

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

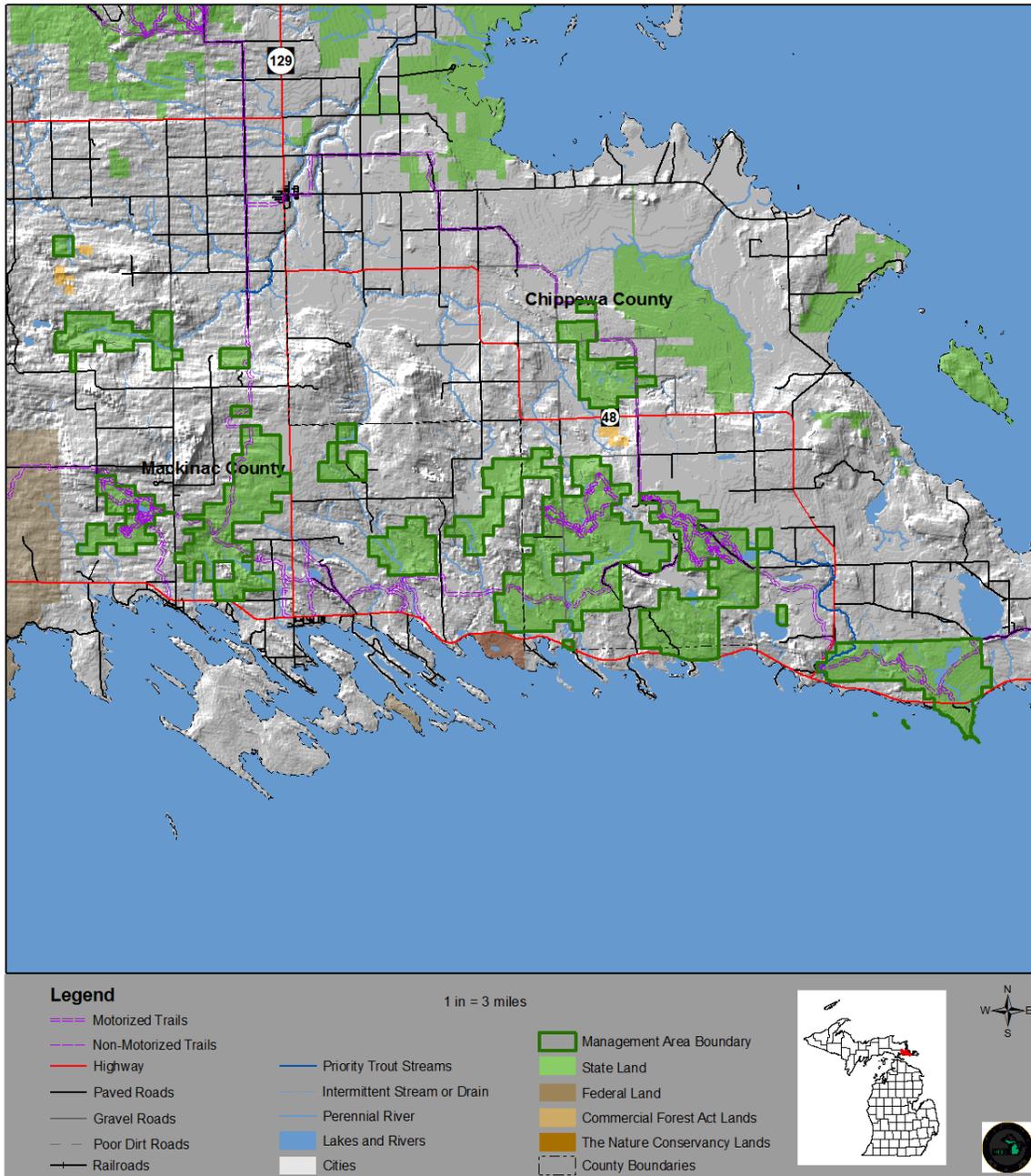


Figure 4.16.1. Location of Huron Patterned Outcrop management area (dark green boundary) in relation to surrounding state forest lands, other ownerships and Lake Huron and the St. Mary's River.

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
Total	100%	27,309	3,584	23,725	1,018	2,094	27,309	2,079	2,168

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.

