4.6 MA 6 – Cheboygan Basin Moraines Management Area

Summary of Use and Management

Management in the Cheboygan Basin Moraines management area (MA) will emphasize balancing age classes of aspen, red pine and lowland poplar and the continuation of selective management of the northern hardwood resource. Management will strive to sustainably produce various forest products, enhance game and non-game wildlife habitat, protect areas of unique character and provide for forest-based recreational uses. With about 7% of the management area being lowland, management activities are expected to be minimally constrained. Expected trends within this 10-year planning period are increased recreational pressure; introduced pests and diseases; elk browsing that influences forest regeneration and increased development; and the resulting increase in the use of state forest lands that has resulted in adverse impacts, particularly off-road vehicle damage.

Introduction

This management area is located near the northern tip of the northern Lower Peninsula in Cheboygan and Presque Isle counties and contains 41,793 acres of state forest (Figure 4.1). The primary attributes which identify the Cheboygan Basin Moraines management area include:

- The management area falls mostly within Albert's Onaway sub-region (Albert, 1995).
- The historic cover types were dominated by northern hardwoods with very small acreages of aspen. In areas influenced by frequent fire from adjacent drier areas, pine was prominent. The current vegetation composition is mostly aspen, red pine, northern hardwoods, lowland poplar and jack pine. This management area has very limited (7%) relatively inaccessible lowland types.
- The dominant landform consists of rolling to moderately sloping ground moraines topography. Drumlins are common and are typically separated by poorly drained outwash.
- This management area's proximity to and use-demand by population concentrations Black Lake and the town of Onaway. The forest resources contribute social and economic values to the area due to the proximity of this management area to the population centers.
- Department of Natural Resource recreation facilities in the area include nearby Onaway State Park, Black Mountain Recreation Area, Tomahawk and Shoepac state forest campgrounds.
- Snowmobile and off-road vehicle trails, the Shoepac Sinkholes Pathway and Northeast State Trail cross the area.
- Surveys have located the several threatened, endangered or special concern species including red-shouldered hawk, common loon, secretive locust, hill's thistle and Alleghany plum.
- This management area contains one or more of the northern Lower 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. 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.

Table 4.6.1. Current cover types, acreages, projected harvests and projected acreages at the end of the ten-year planning period for the Cheboygan Basin Moraines management area, northern Lower 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	37%	15,361	1,501	13,860	2,636		15,361	2,310	
Red Pine	11%	4,652	271	4381	1,310	1,427	4,652	487	2,216
Northern Hardwood	7%	2,816	50	2766		1,311	2,816		1,311
Lowland Conifers	6%	2,372	1,898	474	53		2,372	53	
Oak	5%	1,915	878	1037	191	289	1,915	115	296
Cedar	4%	1,738	1,738				1,738		
Lowland Aspen/Balsam Poplar	4%	1,695	848	848	141		1,695	141	
Jack Pine	4%	1,684	430	1254			1,684	179	
Lowland Deciduous	3%	1,097	768	329	40		1,097	40	
Upland Open/Semi-Open Lands	6%	2,579		2579			2,579		
Lowland Open/Semi-Open Lands	6%	2,464		2464			2,464		
Misc Other (Water, Local, Urban)	1%	313		313			313		
Others	7%	3,107	1,025	2082	337	280	3,107	244	567
Total		41,793	9,406	32,387	4,708	3,307	41,793	3,569	4,390

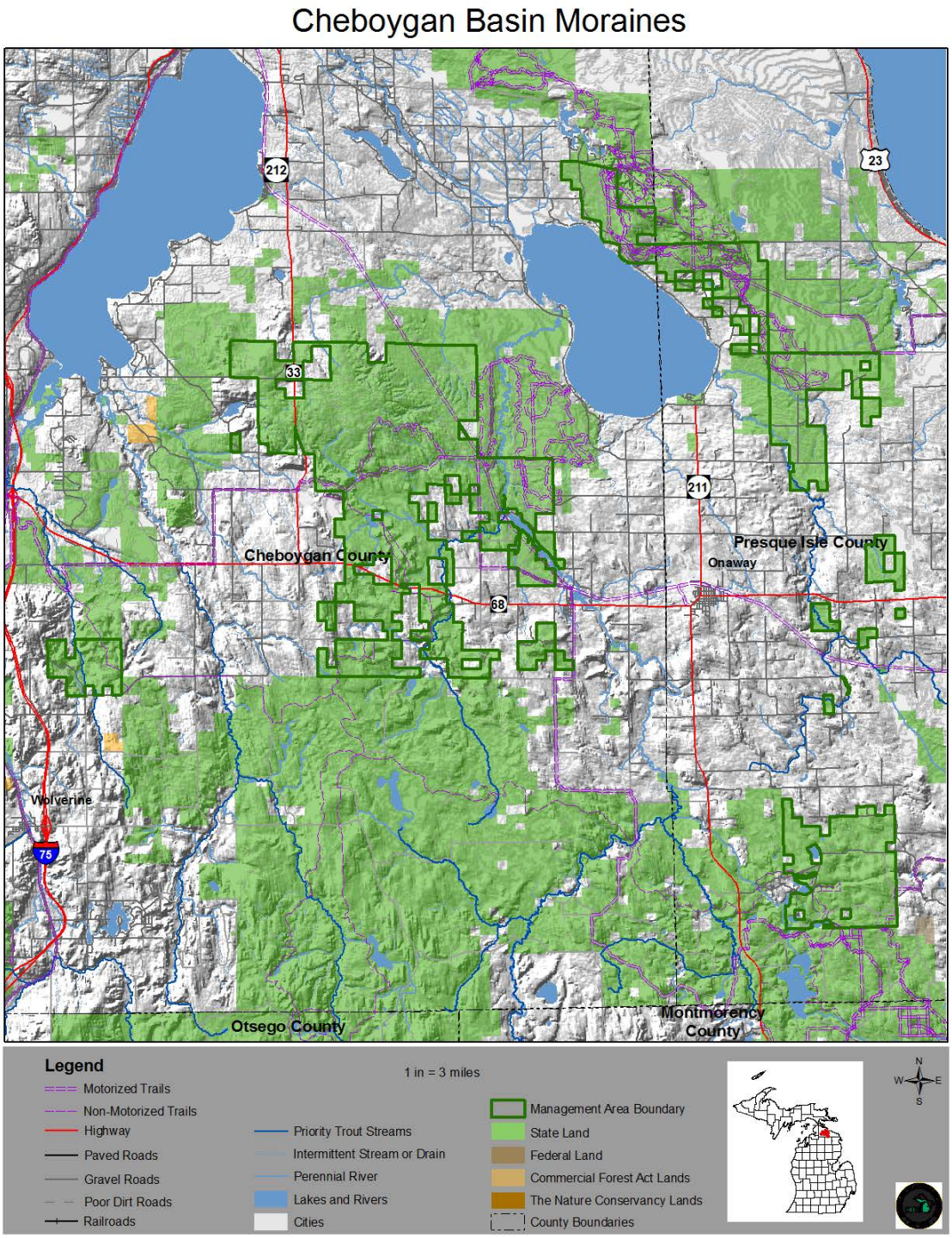

Figure 4.6.1. A map of the Cheboygan Basin Moraines management area (dark green boundary) in relation to state forest and other lands in Cheboygan and Presque Isle counties, Michigan.

