4.3 MA 3 – Hammond Bay Lake Plain Management Area

Summary of Use and Management

Management in the Hammond Bay Lake Plain management area (MA) will emphasize balanced age classes of aspen, red pine, oak and lowland poplar. Management will strive to produce sustainable forest products, enhance game and non-game wildlife habitat, protect areas of unique character and provide for forest-based recreational uses in areas such as the Black Mountain Forest Recreation Area. Management activities may be constrained by poor access in this swampy (35% lowland) area. Expected trends within this 10-year planning period are increased recreational pressure, especially near the recreation area and Cheboygan, Hoeft and Onaway state parks; introduced pests and diseases; and the difficulty in regenerating swamp types. The proximity of uplands interspersed with considerable area of swamp types in this management area is conducive to featuring hare, woodcock, grouse, white-tailed deer and bear.

Introduction

The Hammond Bay Lake Plain management area is located near the northern shore of Lake Huron in the northeast Lower Peninsula in Cheboygan and Presque Isle counties and contains 40,016 acres of state forest (Figure 4.1). The primary attributes which identify the Hammond Bay Lake Plains management area include:

- The management area falls within Albert's Onaway and Cheboygan sub-regions (Albert, 1995).
- The historic cover types of hemlock, northern hardwoods, mixed pines and wetlands.
- The current predominant cover types include aspen, red pine, lowland poplar, oak and swamp types.
- The dominant landforms of sandy lake plain over limestone bedrock near the surface.
- Due to the proximity of this management area to the population centers of Cheboygan and Rogers City, the forest resources contribute social and economic values to the area.
- There are two proposed natural areas in this management area:
    - Duck Lake – Mud Lake (253 acres), features dry-mesic northern forest, bog and northern coast plain marsh communities.
    - Lake Sixteen (133 acres), features Lake Sixteen and northern coast plain marsh communities.
- Department of Natural Resources recreation facilities in this management area include Cheboygan, Hoeft and Onaway state parks, Black Mountain Recreation Area and numerous state forest campgrounds and boat launches. Snowmobile, off-road vehicle and hiking trails cross the area.
- Surveys have located the several threatened, endangered or special concern species including red shouldered hawk, eastern massasauga rattlesnake, Blanding's turtle, wood turtle, bayonet rush, Hill's thistle and Hill's pondweed.
- Communities of special concern include intermittent wetland, inter-dune wetland, wooded dune and swale complex and open dunes.

Much of the topography of this management area is dominated by rolling ground-moraines where glaciers sculpted drumlin fields separated by poorly drained outwash. Beach and swale complexes are well developed near the shoreline portions of the management area.

