-aged state, thereby having trees of varying ages and sizes. In most stands where basal area is 120 square feet per acre or higher, individual tree selection harvests are prescribed that will decrease stocking levels to a basal area of approximately 80 square feet per acre.

The northern hardwood stands on poor soils are generally of lower quality, and some of these stands are being managed using even-aged systems. Recent regeneration harvests are shown as immature in Figure 4.4.4. Where site quality is poor, shelterwood and other even-aged harvesting systems will be considered.

Beech bark disease is prevalent in this management area. The killing front of beech bark disease has been through this area, and salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to beech bark disease mortality and salvage harvesting. Further selection harvesting will be delayed, due to resultant lower than normal residual basal area.

Currently, 292 acres have a partial harvest or selection cut assigned (Figure 4.4.4). In addition, 39 acres currently are prescribed for final harvest. There are four acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations.

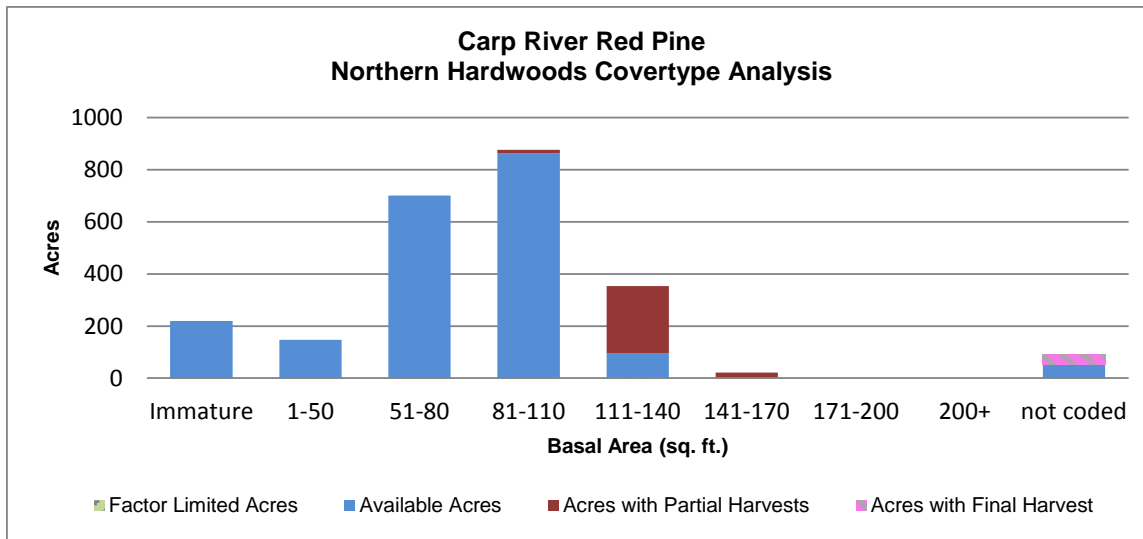


Figure 4.4.4. Basal area distribution of northern hardwood in the Carp River management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwood will be maintained on operable sites, generally by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands. This will provide for a continuous supply of timber, available wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected harvest is for 1,002 acres of partial or selection harvest of northern hardwoods;
- Evaluate stands previously dominated by beech to determine the impact of beech bark disease on regeneration;
- Track beech regeneration in these stands;
- Consider herbicide applications on beech regeneration to promote regeneration of other species; and
- In areas that have lost beech to beech bark disease, consider planting disease resistant beech or oak to increase the availability of hard mast.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.4.1.4 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

Current Condition

Lowland open/semi-open lands occur on approximately 2,210 acres (11%). This category is a combination of lowland shrub (1,699), marsh (392 acres), bog (56 acres) and treed bog (63 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. Lowland open/semi-open lands generally occur in association with creeks, rivers and lowland forested stands. Some of the ecological reference areas and communities of note in this management area are found within these cover types.

Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity. Maintain and protect the ecological reference area values found in these cover types.

Long-Term Year Management Objectives

- Within these stands allow natural processes to occur while protecting their ecological values from man-made disturbances.

### Section 4.4.1.5 Forest Cover Type Management – Upland Open/Semi-Open Lands

#### Current Condition

Upland open/semi-open lands occur on approximately 1,380 acres (7%) of the management area. This category is a combination of the following non-forested land cover types: herbaceous open land (841 acres), low-density trees (393 acres) and upland shrub (146 acres). These communities are valued ecologically as sources of open land habitat for numerous species of wildlife.

#### Desired Future Condition

- Maintain the herbaceous openland, low-density trees and upland shrub communities in the area to provide wildlife habitat and recreational opportunities.

#### Long-Term Management Objectives

- Within herbaceous open land stands, conduct opening maintenance as necessary to maintain this cover type.

### Section 4.4.1.6 Forest Cover Type Management – Lowland Conifer

#### Current Condition

Lowland conifer stands occur on 1,057 acres (5%) of this management area (Table 4.4.1). Lowland conifer stands in the management area have been successfully harvested and regenerated in recent years, resulting in a large number of acres in the 0-9 age classes. Some of the lowland conifer stands are found in riparian zones and are unavailable for harvest at this time. Access to some stands is limited due to the wet sites and the small creeks that are often found in these cover types.

Currently, there are 69 acres with a final harvest prescribed (Figure 4.4.5). There are 18 acres in a different cover type prescribed for final harvest that are expected to convert to lowland conifers upon harvest. These acres are shown in Figure 4.4.5 in the regeneration prescriptions column. There are 406 acres of lowland conifer that have site conditions limiting their harvest at this time. Lowland conifer stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

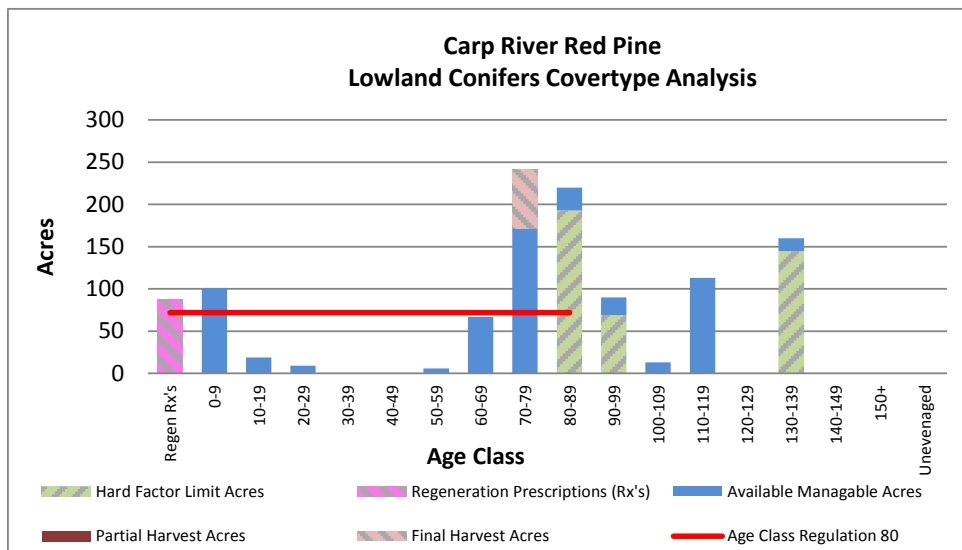


Figure 4.4.5. Age-class distribution of lowland conifers in the Carp River management area (2012 Department of Natural Resources inventory data).

#### Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management, balancing the acres between 0-89 years of age providing for a continuous supply of timber, available wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 72 acres.

### Long-Term Management Objectives

- Balance the age-class distribution of accessible lowland conifers providing a regulated harvest of approximately 72 acres of lowland conifers for harvest each decade.