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 or mowing) will be conducted. In other portions of the state forest, natural succession will achieve ecological objectives. While most stands have a variety of trees species and other vegetation, stands or communities are classified by the species which has the dominant canopy coverage.

4.6.1.1 Forest Cover Type Management – Aspen

Current Condition

Aspen acres total 15,361 or 37% of the management area (Table 4.1). Forest communities dominated primarily by aspen in this management area are valued ecologically as sources of habitat for numerous species of wildlife including ruffed grouse, hare, woodcock, bear, white-tailed deer and various song birds; commercially for pulp and saw logs; and for a wide range of forest recreation. Aspen occurs throughout the area. Most of the aspen in this management area is younger than the 50-year rotation age (Figure 4.6.2) as accessible aspen has been consistently harvested over the last 50 years. There are 1,501 acres of aspen have met harvest criteria but have site conditions that limit harvest (hard factor limited acres).

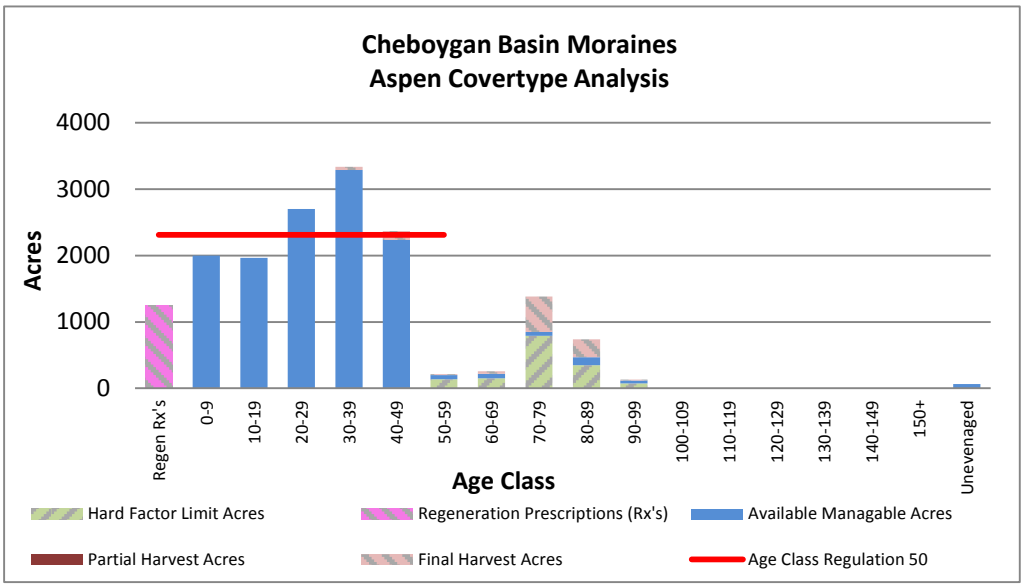

Figure 4.6.2. Age-class distribution for aspen in the Cheboygan Basin Moraines management area (2012 Department of Natural Resources inventory data).

There are 1,253 acres of stands that have regeneration harvest pending and these acres are included in the regeneration prescription class.

Desired Future Condition

- Aspen-dominated forest communities 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

- Conduct final harvests on a projected 2,636 acres targeting the oldest age class first;
- Consider harvesting stands below the rotation age (50 years) to expedite balancing the age-class distribution; 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

- Continue final harvests to balance the aspen age-class distribution; and
- Desired future harvest levels are projected at 2,310 acres of final harvest per 10-year period.

4.6.1.2 Forest Cover Type Management – Red Pine

Current Condition

Red pine acres total 4,652 acres or 11% of the management area (Table 4.6.1), with most being 70 to 79 years old. Red pine in this management area is commercially valued for pulp, saw logs and utility poles. Nearly all of the pine is of planted origin. There are 271 acres of red pine that have met harvest criteria but have site conditions that limit harvest.

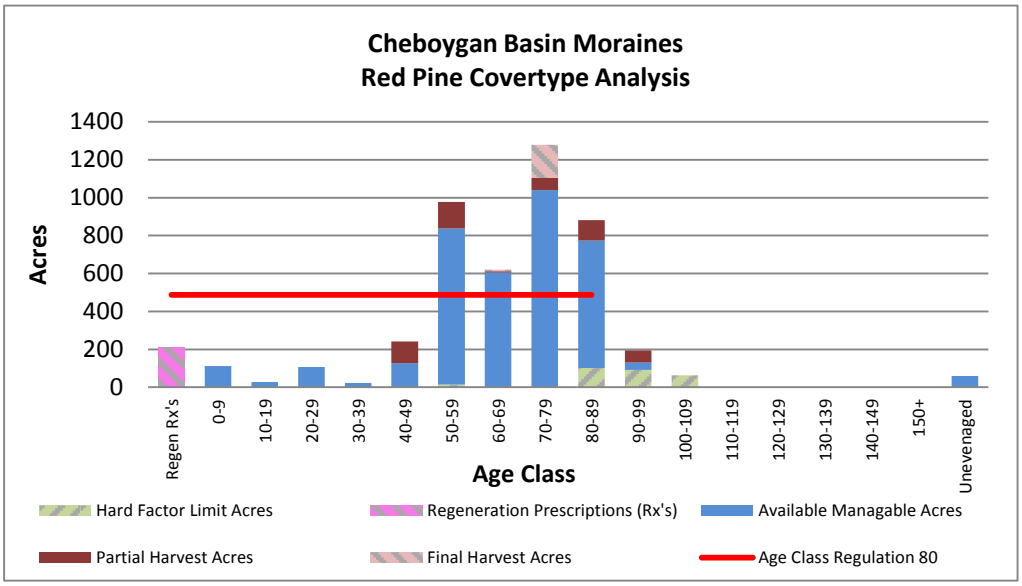

Figure 4.6.3. Age-class distribution for red pine in the Cheboygan Basin Moraines management area (2012 Department of Natural Resources inventory data).

There are approximately 208 acres that have a regeneration harvest pending and these acres are shown in the regeneration prescription class (Figure 4.6.3). There are another 494 acres of red pine with a partial harvest pending and these acres are shown in their current age classes.