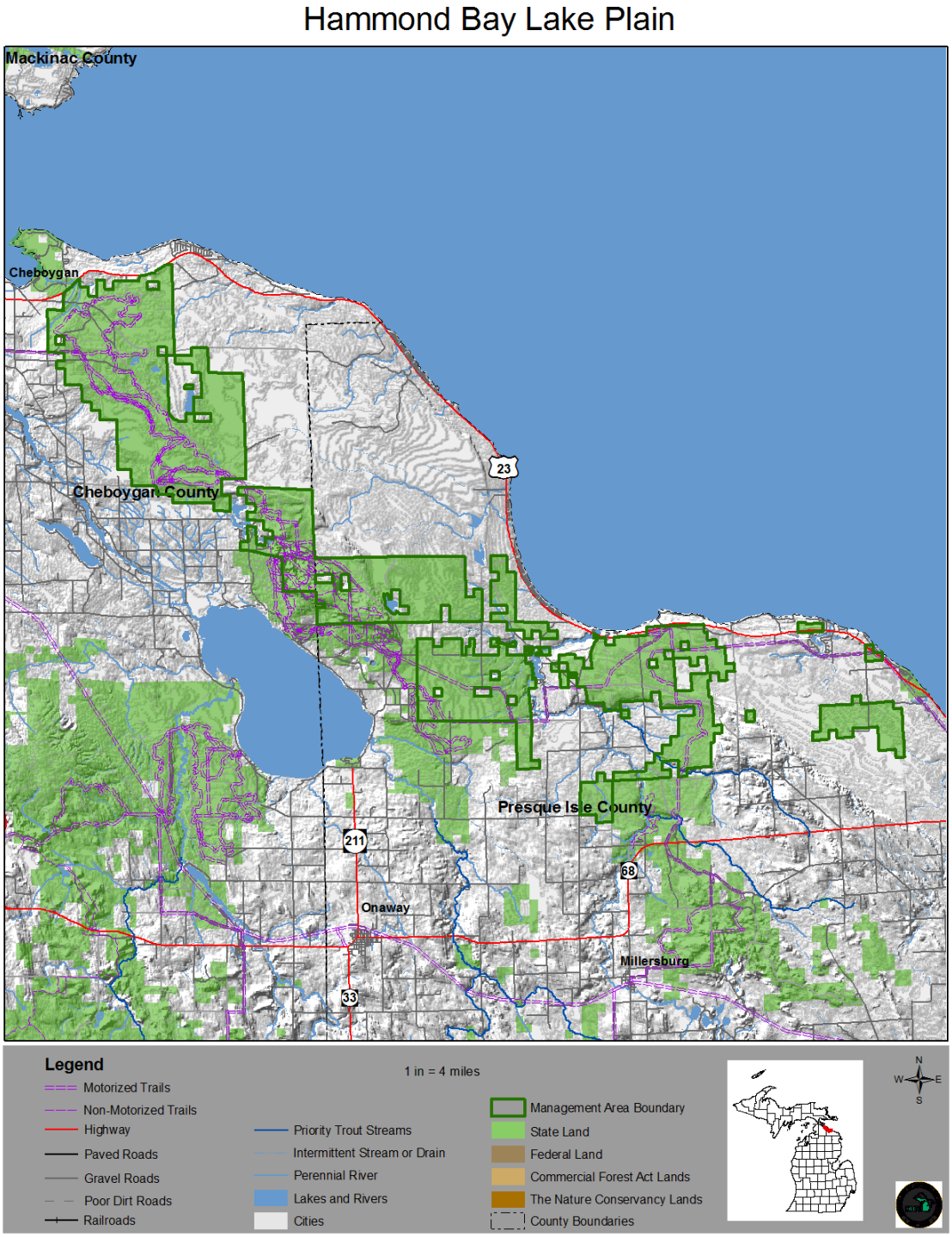

Figure 4.3.1. A map of the Hammond Bay Lake Plain Management Area (dark green boundary) in relation to surrounding state forest and other lands in Cheboygan and Presque Isle counties, Michigan.

Table 4.3.1. Current cover types, acreages, projected harvests and projected acreages at the end of the ten-year planning period for the Hammond Bay Lake Plain 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	22%	8,998	784	8,214	1,846		8,998	1,369	
Red Pine	18%	7,236	707	6529	2,321	2,916	7,236	725	3,684
Lowland Aspen/Balsam Poplar	13%	5,135	2,568	2568	448		5,135	448	
Lowland Conifers	8%	3,074	2,459	615	69		3,074	69	
Oak	5%	2,043	689	1354		320	2,043	150	320
Cedar	4%	1,745	1,745				1,745	2	
Northern Hardwood	4%	1,410	120	1290		418	1,410		568
Lowland Deciduous	3%	1,379	950	429	53		1,379	53	
Jack Pine	3%	1,224	88	1136	0		1,224	162	
Upland Open/Semi-Open Lands	1%	581		581			581		
Lowland Open/Semi-Open Lands	7%	2,892		2892			2,892		
Misc Other (Water, Local, Urban)	1%	246		246			246		
Others	10%	4,053	846	3207	381	700	4,053	355	912
Total		40,016	10,957	29,059	5,117	4,354	40,016	3,333	5,484

4.3.1 Forest Cover Type Management Direction

The following sections contain information on the management direction in the form of **Current Forest Condition, 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 tree species and other vegetation, stands or communities are classified by the species which has the dominant canopy coverage.

4.3.1.1 Forest Cover Type Management – Aspen

Current Condition

Aspen (Figure 4.3.2) acres total 8,998 or 22% of the management area (Table 4.3.1). Aspen is distributed throughout the management area including some wet areas, beach ridges along Lake Huron and glacial outwash plains, sandy beach ridges and coarse textured moraines (habitat classes: PArVVb and PArVHa (see Appendix E)). 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.

Most of the aspen in this management area is younger than the 60-year rotation as accessible aspen has been consistently harvested over the last 40 years. The data show that 784 acres of aspen have met harvest criteria, but are hard-factor limited for a site condition that limits the ability to harvest (hard factor limited acres). The data shows that 612 acres that have a regeneration harvest pending and these acres are included in the regeneration prescription class.

The aspen age class distribution is fairly well balanced and a regulated distribution will be achieved without adjustments to the regulated level of 1,369 acres for each 10-year planning period.

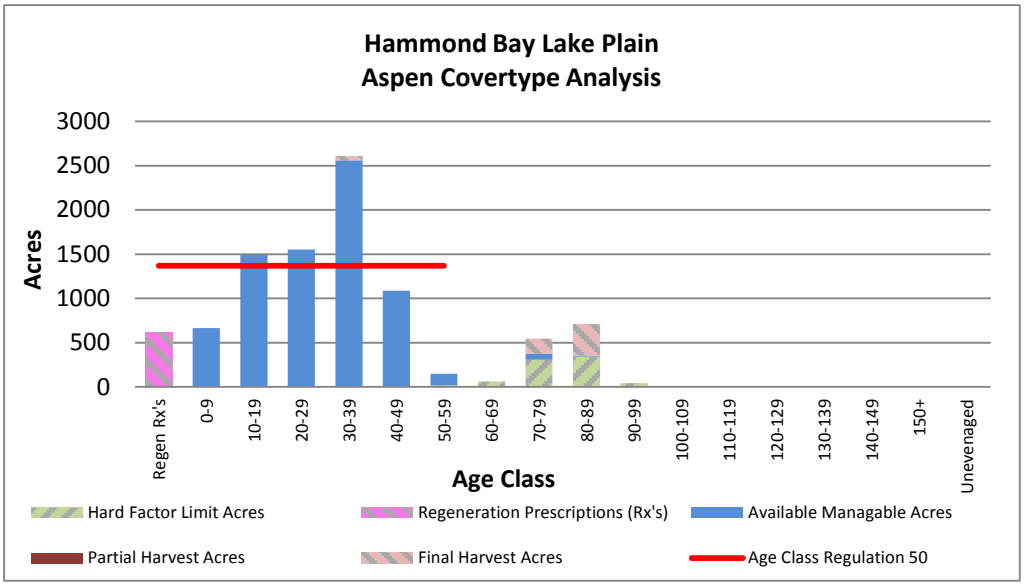

Figure 4.3.2. Age-class distribution for aspen in the Hammond Bay Lake Plain management area (2012 Department of Natural Resources inventory data).

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 and sustainable harvest, wildlife habitat and recreation opportunity.