## **Section 4.4.1.7 Forest Cover Type Management – Other Types**

### Current Condition

There are many other forest cover types spread across the management area (Table 4.4.1) that have less than 5% of the total management area acres. Cedar (920 acres or 4%), lowland spruce/fir (641 acres or 3%), mixed upland deciduous (622 acres or 3%), upland conifers (595 acres or 3%) and upland spruce/fir (553 acres or 3%) are the largest types. The “others” category totals approximately 2,441 acres (12%) and includes: upland mixed forest, hemlock, white pine, lowland aspen/balsam poplar, natural mixed pines, lowland deciduous, tamarack, lowland mixed forest, paper birch and planted mixed pines. Each of the other types has less than 2% of the total acres. The management area also has 79 acres of “miscellaneous other” types, which includes water, sand/soil and roads.

Following general timber management guidelines, the majority of these cover types have been managed as even-aged stands, using natural regeneration after harvest. Attempt to balance the age classes where possible. Some of the mixed cover types with high basal areas may be thinned, depending on their species composition, prior to final harvest.

Over 700 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Where stands are inaccessible, early successional cover types will be changed through natural succession.

### Desired Future Condition

- These cover types will be maintained on suitable sites and will contribute to the compositional diversity of the landscape while providing forest products, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The projected 10-year final harvest is 58 acres of cedar, 206 acres of mixed upland deciduous, 50 acres of upland conifers and 305 acres of other types; and
- The projected 10-year partial harvest is 241 acres of mixed upland deciduous, 131 acres of upland conifers and 306 acres of other types.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## **4.4.2 – Featured Wildlife Species**

While planted red pine is generally low quality wildlife habitat, those stands with a hardwood understory tend to provide more desirable habitat elements and some of the more mature stands occasionally provide breeding sites for woodland raptors. The majority of wildlife management in this management area will focus on the aspen and northern hardwood cover types for this next 10-year period. Increasing and/or maintaining mesic conifers and forest structure will be important for the featured and other associated wildlife species in this management area.

### **Blackburnian Warbler**

The goal for blackburnian warbler is to maintain suitable habitat in priority landscapes. Management should focus on within-stand diversity, habitat fragmentation and conifer components in this management area.

#### Wildlife habitat specifications:

- Increase the mesic conifer (e.g., hemlock, white pine, red pine and upland spruce-fir) component on state forests by: a) Retaining a larger percentage of mesic conifer during harvests; b) Using silvicultural practices that encourage the regeneration of mesic conifer; and c) Where desired/feasible, underplanting hemlock, white pine and white spruce in hardwood-dominated stands on suitable sites without a seed source.
- Provide more older mesic conifers, particularly hemlock, in the landscape by: a) Allowing some actively managed stands of mesic conifer to grow beyond standard rotation ages; b) Including mature mesic conifers as within-stand structure retained during harvests by following Within-Stand Retention Guidance during harvests; and c) Maintaining mature mesic conifer stands within travel corridors and riparian zones or Type 1 or Type 2 old growth special conservation areas.
- Use silvicultural practices that retain, recruit, and expand multi-story hemlock stands and hemlock inclusions within hardwood complexes through group selection, scarification and/or direct planting.

#### **Red-shouldered Hawk**

The goal for red-shouldered hawk is to maintain or improve suitable habitat in the ecoregion. Management activities should focus on the maintenance of large blocks (>385 acres) of mesic northern forest with the appropriate level of large diameter trees in priority landscapes.

#### Wildlife habitat specifications:

- All known woodland raptor nests should be reported to local wildlife staff and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. Confirmed red-shouldered hawk nests are to be documented in accordance with the “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC4172) and included in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment. For red-shouldered hawk nests, the wildlife habitat specifications contained within Michigan DNR’s *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August 2012) will be followed, until the workgroup has completed the guidance that will permanently replace the interim guidelines.

#### **Ruffed Grouse**

The goal for ruffed grouse in the eastern Upper Peninsula is to maintain and improve habitat. Management should focus on maintaining and balancing the age class distribution for aspen in priority landscapes.

#### Wildlife habitat specifications:

- Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
- Move to balance the age-class distribution of aspen and birch cover types to maintain young forests across the management area.
- Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation with aspen in at least four age classes in close proximity to one another.
- Larger harvest units should have irregular boundaries and include one or two, 1-3-acre unharvested inclusions, with the largest cuts having more inclusions following the Within Stand Retention Guidance.
- Hold or increase the conifer component in aspen stands. Leave conifer under four inch diameter at breast height in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
- Maintain cherry production for soft mast.

#### **Snowshoe Hare**

The goal for snowshoe hare in the eastern Upper Peninsula is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash, increasing mesic conifer components and increasing beaver abundance.

#### Wildlife habitat specifications:

- Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under four inches in diameter at breast height.



- Regenerate black spruce stands to young, dense stocking adjacent to uplands.
- Maintain young dense jack pine stands.
- In hare habitat, discourage biomass harvesting and chipping operations in this management area.
- Retain down coarse woody debris already present (before cutting) and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance, retaining the maximum residues.
- When using herbicide treatments to prepare sites for planting red and jack pine in snowshoe hare habitat, encourage more diverse stands of pine and aspen by using application skips in pockets or along stand edges.

#### 4.4.3 – Rare Species and Special Resource Area Management

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC 4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed one listed species and six natural community types of note occurring in the management area as shown in Table 4.4.2. Any established management guidelines will be followed.

Special conservation areas in the management area include: potential old growth areas (Figure 4.4.6), several cold water lakes and streams and several high priority trout streams (Figure 4.4.1), including the Brevort and Carp Rivers.

There are currently no identified high conservation value areas in this management area.

There are three ecological reference areas (Figure 4.4.6) for three natural community types. These are the rich conifer swamp (25 acres), poor fen (44 acres) and intermittent wetland (80 acres). The ecological reference areas will be managed to protect and enhance their natural vegetative and wildlife communities as directed by ecological reference area-specific management plans.

Table 4.4.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Carp River Red Pine management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Intermittent wetland		S3/G2	Confirmed				Lowland open/semi-open	N/A
Muskeg		S3/G4G5	Confirmed				Lowland open/semi-open	N/A
Northern wet meadow		S4/G4	Confirmed				Lowland open/semi-open	N/A
Poor fen		S3/G3	Confirmed				Lowland open/semi-open	N/A
Rich conifer swamp		S3/G4	Confirmed				Tamarack	Late
<b>Birds</b>								
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Management goals during this planning period are:

- Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
- Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
- Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

#### 4.4.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area, due to the species composition, site quality or other factors.

Some of the more important forest health pests in this management area by major cover type include:

- Red pine: red-headed pine sawfly, pine engraver;
- Aspen: white trunk rot, *Hypoxylon* canker ; and
- Northern hardwoods: beech bark disease.

Further information on forest health can be found in Section 3.

#### Invasive Plant Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. While no invasive plant species have yet been documented within or near the management area in the Michigan Invasive Plant Identification Network database, garlic mustard has been observed here. When invasive species are detected, they should be assessed for control measures. Invasive species that merit eradication efforts are those species that threaten sensitive sites, due to their location or growth characteristics and have population levels that may be successfully controlled.