Desired Future Condition

- Red pine on dry-mesic sites will be maintained and managed with a thinning regime until stand replacement harvest at economic maturity with acres balanced between 0 and 89 years of age to provide for continual harvest, wildlife habitat and recreational opportunity.

10-Year Management Objectives

- Follow the Red Pine Management Guidelines, which recommends growing red pine on suitable sites and balancing age-class distribution;
- Conduct partial harvests on a projected 1,427 acres;
- Conduct final harvests on a projected 1,310 acres; and
- Much of the red pine is concentrated in the Black Mountain Recreation Area where proximity to the many trails in the area may limit management options.

Long-Term Management Objectives

- In identified special conservation areas, consider management of red pine to a biological rotation of 200+ years; and
- Desired future harvest levels are projected at 487 acres of final harvest and 2,216 acres of partial harvest per 10-year period.

4.6.1.3 Forest Cover Type Management – Northern Hardwoods

Current Condition

Northern hardwoods acres total 2,816 acres or 7% of the management area (Table 4.6.1). Forest communities dominated by northern hardwoods, primarily northern hardwoods, in this management area are valued ecologically as sources of habitat for numerous species of wildlife including bear, white-tailed deer and various song birds, commercially for pulp and saw logs and for a wide range of forest recreation. Currently there are 23 acres with a regeneration harvest pending and 313 with a partial harvest pending and these acres are included basal area range (Figure 4.6.4).

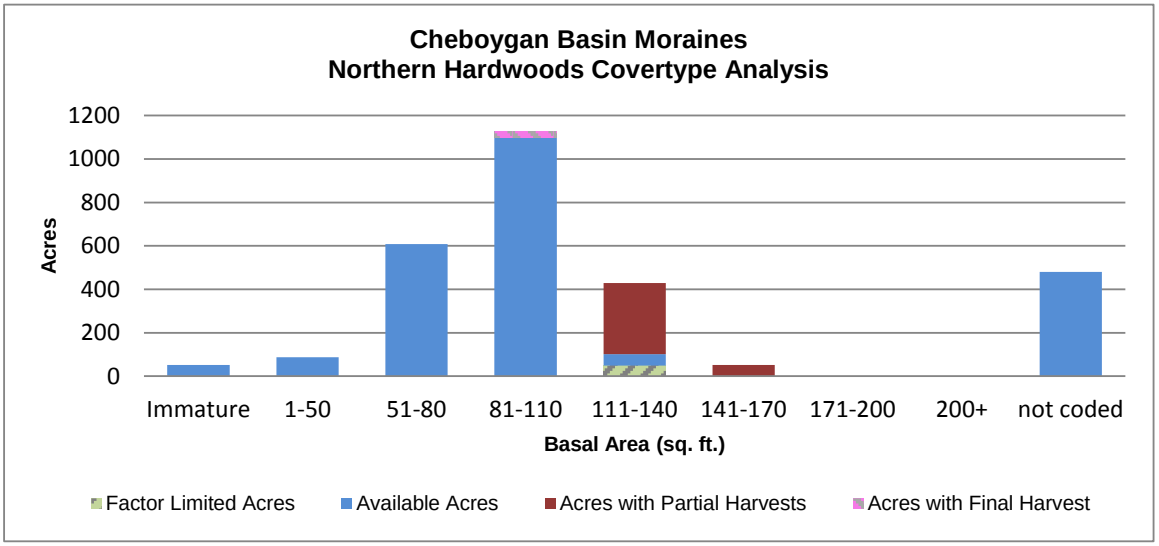

Figure 4.6.4. Basal area distribution for northern hardwoods in the Cheboygan Basin Moraines management area (2012 Department of Natural Resources inventory data).

Data show that 50 acres are unavailable for harvest due to access or some other issue that limits the ability to harvest.

Desired Future Condition

- Northern hardwood-dominated forest communities will be maintained on operable sites through selective harvesting to achieve an all-aged stand structure to provide for a continuous supply of timber products, wildlife habitat and recreation opportunity.

10-Year Management Objectives

- Conduct partial harvests on a projected 1,311 acres of northern hardwood concentrating on those areas with a basal area above 110 square feet per acre.

Long-Term Management Objectives

- Emerald ash borer and beech bark disease will change the stand composition of the northern hardwoods in this management area. As these species lessen in the northern hardwood stands, consider introducing oak for mast;
- Continue to conduct salvage harvests of beech affected by beech bark disease and ash where present and affected by emerald ash borer, in northern hardwood stands, using Beech Bark Disease Management Guidelines and Emerald Ash Borer Guidelines; and
- Consider the need to delay further selection harvesting due to resultant lower than normal residual basal area in post-salvage harvest stands.

4.6.1.4 Forest Cover Type Management – Cedar and Lowland Conifer

Cedar (Figure 4.6.5) acres total 1,738 or 4% of the management area (Table 4.6.1) and lowland conifers (Figure 4.6.6) acres total 2,372 or 6% of the management area (Table 4.6.1) constituting a significant portion of the management area. However, all 1,738 acres of cedar and 1,898 acres of lowland conifers are factor limited due to access and operability issues. These lowland species may offer only limited opportunities for management.

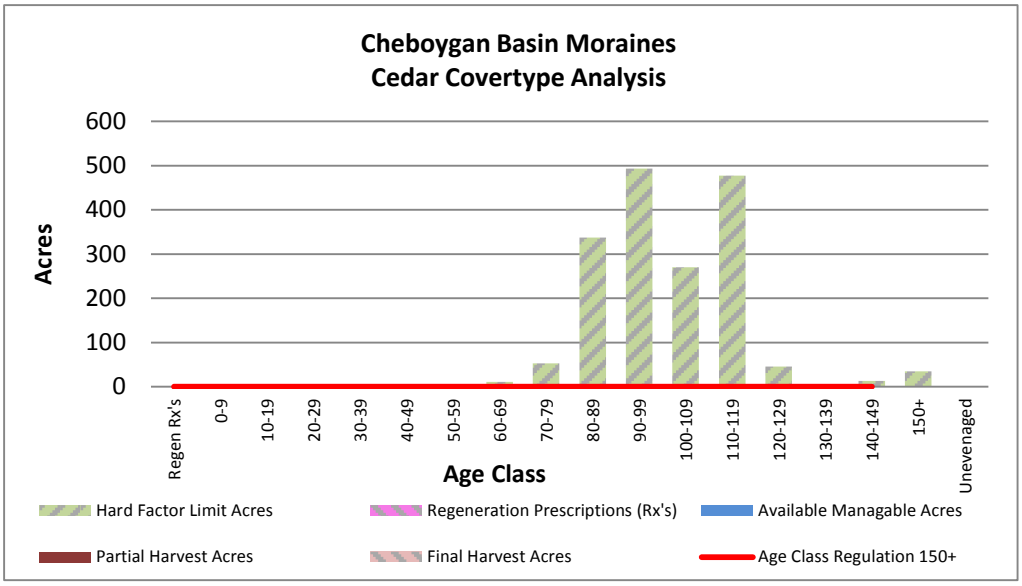

Figure 4.6.5. Age-class distribution for cedar in the Cheboygan Basin Moraines management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

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

10-Year Management Objectives

- Conduct regeneration harvests on a projected 53 acres of lowland conifers;
- Additional opportunities to increase harvest prescriptions in lowland forest types will be assessed, both in and outside (due to forest health issues) of normal years of entry; and
- Consider methods to ensure adequate regeneration of cedar and lowland conifer.