10-Year Management Objectives

- Conduct regeneration harvests on a projected 1,846 acres concentrating on the older age classes where site conditions allow;
- Where necessary and feasible, consider harvesting stands below the rotation age to expedite the balancing of age-class distributions; and
- Non-commercial harvests to manage habitat may be needed where access is limited.

Long-Term Management Objectives

- Desired future harvest levels for final harvest are projected at 1,369 acres per 10-year period to balance the aspen age-class distribution. This is a decrease over the current 10-year period and reflects a continuation of management to balance the age-class distribution.

4.3.1.2 Forest Cover Type Management – Red Pine

Current Condition

Red pine acres total 7,236 or 18% of the management area (Table 4.3.1). Red pine is distributed throughout the management area including habitat classes PArVVb, PArVVb/AFO, PArVHa and PArVCo. When the red pine stands in this management area were planted, a significant amount of jack pine regenerated from seed. These volunteers were often removed during the first thinning, leaving in many cases, red pine stands with less than full stocking.

Forest communities dominated primarily by red pine in this management area are valued commercially for pulp, utility poles and saw timber. There are 707 acres of red pine that have met harvest criteria, but have site conditions that limit harvest (Figure 4.3.3).

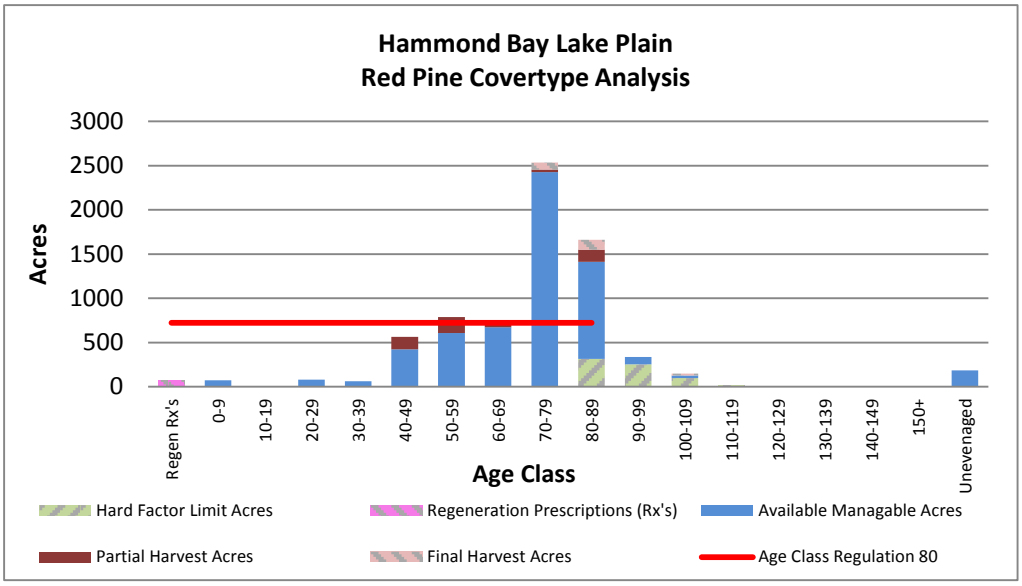

Figure 4.3.3. Age-class distribution for red pine in the Hammond Bay Lake Plain management area (2012 Department of Natural Resources inventory data).

There are 492 acres with a partial harvest prescribed method of cut. These acres remain in the same age class as before the harvest. There are also 70 acres with a final harvest currently prescribed and these acres are included in the regeneration prescription class.

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.
- Due to the active era of red pine planting during the 1920s and 1930s there are spikes of acres above the rotation regulation in the 70-79 and 80-89 year age classes. These acres are being thinned to increase growth on the remaining trees to achieve a more valuable product; and
- There has been almost no regeneration of red pine in the last 40 years and continued efforts, as presented in the Red Pine Management Guidelines, are needed to regenerate the red pine resource.

10-Year Management Objectives

- Follow the Red Pine Management Guidelines, which recommend growing red pine on suitable sites and balancing age-class distribution between the ages of 0 and 89;
- Conduct thinning harvests on a projected 2,916 acres, concentrating on stands of better quality red pine that have the potential for a higher product value in larger size classes; and
- Conduct final harvests on a projected 2,321 acres of red pine beginning with the oldest age classes and with a concentration on stands with less potential for a higher product value.

Long-Term Management Objectives

- Over the next several decades, continue thinning red pine that are currently in the 40-69 year age classes;
- Desired future harvests for partial harvests are projected at 3,684 acres per 10-year period. This is an increase in projected acres for partial harvests and reflects continuing management to increase the value of the older age classes;
- For most stands at age 80, conduct stand replacement harvests for either natural or planted regeneration; and
- Desired future harvests for final harvest are projected at 725 acres per 10-year period. This is a decrease over the current projected 10-year projected harvests. This represents a continued management to balance the age-class distribution.

4.3.1.3 Forest Cover Type Management – Cedar and Lowland Conifer

Cedar acres total 1,745 acres or 4% of the management area and lowland conifer acres total 3,074 or 8% of the management area. These acres constitute a significant portion of the management area. However, all 1,745 acres of cedar and 2,459 acres of lowland conifers are factor limited due to access and operability issues. These lowland species may offer only limited opportunities for management.