# Carp River Red Pine

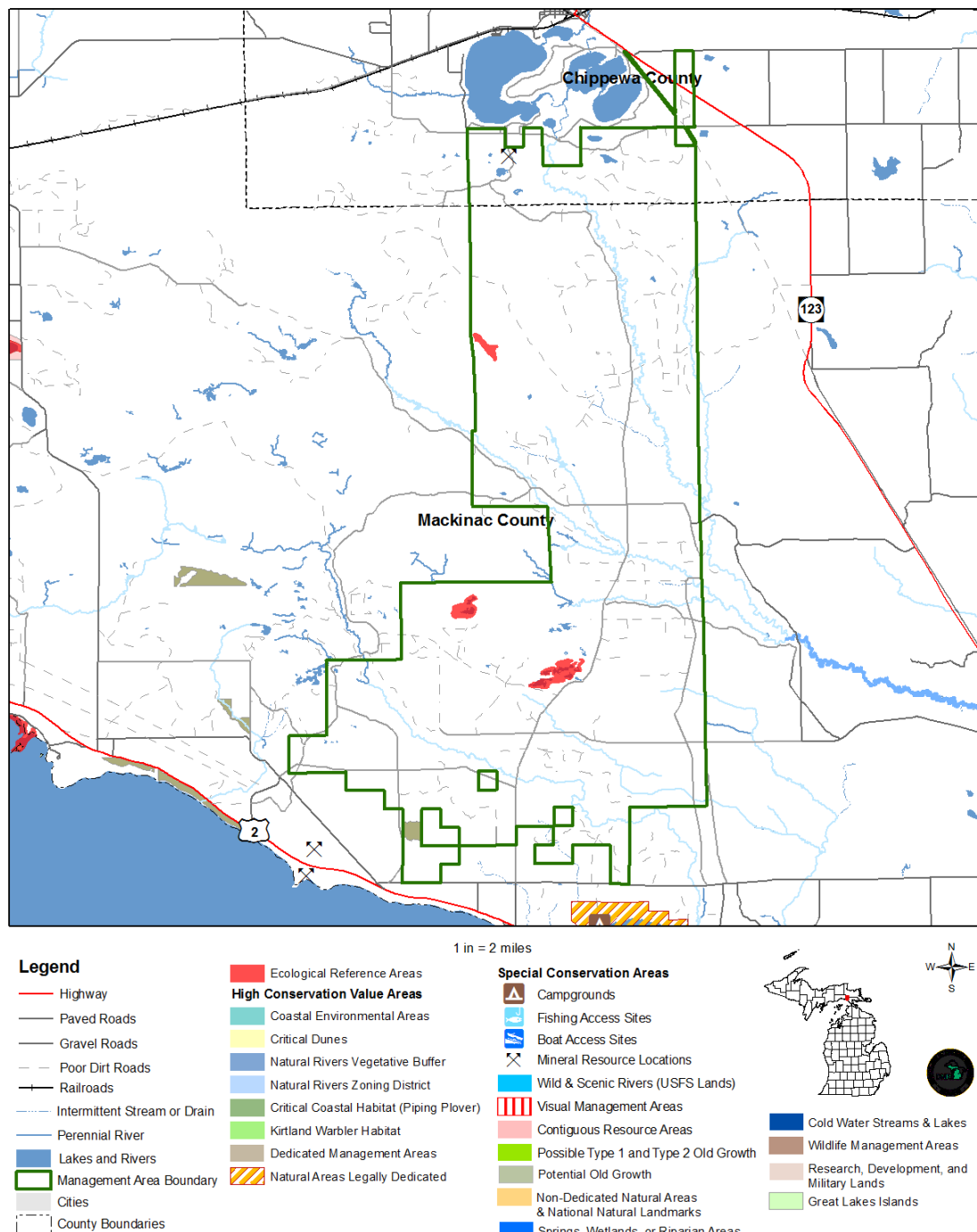


Figure 4.4.6. A map of the Carp River Red Pine management area showing the special resource areas.

## 4.4.5 – Fire Management

In pre-settlement times, these areas were subjected to periodic high intensity stand replacement fires. Fire return intervals were probably between 75 and 250 years, supporting development into long-lived pine communities. Fire management concepts to be used in this management area include:

- Use of prescribed fire to maintain pine communities and encourage natural regeneration; and
- Use of prescribed fire to reduce fuel loading and/or preparatory to planting.

#### **4.4.6 – Public Access and Recreation**

Access for management and recreation is generally good throughout this management area, with the majority of the area accessible by gravel and dirt two-track roads.

Recreational facilities in this management area consist of motorized trails (Figure 4.4.1) and include snowmobile trails the Brevort-Trout Lake Motorcycle Trail and the Brevort-Trout Lake Motorcycle Trailhead. The Brevort-Trout Lake Motorcycle Trail is designated motorcycle use only by Director's Order. Any damage to the 24-inch trail bed must be repaired.

Additional forms of recreation include: blueberry picking, deer, snowshoe hare and ruffed grouse hunting and brook trout fishing.

#### **4.4.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 (*Sustainable Soil and Water Quality Practices on Forest Land*) must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. Portions of the Brevort and Carp River systems are designated as high priority trout streams in this management area and the details are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.4.1.

#### **4.4.8 – Minerals**

Surface sediments consist of lacustrine (lake) sand and gravel and peat and muck, in place thin and discontinuous. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the general area and there may be some potential for additional pits.

The Silurian Engadine, Manistique and Burnt Bluff Groups subcrop below the glacial drift. The Engadine and Burnt Bluff are quarried for stone/limestone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula. (primarily in Mackinac and Chippewa Counties). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.

## 4.4 MA 4 – Carp River Red Pine Management Area

### Summary of Use and Management

Vegetative management in the Carp River Red Pine management area (MA) (Figure 4.4.1) will emphasize management of the red pine resource, balancing the age classes of aspen and selective management of northern hardwoods. Management will strive to produce sustainable yields of various timber products, enhance wildlife habitat, protect areas of unique character, and provide for forest-based recreational uses. Expected issues within this 10-year planning period include introduced pests and diseases and increased recreational pressure.

#### Introduction

The Carp River Red Pine management area is located in the south central portion of the eastern Upper Peninsula (EUP), in Mackinac and Chippewa Counties. It has 20,718 acres of state-owned land. The intensively managed red pine is the primary attribute of this management area. Additional attributes which were important in identifying this management area include:

- The management area falls within the Niagaran Escarpment and Lake Plain subsection 8.1 of the EUP ecoregion (Albert 1995).
- Various landforms of glacial lacustrine origin characterize the sub-subsection, including flat lake bed, deltaic deposits of sand, with cold water trout streams, parabolic dune fields and shallow embayments containing transverse dunes.
- Current cover types of red pine, aspen and northern hardwood are a result of disturbance after the 1800's logging era. Mixed pine stands were planted by members of the Rexton Civilian Conservation Corps (CCC) camp, after the failure of pre-depression era farms.
- Recreation including snowmobiling, motorcycling, hunting and fishing.
- Special features include three natural community ecological reference areas (ERAs).

The Carp River system was used as a pre-historic transportation route and historically for log transportation.

State-owned land in this management area is consolidated and falls within the Sault Ste. Marie Forest Management Unit. The Hiawatha National Forest borders the east side of the management area. The predominant cover types, acreages and projected harvest acres in the management area are shown in Table 4.4.1.

Table 4.4.1 Current cover types, acreages, projected harvest acres and projected ten-year cover type acreage for the Carp River management area, eastern Upper Peninsula ecoregion (2012 Department of Natural Resources inventory data).

Cover Type	Cover %	Current Acreage	Hard Factor Limited Acres	Manageable Acres	10 Year Projected Harvest (Acres)		Projected Acreage in 10 Years	Desired Future Harvest (Acres)	
					Final Harvest	Partial Harvest		Final Harvest	Partial Harvest
Red Pine	23%	4,809	25	4,784	0	1,437	4,809	532	1,615
Aspen	15%	3,034	161	2,873	137	0	3,034	479	0
Northern Hardwood	11%	2,377	4	2,373	0	1,002	2,377	0	1,002
Lowland Open/Semi-Open Lands	11%	2,210	0	2,210	0	0	2,210	0	0
Upland Open/Semi-Open Lands	7%	1,380	0	1,380	0	0	1,380	0	0
Lowland Conifers	5%	1,057	406	651	72	0	1,057	72	0
Cedar	4%	920	0	920	58	0	920	58	0
Jack Pine	4%	851	0	851	83	0	851	122	0
Lowland Spruce/Fir	3%	641	285	356	14	0	641	40	0
Mixed Upland Deciduous	3%	622	10	612	206	241	622	87	241
Misc Other (Water, Local, Urban)	0%	79	0	79	0	0	79	0	0
Others	13%	2,738	421	2,317	305	306	2,738	242	471
<b>Total</b>	<b>100%</b>	<b>20,718</b>	<b>1,312</b>	<b>19,406</b>	<b>875</b>	<b>2,986</b>	<b>20,718</b>	<b>1,632</b>	<b>3,329</b>

Others include: upland conifers, upland spruce/fir, upland mixed forest, hemlock, white pine, lowland aspen/balsam poplar, natural mixed pines, lowland deciduous, tamarack, lowland mixed forest, paper birch and planted mixed pines.