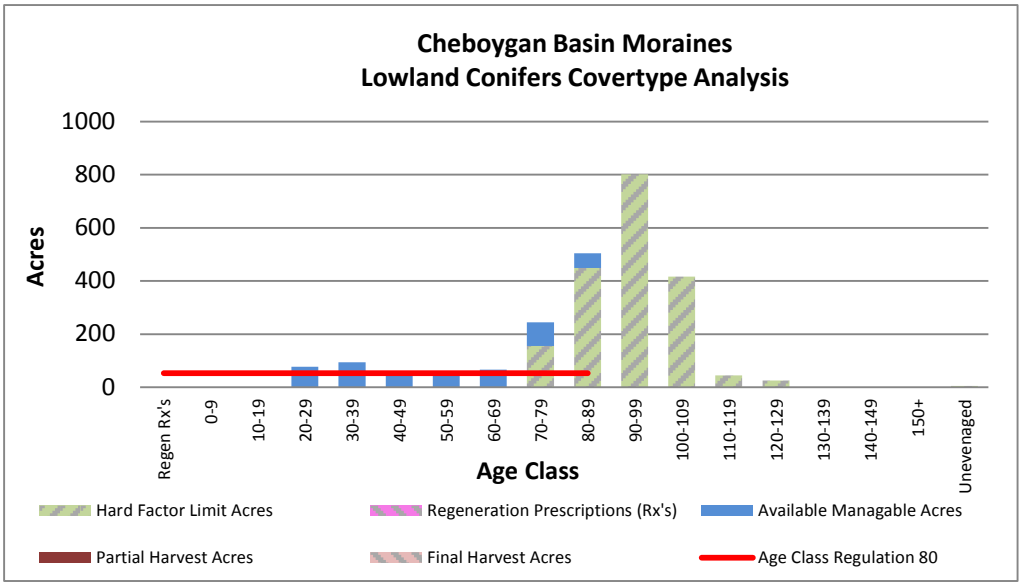

Figure 4.6.6. Age-class distribution for lowland conifers in the Cheboygan Basin Moraines management area (2012 Department of Natural Resources inventory data).

Long-Term Management Objectives

- Continue efforts to regenerate lowland types where feasible; and
- The desired future harvest level of 53 acres for final harvest of lowland conifer is projected per 10-year period.

4.6.1.5 Forest Cover Type Management – Oak

Current Condition

Oak acres total 1,915 acres or 5% of the management area (Table 4.6.1). Oak occurs on glacial outwash plains, sandy beach ridges and coarse textured moraines (habitat classes: PArVHa and ParVHa/PArVVb (see Appendix E)).

The age-class distribution of oak (Figure 4.6.5) is heavily skewed toward the older age classes above 70 and there has been very little regeneration in the last 60 years. Forest communities dominated by oak in this management area, are valued ecologically as sources of habitat for numerous species of wildlife including white-tailed deer, commercially for pulp and saw logs and for a wide range of forest recreation. There are 878 acres of oak have met harvest criteria, but have site conditions that limit harvest.

Desired Future Condition

- Oak in stands and as a component in stands throughout the management area will be maintained through management to provide for timber products, wildlife habitat and recreational opportunities.

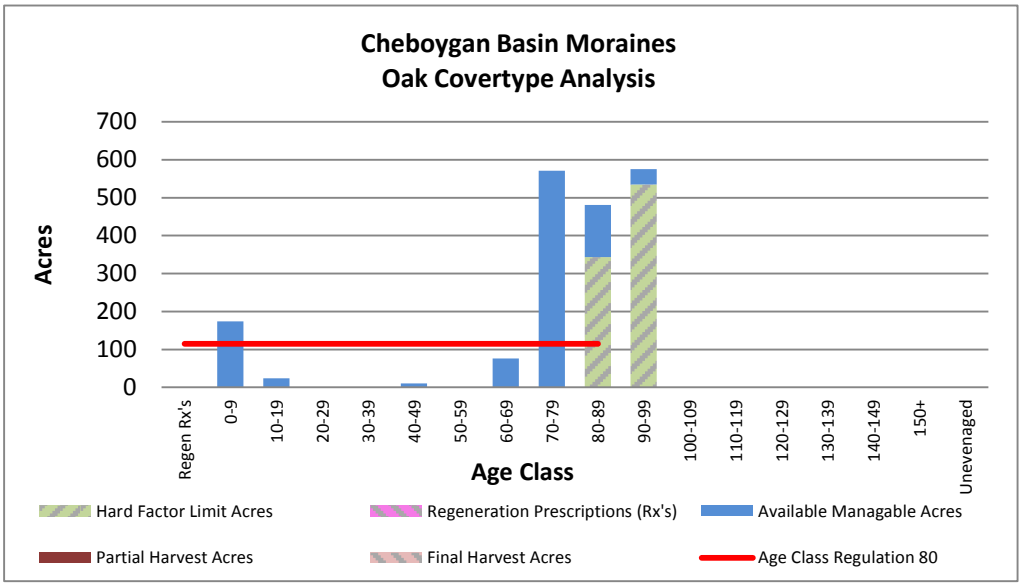

Figure 4.6.7. Age-class distribution for oak in the Cheboygan Basin Moraines management area (2012 Department of Natural Resources inventory data).

10-Year Management Objectives

- Conduct partial harvests on a projected 289 acres;
- Conduct final harvests on a projected 191 acres; and
- Maintain or expand oak as a component in stands throughout the management area through retention and management for natural regeneration on other cover types.

Long-Term Management Objectives

- Continue work towards maintaining oak as the predominant species in selected stands through final harvests;
- It is acceptable that some oak stands may become mixed stands through partial removal of an oak over story, planting pine in oak stands or through natural regeneration of other species;
- Continue to seek opportunities to maintain or expand oak as a component of stands throughout the management area; and
- Desired future harvest levels are projected at 115 acres for final harvest and 296 acres for partial harvest per 10-year period.

4.6.1.6 Forest Cover Type Management – Lowland Aspen/Balsam Poplar

Current Condition

Lowland aspen/balsam poplar acres (Figure 4.6.6) (primarily a mix of balsam poplar, swamp aspen and swamp white birch) total 4,603 acres or 12% of the management area (Table 4.2.1).