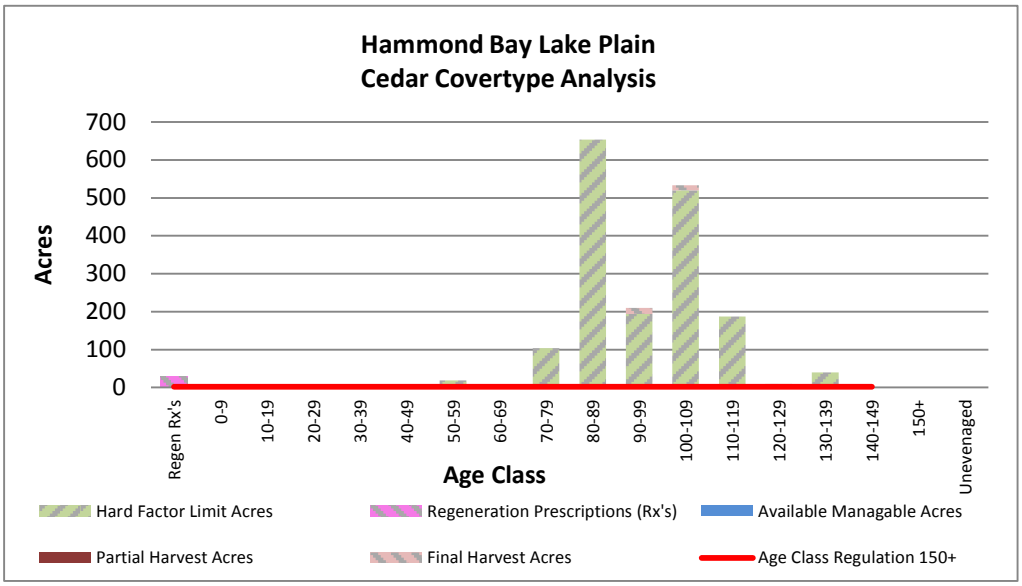

Figure 4.3.4. Age-class distribution for cedar in the Hammond Bay Lake Plain management area (2012 Department of Natural Resources inventory data).

There are 66 acres of final harvests scheduled in lowland conifer and these acres are included in the regeneration prescriptions (Rx's) class (Figure 4.3.5).

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 69 acres of lowland conifers where feasible;
- 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 or cedar and lowland conifer.

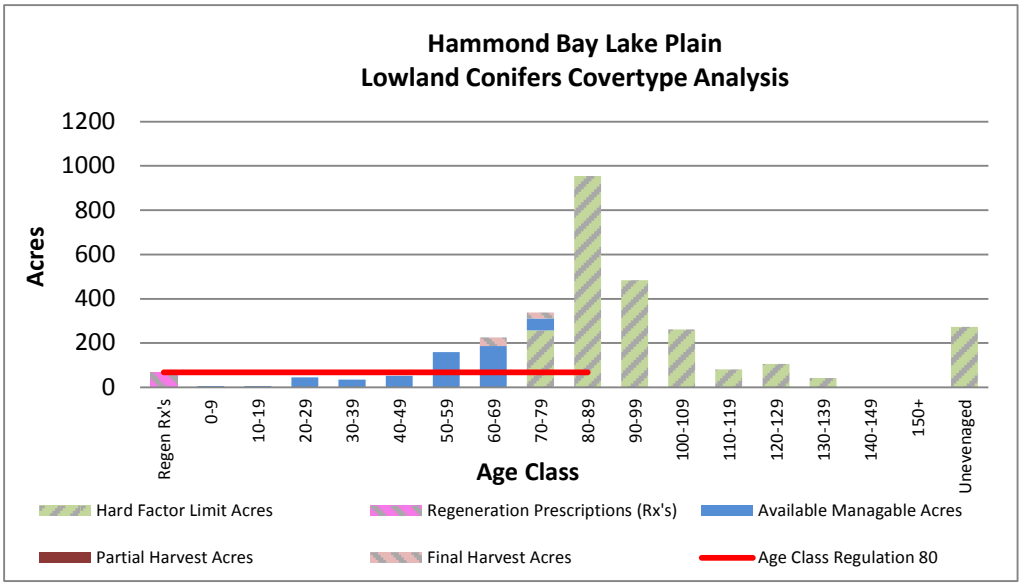

Figure 4.3.5. Age-class distribution for lowland conifers in the Hammond Bay Lake Plain management area (2012 Department of Natural Resources inventory data).

Long-Term Management Objectives

- Continue efforts to regenerate lowland types where feasible; and
- Desired future harvests are projected to remain steady at 69 acres for final harvest of lowland conifer per 10-year period.

4.3.1.4 Forest Cover Type Management – Lowland Aspen/Balsam Poplar

Current Condition

Lowland aspen/balsam poplar (Figure 4.3.6) (primarily balsam poplar, swamp aspen and swamp white birch) acres total 5,135 or 13% of the management area.

Forest communities dominated primarily by lowland poplar in this management area are valued ecologically as sources of habitat for numerous species of wildlife including woodcock, ruffed grouse, bear, white-tailed deer (a featured species in this management area) and various song birds; and commercially for pulp. Lowland poplar is distributed throughout the management area including easement limited sites, outwash plains and till plains (habitat classes: PVCd and unclassified lowlands) and this may limit treatment options. Data show that 2,568 acres of lowland poplar have met harvest criteria, but have site conditions that limit harvest. There are 383 acres with a final harvest prescribed and these acres are included in the regeneration prescription class.

There are spikes of acres above the regulation level of 665 acres in the 20-29 and 0-9 year age classes. Final harvests may need to be adjusted down in this 10-year planning period to offset the surplus in the 0-9 year age class to help balance the age-class distribution. There are few acres available above the 50-year age class regulation target and consideration should be given to harvesting from younger age classes to expedite balancing the age-class distribution.