# Carp River Red Pine

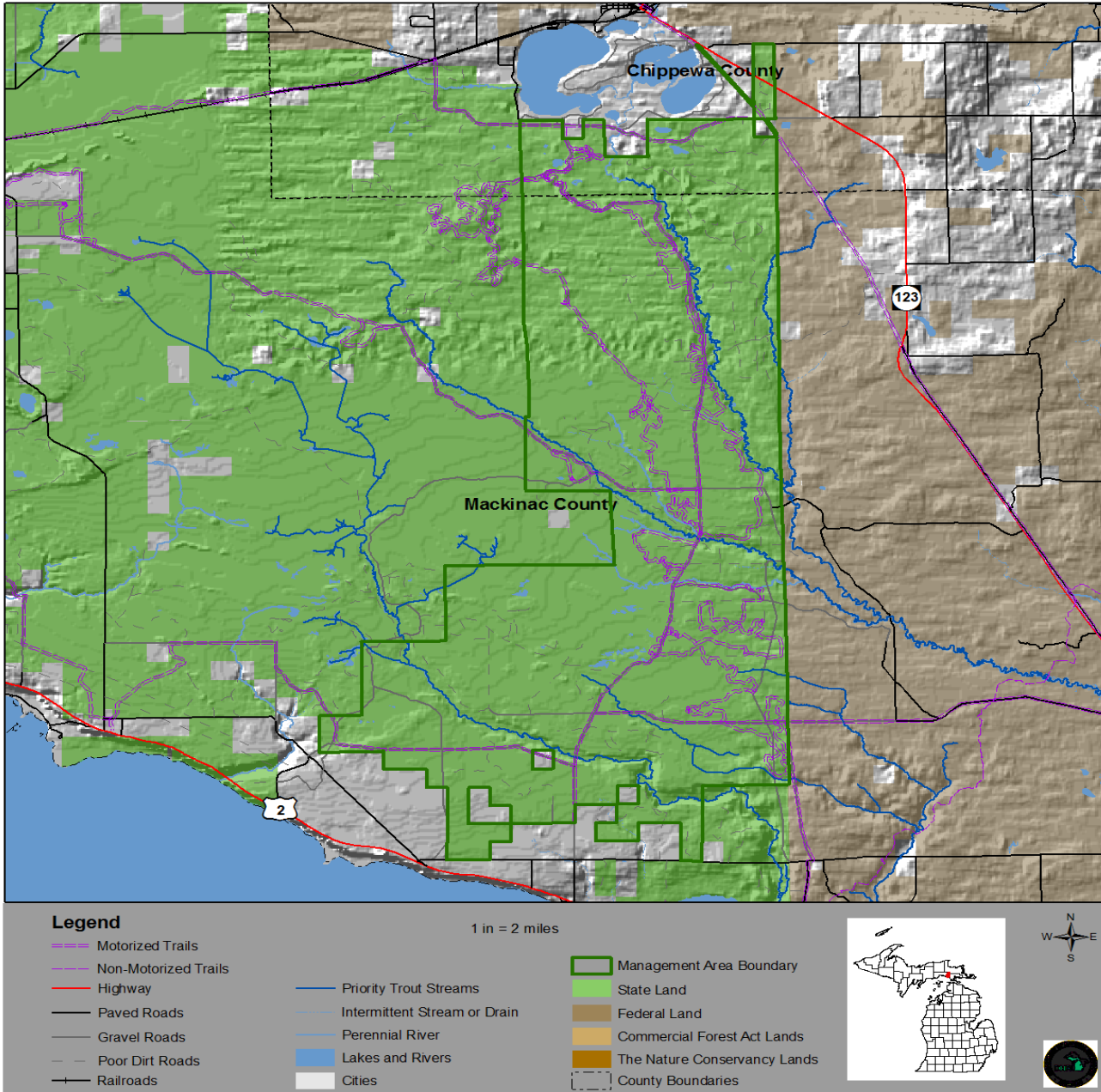


Figure 4.4.1 Location of the Carp River management area (dark green boundary) in relation to surrounding state forest lands other ownerships and Lake Michigan.

## 4.4.1 Forest Cover Type Management Direction

The following sections contain information on vegetation management direction in the form of Desired Future Conditions, 10-Year Management Objectives and Long-Term Management Objectives for each of the major cover types or forest communities within the management area. This information applies to those portions of the forest where active Final Draft EUP MA 4 Carp River Red Pine

management (e.g., timber harvest, prescribed fire, planting, mowing) will be conducted. In other portions of the state forest, passive management resulting in natural succession will achieve ecological objectives. While most stands have a variety of tree species and other vegetation, they are classified by the predominant canopy species.

The following cover types are valued commercially for their timber products; ecologically as sources of habitat for numerous species; and for the variety of recreational opportunities they provide. Harvesting these cover types will provide for a continuous flow of forest products and values.

#### **Section 4.4.1.1 Forest Cover Type Management – Red Pine**

##### Current Condition

Red pine occurs on 4,809 acres (23%) of the management area (Table 4.4.1). Red pine stands are distributed throughout the management area on sandy and loamy soils of outwash plains and moraines with Kotar habitat types of PARVAa, ATFD and AFPO (see Appendix E). These are dry to mesic sites with high potential to grow quality stems. The majority of the red pine stands within the management area were planted in the 1930's by CCC workers. Red pine stands on these high quality sites are usually thinned every 10 years, reducing basal area (BA) to approximately 120 square feet, until replacement harvest age at 80. Regeneration harvests in many of these stands, followed by re-planting, have resulted in a large number of stands in younger age classes. As most of the planted red pine stands are on very productive sites, prescribed burning or the use of herbicide may be necessary to control competing vegetation, thus ensuring successful regeneration.

Currently, there are 465 acres prescribed with for final harvest, and 997 acres are prescribed for partial harvest or thinning (Figure 4.4.2). There are 25 acres of red pine that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Red pine in inaccessible or sensitive areas may remain through biological maturity.

##### Desired Future Condition

- Red pine stands will be maintained and managed through thinning until stand replacement harvest at approximately age 80. Balancing acres between 0-89 years of age will provide for continual harvesting, wildlife habitat represented by the featured species and recreational opportunities.

##### 10-Year Management Objectives

- The 10-year projected harvest is for approximately 1,437 acres of partial harvest or thinning; and
- Due to the current age-class structure of red pine with no stands between 50 and 69 years of age, there are no final harvests projected this decade.

##### Long-Term Management Objectives

- Balance the age-class distribution of red pine providing a regulated rotation harvest of approximately 532 acres of red pine for final harvest per decade (red line on Figure 4.4.2); and
- Stands will be periodically thinned until final harvest when they meet silvicultural criteria.