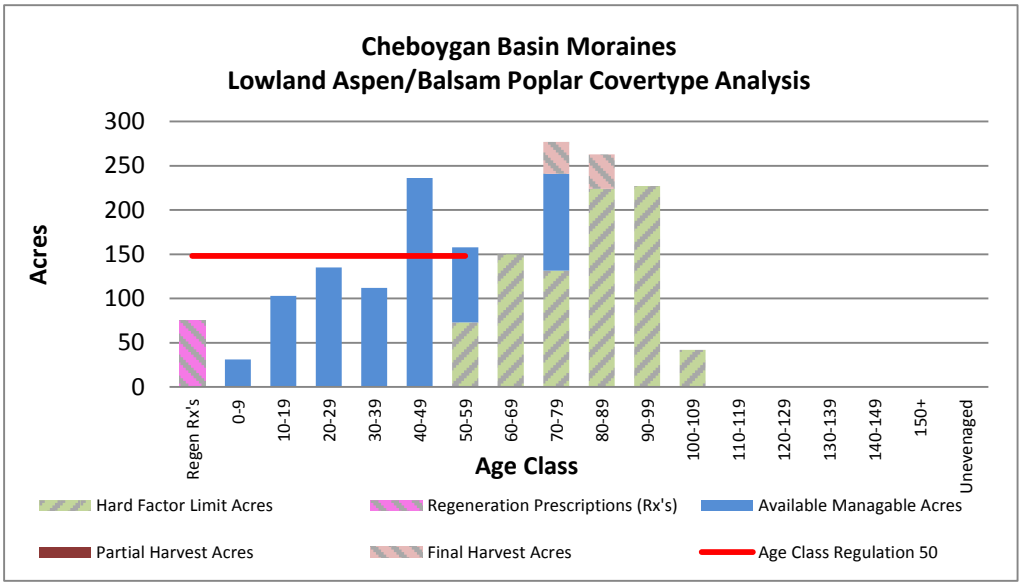

Figure 4.6.8. Age-class distribution for lowland aspen/balsam poplar in the Cheboygan Basin Moraines management area (2012 Department of Natural Resources inventory data).

Lowland aspen/balsam poplar is distributed throughout the management area on areas with a perched water table or seasonally flooded and unclassified lowlands (habitat class: PArVCo). Forest cover types dominated primarily by lowland aspen/balsam poplar in this management area are valued ecologically as sources of habitat for numerous species of wildlife including bear, white-tailed deer and various song birds and commercially for pulp. There are 848 acres of lowland poplar that have met harvest criteria, but have site conditions that limit harvest. Currently, 75 acres of stands have a final harvest pending and these acres are included in the regeneration prescriptions (Rx's) class.

Management may be severely constrained by access issues due to the wet nature of the management area and/or stands that may be too wet for operations. However, young-dense stands of lowland aspen/balsam poplar are an important habitat for species such as ruffed grouse and snowshoe hare.

Desired Future Condition

- Lowland aspen/balsam poplar-dominated forest cover types will be maintained on operable sites through even-aged management with acres balanced between 0 and 59 years of age to provide for a sustainable harvest, wildlife habitat and to contribute to the preservation of regional biodiversity.

10-Year Management Objectives

- Conduct regeneration harvests on a projected 141 acres of lowland aspen/balsam poplar that is age 50 and greater, if it can be done in a manner that will not adversely impact wetland soils; and
- If necessary and feasible, consider habitat cuts in inaccessible or inoperable sites to improve early successional habitat.

Long-Term Management Objectives

- It is acceptable that the older factor-limited lowland poplar, much of it inaccessible for management, will continue to experience natural processes (windthrow, flooding and senescence) resulting in other species encroaching into the understory;
- Consider adaptations to management as a result of emerald ash borer impacts on black ash;
- Continue management on operable sites to provide forest products, wildlife habitat and biodiversity values; and
- Desired future harvest levels are projected at 141 acres of final harvest per 10-year period.

4.6.1.7 Forest Cover Type Management – Lowland Open/Semi-Open Lands

Current Condition

Lowland open/semi-open lands (lowland shrub, marsh, treed bog, bog) communities in this management area are valued ecologically as sources of habitat for numerous species of wildlife. Lowland open/semi-open acres total 2,464 acres or 6% of the management area (Table 4.6.1).

Desired Future Condition

- Lowland open/semi-open lands sites will be maintained at or above current levels to provide wildlife habitat.

10-Year Management Objectives

- Management in lowland open/semi-open lands will be minimal. What little maintenance that will be done will be to maintain the hydrology and open characteristics.

Long-Term Management Objectives

- Continue management to maintain upland open/semi-open lands at or above current levels;
- Continue to protect stands from illegal off-road vehicle use; and
- Where feasible and necessary, use control methods on invasive non-native species.

4.6.1.8 Forest Cover Type Management – Upland Open/Semi- Open Lands

Current Condition

Upland open/semi-open acres total 2,579 acres, or 6% of the management area. This category is a combination of the following non-forested land cover types: herbaceous open land, upland shrub and bare/sparsely vegetated and low density trees. These non-forested areas are a result of natural processes of fire, frost or other disturbances which create openings in the forest canopy along with the past management practices to maintain these areas. These communities are valued ecologically as sources of open land habitat for numerous species of wildlife.

Desired Future Condition

- Maintain upland open/semi-open lands at or above the current level to provide habitat for species which use openings.

10-Year Management Objectives

- Consider management to maintain upland open/semi-open lands.

Long-Term Management Objectives

- Continue management to maintain upland open/semi-open lands at or above current levels;
- Continue to protect stands from illegal foo-road vehicle use; and
- Where feasible and necessary, use control methods on invasive non-native species.

4.6.1.9 Forest Cover Type Management – Other Types

Current Condition

Individual cover types which may cover less than 5% of the management area include: Lowland conifer, 2,372 acres (6% of the management area) and cedar, 1,738 acres (4%) and are a significant portion of the other types and may offer limited opportunities for management. All of the timbered and non-timbered communities have important ecological values and are important habitat for numerous wildlife species.

Desired Future Condition

- 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

- Seek opportunities to harvest, where appropriate, the scattered acreages of upland and lowland minor types where access and operability will not adversely impact sensitive areas;
- Additional opportunities to increase harvest prescriptions in lowland forest types will be assessed, both in and outside (due to forest health issue) of normal years of entry;
- Consider methods to ensure regeneration of lowland types; and
- Other species which make up a small percentage of the management area contribute to the balance of the projected 363 final harvest acres and 280 partial harvest acres.

Long-Term Management Objectives

- Continue efforts to regenerate lowland types where feasible; and
- Desired future harvest levels are for lowland deciduous (40 acres) and lowland conifer (53 acres) is projected to remain steady per 10-year period.