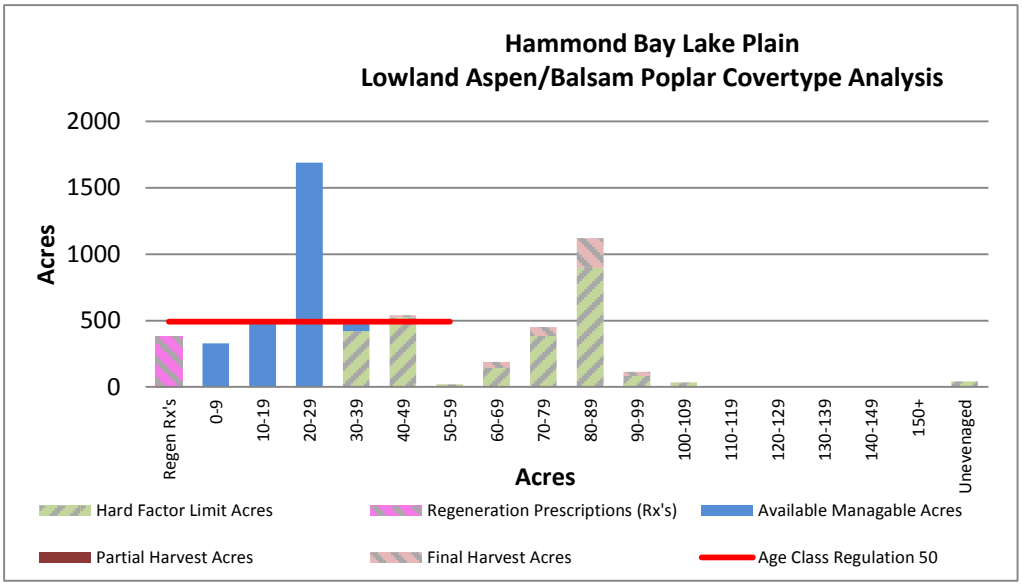

Figure 4.3.6. Age-class distribution for lowland aspen/balsam poplar in the Hammond Bay Lake Plain management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Lowland poplar-dominated forest communities will be maintained on operable sites through even-aged management with acres balanced between 0 and 69 years of age to provide for a regulated and sustainable harvest, wildlife habitat and to contribute to the conservation of regional biodiversity.

10-Year Management Objectives

- Conduct final harvests on a projected 448 acres of lowland aspen/balsam poplar, if it can be done in a manner that will not adversely impact wetland soils; and
- Where necessary and feasible, consider harvesting stands below the rotation age to expedite balancing of age-class distributions.

Long-Term Management Objectives

- It is acceptable that the older lowland poplar, much of it inaccessible for commercial harvest, will continue to experience natural processes (windthrow, flooding and senescence);
- Consider alternatives to managing ash in lowland areas due to impacts from the emerald ash borer; and
- Desired future harvest levels for final harvest are projected at 448 acres per 10-year period. This reflects a continued management to balance age class distributions.

4.3.1.4 Forest Cover Type Management – Oak

Current Condition

Oak acres total 2,043 acres or 5% of the management area (Table 4.3.1). Oak is sparsely distributed throughout the management area including sandy outwash plains on very dry/very poor nutrient sites (habitat class: PVCd). Moderate to well-stocked forest communities dominated primarily low quality red oak, in this management area are valued ecologically as sources of habitat and mast for numerous species of wildlife including bear, white-tailed deer (a featured species in this management area), squirrels and various birds and commercially for firewood and industrial lumber. There are 689 acres of oak that have met harvest criteria (Figure 4.3.7) but have site conditions that limit harvest. There are 309 acres that have a final harvest pending and these acres are included in the regeneration prescriptions class.

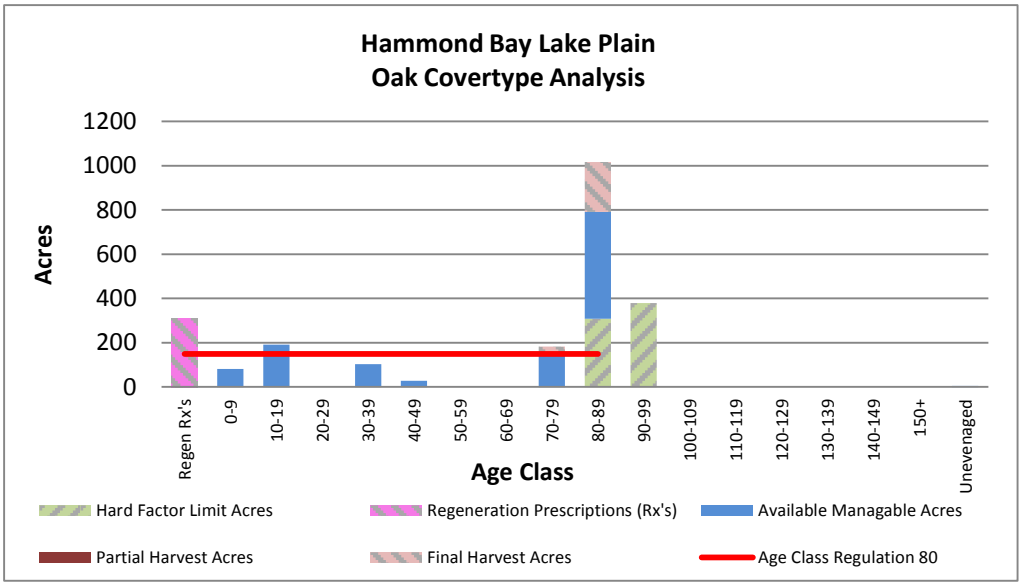

Figure 4.3.7. Age-class distribution for oak in the Hammond Bay Lake Plain management area (2012 Department of Natural Resources inventory data).