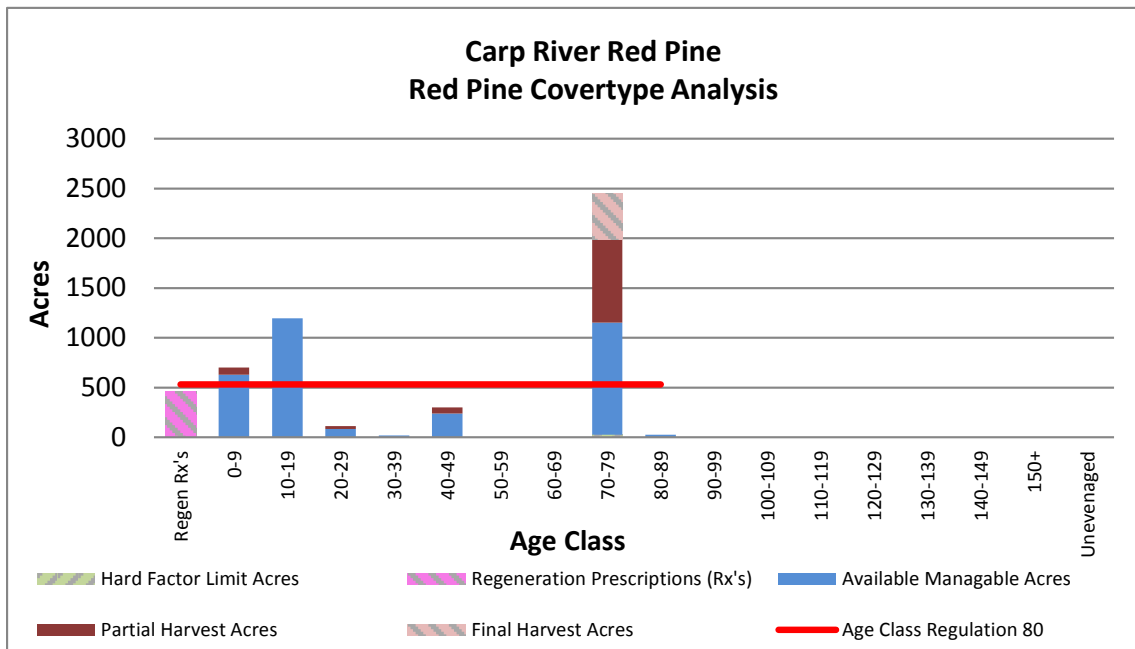


Figure 4.4.2 Age-class distribution of red pine in the Carp River management area (2012 Department of Natural Resources inventory data).

### Section 4.4.1.2 Forest Cover Type Management - Aspen

#### Current Condition

Aspen occurs on approximately 3,034 acres (15%) of the management area (Table 4.4.1). Aspen stands are distributed across the management area on sandy soils with a range of Kotar habitat types including: PVE, PArV, PArVAa, ATFD and AFPo (see Appendix E). Aspen has been consistently harvested and regenerated in recent years, resulting in about 68% of the aspen acreage being in the 0-29 year age classes (Figure 4.4.3).

There are currently 214 acres prescribed for regeneration harvest. In addition, there are 56 acres prescribed for harvest in other cover types that are expected to convert to aspen after harvest. These acres are shown in Figure 4.4.3 in the regeneration prescriptions column. There are 161 acres of aspen that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations. Inaccessible stands of aspen will eventually succeed to late successional species.

#### Desired Future Condition

- Aspen will be maintained on operable sites through even-aged management with acres balanced between 0-59 years of age providing for regulated harvest, wildlife habitat and recreational opportunities.

#### 10-Year Management Objectives

- The projected 10-year final harvest of aspen is 137 acres. Due to the current age-class structure where the majority of the aspen is in the 10-29 year age classes, the projected 10-year final harvest is considerably less than the regulated amount.



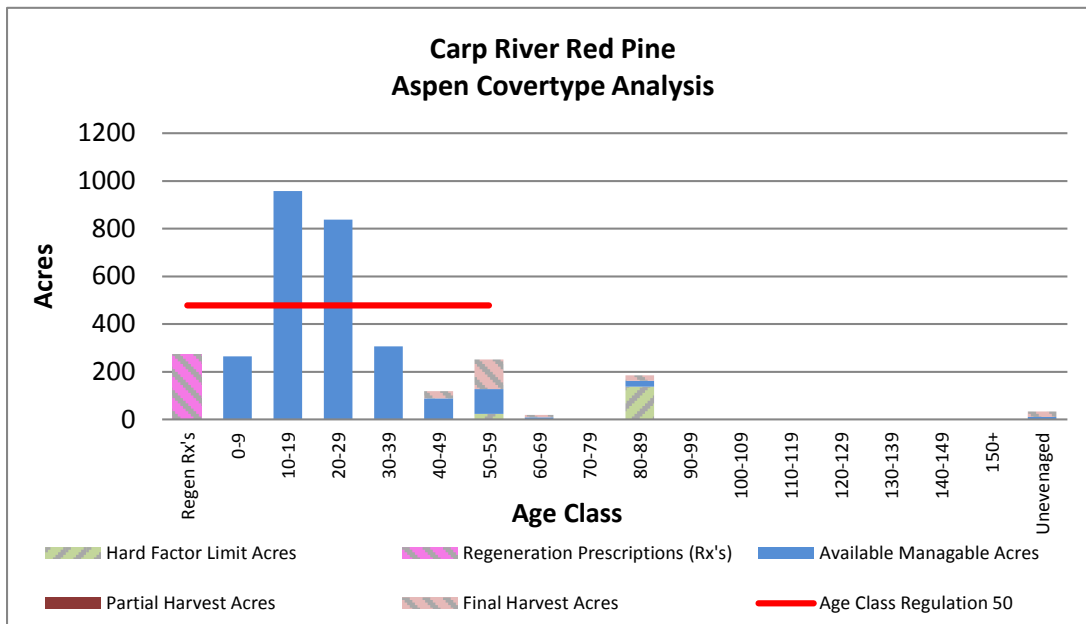


Figure 4.4.3 Age-class distribution of aspen in the Carp River management area (2012 Department of Natural Resources inventory data).

Long-Term Management Objectives

- Balance the age-class structure of accessible aspen stands providing a regulated harvest of approximately 479 acres for harvest per decade.

**Section 4.4.1.3 Forest Cover Type Management – Northern Hardwoods**

Current Condition

Northern hardwood stands occur on approximately 2,377 acres (11%) of the management area (Table 4.4.1). Northern hardwoods are distributed on loam and sand soils of moraines and outwash plains with Kotar habitat types of PARVAa, ATFD and AFPo (see Appendix E). These dry to mesic sites have high potential to grow quality stems. The majority of the stands have been managed using single tree selection to work toward an uneven-aged state, thereby having trees of varying ages and sizes. In most stands where BA is 120 or higher, individual tree selection harvests are prescribed that will decrease stocking levels to a BA of approximately 80 square feet.

The northern hardwood stands on poor soils are generally of lower quality, and some of these stands are being managed using even-aged systems. Recent regeneration harvests are shown as immature in Figure 4.4.4. Where site quality is poor, shelterwood and other even-aged harvesting systems will be considered.

Beech bark disease (BBD) is prevalent in this management area. The killing front of BBD has been through this area, and salvage of affected beech is ongoing. Northern hardwood stands that had a component of beech now have decreased stocking levels due to BBD mortality and salvage harvesting. Further selection harvesting will be delayed, due to resultant lower than normal residual BA.

Currently, 292 acres have a partial harvest or selection cut assigned (Figure 4.4.4). In addition, 39 acres currently are prescribed for final harvest. There are four acres of northern hardwood that have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from harvest calculations.