4.6.2 Featured Wildlife Species

Each of the featured species outlined below includes recommended practices with regard to forest and/or wetland management.

This management area includes a northern Lower Peninsula Grouse Enhanced Management System area. The boundary 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 Grouse Enhanced Management System area boundary may be managed on a shortened rotation with multiple age classes and smaller stand sizes to enhance hunting opportunities for ruffed grouse, woodcock, deer, turkey and hare. The remainder of the management area (outside the boundary) will be managed based on the direction in the management area write up.

The following have been identified as featured species for this management area during this cycle of state forest planning:

- Elk
- Pileated woodpecker
- Red-shouldered hawk
- Ruffed grouse
- Wild turkey
- White-tailed deer

The primary focus of wildlife habitat management in the Cheboygan Basin Moraines management area will be to address the habitat requirements identified for the listed featured species. Based on the selected featured species, some of the most significant wildlife management issues in the management area are the maintenance of young forest, extensive mature forest and large open grassland complexes, the retention of large, over-mature trees and snags and the maintenance and expansion of hard mast and mesic conifer components.

A more detailed overview of featured species is included in Section 3.

Elk

The goal for elk in the northern Lower Peninsula is to maintain the population at 500-900 animals as measured in the biennial aerial survey. Elk prefer open areas and regenerating deciduous forest. Mast crops, especially acorns, are important sources of food in fall and winter. State forest management should focus on maintaining/increasing early successional, opening and hard mast habitat components at/to desired levels in priority landscapes.

Wildlife Habitat Specifications:

The goals of habitat management in the elk range are described in the 2007 Pigeon River Country Concept of Management:

- Maintain 7-8% of the forest cover types managed by even aged management in the 0-9 year-old age class;
- Maintain the existing aspen component;
- Increase the amount of opening and upland brush to 6-7 percent of the range; and
- Maintain the existing component of mast producing trees (red oak, white oak, northern pin oak and beech).

Pileated Woodpecker

The goal for pileated woodpecker in the northern Lower Peninsula is to maintain available habitat. Pileated woodpeckers prefer stands greater than 40 years old for foraging and greater than 70 years old for nesting and roosting and abundance is positively related to the density of trees >12 inches in diameter at breast height. State forest management should focus on the maintenance of a component of large diameter trees (>12 inches in diameter at breast height) at the landscape scale.

Wildlife Habitat Specifications:

- Maintain a component of large diameter trees greater than 12 inches in diameter at breast height.
    - Implementation of Within-Stand Retention Guidance, factor-limited acres, uneven-aged management in the northern hardwoods type, special conservation areas with objectives for big tree management and continued mortality from insect and disease will be sufficient to meet the pileated woodpecker habitat specifications for large trees in this management area.

Red-shouldered Hawk

The goal for red-shouldered hawk in the northern Lower Peninsula is to maintain available habitat. Red-shouldered hawks nest in contiguous, mature, closed canopy, hardwood forests. Nesting habitat consists primarily of well-stocked pole or sawtimber stands (stocking densities 6 and 9) with a closed canopy (80-100%) and basal area of at least 98 square feet per acre. Nests are usually found in deciduous trees with a mean 23 inches in diameter at breast height. State forest 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 suspected red-shouldered hawk nests are to be reported to local wildlife staff and confirmed nests 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 Prescriptions Geographic Decision Support System when there is an expected operational impact. For red-shouldered hawk, 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.

Ruffed Grouse

The goal for grouse in the northern Lower Peninsula is maintain available habitat. Ruffed grouse prefer young (6-15 year-old) even-aged deciduous stands that typically support 8,000-10,000 woody stems/acre. Although ruffed grouse use many different forest types (aspen, birch, oak-hickory) aspen can support higher densities than those attained in other forest types. The juxtaposition of different age-classes allows for different life history requirements to be met within a small area, and promotes higher grouse densities. Ideal aspen stands will be of 40-160 acres under a 40-year rotation with staggered

harvests of 25% every 10 years in 10-40 acre harvest units. Larger harvest units should have irregular boundaries and include one or two 1-3-acre unharvested inclusions. State forest management should focus on maintaining and balancing the age-class distribution for aspen and oak cover types in priority landscapes.

Wildlife Habitat Specifications:

- Maintain the aspen cover type and the aspen component in mixed stands within the management area.
  - Implementation of 10-year management direction for aspen, lowland aspen and lowland deciduous will be sufficient to meet this ruffed grouse habitat specification.
- Move to balance the age-class distribution of aspen and continue management to regenerate oak to maintain young forests across the management area.
  - Implementation of 10-year management direction for aspen, lowland aspen, lowland deciduous and oak will be sufficient to meet this ruffed grouse habitat specification.
- Maintain the upland shrub cover type specifically juneberry, hawthorn, cherry and other mast producing shrub components.
  - Implementation of 10-year management direction for upland brush will be sufficient to meet this grouse habitat specification.
- 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.

Wild Turkey

The goal for turkey in the northern Lower Peninsula is maintain available habitat. In northern Lower Peninsula, snow depth is the primary limiting factor that restricts turkey population expansion as deep snow limits access to winter food. The availability of acorns can help mediate the impacts of deep snow. A secondary limiting factor throughout their range is good brood cover. Openings with grasses and forbs and little or no overstory trees are preferred. State forest management should focus on providing natural winter food, maintaining and regenerating oak and maintaining brood-rearing openings to improve brood-production and winter survival.

Wildlife Habitat Specifications:

- Maintain and increase the number of brood-rearing openings (forest openings, savannas, barrens, hayfields, etc.)
  - Implementation of 10-year management direction for upland open land will be sufficient to meet this turkey habitat specification.
- Through opening maintenance, planting and pruning, provide sources of winter food that are accessible above the snow (food plots, annual grains, fruit-bearing trees or shrubs).
  - Implementation of 10-year management direction for upland open land will be sufficient to meet this turkey habitat specification.
- Conduct silvicultural practices that conserve the oak component in forest stands and promote oak regeneration.
  - Implementation of 10-year management direction for oak will be sufficient to meet this turkey habitat specification.

White-tailed Deer

The goals for white-tailed deer habitat in the northern Lower Peninsula are to: 1) Maintain spring and summer forage and improve recreational access through openings management; 2) Maintain the overall proportion of potential woody browse such as aspen; 3) Maintain or increase the oak component in forest stands and promote oak regeneration; and 4) Maintain and promote functional shelter in wintering complexes.

Wildlife Habitat Specifications:

- Annual manage at least 3,000 acres of forest openings across the ecoregion to provide spring and summer forage and recreational opportunities.
  - Implementation of 10-year management direction for upland open land and upland shrub will be sufficient to meet this deer habitat specification.
- Maintain the aspen cover type and the aspen component in mixed stands within the management area.
  - Implementation of 10-year management direction for aspen, lowland aspen and lowland deciduous will be sufficient to meet this deer habitat specification.