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Huron Patterned Outcrop Aspen Covertypes Analysis

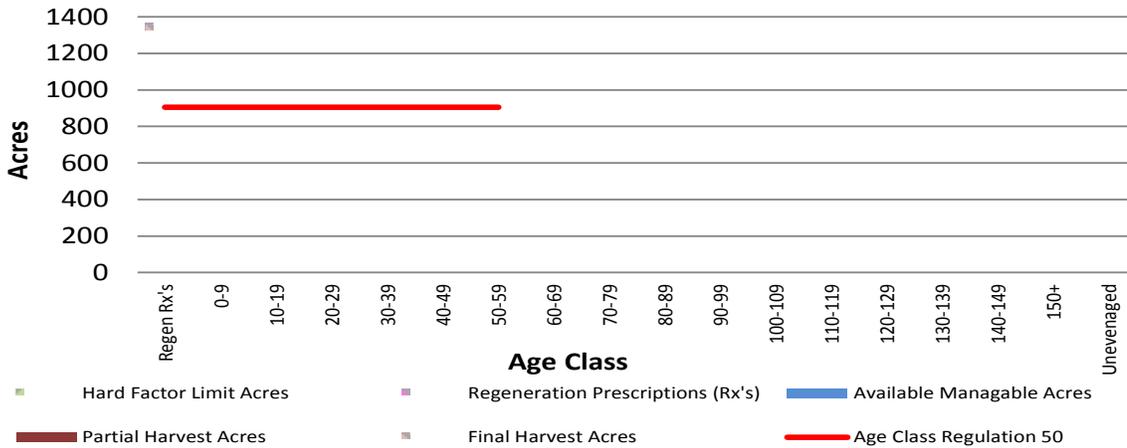


Figure 4.16.2. Age-class distribution of aspen in the Huron Patterned Outcrop management area (2012 Department of Natural Resources inventory data).

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.

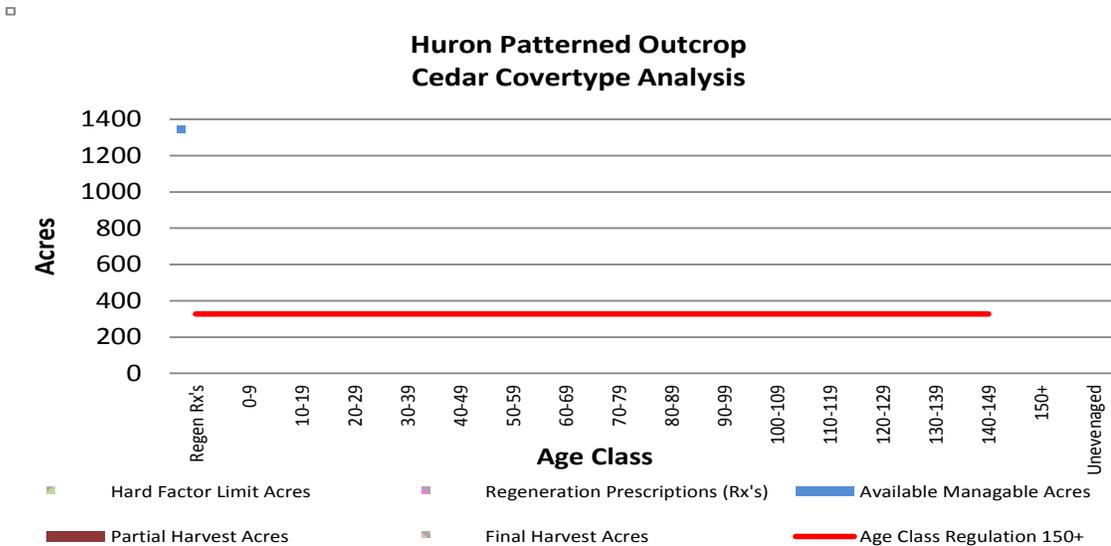


Figure 4.16.3. Age-class distribution of cedar in the Huron Patterned Outcrop management area (2012 Department of Natural Resources inventory data).

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.