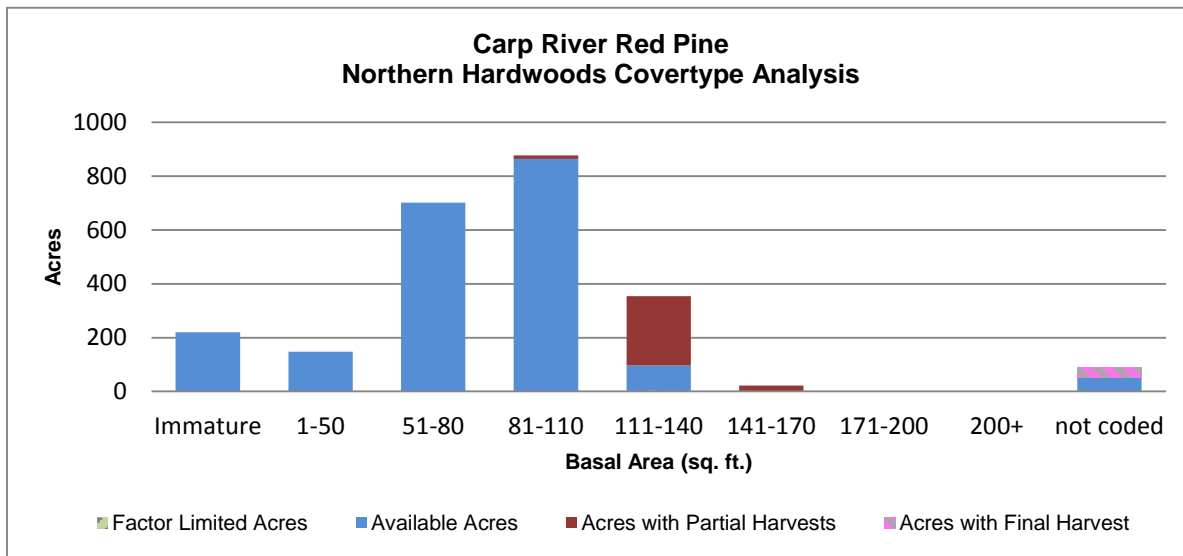


Figure 4.4.4 Basal area distribution of northern hardwood in the Carp River management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Northern hardwood will be maintained on operable sites, generally by using individual tree selection harvesting to provide uneven-aged composition and structurally diverse stands. This will provide for a continuous supply of timber, available wildlife habitat and recreational opportunities.

10-Year Management Objectives

- The 10-year projected harvest is for 1,002 acres of partial or selection harvest of northern hardwoods;
- Evaluate stands previously dominated by beech to determine the impact of BBD on regeneration;
- Track beech regeneration in these stands;
- Consider herbicide applications on beech regeneration to promote regeneration of other species; and
- In areas that have lost beech to BBD, consider planting disease resistant beech or oak to increase the availability of hard mast.

Long-Term Management Objectives

- Select harvest northern hardwood stands on a 20-year cycle.

**Section 4.4.1.4 Forest Cover Type Management – Lowland Open/Semi-Open Lands**

Current Condition

Lowland open/semi-open lands occur on approximately 2,210 acres (11%). This category is a combination of lowland shrub (1,699), marsh (392 acres), bog (56 acres) and treed bog (63 acres). These cover types function ecologically as sources of habitat for numerous species of wildlife. Lowland open/semi-open lands generally occur in association with creeks, rivers and lowland forested stands. Some of the ERAs and communities of note in this management area are found within these cover types.

Desired Future Condition

- Lowland open/semi-open lands will be retained in their current state to ensure an adequate level of wildlife habitat and recreational opportunity. Maintain and protect the ERA values found in these cover types.

Long-Term Year Management Objectives

- Within these stands allow natural processes to occur while protecting their ecological values from man-made disturbances.

### Section 4.4.1.5 Forest Cover Type Management – Upland Open/Semi-Open Lands

#### Current Condition

Upland open/semi-open lands occur on approximately 1,380 acres (7%) of the management area. This category is a combination of the following non-forested land cover types: herbaceous open land (841 acres), low-density trees (393 acres) and upland shrub (146 acres). These communities are valued ecologically as sources of open land habitat for numerous species of wildlife.

#### Desired Future Condition

- Maintain the herbaceous openland, low-density trees and upland shrub communities in the area to provide wildlife habitat, and recreational opportunities.

#### Long-Term Management Objectives

- Within herbaceous open land stands, conduct opening maintenance, as necessary to maintain this cover type.

### Section 4.4.1.6 Forest Cover Type Management – Lowland Conifer

#### Current Condition

Lowland conifer stands occur on 1,057 acres (5%) of this management area (Table 4.4.1). Lowland conifer stands in the MA have been successfully harvested and regenerated in recent years, resulting in a large number of acres in the 0-9 age classes. Some of the lowland conifer stands are found in riparian zones and are unavailable for harvest at this time. Access to some stands is limited due to the wet sites and the small creeks that are often found in these cover types.

Currently, there are 69 acres with a final harvest prescribed (Figure 4.4.5). There are 18 acres in a different cover type prescribed for final harvest that are expected to convert to lowland conifers upon harvest. These acres are shown in Figure 4.4.5 in the regeneration prescriptions column. There are 406 acres of lowland conifer that have site conditions limiting their harvest at this time. Lowland conifer stands in areas inaccessible for harvest will be subject to natural processes, resulting in a range of successional stages.

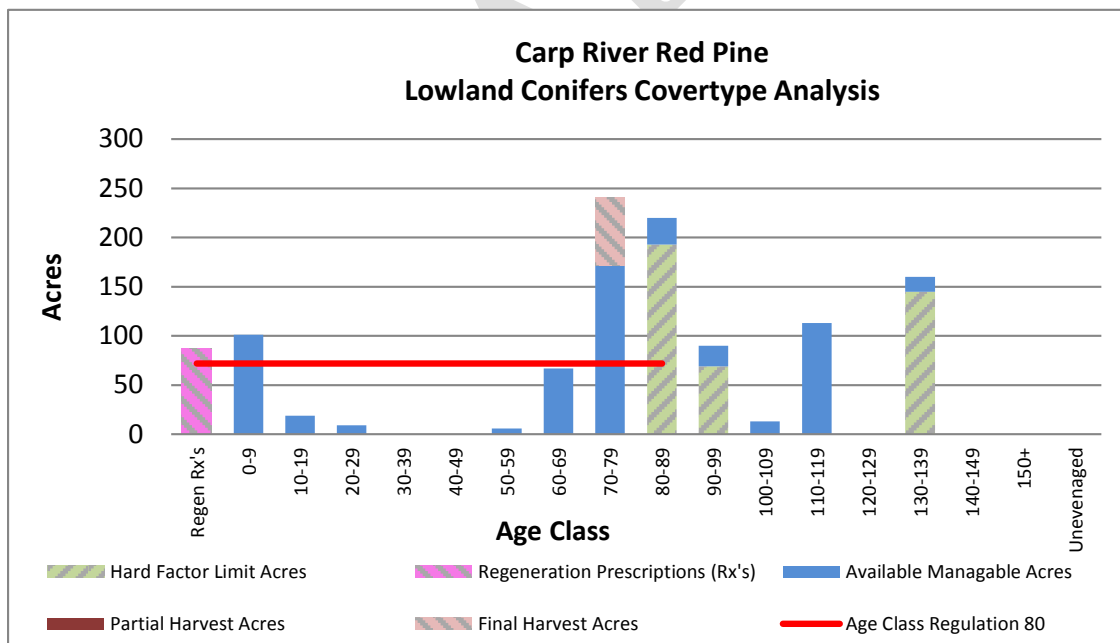


Figure 4.4.5 Age-class distribution of lowland conifers in the Carp River management area (2012 Department of Natural Resources inventory data).

### Desired Future Condition

- Lowland conifer stands will be maintained on operable sites through even-aged management, balancing the acres between 0-89 years of age providing for a continuous supply of timber, available wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The 10-year projected final harvest of lowland conifers is 72 acres.

### Long-Term Management Objectives

- Balance the age-class distribution of accessible lowland conifers providing a regulated harvest of approximately 72 acres of lowland conifers for harvest each decade.

## **Section 4.4.1.7 Forest Cover Type Management – Other Types**

### Current Condition

There are many other forest cover types spread across the management area (Table 4.4.1) that have less than 5% of the total management area acres. Cedar (920 acres or 4%), lowland spruce/fir (641 acres or 3%), mixed upland deciduous (622 acres or 3%), upland conifers (595 acres or 3%) and upland spruce/fir (553 acres or 3%) are the largest types. The “others” category totals approximately 2,441 acres (12%) and includes: upland mixed forest, hemlock, white pine, lowland aspen/balsam poplar, natural mixed pines, lowland deciduous, tamarack, lowland mixed forest, paper birch and planted mixed pines. Each of the other types has less than 2% of the total acres. The management area also has 79 acres of “miscellaneous other” types, which includes water, sand/soil and roads.