Desired Future Condition

- Oak in stands and as a component in stands throughout the management area will be maintained through management between 0 and 89 years of age to provide for timber products, wildlife habitat and recreational opportunities.

10-Year Management Objectives

- Conduct partial harvests on a projected 320 acres of oak;
- Maintain or expand oak as a component in stands throughout the management area through retention and management for natural regeneration on other cover types; and
- Consider final harvests on lower quality oak sites in 80+ year-old stands to expedite the regeneration of oak.

Long-Term Management Objectives

- It is acceptable that some oak stands may become mixed stands through partial removal of an oak overstory, 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;
- Continue work towards maintaining oak as the predominant species in selected stands through final harvests;
- Desired future harvests for final harvest are projected at 150 acres per 10-year period;
- This reflects the need to begin the process of regenerating oak through final harvests and a continuation of management to balance age class distributions;
- Desired future harvests for partial harvest are projected at 320 acres per 10-year period; and
- This reflects continued management to maintain oak on the landscape for wildlife values and timber production.

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

Current Condition

Upland open/semi-open acres total 581 acres or 1% of the management area (Table 4.3.1). This category is a combination of the following non-forested land cover types: herbaceous open land, upland shrub, low-density trees and bare/sparsely vegetated. These non-forested areas are a result of natural fire, frost or other disturbances which created openings in the forest canopy and intentional opening maintenance through prescribed fire or removal of trees that have encroached in openings. These communities are valued ecologically as sources of open land habitat for numerous species of wildlife including wild turkey, a featured species for this management area.

Desired Future Condition

- The amount of upland open/semi-open lands will be at or above the current level to provide habitat for species which use openings.

10-Year Management Objectives

- Where feasible and necessary, conduct management to maintain upland open/semi-open lands; and
- Conduct management activities that favor mast-producing shrubs (such as blueberry, juneberry, cherry and hawthorn) for black bear, turkey and ruffed grouse.

Long-Term Management Objectives

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

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

Current Condition

Lowland open/semi-open lands (lowland shrub, marsh, treed bog and bog) communities in this management area are valued ecologically as sources of habitat for numerous species of wildlife. Lowland open/semi-open acres total 2,892 acres or 7% of the management area (Table 4.3.1).

Desired Future Condition

- Lowland open/semi-open lands sites will be maintained at or above current levels to ensure an adequate level of 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.

4.3.1.7 Forest Cover Type Management – Other Types

Current Condition

Individual cover types which may cover less than 5% of the management area include: northern hardwood, 1,410 acres (4%), lowland deciduous, 1,379 acres (3%), and jack pine, 1,224 acres (3%) (Table 4.1). Also included but not shown in Table 4.1 are even smaller acreages of other cover types including mixed upland deciduous, 813 acres (2%), upland mixed forest, 697 acres (2%), natural mixed pines, 584 acres (1%), white pine, 552 acres (1%), lowland mixed forest, 249 acres (1%) and planted mixed pines, 249 acres (1%). Other scattered acres include paper birch, upland conifers, lowland spruce/fir, tamarack, upland spruce/fir and hemlock. All of these timbered and non-timbered cover types have important ecological values and are important habitat for numerous species. Some of these types are managed through partial or final harvests to provide forest products.

Desired Future Condition

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

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;
- Consider methods to ensure adequate regeneration of lowland types;
- Conduct final harvests on a projected 53 acres of lowland deciduous, 45 acres of mixed upland deciduous and 58 acres of upland mixed forest; and
- Conduct partial harvests on a projected 418 acres of northern hardwood, 148 acres of mixed upland deciduous, 229 acres of natural mixed pines, 104 acres of planted mixed pines and 45 acres of upland conifers.

Long-Term Management Objectives

- Continue management to regenerate lowland types;
- Continue management of upland types to provide a sustainable yield of forest products and wildlife habitat; and
- Consider whether to delay further selection harvesting in northern hardwood due to resultant lower than normal residual basal area in post-salvage harvest stands.

4.3.2 Featured Wildlife Species

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

The following have been identified as featured species for this management are during this 10-year planning period:

- American woodcock
- Beaver
- Pileated woodpecker
- Red-headed woodpecker
- Ruffed grouse
- Snowshoe hare
- White-tailed deer.

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

The primary focus of wildlife habitat management in the Hammond Bay Lake Plain 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; the retention of large, over-mature trees and snags; and the maintenance and expansion of hard-mast and mesic conifer components.

American Woodcock

The goal for American woodcock in the northern Lower Peninsula is to maintain or increase available habitat. American woodcock use young aspen stands having stem densities ranging from 6,000-20,000 stems/acre for feeding, nesting and brood-rearing. State forest management should address the maintenance of adequate early successional habitat to provide feeding, nesting and brood-rearing habitat and opportunity for hunting.

Wildlife Habitat Specifications:

- 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 American woodcock 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 and lowland deciduous will be sufficient to meet this American woodcock habitat specification.
- Identify commercial and non-commercial treatment opportunities in aspen and alder stands associated with non-high priority trout stream riparian zones (see Appendix F) or forested wetlands.

Beaver

The goal for beaver in the northern Lower Peninsula is to maintain available habitat. Consideration will be given to best management practices, trout stream management and trends in beaver nuisance permits issued. State forest management for the species should focus on providing favorable food within 100 feet of streams that are not designated high priority trout streams (see Appendix F).