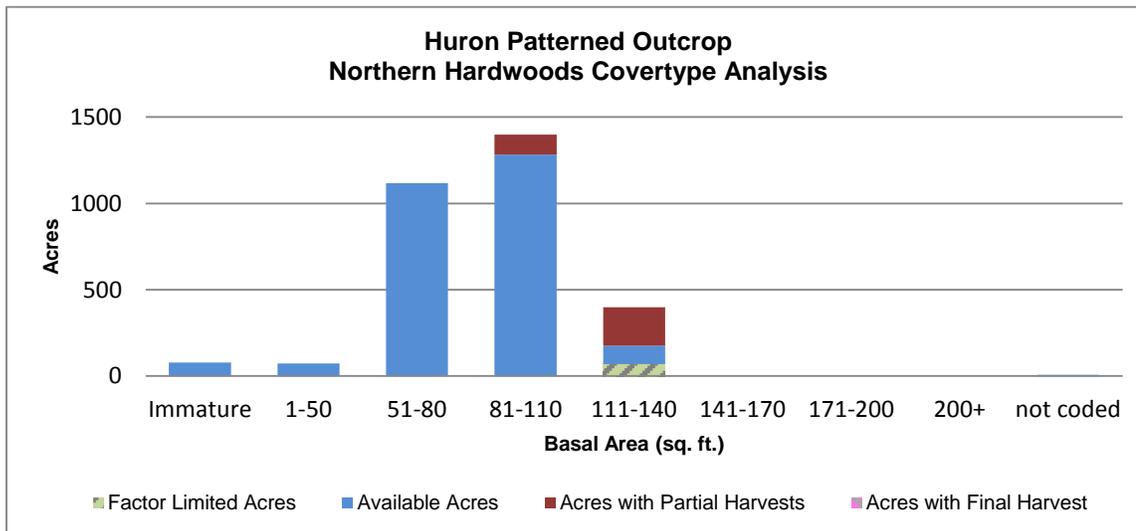


Figure 4.16.4. Basal area distribution of northern hardwood in the Huron Patterned Outcrop management area (2012 Department of Natural Resources inventory data).

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.

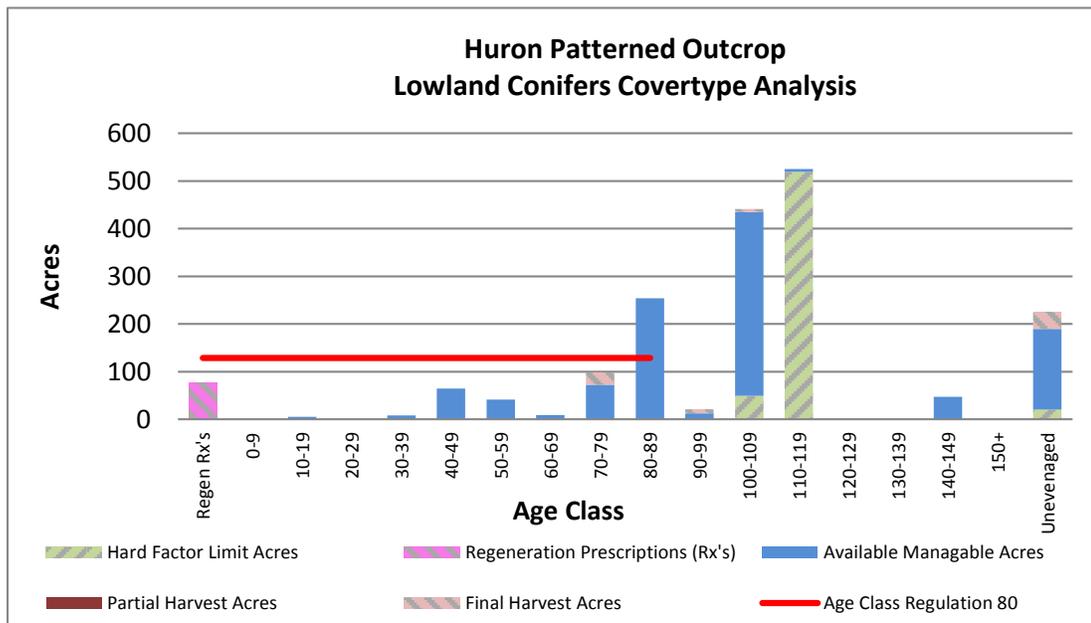


Figure 4.16.5. Age-class distribution of lowland conifers in the Huron Patterned Outcrop management area (2011 Department of Natural Resources inventory data).

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.

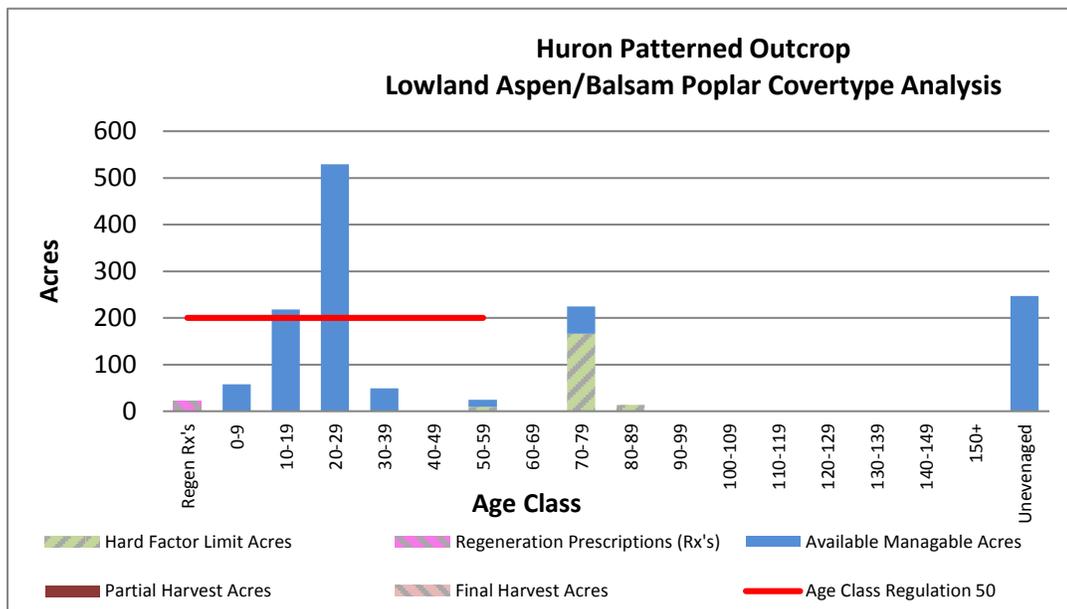


Figure 4.16.6. Age-class distribution of lowland aspen/balsam poplar in the Huron Patterned Outcrop management area (2012 Department of Natural Resources inventory data).