Following general timber management guidelines, the majority of these cover types have been managed as even-aged stands, using natural regeneration after harvest. Attempt to balance the age classes where possible. Some of the mixed cover types with high BAs may be thinned, depending on their species composition, prior to final harvest.

Over 700 acres of these other minor cover types have site conditions limiting their harvest at this time. These hard factor limited acres have been removed from the total number of manageable acres available for harvest calculations. Where stands are inaccessible, early successional cover types will be changed through natural succession.

### Desired Future Condition

- These cover types will be maintained on suitable sites and will contribute to the compositional diversity of the landscape while providing forest products, wildlife habitat and recreational opportunities.

### 10-Year Management Objectives

- The projected 10-year final harvest is 58 acres of cedar, 206 acres of mixed upland deciduous, 50 acres of upland conifers and 305 acres of other types; and
- The projected 10-year partial harvest is 241 acres of mixed upland deciduous, 131 acres of upland conifers and 306 acres of other types.

### Long-Term Management Objectives

- Continue management of these other cover types to provide a sustainable yield of forest products and wildlife habitat.

## **4.4.2 – Featured Wildlife Species**

While planted red pine is generally low quality wildlife habitat, those stands with a hardwood understory tend to provide more desirable habitat elements and some of the more mature stands occasionally provide breeding sites for woodland raptors. The majority of wildlife management in this management area will focus on the aspen and northern hardwood cover types for this next 10-year period. Increasing and/or maintaining mesic conifers and forest structure will be important for the featured and other associated wildlife species in this management area.

## **Blackburnian Warbler**

The goal for blackburnian warbler is to maintain suitable habitat in priority landscapes. Management should focus on within-stand diversity, habitat fragmentation and conifer components in this management area.

### Wildlife habitat specifications:

1. Increase the mesic conifer (e.g., hemlock, white pine, red pine and upland spruce-fir) component on state forests by: a) Retaining a larger percentage of mesic conifer during harvests; b) Using silvicultural practices that encourage the regeneration of mesic conifer; and c) Where desired/feasible, underplanting hemlock, white pine and white spruce in hardwood-dominated stands on suitable sites without a seed source.
2. Provide more older mesic conifers, particularly hemlock, in the landscape by: a) Allowing some actively managed stands of mesic conifer to grow beyond standard rotation ages; b) Including mature mesic conifers as within-stand structure retained during harvests by following Within-Stand Retention Guidance during harvests; and c) Maintaining mature mesic conifer stands within travel corridors and riparian zones, or Type 1 or Type 2 old growth special conservation areas (SCAs).
3. Use silvicultural practices that retain, recruit, and expand multi-story hemlock stands and hemlock inclusions within hardwood complexes through group selection, scarification and/or direct planting.

## **Red-shouldered Hawk**

The goal for red-shouldered hawk is to maintain or improve suitable habitat in the ecoregion. Management activities should focus on the maintenance of large blocks (>385 acres) of mesic northern forest with the appropriate level of large diameter trees in priority landscapes.

### Wildlife habitat specifications:

1. All known woodland raptor nests should be reported to local wildlife staff and included in the Integrated Forest Monitoring Assessment and Prescription (IFMAP) Geographic Decision Support Environment (GDSE). Confirmed red-shouldered hawk nests are to be documented in accordance with the "DNR's Approach to the Protection of Rare Species on State Forest Lands" (IC4172) and included in the IFMAP GDSE.
2. For red-shouldered hawk nests, the wildlife habitat specifications contained within Michigan DNR's *Interim Management Guidelines for Red-Shouldered Hawks and Northern Goshawk on State Forest Lands* (August 2012) will be followed, until the workgroup has completed the guidance that will permanently replace the interim guidelines.

## **Ruffed Grouse**

The goal for ruffed grouse in the EUP is to maintain and improve habitat. Management should focus on maintaining and balancing the age class distribution for aspen in priority landscapes.

### Wildlife habitat specifications:

1. Maintain the aspen cover type and increase the aspen component in mixed stands within the management area.
2. Move to balance the age-class distribution of aspen and birch cover types to maintain young forests across the management area.
3. Ideal aspen stands will be of 40-160 acres under a 50-60 year rotation with aspen in at least four age classes in close proximity to one another.
4. Larger harvest units should have irregular boundaries and include one or two, 1-3-acre unharvested inclusions, with the largest cuts having more inclusions following the Within Stand Retention Guidance.

5. Hold or increase the conifer component in aspen stands. Leave conifer under four inch diameter at breast height (DBH) in mixed stands and aspen types as immediate residual escape cover and to promote corridors.
6. Maintain cherry production for soft mast.

### **Snowshoe Hare**

The goal for snowshoe hare in the EUP is to increase available habitat in the ecoregion. In priority landscapes, management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash, increasing mesic conifer components and increasing beaver abundance.

#### Wildlife habitat specifications:

1. Maintain young aspen and lowland shrub communities such as alder or willow that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Hold or increase the conifer component in aspen stands; leave conifers under 4 inch DBH.
2. Regenerate black spruce stands to young, dense stocking adjacent to uplands.
3. Maintain young dense jack pine stands.
4. In hare habitat, discourage biomass harvesting and chipping operations in this management area.
5. Retain down coarse woody debris already present (before cutting) and resulting from incidental breakage of tops and limbs in the general harvest area, except on skid trails and landings, to the extent feasible. Retain slash, and create brush piles within timber sales associated with hare habitat. In biomass timber sales, apply Michigan Biomass Harvesting Guidance, retaining the maximum residues.
6. When using herbicide treatments to prepare sites for planting red and jack pine in snowshoe hare habitat, encourage more diverse stands of pine and aspen by using application skips in pockets or along stand edges.

#### **4.4.3 – Rare Species and Special Resource Area Management**

All forest operations must be reviewed for potential conflicts between rare species and proposed forest operations following the guidance in “DNR’s Approach to the Protection of Rare Species on State Forest Lands” (IC 4172). This is especially important when listed species are present, past surveys have indicated a possibility of their presence, or when appropriate habitat is available and the species is known to occur in the general region.

Past surveys have noted and confirmed one listed species and six natural community types of note occurring in the management area as shown in Table 4.4.2. Any established management guidelines will be followed.

Special conservation areas (SCAs) in the management area include: potential old growth areas (Figure 4.4.6), several cold water lakes and streams and several high priority trout streams (Figure 4.4.1), including the Brevort and Carp Rivers.

There are currently no identified high conservation value areas in this management area.

There are three ERAs (Figure 4.4.6) for three natural community types. These are the rich conifer swamp (25 acres), poor fen (44 acres) and intermittent wetland (80 acres). The ERAs will be managed to protect and enhance their natural vegetative and wildlife communities as directed by ERA-specific management plans

Table 4.4.2 Occurrence information for special concern, rare, threatened and endangered communities and species for the Carp River Red Pine management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
<b>Natural Communities</b>								
Intermittent wetland		S3/G2	Confirmed				Lowland open/semi-open	N/A
Muskeg		S3/G4G5	Confirmed				Lowland open/semi-open	N/A
Northern wet meadow		S4/G4	Confirmed				Lowland open/semi-open	N/A
Poor fen		S3/G3	Confirmed				Lowland open/semi-open	N/A
Rich conifer swamp		S3/G4	Confirmed				Tamarack	Late
<b>Birds</b>								
Red-shouldered hawk	<i>Buteo lineatus</i>	T/G5/S3-4	Confirmed	PS	Very High	Floodplain forest	Lowland mixed	Mid
						Dry-mesic northern forest	White Pine	Late

Climate Change Vulnerability Index: EV – Extremely Vulnerable; HV – Highly Vulnerable; MV – Moderately Vulnerable; PS – Presumed Stable; and IL – Increase Likely.