Wildlife Habitat Specifications:

- Maintain or promote alder, aspen, birch, maple or willow cover types within 100 feet of non-high priority trout streams with gradients of less than 15% and other inland bodies of water.
    - Implementation of the Dingman Marsh and French Farm Flooding master plans and the 10-year management direction for aspen, lowland aspen and lowland deciduous will be sufficient to meet this habitat specification.

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-headed Woodpecker

The goal for red-headed woodpecker in the northern Lower Peninsula is to maintain or increase available habitat. Red-headed woodpecker are limited by the availability of snags for nesting, roosting and feeding and prefer areas with groupings of snags caused by beaver girdling, flooding, fire, disease or insect outbreaks. Preferred sites are greater than five acres in size with a savannah-like dispersion of large trees (<50% canopy cover) with open understory and include tall trees or snags larger than12 inches in diameter at breast height. State forest management for the species should focus on the maintenance of snags in timber sales and salvage in priority landscapes.

Wildlife Habitat Specifications:

- Retain patches of dead wood left by beaver floodings, fire, disease and insect outbreaks by minimizing salvage cuts within the management area with preference for snags larger than 12 inches in diameter at breast height.
    - Implementation of beaver wildlife habitat specifications, Within-Stand Retention Guidance, factor-limited acres and continued mortality from insect and disease will be sufficient to meet the red-headed woodpecker habitat specifications for snags in this management area.

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.

Snowshoe Hare

The goal for snowshoe hare in the northern Lower Peninsula is to maintain or increase available habitat. Hare populations use areas of dense, young (sapling/pole) forest and shrub communities and prefer alder and coniferous swamps. Dense understory cover is the primary limiting factor as escape/thermal cover is more important than food availability. In mature forests, hare are associated with beaver ponds and aspen harvests, feeding upon available cuttings and finding cover in the resulting re-vegetation. State forest management should focus on maintaining young aspen adjacent to lowlands, maintaining jack pine, retaining slash, increasing mesic conifer components and increasing beaver.

Wildlife Habitat Specifications:

- Maintain young aspen and lowland shrub (alder or willow) communities that have a conifer understory or young aspen stands that are adjacent to lowland/swamp conifer and mesic conifers. Conduct silvicultural practices that maintain or increase mesic conifer components in aspen stands.
  - Implementation of beaver wildlife habitat specifications and the 10-year management direction for aspen, lowland aspen and lowland deciduous will be sufficient to meet this hare habitat specification.
- When conducting site-prep herbicide treatments, encourage more diverse stands by using application-skips in pockets or along stand edges.
- In snowshoe hare habitat, limit biomass harvesting and whole-tree chipping operations, retain slash and create brush piles.

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.

4.3.3 Rare Species and Special Resource Area Management

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

Past surveys have noted and confirmed six listed species as well as two natural communities of note occurring in the management area as listed in Table 4.3.2. Any established management guidelines will be followed. Further surveys for special species and natural communities will be carried out as a matter of course during the inventory process and opportunistically for special more focused surveys.

As shown in Figure 4.3.8, there are two non-dedicated natural areas that are special conservation areas: Duck Lake-Mud Lake Chain (237 acres) and Lake Sixteen (181 acres).

Although there are no high conservation value areas, there are four ecological reference areas for the intermittent wetland natural community (one each of 33.87 acres, 47.58 acres, 73.75 acres and 28.7 acres on state land) in the Hammond Bay Lake Plains management area as shown in Figure 4.3.8.These ecological reference areas will be managed to enhance and protect their natural vegetative and associated wildlife communities as directed by an ecological reference area-specific management plan. These individual management plans will be developed over the life of this planning period.

Management goals during this planning period:

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

Table 4.3.2. Occurrence information for special concern, rare, threatened and endangered communities and species for the Hammond Bay Lake Plains management area.

Common Name	Scientific Name	Status	Status in Management Area	Climate Change Vulnerability Index (CCVI)	Confidence	Natural Community Association	Probable Cover Types	Successional Stage
Natural Communities								
Dry northern forest		S3/G3?	Confirmed				Jack Pine, Red Pine	Late
Intermittent wetland		S3/G2	Confirmed				Lowland open/semi-open	N/A
Birds								
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
						Dry-mesic southern forest		
						Mesic northern Forest	Northern Hardwood	Late
Prairie warbler	*Dendroica discolor*	E/G5/S1	Confirmed	IL	Very High	Open dunes	Upland open/semi-open	N/A
						Pine barrens	Jack Pine	Early
						Oak-pine barrens	Oak	Mid
						Great Lakes barrens	Upland open/semi-open	N/A
Moth								
Three striped oncocnemis	*Oncocnemis piffardi*	*SC/G4/S1S2*	Confirmed	HV	Moderate	Northern fen	Lowland open/semi-open	N/A
						Emergent marsh	Lowland open/semi-open	N/A
						Interdunal wetland	Lowland open/semi-open	N/A
						Northern wet meadow	Lowland open/semi-open	N/A
						Great Lakes marsh	Lowland open/semi-open	N/A
Reptile								
Blanding's turtle	*Emydoidea blandingii*	SC/G4/S3	Confirmed	HV	Very High	Mesic southern forest		
						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
Plants								
Bayonet rush	*Juncus militaris*	T/G4/S1	Confirmed			Emergent marsh	Lowland open/semi-open	N/A