- Move to balance the age-class distribution of aspen and continue management to regenerate oak to maintain young forests across the management area.
  - Implementation of 10-year management direction for aspen, lowland aspen, lowland deciduous and oak will be sufficient to meet this deer habitat specification.
- Conduct silvicultural practices that conserve the oak component in forest stands and promote oak regeneration.
  - Implementation of 10-year management direction for oak will be sufficient to meet this deer habitat specification.
- Manage cedar and hemlock with the main objectives of regeneration and providing future functional cover.
  - Implementation of 10-year management direction for cedar and lowland conifer will be sufficient to meet this deer habitat specification.
- Promote hemlock on appropriate sites using silviculture to increase within-stand hemlock components.

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 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 4.6.2. 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 4.6.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Cheboygan Basin Moraines 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
Birds								
Northern goshawk	*Accipiter gentilis*	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	*Buteo lineatus*	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
Common loon	*Gavia immer*	T/G5/S3-4	Confirmed	HV	Very High	Emergent Marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
Reptile								
Blanding's turtle	*Emydoidea blandingii*	SC/G4/S3	Confirmed	HV	Very High	Mesic prairie	Upland open/semi-open	N/A
						Dry-mesic prairie	Upland open/semi-open	N/A
						Mesic sand prairie	Upland open/semi-open	N/A
						Coastal fen	Lowland open/semi-open	N/A
						Rich conifer swamp	Tamarack	Late
						Northern fen	Lowland open/semi-open	N/A
						Submergent marsh	Lowland open/semi-open	N/A
						Bog	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
						Wet prairie	Lowland open/semi-open	N/A
						Prairie fen	Lowland open/semi-open	N/A
						Great Lakes marsh	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Coastal plain marsh	Lowland open/semi-open	N/A
						Wet-mesic sand prairie	Lowland open/semi-open	N/A
						Floodplain forest	Lowland mixed	Mid
						Inundated shrub swamp	Lowland open/semi-open	N/A
Wood turtle	*Glyptemys insculpta*	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
Plants								
Hill's thistle	*Cirsium hillii*	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

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

There are no high conservation value areas or ecological reference areas identified for the Cheboygan Basin Moraines management area as illustrated in Figure 4.6.7.

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.

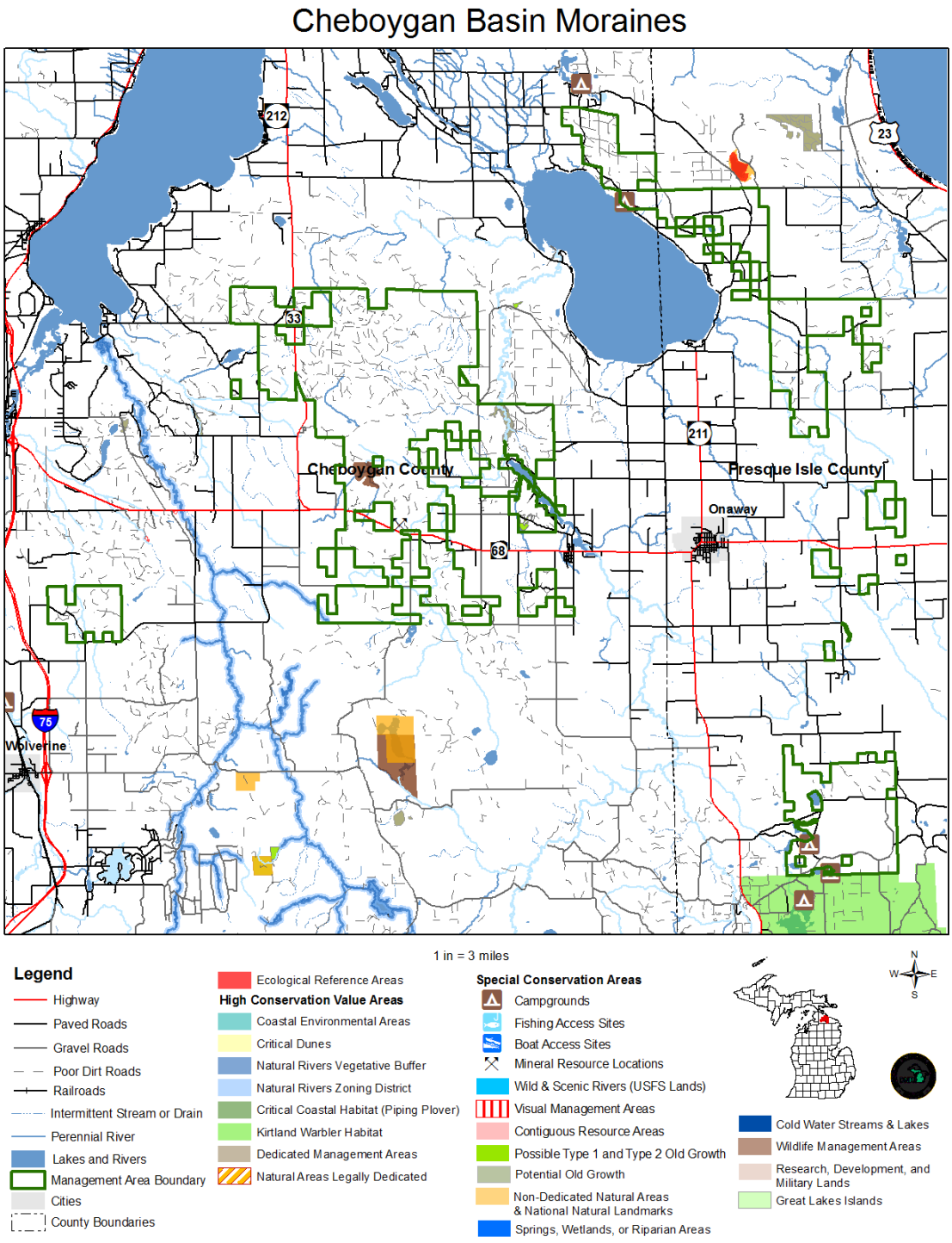

Figure 4.6.7. A map of the Cheboygan Basin Moraines management area showing the special resource areas.

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 include oak decline, emerald ash borer and beech bark disease and management should be adapted as follows:

- Oak decline is most prevalent on frost-prone, nutrient poor outwash plains. Old age and drought predispose areas to two-lined chestnut borer and *Armillaria* root rot. Shorter rotations will reduce the risk of decline;
- Full site use (e.g., stocking, desired species and low species diversity) on high-quality northern hardwood sites heavily impacted by beech bark disease and/or emerald ash borer is important;
- Consider planting red or white oaks, white or red pines, black cherry, white spruce, etc. as site conditions and quality allow; and
- Herbicides may be needed to control competing vegetation and/or to reduce density of ash and beech regeneration.