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 *Hypoxyylon* 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

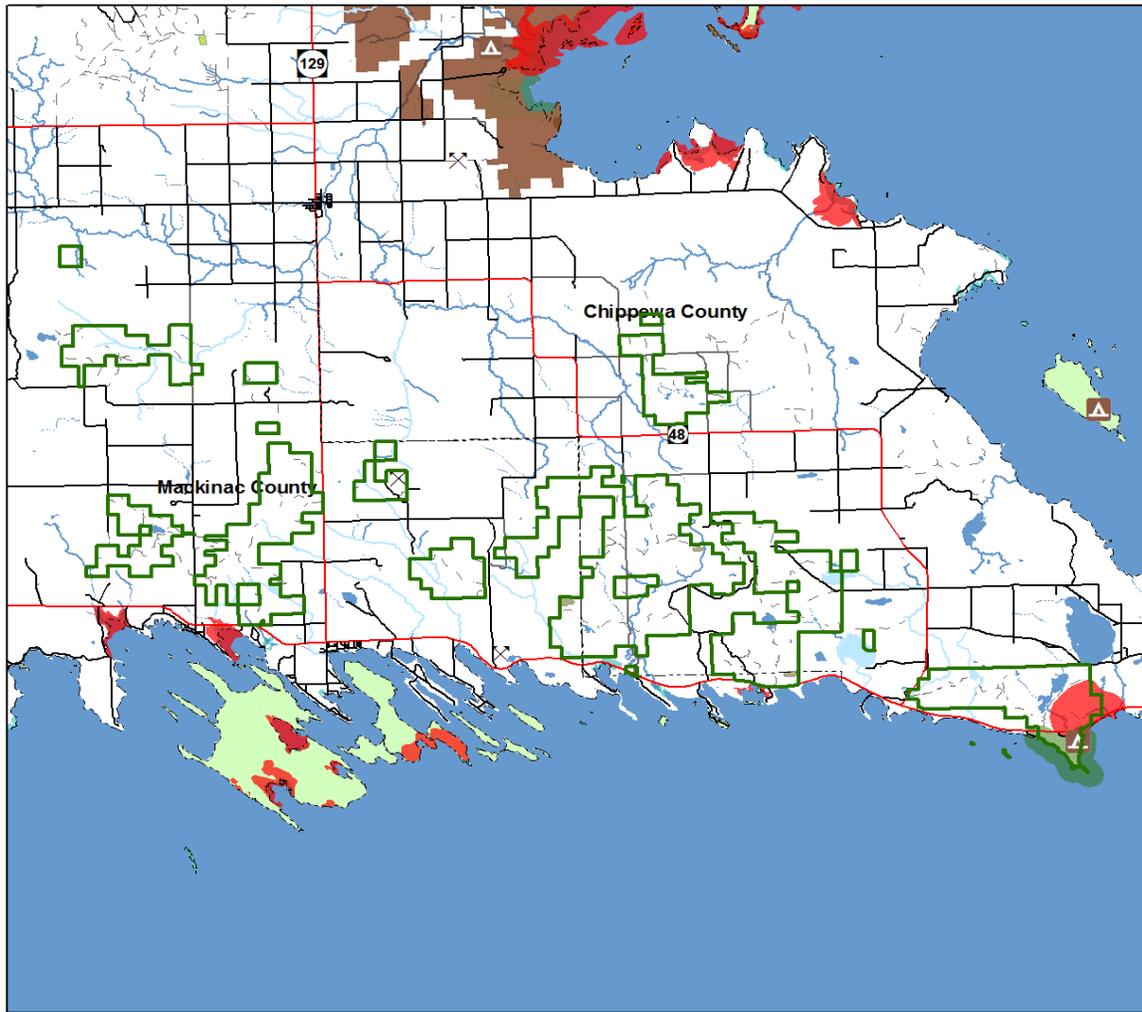
Invasive exotic species, specifically plants, may pose a significant forest health threat to forested and non-forested areas throughout the management area. The statewide database of invasive plant species does not yet document any known species or locations within or surrounding the management area. 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
Natural Communities								
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
Birds								
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
Snails								
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
Plants								
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.