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

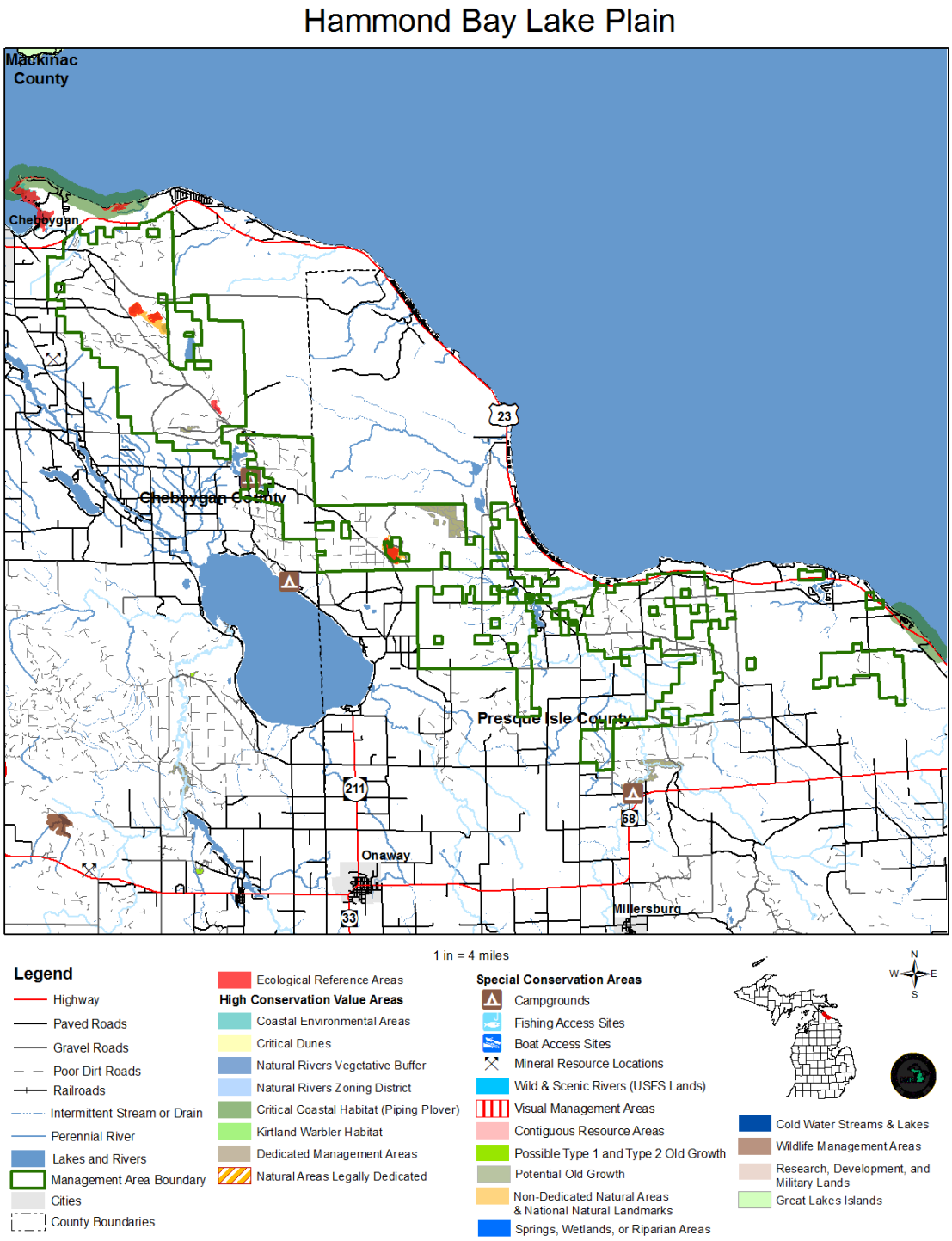

Figure 4.3.8. A map of the Hammond Bay Lake Plains management area showing the special resource areas.

4.3.4 Forest Health Management

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

- 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.
- Emerald ash borer in black ash on lowland sites will be difficult to control due to access issues. It is expected that other species will replace ash on lowland sites.

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 4.3.3 below. 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 4.3.3. Locations of invasive species mapped in and within a five-mile buffer of the management area (Midwest Invasive Species Information Network database).

Hammond Bay Lake Plain - FMD Management Areas	Cases within FMD Areas	Cases within 5-Mile Buffer	Total number of cases	Total number of different Invasive Species
	0	17	17	2

Invasive Species within FMD Areas	Occurrences	Invasive Species within 5-Mile Buffer	Occurrences
-	-	Japanese Knotweed *Fallopia japonica*	3
-	-	Phragmites (Common Reed) *Phragmites australis*	14

4.3.5 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 4.3.1 and listed in Appendix F.

4.3.6 Fire Management

Swamp types which are a major component of this management area are rarely impacted by natural fire regimes. However, disturbance through fire has played an important role in the initial propagation and maintenance of 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 applied 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.
- Recognize that increased urbanization in close proximity and within the management area will present more wildland/urban interface challenges to wildfire suppression.

4.3.7 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.

Recreation in the this management area centers around the Black Mountain Recreation Area and includes the Black Lake Trail Camp, Twin Lake State Forest Campground (Figure 4.3.8), Black Lake State Forest Campground (Figure 4.3.8) and the Black Mountain – Silver Creek Snowmobile Trail (Figure 4.3.1). Also included in the management area is the Ocqueoc River Mouth Access Site.

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.

4.3.8 Oil, Gas and Mineral Development

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

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

The nearest oil and gas production, the Guelph (former Niagaran) reef play, is located six miles south of the management area in Presque Isle County. 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, 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.