Management goals during this planning period are:

1. Document occurrences of rare, threatened, endangered and special concern species and natural communities for the management area through the inventory process or with occasional focused surveys.
2. Evaluate all potential Type 1, potential Type 2 and potential old growth areas to determine their status as a special resource area.
3. Develop and maintain management and monitoring plans for ecological reference areas on state forest land.

#### 4.4.4 – Forest Health Management

Although forest health issues span the entire landscape, some specific threats are more important in this management area, due to the species composition, site quality or other factors.

Some of the more important forest health pests in this management area by major cover type include:

- Red pine: red-headed pine sawfly, pine engraver
- Aspen: white trunk rot, *Hypoxyylon* canker
- Northern hardwoods: beech bark disease (BBD)

Further information on forest health can be found in Section 3.

#### Invasive Plant Species

Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. While no invasive plant species have yet been documented within or near the management area in the Michigan Invasive Plant Identification Network database, garlic mustard has been observed here. When invasive species are detected, they should be assessed for control measures. Invasive species that merit eradication efforts are those species that threaten sensitive sites, due to their location or growth characteristics and have population levels that may be successfully controlled.

# Carp River Red Pine

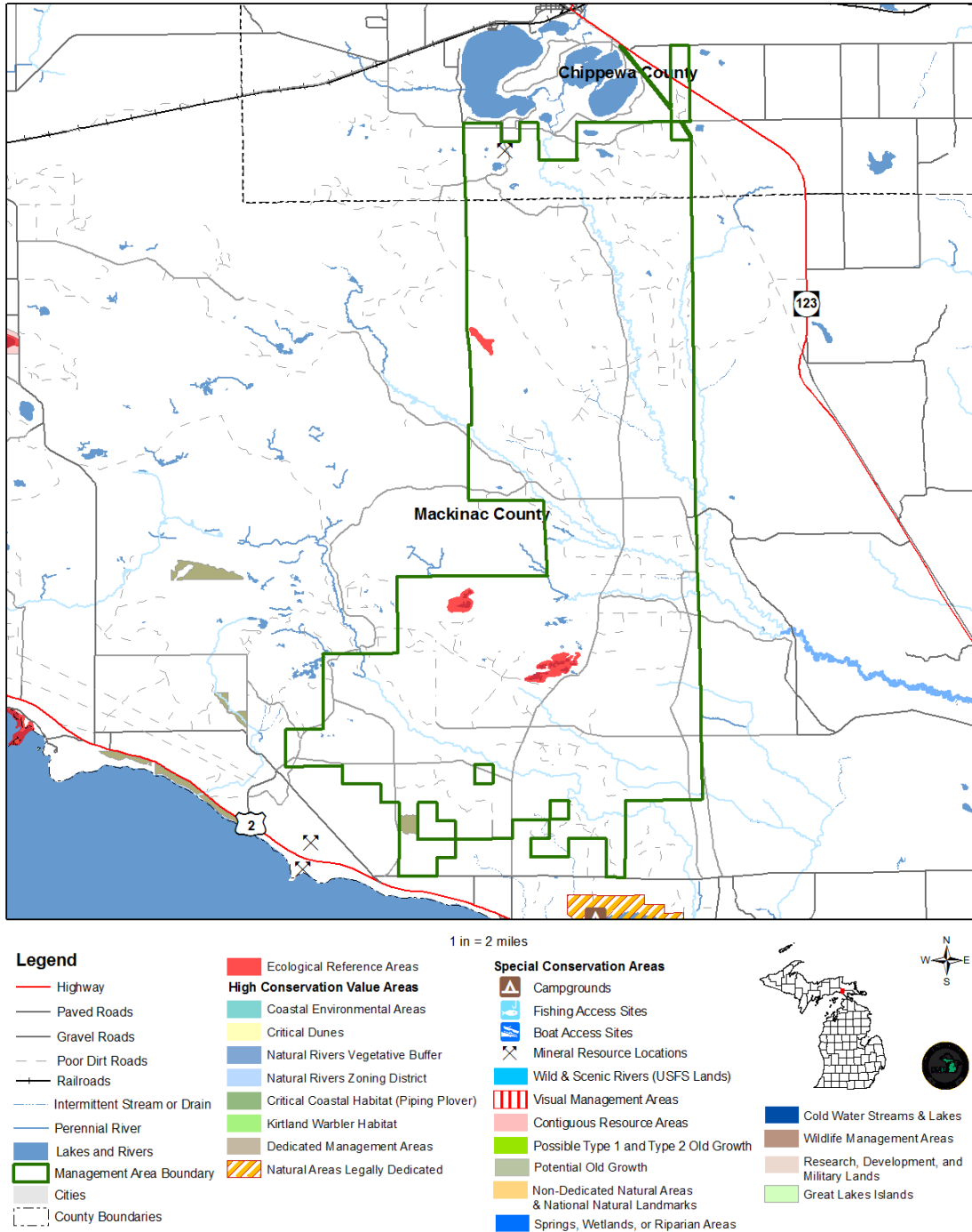


Figure 4.4.6 A map of the Carp River Red Pine management area showing the special resource areas.

## 4.4.5 – Fire Management

In pre-settlement times, these areas were subjected to periodic high intensity stand replacement fires. Fire return intervals were probably between 75 and 250 years, supporting development into long-lived pine communities. Fire management concepts to be used in this management area include:

- Use of prescribed fire to maintain pine communities and encourage natural regeneration; and
- Use of prescribed fire to reduce fuel loading and/or preparatory to planting.



#### **4.4.6 – Public Access and Recreation**

Access for management and recreation is generally good throughout this management area, with the majority of the area accessible by gravel and dirt two-track roads.

Recreational facilities in this management area consist of motorized trails (Figure 4.4.1) and include snowmobile trails the Brevort-Trout Lake Motorcycle Trail and the Brevort-Trout Lake Motorcycle Trailhead. The Brevort-Trout Lake Motorcycle Trail is designated motorcycle use only by Director's Order. Any damage to the 24-inch trail bed must be repaired.

Additional forms of recreation include: blueberry picking, deer, snowshoe hare and ruffed grouse hunting and brook trout fishing.

#### **4.4.7 – Aquatic Resource Management**

Fisheries Division management unit biologists will review proposed forest management activities using the compartment review process, and will consider the potential impact of proposed prescriptions upon riparian and aquatic values. Management prescriptions will be modified to account for riparian and aquatic values by applying the standards and guidance documents listed in the introduction to this plan section to the unique conditions specific to any given forest stand.

Prescription of riparian management zone widths greater than the minimum widths provided in IC4011 must be justified and documented during the compartment review process.

Forested stands adjacent to designated high priority trout streams will specifically be managed to discourage beaver use in accordance with both DNR Policy and Procedure 39.21-20 Beaver Management and IC 4011. Portions of the Brevort and Carp River systems are designated as high priority trout streams in this management area and the details are shown in the Integrated Forest Monitoring Assessment and Prescription Geographic Decision Support Environment and in Figure 4.4.1.

#### **4.4.8 – Minerals**

Surface sediments consist of lacustrine (lake) sand and gravel and peat and muck, in place thin and discontinuous. There is insufficient data to determine the glacial drift thickness. Sand and gravel pits are located in the general area, and there may be some potential for additional pits.

The Silurian Engadine, Manistique and Burnt Bluff Groups subcrop below the glacial drift. The Engadine and Burnt Bluff are quarried for stone/limestone in the Upper Peninsula.

Exploration and development for oil and gas has been limited to a few wells drilled in the Upper Peninsula. (primarily in Mackinac and Chippewa Counties). No economic oil and gas production has been found in the Upper Peninsula.

Metallic mineral production is not supported by the geology given the depth to known metallic bearing formations.