Invasive Species

Invasive species pose a major threat to forest resources. They impact timber production, wildlife habitat and recreational access. Locations of invasive species mapped in and within a five-mile buffer of the management area are summarized in Table 4.6.3. This information was compiled from the Midwest Invasive Species Information Network database, but it should not be considered complete. This information and other sources that show the extent and location of invasives, will be used to inform the potential for additional sightings that should be documented. Invasives 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 4.6.3. Locations of invasive species mapped in and within a five-mile buffer of the management area (Midwest Invasive Species Information Network database).

Cheboygan Basin Moraines - FMD MA	Cases within FMD Areas	Cases within 5-Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	3	3	3

Invasive Species within FMD Areas	Occurrences	Invasive Species within 5-Mile Buffer	Occurrences
-	-	Reed Canary Grass *Phalaris arundinacea*	1
-	-	Spotted Knapweed *Centaurea stoebe*	1

4.6.5 Aquatic Resources

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. Designated high priority trout streams for this management area are shown in Figure 4.6.1 and listed in Appendix F.

4.6.6 Fire Management

Disturbance through fire has played an important role in the initial propagation and maintenance of oak and natural oak/pine types and small inclusions of aspen or grass/upland brush types. The Michigan DNR has a prescribed fire program and maintains a well-trained staff to conduct prescribed burns for silviculture, habitat maintenance or habitat restoration. Each year, all burns prescribed on state forests, parks and wildlife game lands are evaluated and ranked, with funding allocated to the highest priority burns. The ability to fund prescribed burns is based on available funding, the total acres prescribed for burning and the prioritized ranking of individual burns. The demand for prescribed burning money

frequently exceeds the amount of funding and some recommended burns may not be funded for that fiscal year. Once funded, the ability to implement a burn is dependent on suitable prescribed burning weather, a suitable fuel (vegetation) condition, local staffing and other resources.

The following fire management concepts should be considered in the management area:

- When feasible, seek opportunities to use fire in the oak/pine areas to encourage pine and oak regeneration and to discourage competition;
- When feasible, seek opportunities to incorporate fire as a tool to restore or maintain managed openings; and
- Recognize that increased urbanization in close proximity and within the management area will present more wildland/urban interface challenges to wildfire suppression.

4.6.7 Public Access and Recreation

Access for management and/or recreation is generally limited throughout much of this management area due to wet sites and limited access from adjacent landowners. The department will continue to seek access across adjacent private property. In accordance with the department's *Sustainable Soil and Water Quality Practices on Forest Land*, upon completion of harvesting, temporary spur and seasonal roads will be closed and stabilized.

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.

Opportunities for recreation on state forest lands are abundant in the management area. The Shore-to-Shore horse trail provides opportunities for horseback riding and the Bummer's Roost and Black Lake trails serve off-road vehicle riders. The Shoepac Sinkholes Pathway and Northeast State Trail give hikers a chance explore on foot, while the Tomahawk to Red Bridge Michigan Coast-to-Coast to Cycle Trail provides opportunities for motorcycle riders and the Black Mountain-Silver Creek Snowmobile Trail serves winter enthusiasts. The trails are shown in Figure 4.6.1. State forest campgrounds (Figure 4.6.3) include Black Lake, Shoepac Lake and Tomahawk Lake and there are boating access sites at Black Lake, Shoepac Lake and Little Tomahawk Lake.

Although managing recreational opportunities is the primary responsibility of Parks and Recreation Division, timber management activities may impact the quality of recreational opportunities and management modifications will be considered to minimize these impacts.

Management modifications that may minimize possible recreational trail and other infrastructure impacts are agreed upon by recreation staff in Parks and Recreation Division and Forest Resources Division staff through the compartment review process. Public input received through meetings, including the compartment review process and other forums, will also be considered. Trail protection specifications can be applied through the vegetative management system in the design and administration of timber management activities. Guidance for within-stand retention may also be used along trails to minimize impacts which may include modifications to management such as maintaining conifers to shade winter snow trails or retaining trees along single-track off-road vehicle trails to maintain the integrity of narrow trails. Where modifications to management may not be compatible with timber management objectives, opportunities to educate the public on the department's timber management policies may be considered. Specifications and guidance for management around trails may include, but is not limited to: vegetative management system Sections 5.2.39, 5.2.40, 5.2.41 and 5.2.42, and the Department of Natural Resources Within Stand Retention Guidance.

4.6.8 Oil, Gas and Mineral Development

Surface sediments consist of coarse-textured till, ice-contact outwash sand and gravel, lacustrine (lake) sand and gravel and dune sand. The glacial drift thickness varies between 0 and 600 feet. Sand and gravel pits are located in this management area and there is good potential for additional gravel pits.

The Devonian Antrim Shale, Traverse Group, Bell Shale, Dundee Limestone and Detroit River Group subcrop below the glacial drift. Many of the bedrock formations have limestone/dolomite potential, especially in areas of thin glacial till.

In oil and gas production, the Guelph (former Niagaran) reef play, is located in the Presque Isle County part of the management area. The Collingwood Formation may have oil and gas potential in this area and most of the management area is currently leased. If drilling is sucessful for the Collingwood Formation, additional leasing and drilling in the management area could occur.

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

Administration of oil and gas development on state forest land is provided by both the DNR and Department of Environmental Quality to ensure that minerals shall be developed in an orderly manner to optimize revenue consistent with other public interest and natural resource values.

Lease classification of state lands is guided by DNR Oil and Gas Lease Classification Procedure No. 27.23-15. Contained within each DNR Oil and Gas Lease Agreement are environmental terms which detail requirements for permits to drill issued by the Department of Environmental Quality, supervisor of wells pursuant to Part 615 of 1994 PA 451, as amended. No operations are to take place in a wetland (as defined in Part 303 of 1994 PA 451, as amended), habitat critical to the survival of an endangered species and designated under provisions of Part 365 of 1994 PA 451, as amended or a site designated by the secretary of state to be of historical or archeological significance, unless a plan to eliminate negative impacts to archeological or historical resources is agreed upon. Areas identified as having special wildlife, environmental, recreational significance and/or state surface require a development plan which will minimize negative impacts and will minimize surface waste while remaining consistent with the spacing requirements established by the supervisor of wells. All pipelines from the well site are required to follow existing well roads or utility corridors and all pipelines are to be buried below plow depth. Forest operations (including harvest and planting trees, prescribed fire and wildfire response) in the management area may require modification to accommodate the presence of pre-existing oil and gas pipelines located at or near the ground surface. Abandoned well sites should be incorporated back into state forest stands as either forest openings or re-forested areas, as determined by the vegetation plan contained in the lease agreement or as subsequently decided in compartment review.